Rhode Island
Technical Reference Manual

For Estimating Savings from Energy Efficiency Measures

2016 Program Year

Table of Contents

TABLE OF CONTENTS ..... **I**

INTRODUCTION **1**

THE TRM IN THE CONTEXT OF ENERGY EFFICIENCY PROGRAMS **2**

- OVERVIEW 2
- PLANNING AND REPORTING 2
- UPDATES TO PROGRAM ADMINISTRATOR TRACKING SYSTEMS 2
- EVOLUTION OF PROGRAM AND MEASURE COST EFFECTIVENESS ANALYSIS TOOLS 2
- EVALUATION, MEASUREMENT AND VERIFICATION 3
- QUALITY CONTROL 3

TRM UPDATE PROCESS **4**

- OVERVIEW 4
- KEY STAKEHOLDERS AND RESPONSIBILITIES 4
- TRM UPDATE CYCLE 5

MEASURE CHARACTERIZATION STRUCTURE **6**

IMPACT FACTORS FOR CALCULATING ADJUSTED GROSS AND NET SAVINGS **10**

- TYPES OF IMPACT FACTORS 10
- STANDARD NET–TO–GROSS FORMULAS 12

MEASURE CHARACTERIZATIONS (listed alphabetically by measure name within sub-sections)

RESIDENTIAL ELECTRIC EFFICIENCY MEASURES M-1

New Construction / Time of Replacement

Appliances	M-1
Building Shell	M-15
HVAC	M-19
Lighting	M-55
Plug Load	M-61
Water Heating	M-67
Whole Home	M-73

Retrofit

Appliances	M-79
Building Shell	M-89
HVAC	M-111
Lighting	M-161
Motors / Drives	M-223
Plug Load	M-227
Refrigeration	M-239
Water Heating	M-241
Whole Home	M-275

COMMERCIAL ELECTRIC EFFICIENCY MEASURES M-285

Direct Install	M-285

New Construction / Time of Replacement

Compressed Air	M-331
Food Service	M-355
HVAC	M-365
Lighting	M-389
Motors / Drives	M-405
Custom	M-411

© 2015 National Grid
ALL RIGHTS RESERVED

Retrofit
Custom M-421
Refrigeration M-447
Whole Building M-471

RESIDENTIAL GAS EFFICIENCY MEASURES……..….M-473
New Construction / Time of Replacement
Building Shell M-473
HVAC M-475
Water Heating M-497
Retrofit
Building Shell M-519
HVAC M-545
Water Heating M-571
Whole Home M-595

COMMERCIAL GAS EFFICIENCY MEASURES……..…….M-601
Direct Install M-601
New Construction / Time of Replacement
Food Service M-625
HVAC M-639
Water Heating M-661
Whole Building M-671
Retrofit
Building Shell M-673
HVAC M-679
Water Heating M-687
Whole Building M-695

APPENDICES
APPENDIX A: REFERENCE TABLES……...… A-1
APPENDIX B: NON ENERGY IMPACTS.…….……..B-1
APPENDIX C: ACRONYMNS…….……..C-1
APPENDIX D: GLOSSARY……D-1
APPENDIX E: SOURCE LIST……E-1

© 2015 National Grid
ALL RIGHTS RESERVED

Introduction

This *Rhode Island Technical Reference Manual* ("TRM") documents for regulatory agencies, customers, and other stakeholders the methodologies and assumptions used by National Grid to estimate the savings, including reductions in energy and demand consumption and other resource and non-energy impacts, attributable to its electric and gas energy efficiency programs. This reference manual provides methods, formulas and default assumptions for estimating energy, peak demand and other resource and non-energy impacts from efficiency measures.

Within this TRM, efficiency measures are organized by the sector for which the measure is eligible and by the primary energy source associated with the measure. The two sectors are Residential and Commercial & Industrial ("C&I"). The primary energy sources addressed in this TRM are electricity and natural gas.

Each measure is presented in its own section as a "measure characterization." The measure characterizations provide mathematical equations for determining savings (algorithms), as well as default assumptions and sources, where applicable. In addition, any descriptions of calculation methods or baselines are provided as appropriate. The parameters for calculating savings are listed in the same order for each measure.

Algorithms are provided for estimating annual energy and peak demand impacts for primary and secondary energy sources if appropriate. In addition, algorithms or calculated results may be provided for other non-energy impacts (such as water savings or operation and maintenance cost savings). Assumptions are based on Rhode Island data where available. Where Rhode Island-specific data is not available, assumptions may be based on: 1) manufacturer and industry data, 2) a combination of the best available data from jurisdictions in the same region, or 3) engineering judgment to develop credible and realistic factors.

The TRM is reviewed and updated annually to reflect changes in technology, baselines and evaluation results.

© 2015 National Grid
ALL RIGHTS RESERVED

The TRM in the Context of Energy Efficiency Programs

Overview

The purpose of this section is to show how the TRM fits into the process of administering energy efficiency programs in Rhode Island. This section explains how the TRM is connected to the following efforts:

- Planning,
- Annual reporting,
- Updates to PA tracking systems,
- Evolution of program and measure cost effectiveness analysis tools,
- Evaluation, Measurement and Verification ("EM&V"),
- Quality control.

Planning and Reporting

National Grid is submitting this fifth version of the RI TRM (the 2016 TRM) to the stakeholders along with its Energy Efficiency Program Plan ("EE Program Plan") for 2016.

The RI TRM provides regulators and stakeholders with documentation of the assumptions and algorithms that National Grid will use in planning and reporting its energy savings for 2016. It can also be used to support qualification in ISO-New England Forward Capacity Market Auctions. However, due to the nature of planning, not all planning assumptions – such as those for Commercial and Industrial programs – are documented in this TRM. For these areas, the algorithms used to calculate planned savings are presented.

Updates to Program Administrator Tracking Systems

National Grid maintains a tracking system that contains the energy efficiency data that it uses to meet its annual reporting to the RI PUC. The current design of the tracking system influences the types of assumptions and algorithms that appear in this TRM. The current algorithms leverage inputs that National Grid collects.

Evolution of Program and Measure Cost Effectiveness Analysis Tools

The program and measure cost effectiveness analysis tools are Microsoft® Excel® workbooks used by National Grid to ensure that the measures and programs that they implement meet the cost effectiveness requirements defined by the Rhode Island PUC in Docket 4443. National Grid also uses the output from the cost effectiveness analysis tools to develop the input (data, tables, and graphs) for its EE Program Plans and Year-End Reports. National Grid envisions aligning the measure names and the categorization of measures in the TRM with the measure names and categorization of measures in the cost effectiveness analysis tools either directly, or through the use of a translation tool.

© 2015 National Grid
ALL RIGHTS RESERVED

Evaluation, Measurement and Verification

Evaluation, Measurement and Verification ("EM&V") ensures that the programs are evaluated, measured, and verified in a way that provides confidence to the public at large that the savings are real and in a way that enables National Grid to report those savings to the EERMC and RI PUC with full confidence.

The 2016 Rhode Island TRM will be updated with any updates to assumptions and algorithms due EM&V results from the time when it and the 2016 EE Program Plan are submitted.

A secondary goal of creating a TRM is to identify areas where savings calculations can be improved. The TRM will inform future EM&V planning as a means to make these improvements.

For its Rhode Island programs, National Grid may use evaluation results from other jurisdictions. For some of these, Rhode Island contributed sites and/or budgets. For others, the application of results from other jurisdictions is considered based on how similar the programs, delivery, and markets are to those in Rhode Island.

Quality Control

Regulators and stakeholders can use the TRM to confirm that savings inputs and calculations are reasonable and reliable. However, the TRM cannot be used by regulators and stakeholders to replicate the Company's reported savings. The TRM does not provide regulators and stakeholders with data inputs at a level that is detailed enough to enable replication of the savings reported by PAs. These calculations occur within tracking systems, within separate Excel workbooks, and within cost effectiveness analysis tools. However, in the event that regulators and stakeholders request that PAs provide tracking system details, the reproduction of reported data will be possible using the TRM.

© 2015 National Grid
ALL RIGHTS RESERVED

TRM Update Process

Overview

This section describes the process for updating the TRM. The update process is synchronized with the filing of EE Program Plans.

Updates to the TRM can include:

- additions of new measures,
- updates to existing TRM measures due to:
  - changes in baseline equipment or practices, affecting measure savings
  - changes in efficient equipment or practices, affecting measure savings
  - changes to deemed savings due the revised assumptions for algorithm parameter values (e.g., due to new market research or evaluation studies) o other similar types of changes,
- updates to impact factors (e.g., due to new impact evaluation studies),
- discontinuance of existing TRM measures, and
- updates to the glossary and other background material included in the TRM.

Each TRM is associated with a specific program year, which corresponds to the calendar year. The TRM for each program year is updated over time as needed to both plan for future program savings and to report actual savings.

Key Stakeholders and Responsibilities

Key stakeholders and their responsibilities for the TRM updates are detailed in the following table.

Stakeholder	**Responsibilities**
National Grid	• Identify and perform needed updates to the TRM • Provide TRM to interested stakeholders
Rhode Island EERMC and Division of Public Utilities and Carriers	• In 2012, the EERMC commissioned the Natural Gas Opportunities Report • Review; suggest modifications; and accept TRM • Assure coordination with National Grid submissions of program plans and reported savings

Jointly	• Administrative coordination of TRM activities, including:
	  • Assure collaboration and consensus regarding TRM updates
	  • Assure updates are compiled and incorporated into the TRM
	  • Coordinate with related program activities (e.g., evaluation and program reporting processes)

© 2015 National Grid
ALL RIGHTS RESERVED

TRM Update Cycle

The description below indicates the main milestones of the TRM update cycle over a period of two years. The identifier "program year" or "PY" is used to show that this cycle will be repeated every year. For example, for the 2017 Program Year, compilation of updates will begin after the 2016 TRM is completed in October 2015, and will continue through September 2016, for submission in November 2016.

September PY-2 to September PY-1: The PY TRM will be updated as needed based on evaluation studies and any other updates.

After the PY-1 TRM has been filed, there may be updates to the TRM. The most common updates to the TRM will result from new evaluation studies. Results of evaluation studies will be integrated into the next version of the TRM as the studies are completed. Other updates may include the results of group discussions to adopt latest research or the addition or removal of energy efficiency measures

November (PY-1) prior to program year: The PY TRM is filed with National Grid's PY EE program plan

The PY TRM is submitted to the PUC jointly with National Grid's EE program plan. With regard to the program plans, the TRM is considered a "planning document" in that it provides the documentation for how the PAs *plan* to count savings for that program year. The TRM is not intended to fully document how the PAs develop their plan estimates for savings.

January PY: National Grid begins to track savings based on the PY TRM

Beginning in January PY, the PAs will track savings for the PY based on the PY TRM.

© 2015 National Grid
ALL RIGHTS RESERVED

Measure Characterization Structure

This section describes the common entries or inputs that make up each measure characterization. A formatted template follows the descriptions of each section of the measure characterization.

Source citations: The source of each assumption or default parameter value should be properly referenced in a footnote.

Applicability: All Measures shown within the 2016 TRM are active for the 2016 Program Year: from 1/1/2016 to 12/31/2016

Measure Description Overview

This section will include a plain text description of the efficient and baseline technology and the benefit(s) of its installation, as well as subfields of supporting information including:

Fuel: The fuel against which savings are being claimed, and the program from which EE incentives are being drawn

Sector: Indicates whether measure is Residential, Income Eligible or Commercial and Industrial

Project Type: Indicates if measure is Retrofit or New Construction / Time of Replacement

Category: Indicates the measure category, for example: Lighting, HVAC, Hot Water, Products, Food Service, Compressed Air, Motors/Drives, Refrigeration, Behavior, Custom, etc

Type and Sub-type: Further measure classification for purposes of sorting measures

Program Name: The current program name under which the measure is being delivered.

Measure Name: A single device or behavior may be analyzed as a range of measures depending on a variety of factors which largely translate to where it is and who is using it. Such factors include hours of use, location, and baseline (equipment replaced or behavior modified). For example, the same screw-in compact fluorescent lamp will produce different savings if installed in an emergency room waiting area than if installed in a bedside lamp.

Measure Description: Description of the energy efficiency measure, its benefits, and applications.

Baseline Description: Description of the assumed equipment/operation efficiency in the absence of program intervention. Multiple baselines will be provided as needed, e.g., for different markets. Baselines may refer to reference tables or may be presented as a table for more complex measures)

Savings Principle: The means by which the measure saves energy relative to the baseline. Description of the assumed or calculated equipment/operation efficiency from which the energy and demand savings are determined. The high efficiency case may be based on specific details of the measure installation, minimum requirements for inclusion in the program, or an energy efficiency case based on historical participation. It may refer to tables within the measure characterization or in the appendices or efficiency standards set by organizations such as ENERGY STAR® or the Consortium for Energy Efficiency

Savings Calculation method: How the savings values are determined; in most cases, values are either deemed or calculated

© 2015 National Grid
ALL RIGHTS RESERVED

Savings unit: required minimum unit / characteristic for claiming listed savings values

Savings

This section includes various information on the measure savings and how they are determined.

- **Summary Average Gross Savings per Unit by Program:** This table summarizes the resource savings (kWh, kW, MMBtu) of all efficiency offerings within a measure category via a weighted average of their savings. This is only for illustrating savings and does not correspond to how savings are tracked
    - **Program:** This describes the programs in which the measures are offered. Some measures are offered in multiple program

Sector and Program name mapping will be as follows:

Sector	Full Program Name
Residential – Electric	EnergyStar® Homes
	EnergyStar® HVAC
	EnergyWise
	EnergyWise Multifamily
	EnergyStar® Lighting
	Home Energy Reports
	EnergyStar® Products
Income Eligible – Electric	Single Family Appliance Management
	Income Eligible Multifamily
Commercial & Industrial – Electric	Commercial New Construction
	Commercial Retrofit
	Direct Install
Residential – Gas	EnergyStar® Heating System
	EnergyWise
	EnergyWise Multifamily
	Home Energy Reports
	Residential New Construction
Income Eligible – Gas	Single Family Appliance Management
	Income Eligible Multifamily
Commercial & Industrial – Gas	Commercial New Construction
	Commercial Retrofit
	Direct Install
	Commercial & Industrial Multifamily

© 2015 National Grid
ALL RIGHTS RESERVED

- **Algorithm Type:** This section describes which of four methods of savings calculation applies to a measure
    - Deemed: The same savings are allocated to every unit of a measure
    - Engineering Algorithm with Deemed Inputs: Measure savings are calculated with an engineering formula, the inputs of which are constant for all units of a measure.
    - Engineering Algorithm with Site Specific Inputs: Measure savings are calculated with an engineering formula, the inputs of which depend on data from the installation site.
    - Custom: Each unit of a measure receives a unique savings calculation that depends on site specific data.
- **Units:** This section describes what is installed or affected by an efficiency measure (eg. a boiler or a participant). It defines the quantity counted for savings.
- **Algorithm:** This section will describe the method for calculating the primary energy savings in appropriate units, i.e., kWh for electric energy savings or MMBtu for natural gas energy savings. The savings algorithm will be provided in a form similar to the following

  $$\Delta kWh = \Delta kW \times Hours$$

  Similarly, the method for calculating electric demand savings will be provided in a form similar to the following:

  $$\Delta kW = \left(Watts_{BASE} - Watts_{EE}\right)/1000$$

  Below the savings algorithms, a table contains the definitions (and, in some cases, default values) of each input in the equation(s). The inputs for a particular measure may vary and will be reflected as such in this table (see example below).

ΔkWh	=	gross annual kWh savings from the measure
ΔkW	=	gross connected kW savings from the measure
Hours	=	average hours of use per year
$Watts_{BASE}$	=	baseline connected kW
$Watts_{EE}$	=	energy efficient connected kW

- **Hours**: The operating hours for equipment that is either on or off, or equivalent full load hours for technologies that operate at partial loads, or reduced hours for controls. Reference tables will be used as needed to avoid repetitive entries.
- **Measure Gross Savings per Unit:** This table summarizes the unit resource impacts of each efficiency offering within a measure category (e.g., the savings for boilers of different efficiencies and ratings in the Boiler measure category). The source for each value is referenced.
- **Non-Energy Impacts:** This refers the reader to tables in the Appendix that describe

© 2015 National Grid
ALL RIGHTS RESERVED

non-energy impacts associated with a given efficiency measure. If the measure has no NEIs, the entry is "N/A."

Impact Factors for Calculating Adjusted Gross Savings:

This section includes a table of impact factor values for adjusting gross savings and calculating lifetime savings. Sources are referenced. Impact factors (free ridership, spillover and/or net-togross ratio) for calculating net savings from adjusted gross savings are in Appendix B.

- **Measure Life:** Measure Life includes equipment life and the effects of measure persistence. Equipment life is the number of years that a measure is installed and will operate until failure. Measure persistence takes into account business turnover, early retirement of installed equipment, and other reasons measures might be removed or discontinued**.**

Other impact factors are defined in the next section.

© 2015 National Grid
ALL RIGHTS RESERVED

Impact Factors for Calculating Adjusted Gross and Net Savings

National Grid uses the algorithms in the Measure Characterization sections to calculate the gross savings for energy efficiency measures. Impact factors are then applied to make various adjustments to the gross savings estimate to account for the performance of individual measures or energy efficiency programs as a whole in achieving energy reductions as assessed through evaluation studies. Impacts factors address both the technical performance of energy efficiency measures and programs, accounting for the measured energy and demand reductions realized compared to the gross estimated reductions, as well as the programs' effect on the market for energy efficient products and services.

This section describes the types of impact factors used to make such adjustments, and how those impacts are applied to gross savings estimates. Definitions of the impact factors and other terms are also provided in the Glossary (Appendix F).

Types of Impact Factors

The impact factors used to adjust savings fall into one of two categories:

Impact factors used to adjust gross savings:

- In-Service Rate ("ISR")
- Savings Persistence Factor ("SPF")
- Realization Rate ("RR")
- Summer and Winter Peak Demand Coincidence Factors ("CF").

Impact factors used to calculate net savings:

- Free-Ridership ("FR") and Spillover ("SO") Rates
- Net-to-Gross Ratios ("NTG").

The **in-service rate** is the actual portion of efficient units that are installed. For example, efficient lamps may have an in-service rate less than 1.00 since some lamps are purchased as replacement units and are not immediately installed. The ISR is 1.00 for most measures.

The **savings persistence factor** is the portion of first-year energy or demand savings expected to persist over the life of the energy efficiency measure. The SPF is developed by conducting surveys of installed equipment several years after installation to determine the actual operational capability of the equipment. The SPF is 1.00 for most measures.

In contrast to savings persistence, *measure persistence* takes into account business turnover, early retirement of installed equipment, and other reasons the installed equipment might be removed or discontinued. Measure persistence is generally incorporated as part of the measure life, and therefore is not included as a separate impact factor.

© 2015 National Grid
ALL RIGHTS RESERVED

The **realization rate** is used to adjust the gross savings (as calculated by the savings algorithms) based on impact evaluation studies. The realization rate is equal to the ratio of measure savings developed from an impact evaluation to the estimated measure savings derived from the savings algorithms. The realization rate does not include the effects of any other impact factors. Depending on the impact evaluation study, there may be separate realization rates for energy (kWh), peak demand (kW), or fossil fuel energy (MMBtu).

A **coincidence factor** adjusts the connected load kW savings derived from the savings algorithm. A coincidence factor represents the fraction of the connected load reduction expected to occur at the same time as a particular system peak period. The coincidence factor includes both coincidence and diversity factors combined into one number, thus there is no need for a separate diversity factor in this TRM.

Coincidence factors are provided for the on-peak period as defined by the ISO New England for the Forward Capacity Market ("FCM"), and are calculated consistently with the FCM methodology. Electric demand reduction during the ISO New England peak periods is defined as follows:

- Summer On-Peak: average demand reduction from 1:00-5:00 PM on non-holiday weekdays in June July, and August
- Winter On-Peak: average demand reduction from 5:00-7:00 PM on non-holiday weekdays in December and January

The values described as Coincidence Factors in the TRM are not always consistent with the strict definition of a Coincidence Factor (CF). It would be more accurate to define the Coincidence Factor as "the value that is multiplied by the Gross kW value to calculate the average kW reduction coincident with the on-peak periods." A coincidence factor of 1.00 may be used because the coincidence is already included in the estimate of Gross kW; this is often the case when the "Max kW Reduction" is not calculated and instead the "Gross kW" is estimated using the annual kWh reduction estimate and a loadshape model.

A **free-rider** is a customer who participates in an energy efficiency program (and gets an incentive) but who would have installed some or all of the same measure(s) on their own, with no change in timing of the installation, if the program had not been available. The **free-ridership rate** is the percentage of savings attributable to participants who would have installed the measures in the absence of program intervention.

The **spillover rate** is the percentage of savings attributable to a measure or program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of 1) participants in the program who install additional energy efficient measures outside of the program as a result of participating in the program, and 2) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program. These two components are the **participant spillover** (SO_P) and **non-participant spillover** (SO_{NP}).

© 2015 National Grid
ALL RIGHTS RESERVED

The **net savings** value is the final value of savings that is attributable to a measure or program. Net savings differs from gross savings because it includes the effects of the free-ridership and/or spillover rates.

The **net-to-gross** ratio is the ratio of net savings to the gross savings adjusted by any impact factors (i.e., the "adjusted" gross savings). Depending on the evaluation study, the NTG ratio may be determined from the free-ridership and spillover rates, if available, or it may be a distinct value with no separate specification of FR and SO values.

Standard Net–to–Gross Formulas

The TRM measure entries provide algorithms or methodologies for calculating the gross energy and demand savings for each category of efficiency measures. The following standard formulas show how the impact factors are applied to calculate the net savings. These are the calculations used by National Grid to track and report gross and net savings for its energy efficiency programs in Rhode Island.

- **Calculation of Net Annual Electric Energy Savings**
  $net_kWh = gross_kWh \times SPF \times ISR \times RR_E \times NTG$

- **Calculation of Net Summer Electric Peak Demand Coincident kW Savings**
  $net_kW_{SP} = gross_kW \times SPF \times ISR \times RR_{SP} \times CF_{SP} \times NTG$

- **Calculation of Net Winter Electric Peak Demand Coincident kW Savings**
  $net_kW_{WP} = gross_kW \times SPF \times ISR \times RR_{WP} \times CF_{WP} \times NTG$

- **Calculation of Net Annual Natural Gas Energy Savings**
  $net_MMbtu = gross_MMBtu \times SPF \times ISR \times RR_E \times NTG$

Where:
Gross_kWh = Gross Annual kWh Savings
net_kWh = Net Annual kWh Savings
$Gross_kW_{SP}$ = Gross Connected kW Savings (summer peak)
$Gross_kW_{WP}$ = Gross Connected kW Savings (winter peak)
net_kW_{SP} = Adjusted Gross Connected kW Savings (winter peak)
net_kW_{WP} = Net Coincident kW Savings (winter peak)
Gross_MMBtu = Gross Annual MMBtu Savings
net_MMBtu = Net Annual MMBtu Savings
SPF = Savings Persistence Factor
ISR = In-Service Rate
CF_{SP} = Peak Coincidence Factor (summer peak)
CF_{WP} = Peak Coincidence Factor (winter peak)
RR_E = Realization Rate for electric energy (kWh)
RR_{SP} = Realization Rate for summer peak kW
RR_{WP} = Realization Rate for winter peak kW

© 2015 National Grid
ALL RIGHTS RESERVED

NTG = Net-to-Gross Ratio FR = Free-Ridership Factor SO_P = Participant Spillover Factor
SO_{NP} = Non-Participant Spillover Factor

Depending on the evaluation study methodology:

- NTG is equal to ($1 – FR + SO_P + SO_{NP}$), or
- NTG is a single value with no distinction of FR, SO_P, SO_{NP}, and/or other factors that cannot be reliably isolated.

© 2015 National Grid
ALL RIGHTS RESERVED

Measure Characterizations

© 2015 National Grid
ALL RIGHTS RESERVED

TRL Reference Number	RI_0398
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Dehumidifiers
Sub-type	Dehumidifier
Program Name	EnergyStar Products
Measure Name	Dehumidifier
Measure Description	The Installation of high efficiency dehumidifiers and the turn-in of existing inefficienct dehumidifyers.
Baseline Description	Standard efficiency.
Savings Principle	The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Per dehumidifer
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	73
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.042
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.90
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.50
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.50
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 34 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 30 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0436
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Dehumidifiers
Sub-type	Dehumidifier
Program Name	EnergyStar Products
Measure Name	Dehumidifier Recycling
Measure Description	Recycling of old dehumidifiers
Baseline Description	Operating inefficient unit.
Savings Principle	Recycling of inefficient unit.
Energy Savings calculation method	Deemed
Savings unit	Per dehumidifer
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	196
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.114
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.85
CF summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 50 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$30 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0432
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Clothes Dryers
Sub-type	Dryer
Program Name	EnergyStar Products
Measure Name	EnergyStar Dryer
Measure Description	The installation of an EnergyStar clothes dryer .
Baseline Description	A new electric dryer.
Savings Principle	An EnergyStar electric dryer.
Energy Savings calculation method	Deemed
Savings unit	Installed EnergyStar dryer.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	154
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.053
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	SEDI HE Dryer Screening Ver.2 Using DOE2005.xls
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.90
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.10
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.90
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 60 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 50 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0282
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Refrigerators
Sub-type	Refrigerator
Program Name	EnergyWise
Measure Name	EW SF Refrig rebate
Measure Description	This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator.
Baseline Description	For Top Ten® and Most Efficient® refrigerators, the baseline is a 50% mix of available Energy Star® and Federal standard compliant refrigerators. For Energy Star® refrigerators, the baseline is a refrigerator that meets Federal standards.
Savings Principle	The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency refrigerator.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × deltakW Where: Qty = Total number of units. kWh_base = Deemed average demand per baseline unit. kWh_ee = Deemed average demand per high-efficiency unit. DeltakW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	770
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.095
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0273
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Recycling
Sub-type	Freezer Recycling
Program Name	EnergyStar Products
Measure Name	Freezer Recycling
Measure Description	The retirement of old, inefficient secondary refrigerators and freezers.
Baseline Description	The baseline efficiency case is an old, inefficient secondary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use.
Savings Principle	The high efficiency case assumes no replacement of secondary unit.
Energy Savings calculation method	Deemed
Savings unit	Removal of existing refrigerator or freezer.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	663
kWh/yr savings source	NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company.
kWh/yr savings note	#N/A
kW reduction	0.082
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	172.53
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.41
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.59
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 55 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0267
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Freezers
Sub-type	Freezer
Program Name	EnergyStar Products
Measure Name	Freezers
Measure Description	This measure covers the replacement of an existing inefficient freezer with a new efficient freezer.
Baseline Description	For Top Ten® and Most Efficient® refrigerators, the baseline is a 50% mix of available Energy Star® and Federal standard compliant freezers. For Energy Star® refrigerators, the baseline is a freezer that meets Federal standards.
Savings Principle	The high efficiency case is an Energy Star® freezer or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency freezer.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × deltakW Where: Qty = Total number of units. kWh_base = Deemed average demand per baseline unit. kWh_ee = Deemed average demand per high-efficiency unit. DeltakW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	49
kWh/yr savings source	Environmental Protection Agency (2012). Freezers Qualified Product List. July 18, 2012. Average of all units in category
kWh/yr savings note	#N/A
kW reduction	0.006
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11
measure life source	Environmental Protection Agency (2011). Life Cycle Cost Estimate for ENERGY STAR Freezer. Accessed 9/7/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.35
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.65
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 50 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 50 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0426
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Appliances
Type	Clothes Dryers
Sub-type	Dryer
Program Name	EnergyStar Products
Measure Name	Super Efficient Dryer
Measure Description	The installation of a clothes dryer promoted by the Super Efficient Dryer Initiative.
Baseline Description	A new electric dryer.
Savings Principle	A super efficient electric dryer such as those promoted through the Super Efficient Dryer Initiative.
Energy Savings calculation method	Deemed
Savings unit	Installed super efficient dryer.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	241
kWh/yr savings source	SEDI HE Dryer Screening Ver.2 Using DOE2005.xls
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	13
measure life source	SEDI HE Dryer Screening Ver.2 Using DOE2005.xls
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 412 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 200 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0012
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Building Shell
Type	Insulation
Sub-type	Cooling
Program Name	Residential New Construction
Measure Name	Renovation Rehab Cooling
Measure Description	Renovation Rehab projects include the installation of roof, wall, and basement insulation
Baseline Description	The baseline case is the performance of the house before participation in the program
Savings Principle	The efficient case is the post-retrofit performance of a house participating the program
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Complete Renovation Rehab project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	#N/A
measure life note	Common measure life for insulation measures.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0013
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Building Shell
Type	Insulation
Sub-type	DHW
Program Name	Residential New Construction
Measure Name	Renovation Rehab Heating
Measure Description	Renovation Rehab projects include the installation of roof, wall, and basement insulation
Baseline Description	The baseline case is the performance of the house before participation in the program
Savings Principle	The efficient case is the post-retrofit performance of a house participating the program
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Complete Renovation Rehab project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	#N/A
measure life note	Common measure life for insulation measures.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0162
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Central AC Quality Install
Program Name	EnergyStar HVAC
Measure Name	CoolSmart AC QIV ES
Measure Description	The verification of proper charge and airflow during installation of new Central AC system.
Baseline Description	The baseline efficiency case is a cooling system with SEER = 14.5 and EER = 12 not installed according to manufacturer specifications.
Savings Principle	The high efficiency case is the same cooling system installed according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed QIV on new AC system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	45
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.15
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.16
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 175 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0163
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Central AC Quality Install
Program Name	EnergyStar HVAC
Measure Name	CoolSmart AC QIV NES
Measure Description	The verification of proper charge and airflow during installation of new Central AC system.
Baseline Description	The baseline efficiency case is a cooling system with SEER = 14.5 and EER = 12 not installed according to manufacturer specifications.
Savings Principle	The high efficiency case is the same cooling system installed according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed QIV on new AC system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	49.8
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.164
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.16
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 642 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 150 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0098
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Central AC
Program Name	EnergyStar HVAC
Measure Name	CoolSmart AC SEER 16.0 EER 13
Measure Description	The purchase and installation of high efficiency central air-conditioning (CAC) unit rather than a standard CAC system, and/or to replace an existing inefficient CAC system.
Baseline Description	The baseline efficiency case is a blend of code-compliant central air-conditioning system with SEER = 13 and EER = 11. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10 and EER = 8.5.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified Central AC system.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency central AC system for cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	198.8
kWh/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
kWh/yr savings note	#N/A
kW reduction	0.55
kW reduction source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	16
measure life source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Massachusetts Common Assumption
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Massachusetts Common Assumption
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Massachusetts Common Assumption
Coincidence factor (CF) summer peak	0.25
CF summer peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.28
Spill-Over (non-participant)	0.00
Net-to-Gross	0.86
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 942 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0421
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Central AC
Program Name	EnergyStar HVAC
Measure Name	CoolSmart AC SEER 18.0 EER 13
Measure Description	The purchase and installation of high efficiency central air-conditioning (CAC) unit rather than a standard CAC system, and/or to replace an existing inefficient CAC system.
Baseline Description	The baseline efficiency case is a blend of code-compliant central air-conditioning system with SEER = 13 and EER = 11. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10 and EER = 8.5.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified Central AC system.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency central AC system for cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	276.8
kWh/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
kWh/yr savings note	#N/A
kW reduction	0.55
kW reduction source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	16
measure life source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Massachusetts Common Assumption
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Massachusetts Common Assumption
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Massachusetts Common Assumption
Coincidence factor (CF) summer peak	0.25
CF summer peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.28
Spill-Over (non-participant)	0.00
Net-to-Gross	0.86
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 942 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0166
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Heat Pump Quality Install
Program Name	EnergyStar HVAC
Measure Name	CoolSmart HP QIV ES
Measure Description	The verification of proper charge and airflow during installation of new Heat Pump systems.
Baseline Description	The baseline efficiency case is a heating and cooling system with SEER = 14.5, EER = 12 and HSPF = 8.2) not installed according to manufacturer specifications.
Savings Principle	The high efficiency case is the same heating and cooling system not installed according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed QIV on new heat pump system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment HSPF = Heating efficiency of existing equipment Hours_C = Deemed average equivalent full load cooling hours Hours_H = Deemed average equivalent full load heating hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	308
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.22
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.26
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.16
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 175 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0167
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Heat Pump Quality Install
Program Name	EnergyStar HVAC
Measure Name	CoolSmart HP QIV NES
Measure Description	The verification of proper charge and airflow during installation of new Heat Pump systems.
Baseline Description	The baseline efficiency case is a heating and cooling system with SEER = 14.5, EER = 12 and HSPF = 8.2) not installed according to manufacturer specifications.
Savings Principle	The high efficiency case is the same heating and cooling system not installed according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed QIV on new heat pump system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment HSPF = Heating efficiency of existing equipment Hours_C = Deemed average equivalent full load cooling hours Hours_H = Deemed average equivalent full load heating hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	308
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.22
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.26
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.16
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 175 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0099
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Central AC
Program Name	EnergyStar HVAC
Measure Name	CS AC SEER =>14.5, EER =>12, NEW Estar
Measure Description	The purchase and installation of high efficiency central air-conditioning (CAC) unit rather than a standard CAC system, and/or to replace an existing inefficient CAC system.
Baseline Description	The baseline efficiency case is a blend of code-compliant central air-conditioning system with SEER = 13 and EER = 11. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10 and EER = 8.5.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified Central AC system.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency central AC system for cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	145.6
kWh/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
kWh/yr savings note	#N/A
kW reduction	0.409
kW reduction source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.35
Spill-Over (participant)	0.28
Spill-Over (non-participant)	0.00
Net-to-Gross	0.93
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 200 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0100
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Central AC
Program Name	EnergyStar HVAC
Measure Name	Down Size 1/2 ton
Measure Description	Reduction in system size consistent with manual J calculations.
Baseline Description	The baseline efficiency case is a system that is not sized in accordance with a manual J calculation.
Savings Principle	The high efficiency case is a system that is sized in accordance with a manual J calculation.
Energy Savings calculation method	Deemed
Savings unit	Completed job (assume downsize 1/2 ton).
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	203
kWh/yr savings source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kWh/yr savings note	#N/A
kW reduction	0.3
kW reduction source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 120 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0173
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Motors
Sub-type	ECM Motor
Program Name	EnergyStar HVAC
Measure Name	ECM Gas Rebate
Measure Description	Installation of high efficiency motors on residential furnace fans, including electronically commutated motors (ECMs) or steady state brushless furnace fan motors.
Baseline Description	The baseline efficiency case is the installation of a furnace with a standard efficiency steady state motor.
Savings Principle	The high efficiency case is the installation an electronically commutated motor or brushless fan motor on a residential furnace.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency furnace fan motor.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	168
kWh/yr savings source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kWh/yr savings note	#N/A
kW reduction	0.124
kW reduction source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	-0.72
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Sachs, Harvey (2003). Energy Savings from Efficient Furnace Air Handlers in Massachusetts.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0423
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Ductless
Program Name	EnergyStar HVAC
Measure Name	MiniSplit HP SEER 20, HSPF 11
Measure Description	The installation of a more efficient ENERGY STAR® rated Ductless MiniSplit system.
Baseline Description	The baseline efficiency case is a non- ENERGY STAR® rated ductless mini split heat pump with SEER 14, EER 8.5 and HSPF 8.2.
Savings Principle	The high efficiency case is a high-efficiency Ductless Mini Split System.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency ductless minisplit system.
Savings Equation	Gross kWh = deltakWh_ASHP + deltakWh_DuctSealing Gross kW = deltakW_ASHP + deltakW_DuctSealing Where: deltakWh_ASHP = Gross annual energy savings from equivalent ASHP unit. deltakWh_DuctSealing = Gross annual energy savings from Duct Sealing. deltakW_ASHP = Gross demand savings from equivalent ASHP unit. deltakW_DuctSealing = Gross demand savings from Duct Sealing.
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	330
kWh/yr savings source	#N/A
kWh/yr savings note	Calculated. Tonnage used in calculations is 1.25, as provided by Conservation Services Group
kW reduction	0.454
kW reduction source	#N/A
kW reduction note	Calculated. Tonnage used in calculations is 1.25, as provided by Conservation Services Group
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.50
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.45
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.62
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 700 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0164
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Central AC Quality Install
Program Name	EnergyStar HVAC
Measure Name	Rightsizing on ES Tier 2 14.5 12
Measure Description	Documentation that system size is in compliance with manual J calculations.
Baseline Description	The baseline efficiency case is a system that is not sized in accordance with a manual J calculation.
Savings Principle	The high efficiency case is a system that is sized in accordance with a manual J calculation.
Energy Savings calculation method	Deemed
Savings unit	Completed job compliant with Manual J sizing
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	123
kWh/yr savings source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kWh/yr savings note	#N/A
kW reduction	0.15
kW reduction source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	KEMA (2013). Project 25 Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; Page 1-5
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 300 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0165
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Central AC Quality Install
Program Name	EnergyStar HVAC
Measure Name	Rightsizing Top Tier 15/12.5
Measure Description	Documentation that system size is in compliance with manual J calculations.
Baseline Description	The baseline efficiency case is a system that is not sized in accordance with a manual J calculation.
Savings Principle	The high efficiency case is a system that is sized in accordance with a manual J calculation.
Energy Savings calculation method	Deemed
Savings unit	Completed job compliant with Manual J sizing
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	123
kWh/yr savings source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kWh/yr savings note	#N/A
kW reduction	0.15
kW reduction source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	KEMA (2013). Project 25 Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; Page 1-5
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 175 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0105
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Room AC
Program Name	EnergyStar Products
Measure Name	Room AC (10.8)
Measure Description	The installation of ENERGY STAR® qualified room air conditioners. ENERGY STAR® qualified air conditioners are typically 10% more efficient than models meeting federal standards.
Baseline Description	The baseline efficiency case is a window AC unit that meets the minimum federal efficiency standard for efficiency which currently is EER 9.8.
Savings Principle	The high efficiency level is a room AC unit meeting or exceeding the federal efficiency standard by 10% or more. Average size is 10,000 Btu and average EERs is 10.8.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency room air-conditioner.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	43
kWh/yr savings source	energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls.
kWh/yr savings note	#N/A
kW reduction	0.123
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Room Air Conditioner.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.36
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.64
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 42 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 25 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0171
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Motors
Sub-type	ECM Motor
Program Name	EnergyStar HVAC
Measure Name	Furnace ECM
Measure Description	Installation of high efficiency motors on residential furnace fans, including electronically commutated motors (ECMs) or steady state brushless furnace fan motors.
Baseline Description	The baseline efficiency case is the installation of a furnace with a standard efficiency steady state motor.
Savings Principle	The high efficiency case is the installation an electronically commutated motor or brushless fan motor on a residential furnace.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency furnace fan motor.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	168
kWh/yr savings source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kWh/yr savings note	#N/A
kW reduction	0.124
kW reduction source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	7.22
Oil MMBtu/yr savings source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Sachs, Harvey (2003). Energy Savings from Efficient Furnace Air Handlers in Massachusetts.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0116
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Air Source
Program Name	EnergyStar HVAC
Measure Name	Heat Pump SEER 16.0 EER 12 HSPF 8.5
Measure Description	The purchase and installation of high efficiency residential heat pump system rather than a standard HVAC system, or to replace an existing inefficient HVAC system.
Baseline Description	The baseline efficiency case is a residential heat pump with EER = 11.85, SEER = 14 and HSPF = 8.2. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10, EER = 8.5 and HSPF = 7.0.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified air-source heat pump.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiecny air-source heat pump system for heating.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + (1/HSPF_base - 1/HSPF_ee) × Hours_H] Gross kW = Tons × (kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee),(1/HSPF_base - 1/HSPF_ee)] Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours HSPF_base = Heating efficiency of baseline equipment. HSPF_ee = Heating efficiency of new equipment. Hours_H = Deemed average equivalent full load heating hours
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	450.3
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.31
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.23
CF summer peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.53
CF winter peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.35
Spill-Over (participant)	0.28
Spill-Over (non-participant)	0.00
Net-to-Gross	0.93
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 549 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0422
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Air Source
Program Name	EnergyStar HVAC
Measure Name	Heat Pump SEER 18.0 HSPF 9.6
Measure Description	The purchase and installation of high efficiency residential heat pump system rather than a standard HVAC system, or to replace an existing inefficient HVAC system.
Baseline Description	The baseline efficiency case is a residential heat pump with EER = 11.85, SEER = 14 and HSPF = 8.2. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10, EER = 8.5 and HSPF = 7.0.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified air-source heat pump.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiecny air-source heat pump system for heating.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + (1/HSPF_base - 1/HSPF_ee) × Hours_H] Gross kW = Tons × (kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee),(1/HSPF_base - 1/HSPF_ee)] Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours HSPF_base = Heating efficiency of baseline equipment. HSPF_ee = Heating efficiency of new equipment. Hours_H = Deemed average equivalent full load heating hours
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	1077.8
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.36
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.23
CF summer peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.53
CF winter peak source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.35
Spill-Over (participant)	0.28
Spill-Over (non-participant)	0.00
Net-to-Gross	0.93
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1000 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0424
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	HVAC O&M
Sub-type	Central AC Quality Install
Program Name	EnergyStar HVAC
Measure Name	Mini Split Heat Pump QIV
Measure Description	The verification of proper charge and airflow during installation of new Central AC system.
Baseline Description	The baseline efficiency case is a cooling system with SEER = 14.5 and EER = 12 not installed according to manufacturer specifications.
Savings Principle	The high efficiency case is the same cooling system installed according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed QIV on new AC system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	51
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.082
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	0
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	0.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 175 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0121
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Ductless
Program Name	EnergyStar HVAC
Measure Name	Mini Split HP SEER 18.0 HSPF 9
Measure Description	The installation of a more efficient ENERGY STAR® rated Ductless MiniSplit system.
Baseline Description	The baseline efficiency case is a non- ENERGY STAR® rated ductless mini split heat pump with SEER 14, EER 8.5 and HSPF 8.2.
Savings Principle	The high efficiency case is a high-efficiency Ductless Mini Split System.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency ductless minisplit system.
Savings Equation	Gross kWh = deltakWh_ASHP + deltakWh_DuctSealing Gross kW = deltakW_ASHP + deltakW_DuctSealing Where: deltakWh_ASHP = Gross annual energy savings from equivalent ASHP unit. deltakWh_DuctSealing = Gross annual energy savings from Duct Sealing. deltakW_ASHP = Gross demand savings from equivalent ASHP unit. deltakW_DuctSealing = Gross demand savings from Duct Sealing.
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	286
kWh/yr savings source	#N/A
kWh/yr savings note	Calculated. Tonnage used in calculations is 1.25, as provided by Conservation Services Group
kW reduction	0.342
kW reduction source	#N/A
kW reduction note	Calculated. Tonnage used in calculations is 1.25, as provided by Conservation Services Group
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.50
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.45
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.62
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 700 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0196
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	Residential New Construction
Measure Name	CFL
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	43.5
kWh/yr savings source	NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the Massachusetts PAs.
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the Massachusetts PAs.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.99
In-service rate source	Nexus Market Research & Dorothy Conant (2006). Massachusetts ENERGY STAR® Homes: 2005 Baseline Study: Part II: Homeowner Survey Analysis Incorporating Inspection Data Final Report. Prepared for the Massachusetts Joint Management Committee.
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for t
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for t
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.23
Spill-Over (participant)	0.10
Spill-Over (non-participant)	0.00
Net-to-Gross	0.87
Net-to-Gross source	NMR Group (2012). Rhode Island 2011 Basline Study of Single-Family Residential New Construction. Prepared for national Grid.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 5 Per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 5 Per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0191
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	CFL Fixture
Program Name	Residential New Construction
Measure Name	ESH Fixtures
Measure Description	The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan.
Baseline Description	The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 912.5 hours/year or calculated for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	71.1
kWh/yr savings source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
kWh/yr savings note	#N/A
kW reduction	0.072
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.95

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	Nexus Market Research & Dorothy Conant (2006). Massachusetts ENERGY STAR® Homes: 2005 Baseline Study: Part II: Homeowner Survey Analysis Incorporating Inspection Data Final Report. Prepared for the Massachusetts Joint Management Committee.
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.08
Spill-Over (participant)	0.04
Spill-Over (non-participant)	0.00
Net-to-Gross	0.96
Net-to-Gross source	NMR Group (2012). Rhode Island 2011 Basline Study of Single-Family Residential New Construction. Prepared for national Grid.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 8 Per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 Per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0223
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	Residential New Construction
Measure Name	LEDs
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	33
kWh/yr savings source	NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the Massachusetts PAs.
kWh/yr savings note	#N/A
kW reduction	0.052
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.08
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.92
Net-to-Gross source	NMR Group (2012). Rhode Island 2011 Basline Study of Single-Family Residential New Construction. Prepared for national Grid.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 14 Per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 14 Per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0236
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Plug Load
Type	Electronics
Sub-type	Computer
Program Name	EnergyStar Products
Measure Name	Computers
Measure Description	Rebates for ENERGY STAR® computers.
Baseline Description	The baseline efficiency case is a conventional computer.
Savings Principle	The high efficiency case is a subset of computers that are ENERGY STAR® rated or are included in the Top Ten USA ranking.
Energy Savings calculation method	Deemed
Savings unit	Rebated ENERGY STAR® computer
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	The operational hours include: 3504 annual idle hours, 438 annual sleep hours, and 4818 annual off hours.
Hours Source	Energy Star Program Requirements for Computers Version 5.0
Hours source note	#N/A
kWh/yr Savings	70
kWh/yr savings source	Environmental Protection Agency (2012). ENERGY STAR Desktop & Integrated Computer Product List. August 2, 2012. Average of all units in cateogry
kWh/yr savings note	#N/A
kW reduction	0.015
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	4
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for ENERGY STAR Office Equipment.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.75
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 20 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0238
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Plug Load
Type	Electronics
Sub-type	Monitor
Program Name	EnergyStar Products
Measure Name	Monitors
Measure Description	Rebates for ENERGY STAR® qualified computer monitors.
Baseline Description	The baseline efficiency case is a conventional computer monitor.
Savings Principle	The high efficiency case is an ENERGY STAR® rated LCD monitor.
Energy Savings calculation method	Deemed
Savings unit	Rebated ENERGY STAR® computer monitor
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	35
kWh/yr savings source	Consortium for Energy Efficiency (2008). Consumer Electronics Program Guide: Information on Voluntary Approaches for the Promotion of Energy Efficient Consumer Electronics - Products and Practices.
kWh/yr savings note	#N/A
kW reduction	0.01
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Consortium for Energy Efficiency (2008). Consumer Electronics Program Guide: Information on Voluntary Approaches for the Promotion of Energy Efficient Consumer Electronics - Products and Practices.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.35
CF summer peak source	#N/A
CF summer peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	National Grid assumption based on regional PA working groups.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.75
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 20 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 20 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0242
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Plug Load
Type	Room Air Cleaners
Sub-type	Room Air Cleaner
Program Name	EnergyStar Products
Measure Name	Room air cleaners
Measure Description	Rebates provided for the purchase of an ENERGY STAR® qualified room air cleaner. ENERGY STAR® air cleaners are 40% more energy-efficient than standard models.
Baseline Description	The baseline efficiency case is a conventional unit with clean air delivery rate (CADR) of 51-100.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified air cleaner with a CADR of 51-100.
Energy Savings calculation method	Deemed
Savings unit	Rebated ENERGY STAR® room air cleaner
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	The Savings are based on 16 operating hours per day, 365 days per year
Hours Source	Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances
Hours source note	#N/A
kWh/yr Savings	391
kWh/yr savings source	Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances.
kWh/yr savings note	#N/A
kW reduction	0.084
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.75
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 72 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 40 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0336
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Heat Pump Water Heater
Program Name	EnergyStar HVAC
Measure Name	HPWH 50 gallon (electric)
Measure Description	Installation of a heat pump water heater (HPWH) instead of an electric resistance water heater.
Baseline Description	The baseline efficiency case is a new, standard efficiency electric resistance hot water heater.
Savings Principle	The high efficiency case is a high efficiency heat pump water heater.
Energy Savings calculation method	Deemed
Savings unit	Installed heat pump water heater.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1654
kWh/yr savings source	Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR.
kWh/yr savings note	#N/A
kW reduction	0.37
kW reduction source	Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	#N/A
measure life note	Based on warranty of equipment
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.47
CF summer peak source	Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 750 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0347
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater Insulation
Sub-type	Insulation
Program Name	Residential New Construction
Measure Name	Renovation Rehab Domestic Hot Water
Measure Description	Renovation Rehab projects include the installation of roof, wall, and basement insulation
Baseline Description	The baseline case is the performance of the house before participation in the program
Savings Principle	The efficient case is the post-retrofit performance of a house participating the program
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Complete Renovation Rehab project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	#N/A
measure life note	Common measure life for insulation measures.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0325
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Residential New Construction
Measure Name	Showerheads
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	129
kWh/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	0.022
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.58
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 10 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0363
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Whole Home
Type	Custom
Sub-type	Cooling
Program Name	Residential New Construction
Measure Name	ESH Cooling
Measure Description	To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.
Baseline Description	The User Defined Reference Home was revised in 2012 as a result of a baseline study.
Savings Principle	The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed ESH heating, cooling, or DHW project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because energy savings are custom calculated.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0364
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Whole Home
Type	Custom
Sub-type	DHW
Program Name	Residential New Construction
Measure Name	ESH DHW
Measure Description	To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.
Baseline Description	The User Defined Reference Home was revised in 2012 as a result of a baseline study.
Savings Principle	The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed ESH heating, cooling, or DHW project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	Calc
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because energy savings are custom calculated.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0365
Fuel	Electric
Sector	Residential
Project Type	New Construction
Category	Whole Home
Type	Custom
Sub-type	Heating
Program Name	Residential New Construction
Measure Name	ESH Heating
Measure Description	To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.
Baseline Description	The User Defined Reference Home was revised in 2012 as a result of a baseline study.
Savings Principle	The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed ESH heating, cooling, or DHW project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	Calc
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because energy savings are custom calculated.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0274
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Appliances
Type	Recycling
Sub-type	Refrigerator Recycling
Program Name	Single Family Appliance Management
Measure Name	Appliance Removal
Measure Description	This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator.
Baseline Description	For Top Ten® and Most Efficient® refrigerators, the baseline is a 50% mix of available Energy Star® and Federal standard compliant refrigerators. For Energy Star® refrigerators, the baseline is a refrigerator that meets Federal standards.
Savings Principle	The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency refrigerator.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × deltakW Where: Qty = Total number of units. kWh_base = Deemed average demand per baseline unit. kWh_ee = Deemed average demand per high-efficiency unit. DeltakW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1180
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.15
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	15.89
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	172.53
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 55 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 55 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0280
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Appliances
Type	Refrigerators
Sub-type	Refrigerator
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Refrigerator
Measure Description	This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator. ENERGY STAR® qualified refrigerators use at least 20% less energy than non-qualified models.
Baseline Description	The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit.
Savings Principle	The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency refrigerator.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × (kWh_base - kWh_ee) / Hours Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.86
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0281
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Appliances
Type	Refrigerators
Sub-type	Refrigerator
Program Name	EnergyWise MultiFamily
Measure Name	EW Refrigerator
Measure Description	This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator. ENERGY STAR® qualified refrigerators use at least 20% less energy than non-qualified models.
Baseline Description	The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit.
Savings Principle	The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency refrigerator.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × (kWh_base - kWh_ee) / Hours Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.86
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0268
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Appliances
Type	Freezers
Sub-type	Freezer
Program Name	Single Family Appliance Management
Measure Name	Replacement Freezer
Measure Description	This measure covers the replacement of an existing inefficient freezer with a new energy efficient model.
Baseline Description	The baseline efficiency case for both the replaced and baseline new freezer is represented by the existing freezer. It is assumed that low-income customers would replace their freezers with a used inefficient unit.
Savings Principle	The high efficiency case is a new high efficiency freezer.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency freezer.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × (kWh_base - kWh_ee) / Hours Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	484
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.06
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	19
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	6.52
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	199.14
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 600 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 600 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0285
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Appliances
Type	Refrigerators
Sub-type	Refrigerator
Program Name	Single Family Appliance Management
Measure Name	Replacement Refrigerator
Measure Description	This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator. ENERGY STAR® qualified refrigerators use at least 20% less energy than non-qualified models.
Baseline Description	The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit.
Savings Principle	The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed high-efficiency refrigerator.
Savings Equation	Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × (kWh_base - kWh_ee) / Hours Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	384
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.05
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	19
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	5.17
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	199.14
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 1200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1200 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0002
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Air Sealing
Sub-type	Air Sealing/Infiltration
Program Name	EnergyWise MultiFamily
Measure Name	EW Air Sealing (electric)
Measure Description	Thermal shell air leaks are sealed through strategic use and location of air-tight materials.
Baseline Description	The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)
Savings Principle	The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed air sealing project.
Savings Equation	Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM Gross kW = Gross kWh × kW/kWh Where: Stories = Total stories in the multi-family building SQFT = Area of building in square feet CFM/SQFT_pre = Estimate of pre-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the improved roof and floor deltakWh/CFM = Average annual kWh reduction per CFM Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM kW/kWh = Average kW reduction per kWh reduction
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	19.28
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	135.83
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0015
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	EnergyWise MultiFamily
Measure Name	EW Insulation (electric) Other
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0029
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	EnergyWise MultiFamily
Measure Name	EW Insulation (electric) Shell
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post) Gross kW = Gross kWh × kW/kWh Where: SQFT = Square feet of insulation installed deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation R_pre = R-Value of the existing insulation R_post = R-Value of the new installed insulation Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM kW/kWh = Average annual kW reduction per kWh reduction
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.31
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	378.05
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0003
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Air Sealing
Sub-type	Air Sealing/Infiltration
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Air Sealing (electric)
Measure Description	Thermal shell air leaks are sealed through strategic use and location of air-tight materials.
Baseline Description	The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)
Savings Principle	The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed air sealing project.
Savings Equation	Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM Gross kW = Gross kWh × kW/kWh Where: Stories = Total stories in the multi-family building SQFT = Area of building in square feet CFM/SQFT_pre = Estimate of pre-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the improved roof and floor deltakWh/CFM = Average annual kWh reduction per CFM Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM kW/kWh = Average kW reduction per kWh reduction
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0016
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Insulation Other (electric)
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0030
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Insulation Shell (electric)
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post) Gross kW = Gross kWh × kW/kWh Where: SQFT = Square feet of insulation installed deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation R_pre = R-Value of the existing insulation R_post = R-Value of the new installed insulation Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM kW/kWh = Average annual kW reduction per kWh reduction
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0043
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation & Air sealing
Sub-type	Weatherization
Program Name	Single Family Appliance Management
Measure Name	Weatherization (electric)
Measure Description	Installation of weatherization measures such as air sealing and insulation in homes heated with electricity, oil, or propane. Non-heating electric savings are achieved from reduced fan run time for heating and cooling systems.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Deemed
Savings unit	Completed weatherization project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1616
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.86
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	137.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	368.56
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 4500 per job
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 4500 per job

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0044
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation & Air sealing
Sub-type	Weatherization
Program Name	Single Family Appliance Management
Measure Name	Weatherization (oil)
Measure Description	Installation of weatherization measures such as air sealing and insulation in homes heated with electricity, oil, or propane. Non-heating electric savings are achieved from reduced fan run time for heating and cooling systems.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Deemed
Savings unit	Completed weatherization project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	377
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.2
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	28.1
Oil MMBtu/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	171.89
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	368.56
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 4500 per job
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 4500 per job

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0031
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	EnergyWise
Measure Name	EW SF Wx - GAS- Non Elec
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	251
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.13
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0032
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	EnergyWise
Measure Name	EW SF Wx - OIL- Non Elec
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	336
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.18
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	23.68
Oil MMBtu/yr savings source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	109.92
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	513.88
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2631 / participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1117 / participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0033
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	EnergyWise
Measure Name	EW SF Wx-Electric - Elec
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1558
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.83
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	66.59
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	513.88
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2298 / participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1657 / participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0169
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	HVAC O&M
Sub-type	HVAC Tune Up
Program Name	EnergyStar HVAC
Measure Name	CoolSmart AC Digital Check
Measure Description	Tune-up of an existing central AC system.
Baseline Description	The baseline efficiency case is a standard central air-conditioning system that does not operate according to manufacturer specifications.
Savings Principle	The high efficiency case is the same baseline system but which operates according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed tune-up of existing AC system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	The equivalent full load cooling hours are 360 hours/year.
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	64.8
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.212
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	NYSERDA Deemed Savings Database (Rev 11).
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	#N/A
CF summer peak note	Massachusetts Common Assumption
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Massachusetts Common Assumption
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 175 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 175 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0168
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	HVAC O&M
Sub-type	Heat Pump Tune Up
Program Name	EnergyStar HVAC
Measure Name	CoolSmart HP Digital Check
Measure Description	Tune-up of an existing heat pump system.
Baseline Description	The baseline efficiency case is a standard residential heat pump system that does not operating according to manufacturer specifications.
Savings Principle	The high efficiency case is the same baseline system but which operates according to manufacturer specifications.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Completed tune-up of existing heat pump system
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment HSPF = Heating efficiency of existing equipment Hours_C = Deemed average equivalent full load cooling hours Hours_H = Deemed average equivalent full load heating hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	373.4
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.257
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	KEMA (2013). Project 25 Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; Page 1-5
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.21
CF summer peak source	#N/A
CF summer peak note	Massachusetts Common Assumption
Coincidence factor (CF) winter peak	0.50
CF winter peak source	#N/A
CF winter peak note	Massachusetts Common Assumption
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 742 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0112
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Ducting
Sub-type	Duct Insulation
Program Name	EnergyStar HVAC
Measure Name	Duct Sealing - 100 CFM redcution in leaks 15% of flow to 5%
Measure Description	A 66% reduction in duct leakage from 15% to 5% of supplied CFM.
Baseline Description	The baseline efficiency case is assumes a 15% leakage.
Savings Principle	The high efficiency case is a system with duct leakage reduced by 66% to 5% leakage.
Energy Savings calculation method	Deemed
Savings unit	Complete duct sealing job for existing HVAC system
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	212
kWh/yr savings source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kWh/yr savings note	#N/A
kW reduction	0.3
kW reduction source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 200 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0101
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Cooling
Sub-type	Central AC
Program Name	EnergyStar HVAC
Measure Name	Early Replacement AC (EE)
Measure Description	Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment.
Baseline Description	The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0
Savings Principle	For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installation of a new efficient air conditioner.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	103
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.273
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 942 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0102
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Cooling
Sub-type	Central AC
Program Name	EnergyStar HVAC
Measure Name	Early Replacement AC (Retire)
Measure Description	Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment.
Baseline Description	The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0
Savings Principle	For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installation of a new efficient air conditioner.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	299
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.963
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 942 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0123
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Heat Pumps
Sub-type	Early replacement
Program Name	EnergyStar HVAC
Measure Name	Early Replacement HP (EE)
Measure Description	Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment.
Baseline Description	The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0
Savings Principle	For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installation of a new efficient air conditioner.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	32
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	0.038
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.50
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 1000 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 850 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0124
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Heat Pumps
Sub-type	Early replacement
Program Name	EnergyStar HVAC
Measure Name	Early Replacement HP (Retire)
Measure Description	Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment.
Baseline Description	The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0
Savings Principle	For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installation of a new efficient air conditioner.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) Where: 3 Tons = Deemed average equipment cooling capacity from Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours
Hours	Equivalent full load hours are 1200 hours/year for heating and 360 hours/year for cooling
Hours Source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Hours source note	#N/A
kWh/yr Savings	1189
kWh/yr savings source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kWh/yr savings note	#N/A
kW reduction	1.199
kW reduction source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.25
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.50
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	Massachusetts Common Assumption
Gross Measure TRC unit	$ 1000 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 850 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0174
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Motors
Sub-type	ECM Motor
Program Name	EnergyStar HVAC
Measure Name	ECM Pumps
Measure Description	Heating hot water circulation retrofit projects replacing the existing hot water circulation systems with ECM pumps and zone valves.
Baseline Description	The baseline case is standard efficiency steady-state motor without variable speed capabilities.
Savings Principle	The efficient case is the installation of a pump with an electronically commutated motor (ECM) with variable speed capabilities on a boiler.
Energy Savings calculation method	Deemed
Savings unit	Installed ECM circulator pump retrofit project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	142.3
kWh/yr savings source	The Cadmus Group (2012). Impact Evaluation of the 2011-2012 ECM Circulation Pump Pilot Program.
kWh/yr savings note	#N/A
kW reduction	0.406
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	The Cadmus Group (2012). Impact Evaluation of the 2011-2012 ECM Circulation Pump Pilot Program.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 750 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0113
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Ducting
Sub-type	Duct Insulation
Program Name	EnergyStar HVAC
Measure Name	Energy Star QI with Duct Modifications
Measure Description	50% reduction in duct leakage from 20% to 10%. This measure may also include duct modifications.
Baseline Description	The baseline efficiency case is a system with an installation that is inconsistent with manufacturer specifications and may include leaky ducts.
Savings Principle	The high efficiency case is a system with an installation that is consistent with manufacturer specifications and may have reduced duct leakage.
Energy Savings calculation method	Deemed
Savings unit	Completed job
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	513
kWh/yr savings source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kWh/yr savings note	#N/A
kW reduction	0.85
kW reduction source	RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating;
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.26
CF summer peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.16
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1000 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 525 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0108
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Cooling
Sub-type	Window AC
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Window AC Replacement
Measure Description	Replacement of existing inefficient room air conditioners with more efficient models. This is only offered as a measure when an AC timer would not reduce usage during the peak period.
Baseline Description	The baseline efficiency case is the existing air conditioning unit.
Savings Principle	The high efficiency case is the high efficiency room air conditioning unit.
Energy Savings calculation method	Deemed
Savings unit	Replacement of existing window AC with high-efficiency window AC.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Calculated for Multifamily applications and not applicable for single family.
Hours Source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0085
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise MultiFamily
Measure Name	EW Programmable thermostat (electric)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0080
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Income Eligible MultiFamily
Measure Name	EW Programmable thermostat (electric)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0077
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise
Measure Name	EW SF Programmable Thermostat (Electric heat only)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	330
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.176
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.02
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.80
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0433
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise
Measure Name	EW SF Programmable Thermostat (Oil only)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.176
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0081
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise
Measure Name	EW SF WiFi Thermostat
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.231
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0078
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise MultiFamily
Measure Name	EW WiFi programmable thermostat (electric)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0150
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Heating
Sub-type	Efficient Heating
Program Name	Single Family Appliance Management
Measure Name	Heating system replacement (oil)
Measure Description	Replacement of existing oil heating system with a new high efficiency system. Electric savings can be attributed to reduced fan run time and reduced usage of electric space heaters.
Baseline Description	The baseline efficiency case is the existing inefficient heating equipment.
Savings Principle	The high efficiency case is the new efficient heating equipment.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency heating system.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	132
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.07
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	18.4
Oil MMBtu/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	159.36
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	249.20
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	4500 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	4500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0153
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Heating
Sub-type	Efficient Heating
Program Name	EnergyStar HVAC
Measure Name	Oil Heat Replacement
Measure Description	Replacement of existing oil or propane heating system with a new high efficiency system. Electric savings can be attributed to reduced fan run time and reduced usage of electric space heaters.
Baseline Description	The baseline efficiency case is the existing inefficient heating equipment.
Savings Principle	The high efficiency case is the new efficient heating equipment.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency heating system.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	132
kWh/yr savings source	The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kWh/yr savings note	#N/A
kW reduction	0.07
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	18.4
Oil MMBtu/yr savings source	The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.01
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 500 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 200 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0079
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Single Family Appliance Management
Measure Name	Programmable thermostat
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	3.2
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.03
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0407
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyStar Products
Measure Name	Wifi Programmable Thermostat
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Per thermostat
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.23
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 150 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 50 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0369
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Income Eligible MultiFamily
Measure Name	Wifi Programmable Thermostat
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Per thermostat
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.231
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	6.6
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0095
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyStar HVAC
Measure Name	WiFi programmable thermostat with cooling (gas)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid.
kWh/yr savings note	#N/A
kW reduction	0.231
kW reduction source	The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	6.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 50 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0096
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyStar HVAC
Measure Name	WiFi programmable thermostat with cooling (oil)
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid.
kWh/yr savings note	#N/A
kW reduction	0.231
kW reduction source	The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	6.6
Oil MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0109
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Cooling
Sub-type	Window AC
Program Name	Single Family Appliance Management
Measure Name	Window AC Replacements
Measure Description	Replacement of existing inefficient room air conditioners with more efficient models. This is only offered as a measure when an AC timer would not reduce usage during the peak period.
Baseline Description	The baseline efficiency case is the existing air conditioning unit.
Savings Principle	The high efficiency case is the high efficiency room air conditioning unit.
Energy Savings calculation method	Deemed
Savings unit	Replacement of existing window AC with high-efficiency window AC.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Calculated for Multifamily applications and not applicable for single family.
Hours Source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Hours source note	#N/A
kWh/yr Savings	100
kWh/yr savings source	Quantec, LLC (2005). Evaluation of National Grid's 2003 Appliance Management Program: Room Air Conditioning Metering and Non-Energy Benefits Study. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.29
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Room Air Conditioner. Interactive Excel Spreadsheet found at www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	50.85
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 350 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 350 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0420
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise
Measure Name	EW Single FamilyWiFi Thermostat - DR Enabled
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.231
kW reduction source	National Grid DR Thermostat Demand Savings Calc.xlsx
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0197
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	Single Family Appliance Management
Measure Name	CFL
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	43.5
kWh/yr savings source	NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the Massachusetts PAs.
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the Massachusetts PAs.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	Nexus Market Research & Dorothy Conant (2006). Massachusetts ENERGY STAR® Homes: 2005 Baseline Study: Part II: Homeowner Survey Analysis Incorporating Inspection Data Final Report. Prepared for the Massachusetts Joint Management Committee.
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for t
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for t
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.60
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	NMR Group (2012). Rhode Island 2011 Basline Study of Single-Family Residential New Construction. Prepared for national Grid.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 10 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0198
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	EnergyWise MultiFamily
Measure Name	EW CFLs
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.18
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.82
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0192
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Fixture
Program Name	EnergyWise MultiFamily
Measure Name	EW Fixtures
Measure Description	The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan.
Baseline Description	The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 912.5 hours/year or calculated for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0215
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyWise MultiFamily
Measure Name	EW LED A Lamp
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0199
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	Income Eligible MultiFamily
Measure Name	EW LI CFLs
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0193
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Fixture
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Fixtures
Measure Description	The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan.
Baseline Description	The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 912.5 hours/year or calculated for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0216
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	Income Eligible MultiFamily
Measure Name	EW LI LED A Lamp
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	Supplied by vendor
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0217
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	Income Eligible MultiFamily
Measure Name	EW LI LED Fixture
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11
measure life source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0187
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Exterior
Sub-type	CFL Fixture
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Outdoor Fixtures
Measure Description	The installation of hardwired ENERGY STAR® fluorescent outdoor fixtures with pin-based bulbs. Savings for this measure are attributable to high efficiency outdoor lighting fixtures and are treated similarly to indoor fixtures.
Baseline Description	The baseline efficiency case is an incandescent, screw-based fixture with an incandescent bulb.
Savings Principle	The high efficiency case is an ENERGY STAR® fixture wired for exclusive use with a pin based CFL bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,642.5 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0212
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Fixture
Program Name	EnergyWise MultiFamily
Measure Name	EW MF LED Fixtures
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.18
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.82
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0188
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Exterior
Sub-type	CFL Fixture
Program Name	EnergyWise MultiFamily
Measure Name	EW Outdoor Fixtures
Measure Description	The installation of hardwired ENERGY STAR® fluorescent outdoor fixtures with pin-based bulbs. Savings for this measure are attributable to high efficiency outdoor lighting fixtures and are treated similarly to indoor fixtures.
Baseline Description	The baseline efficiency case is an incandescent, screw-based fixture with an incandescent bulb.
Savings Principle	The high efficiency case is an ENERGY STAR® fixture wired for exclusive use with a pin based CFL bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,642.5 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11
measure life source	Nexus Market Research and RLW Analytics (2008). Residential Lighting Measure Life Study. Prepared for New England Residential Lighting Program Sponsors.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0200
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	EnergyWise
Measure Name	EW SF CFL
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	43.5
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.045
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.24
Spill-Over (participant)	0.03
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0194
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Fixture
Program Name	EnergyWise
Measure Name	EW SF Fixtures
Measure Description	The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan.
Baseline Description	The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1168 hours/year or calculated for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	71.1
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.072
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0218
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyWise
Measure Name	EW SF LED Bulbs
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,205 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	47.6
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.048
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0213
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Fixture
Program Name	EnergyWise
Measure Name	EW SF LED Fixture
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,205 hours/year.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	70.9
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.071
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0189
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Exterior
Sub-type	CFL Fixture
Program Name	EnergyWise
Measure Name	EW SF OFIXTURE
Measure Description	The installation of hardwired ENERGY STAR® fluorescent outdoor fixtures with pin-based bulbs. Savings for this measure are attributable to high efficiency outdoor lighting fixtures and are treated similarly to indoor fixtures.
Baseline Description	The baseline efficiency case is an incandescent, screw-based fixture with an incandescent bulb.
Savings Principle	The high efficiency case is an ENERGY STAR® fixture wired for exclusive use with a pin based CFL bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,642.5 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	87
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.088
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0201
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	EnergyStar Lighting
Measure Name	HTR CFL Bulbs
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	53
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	4
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.95
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.07
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.93
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 4 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0195
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Fixture
Program Name	EnergyStar Lighting
Measure Name	Indoor CFL Fixture
Measure Description	The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan.
Baseline Description	The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	78.9
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.072
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	4
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.96
In-service rate source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for t

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.04
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.96
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 30 per fixture
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per fixture

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0404
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Fixture
Program Name	Single Family Appliance Management
Measure Name	Indoor Fixtures
Measure Description	The installation of ENERGY STAR® LED indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan.
Baseline Description	0
Savings Principle	The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with and LED.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Retrofitted fixture
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	0
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	70.9
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.07
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.17
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	1.06
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0219
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyStar Lighting
Measure Name	LED A Lamps
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	40.2
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.033
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.98
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.10
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.90
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 10 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 3.5 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0220
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyStar Lighting
Measure Name	LED Bulbs (EISA Exempt)
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	52.4
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	Expected lifetime from ENERGY STAR
In-service rate (ISR)	0.98
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.10
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.90
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 14 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0221
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	Single Family Appliance Management
Measure Name	LED Bulbs LI
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,022 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	47.6
kWh/yr savings source	#N/A
kWh/yr savings note	ENERGY STAR Website (2011). Light Bulbs for Consumers.
kW reduction	0.048
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.13
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.63
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 17 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 17 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0214
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Fixture
Program Name	EnergyStar Lighting
Measure Name	LED Fixtures
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	59.9
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.05
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.98
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.02
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.98
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 35 per fixture
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 7 per fixture

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0190
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Exterior
Sub-type	CFL Fixture
Program Name	EnergyStar Lighting
Measure Name	Outdoor Fixture
Measure Description	The installation of hardwired ENERGY STAR® fluorescent outdoor fixtures with pin-based bulbs. Savings for this measure are attributable to high efficiency outdoor lighting fixtures and are treated similarly to indoor fixtures.
Baseline Description	The baseline efficiency case is an incandescent, screw-based fixture with an incandescent bulb.
Savings Principle	The high efficiency case is an ENERGY STAR® fixture wired for exclusive use with a pin based CFL bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,642.5 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
Hours source note	#N/A
kWh/yr Savings	87
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.088
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.87
In-service rate source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.04
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.96
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 30 per fixture
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per fixture

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0406
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Fixture
Program Name	EnergyStar Lighting
Measure Name	Outdoor LED Fixture
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	Existing lighting mix.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Retrofitted fixture
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	0
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	113.4
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.094
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.50
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 30 per fixture
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per fixture

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0203
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	EnergyStar Lighting
Measure Name	School Program CFL Bulbs
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	53
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	4
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.50
In-service rate source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.46
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.54
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 3 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 3 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0405
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyStar Lighting
Measure Name	School Program LED Bulbs
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	Existing lighting mix.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed lamp
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	40.2
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.033
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.50
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.10
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.90
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 8 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0419
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyStar Lighting
Measure Name	HTR LED A Lamps
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	39.5
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.033
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.98
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 15 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0430
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	EnergyStar Lighting
Measure Name	LED Reflector
Measure Description	The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is and ENERGY STAR® qualified LED fixture.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee) Where: Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	57.2
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.048
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.98
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.10
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.90
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 15 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0204
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	EnergyStar Lighting
Measure Name	Screw-in CFL Bulbs
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	53
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	4
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.95
In-service rate source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.46
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.54
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 4 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0205
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	EnergyStar Lighting
Measure Name	Screw-in CFL Bulbs (EISA Exempt)
Measure Description	The installation of compact fluorescent bulbs.
Baseline Description	The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through a home energy audit, the base line is a 65 Watt incandescent.
Savings Principle	The high efficiency case is an ENERGY STAR® rated CFL spiral bulb.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Rebated lamp or fixture.
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The average annual operating hours are 1,058 hours/year for rebated lights and calculated by vendor for home audit applications.
Hours Source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Hours source note	#N/A
kWh/yr Savings	52.4
kWh/yr savings source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
kWh/yr savings note	#N/A
kW reduction	0.044
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	0.95
In-service rate source	Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.14
CF summer peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	3.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.46
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.54
Net-to-Gross source	#N/A
Net-to-Gross note	Consistent with MA TRM
Gross Measure TRC unit	$ 5 per bulb
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 2 per bulb

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0228
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Motors/Drives
Type	Variable Speed Drive
Sub-type	Pump
Program Name	EnergyStar Products
Measure Name	Pool pump (2
Measure Description	The installation of a 2-speed or variable speed drive pool pump. Operating a pool pump for a longer period of time at a lower wattage can move the same amount of water using significantly less energy.
Baseline Description	The baseline efficiency case is a single speed pump.
Savings Principle	The high efficiency case is a 2-speed or variable speed pump.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed efficient pool pump.
Savings Equation	Gross kWh = Qty × kWh_base × %SAVE Gross kW = Qty × deltakW Where: Qty = Total number of units. kWh_base = Deemed average annual kWh consumption per baseline unit. %SAVE = Deemed average savings factor. DeltakW = Deemed average kW reduction per unit.
Hours	Hours are considered on a case-by-case basis since they are dependent on seasonal factors, pool size, and treatment conditions.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	824
kWh/yr savings source	Pacific Gas and Electric The Multi-Speed Pool Pump Fact Sheet.
kWh/yr savings note	#N/A
kW reduction	0.35
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions. Prepared for Pacific Gas and Electric Company.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 300 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0229
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Motors/Drives
Type	Variable Speed Drive
Sub-type	Pump
Program Name	EnergyStar Products
Measure Name	Pool pump (variable)
Measure Description	The installation of a 2-speed or variable speed drive pool pump. Operating a pool pump for a longer period of time at a lower wattage can move the same amount of water using significantly less energy.
Baseline Description	The baseline efficiency case is a single speed pump.
Savings Principle	The high efficiency case is a 2-speed or variable speed pump.
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed efficient pool pump.
Savings Equation	Gross kWh = Qty × kWh_base × %SAVE Gross kW = Qty × deltakW Where: Qty = Total number of units. kWh_base = Deemed average annual kWh consumption per baseline unit. %SAVE = Deemed average savings factor. DeltakW = Deemed average kW reduction per unit.
Hours	Hours are considered on a case-by-case basis since they are dependent on seasonal factors, pool size, and treatment conditions.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1062
kWh/yr savings source	Pacific Gas and Electric The Multi-Speed Pool Pump Fact Sheet.
kWh/yr savings note	#N/A
kW reduction	0.5
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions. Prepared for Pacific Gas and Electric Company.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 650 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0243
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Plug Load
Type	Smart Strips
Sub-type	Smart Strip
Program Name	EnergyStar Products
Measure Name	Advanced Power Strips
Measure Description	The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.
Baseline Description	The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on
Savings Principle	The high efficiency case is the use of a smart strip or advanced smart strip.
Energy Savings calculation method	Deemed
Savings unit	Rebated smart strip.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	346
kWh/yr savings source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	0.074
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 100 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 35 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0244
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Plug Load
Type	Smart Strips
Sub-type	Smart Strip
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Smart Strips
Measure Description	The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.
Baseline Description	The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on
Savings Principle	The high efficiency case is the use of a smart strip or advanced smart strip.
Energy Savings calculation method	Deemed
Savings unit	Rebated smart strip.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	6
measure life source	Nexus Market Research and RLW Analytics (2008). Residential Lighting Measure Life Study. Prepared for New England Residential Lighting Program Sponsors.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0245
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Plug Load
Type	Smart Strips
Sub-type	Smart Strip
Program Name	EnergyWise
Measure Name	EW SF Smart Strip
Measure Description	The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.
Baseline Description	The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on
Savings Principle	The high efficiency case is the use of a smart strip or advanced smart strip.
Energy Savings calculation method	Deemed
Savings unit	Rebated smart strip.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	79
kWh/yr savings source	ECOS 2009 Smart Plug Strips: Draft Report
kWh/yr savings note	#N/A
kW reduction	0.017
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0246
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Plug Load
Type	Smart Strips
Sub-type	Smart Strip
Program Name	EnergyWise MultiFamily
Measure Name	EW Smart Strips
Measure Description	The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.
Baseline Description	The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on
Savings Principle	The high efficiency case is the use of a smart strip or advanced smart strip.
Energy Savings calculation method	Deemed
Savings unit	Rebated smart strip.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	79
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.0158
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0366
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Plug Load
Type	Smart Strips
Sub-type	Smart Strip
Program Name	EnergyStar Products
Measure Name	Smart Strips
Measure Description	The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.
Baseline Description	The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on
Savings Principle	The high efficiency case is the use of a smart strip or advanced smart strip.
Energy Savings calculation method	Deemed
Savings unit	Per smart strip
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	79
kWh/yr savings source	ECOS 2009 Smart Plug Strips: Draft Report
kWh/yr savings note	#N/A
kW reduction	0.017
kW reduction source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 20 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 15 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0247
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Plug Load
Type	Smart Strips
Sub-type	Smart Strip
Program Name	Single Family Appliance Management
Measure Name	Smart Strips
Measure Description	The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.
Baseline Description	The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on
Savings Principle	The high efficiency case is the use of a smart strip or advanced smart strip.
Energy Savings calculation method	Deemed
Savings unit	Rebated smart strip.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	75
kWh/yr savings source	ECOS 2009 Smart Plug Strips: Draft Report
kWh/yr savings note	#N/A
kW reduction	0.02
kW reduction source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	In-service rates are set to 100% based on the assumption that all purchased units are installed.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	1.01
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 30 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 30 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0279
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Refrigeration
Type	Refrigeration O&M
Sub-type	Refrigerator Brush
Program Name	EnergyWise
Measure Name	EW SF Refrigerator Brush
Measure Description	The cleaning of refrigerator coils.
Baseline Description	A refrigerator with uncleaned coils.
Savings Principle	A refrigerator with coils cleaned by an auditor.
Energy Savings calculation method	Deemed
Savings unit	Per brushed refrigerator coil
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	37
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.005
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.93
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0295
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Flow Control Measures
Program Name	Single Family Appliance Management
Measure Name	DHWater Measure (electric)
Measure Description	DHW measures include high-efficiency low-flow showerheads and faucet aerators save water and water heating energy.
Baseline Description	The baseline efficiency case is the existing domestic hot water equipment.
Savings Principle	The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.
Energy Savings calculation method	Deemed
Savings unit	Installed DHW efficiency measure.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	134
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.02
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.94
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	4028.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	1.80
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	28.33
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 8 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0296
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Flow Control Measures
Program Name	Single Family Appliance Management
Measure Name	DHWater Measure (gas & other)
Measure Description	DHW measures include high-efficiency low-flow showerheads and faucet aerators save water and water heating energy.
Baseline Description	The baseline efficiency case is the existing domestic hot water equipment.
Savings Principle	The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.
Energy Savings calculation method	Deemed
Savings unit	Installed DHW efficiency measure.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.9
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	4028.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	28.33
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 8 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0297
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Flow Control Measures
Program Name	Single Family Appliance Management
Measure Name	DHWater Measure (oil)
Measure Description	DHW measures include high-efficiency low-flow showerheads and faucet aerators save water and water heating energy.
Baseline Description	The baseline efficiency case is the existing domestic hot water equipment.
Savings Principle	The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.
Energy Savings calculation method	Deemed
Savings unit	Installed DHW efficiency measure.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0.7
Oil MMBtu/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	4028.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	1.28
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	28.33
One time $ savings source/description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 8 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 8 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0289
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Aerator (electric)
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is a 2.2 GPM faucet.
Savings Principle	The high efficiency case is a faucet with 1.5 GPM or less aerator installed.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	Supplied by vendor
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.58
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	332.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0301
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Income Eligible MultiFamily
Measure Name	EW LI Showerheads (Elec Ht)
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.11
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.22
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 398/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 380/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0298
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Flow Control Measures
Program Name	EnergyWise
Measure Name	EW SF DHW
Measure Description	DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy.
Baseline Description	The baseline efficiency case is the existing domestic hot water equipment.
Savings Principle	The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.
Energy Savings calculation method	Deemed
Savings unit	Installed DHW efficiency measure.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.94
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	4028.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0334
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Water Heater
Sub-type	Heat Pump Water Heater
Program Name	EnergyWise
Measure Name	EW SF HPWH 50 gallon
Measure Description	Installation of a heat pump water heater (HPWH) instead of an electric resistance water heater.
Baseline Description	The baseline efficiency case is a new, standard efficiency electric resistance hot water heater.
Savings Principle	The high efficiency case is a high efficiency heat pump water heater.
Energy Savings calculation method	Deemed
Savings unit	Installed heat pump water heater.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1654
kWh/yr savings source	Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR.
kWh/yr savings note	#N/A
kW reduction	0.37
kW reduction source	Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	#N/A
measure life note	Based on warranty of equipment
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.47
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0302
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise MultiFamily
Measure Name	EW Showerhead (electric)
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	Supplied by vendor
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.58
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0311
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyStar Products
Measure Name	Low Flow Showerhead thermo Control (ladybug electric DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	76
kWh/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
kWh/yr savings note	#N/A
kW reduction	0.011
kW reduction source	PGE Low Flow Showerhead and Thermostatic Restriction Valve
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.94
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	578.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 30 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 11 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0434
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyStar Products
Measure Name	Low Flow Showerhead thermo Control (ladybug gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.38
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	578.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 30 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 11 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0428
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyStar Products
Measure Name	Low Flow Showerhead thermo Control (ladybug oil. Propane DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0.43
Oil MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0.38
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	578.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 30 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 11 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0303
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyStar Products
Measure Name	Low Flow Showerhead w/thermo Control (roadrunner electric DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	372
kWh/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
kWh/yr savings note	#N/A
kW reduction	0.055
kW reduction source	PGE Low Flow Showerhead and Thermostatic Restriction Valve
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.94
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	2723.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 40 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 15 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0435
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyStar Products
Measure Name	Low Flow Showerhead w/thermo Control (roadrunner gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	1.84
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	2723.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 40 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 15 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0427
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyStar Products
Measure Name	Low Flow Showerhead w/thermo Control (roadrunner oil. Propane DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	2.09
Oil MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	1.2
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	National Grid assumption based on regional PA working groups.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	National Grid assumption based on regional PA working groups.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	2723.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 40 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 15 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0300
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Flow Control Measures
Program Name	Single Family Appliance Management
Measure Name	Waterbed mattress replacement
Measure Description	Replacement of waterbed mattress with a standard mattress.
Baseline Description	The baseline efficiency case is an existing waterbed mattress.
Savings Principle	The high efficiency case is a new standard mattress.
Energy Savings calculation method	Deemed
Savings unit	Replacement of existing waterbed mattress with new standard mattress.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	872
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.19
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	http://www.serta.com/best-mattress-FAQs-mattresses-Serta-Number--1-Best-Selling-Mattress.html
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	11.74
Annual $ savings source / description	NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 600 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 600 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0292
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	EnergyWise
Measure Name	Faucet aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a residential setting with service water heated by electricity.
Baseline Description	The baseline efficiency case is 2.2 GPM or greater faucet.
Savings Principle	The high efficiency case is a faucet with 1.5 GPM or less aerator installed.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	49
kWh/yr savings source	The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
kWh/yr savings note	#N/A
kW reduction	0.007
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	Supplied by vendor
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.94
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	332.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 790/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 766/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0288
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	EnergyWise MultiFamily
Measure Name	Faucet aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity.
Baseline Description	The baseline efficiency case is 2.2 GPM or greater faucet.
Savings Principle	The high efficiency case is a faucet with 1.5 GPM or less aerator installed.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	Supplied by vendor
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rates are 100% since savings estimates are based on evaluation results.
Coincidence factor (CF) summer peak	0.58
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	332.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.15
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.85
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 305/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 296/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0354
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Audit
Sub-type	Educational Kit
Program Name	Single Family Appliance Management
Measure Name	Basic Educational Measures
Measure Description	Installation of basic educational measures during an audit to help customers become more aware of energy efficiency.
Baseline Description	The baseline efficiency case assumes no measures installed.
Savings Principle	The high efficiency case includes basic educational measures such as CFLs, low flow showerheads, pool and air conditioner timers, torchieres, and programmable thermostats.
Energy Savings calculation method	Deemed
Savings unit	Completed audit.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	138
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.03
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	National Grid assumption based on regional PA working groups.
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	9.56
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 176 per kit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$176 per kit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0355
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	New Movers
Measure Description	A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	A control group of homes that does not receive Home Energy Reports
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Customer receiving energy reports
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	National Grid assumption based on regional PA working groups.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is 100% since measure life is 1 year.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	Free-ridership and spillover are not applicable as customers cannot participate without the utility program.
Gross Measure TRC unit	$ 9.07 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 9.07 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0429
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	New Movers dual fuel
Measure Description	A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	A control group of homes that does not receive Home Energy Reports
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Customer receiving energy reports
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	National Grid assumption based on regional PA working groups.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is 100% since measure life is 1 year.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.73
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	Free-ridership and spillover are not applicable as customers cannot participate without the utility program.
Gross Measure TRC unit	$ 9.07 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 9.07 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0402
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	Opt-out dual fuel
Measure Description	A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	No Home Energy Report.
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Per participant
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.08
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 9.07 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 9.07 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0403
Fuel	Electric
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	Opt-Out electric
Measure Description	A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	No Home Energy Report.
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Per participant
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	0.93
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 9.07 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 9.07 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0385
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Appliances
Type	Recycling
Sub-type	Refrigerator Recycling
Program Name	Direct Install
Measure Name	Refrigerator Recycling
Measure Description	The retirement of old, inefficient secondary refrigerators and freezers.
Baseline Description	Existing refrigerator continues to operate.
Savings Principle	The high efficiency case assumes no replacement of secondary unit.
Energy Savings calculation method	Deemed
Savings unit	Removal of existing refrigerator or freezer.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	720
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.08
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0383
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Direct Install
Measure Name	Programmable Thermostats
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed thermostat
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0186
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Custom
Sub-type	Lighting
Program Name	Direct Install
Measure Name	Custom lighting
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.04

Copyright 2015 National Grid
All Rights Reserved

RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.02
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.13
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0384
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Exterior
Sub-type	LED Fixture
Program Name	Direct Install
Measure Name	Exterior LED Fixtures
Measure Description	The installation of hardwired ENERGY STAR® fluorescent outdoor fixtures with pin-based bulbs. Savings for this measure are attributable to high efficiency outdoor lighting fixtures and are treated similarly to indoor fixtures.
Baseline Description	Lighting baseline mix.
Savings Principle	0
Energy Savings calculation method	Calculated using deemed inputs
Savings unit	Installed LED fixtures
Savings Equation	Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.05
RRe source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	1.00
RRd winter peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.11
CF summer peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.91
CF winter peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0227
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Signage
Sub-type	Exit Sign LED
Program Name	Direct Install
Measure Name	LED Exit Signs
Measure Description	This measure promotes the installation of efficient lighting including, but not limited to, efficient fluorescent lamps, ballasts, and fixtures, solid state lighting, and efficient high intensity discharge (HID) lamps, ballasts, and fixtures.
Baseline Description	For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.
Savings Principle	For both new construction and retrofit installations, the high efficiency case is project-specific and is determined using actual fixture counts for the project and wattages found in Tables 3 and 5 in Appendix A.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific. deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0

Copyright 2015 National Grid
All Rights Reserved

measure life	13
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007. Prepared for National Grid
RRe note	#N/A
RR demand (RRd) summer peak	0.98
RRd summer peak source	Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007. Prepared for National Grid
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.98
RRd winter peak source	Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007. Prepared for National Grid
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0210
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Interior
Sub-type	Efficient Lighting
Program Name	Direct Install
Measure Name	Lighting systems
Measure Description	This measure promotes the installation of efficient lighting including, but not limited to, efficient fluorescent lamps, ballasts, and fixtures, solid state lighting, and efficient high intensity discharge (HID) lamps, ballasts, and fixtures.
Baseline Description	For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.
Savings Principle	For both new construction and retrofit installations, the high efficiency case is project-specific and is determined using actual fixture counts for the project and wattages found in Tables 3 and 5 in Appendix A.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific. deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	11

Copyright 2015 National Grid
All Rights Reserved

measure life source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.03
RRe source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRe note	#N/A
RR demand (RRd) summer peak	0.96
RRd summer peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.96
RRd winter peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.55
CF summer peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.45
CF winter peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0183
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Controls
Sub-type	Occupancy Sensor
Program Name	Direct Install
Measure Name	Occupancy sensors
Measure Description	This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls.
Baseline Description	The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction).
Savings Principle	The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed lighting controls project.
Savings Equation	Gross kWh = SUM[QTY_i × Watts_i × (Hours_base_i - Hours_ee_i)] / (Watts per kW) Gross kW = SUM(QTY_i × Watts_i) / (Watts per kW) Where: QTY_i = Quantity in controlled fixtures in location i Watts_i = Connected wattage of controlled fixtures in location i Hours_base_i = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations). Hours_ee_i = Total annual hours that the connected lighting in location i operates with the lighting controls implemented. 1,000 Watts per kW = Conversion factor deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	9
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.87
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRe note	#N/A
RR demand (RRd) summer peak	0.94
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.94
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.35
CF summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.28
CF winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0206
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Interior
Sub-type	CFL Screw Base
Program Name	Direct Install
Measure Name	Screw-in CFL
Measure Description	This measure promotes the installation of efficient lighting including, but not limited to, efficient fluorescent lamps, ballasts, and fixtures, solid state lighting, and efficient high intensity discharge (HID) lamps, ballasts, and fixtures.
Baseline Description	For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.
Savings Principle	For both new construction and retrofit installations, the high efficiency case is project-specific and is determined using actual fixture counts for the project and wattages found in Tables 3 and 5 in Appendix A.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific. deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0

Copyright 2015 National Grid
All Rights Reserved

measure life	11
measure life source	MA LIGHTING WORKSHEET_T12_Standard-wrb v2 RI Calcs.xls.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	0.87
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	HEC, Inc. (1996). Final Report for New England Power Service Company Persistence of Savings Study. Prepared for NEPSCo.
Realization rate energy (RRe)	1.03
RRe source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRe note	#N/A
RR demand (RRd) summer peak	0.96
RRd summer peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.96
RRd winter peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.55
CF summer peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.45
CF winter peak source	DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0234
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Other
Type	Custom
Sub-type	Other
Program Name	Direct Install
Measure Name	Custom other
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.81

Copyright 2015 National Grid
All Rights Reserved

RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	0.77
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.53
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0266
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Custom
Sub-type	Refrigeration
Program Name	Direct Install
Measure Name	Custom refrigeration
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.60

Copyright 2015 National Grid
All Rights Reserved

RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.49
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.69
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0254
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Door Heater Control
Program Name	Direct Install
Measure Name	Door heater control
Measure Description	The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating results in a reduced cooling load.
Baseline Description	The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls.
Savings Principle	The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by measuring the ambient humidity and temperature of the store, calculating the dew point, and using pulse width modulation (PWM) to control the anti-sweat heater based on specific algorithms for freezer and cooler doors. Door temperature is typically maintained about 5 degrees Fahrenheit above the store air dew point temperature with the heaters operating at 80% (adjustable).
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed door heater controls on existing cooler/freezer.
Savings Equation	Gross kWh = kW_DoorHeater × %OFF × Hours Gross kW = kW_DoorHeater × %OFF Where: kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific %OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters Hours = Door heater annual run hours before controls
Hours	Pre-retrofit hours are 8,760 hours per year. After controls are installed, the door heaters in freezers are on for an average 4,730.4 hours/year (46% off time) and the door heaters for coolers are on for an average 2,277.6 hours/year (74% off time).
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
Coincidence factor (CF) summer peak	0.50
CF summer peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0271
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Motors
Sub-type	ECM
Program Name	Direct Install
Measure Name	ECM evaporator fan motors (walk–in coolers/ freezers)
Measure Description	Installation of electronically commutated motors (ECMs) in multi-deck and freestanding coolers and freezers, typically on the retail floor of convenience stores, liquor stores, and grocery stores.
Baseline Description	The baseline efficiency case is the existing case motor.
Savings Principle	The high efficiency case is the replacement of the existing case motor with an ECM.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed electronically commutated motor for evaporator fans in existing cooler/freezer.
Savings Equation	Gross kWh = kW_Fan × LRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours Where: kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment LRF = Load reduction factor for motor replacement Hours = Annual fan operating hours: site-specific 1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor
Hours	The annual operating hours are assumed to be 8,760 * (1-%OFF), where %OFF = 0 if the facility does not have evaporator fan controls or %OFF > 0 if the facility has evaporator fan controls. See section: Refrigeration – Evaporator Fan Controls for %OFF valu
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	0.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.87
CF summer peak source	RLW Analytics (2007). Impact Evaluation Analysis of the 2005 Custom SBS Program. Prepared for National Grid. Derivation based on site specific results from the study adjusted for current on peak hours.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.51
CF winter peak source	RLW Analytics (2007). Impact Evaluation Analysis of the 2005 Custom SBS Program. Prepared for National Grid. Derivation based on site specific results from the study adjusted for current on peak hours.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0257
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Fan Control
Program Name	Direct Install
Measure Name	Fan Control
Measure Description	Installation of controls to modulate the evaporator fans based on temperature control. Energy savings include: fan energy savings from reduced fan operating hours, refrigeration energy savings from reduced waste heat, and compressor energy savings resulting from the electronic temperature control. Electronic controls allow less fluctuation in temperature, thereby creating savings.
Baseline Description	The baseline efficiency case assumes evaporator fans that run 8760 annual hours with no temperature control.
Savings Principle	The high efficiency case is the use of an energy management system to control evaporator fan operation based on temperature.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed controls on evaporator fans in existing cooler/freezer.
Savings Equation	Gross kWh = kW_Fan × %OFF × (Hours per year) × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) + [kW_cp × Hours_cp + kW_fan × (Hours per year) × (1-%OFF)] × %SAVE Gross kW = Gross kWh / Hours Where: kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment %OFF_heater = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters 8760 Hours per year = Conversion factor 1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3,413 Btu/hr per kW = Conversion factor 12 kBtu/hr per ton = Conversion factor kW_cp = Total power demand of compressor motor and condenser fan calculated from equipment nameplate data and estimated 0.85 power factor Hours_cp = Equivalent annual full load hours of compressor operation; Estimate based on NRM field experience. %OFF_evap = Percent of annual hours that the evaporator is turned off; Estimate based on NRM field experience. %SAVE = Reduced run-time of compressor and evaporator due to electronic controls; Estimate based on NRM field experience.
Hours	The average annual operating hours are 4072 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Calculation assumptions based off of NRM field experience and data
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Calculation assumptions based off of NRM field experience and data
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.58
RRe source	HEC, Inc. (1996). Analysis of Savings from Walkiin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	HEC, Inc. (1996). Analysis of Savings from Walkiin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	HEC, Inc. (1996). Analysis of Savings from Walkiin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.23
CF summer peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.84
CF winter peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0255
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Door Heater Control
Program Name	Direct Install
Measure Name	Freezer Door Heater Controls
Measure Description	The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating results in a reduced cooling load.
Baseline Description	The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls.
Savings Principle	The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by measuring the ambient humidity and temperature of the store, calculating the dew point, and using pulse width modulation (PWM) to control the anti-sweat heater based on specific algorithms for freezer and cooler doors. Door temperature is typically maintained about 5 degrees Fahrenheit above the store air dew point temperature with the heaters operating at 80% (adjustable).
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed door heater controls on existing cooler/freezer.
Savings Equation	Gross kWh = kW_DoorHeater × %OFF × Hours Gross kW = kW_DoorHeater × %OFF Where: kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific %OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters Hours = Door heater annual run hours before controls
Hours	Pre-retrofit hours are 8,760 hours per year. After controls are installed, the door heaters in freezers are on for an average 4,730.4 hours/year (46% off time) and the door heaters for coolers are on for an average 2,277.6 hours/year (74% off time).
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
Coincidence factor (CF) summer peak	0.50
CF summer peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0261
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Vending Miser
Program Name	Direct Install
Measure Name	Glass front refrigerated coolers
Measure Description	Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.
Baseline Description	The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Savings Principle	The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Energy Savings calculation method	Deemed
Savings unit	Installed vending miser.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1208
kWh/yr savings source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kWh/yr savings note	#N/A
kW reduction	0.138
kW reduction source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0278
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Refrigeration Lighting
Sub-type	Refrigerator Case LED
Program Name	Direct Install
Measure Name	LEDs for freezer/cooler cases
Measure Description	Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load.
Baseline Description	The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases.
Savings Principle	The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base × Watts_base × Hours_base) - SUM(QTY_ee × kW_ee × Hours_ee)] × (1 + EffRefrig × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours_ee Where: QTY_base = Quantity of baseline lighting fixtures in cooler/freezer case Watts_base = Connected wattage of baseline lighting fixtures in cooler/freezer case Hours_base = Annual operating hours of baseline lighting fixtures in cooler/freezer case QTY_ee = Quantity of efficient lighting fixtures in cooler/freezer case Watts_ee = Connected wattage of efficient lighting fixtures in cooler/freezer case Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case 1.9 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	13
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.04
RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.07
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.15
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0259
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Novelty Cooler Control
Program Name	Direct Install
Measure Name	Novelty cooler shutoff
Measure Description	Installation of controls to shut off a facility's novelty coolers for non-perishable goods based on pre-programmed store hours. Energy savings occur as coolers cycle off during facility unoccupied hours.
Baseline Description	The baseline efficiency case is the novelty coolers operating 8,760 hours per year.
Savings Principle	The high efficiency case is the novelty coolers operating fewer than 8,760 hours per year since they are controlled to cycle each night based on pre-programmed facility unoccupied hours.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed controls on existing cooler/freezer.
Savings Equation	Gross kWh = kW_nc × DC_nc × HoursOff Gross kW = 0 Where: kW_nc = Power demand of novelty cooler calculated from equipment nameplate data and estimated 0.85 power factor. DC_nc = Weighted average annual duty cycle; Estimate based on NRM field experience. HoursOff = Potential hours off every night per year, estimated as one less than the number of hours the store is closed per day: site-specific.
Hours	Energy and demand savings are based on the reduced operation hours of the cooler equipment. Hours reduced per day are estimated on a case-by-case basis, and are typically calculated as one less than the number of hours per day that the facility is closed
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0265
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Vending Miser
Program Name	Direct Install
Measure Name	Refrigerated beverage vending machine
Measure Description	Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.
Baseline Description	The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Savings Principle	The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Energy Savings calculation method	Deemed
Savings unit	Installed vending miser.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1612
kWh/yr savings source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kWh/yr savings note	#N/A
kW reduction	0.184
kW reduction source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0263
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Refrigeration
Type	Controls
Sub-type	Vending Miser
Program Name	Direct Install
Measure Name	Non-refrigerated snack vending machine
Measure Description	Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.
Baseline Description	The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Savings Principle	The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Energy Savings calculation method	Deemed
Savings unit	Installed vending miser.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	343
kWh/yr savings source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kWh/yr savings note	#N/A
kW reduction	0.039
kW reduction source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	National Grid assumption based on regional PA working groups. Assumptions based on historical steam trap surveys. Steam losses in lbs/hr are found using “Boiler Efficiency Institute (1987). Steam Efficiency Improvement; Page 34, Table 4.1 under Steam Leak
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0386
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	Direct Install
Measure Name	Faucet Aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow.
Baseline Description	The baseline efficiency case is a 2.2 GPM faucet.
Savings Principle	The high efficiency is a low-flow faucet aerator.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	387.4
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.07
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	5460.00
Sewer savings: gallons/yr	5460.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0389
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Spray Valve
Program Name	Direct Install
Measure Name	Salon Nozzle
Measure Description	The installation of a high efficiency salon nozzle.
Baseline Description	Standard salon nozzle.
Savings Principle	An efficient salon nozzle.
Energy Savings calculation method	Deemed
Savings unit	Installed salon nozzle
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	4648.9
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.79
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	28639.00
Sewer savings: gallons/yr	28639.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0388
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Direct Install
Measure Name	Low-Flow Showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is a 2.5 GPM showerhead.
Savings Principle	The high efficiency case is a 1.5 GPM showerhead.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1185
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.2
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	7300.00
Sewer savings: gallons/yr	7300.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0387
Fuel	Electric
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Spray Valve
Program Name	Direct Install
Measure Name	Pre-Rinse Spray Valve
Measure Description	Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM.
Baseline Description	Standard spray valve.
Savings Principle	The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM.
Energy Savings calculation method	Deemed
Savings unit	Installed pre-rinse spray valve.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	2871.4
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.75
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	6410.00
Sewer savings: gallons/yr	6410.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.01
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0051
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Refrigerated Air Dryers
Sub-type	Refrigerated Air Dryer
Program Name	Commercial New Construction
Measure Name	Dryer (100<=CFM<200)
Measure Description	The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryers. Refrigerated air dryers remove the moisture from a compressed air system to enhance overall system performance. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible.
Baseline Description	The baseline efficiency case is a non-cycling refrigerated air dryer.
Savings Principle	The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total CFM of installed air dryer capacity.
Savings Equation	Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM Where: CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0052
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Refrigerated Air Dryers
Sub-type	Refrigerated Air Dryer
Program Name	Commercial New Construction
Measure Name	Dryer (200<=CFM<300)
Measure Description	The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryers. Refrigerated air dryers remove the moisture from a compressed air system to enhance overall system performance. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible.
Baseline Description	The baseline efficiency case is a non-cycling refrigerated air dryer.
Savings Principle	The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total CFM of installed air dryer capacity.
Savings Equation	Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM Where: CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0053
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Refrigerated Air Dryers
Sub-type	Refrigerated Air Dryer
Program Name	Commercial New Construction
Measure Name	Dryer (300<=CFM<400)
Measure Description	The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryers. Refrigerated air dryers remove the moisture from a compressed air system to enhance overall system performance. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible.
Baseline Description	The baseline efficiency case is a non-cycling refrigerated air dryer.
Savings Principle	The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total CFM of installed air dryer capacity.
Savings Equation	Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM Where: CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0054
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Refrigerated Air Dryers
Sub-type	Refrigerated Air Dryer
Program Name	Commercial New Construction
Measure Name	Dryer (CFM >=400)
Measure Description	The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryers. Refrigerated air dryers remove the moisture from a compressed air system to enhance overall system performance. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible.
Baseline Description	The baseline efficiency case is a non-cycling refrigerated air dryer.
Savings Principle	The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total CFM of installed air dryer capacity.
Savings Equation	Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM Where: CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0055
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Refrigerated Air Dryers
Sub-type	Refrigerated Air Dryer
Program Name	Commercial New Construction
Measure Name	Dryer (CFM<100)
Measure Description	The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryers. Refrigerated air dryers remove the moisture from a compressed air system to enhance overall system performance. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible.
Baseline Description	The baseline efficiency case is a non-cycling refrigerated air dryer.
Savings Principle	The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total CFM of installed air dryer capacity.
Savings Equation	Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM Where: CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0045
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	High Efficiency Air Compressors
Sub-type	Load/No Load
Program Name	Commercial New Construction
Measure Name	Load/No Load (15<=HP<25)
Measure Description	Covers the installation of oil flooded, rotary screw compressors with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with properly sized air receiver. Efficient air compressors use various control schemes to improve compression efficiencies at partial loads. When an air compressor fitted with Load/No Load, Variable Speed Drive, or Variable Displacement capacity controls is used in conjunction with a properly-sized air receiver, considerable amounts of energy can be saved.
Baseline Description	The baseline efficiency case is a typical modulating compressor with blow down valve.
Savings Principle	The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with a properly sized air receiver. Air receivers are designed to provide a supply buffer to meet short-term demand spikes which can exceed the compressor capacity. Installing a larger receiver tank to meet occasional peak demands can allow for the use of a smaller compressor.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total horsepower (hp) of installed air compressor capacity.
Savings Equation	Gross kWh = HP_compressor × deltakW/HP × Hours Gross kW = HP_compressor × deltakW/HP HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific Hours = Annual operating hours of the air compressor: site-specific deltakW/HP = Air compressor kW reduction per HP
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0046
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	High Efficiency Air Compressors
Sub-type	Load/No Load
Program Name	Commercial New Construction
Measure Name	Load/No Load (25<=HP<=75)
Measure Description	Covers the installation of oil flooded, rotary screw compressors with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with properly sized air receiver. Efficient air compressors use various control schemes to improve compression efficiencies at partial loads. When an air compressor fitted with Load/No Load, Variable Speed Drive, or Variable Displacement capacity controls is used in conjunction with a properly-sized air receiver, considerable amounts of energy can be saved.
Baseline Description	The baseline efficiency case is a typical modulating compressor with blow down valve.
Savings Principle	The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with a properly sized air receiver. Air receivers are designed to provide a supply buffer to meet short-term demand spikes which can exceed the compressor capacity. Installing a larger receiver tank to meet occasional peak demands can allow for the use of a smaller compressor.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total horsepower (hp) of installed air compressor capacity.
Savings Equation	Gross kWh = HP_compressor × deltakW/HP × Hours Gross kW = HP_compressor × deltakW/HP HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific Hours = Annual operating hours of the air compressor: site-specific deltakW/HP = Air compressor kW reduction per HP
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0050
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Low Pressure Drop Filters
Sub-type	Low Pressure Drop Filter
Program Name	Commercial New Construction
Measure Name	Low pressure drop filter
Measure Description	Filters remove solids and aerosols from compressed air systems. Low pressure drop filters have longer lives and lower pressure drops than traditional coalescing filters resulting in higher efficiencies.
Baseline Description	The baseline efficiency case is a standard coalescing filter with initial drop of between 1 and 2 pounds per sq inch (psi) with an end of life drop of 10 psi.
Savings Principle	The high efficiency case is a low pressure drop filter with initial drop not exceeding 1 psi over life and 3 psi at element change. Filters must be deep-bed, “mist eliminator” style and installed on a single operating compressor rated 15 – 75 HP.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed filter.
Savings Equation	Gross kWh = Qty × HP_compressor × (kW per HP) × %SAVE × Hours Gross kW = Qty × HP_compressor × (kW per HP) × %SAVE Where: Qty = Number of filters installed: site-specific HP_compressor = Average compressor load: site-specific kW per HP = Conversion factor %SAVE = Percent change in pressure drop: site-specific Hours = Annual operating hours of the lower pressure drop filter: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	#N/A
measure life note	Based on NSTAR estimates of typical replacement schedule
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0047
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	High Efficiency Air Compressors
Sub-type	Variable Displacement
Program Name	Commercial New Construction
Measure Name	Variable Displacement (50<=HP<=75)
Measure Description	Covers the installation of oil flooded, rotary screw compressors with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with properly sized air receiver. Efficient air compressors use various control schemes to improve compression efficiencies at partial loads. When an air compressor fitted with Load/No Load, Variable Speed Drive, or Variable Displacement capacity controls is used in conjunction with a properly-sized air receiver, considerable amounts of energy can be saved.
Baseline Description	The baseline efficiency case is a typical modulating compressor with blow down valve.
Savings Principle	The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with a properly sized air receiver. Air receivers are designed to provide a supply buffer to meet short-term demand spikes which can exceed the compressor capacity. Installing a larger receiver tank to meet occasional peak demands can allow for the use of a smaller compressor.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total horsepower (hp) of installed air compressor capacity.
Savings Equation	Gross kWh = HP_compressor × deltakW/HP × Hours Gross kW = HP_compressor × deltakW/HP HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific Hours = Annual operating hours of the air compressor: site-specific deltakW/HP = Air compressor kW reduction per HP
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0048
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	High Efficiency Air Compressors
Sub-type	Variable Speed Drive
Program Name	Commercial New Construction
Measure Name	VSD (15<=HP<25)
Measure Description	Covers the installation of oil flooded, rotary screw compressors with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with properly sized air receiver. Efficient air compressors use various control schemes to improve compression efficiencies at partial loads. When an air compressor fitted with Load/No Load, Variable Speed Drive, or Variable Displacement capacity controls is used in conjunction with a properly-sized air receiver, considerable amounts of energy can be saved.
Baseline Description	The baseline efficiency case is a typical modulating compressor with blow down valve.
Savings Principle	The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with a properly sized air receiver. Air receivers are designed to provide a supply buffer to meet short-term demand spikes which can exceed the compressor capacity. Installing a larger receiver tank to meet occasional peak demands can allow for the use of a smaller compressor.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total horsepower (hp) of installed air compressor capacity.
Savings Equation	Gross kWh = HP_compressor × deltakW/HP × Hours Gross kW = HP_compressor × deltakW/HP HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific Hours = Annual operating hours of the air compressor: site-specific deltakW/HP = Air compressor kW reduction per HP
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0049
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	High Efficiency Air Compressors
Sub-type	Variable Speed Drive
Program Name	Commercial New Construction
Measure Name	VSD (25<=HP<=75)
Measure Description	Covers the installation of oil flooded, rotary screw compressors with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with properly sized air receiver. Efficient air compressors use various control schemes to improve compression efficiencies at partial loads. When an air compressor fitted with Load/No Load, Variable Speed Drive, or Variable Displacement capacity controls is used in conjunction with a properly-sized air receiver, considerable amounts of energy can be saved.
Baseline Description	The baseline efficiency case is a typical modulating compressor with blow down valve.
Savings Principle	The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load, Variable Speed Drive, or Variable Displacement capacity control with a properly sized air receiver. Air receivers are designed to provide a supply buffer to meet short-term demand spikes which can exceed the compressor capacity. Installing a larger receiver tank to meet occasional peak demands can allow for the use of a smaller compressor.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Total horsepower (hp) of installed air compressor capacity.
Savings Equation	Gross kWh = HP_compressor × deltakW/HP × Hours Gross kW = HP_compressor × deltakW/HP HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific Hours = Annual operating hours of the air compressor: site-specific deltakW/HP = Air compressor kW reduction per HP
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0056
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Compressed Air
Type	Zero Loss Condensate Drains
Sub-type	Zero Loss Condensate Drain
Program Name	Commercial New Construction
Measure Name	Zero loss condensate drain
Measure Description	Drains remove water from a compressed air system. Zero loss condensate drains remove water from a compressed air system without venting any air, resulting in less air demand and consequently greater efficiency.
Baseline Description	The baseline efficiency case is the installation of a standard condensate drain on a compressor system.
Savings Principle	The high efficiency case is the installation of a zero loss condensate drain on a single operating compressor rated <= 75 HP.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed drain.
Savings Equation	Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM Where: CFM_pipe = CFM capacity of piping: site-specific 0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity 0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario. Hours = Annual operating hours of the zero loss condensate drain: site-specific
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0.244
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.80
CF summer peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.54
CF winter peak source	DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.43 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0061
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Oven
Program Name	Commercial New Construction
Measure Name	Commercial Electric Convection Oven
Measure Description	Installation of a qualified ENERGY STAR® commercial oven. ENERGY STAR® commercial ovens save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates.
Baseline Description	The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15 of Appendix A.
Savings Principle	The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15 of Appendix A.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency commercial electric oven.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	Ovens are assumed to operate 313 days per year. Combination ovens are assumed to operate 12 hours a day, or 3756 hours per year.
Hours Source	Technical Assessment of Commercial Ovens <http://www.fishnick.com/equipment/techassessment/7_ovens.pdf>, pg.23
Hours source note	#N/A
kWh/yr Savings	1364
kWh/yr savings source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kWh/yr savings note	#N/A
kW reduction	0.436
kW reduction source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Food Service Technology Center (2011). Gas Griddle Life-Cycle Cost Calculation. Accessed on 10/12/2011.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101, Commercial Convection Oven, Revision #0.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
Coincidence factor (CF) summer peak	0.90
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Coincidence factor (CF) winter peak	0.90
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0057
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Fryer
Program Name	Commercial New Construction
Measure Name	Commercial Electric Fryer
Measure Description	Installation of a qualified ENERGY STAR® commercial fryer, which saves energy during preheating, cooking, and idling.
Baseline Description	The baseline efficiency case is a deep-fat fryer with a cooking efficiency of 75%, a shortening capacity of up to 65 pounds, daily a preheat energy of 2.3 kWh, and an idle energy rate of 1.05 kW
Savings Principle	The high efficiency case is a deep-fat fryer with a cooking energy efficiency of 80%, a shortening capacity of up to 65 pounds, a daily preheat energy of 2.3 kWh, and an idle energy rate of 1.05 kW.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency electric fryer.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	Fryers are assumed to operate 313 days per year, or 6 days per week.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	760
kWh/yr savings source	ENERGYSTAR Commercial Kitchen Equipment Savings Calculator: Fryer Calculations. www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls.
kWh/yr savings note	#N/A
kW reduction	0.202
kW reduction source	ENERGYSTAR Commercial Kitchen Equipment Savings Calculator: Fryer Calculations. www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101, Commercial Convection Oven, Revision #0.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	All PAs use 100% savings persistence factors.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100%
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100%
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100%
Coincidence factor (CF) summer peak	0.90
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Coincidence factor (CF) winter peak	0.90
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0059
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Griddle
Program Name	Commercial New Construction
Measure Name	Commercial electric griddle
Measure Description	Installation of a qualified ENERGY STAR® griddle. ENERGY STAR® griddles save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates.
Baseline Description	The baseline efficiency case is a standard efficiency (30% efficient) gas griddle.
Savings Principle	The high efficiency case is a gas griddle with an efficiency of 38%.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency commercial electric griddle.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	Griddles are assumed to operate 313 days per year. Combination ovens are assumed to operate 12 hours a day, or 3756 hours per year.
Hours Source	Technical Assessment of Commercial Ovens <http://www.fishnick.com/equipment/techassessment/7_ovens.pdf>, pg.23
Hours source note	#N/A
kWh/yr Savings	2226
kWh/yr savings source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kWh/yr savings note	#N/A
kW reduction	0.593
kW reduction source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Gas Fryer.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Food Service Technology Center (2011). Electric Griddle Life-Cycle Cost Calculator. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
Coincidence factor (CF) summer peak	0.90
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Coincidence factor (CF) winter peak	0.90
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0062
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Oven
Program Name	Commercial New Construction
Measure Name	Commercial electric oven
Measure Description	Installation of a qualified ENERGY STAR® commercial oven. ENERGY STAR® commercial ovens save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates.
Baseline Description	The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15 of Appendix A.
Savings Principle	The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15 of Appendix A.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency commercial electric oven.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	Ovens are assumed to operate 313 days per year. Combination ovens are assumed to operate 12 hours a day, or 3756 hours per year.
Hours Source	Technical Assessment of Commercial Ovens <http://www.fishnick.com/equipment/techassessment/7_ovens.pdf>, pg.23
Hours source note	#N/A
kWh/yr Savings	9688
kWh/yr savings source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kWh/yr savings note	#N/A
kW reduction	2.579
kW reduction source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101, Commercial Convection Oven, Revision #0.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
Coincidence factor (CF) summer peak	0.90
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Coincidence factor (CF) winter peak	0.90
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0067
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Steamer
Program Name	Commercial New Construction
Measure Name	Commercial electric steamer
Measure Description	Installation of a qualified ENERGY STAR® commercial steam cooker. ENERGY STAR® steam cookers save energy during cooling and idle times due to improved cooking efficiency and idle energy rates.
Baseline Description	The baseline efficiency case is a conventional electric steam cooker with a cooking energy efficiency of 30%, pan production capacity of 23.3 pounds per hour, and an idle energy rate of 1.2 kW.
Savings Principle	The high efficiency case is an ENERGY STAR® electric steam cooker with a cooking energy efficiency of 50%, pan production capacity of 16.7 pounds per hour, and an idle energy rate of 0.4 kW.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency commercial electric steamer.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours Where: Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.
Hours	Steamers are assumed to operate 313 days per year, 12 hours a day, or 3756 hours per year.
Hours Source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
Hours source note	#N/A
kWh/yr Savings	8381
kWh/yr savings source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kWh/yr savings note	#N/A
kW reduction	2.231
kW reduction source	ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls>
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
Coincidence factor (CF) summer peak	0.90
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Coincidence factor (CF) winter peak	0.90
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0110
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Custom
Sub-type	HVAC
Program Name	Commercial New Construction
Measure Name	Custom HVAC
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.10
RRe source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.13
RRd summer peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.66
RRd winter peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.33
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.67
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0177
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Ventilation
Sub-type	Demand Control Ventilation
Program Name	Commercial New Construction
Measure Name	Demand control ventilation
Measure Description	The measure is to control quantity of outside air to an air handling system based on detected space CO2 levels. The installed systems monitor the CO2 in the spaces or return air and reduce the outside air use when possible to save energy while meeting indoor air quality standards.
Baseline Description	The baseline efficiency case for this measure assumes the relevant HVAC equipment has no ventilation control.
Savings Principle	The high efficiency case is the installation of an outside air intake control based on CO2 sensors.
Energy Savings calculation method	Custom
Savings unit	Installed demand control ventilation project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = Gross kWh × deltaMMBtu_Gas/kWh Gross MMBtu Oil = Gross kWh × deltaMMBtu_Oil/kWh deltaMMBtu_Gas/kWh = Deemed average natural gas impact per gross electric energy impact deltaMMBtu_Oil/kWh = Deemed average heating oil impact per gross electric energy impact
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Calculated with the National Grid DCV savings Tool
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Calculated with the National Grid DCV savings Tool
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because energy savings are custom calculated.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because energy savings are custom calculated.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because energy savings are custom calculated.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to 1.00 because coincidence is built into the estimates of Gross kW.
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to 1.00 because coincidence is built into the estimates of Gross kW.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0069
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Controls
Sub-type	Economizer
Program Name	Commercial New Construction
Measure Name	Dual enthalpy economizer controls
Measure Description	The measure is to upgrade the outside-air dry-bulb economizer to a dual enthalpy economizer. The system will continuously monitor the enthalpy of both the outside air and return air. The system will control the system dampers adjust the outside quantity based on the two readings.
Baseline Description	The baseline efficiency case for this measure assumes the relevant HVAC equipment is operating with a fixed dry-bulb economizer.
Savings Principle	The high efficiency case is the installation of an outside air economizer utilizing two enthalpy sensors, one for outdoor air and one for return air.
Energy Savings calculation method	Deemed
Savings unit	Total tons of controlled cooling capacity.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	289
kWh/yr savings source	Patel, Dinesh (2001). Energy Analysis: Dual Enthalpy Control. Prepared for NSTAR.
kWh/yr savings note	#N/A
kW reduction	0.289
kW reduction source	Patel, Dinesh (2001). Energy Analysis: Dual Enthalpy Control. Prepared for NSTAR.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.05
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Copyright 2015 National Grid
All Rights Reserved

RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.34
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0172
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Motors
Sub-type	ECM Motor
Program Name	Commercial New Construction
Measure Name	ECM fan motor for HVAC
Measure Description	This measure is offered through the Cool Choice program and promotes the installation of electronically commutated motors (ECMs) on fan powered terminal boxes, fan coils, and HVAC supply fans on small unitary equipment.
Baseline Description	The baseline efficiency case for this measure assumes the VAV box fans are powered by a single speed fractional horsepower permanent split capacitor (PSC) induction motor.
Savings Principle	The high efficiency case must have a motor installed on new, qualifying HVAC equipment.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed ECM fan motor.
Savings Equation	Gross kWh = DesignCFM × BoxSizeFactor × %Flow_Annual × Hours Gross Summer kW = DesignCFM × BoxSizeFactor × %Flow_Summer × Hours Gross Winter kW = DesignCFM × BoxSizeFactor × %Flow_Winter × Hours Where: DesignCFM = Capacity of the VAV box in cubic feet per minute: site-specific. BoxSizeFactor = Savings factor in Watts/CFM %Flow_Annual = Average % of design flow over all operating hours %Flow_Summer = Average % of design flow during summer peak period %Flow_Winter = Average % of design flow during winter peak period Hours = Estimated annual operating hours for VAV box fans: site-specific. DesignCFM = Capacity of the VAV box in cubic feet per minute: site-specific. Hours = Estimated annual operating hours for VAV box fans: site-specific.
Hours	The average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0125
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Ground Source
Program Name	Commercial New Construction
Measure Name	Ground source (closed loop) heat pump
Measure Description	This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.
Baseline Description	The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code.
Savings Principle	The high efficiency case assumes the HVAC equipments exceeds the specifications of the International Energy Conservation Code (IECC) 2012.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed heat pump system for space cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H] Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee) Where: Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1
Hours	If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.05
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.40
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0127
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Groundwater Source
Program Name	Commercial New Construction
Measure Name	Groundwater source (open loop) heat pump
Measure Description	This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.
Baseline Description	The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code.
Savings Principle	The high efficiency case assumes the HVAC equipments exceeds the specifications of the International Energy Conservation Code (IECC) 2012.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed heat pump system for space cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H] Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee) Where: Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1
Hours	If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.05
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.40
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0106
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Unitary AC
Program Name	Commercial New Construction
Measure Name	Unitary AC (air cooled)
Measure Description	This measure promotes the installation of high efficiency unitary air conditioning equipment in lost opportunity applications. Air conditioning (AC) systems are a major consumer of electricity and systems that exceed baseline efficiencies can save considerable amounts of energy. This measure applies to air, water, and evaporatively-cooled unitary AC systems, both single-package and split systems.
Baseline Description	The baseline efficiency case for new installations assumes compliance with the International Energy Conservation Code (IECC) 2012 as mandated by Rhode Island State Building Code. Table 7 in Appendix A details the specific efficiency requirements by equipment type.
Savings Principle	The high efficiency case assumes the HVAC equipments exceeds the specifications of the International Energy Conservation Code (IECC) 2012.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed unitary AC system for space cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee) Where: Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1 EER_base = Energy Efficiency Ratio of baseline equipment: code. Since IECC 2012 does not provide EER requirements for equipment < 5.4 tons, assume the following conversion: EER ≈ SEER/1.1
Hours	If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.40
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0107
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Unitary AC
Program Name	Commercial New Construction
Measure Name	Unitary AC (evaporatively cooled)
Measure Description	This measure promotes the installation of high efficiency unitary air conditioning equipment in lost opportunity applications. Air conditioning (AC) systems are a major consumer of electricity and systems that exceed baseline efficiencies can save considerable amounts of energy. This measure applies to air, water, and evaporatively-cooled unitary AC systems, both single-package and split systems.
Baseline Description	The baseline efficiency case for new installations assumes compliance with the International Energy Conservation Code (IECC) 2012 as mandated by Rhode Island State Building Code. Table 7 in Appendix A details the specific efficiency requirements by equipment type.
Savings Principle	The high efficiency case assumes the HVAC equipments exceeds the specifications of the International Energy Conservation Code (IECC) 2012.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed unitary AC system for space cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee) Where: Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1 EER_base = Energy Efficiency Ratio of baseline equipment: code. Since IECC 2012 does not provide EER requirements for equipment < 5.4 tons, assume the following conversion: EER ≈ SEER/1.1
Hours	If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.40
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0126
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Ground Source
Program Name	Commercial New Construction
Measure Name	Water source heat pump
Measure Description	This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.
Baseline Description	The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code.
Savings Principle	The high efficiency case assumes the HVAC equipments exceeds the specifications of the International Energy Conservation Code (IECC) 2012.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed heat pump system for space cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H] Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee) Where: Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1
Hours	If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.05
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.40
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0103
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Chiller, Air Cooled
Program Name	Commercial New Construction
Measure Name	Air-cooled chiller
Measure Description	This measure promotes the installation of efficient air-cooled water chilling packages for comfort cooling applications. Eligible chillers include air-cooled chillers for single chiller systems or for the lead chiller only in multi-chiller systems.
Baseline Description	The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. As described in Chapter 13 of the aforementioned document, energy efficiency must be met via compliance with the Internationational Energy Conservation Code 2012.
Savings Principle	The high efficiency case assumes water chilling packages that exceed the efficiency levels required by Rhode Island State Building Code and meet the minimum efficiency requirements as stated in the New Construction HVAC energy efficiency rebate forms. Energy and demand savings calculations are base on actual equipment efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency chiller for space cooling.
Savings Equation	Gross kWh = Tons × 12 × (1/EER_base - 1/EER_ee) × Hours_C Gross kW = Tons × 12 × (1/EER_base - 1/EER_ee) × LF Where: Tons = Rated cooling capacity of the installed equipment: site-specific. EER_base = Energy Efficiency Ratio of baseline equipment: code Reference Table 9 EER_ee = Energy Efficiency Ratio of the efficient equipment: site-specific. Hours_C = Equivalent full load cooling hours Reference Table 11 LF = Load Factor 12 = Conversion factor: 12 kBtu/hr per ton.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm inputs are based on engineering estimates of cooling hours and 2012 International Code Council (2012). 2012 International Energy Conservation Code; Page C-46, Table C403.2.3(7)
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm inputs are based on engineering estimates of cooling hours and 2012 International Code Council (2012). 2012 International Energy Conservation Code; Page C-46, Table C403.2.3(7)
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	23

Copyright 2015 National Grid
All Rights Reserved

measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.04
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0114
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heat Pumps
Sub-type	Air Source
Program Name	Commercial New Construction
Measure Name	Air-cooled heat pump
Measure Description	This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.
Baseline Description	The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code.
Savings Principle	The high efficiency case assumes the HVAC equipments exceeds the specifications of the International Energy Conservation Code (IECC) 2012.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed heat pump system for space cooling.
Savings Equation	Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H] Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee) Where: Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1
Hours	If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.
Hours Source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm inputs are based on engineering estimates of cooling hours and 2012 International Code Council (2012). 2012 International Energy Conservation Code; Page C-46, Table C403.2.3(7)
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm Inputs based on UI and CL&P Program Savings Documentation for 2011 Program Year, Section 2.2.2 C&I LO Cooling - Unitary AC & Heat Pumps
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.05
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.40
CF summer peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0104
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Cooling
Sub-type	Chiller, Water Cooled
Program Name	Commercial New Construction
Measure Name	Water-cooled chiller
Measure Description	This measure promotes the installation of efficient water-cooled and air-cooled water chilling packages for comfort cooling applications. Eligible chillers include air-cooled, water cooled rotary screw and scroll, and water cooled centrifugal chillers for single chiller systems or for the lead chiller only in multi-chiller systems.
Baseline Description	The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. As described in Chapter 13 of the aforementioned document, energy efficiency must be met via compliance with the Internationational Energy Conservation Code 2012.
Savings Principle	The high efficiency case assumes water chilling packages that exceed the efficiency levels required by Rhode Island State Building Code and meet the minimum efficiency requirements as stated in the New Construction HVAC energy efficiency rebate forms. Energy and demand savings calculations are base on actual equipment efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency chiller for space cooling.
Savings Equation	Gross kWh = Tons × (kW/ton_base - kW/ton_ee) × Hours_C Gross kW = Tons × (kW/ton_base - kW/ton_ee) × LF Where: Tons = Rated cooling capacity of the installed equipment: site-specific. kW/ton_base = Rated efficiency of baseline equipment: code kW/ton_ee = Energy efficiency rating of the efficient equipment: site-specific. Hours_C = Equivalent full load cooling hours LF = Load Factor
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorithm inputs are based on engineering estimates of cooling hours and 2012 International Code Council (2012). 2012 International Energy Conservation Code; Page C-46, Table C403.2.3(7)
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorithm inputs are based on engineering estimates of cooling hours and 2012 International Code Council (2012). 2012 International Energy Conservation Code; Page C-46, Table C403.2.3(7)
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	23
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.04
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0184
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Custom
Sub-type	Lighting
Program Name	Commercial New Construction
Measure Name	Custom lighting
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	National Grid assumption based on regional PA working groups. Assumptions based on historical steam trap surveys. Steam losses in lbs/hr are found using "Boiler Efficiency Institute (1987). Steam Efficiency Improvement; Page 34, Table 4.1 under Steam Leak
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.92
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.11
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.79
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.33
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.67
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0180
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Controls
Sub-type	Dimming
Program Name	Commercial New Construction
Measure Name	Daylight dimming
Measure Description	This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls.
Baseline Description	The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction).
Savings Principle	The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed lighting controls project.
Savings Equation	Gross kWh = SUM[QTY_i × Watts_i × (Hours_base_i - Hours_ee_i)] / (Watts per kW) Gross kW = SUM(QTY_i × Watts_i) / (Watts per kW) Where: QTY_i = Quantity in controlled fixtures in location i Watts_i = Connected wattage of controlled fixtures in location i Hours_base_i = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations). Hours_ee_i = Total annual hours that the connected lighting in location i operates with the lighting controls implemented. 1,000 Watts per kW = Conversion factor deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.38
RRe source	RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	0.96
RRd summer peak source	RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.96
RRd winter peak source	RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.15
CF summer peak source	RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.27 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.20 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0225
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Exterior
Sub-type	Street Lighting
Program Name	Commercial New Construction
Measure Name	LED Street Lights
Measure Description	The installation of LED street lights.
Baseline Description	The baseline case is customer owned high-pressure sodium, incandescent, or mercury vapor street lighting.
Savings Principle	The high efficiency case is the installation of LED street lighting.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed LED Streetlight
Savings Equation	Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific. deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	#N/A
measure life note	Based on National Grid Staff estimates
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	Calc
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Calc
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 0.27 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.20 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0208
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	Efficient Lighting
Program Name	Commercial New Construction
Measure Name	Lighting systems
Measure Description	This measure promotes the installation of efficient lighting including, but not limited to, efficient fluorescent lamps, ballasts, and fixtures, solid state lighting, and efficient high intensity discharge (HID) lamps, ballasts, and fixtures.
Baseline Description	For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.
Savings Principle	For both new construction and retrofit installations, the high efficiency case is project-specific and is determined using actual fixture counts for the project and wattages found in Tables 3 and 5 in Appendix A.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific. deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.89
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRe note	#N/A
RR demand (RRd) summer peak	0.97
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.97
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.65
CF summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.49
CF winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.27 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.20 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0181
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Controls
Sub-type	Occupancy Sensor
Program Name	Commercial New Construction
Measure Name	Occupancy sensors
Measure Description	This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls.
Baseline Description	The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction).
Savings Principle	The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed lighting controls project.
Savings Equation	Gross kWh = SUM[QTY_i × Watts_i × (Hours_base_i - Hours_ee_i)] / (Watts per kW) Gross kW = SUM(QTY_i × Watts_i) / (Watts per kW) Where: QTY_i = Quantity in controlled fixtures in location i Watts_i = Connected wattage of controlled fixtures in location i Hours_base_i = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations). Hours_ee_i = Total annual hours that the connected lighting in location i operates with the lighting controls implemented. 1,000 Watts per kW = Conversion factor deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	ERS (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.68
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRe note	#N/A
RR demand (RRd) summer peak	0.96
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.96
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.15
CF summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.27 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.20 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0211
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	Efficient Lighting
Program Name	Commercial New Construction
Measure Name	Performance lighting
Measure Description	Advanced lighting design refers to the implementation of various lighting design principles aimed at creating a quality and appropriate lighting experience while reducing unnecessary light usage. This is often done by a professional in a new construction situation. Advanced lighting design uses techniques like maximizing task lighting and efficient fixtures to create a system of optimal energy efficiency and functionality.
Baseline Description	The baseline efficiency assumes compliance with lighting power density requirements as mandated by Rhode Island State Building Code. Energy efficiency must be met via compliance with the International Energy Conservation Code (IECC) 2012, as described in Appendix A Table 1 and Table 2.
Savings Principle	The high efficiency case assumes lighting systems with lighting power densities below those required by Rhode Island State Building Code. Installed lighting wattage should be determined using the installed fixture counts and wattages.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed lighting fixture project.
Savings Equation	Gross kWh = [SUM(LPD_base_i × Area_i × Hours_i) - SUM(QTY_ee_j × Watts_ee_j × Hours_j)] / (Watts per kW) Gross kW = [SUM(LPD_base_i × Area_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: Area_i = Floor area of location i (SQFT) Hours_base_i = Total annual operating hours for baseline lighting equipment in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j Hours_j = Lighting annual hours of operation: site-specific. 1,000 Watts per kW = Conversion factor deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.

Copyright 2015 National Grid
All Rights Reserved

measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.07
RRe source	KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19.
RRe note	#N/A
RR demand (RRd) summer peak	0.80
RRd summer peak source	KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.73
RRd winter peak source	KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.27 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.20 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0224
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	Linear Fluorescent
Program Name	Commercial Retrofit
Measure Name	Upstream Fluorescents
Measure Description	The installation of efficient lighting discounted at the distribution level.
Baseline Description	The baseline case is a mix of fluorescent and halogen fixtures for LEDs and low efficiency fluorescents for high efficiency fluorescents.
Savings Principle	The high efficiency case is high efficiency LED or linear fluorescent lighting. Please refer to Table 6 in Appendix A for wattage details.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	The annual hours of operation are application specific and can be seen in Table 6: Upstream Lighting.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Table 6
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Table 6
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	Table 6
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	Impact factor incorporated into other parameters
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.10
RRe source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
RRe note	#N/A
RR demand (RRd) summer peak	0.94
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.94
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.58
CF summer peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.56
CF winter peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.93
Net-to-Gross source	DNV KEMA (2013), Process Evaluation of the 2012 Bright Opportunities Program, Final Report, June 14, 2013
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.37 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.18 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0222
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Lighting
Type	Interior
Sub-type	LED Screw Base
Program Name	Commercial Retrofit
Measure Name	Upstream LEDs
Measure Description	The installation of efficient lighting discounted at the distribution level.
Baseline Description	The baseline case is a mix of fluorescent and halogen fixtures for LEDs and low efficiency fluorescents for high efficiency fluorescents.
Savings Principle	The high efficiency case is high efficiency LED or linear fluorescent lighting. Please refer to Table 6 in Appendix A for wattage details.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	The annual hours of operation are application specific and can be seen in Table 6: Upstream Lighting.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Table 6
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Table 6
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	Table 6
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	Impact factor incorporated into other parameters
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.80
RRe source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
RRe note	#N/A
RR demand (RRd) summer peak	0.87
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.87
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.61
CF summer peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.58
CF winter peak source	DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.25
Spill-Over (non-participant)	0.00
Net-to-Gross	1.16
Net-to-Gross source	Note To File, Jeremy Newberger
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.37 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.18 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0415
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Motor
Type	Custom
Sub-type	Motor
Program Name	Commercial New Construction
Measure Name	Custom Motor
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.14
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.17
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.33
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.67
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0230
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Motors/Drives
Type	Variable Speed Drive
Sub-type	VSD
Program Name	Commercial New Construction
Measure Name	Variable speed drives
Measure Description	This measure covers the installation of variable speed drives for multiple end uses and building types.
Baseline Description	The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.
Savings Principle	In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed variable speed drive on exisitng motor or with new NEMA premium efficiency motor.
Savings Equation	Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP Where: HP_motor = Total horsepower of controlled motor: site-specific. MotorEff = Motor efficiency: site-specific. deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type HP_motor = Total horsepower of controlled motor: site-specific. deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.94
RRe source	KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.19 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.14 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0232
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Motors/Drives
Type	Variable Speed Drive
Sub-type	VSD with Motor
Program Name	Commercial New Construction
Measure Name	Variable speed drives w/motor
Measure Description	This measure covers the installation of variable speed drives for multiple end uses and building types.
Baseline Description	The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.
Savings Principle	In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed variable speed drive on exisitng motor or with new NEMA premium efficiency motor.
Savings Equation	Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP Where: HP_motor = Total horsepower of controlled motor: site-specific. MotorEff = Motor efficiency: site-specific. deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type HP_motor = Total horsepower of controlled motor: site-specific. deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.94
RRe source	KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.19 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.14 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0380
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Other
Type	Custom
Sub-type	Other
Program Name	Commercial New Construction
Measure Name	Custom Other
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.14
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.17
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.33
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.67
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0248
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Process
Type	Custom
Sub-type	Process
Program Name	Commercial New Construction
Measure Name	Custom process
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	0.93
RRe source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.04
RRd winter peak source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.33
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.67
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0379
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Refrigeration
Type	Custom
Sub-type	Refrigeration
Program Name	Commercial New Construction
Measure Name	Custom Refrigeration
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.14
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.17
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.33
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.67
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0276
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Refrigeration
Type	Refrigeration Lighting
Sub-type	Refrigerator Case LED
Program Name	Commercial New Construction
Measure Name	LEDs for freezer/cooler cases
Measure Description	Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load.
Baseline Description	The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases.
Savings Principle	The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base × Watts_base × Hours_base) - SUM(QTY_ee × kW_ee × Hours_ee)] × (1 + EffRefrig × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours_ee Where: QTY_base = Quantity of baseline lighting fixtures in cooler/freezer case Watts_base = Connected wattage of baseline lighting fixtures in cooler/freezer case Hours_base = Annual operating hours of baseline lighting fixtures in cooler/freezer case QTY_ee = Quantity of efficient lighting fixtures in cooler/freezer case Watts_ee = Connected wattage of efficient lighting fixtures in cooler/freezer case Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case 1.9 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	13
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.94
RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.01
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.01
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.14
Net-to-Gross	0.72
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.27 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.20 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0350
Fuel	Electric
Sector	C&I
Project Type	New Construction
Category	Whole Building
Type	Custom
Sub-type	Whole Building
Program Name	Commercial New Construction
Measure Name	Comprehensive Design (CDA)
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	Calc
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.20
RRe source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	0.84
RRd summer peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.50
RRd winter peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.11
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.89
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.24 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0425
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	CHP
Type	Custom
Sub-type	CHP
Program Name	Commercial Retrofit
Measure Name	Custom CHP
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	Calc
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.95
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	1.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.52 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.26 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0390
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Compressed Air
Type	Custom
Sub-type	Compressed Air
Program Name	Commercial Retrofit
Measure Name	Custom Compressed Air
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.93
RRe source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.04
RRd winter peak source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0111
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Custom
Sub-type	HVAC
Program Name	Commercial Retrofit
Measure Name	Custom HVAC
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.10
RRe source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.13
RRd summer peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.66
RRd winter peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0074
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Energy Management System
Program Name	Commercial Retrofit
Measure Name	Energy management system
Measure Description	The measure is the installation of a new building energy management system (EMS) or the expansion of an existing energy management system for control of non-lighting electric and gas end-uses in an existing building on existing equipment.
Baseline Description	The baseline case is the existing equipment and systems without the implemented controls.
Savings Principle	The high efficiency case is the installation of a new EMS or the expansion of an existing EMS to control additional non-lighting electric and/or gas equipment. The EMS must be installed in an existing building on existing equipment.
Energy Savings calculation method	Custom
Savings unit	Upgrade to existing energy management system.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = Gross kWh × deltaMMBtu_Gas/kWh Gross MMBtu Oil = Gross kWh × deltaMMBtu_Oil/kWh deltaMMBtu_Gas/kWh = Deemed average natural gas impact per gross electric energy impact deltaMMBtu_Oil/kWh = Deemed average heating oil impact per gross electric energy impact
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Impact Evaluation of the 2012-2013 Boiler Reset Control Pilot Program. Prepared for the Electric and Gas Energy Efficiency Program Administrators of Massachusetts.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.04
RRe source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co.

Copyright 2015 National Grid
All Rights Reserved

RRe note	#N/A
RR demand (RRd) summer peak	1.03
RRd summer peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.03
RRd winter peak source	The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0075
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Occupancy Sensor
Program Name	Commercial Retrofit
Measure Name	Hotel occupancy sensor
Measure Description	The measure is to the installation of hotel occupancy sensors (HOS) to control packaged terminal AC units (PTACs) with electric heat, heat pump units and/or fan coil units in hotels that operate all 12 months of the year.
Baseline Description	The baseline efficiency case assumes the equipment has no occupancy based controls.
Savings Principle	The high efficiency case is the installation of controls that include (a) occupancy sensors, (b) window/door switches for rooms that have operable window or patio doors, and (c) set back to 65 degrees Fahrenheit in the heating mode and set forward to 78 F in the cooling mode when occupancy detector is in the unoccupied mode. Sensors controlled by a front desk system are not eligible.
Energy Savings calculation method	Deemed
Savings unit	Installed hotel occupancy sensor.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	438
kWh/yr savings source	National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.
kWh/yr savings note	#N/A
kW reduction	0.09
kW reduction source	National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.30
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	0.70
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.64 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.32 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0185
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Lighting
Type	Custom
Sub-type	Lighting
Program Name	Commercial Retrofit
Measure Name	Custom lighting
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	National Grid assumption based on regional PA working groups. Assumptions based on historical steam trap surveys. Steam losses in lbs/hr are found using “Boiler Efficiency Institute (1987). Steam Efficiency Improvement; Page 34, Table 4.1 under Steam Leak
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.92
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.11
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.79
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0209
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Lighting
Type	Interior
Sub-type	Efficient Lighting
Program Name	Commercial Retrofit
Measure Name	Lighting systems
Measure Description	This measure promotes the installation of efficient lighting including, but not limited to, efficient fluorescent lamps, ballasts, and fixtures, solid state lighting, and efficient high intensity discharge (HID) lamps, ballasts, and fixtures.
Baseline Description	For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.
Savings Principle	For both new construction and retrofit installations, the high efficiency case is project-specific and is determined using actual fixture counts for the project and wattages found in Tables 3 and 5 in Appendix A.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed high-efficiency lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) Where: QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific. deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12

Copyright 2015 National Grid
All Rights Reserved

measure life source	Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.89
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRe note	#N/A
RR demand (RRd) summer peak	0.97
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.97
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.65
CF summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.49
CF winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.464 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.232 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0182
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Lighting
Type	Controls
Sub-type	Occupancy Sensor
Program Name	Commercial Retrofit
Measure Name	Occupancy sensors
Measure Description	This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls.
Baseline Description	The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction).
Savings Principle	The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed lighting controls project.
Savings Equation	Gross kWh = SUM[QTY_i × Watts_i × (Hours_base_i - Hours_ee_i)] / (Watts per kW) Gross kW = SUM(QTY_i × Watts_i) / (Watts per kW) Where: QTY_i = Quantity in controlled fixtures in location i Watts_i = Connected wattage of controlled fixtures in location i Hours_base_i = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations). Hours_ee_i = Total annual hours that the connected lighting in location i operates with the lighting controls implemented. 1,000 Watts per kW = Conversion factor deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.68
RRe source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRe note	#N/A
RR demand (RRd) summer peak	0.96
RRd summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.96
RRd winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.15
CF summer peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.18
CF winter peak source	KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.464 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.232 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0392
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Motor
Type	Custom
Sub-type	Motor
Program Name	Commercial Retrofit
Measure Name	Custom Motor
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.14
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.17
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0231
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Motors/Drives
Type	Variable Speed Drive
Sub-type	VSD
Program Name	Commercial Retrofit
Measure Name	Variable speed drives
Measure Description	This measure covers the installation of variable speed drives for multiple end uses and building types.
Baseline Description	The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.
Savings Principle	In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed variable speed drive on exisitng motor or with new NEMA premium efficiency motor.
Savings Equation	Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP Where: HP_motor = Total horsepower of controlled motor: site-specific. MotorEff = Motor efficiency: site-specific. deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type HP_motor = Total horsepower of controlled motor: site-specific. deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	13
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.94
RRe source	KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.60 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.30 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0233
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Motors/Drives
Type	Variable Speed Drive
Sub-type	VSD with Motor
Program Name	Commercial Retrofit
Measure Name	Variable speed drives w/motor
Measure Description	This measure covers the installation of variable speed drives for multiple end uses and building types.
Baseline Description	The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.
Savings Principle	In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed variable speed drive on exisitng motor or with new NEMA premium efficiency motor.
Savings Equation	Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP Where: HP_motor = Total horsepower of controlled motor: site-specific. MotorEff = Motor efficiency: site-specific. deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type HP_motor = Total horsepower of controlled motor: site-specific. deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	13
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.94
RRe source	KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.60 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.30 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0393
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Other
Type	Custom
Sub-type	Other
Program Name	Commercial Retrofit
Measure Name	Custom Other
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.14
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.17
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0249
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Process
Type	Custom
Sub-type	Process
Program Name	Commercial Retrofit
Measure Name	Custom process
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	0.93
RRe source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.04
RRd winter peak source	KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0270
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Motors
Sub-type	ECM
Program Name	Commercial Retrofit
Measure Name	Case ECMs
Measure Description	Installation of various sizes of electronically commutated motors (ECMs) in walk-in coolers and freezers to replace existing evaporator fan motors.
Baseline Description	The baseline efficiency case is an existing case motor.
Savings Principle	The high efficiency case is the replacement of an existing case with an ECM.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed electronically commutated motor for evaporator fans in existing cooler/freezer.
Savings Equation	Gross kWh = kW_motor × LRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours Where: kW_motor = Metered load of existing case motor: site-specific LRF = Load reduction factor: 53% when shaded pole motors are replaced, 29% when PSC motors are replaced Hours = Average runtime of case motors; Estimate based on NRM field experience. RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor
Hours	Hours are the annual operating hours of the case motors.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.87
CF summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.51
CF winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0287
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Temp Maintain
Sub-type	Night Cover
Program Name	Commercial Retrofit
Measure Name	Cooler night cover
Measure Description	Installation of retractable aluminum woven fabric covers for open-type refrigerated display cases, where the covers are deployed during the facility unoccupied hours in order to reduce refrigeration energy consumption.
Baseline Description	The baseline efficiency case is the annual operation of open-display cooler cases.
Savings Principle	The high efficiency case is the use of night covers to protect the exposed area of display cooler cases during unoccupied hours.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Linear feet of installed night covers on existing cooler cases.
Savings Equation	Gross kWh = Width × deltakW/feet × Hours Gross kW = Width × deltakW/feet Where: Width = Width in feet of the opening that the night covers protect: site-specific deltakW/feet = Savings factor based on the temperature of the case Hours = Annual hours that the night covers are in use: site-specific
Hours	Hours represent the number of annual hours that the night covers are in use, and should be determined on a case-by-case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0391
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Custom
Sub-type	Refrigeration
Program Name	Commercial Retrofit
Measure Name	Custom Refrigeration
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	Defined per project.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRe note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.14
RRd summer peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.17
RRd winter peak source	DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0252
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Defrost Control
Program Name	Commercial Retrofit
Measure Name	Defrost control
Measure Description	A control mechanism to skip defrost cycles when defrost is unnecessary.
Baseline Description	The baseline efficiency case is an evaporator fan electric defrost system that uses a time clock mechanism to initiate defrost.
Savings Principle	The high efficiency case is an evaporator fan defrost system with electric defrost controls.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed defrost controls in existing cooler/freezer.
Savings Equation	Gross kWh = kW_Defrost × DRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours Where: kW_Defrost = Load of electric defrost: site-specific DRF = Defrost reduction factor- percent reduction in defrosts required per year: 35% Hours = Number of hours defrost occurs over a year without the defrost controls 1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12 kBtu/hr per ton = Conversion factor
Hours	The number of defrost cycles is estimated to decrease by 35% from an average number of defrost cycles of 1460 defrosts/year at 40 minutes each for a total of 973 hours/year. The number of defrost cycles with the defrost controls is 949 cycles/year, or 633
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence factors set to 1.00 since gross kW is the average kW reduction during operation.
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence factors set to 1.00 since gross kW is the average kW reduction during operation.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0253
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Door Heater Control
Program Name	Commercial Retrofit
Measure Name	Door heater control
Measure Description	The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating results in a reduced cooling load.
Baseline Description	The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls.
Savings Principle	The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by measuring the ambient humidity and temperature of the store, calculating the dew point, and using pulse width modulation (PWM) to control the anti-sweat heater based on specific algorithms for freezer and cooler doors. Door temperature is typically maintained about 5 degrees Fahrenheit above the store air dew point temperature with the heaters operating at 80% (adjustable).
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed door heater controls on existing cooler/freezer.
Savings Equation	Gross kWh = kW_DoorHeater × %OFF × Hours Gross kW = kW_DoorHeater × %OFF Where: kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific %OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters Hours = Door heater annual run hours before controls
Hours	Pre-retrofit hours are 8,760 hours per year. After controls are installed, the door heaters in freezers are on for an average 4,730.4 hours/year (46% off time) and the door heaters for coolers are on for an average 2,277.6 hours/year (74% off time).
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed 100% because savings are based on researched assumptions.
Coincidence factor (CF) summer peak	0.50
CF summer peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0272
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Motors
Sub-type	ECM
Program Name	Commercial Retrofit
Measure Name	ECM Evaporator fan Motors for Walk-in coolers
Measure Description	Installation of electronically commutated motors (ECMs) in multi-deck and freestanding coolers and freezers, typically on the retail floor of convenience stores, liquor stores, and grocery stores.
Baseline Description	The baseline efficiency case is the existing case motor.
Savings Principle	The high efficiency case is the replacement of the existing case motor with an ECM.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed electronically commutated motor for evaporator fans in existing cooler/freezer.
Savings Equation	Gross kWh = kW_Fan × LRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours Where: kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment LRF = Load reduction factor for motor replacement Hours = Annual fan operating hours: site-specific 1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor
Hours	The annual operating hours are assumed to be 8,760 * (1-%OFF), where %OFF = 0 if the facility does not have evaporator fan controls or %OFF > 0 if the facility has evaporator fan controls. See section: Refrigeration – Evaporator Fan Controls for %OFF valu
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.87
CF summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.51
CF winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0256
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Fan Control
Program Name	Commercial Retrofit
Measure Name	Evaporator fan control
Measure Description	Installation of controls to modulate the evaporator fans based on temperature control. Energy savings include: fan energy savings from reduced fan operating hours, refrigeration energy savings from reduced waste heat, and compressor energy savings resulting from the electronic temperature control. Electronic controls allow less fluctuation in temperature, thereby creating savings.
Baseline Description	The baseline efficiency case assumes evaporator fans that run 8760 annual hours with no temperature control.
Savings Principle	The high efficiency case is the use of an energy management system to control evaporator fan operation based on temperature.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed controls on evaporator fans in existing cooler/freezer.
Savings Equation	Gross kWh = kW_Fan × %OFF × (Hours per year) × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) + [kW_cp × Hours_cp + kW_fan × (Hours per year) × (1-%OFF)] × %SAVE Gross kW = Gross kWh / Hours Where: kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment %OFF_heater = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters 8760 Hours per year = Conversion factor 1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3,413 Btu/hr per kW = Conversion factor 12 kBtu/hr per ton = Conversion factor kW_cp = Total power demand of compressor motor and condenser fan calculated from equipment nameplate data and estimated 0.85 power factor Hours_cp = Equivalent annual full load hours of compressor operation; Estimate based on NRM field experience. %OFF_evap = Percent of annual hours that the evaporator is turned off; Estimate based on NRM field experience. %SAVE = Reduced run-time of compressor and evaporator due to electronic controls; Estimate based on NRM field experience.
Hours	The average annual operating hours are 4072 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.58
RRe source	HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSCo.
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSCo.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.00
RRd winter peak source	HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSCo.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.23
CF summer peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.84
CF winter peak source	HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0260
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Vending Miser
Program Name	Commercial Retrofit
Measure Name	Glass front refrigerated coolers
Measure Description	Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.
Baseline Description	The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Savings Principle	The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Energy Savings calculation method	Deemed
Savings unit	Installed vending miser.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1208
kWh/yr savings source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kWh/yr savings note	#N/A
kW reduction	0.138
kW reduction source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0277
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Refrigeration Lighting
Sub-type	Refrigerator Case LED
Program Name	Commercial Retrofit
Measure Name	LEDs for freezer/cooler cases
Measure Description	Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load.
Baseline Description	The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases.
Savings Principle	The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed lighting project.
Savings Equation	Gross kWh = [SUM(QTY_base × Watts_base × Hours_base) - SUM(QTY_ee × kW_ee × Hours_ee)] × (1 + EffRefrig × (Btu/hr per kW) / (Btu/hr per ton)) Gross kW = Gross kWh / Hours_ee Where: QTY_base = Quantity of baseline lighting fixtures in cooler/freezer case Watts_base = Connected wattage of baseline lighting fixtures in cooler/freezer case Hours_base = Annual operating hours of baseline lighting fixtures in cooler/freezer case QTY_ee = Quantity of efficient lighting fixtures in cooler/freezer case Watts_ee = Connected wattage of efficient lighting fixtures in cooler/freezer case Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case 1.9 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case
Hours	The average annual operating hours are 8760 hours/year.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	13
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.94
RRe source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	1.01
RRd summer peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	1.01
RRd winter peak source	RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	1.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Coincidence factor (CF) winter peak	1.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.464 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.232 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0258
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Novelty Cooler Control
Program Name	Commercial Retrofit
Measure Name	Novelty cooler shutoff
Measure Description	Installation of controls to shut off a facility's novelty coolers for non-perishable goods based on pre-programmed store hours. Energy savings occur as coolers cycle off during facility unoccupied hours.
Baseline Description	The baseline efficiency case is the novelty coolers operating 8,760 hours per year.
Savings Principle	The high efficiency case is the novelty coolers operating fewer than 8,760 hours per year since they are controlled to cycle each night based on pre-programmed facility unoccupied hours.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Installed controls on existing cooler/freezer.
Savings Equation	Gross kWh = kW_nc × DC_nc × HoursOff Gross kW = 0 Where: kW_nc = Power demand of novelty cooler calculated from equipment nameplate data and estimated 0.85 power factor. DC_nc = Weighted average annual duty cycle; Estimate based on NRM field experience. HoursOff = Potential hours off every night per year, estimated as one less than the number of hours the store is closed per day: site-specific.
Hours	Energy and demand savings are based on the reduced operation hours of the cooler equipment. Hours reduced per day are estimated on a case-by-case basis, and are typically calculated as one less than the number of hours per day that the facility is closed
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR.
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0264
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Vending Miser
Program Name	Commercial Retrofit
Measure Name	Refrigerated beverage vending machine
Measure Description	Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.
Baseline Description	The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Savings Principle	The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Energy Savings calculation method	Deemed
Savings unit	Installed vending miser.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	1612
kWh/yr savings source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kWh/yr savings note	#N/A
kW reduction	0.184
kW reduction source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0262
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Refrigeration
Type	Controls
Sub-type	Vending Miser
Program Name	Commercial Retrofit
Measure Name	Non-refrigerated snack vending machine
Measure Description	Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.
Baseline Description	The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Savings Principle	The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.
Energy Savings calculation method	Deemed
Savings unit	Installed vending miser.
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Where: Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.
Hours	It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	343
kWh/yr savings source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kWh/yr savings note	#N/A
kW reduction	0.039
kW reduction source	USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0
Gas Heat MMBtu/yr savings source	National Grid assumption based on regional PA working groups. Assumptions based on historical steam trap surveys. Steam losses in lbs/hr are found using “Boiler Efficiency Institute (1987). Steam Efficiency Improvement; Page 34, Table 4.1 under Steam Leak
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.79
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.294 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.147 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0351
Fuel	Electric
Sector	C&I
Project Type	Retrofit
Category	Whole Building
Type	Custom
Sub-type	Whole Building
Program Name	Commercial Retrofit
Measure Name	Comprehensive Retrofit (CR)
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom energy-efficiency project.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	The annual hours of operation are site specific and will be determined on a case by case basis.
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	Calc
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.20
RRe source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	0.84
RRd summer peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.50
RRd winter peak source	KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.48 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.24 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0014
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Building Shell
Type	Insulation
Sub-type	Heating
Program Name	Residential New Construction
Measure Name	Renovation Rehab Heating
Measure Description	Renovation Rehab projects include the installation of roof, wall, and basement insulation
Baseline Description	The baseline case is the performance of the house before participation in the program
Savings Principle	The efficient case is the post-retrofit performance of a house participating the program
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Complete Renovation Rehab project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kW reduction note	Calculated, per 100ft2
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0128
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	EnergyStar HVAC
Measure Name	Boiler (forced hot water) >= 95% AFUE
Measure Description	Installation of a new space heating gas-fired condensing boiler.
Baseline Description	The baseline efficiency case is a boiler with an AFUE equal to 82%.
Savings Principle	The high efficiency case is a boiler with an AFUE greater than or equal to 90% or 95%.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	14.1
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	19
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.32
Spill-Over (participant)	0.08
Spill-Over (non-participant)	0.00
Net-to-Gross	0.76
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 4044.15 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 700 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0154
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Furnace
Program Name	EnergyStar HVAC
Measure Name	Furnace (forced hot air) >= 97% AFUE
Measure Description	Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan.
Baseline Description	The baseline efficiency case is a 85% AFUE (negotiated) furnace.
Savings Principle	The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor or a new furnace with AFUE >= 97% and an electronically commutated motor.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency furnace with ECM
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	9.2
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.41
Spill-Over (participant)	0.22
Spill-Over (non-participant)	0.00
Net-to-Gross	0.81
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1865.98 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0155
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Furnace
Program Name	EnergyStar HVAC
Measure Name	Furnace (forced hot air) 95% AFUE w/ECM
Measure Description	Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan.
Baseline Description	The baseline efficiency case is a 85% AFUE (negotiated) furnace.
Savings Principle	The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor or a new furnace with AFUE >= 97% and an electronically commutated motor.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency furnace with ECM
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	8.1
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.41
Spill-Over (participant)	0.22
Spill-Over (non-participant)	0.00
Net-to-Gross	0.81
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1703.82 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0149
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Efficient Heating
Program Name	Residential New Construction
Measure Name	Heating
Measure Description	This measure involves the installation of a high-efficiency natural gas heating system.
Baseline Description	The baseline efficiency case is a standard efficiency natural gas heating system.
Savings Principle	The high efficiency case is the installation of a high-efficiency natural gas heating system.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency natural gas heating system.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0147
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	EnergyStar HVAC
Measure Name	Integrated water heater/condensing boiler
Measure Description	This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank.
Baseline Description	The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater.
Savings Principle	The high efficiency case is an integrated water heater/condensing boiler with a 90% AFUE boiler and a 0.9 EF water heater.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency integrated boiler/water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	10.4
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.34
Spill-Over (participant)	0.08
Spill-Over (non-participant)	0.00
Net-to-Gross	0.74
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1728.48 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0431
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	EnergyStar HVAC
Measure Name	Integrated water heater/condensing boiler 95
Measure Description	This measure promotes the installation of a combined condensing high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank.
Baseline Description	The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater.
Savings Principle	The high efficiency case is an integrated water heater/condensing boiler with a 95% AFUE boiler and a 0.95 EF water heater.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency integrated boiler/water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	12.8
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.34
Spill-Over (participant)	0.08
Spill-Over (non-participant)	0.00
Net-to-Gross	0.74
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0140
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	EnergyStar HVAC
Measure Name	Hard-to-reach Boiler (forced hot water) >= 95% AFUE
Measure Description	Installation of a new space heating gas-fired condensing boiler.
Baseline Description	The baseline efficiency case is a boiler with an AFUE equal to 82%.
Savings Principle	The high efficiency case is a boiler with an AFUE greater than or equal to 90% or 95%.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	14.1
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	19
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.32
Spill-Over (participant)	0.08
Spill-Over (non-participant)	0.00
Net-to-Gross	0.76
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 4044.15 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 700 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0141
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	EnergyStar HVAC
Measure Name	Hard-To-Reach Boiler (forced hot water) 90% AFUE
Measure Description	Installation of a new space heating gas-fired condensing boiler.
Baseline Description	The baseline efficiency case is a boiler with an AFUE equal to 82%.
Savings Principle	The high efficiency case is a boiler with an AFUE greater than or equal to 90% or 95%.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	11.4
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.11
Spill-Over (participant)	0.03
Spill-Over (non-participant)	0.00
Net-to-Gross	0.92
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 300
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0158
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Furnace
Program Name	EnergyStar HVAC
Measure Name	Hard-to-reach Furnace (forced hot air) >= 97% AFUE
Measure Description	Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan.
Baseline Description	The baseline efficiency case is a 85% AFUE (negotiated) furnace.
Savings Principle	The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor or a new furnace with AFUE >= 97% and an electronically commutated motor.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency furnace with ECM
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	9.2
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.14
Spill-Over (participant)	0.03
Spill-Over (non-participant)	0.00
Net-to-Gross	0.89
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2077.71 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 400 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0159
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Furnace
Program Name	EnergyStar HVAC
Measure Name	Hard-to-Reach Furnace (forced hot air) 95% AFUE w/ECM
Measure Description	Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan.
Baseline Description	The baseline efficiency case is a 85% AFUE (negotiated) furnace.
Savings Principle	The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor or a new furnace with AFUE >= 97% and an electronically commutated motor.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency furnace with ECM
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	8.1
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.14
Spill-Over (participant)	0.07
Spill-Over (non-participant)	0.00
Net-to-Gross	0.94
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1865.98 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0144
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	EnergyStar HVAC
Measure Name	Hard-To-Reach Integrated water heater/condensing boiler
Measure Description	This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank.
Baseline Description	The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater.
Savings Principle	The high efficiency case is an integrated water heater/condensing boiler with a 90% AFUE boiler and a 0.9 EF water heater.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency integrated boiler/water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	10.4
Gas Heat MMBtu/yr savings source	Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	47.16
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	379.29
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.11
Spill-Over (participant)	0.03
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1728.48 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0328
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Condensing Water Heater
Program Name	EnergyStar HVAC
Measure Name	Condensing Gas Water Heater (THERMAL EFICIENCY 0.95)
Measure Description	Condensing water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.37
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	Nexus Market Research (2010). HEHE Process and Impact Evaluation. Prepared for GasNetworks
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1728.48 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0332
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Efficient Standard Tank Water Heater
Program Name	EnergyStar HVAC
Measure Name	High Efficiency Stand Alone Water Heater (0.67 EF)
Measure Description	Stand-alone storage water heaters are high efficiency water heaters that are not combined with space heating devices.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	1.9
Gas Heat MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.13
Spill-Over (participant)	0.13
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 562.23 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0299
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Flow Control
Sub-type	Flow Control Measures
Program Name	Residential New Construction
Measure Name	Hot water heating
Measure Description	DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy.
Baseline Description	The baseline efficiency case is the existing domestic hot water equipment.
Savings Principle	The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.
Energy Savings calculation method	Deemed
Savings unit	Installed DHW efficiency measure.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0348
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater Insulation
Sub-type	Insulation
Program Name	Residential New Construction
Measure Name	Renovation Rehab Domestic Hot Water
Measure Description	Renovation Rehab projects include the installation of roof, wall, and basement insulation
Baseline Description	The baseline case is the performance of the house before participation in the program
Savings Principle	The efficient case is the post-retrofit performance of a house participating the program
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Complete Renovation Rehab project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kWh/yr savings note	Supplied by vendor
kW reduction	Calc
kW reduction source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
kW reduction note	Supplied by vendor
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	Custom
CF summer peak source	#N/A
CF summer peak note	Coincidence factors are custom calculated based on project-specific detail.
Coincidence factor (CF) winter peak	Custom
CF winter peak source	#N/A
CF winter peak note	Coincidence factors are custom calculated based on project-specific detail.
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	Assumed to equal incentive amount. per housing Unit
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	Varies by performance tier, housing type & number of units. See Source for details per housing Unit

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0414
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	EnergyStar HVAC
Measure Name	Tankless Water Heaters (EF 0.94)
Measure Description	Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installed condensing tankless water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.25
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.75
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2077.71 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 400 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0346
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	EnergyStar HVAC
Measure Name	Tankless Water Heaters (EF 0.95)
Measure Description	Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installed condensing tankless water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.28
Spill-Over (participant)	0.25
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2478.78 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 400 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0330
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Condensing Water Heater
Program Name	EnergyStar HVAC
Measure Name	Hard-To-Reach Condensing Gas Water Heater (THERMAL EFICIENCY 0.95)
Measure Description	Condensing water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.12
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.88
Net-to-Gross source	Nexus Market Research (2010). HEHE Process and Impact Evaluation. Prepared for GasNetworks
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1785.86 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 300 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0331
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Efficient Standard Tank Water Heater
Program Name	EnergyStar HVAC
Measure Name	Hard-to-Reach High Efficiency Stand Alone Water Heater (0.67 EF)
Measure Description	Stand-alone storage water heaters are high efficiency water heaters that are not combined with space heating devices.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	1
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	1.9
Gas Heat MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.04
Spill-Over (participant)	0.03
Spill-Over (non-participant)	0.00
Net-to-Gross	0.98
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 562.23 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0413
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	EnergyStar HVAC
Measure Name	Hard-to-Reach Tankless Water Heaters (EF 0.94)
Measure Description	Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	Standard efficiency.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installed tankless water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	0.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.08
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.92
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2077.71 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 400 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0342
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	EnergyStar HVAC
Measure Name	Hard-to-Reach Tankless Water Heaters (EF 0.95)
Measure Description	Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.67, a condensing water heater with an energy factor >= 0.95, a tankless water heater with an energy factor >= 0.82, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency water heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	19
measure life source	DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.08
Spill-Over (non-participant)	0.00
Net-to-Gross	0.99
Net-to-Gross source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2478.78 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 400 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0324
Fuel	Gas
Sector	Residential
Project Type	New Construction
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Residential New Construction
Measure Name	Low-flow showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.48
Gas Heat MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 10 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0004
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Air Sealing
Sub-type	Air Sealing/Infiltration
Program Name	Income Eligible MultiFamily
Measure Name	LI MF Air Sealing
Measure Description	Thermal shell air leaks are sealed through strategic use and location of air-tight materials.
Baseline Description	The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)
Savings Principle	The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed air sealing project.
Savings Equation	Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu) Where: CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0018
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	Income Eligible MultiFamily
Measure Name	LI MF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0017
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	Income Eligible MultiFamily
Measure Name	LI MF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0034
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	Income Eligible MultiFamily
Measure Name	LI MF Shell Insulation
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu Gas = SQFT × [1/R_pre - 1/(R_pre + R_add)] × HDD × (Hours per Day) × CorrectionFactor × SeasonalEff / (Btu per MMBtu) Where: SQFT = Square feet of insulation installed R_pre = Total R-value of the existing attic, basement or sidewall (ft2-hr-°F/Btu) R_add = R-value of the added insulation (ft2-hr-°F/Btu) 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0006
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Air Sealing
Sub-type	Air Sealing/Infiltration
Program Name	EnergyWise MultiFamily
Measure Name	MF Air Sealing
Measure Description	Thermal shell air leaks are sealed through strategic use and location of air-tight materials.
Baseline Description	The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)
Savings Principle	The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed air sealing project.
Savings Equation	Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu) Where: CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15

Copyright 2015 National Grid
All Rights Reserved

measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0022
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	EnergyWise MultiFamily
Measure Name	MF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0020
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	EnergyWise MultiFamily
Measure Name	MF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0036
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	EnergyWise MultiFamily
Measure Name	MF Shell Insulation
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu Gas = SQFT × [1/R_pre - 1/(R_pre + R_add)] × HDD × (Hours per Day) × CorrectionFactor × SeasonalEff / (Btu per MMBtu) Where: SQFT = Square feet of insulation installed R_pre = Total R-value of the existing attic, basement or sidewall (ft2-hr-°F/Btu) R_add = R-value of the added insulation (ft2-hr-°F/Btu) 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A

Copyright 2015 National Grid
All Rights Reserved

In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0007
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Air Sealing
Sub-type	Air Sealing/Infiltration
Program Name	EnergyWise
Measure Name	SF Air Sealing
Measure Description	Thermal shell air leaks are sealed through strategic use and location of air-tight materials.
Baseline Description	The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)
Savings Principle	The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed air sealing project.
Savings Equation	Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu) Where: CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0

Copyright 2015 National Grid
All Rights Reserved

measure life	15
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0024
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	EnergyWise
Measure Name	SF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0023
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	EnergyWise
Measure Name	SF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0037
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Shell
Program Name	EnergyWise
Measure Name	SF Shell Insulation
Measure Description	Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.
Baseline Description	The baseline efficiency case is any existing home shell measures.
Savings Principle	The high efficiency case includes increased weatherization insulation levels.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu Gas = SQFT × [1/R_pre - 1/(R_pre + R_add)] × HDD × (Hours per Day) × CorrectionFactor × SeasonalEff / (Btu per MMBtu) Where: SQFT = Square feet of insulation installed R_pre = Total R-value of the existing attic, basement or sidewall (ft2-hr-°F/Btu) R_add = R-value of the added insulation (ft2-hr-°F/Btu) 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00

Copyright 2015 National Grid
All Rights Reserved

In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0042
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Building Shell
Type	Insulation & Air sealing
Sub-type	Weatherization
Program Name	Single Family Appliance Management
Measure Name	Weatherization
Measure Description	Installation of weatherization measures such as air sealing and insulation in gas heated homes. Electric savings are achieved from reduced run time of the HVAC system fan(s).
Baseline Description	The baseline efficiency case is the existing home shell.
Savings Principle	The high efficiency case can be a combination of increased insulation, air sealing, duct sealing, and other improvements to the home shell.
Energy Savings calculation method	Deemed
Savings unit	Household with weatherization measures installed
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	344
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.009
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	18.8
Gas Heat MMBtu/yr savings source	Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.03
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.03
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	128.80
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	368.56
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 4500 per job
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 4500 per job

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0070
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Boiler Control
Program Name	EnergyStar HVAC
Measure Name	Boiler Load Controls
Measure Description	Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.
Baseline Description	The baseline efficiency case is a boiler without reset or load controls.
Savings Principle	The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.
Energy Savings calculation method	Deemed
Savings unit	Installation of boiler reset control on existing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	2.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	The Cadmus Group (2012). Impact Evaluation of the 2012-2013 Boiler Reset Control Pilot Program. Prepared for the Electric and Gas Energy Efficiency Program Administrators of Massachusetts.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.92
CF summer peak source	The Cadmus Group (2012). Impact Evaluation of the 2012-2013 Boiler Reset Control Pilot Program. Prepared for the Electric and Gas Energy Efficiency Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	The Cadmus Group (2012). Impact Evaluation of the 2012-2013 Boiler Reset Control Pilot Program. Prepared for the Electric and Gas Energy Efficiency Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 300
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0072
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Boiler Control
Program Name	EnergyStar HVAC
Measure Name	Boiler Reset Controls
Measure Description	Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.
Baseline Description	The baseline efficiency case is a boiler without reset or load controls.
Savings Principle	The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.
Energy Savings calculation method	Deemed
Savings unit	Installation of boiler reset control on existing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	4.5
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 300 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0073
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Boiler Control
Program Name	EnergyStar HVAC
Measure Name	Hard-To-Reach Boiler Reset Controls
Measure Description	Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.
Baseline Description	The baseline efficiency case is a boiler without reset or load controls.
Savings Principle	The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.
Energy Savings calculation method	Deemed
Savings unit	Installation of boiler reset control on existing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	4.5
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 300 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0179
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Ventilation
Sub-type	Heat Recovery Ventilator
Program Name	EnergyStar HVAC
Measure Name	Heat Recovery Ventilator
Measure Description	Heat Recovery Ventilators (HRV) can help make mechanical ventilation more cost effective by reclaiming energy from exhaust airflows. An electric penalty results due to the increased electricity consumed by the system fans.
Baseline Description	The baseline efficiency case is an ASHRAE 62.2-compliant exhaust fan system with no heat recovery.
Savings Principle	The high efficiency case is an exhaust fan system with heat recovery.
Energy Savings calculation method	Deemed
Savings unit	Installation of heat recovery ventilation system
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	-133
kWh/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
kWh/yr savings note	#N/A
kW reduction	-0.07
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 960 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0151
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Heating
Sub-type	Efficient Heating
Program Name	Single Family Appliance Management
Measure Name	Heating system replacement (gas)
Measure Description	Replacement of an existing gas heating system with a new high efficiency system. Electric savings are achieved from reduced run time of the heating system fan(s).
Baseline Description	The baseline efficiency case is the existing inefficient heating equipment.
Savings Principle	The high efficiency case is the new efficient heating equipment.
Energy Savings calculation method	Deemed
Savings unit	Installation of new high-efficiency gas heating system
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	172
kWh/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
kWh/yr savings note	#N/A
kW reduction	0.024
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	18.4
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.03
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.03
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	134.82
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	249.20
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 4500 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 4500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0088
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Income Eligible MultiFamily
Measure Name	Programmable thermostat
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	RLW Analytics (2007). Validating the Impacts of Programmable Thermostats. Prepared for GasNetworks; Page 2. Conversion factor for CCF to therms is 1.024.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0087
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise MultiFamily
Measure Name	Programmable thermostat
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0086
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise
Measure Name	Programmable thermostat
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0091
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyStar HVAC
Measure Name	WiFi Enabled Thermostat
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	6.6
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 50 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0092
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyStar HVAC
Measure Name	WiFi Enabled Thermostat with Cooling
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	104
kWh/yr savings source	The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid.
kWh/yr savings note	#N/A
kW reduction	0.231
kW reduction source	The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	6.6
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	1.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 270 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 50 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0094
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise MultiFamily
Measure Name	WiFi programmable thermostat
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0093
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	EnergyWise
Measure Name	WiFi programmable thermostat
Measure Description	Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.
Baseline Description	For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installation of programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0178
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	HVAC
Type	Ventilation
Sub-type	Heat Recovery Ventilator
Program Name	EnergyStar HVAC
Measure Name	Hard-to-Reach Heat Recovery Ventilator
Measure Description	Heat Recovery Ventilators (HRV) can help make mechanical ventilation more cost effective by reclaiming energy from exhaust airflows. An electric penalty results due to the increased electricity consumed by the system fans.
Baseline Description	The baseline efficiency case is an ASHRAE 62.2-compliant exhaust fan system with no heat recovery.
Savings Principle	The high efficiency case is an exhaust fan system with heat recovery.
Energy Savings calculation method	Deemed
Savings unit	Installation of heat recovery ventilation system
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	-133
kWh/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	7.7
Gas Heat MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts Residential Retrofit and Low Income Program Area: Brushless Fan Motors Impact Evaluation. Prepared for The Electric and Gas Program Administrators of Massachusetts.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is 100% since gross savings values are based on evaluation results.
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	1.00
CF winter peak source	Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 960 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0294
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	Income Eligible MultiFamily
Measure Name	Faucet aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow.
Baseline Description	The baseline efficiency case is an existing faucet with a high flow.
Savings Principle	The high efficiency is a low-flow faucet aerator.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	332.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0333
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Water Heater
Sub-type	Efficient Water Heater
Program Name	Income Eligible MultiFamily
Measure Name	LI MF Water heating system replacement
Measure Description	Replacement of an existing natural gas water heating system with a new high-efficiency natural gas system.
Baseline Description	The baseline efficiency case is the existing natural gas water heating system.
Savings Principle	The high efficiency case is a high-efficiency natural gas water heating system.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency natural gas water heating system.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0318
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Income Eligible MultiFamily
Measure Name	Low Flow Showerhead thermo Control (ladybug gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.21
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	296.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0317
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise MultiFamily
Measure Name	Low Flow Showerhead thermo Control (ladybug gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.21
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	435.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0316
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise
Measure Name	Low Flow Showerhead thermo Control (ladybug gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.14
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	296.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0310
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Income Eligible MultiFamily
Measure Name	Low Flow Showerhead w/thermo Control (roadrunner gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	1.4
Gas Heat MMBtu/yr savings source	The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	1768.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0309
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise MultiFamily
Measure Name	Low Flow Showerhead w/thermo Control (roadrunner gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	1.4
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	2888.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0308
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise
Measure Name	Low Flow Showerhead w/thermo Control (roadrunner gas DHW)
Measure Description	A showerhead with a control that limits flow once water is heated.
Baseline Description	The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adaper, a low flow showerhead with flow of 1.5 gpm or less.
Savings Principle	The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.86
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	Massachusetts Common Assumption
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	National Grid assumption based on regional PA working groups.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	1768.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0293
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	EnergyWise MultiFamily
Measure Name	Faucet aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is 2.2 GPM or greater faucet.
Savings Principle	The high efficiency case is a faucet with 1.5 GPM or less aerator installed.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	332.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0323
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Income Eligible MultiFamily
Measure Name	Low-flow showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Verifying Thermostatic Valve Showerhead Savings.xls
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 390/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 390/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0322
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise MultiFamily
Measure Name	Low-flow showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 601/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 553/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0321
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	EnergyWise
Measure Name	Low-flow showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.
Baseline Description	The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.
Savings Principle	The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.99
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	$ 2537/audit with multiple installed measures
Gross Measure TRC source	Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June
Gross Measure TRC note	#N/A
Incentive Unit	$ 1776/audit with multiple installed measures

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0356
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	New Movers
Measure Description	A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	A control group of homes that does not receive Home Energy Reports.
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Customer receiving energy reports
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is 100% since measure life is 1 year.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate will be determined by an independent evaluation.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	Free-ridership and spillover are not applicable as customers cannot participate without the utility program.
Gross Measure TRC unit	$ 3.71 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 3.71 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0411
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	Opt-out dual fuel
Measure Description	A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	No Home Energy Report.
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Per participant
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is 100% since measure life is 1 year.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate will be determined by an independent evaluation.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	Free-ridership and spillover are not applicable as customers cannot participate without the utility program.
Gross Measure TRC unit	$ 3.71 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 3.71 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0412
Fuel	Gas
Sector	Residential
Project Type	Retrofit
Category	Whole Home
Type	Behavior
Sub-type	Home Energy Reports
Program Name	Home Energy Reports
Measure Name	Opt-out gas
Measure Description	A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.
Baseline Description	No Home Energy Report.
Savings Principle	A home that receives Home Energy Reports.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Per participant
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	1
measure life source	Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is 100% since measure life is 1 year.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate will be determined by an independent evaluation.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	Free-ridership and spillover are not applicable as customers cannot participate without the utility program.
Gross Measure TRC unit	$ 3.71 per participant
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 3.71 per participant

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0372
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	HVAC
Type	Controls
Sub-type	Boiler Control
Program Name	Direct Install
Measure Name	Boiler Reset Control
Measure Description	Boiler reset controls are devices that automatically control boiler water temperature based on outdoor temperature using a software program.
Baseline Description	Fixed boiler water temperature.
Savings Principle	The high efficiency case is a boiler with reset controls.
Energy Savings calculation method	Deemed
Savings unit	Installed boiler reset control
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	35.5
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 600 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 420 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0084
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Direct Install
Measure Name	Programmable thermostat
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	3.2
Gas Heat MMBtu/yr savings source	E-mail correspondence among MA PAs and Ralph Prahl
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.02
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 180 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 126 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0176
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	HVAC
Type	Steam Traps
Sub-type	Steam Trap
Program Name	Direct Install
Measure Name	Steam trap HVAC
Measure Description	The repair or replacement of malfunctioning steam traps.
Baseline Description	The baseline efficiency case is a failed steam trap.
Savings Principle	The high efficiency case is a repaired or replaced steam trap.
Energy Savings calculation method	Deemed
Savings unit	Repaired or replaced steam trap.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	25.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	6
measure life source	DNV GL MA 2013 Prescriptive Gas Impact Evaluation: Steam Trap Evaulation Phase 1
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.02
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0377
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Lighting
Type	Custom
Sub-type	Lighting
Program Name	Direct Install
Measure Name	SBS Custom Measures
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	0
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Completed custom project
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.03
Spill-Over (participant)	0.02
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 0.76 /kWh
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 0.53 /kWh

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0291
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	Direct Install
Measure Name	Faucet aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is a 2.2 GPM faucet.
Savings Principle	The high efficiency case is a faucet with 1.5 GPM or less aerator installed.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	The calculator used to determine the deemed savings uses a default operation of 30 minuts/day, 260 days/year. Not applicable for Multifamily applications.
Hours Source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	1.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	5460.00
Sewer savings: gallons/yr	5460.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 11 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 11 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0373
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Water Heater Insulation
Sub-type	Insulation
Program Name	Direct Install
Measure Name	Insulation Pipe Diameter 1.5in H2O
Measure Description	Install insulation on hot water or steam piping located in non-conditioned spaces.
Baseline Description	Existing uninsulated pipe.
Savings Principle	The high efficiency condition is steam or hot water piping in unconditional space with insulation installed.
Energy Savings calculation method	Deemed
Savings unit	Installed LF of pipe insulation
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.21
Gas Heat MMBtu/yr savings source	RLW Analytics (2005). Impact and Process Evaluation Building Operator Training and Certification (BOC) Program. Prepared for NEEP.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 8 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 5.6 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0374
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Water Heater Insulation
Sub-type	Insulation
Program Name	Direct Install
Measure Name	Insulation Pipe Diameter 1.5in Steam
Measure Description	Install insulation on hot water or steam piping located in non-conditioned spaces.
Baseline Description	Existing uninsulated pipe.
Savings Principle	The high efficiency condition is steam or hot water piping in unconditional space with insulation installed.
Energy Savings calculation method	Deemed
Savings unit	Installed LF of pipe insulation
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.21
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 8 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 5.6 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0375
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Water Heater Insulation
Sub-type	Insulation
Program Name	Direct Install
Measure Name	Insulation Pipe Diameter 2in H2O
Measure Description	Install insulation on hot water or steam piping located in non-conditioned spaces.
Baseline Description	Existing uninsulated pipe.
Savings Principle	The high efficiency condition is steam or hot water piping in unconditional space with insulation installed.
Energy Savings calculation method	Deemed
Savings unit	Installed LF of pipe insulation
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.36
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 11 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 7.7 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0376
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Water Heater Insulation
Sub-type	Insulation
Program Name	Direct Install
Measure Name	Insulation Pipe Diameter 2in Steam
Measure Description	Install insulation on hot water or steam piping located in non-conditioned spaces.
Baseline Description	Existing uninsulated pipe.
Savings Principle	The high efficiency condition is steam or hot water piping in unconditional space with insulation installed.
Energy Savings calculation method	Deemed
Savings unit	Installed LF of pipe insulation
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.37
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 11 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 7.7 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0378
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Spray Valve
Program Name	Direct Install
Measure Name	Salon Nozzle
Measure Description	The installation of a high efficiency salon nozzle.
Baseline Description	Standard salon nozzle.
Savings Principle	An efficient salon nozzle.
Energy Savings calculation method	Deemed
Savings unit	Installed salon nozzle
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	20.4
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	28639.00
Sewer savings: gallons/yr	28639.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 100 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0320
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Direct Install
Measure Name	Low-flow showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is a 2.5 GPM showerhead.
Savings Principle	The high efficiency case is a 1.5 GPM showerhead.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	The calculator used to determine the deemed savings uses a default operation of 20 minutes/day, 365 days/year. Not applicable for Multifamily applications.
Hours Source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	5.2
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	10
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	7300.00
Sewer savings: gallons/yr	7300.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 35 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 24.5 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0327
Fuel	Gas
Sector	C&I
Project Type	Direct Install
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Spray Valve
Program Name	Direct Install
Measure Name	Pre-rinse spray valve
Measure Description	Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM.
Baseline Description	The baseline efficiency case is a standard efficiency spray valve.
Savings Principle	The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM.
Energy Savings calculation method	Deemed
Savings unit	Installed pre-rinse spray valve.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	11.4
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	Coincidence Factors are set to zero since demand savings typically occur during off-peak hours
Water savings: gallons/yr	6410.00
Sewer savings: gallons/yr	6410.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.05
Spill-Over (participant)	0.01
Spill-Over (non-participant)	0.00
Net-to-Gross	0.97
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 100 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0058
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Fryer
Program Name	Commercial New Construction
Measure Name	Commercial gas fryer
Measure Description	The installation of a natural-gas fired fryer that is either ENERGY Star rated or has a heavy-load cooking efficiency of at least 50%. Qualified fryers use advanced burner and heat exchanger designs to use fuel more efficiently, as well as increased insulation to reduce standby heat loss.
Baseline Description	The baseline efficiency case is a typical low-efficiency gas-fired fryer with 35% cooking efficiency, 16,000 Btu preheat energy, 14,000 Btu/h Idle Energy rate, and 60 lbs/h production capacity.
Savings Principle	The high efficiency case cooking efficiency and Idle Energy Rate are site specific and can be determined on a case-by-case basis. To simplify the savings algorithm, typical values for food load (150 lbs/day) and preheat energy (15.500 Btu) are assumed.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired fryer.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	58.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Gas Fryer.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 3400 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0060
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Griddle
Program Name	Commercial New Construction
Measure Name	Commercial gas griddle
Measure Description	Installation of a high efficiency gas-fired griddle.
Baseline Description	The baseline efficiency case is a standard efficiency (30% efficient) gas griddle.
Savings Principle	The high efficiency case is a gas griddle with an efficiency of 38%.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired griddle
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	18.5
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Food Service Technology Center (2011). Gas Griddle Life-Cycle Cost Calculation. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1165 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0068
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Steamer
Program Name	Commercial New Construction
Measure Name	Commercial gas steamer (>= 38% efficiency)
Measure Description	The baseline efficiency case is a typical boiler-based steamer with the following operating parameters: Preheat Energy rate = 72,000 Btu/hour, Idle Energy Rate = 18,000 Btu/hour, Heavy Load Efficiency = 18.0%, Production Capacity per pan = 23.3 lbs/hour, Average Water Consumption Rate = 40 gal/hour, and Percentage of Time in Constant Steam Mode = 40%.
Baseline Description	The baseline efficiency case is a typical boiler-based steamer with the following operating parameters: cooking energy efficiency = 18%, production capacity per pan = 23.3 lbs/hr, preheat energy rate = 72,000 Btu/hr, idle energy rate = 18,000 Btu/h, water consumption of 40gal/h, and Percentage of Time in Constant Steam Mode = 40%.
Savings Principle	The high efficiency case is an ENERGY STAR® qualified gas-fired steamer with the following operating parameters for a 6 pan steamer: Preheat Energy Rate = 36,000 Btu/hour, Idle Energy Rate = 12,500 Btu/hour, Heavy Load Efficiency = 38.0%, Production Capacity per pan = 20 lbs/hour, and Average Water Consumption Rate = 3 gallons/hour, and Percentage of Time in Constant Steam Mode = 40%.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired steamer.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	The deemed savings assumes 4,380 annual operating hours (12 hours a day * 365 days/year).
Hours Source	Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	106.6
Gas Heat MMBtu/yr savings source	Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Environmental Protection Agency (2011). Savings Calculator for ENERGY STAR Qualified Commercial Kitchen Equipment: Steam Cooker Calcs.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	162060.00
Sewer savings: gallons/yr	162060.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2000 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0063
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Oven
Program Name	Commercial New Construction
Measure Name	Gas-fired combination oven (>= 44% efficiency)
Measure Description	Installation of high efficiency gas-fired ovens.
Baseline Description	The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15.
Savings Principle	The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired oven.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	110.3
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Food Service Technology Center (2011). Gas Combination Oven Life-Cycle Cost Calculator.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1300 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0064
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Oven
Program Name	Commercial New Construction
Measure Name	Gas-fired convection oven (>= 44% efficiency)
Measure Description	Installation of high efficiency gas-fired ovens.
Baseline Description	The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15.
Savings Principle	The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired oven.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	30.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Food Service Technology Center (2012). Gas Convection Oven Life-Cycle Cost Calculator. http://www.fishnick.com/saveenergy/tools/calculators/govencalc.php.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1886 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0065
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Oven
Program Name	Commercial New Construction
Measure Name	Gas-fired conveyer oven (>= 44% efficiency)
Measure Description	Installation of high efficiency gas-fired ovens.
Baseline Description	The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15.
Savings Principle	The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired oven.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	84.5
Gas Heat MMBtu/yr savings source	Food Service Technology Center (2011). Gas Combination Oven Life-Cycle Cost Calculator.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2100 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0066
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Food Service
Type	Cooking Equipment
Sub-type	Oven
Program Name	Commercial New Construction
Measure Name	Gas-fired rack oven (>= 50% efficiency)
Measure Description	Installation of high efficiency gas-fired ovens.
Baseline Description	The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15.
Savings Principle	The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency gas-fired oven.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	211.3
Gas Heat MMBtu/yr savings source	Food Service Technology Center (2012). Gas Convection Oven Life-Cycle Cost Calculator. http://www.fishnick.com/saveenergy/tools/calculators/govencalc.php.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	12
measure life source	Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	100% realization rates are assumed because savings are based on researched assumptions by FSTC.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1000 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 4000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0130
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Condensing boiler <= 300 MBH 90%
Measure Description	The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)
Baseline Description	The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity.
Savings Principle	The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency condensing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	30.6
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 3479 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0131
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Condensing boiler <= 300 MBH 95%
Measure Description	The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)
Baseline Description	The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity.
Savings Principle	The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency condensing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	27.8
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 3848 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0132
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Condensing boiler 1000
Measure Description	The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)
Baseline Description	The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity.
Savings Principle	The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency condensing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	197.2
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 7874 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 7500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0133
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Condensing boiler 1701+ MBH
Measure Description	The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)
Baseline Description	The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity.
Savings Principle	The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency condensing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	345.1
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 10601 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 10000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0134
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Condensing boiler 301
Measure Description	The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)
Baseline Description	The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity.
Savings Principle	The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency condensing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	58.4
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 3879 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 2000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0135
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Condensing boiler 500
Measure Description	The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)
Baseline Description	The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity.
Savings Principle	The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency condensing boiler
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	107.3
Gas Heat MMBtu/yr savings source	The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 5077 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 4000 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0161
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Unit Heater
Program Name	Commercial New Construction
Measure Name	Condensing Unit heater
Measure Description	The baseline efficiency case is a standard efficiency gas fired unit heater with minimum combustion efficiency of 80%, interrupted or intermittent ignition device (IID), and either power venting or an automatic flue damper.
Baseline Description	The baseline efficiency case is a standard efficiency unit heater.
Savings Principle	The high efficiency case is a condensing gas unit heater with 90% AFUE or greater.
Energy Savings calculation method	Deemed
Savings unit	Installed condensing unit heater.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	40.9
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Ecotrope, Inc. (2003). Natural Gas Efficiency and Conservation Measure Resource Assessment for the Residential and Commercial Sectors. Prepared for the Energy Trust of Oregon.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2400 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 750 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0156
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Furnace
Program Name	Commercial New Construction
Measure Name	Furnace 95+ AFUE (<150) w/ECM Motor
Measure Description	The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motors significantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors.
Baseline Description	The baseline efficiency case is a 90% AFUE furnace in the <150 kBTuh size category.
Savings Principle	The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency warm air furnace with ECM fan motor
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	168
kWh/yr savings source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kWh/yr savings note	#N/A
kW reduction	0.124
kW reduction source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	9
Gas Heat MMBtu/yr savings source	NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A

Copyright 2015 National Grid
All Rights Reserved

Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1626 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0157
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Furnace
Program Name	Commercial New Construction
Measure Name	Furnace 97+ AFUE (<150) w/ECM Motor
Measure Description	The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motors significantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors.
Baseline Description	The baseline efficiency case is a 90% AFUE furnace in the <150 kBTuh size category.
Savings Principle	The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency warm air furnace with ECM fan motor
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	168
kWh/yr savings source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kWh/yr savings note	#N/A
kW reduction	0.124
kW reduction source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	9.9
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	1.00
RRd summer peak source	#N/A
RRd summer peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) winter peak	1.00
RRd winter peak source	#N/A
RRd winter peak note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
Coincidence factor (CF) summer peak	0.00
CF summer peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.16
CF winter peak source	Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1707 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 800 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0160
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Infrared Heater
Program Name	Commercial New Construction
Measure Name	Infrared heater
Measure Description	The installation of a gas-fired low intensity infrared heating system in place of a unit heater, furnace, or other standard efficiency equipment. Infrared heating uses radiant heat as opposed to warm air to heat buildings. In commercial environments with high air exchange rates, heat loss is minimal because the space's heat comes from surfaces rather than air.
Baseline Description	The baseline efficiency case is a standard efficiency gas-fired unit heater with combustion efficiency of 80%.
Savings Principle	The high efficiency case is a gas-fired low-intensity infrared heating unit.
Energy Savings calculation method	Deemed
Savings unit	Installed infrared heater
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	12
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	17
measure life source	Nexant (2006). DSM Market Characterization Report. Prepared for Questar Gas.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2982 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 750 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0148
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	HVAC
Type	Heating
Sub-type	Boiler
Program Name	Commercial New Construction
Measure Name	Integrated water heater/condensing boiler (EF 0.90; AFUE 90%)
Measure Description	This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank.
Baseline Description	The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater.
Savings Principle	The high efficiency case is a condensing, integrated water heater/boiler with an AFUE >= 90%.
Energy Savings calculation method	Deemed
Savings unit	Installed high efficiency integrated boiler/water heater unit.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	24.6
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	ASHRAE Applications Handbook (2003); Page 36.3, assumes combined boiler and water heating systems have a measure life similar to a typical boiler.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1273 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0329
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Condensing Water Heater
Program Name	Commercial New Construction
Measure Name	Condensing stand Alone Water Heater
Measure Description	The installation of a high-efficiency water heaters. Indirect water heaters use a storage tank that is heated by the main boiler. The energy stored by the water tank allows the boiler to turn off and on less often, saving considerable energy. Tankless water heaters circulate water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%.
Savings Principle	The high efficiency case is either for a condensing stand-alone commercial water heater with a thermal efficiency of 95% or greater and a capacity between 75,000 Btu and 300,000 Btu, a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least .67 and a nominal input of 75,000 Btu/hour or less, or an indirect water heater with a Combined Appliance Efficiency (CAE) of 85% or greater.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency water heater.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	25
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2340 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0340
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Indirect Water Heater
Program Name	Commercial New Construction
Measure Name	Indirect water heater (EF >= 0.82, CAE >= 85%)
Measure Description	The installation of a high-efficiency water heaters. Indirect water heaters use a storage tank that is heated by the main boiler. The energy stored by the water tank allows the boiler to turn off and on less often, saving considerable energy. Tankless water heaters circulate water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%.
Savings Principle	The high efficiency case is either for a condensing stand-alone commercial water heater with a thermal efficiency of 95% or greater and a capacity between 75,000 Btu and 300,000 Btu, a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least .67 and a nominal input of 75,000 Btu/hour or less, or an indirect water heater with a Combined Appliance Efficiency (CAE) of 85% or greater.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency water heater.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	19
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00

Copyright 2015 National Grid
All Rights Reserved

RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1749 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 400 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0343
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	Commercial New Construction
Measure Name	On-demand tankless water heater (EF>=0.82)
Measure Description	Tankless water heaters circulate water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.82.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency water heater.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	6.3
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 2817 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 500 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0344
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	Commercial New Construction
Measure Name	On-demand tankless water heater (EF>=0.90)
Measure Description	Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.90.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency water heater.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	89
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 3449 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 800 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0344
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Water Heating
Type	Water Heater
Sub-type	Tankless Water Heater
Program Name	Commercial New Construction
Measure Name	On-demand tankless water heater (EF>=0.95)
Measure Description	Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.
Baseline Description	The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61.
Savings Principle	The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.95.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency water heater.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	90
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	20
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.42
Spill-Over (participant)	0.05
Spill-Over (non-participant)	0.00
Net-to-Gross	0.63
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 3449 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 800 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0352
Fuel	Gas
Sector	C&I
Project Type	New Construction
Category	Whole Building
Type	Custom
Sub-type	Whole Building
Program Name	Commercial New Construction
Measure Name	Custom New Construction
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom efficiency application.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.

Copyright 2015 National Grid
All Rights Reserved

Realization rate energy (RRe)	0.76
RRe source	KEMA (2011). Impact Evaluation of C&I Custom Gas Installations. Prepared for National Grid.
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	Calc
Sewer savings: gallons/yr	Calc
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.09
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.91
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 8863.71 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 6647.78 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0005
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Building Shell
Type	Air Sealing
Sub-type	Air Sealing/Infiltration
Program Name	Commercial and Industrial MultiFamily
Measure Name	MF Air Sealing
Measure Description	Thermal shell air leaks are sealed through strategic use and location of air-tight materials.
Baseline Description	The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)
Savings Principle	The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.
Energy Savings calculation method	Calculated using site-specific inputs
Savings unit	Completed air sealing project.
Savings Equation	Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu) Where: CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0

Copyright 2015 National Grid
All Rights Reserved

measure life	15
measure life source	GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0021
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	Commercial and Industrial MultiFamily
Measure Name	MF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	3.15
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0019
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Building Shell
Type	Insulation
Sub-type	Other
Program Name	Commercial and Industrial MultiFamily
Measure Name	MF Other Insulation
Measure Description	Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities.
Baseline Description	The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation.
Savings Principle	The high efficiency case is the existing facility or equipment after the implementation of additional insulation.
Energy Savings calculation method	Deemed
Savings unit	Completed insulation project.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	Heating hours are characterized by the heating degree days for the facility, 4644.
Hours Source	This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	25
measure life source	The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Energy realization rate is 100% because deemed savings are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.20
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.80
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0071
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Boiler Control
Program Name	Commercial Retrofit
Measure Name	Boiler reset control (multi
Measure Description	Boiler reset controls are devices that automatically control boiler water temperature based on outdoor temperature using a software program.
Baseline Description	The baseline efficiency case is a boiler without reset controls.
Savings Principle	The high efficiency case is a boiler with reset controls.
Energy Savings calculation method	Deemed
Savings unit	Boiler reset control installed on existing boiler.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	35.5
Gas Heat MMBtu/yr savings source	Environmental Protection Agency (2011). Savings Calculator for ENERGY STAR Qualified Commercial Kitchen Equipment: Steam Cooker Calcs.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.06
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.94
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 993 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 225 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0152
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Heating
Sub-type	Efficient Heating
Program Name	Commercial and Industrial MultiFamily
Measure Name	MF Heating System Replacement
Measure Description	Replacement of an existing gas heating system with a new high efficiency system. Electric savings are achieved from reduced run time of the heating system fan(s).
Baseline Description	The baseline case is the existing heating system.
Savings Principle	The high efficiency case is the new efficient heating equipment.
Energy Savings calculation method	Deemed
Savings unit	Installed high-efficiency natural gas heating system.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	18
measure life source	Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Furnace.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00

Copyright 2015 National Grid
All Rights Reserved

CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	#N/A
Net-to-Gross note	The Net-to-Gross ratio is Assumed to be 100%.
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0083
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Controls
Sub-type	Thermostat
Program Name	Commercial Retrofit
Measure Name	Programmable thermostat
Measure Description	Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.
Baseline Description	The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.
Savings Principle	The high efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat installed.
Energy Savings calculation method	Deemed
Savings unit	Installed programmable thermostat
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	3.2
Gas Heat MMBtu/yr savings source	E-mail correspondence among MA PAs and Ralph Prahl
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	15
measure life source	Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 184.97 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 184.97 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0175
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	HVAC
Type	Steam Traps
Sub-type	Steam Trap
Program Name	Commercial Retrofit
Measure Name	Steam trap HVAC
Measure Description	The repair or replacement of malfunctioning steam traps.
Baseline Description	The baseline efficiency case is a failed steam trap.
Savings Principle	The high efficiency case is a repaired or replaced steam trap.
Energy Savings calculation method	Deemed
Savings unit	Repaired or replaced steam trap.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	25.7
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	6
measure life source	DNV GL MA 2013 Prescriptive Gas Impact Evaluation: Steam Trap Evaulation Phase 1
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 250 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 75 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0290
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Faucet Aerator
Program Name	Commercial and Industrial MultiFamily
Measure Name	Faucet aerator
Measure Description	Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is a 2.2 GPM faucet.
Savings Principle	The high efficiency case is a faucet with 1.5 GPM or less aerator installed.
Energy Savings calculation method	Deemed
Savings unit	Installed faucet aerator.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	The calculator used to determine the deemed savings uses a default operation of 30 minuts/day, 260 days/year. Not applicable for Multifamily applications.
Hours Source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.36
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.96
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	332.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0371
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Commercial Retrofit
Measure Name	Low-Flow Showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.
Baseline Description	0
Savings Principle	The high efficiency case is a 1.5 GPM showerhead.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	5.2
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	#N/A
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	#N/A
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	0.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.06
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.94
Net-to-Gross source	#N/A
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 200 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 200 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0319
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Showerhead
Program Name	Commercial and Industrial MultiFamily
Measure Name	Low-flow showerhead
Measure Description	Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.
Baseline Description	The baseline efficiency case is a 2.5 GPM showerhead.
Savings Principle	The high efficiency case is a 1.5 GPM showerhead.
Energy Savings calculation method	Deemed
Savings unit	Installed low-flow showerhead
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	The calculator used to determine the deemed savings uses a default operation of 20 minutes/day, 365 days/year. Not applicable for Multifamily applications.
Hours Source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	0.48
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	7
measure life source	GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.93
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00

Copyright 2015 National Grid
All Rights Reserved

RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	3696.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	N/A
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	N/A

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0326
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Water Heating
Type	Flow Control
Sub-type	Low Flow Spray Valve
Program Name	Commercial Retrofit
Measure Name	Pre-rinse spray valve
Measure Description	Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM.
Baseline Description	The baseline efficiency case is a standard efficiency spray valve.
Savings Principle	The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM.
Energy Savings calculation method	Deemed
Savings unit	Installed pre-rinse spray valve.
Savings Equation	Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	0
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	11.4
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	8
measure life source	Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A
RRe note	Realization rate is assumed to be 100% since evaluation adjusts deemed savings value
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A

Copyright 2015 National Grid
All Rights Reserved

Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	6410.00
Sewer savings: gallons/yr	6410.00
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.06
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.94
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 100 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 100 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0349
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Whole Building
Type	Custom
Sub-type	Certification
Program Name	Commercial Retrofit
Measure Name	Building operator certification
Measure Description	Class improves a building operator's ability to optimize facility gas and electricity utilization.
Baseline Description	The baseline efficiency case is a building operator not attending a class on improving the efficiency of facility gas and electricity use.
Savings Principle	The high efficiency case is a building operator attending a class on improving the efficiency of facility gas and electricity use.
Energy Savings calculation method	Deemed
Savings unit	Course completion by building operator
Savings Equation	Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	22273
kWh/yr savings source	RLW Analytics (2005). Impact and Process Evaluation Building Operator Training and Certification (BOC) Program. Prepared for NEEP.
kWh/yr savings note	#N/A
kW reduction	0
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	334.1
Gas Heat MMBtu/yr savings source	The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012.
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	0
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	RLW Analytics (2005). Impact and Process Evaluation Building Operator Training and Certification (BOC) Program. Prepared for NEEP.
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	5
measure life source	RLW Analytics (2005). Impact and Process Evaluation Building Operator Training and Certification (BOC) Program. Prepared for NEEP.
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	1.00
RRe source	#N/A

Copyright 2015 National Grid
All Rights Reserved

RRe note	Realization rate is 100% since gross savings values are based on evaluation results.
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	26171.00
Sewer savings: gallons/yr	0.00
Water / Sewer savings Source	RLW Analytics (2005). Impact and Process Evaluation Building Operator Training and Certification (BOC) Program. Prepared for NEEP.
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.00
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	1.00
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 1695 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 1250 per measure

.

Copyright 2015 National Grid
All Rights Reserved

TRL Reference Number	RI_0353
Fuel	Gas
Sector	C&I
Project Type	Retrofit
Category	Whole Building
Type	Custom
Sub-type	Whole Building
Program Name	Commercial Retrofit
Measure Name	Custom Retrofit
Measure Description	The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.
Baseline Description	For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information.
Savings Principle	The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.
Energy Savings calculation method	Custom
Savings unit	Installed custom efficiency application.
Savings Equation	Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom
Hours	N/A
Hours Source	#N/A
Hours source note	#N/A
kWh/yr Savings	Calc
kWh/yr savings source	#N/A
kWh/yr savings note	#N/A
kW reduction	Calc
kW reduction source	#N/A
kW reduction note	#N/A
Gas Heat MMBtu/yr savings	Calc
Gas Heat MMBtu/yr savings source	#N/A
Gas Heat MMBtu/yr savings note	#N/A
Oil MMBtu/yr savings	Calc
Oil MMBtu/yr savings source	#N/A
Oil MMBtu/yr savings note	#N/A
Propane MMBtu/yr savings	0
Propane MMBtu/yr savings source	#N/A
Propane MMBtu/yr savings note	#N/A
Energy Reference(s) & table(s) notes	0
measure life	mult
measure life source	#N/A
measure life note	#N/A
In-service rate (ISR)	1.00
In-service rate source	#N/A
In-service rate note	All installations have 100% in-service rate since programs include verification of equipment installations.
Savings Persistence Factor (SPF)	1.00
Savings Persistence Factor source	#N/A
Savings Persistence Factor note	Savings persistence is assumed to be 100%.
Realization rate energy (RRe)	0.78
RRe source	KEMA (2011). Impact Evaluation of C&I Custom Gas Installations. Prepared for National Grid.

Copyright 2015 National Grid
All Rights Reserved

RRe note	#N/A
RR demand (RRd) summer peak	0.00
RRd summer peak source	#N/A
RRd summer peak note	#N/A
RR demand (RRd) winter peak	0.00
RRd winter peak source	#N/A
RRd winter peak note	#N/A
Coincidence factor (CF) summer peak	0.00
CF summer peak source	#N/A
CF summer peak note	#N/A
Coincidence factor (CF) winter peak	0.00
CF winter peak source	#N/A
CF winter peak note	#N/A
Water savings: gallons/yr	Calc
Sewer savings: gallons/yr	Calc
Water / Sewer savings Source	#N/A
Water / Sewer savings note	#N/A
Annual $ savings	0.00
Annual $ savings source / description	#N/A
Annual $ savings note	#N/A
One time $ savings	0.00
One time $ savings source/description	#N/A
One time $ savings note	#N/A
Free-Ridership	0.23
Spill-Over (participant)	0.00
Spill-Over (non-participant)	0.00
Net-to-Gross	0.78
Net-to-Gross source	TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015
Net-to-Gross note	#N/A
Gross Measure TRC unit	$ 26831.24 per measure
Gross Measure TRC source	#N/A
Gross Measure TRC note	#N/A
Incentive Unit	$ 17851.68 per measure

Copyright 2015 National Grid
All Rights Reserved

Table 1: Lighting Power Densities Using the Building Area Method (WATTSb,i)

Building Area Type	Lighting Power Density (W/ft2) [1]
Automotive Facility	0.9
Convention Center	1.2
Court House	1.2
Dining: Bar Lounge/Leisure	1.3
Dining: Cafeteria/Fast Food	1.4
Dining: Family	1.6
Dormitory	1
Fire Stations	0.8
Exercise Center	1
Gymnasium	1.1
Healthcare-Clinic	1
Hospital	1.2
Hotel	1
Library	1.3
Manufacturing Facility	1.3
Motel	1
Motion Picture Theatre	1.2
Multi-Family	0.7
Museum	1.1
Office	0.9
Parking Garage	0.3
Penitentiary	1
Performing Arts Theatre	1.6
Police/Fire Station	1
Post Office	1.1
Religious Building	1.3
Retail	1.4
School/University	1.2
Sports Arena	1.1
Town Hall	1.1
Transportation	1
Warehouse	0.6
Workshop	1.4

[1] IECC 2012

Copyright 2015 National Grid
All Rights Reserved

Table 2: Lighting Power Densities Using the Space-by-Space Method (WATTSb,i)

Common Space Types	Lighting Power Density (W/ft^2)
Atrium – First 40 feet in height	0.03 per ft. ht.
Atrium – Above 40 feet in height	0.02 per ft. ht.
Audience/seating	
For Auditorium	0.9
For performing arts theater	2.6
For motion picture theater	1.2
Classroom/lecture/training	1.3
Conference/meeting/multipurpose	1.2
Corridor/transition	0.7
Dining Area	0.9
Bar/lounge/leisure dining	1.4
Family dining area	1.4
Dressing/fitting room performing arts theater	1.1
Electrical/mechanical	1.1
Food preparation	1.2
Laboratory for classrooms	1.3
Laboratory for medical/industrial/research	1.8
Lobby	1.1
Lobby for performing arts theater	3.3
Lobby for motion picture theater	1
Locker room	0.8
Lounge/Recreation	0.8
Office - enclosed	1.1
Office – open plan	1
Restroom	1
Sales area	1.6
Stairway	0.7
Storage	0.8
Workshop	1.6
Courthouse/police station/penitentiary	
Courtroom	1.9
Confinement cells	1.1
Judge Chambers	1.3
Penitentiary audience seating	0.5
Penitentiary classroom	1.3
Penitentiary dining	1.1
BUILDING SPECIFIC SPACE-BY-SPACE TYPES	
Automotive – service/repair	0.7
Bank/office – banking activity area	1.5
Dormitory living quarters	1.1
Gymnasium/fitness center	

Copyright 2015 National Grid
All Rights Reserved

Fitness area	0.9
Gymnasium audience/seating	0.4
Playing area	1.4
COMMON SPACE-BY-SPACE TYPES	1.4
Healthcare clinic/hospital	
Corridors/transition	1
Exam/treatment	1.7
Emergency	0.8
Public and staff lounge	0.8
Medical Supplies	1.4
Nursery	0.9
Nurse Station	1
Physical Therapy	0.9
Patient room	0.7
Pharmacy	1.2
Radiology/imaging	1.3
Operating room	2.2
Recovery	1.2
Lounge Recreation	0.8
Laundry – washing	0.6
Hotel	
Dining area	1.3
Guest rooms	1.1
Hotel lobby	2.1
Highway lodging dining	1.2
Highway lodging guest rooms	1.1
Library	
Stacks	1.7
Card File and cataloguing	1.1
Reading area	1.2
Manufacturing	
Corridors/transition	0.4
Detailed Manufacturing	1.3
Equipment Room	1
Extra high bay (> 50-foot floor-ceiling height)	1.1
High bay (25 – 50-foot floor-ceiling height)	1.2
Low bay (< 25-foot floor-ceiling height)	1.2
Museum	
General Exhibition	1
Restoration	1.7
Parking Garage – garage areas	0.2
Convention Center	
Exhibit space	1.5
Audience/seating area	0.9

Copyright 2015 National Grid
All Rights Reserved

Fire Stations	
Engine Room	0.8
Sleeping quarters	0.3
Post Office	
Sorting area	0.9
Religious building	
Fellowship hall	0.6
Audience seating	2.4
Worship pulpit/choir	2.4
Retail	
Dressing/fitting area	0.9
Mall concourse	1.6
Sales area	1.6
BUILDING SPECIFIC SPACE-BY-SPACE TYPES	
Sports areana	
Audience seating	0.4
Court sports area – Class 4	0.7
Court sports area – Class 3	1.2
Court sports area – Class 2	1.9
Court sports area – Class 1	3
Ring sports area	2.7
Transportation	
Air/train/bus baggage area	1
Airport concourse	0.6
Terminal – ticket counter	1.5
Warehouse	
Fine material storage	1.4
Medium/bulky material	0.6

[1] IECC 2012

Copyright 2015 National Grid
All Rights Reserved

Table 3: New Construction Proposed Lighting Wattage Tables

Device Code	Device Description	Rated Watts
LED Exit Signs		
1E0002	2.0 WATT LED	2
1E0003	3.0 WATT LED	3
1E0005	5.0 WLED	5
1E0005C	0.5 WATT LEC	0.5
1E0008	8.0 WLED	8
1E0015	1.5 WATT LED	1.5
1E0105	10.5 WATT LED	10.5
Compact Fluorescents (CFL's)		
2C0007S	2/7W COMPACT HW	18
1C0005S	5W COMPACT HW	7
1C0007S	7W COMPACT HW	9
1C0009S	9W COMPACT HW	11
1C0011S	11W COMPACT HW	13
1C0013S	13W COMPACT HW	15
1C0018E	18W COMPACT HW ELIG	20
1C0018S	18W COMPACT HW	20
1C0022S	22W COMPACT HW	24
1C0023E	1/23W COMPACT HW ELIG	25
1C0026E	26W COMPACT HW ELIG	28
1C0026S	26W COMPACT HW	28
1C0028S	28W COMPACT HW	30
1C0032E	32W COMPACT HW ELIG	34
1C0032S	32W CIRCLINE HW	34
1C0042E	1/42W COMPACT HW ELIG	48
1C0044S	44W CIRCLINE HW	46
1C0057E	1/57W COMPACT HW ELIG	65
1C2232S	22/32W CIRCLINE HW	58
1C2D10E	10W 2D COMPACT HW ELIG	12
1C2D16E	16W 2D COMPACT HW ELIG	18
1C2D21E	21W 2D COMPACT HW ELIG	22
1C2D28E	28W 2D COMPACT HW ELIG	28
1C2D38E	38W 2D COMP.HW ELIG	36
1C3240S	32/40W CIRCLINE HW	80
2C0005S	2/5W COMPACT HW	14
2C0009S	2/9W COMPACT HW	22
2C0011S	2/11W COMPACT HW	26
2C0013E	2/13W COMPACT HW ELIG	28
2C0013S	2/13W COMPACT HW	30

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Compact Fluorescents (CFL's) (cont)		
2C0018E	2/18W COMP. HW ELIG	40
2C0026E	2/26W COMP. HW ELIG	54
2C0032E	2/32W COMPACT HW ELIG	68
2C0042E	2/42W COMPACT HW ELIG	100
3C0009S	3/9W COMPACT HW	33
3C0013S	3/13W COMPACT HW	45
3C0018E	3/18W COMPACT HW ELIG	60
3C0026E	3/26W COMPACT HW ELIG	82
3C0032E	3/32W COMPACT HW ELIG	114
3C0042E	3/42W COMPACT HW ELIG	141
4C0018E	4/18W COMPACT HW ELIG	80
4C0026E	4/26W COMPACT HW ELIG	108
4C0032E	4/32W COMPACT HW ELIG	152
4C0042E	4/42W COMPACT HW ELIG	188
6C0026E	6/26W COMPACT HW ELIG	162
6C0032E	6/32W COMPACT HW ELIG	228
6C0042E	6/42W COMPACT HW ELIG	282
8C0026E	8/26W COMPACT HW ELIG	216
8C0032E	8/32W COMPACT HW ELIG	304
8C0042E	8/42W COMPACT HW ELIG	376
T5 Systems		
1F14SSE	1L2' 14W T5/ELIG	16
2F14SSE	2L2' 14W T5/ELIG	32
3F14SSE	3L2' 14W T5/ELIG	50
4F14SSE	4L2' 14W T5/ELIG	68
1F24HSE	1L2' 24W T5HO/ELIG	29
2F24HSE	2L2' 24W T5HO/ELIG	52
3F24HSE	3L2' 24W T5HO/ELIG	80
1F21SSE	1L3' 21W T5/ELIG	24
2F21SSE	2L3' 21W T5/ELIG	47
1F39HSE	1L3' 39W T5HO/ELIG	42
2F39HSE	2L3' 39W T5HO/ELIG	85
1F28SSE	1L4' 28W T5/ELIG	32
2F28SSE	2L4' 28W T5/ELIG	63
3F28SSE	3L4' 28W T5/ELIG	95
4F28SSE	4L4' 28W T5/ELIG	126
6F28SSE	6L4' 28W T5/ELIG	189
1F47HSE	1L4' 47W T5HO/ELIG	53
2F47HSE	2L4' 47W T5HO/ELIG	103
3F47HSE	3L4' 47W T5HO/ELIG	157

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
	T5 Systems (cont.)	
4F47HSE	4L4' 47W T5HO/ELIG	200
5F47HSE	5L4' 47W T5HO/ELIG	260
6F47HSE	6L4' 47W T5HO/ELIG	303
1F50HSE	1L4' 50W T5HO/ELIG	58
2F50HSE	2L4' 50W T5HO/ELIG	110
3F50HSE	3L4' 50W T5HO/ELIG	168
4F50HSE	4L4' 50W T5HO/ELIG	215
5F50HSE	5L4' 50W T5HO/ELIG	278
6F50HSE	6L4' 50W T5HO/ELIG	325
1F54HSE	1L4' 54W T5HO/ELIG	59
2F54HSE	2L4' 54W T5HO/ELIG	117
3F54HSE	3L4' 54W T5HO/ELIG	177
4F54HSE	4L4’ 54W T5HO/ELIG	234
5F54HSE	5L4' 54W T5HO/ELIG	294
6F54HSE	6L4’ 54W T5HO/ELIG	351
8F54HSE	8L4' 54W T5HO/ELIG	468
10F54HSE	10L4’ 54W T5HO/ELIG	585
	Two Foot High Efficient T8 Systems	
1F17ESL	1L2' 17W T8EE/ELEE LOW PWR	14
1F17ESN	1L2' 17W T8EE/ELEE	17
1F17ESH	1L2' 17W T8EE/ELEE HIGH PWR	20
1F28BXE	1L2' F28BX/ELIG	32
2F17ESL	2L2' 17W T8EE/ELEE LOW PWR	27
2F17ESN	2L2' 17W T8EE/ELEE	32
2F17ESH	2L2' 17W T8EE/ELEE HIGH PWR	40
2F28BXE	2L2' F28BX/ELIG	63
3F17ESL	3L2' 17W T8EE/ELEE LOW PWR	39
3F17ESN	3L2' 17W T8EE/ELEE	46
3F17ESH	3L2' 17W T8EE/ELEE HIGH PWR	61
3F28BXE	3L2' F28BX/ELIG	94
	Three Foot High Efficient T8 Systems	
1F25ESL	1L3' 25W T8EE/ELEE LOW PWR	21
1F25ESN	1L3' 25W T8EE/ELEE	24
1F25ESH	1L3' 25W T8EE/ELEE HIGH PWR	30
2F25ESL	2L3' 25W T8EE/ELEE LOW PWR	40
2F25ESN	2L3' 25W T8EE/ELEE	45
2F25ESH	2L3' 25W T8EE/ELEE HIGH PWR	60
3F25ESL	3L3' 25W T8EE/ELEE LOW PWR	58
3F25ESN	3L3' 25W T8EE/ELEE	67
3F25ESH	3L3' 25W T8EE/ELEE HIGH PWR	90

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Four Foot T8 High Efficient / Reduce Wattage Systems		
1F25EEH	1L4' 25W T8EE/ELEE HIGH PWR	30
1F25EEE	1L4' 25W T8EE/ELEE	22
1F25EEL	1L4' 25W T8EE/ELEE LOW PWR	19
2F25EEH	2L4' 25W T8EE/ELEE HIGH PWR	57
2F25EEE	2L4' 25W T8EE/ELEE	43
2F25EEL	2L4' 25W T8EE/ELEE LOW PWR	37
3F25EEH	3L4' 25W T8EE/ELEE HIGH PWR	86
3F25EEE	3L4' 25W T8EE/ELEE	64
3F25EEL	3L4' 25W T8EE/ELEE LOW PWR	57
4F25EEH	4L4' 25W T8EE/ELEE HIGH PWR	111
4F25EEE	4L4' 25W T8EE/ELEE	86
4F25EEL	4L4' 25W T8EE/ELEE LOW PWR	75
1F28EEH	1L4' 28W T8EE/ELEE HIGH PWR	33
1F28EEE	1L4' 28W T8EE/ELEE	24
1F28EEL	1L4' 28W T8EE/ELEE LOW PWR	22
2F28EEH	2L4' 28WT8EE/ELEE HIGH PWR	64
2F28EEE	2L4' 28W T8EE/ELEE	48
2F28EEL	2L4' 28W T8EE/ELEE LOW PWR	42
3F28EEH	3L4' 28W T8EE/ELEE HIGH PWR	96
3F28EEE	3L4' 28W T8EE/ELEE	72
3F28EEL	3L4' 28W T8EE/ELEE LOW PWR	63
4F28EEH	4L4' 28W T8EE/ELEE HIGH PWR	126
4F28EEE	4L4' 28W T8EE/ELEE	94
4F28EEL	4L4' 28W T8EE/ELEE LOW PWR	83
1F30EEH	1L4' 30W T8EE/ELEE HIGH PWR	36
1F30EEE	1L4' 30W T8EE/ELEE	26
1F30EEL	1L4' 30W T8EE/ELEE LOW PWR	24
2F30EEH	2L4' 30WT8EE/ELEE HIGH PWR	69
2F30EEE	2L4' 30W T8EE/ELEE	52
2F30EEL	2L4' 30W T8EE/ELEE LOW PWR	45
3F30EEH	3L4' 30W T8EE/ELEE HIGH PWR	103
3F30EEE	3L4' 30W T8EE/ELEE	77
3F30EEL	3L4' 30W T8EE/ELEE LOW PWR	68

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Four Foot T8 High Efficient / Reduce Wattage Systems (cont.)		
4F30EEH	4L4' 30W T8EE/ELEE HIGH PWR	133
4F30EEE	4L4' 30W T8EE/ELEE	101
4F30EEL	4L4' 30W T8EE/ELEE LOW PWR	89
1F32EEH	1L4' 32W T8EE/ELEE HIGH PWR	38
1F32EEE	1L4' 32W T8EE/ELEE	28
1F32EEL	1L4' 32W T8EE/ELEE LOW PWR	25
2F32EEH	2L4' 32W T8EE/ELEE HIGH PWR	73
2F32EEE	2L4' 32W T8EE/ELEE	53
2F32EEL	2L4' 32W T8EE/ELEE LOW PWR	47
3F32EEH	3L4' 32W T8EE/ELEE HIGH PWR	109
3F32EEE	3L4' 32W T8EE/ELEE	82
3F32EEL	3L4' 32W T8EE/ELEE LOW PWR	72
4F32EEH	4L4' 32W T8EE/ELEE HIGH PWR	141
4F32EEE	4L4' 32W T8EE/ELEE	107
4F32EEL	4L4' 32W T8EE/ELEE LOW PWR	95
6F32EEH	6L4' 32W T8EE/ELEE HIGH PWR	218
6F32EEE	6L4' 32W T8EE/ELEE	168
6F32EEL	6L4' 32W T8EE/ELEE LOW PWR	146
Eight Foot T8 Systems		
1F59SSE	1L8' T8/ELIG	60
1F80SSE	1L8' T8 HO/ELIG	85
2F59SSE	2L8' T8/ELIG	109
2F59SSL	2L8' T8/ELIG LOW PWR	100
2F80SSE	2L8' T8 HO/ELIG	160
LED Lighting Fixtures		
1L002	2 WATT LED	2
1L003	3 WATT LED	3
1L004	4 WATT LED	4
1L005	5 WATT LED	5
1L006	6 WATT LED	6
1L007	7 WATT LED	7
1L008	8 WATT LED	8
1L009	9 WATT LED	9
1L010	10 WATT LED	10
1L011	11 WATT LED	11
1L012	12 WATT LED	12
1L013	13 WATT LED	13
1L014	14 WATT LED	14
1L015	15 WATT LED	15
1L016	16 WATT LED	16
1L017	17 WATT LED	17

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
LED Lighting Fixtures (cont.)		
1L018	18 WATT LED	18
1L019	19 WATT LED	19
1L020	20 WATT LED	20
1L021	21 WATT LED	21
1L022	22 WATT LED	22
1L023	23 WATT LED	23
1L024	24 WATT LED	24
1L025	25 WATT LED	25
1L026	26 WATT LED	26
1L027	27 WATT LED	27
1L028	28 WATT LED	28
1L029	29 WATT LED	29
1L030	30 WATT LED	30
1L031	31 WATT LED	31
1L032	32 WATT LED	32
1L033	33 WATT LED	33
1L034	34 WATT LED	34
1L035	35 WATT LED	35
1L036	36 WATT LED	36
1L037	37 WATT LED	37
1L038	38 WATT LED	38
1L039	39 WATT LED	39
1L040	40 WATT LED	40
1L041	41 WATT LED	41
1L042	42 WATT LED	42
1L043	43 WATT LED	43
1L044	44 WATT LED	44
1L045	45 WATT LED	45
1L046	46 WATT LED	46
1L047	47 WATT LED	47
1L048	48 WATT LED	48
1L049	49 WATT LED	49
1L050	50 WATT LED	50
1L055	55 WATT LED	55
1L060	60 WATT LED	60
1L070	70 WATT LED	70
1L073	73 WATT LED	73
1L075	75 WATT LED	75
1L080	90 WATT LED	90
1L085	85 WATT LED	85
1L090	90 WATT LED	90

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
LED Lighting Fixtures (cont.)		
1L095	95 WATT LED	95
1L100	100 WATT LED	100
1L106	106 WATT LED	106
1L107	107 WATT LED	107
1L116	116 WATT LED	116
1L120	120 WATT LED	120
1L125	125 WATT LED	125
1L130	130 WATT LED	130
1L135	135 WATT LED	135
1L140	140 WATT LED	140
1L145	145 WATT LED	145
1L150	150 WATT LED	150
1L155	155 WATT LED	155
1L160	160 WATT LED	160
1L165	165 WATT LED	165
1L170	170 WATT LED	170
1L175	175 WATT LED	175
1L180	180 WATT LED	180
1L185	185 WATT LED	185
1L190	190 WATT LED	190
1L200	200 WATT LED	200
1L210	210 WATT LED	210
1L220	220 WATT LED	220
1L240	240 WATT LED	240
Electronic Metal Halide Lamps		
1M0150E	150W METAL HALIDE EB	160
1M0200E	200W METAL HALIDE EB	215
1M0250E	250W METAL HALIDE EB	270
1M0320E	320W METAL HALIDE EB	345
1M0350E	350W METAL HALIDE EB	375
1M0400E	400W METAL HALIDE EB	430
1M0450E	400W METAL HALIDE EB	480
MH Track Lighting		
1M0020E	20W MH SPOT	25
1M0025E	25W MH SPOT	25
1M0035E	35W MH SPOT	44
1M0039E	39W MH SPOT	47
1M0050E	50W MH SPOT	60
1M0070E	70W MH SPOT	80
1M0100E	100W MH SPOT	111
1M0150E	150W MH SPOT	162

Copyright 2015 National Grid
All Rights Reserved

Table 4: Retrofit Existing Lighting Wattage Tables

Device Code	Device Description	Rated Watts
Incandescent Lamps		
1I0015	15W INC	15
1I0020	20W INC	20
1I0025	25W INC	25
1I0034	34W INC	34
1I0036	36W INC	36
1I0040	40W INC	40
1I0042	42W INC	42
1I0045	45W INC	45
1I0050	50W INC	50
1I0052	52W INC	52
1I0054	54W INC	54
1I0055	55W INC	55
1I0060	60W INC	60
1I0065	65W INC	65
1I0067	67W INC	67
1I0069	69W INC	69
1I0072	72W INC	72
1I0075	75W INC	75
1I0080	80W INC	80
1I0085	85W INC	85
1I0090	90W INC	90
1I0093	93W INC	93
1I0100	100W INC	100
1I0120	120W INC	120
1I0125	125W INC	125
1I0135	135W INC	135
1I0150	150W INC	150
1I0200	200W INC	200
1I0300	300W INC	300
1I0448	448W INC	448
1I0500	500W INC	500
1I0750	750W INC	750
1I1000	1000W INC	1000
1I1500	1500W INC	1500
Low Voltage Halogen Fixture (includes Transformer)		
1R0020	20W LV HALOGEN FIXT	30
1R0025	25W LV HALOGEN FIXT	35
1R0035	35W LV HALOGEN FIXT	45

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Low Voltage Halogen Fixture (includes Transformer) (cont.)		
1R0042	42W LV HALOGEN FIXT	52
1R0050	50W LV HALOGEN FIXT	60
1R0065	65W LV HALOGEN FIXT	75
1R0075	75W LV HALOGEN FIXT	85
Halogen/Quartz Lamps		
1T0035	35W HALOGEN LAMP	35
1T0040	40W HALOGEN LAMP	40
1T0042	42W HALOGEN LAMP	42
1T0045	45W HALOGEN LAMP	45
1T0047	47W HALOGEN LAMP	47
1T0050	50W HALOGEN LAMP	50
1T0052	52W HALOGEN LAMP	52
1T0055	55W HALOGEN LAMP	55
1T0060	60W HALOGEN LAMP	60
1T0072	72W HALOGEN LAMP	72
1T0075	75W HALOGEN LAMP	75
1T0090	90W HALOGEN LAMP	90
1T0100	100W HALOGEN LAMP	100
1T0150	150W HALOGEN LAMP	150
1T0200	200W HALOGEN LAMP	200
1T0250	250W HALOGEN LAMP	250
1T0300	300W HALOGEN LAMP	300
1T0350	350W HALOGEN LAMP	350
1T0400	400W HALOGEN LAMP	400
1T0425	425W HALOGEN LAMP	425
1T0500	500W HALOGEN LAMP	500
1T0750	750W HALOGEN LAMP	750
1T0900	900W HALOGEN LAMP	900
1T1000	1000W HALOGEN LAMP	1000
1T1200	1200W HALOGEN LAMP	1200
1T1500	1500W HALOGEN LAMP	1500
Mercury Vapor (MV)		
1V0040S	40W MERCURY	50
1V0050S	50W MERCURY	75
1V0075S	75W MERCURY	95
1V0100S	100W MERCURY	120
1V0175S	175W MERCURY	205
1V0250S	250W MERCURY	290
1V0400S	400W MERCURY	455

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Low Pressure Sodium (LPS)		
1V0700S	700W MERCURY	775
1V1000S	1000W MERCURY	1075
2V0400S	2/400W MERCURY	880
1L0035S	35W LPS	60
1L0055S	55W LPS	85
1L0090S	90W LPS	130
1L0135S	135W LPS	180
1L0180S	180W LPS	230
High Pressure Sodium (HPS)		
1H0035S	35W HPS	45
1H0050S	50W HPS	65
1H0070S	70W HPS	90
1H0100S	100W HPS	130
1H0150S	150W HPS	190
1H0200S	200W HPS	240
1H0225S	225W HPS	275
1H0250S	250W HPS	295
1H0310S	310W HPS	350
1H0360S	360W HPS	435
1H0400S	400W HPS	460
1H0600S	600W HPS	675
1H0750S	750W HPS	835
1H1000S	1000W HPS	1085
Metal Halide (MH)		
1M0032S	32W METAL HALIDE	40
1M0050S	50W METAL HALIDE	65
1M0070S	70W METAL HALIDE	95
1M0100S	100W METAL HALIDE	120
1M0150S	150W METAL HALIDE	190
1M0175S	175W METAL HALIDE	205
1M0250S	250W METAL HALIDE	295
1M0360S	360W METAL HALIDE	430
1M0400S	400W METAL HALIDE	455
1M0750S	750W METAL HALIDE	825
1M1000S	1000W METAL HALIDE	1075
1M1500S	1500W METAL HALIDE	1615
1M1800S	1800W METAL HALIDE	1875

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Pulse Start Metal Halide Lamp/Ballast		
1M0100P	100W MH CWA	128
1M0100R	100W MH LINEAR	118
1M0150P	150W MH CWA	190
1M0150R	150W MH LINEAR	172
1M0175P	175W MH CWA	208
1M0175R	175W MH LINEAR	190
1M0200P	200W MH CWA	232
1M0200R	200W MH LINEAR	218
1M0250P	250W MH CWA	288
1M0250R	250W MH LINEAR	265
1M0300P	300W MH CWA	342
1M0300R	300W MH LINEAR	324
1M0320P	320W MH CWA	365
1M0320R	320W MH LINEAR	345
1M0350P	350W MH CWA	400
1M0350R	350W MH LINEAR	375
1M0400P	400W MH CWA	455
1M0400R	400W MH LINEAR	430
1M0450P	450W MH CWA	508
1M0450R	450W MH LINEAR	480
1M0750P	750W MH CWA	815
1M0750R	750W MH LINEAR	805
1M0875P	875W MH CWA	950
1M0875R	875W MH LINEAR	927
1M1000P	1000W MH CWA	1080
Two Foot T8 / T12 Systems		
1F20SSS	F20T12/HPF(1)	32
1F80BXE	1L2' F80BXE/ELIG	90
1F55BXE	1L2' F55BX/ELIG	56
2F17SSE	2L2' 17W T8/ELIG	37
2F17SSL	2L2' 17W T8/ELIG LOW POWER	27
2F17SSM	2L2' 17W T8/EEMAG	45
2F20SSS	F20T12/HPF(2)	56
2F24HSS	2L2' 24 T12HO/STD/STD	85
2F40BXE	2L2' F40BX/ELIG	72
2F50BXE	2L2' F50BX/ELIG	108
2F55BXE	2L2'55BXE/ELIG	112
3F17SSE	3L2' 17W T8/ELIG	53
3F17SSL	3L2' 17W T8/ELIG LOW POWER	39

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Two Foot T8 / T12 Systems (cont.)		
3F20SSS	F20T12/HPF(3)	78
3F40BXE	3L2' F40BX/ELIG	102
3F50BXE	3L2' F50BX/ELIG	162
3F55BXE	3L2' F55BX/ELIG	168
4F17SSE	4L2' 17W T8/ELIG	62
4F36BXE	4L2' F36BX/ELIG	148
4F40BXE	4L2' F40BX/ELIG	144
4F40BXH	4L 40W T5 (Std.) HIGH LMN	170
4F50BXE	4L2' F50BX/ELIG	216
4F55BXE	4L2' F55BX/ELIG	224
5F40BXE	5L2' F40BX/ELIG	190
5F50BXE	5L2' F50BX/ELIG	270
5F55BXE	5L2' F55BX/ELIG	280
6F36BXE	6L2' F36BX/ELIG	212
6F40BXE	6L2' F40BX/ELIG	204
6F50BXE	6L2' F50BX/ELIG	324
6F55BXE	6L2' F55BX/ELIG	336
8F36BXE	8L2' F36BX/ELIG	296
8F40BXE	8L2' F40BX/ELIG	288
8F50BXE	8L2' F50BX/ELIG	432
8F55BXE	8L2' F55BX/ELIG	448
9F36BXE	9L2' F36BX/ELIG	318
9F40BXE	9L2' F40BX/ELIG	306
9F50BXE	9L2' F50BX/ELIG	486
9F55BXE	9L2' F55BX/ELIG	504
12F40BE	12L2' F40BX/ELIG	408
12F50BE	12L2' F50BX/ELIG	648
12F55BE	12L2' F55BX/ELIG	672
Three Foot T8 / T12 Systems		
1F30SEM	1L3' 30W T12 EE/EEMAG	38
1F30SES	1L3' 30W T12 EE/STD	42
1F30SSS	1L3' 30W T12 STD/STD	46
1F25SSE	1L3' 25W T8/ELIG	24
1F25SSH	1L3' 25W T8/ELIG HIGH LMN	28
2F30SEE	2L3' 30W T12 EE/ELIG	49
2F30SEM	2L3' 30W T12 EE/EEMAG	66
2F30SES	2L3' 30W T12 EE/STD	73
2F30SSS	2L3' 30W T12 STD/STD	80
2F25SSE	2L3' 25W T8/ELIG	47
2F25SSM	2L3' 25W T8/EEMAG	65

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Three Foot T8 / T12 Systems		
3F30SSS	3L3' 30W T12 STD/STD	140
3F30SES	3L3' 30W T12 EE/STD	127
3F25SSE	3L3’ 25W T8/ELIG	68
4F25SSE	4L3' 25W T8/ELIG	88
Four Foot F48 T8 Systems		
1F48SES	1L4' F48T12EE/STD	50
1F48SSS	1L4' F48T12/STD	60
2F48SES	2L4' F48T12EE/STD	82
2F48SSS	2L4' F48T12/STD	102
3F48SES	3L4' F48T12EE/STD	132
3F48SSS	3L4' F48T12/STD	162
4F48SES	4L4' F48T12EE/STD	164
4F48SSS	4L4' F48T12/STD	204
1F48HES	1L4' F48HO/EE/STD	80
1F48HSS	1L4' F48H0/STD/STD	85
2F48HES	2L4' F48HO/EE/STD	135
2F48HSS	2L4' F48H0/STD/STD	145
3F48HES	3L4' F48HO/EE/STD	215
3F48HSS	3L4' F48H0/STD/STD	230
4F48HES	4L4' F48HO/EE/STD	270
4F48HSS	4L4' F48H0/STD/STD	290
Four Foot F48VHO T12 Systems		
1F48VES	1L4' F48VHO/EE/STD	123
1F48VSS	1L4' F48VHO/STD/STD	138
2F48VES	2L4' F48VHO/EE/STD	210
2F48VSS	2L4' F48VHO/STD/STD	240
3F48VES	3L4' F48VHO/EE/STD	333
3F48VSS	3L4' F48VHO/STD/STD	378
4F48VES	4L4' F48VHO/EE/STD	420
4F48VSS	4L4' F48VHO/STD/STD	480
Four Foot T12 Systems		
1F40SEE	1L4' EE/ELIG	38
1F40SEM	1L4' EE/EEMAG	40
1F40SES	1L4' EE/STD	50
1F40SSE	1L4' STD/ELIG	46
1F40SSM	1L4' STD/EEMAG	50
1F40SSS	1L4' STD/STD	57
1F40HSE	1L4' HO/STD/ELIG	59

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Four Foot T12 Systems (cont.)		
2F40SEE	2L4' EE/ELIG	60
2F40SEM	2L4' EE/EEMAG	70
2F40SES	2L4' EE/STD	80
2F40SSE	2L4' STD/ELIG	72
2F40SSM	2L4' STD/EEMAG	86
2F40SSS	2L4' STD/STD	94
3F40SEE	3L4' EE/ELIG	90
3F40SEM	3L4' EE/EEMAG	110
3F40SES	3L4' EE/STD	130
3F40SSE	3L4' STD/ELIG	110
3F40SSM	3L4' STD/EEMAG	136
3F40SSS	3L4' STD/STD	151
4F40SEE	4L4' EE/ELIG	120
4F40SEM	4L4' EE/EEMAG	140
4F40SES	4L4' EE/STD	160
4F40SSE	4L4' STD/ELIG	144
4F40SSM	4L4' STD/EEMAG	172
4F40SSS	4L4' STD/STD	188
6F40SSS	6L4' STD/STD	282
Four Foot T8 Systems		
1F32SSE	1L4' T8/ELIG	30
1F32SSL	1L4’ T8/ELIG LOW POWER	26
1F32SSM	1L4' T8/EEMAG	37
1F32SSH	1L4’ T8/ELIG HIGH LMN	36
2F32SSE	2L4' T8/ELIG	60
2F32SSH	2L4' T8/ELIG HIGH LMN	78
2F32SSL	2L4’ T8/ELIG LOW PWR	52
2F32SSM	2L4' T8/EEMAG	70
3F32SSE	3L4' T8/ELIG	88
3F32SSH	3L4' T8/ELIG HIGH LMN	112
3F32SSL	3L4’ T8/ELIG LOW POWER	76
3F32SSM	3L4' T8/EEMAG	107
4F32SSE	4L4' T8/ELIG	112
4F32SSH	4L4' T8/ELIG HIGH LMN	156
4F32SSL	4L4’ T8/ELIG LOW PWR	98
4F32SSM	4L4' T8/EEMAG	140
5F32SSE	5L4' T8/ELIG	148
5F32SSH	5L4' T8/ELIG HIGH LMN	190
6F32SSE	6L4' T8/ELIG	174
8F32SSH	8L4' T8/ELIG HIGH LMN	312

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Five Foot T8 / T12 Systems		
1F60HSM	1L5' HO/STD/EEMAG	90
1F60HSE	1L5' HO/STD/ELIG	70
1F60SSM	1L5'/STD/EEMAG	73
1F60TSM	1L5' T10HO/STD/EEMAG	135
2F40HSE	2L5' HO/STD/ELIG	123
2F40TSE	2L5'T8/ELIG	68
2F60HSM	2L5' HO/STD/EEMAG	178
2F60SSM	2L5'/STD/EEMAG	122
3F40TSE	3L5'T8/ELIG	106
Six Foot T12 & T12HO Systems		
1F72HSE	1L6' T8HO/ELIG	80
1F72HSS	1L6' F72HO/STD/STD	113
1F72SSM	1L6' STD/EEMAG	80
1F72SSS	1L6' STD/STD	95
2F72HSE	2L6'T8 HO/ELIG	160
2F72HSM	2L6' F72HO/STD/EEMAG	193
2F72HSS	2L6' F72HO/STD	195
2F72SSM	2L6' STD/EEMAG	135
2F72SSS	2L6' STD/STD	173
Device Code	**Device Description**	**Rated Watts**
Eight Foot T12HO Systems		
1F96HES	1L8' HO/EE/STD	125
1F96HSS	1L8' HO/STD/STD	135
2F96HEE	2L8' HO/EE/ELIG	170
2F96HEM	2L8' HO/EE/EEMAG	207
2F96HES	2L8' HO/EE/STD	227
2F96HSE	2L8' HO/STD/ELIG	195
2F96HSM	2L8' HO/STD/EEMAG	237
2F96HSS	2L8' HO/STD/STD	257
3F96HES	3L8' HO/EE/STD	352
3F96HSS	3L8' HO/STD/STD	392
4F96HEE	4L8' HO/EE/ELIG	340
4F96HEM	4L8' HO/EE/EEMAG	414
4F96HES	4L8' HO/EE/STD	454
4F96HSE	4L8' HO/STD/ELIG	390
4F96HSM	4L8' HO/STD/EEMAG	474
4F96HSS	4L8' HO/STD/STD	514

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Eight Foot T12VHO Systems		
1F96VES	1L8' VHO/EE/STD	200
1F96VSS	1L8' VHO/STD/STD	230
2F96VES	2L8' VHO/EE/STD	390
2F96VSS	2L8' VHO/STD/STD	450
3F96VES	3L8' VHO/EE/STD	590
3F96VSS	3L8' VHO/STD/STD	680
4F96VES	4L8' VHO/EE/STD	780
4F96VSS	4L8' VHO/STD/STD	900
Eight Foot T8 Systems		
1F59SSE	1L8' T8/ELIG	60
1F80SSE	1L8' T8 HO/ELIG	85
2F59SSE	2L8' T8/ELIG	109
2F59SSL	2L8' T8/ELIG LOW PWR	100
2F80SSE	2L8' T8 HO/ELIG	160
Eight Foot T12 Systems		
1F96SEE	1L8' EE/ELIG	60
1F96SES	1L8' EE/STD	83
1F96SSE	1L8' STD/ELIG	70
1F96SSS	1L8' STD/STD	100
2F96SEE	2L8' EE/ELIG	109
2F96SEM	2L8' EE/EEMAG	123
2F96SES	2L8' EE/STD	138
2F96SSE	2L8' STD/ELIG	134
2F96SSM	2L8' STD/EEMAG	158
2F96SSS	2L8' STD/STD	173
3F96SES	3L8' EE/STD	221
3F96SSS	3L8' STD/STD	273
4F96SEE	4L8' EE/ELIG	218
4F96SEM	4L8' EE/EEMAG	246
4F96SES	4L8' EE/STD	276
4F96SSE	4L8' STD/ELIG	268
4F96SSM	4L8' STD/EEMAG	316
4F96SSS	4L8' STD/STD	346

Copyright 2015 National Grid
All Rights Reserved

Table 5: Retrofit Proposed Lighting Wattage Tables

Device Code	Device Description	Rated Watts
LED Exit Signs		
1E0002	2.0 WATT LED	2
1E0003	3.0 WATT LED	3
1E0005	5.0 WLED	5
1E0005C	0.5 WATT LEC	0.5
1E0008	8.0 WLED	8
1E0015	1.5 WATT LED	1.5
1E0105	10.5 WATT LED	10.5
Compact Fluorescents (CFL's)		
2C0007S	2/7W COMPACT HW	18
1C0005S	5W COMPACT HW	7
1C0007S	7W COMPACT HW	9
1C0009S	9W COMPACT HW	11
1C0011S	11W COMPACT HW	13
1C0013S	13W COMPACT HW	15
1C0018E	18W COMPACT HW ELIG	20
1C0018S	18W COMPACT HW	20
1C0022S	22W COMPACT HW	24
1C0023E	1/23W COMPACT HW ELIG	25
1C0026E	26W COMPACT HW ELIG	28
1C0026S	26W COMPACT HW	28
1C0028S	28W COMPACT HW	30
1C0032E	32W COMPACT HW ELIG	34
1C0032S	32W CIRCLINE HW	34
1C0042E	1/42W COMPACT HW ELIG	48
1C0044S	44W CIRCLINE HW	46
1C0057E	1/57W COMPACT HW ELIG	65
1C2232S	22/32W CIRCLINE HW	58
1C2D10E	10W 2D COMPACT HW ELIG	12
1C2D16E	16W 2D COMPACT HW ELIG	18
1C2D21E	21W 2D COMPACT HW ELIG	22
1C2D28E	28W 2D COMPACT HW ELIG	28
1C2D38E	38W 2D COMP.HW ELIG	36
1C3240S	32/40W CIRCLINE HW	80
2C0005S	2/5W COMPACT HW	14
2C0009S	2/9W COMPACT HW	22
2C0011S	2/11W COMPACT HW	26
2C0013E	2/13W COMPACT HW ELIG	28
2C0013S	2/13W COMPACT HW	30

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Compact Fluorescents (CFL's) (cont.)		
2C0018E	2/18W COMP. HW ELIG	40
2C0026E	2/26W COMP. HW ELIG	54
2C0032E	2/32W COMPACT HW ELIG	68
2C0042E	2/42W COMPACT HW ELIG	100
3C0009S	3/9W COMPACT HW	33
3C0013S	3/13W COMPACT HW	45
3C0018E	3/18W COMPACT HW ELIG	60
3C0026E	3/26W COMPACT HW ELIG	82
3C0032E	3/32W COMPACT HW ELIG	114
3C0042E	3/42W COMPACT HW ELIG	141
4C0018E	4/18W COMPACT HW ELIG	80
4C0026E	4/26W COMPACT HW ELIG	108
4C0032E	4/32W COMPACT HW ELIG	152
4C0042E	4/42W COMPACT HW ELIG	188
6C0026E	6/26W COMPACT HW ELIG	162
6C0032E	6/32W COMPACT HW ELIG	228
6C0042E	6/42W COMPACT HW ELIG	282
8C0026E	8/26W COMPACT HW ELIG	216
8C0032E	8/32W COMPACT HW ELIG	304
8C0042E	8/42W COMPACT HW ELIG	376
T5 Systems		
1F14SSE	1L2' 14W T5/ELIG	16
2F14SSE	2L2' 14W T5/ELIG	32
3F14SSE	3L2' 14W T5/ELIG	50
4F14SSE	4L2' 14W T5/ELIG	68
1F24HSE	1L2' 24W T5HO/ELIG	29
2F24HSE	2L2' 24W T5HO/ELIG	52
3F24HSE	3L2' 24W T5HO/ELIG	80
1F21SSE	1L3' 21W T5/ELIG	24
2F21SSE	2L3' 21W T5/ELIG	47
1F39HSE	1L3' 39W T5HO/ELIG	42
2F39HSE	2L3' 39W T5HO/ELIG	85
1F28SSE	1L4' 28W T5/ELIG	32
2F28SSE	2L4' 28W T5/ELIG	63
3F28SSE	3L4' 28W T5/ELIG	95
4F28SSE	4L4' 28W T5/ELIG	126
6F28SSE	6L4' 28W T5/ELIG	189
1F47HSE	1L4' 47W T5HO/ELIG	53
2F47HSE	2L4' 47W T5HO/ELIG	103
3F47HSE	3L4' 47W T5HO/ELIG	157

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
T5 Systems (cont.)		
4F47HSE	4L4' 47W T5HO/ELIG	200
5F47HSE	5L4' 47W T5HO/ELIG	260
6F47HSE	6L4' 47W T5HO/ELIG	303
1F50HSE	1L4' 50W T5HO/ELIG	58
2F50HSE	2L4' 50W T5HO/ELIG	110
3F50HSE	3L4' 50W T5HO/ELIG	168
4F50HSE	4L4' 50W T5HO/ELIG	215
5F50HSE	5L4' 50W T5HO/ELIG	278
6F50HSE	6L4' 50W T5HO/ELIG	325
1F54HSE	1L4' 54W T5HO/ELIG	59
2F54HSE	2L4' 54W T5HO/ELIG	117
3F54HSE	3L4' 54W T5HO/ELIG	177
4F54HSE	4L4’ 54W T5HO/ELIG	234
5F54HSE	5L4' 54W T5HO/ELIG	294
6F54HSE	6L4’ 54W T5HO/ELIG	351
8F54HSE	8L4' 54W T5HO/ELIG	468
10F54HSE	10L4’ 54W T5HO/ELIG	585
Two Foot High Efficient T8 Systems		
1F17ESL	1L2' 17W T8EE/ELEE LOW PWR	14
1F17ESN	1L2' 17W T8EE/ELEE	17
1F17ESH	1L2' 17W T8EE/ELEE HIGH PWR	20
1F28BXE	1L2' F28BX/ELIG	32
2F17ESL	2L2' 17W T8EE/ELEE LOW PWR	27
2F17ESN	2L2' 17W T8EE/ELEE	32
2F17ESH	2L2' 17W T8EE/ELEE HIGH PWR	40
2F28BXE	2L2' F28BX/ELIG	63
3F17ESL	3L2' 17W T8EE/ELEE LOW PWR	39
3F17ESN	3L2' 17W T8EE/ELEE	46
3F17ESH	3L2' 17W T8EE/ELEE HIGH PWR	61
3F28BXE	3L2' F28BX/ELIG	94
Three Foot High Efficient T8 Systems		
1F25ESL	1L3' 25W T8EE/ELEE LOW PWR	21
1F25ESN	1L3' 25W T8EE/ELEE	24
1F25ESH	1L3' 25W T8EE/ELEE HIGH PWR	30
2F25ESL	2L3' 25W T8EE/ELEE LOW PWR	40
2F25ESN	2L3' 25W T8EE/ELEE	45
2F25ESH	2L3' 25W T8EE/ELEE HIGH PWR	60
3F25ESL	3L3' 25W T8EE/ELEE LOW PWR	58
3F25ESN	3L3' 25W T8EE/ELEE	67
3F25ESH	3L3' 25W T8EE/ELEE HIGH PWR	90

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Four Foot T8 High Efficient / Reduce Wattage Systems		
1F25EEH	1L4' 25W T8EE/ELEE HIGH PWR	30
1F25EEE	1L4' 25W T8EE/ELEE	22
1F25EEL	1L4' 25W T8EE/ELEE LOW PWR	19
2F25EEH	2L4' 25W T8EE/ELEE HIGH PWR	57
2F25EEE	2L4' 25W T8EE/ELEE	43
2F25EEL	2L4' 25W T8EE/ELEE LOW PWR	37
3F25EEH	3L4' 25W T8EE/ELEE HIGH PWR	86
3F25EEE	3L4' 25W T8EE/ELEE	64
3F25EEL	3L4' 25W T8EE/ELEE LOW PWR	57
4F25EEH	4L4' 25W T8EE/ELEE HIGH PWR	111
4F25EEE	4L4' 25W T8EE/ELEE	86
4F25EEL	4L4' 25W T8EE/ELEE LOW PWR	75
1F28EEH	1L4' 28W T8EE/ELEE HIGH PWR	33
1F28EEE	1L4' 28W T8EE/ELEE	24
1F28EEL	1L4' 28W T8EE/ELEE LOW PWR	22
2F28EEH	2L4' 28WT8EE/ELEE HIGH PWR	64
2F28EEE	2L4' 28W T8EE/ELEE	48
2F28EEL	2L4' 28W T8EE/ELEE LOW PWR	42
3F28EEH	3L4' 28W T8EE/ELEE HIGH PWR	96
3F28EEE	3L4' 28W T8EE/ELEE	72
3F28EEL	3L4' 28W T8EE/ELEE LOW PWR	63
4F28EEH	4L4' 28W T8EE/ELEE HIGH PWR	126
4F28EEE	4L4' 28W T8EE/ELEE	94
4F28EEL	4L4' 28W T8EE/ELEE LOW PWR	83
1F30EEH	1L4' 30W T8EE/ELEE HIGH PWR	36
1F30EEE	1L4' 30W T8EE/ELEE	26
1F30EEL	1L4' 30W T8EE/ELEE LOW PWR	24
2F30EEH	2L4' 30WT8EE/ELEE HIGH PWR	69
2F30EEE	2L4' 30W T8EE/ELEE	52
2F30EEL	2L4' 30W T8EE/ELEE LOW PWR	45
3F30EEH	3L4' 30W T8EE/ELEE HIGH PWR	103
3F30EEE	3L4' 30W T8EE/ELEE	77
3F30EEL	3L4' 30W T8EE/ELEE LOW PWR	68
4F30EEH	4L4' 30W T8EE/ELEE HIGH PWR	133
4F30EEE	4L4' 30W T8EE/ELEE	101
4F30EEL	4L4' 30W T8EE/ELEE LOW PWR	89
1F32EEH	1L4' 32W T8EE/ELEE HIGH PWR	38
1F32EEE	1L4' 32W T8EE/ELEE	28
1F32EEL	1L4' 32W T8EE/ELEE LOW PWR	25
2F32EEH	2L4' 32W T8EE/ELEE HIGH PWR	73
2F32EEE	2L4' 32W T8EE/ELEE	53

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
Four Foot T8 High Efficient / Reduce Wattage Systems (cont.)		
2F32EEL	2L4' 32W T8EE/ELEE LOW PWR	47
3F32EEH	3L4' 32W T8EE/ELEE HIGH PWR	109
3F32EEE	3L4' 32W T8EE/ELEE	82
3F32EEL	3L4' 32W T8EE/ELEE LOW PWR	72
4F32EEH	4L4' 32W T8EE/ELEE HIGH PWR	141
4F32EEE	4L4' 32W T8EE/ELEE	107
4F32EEL	4L4' 32W T8EE/ELEE LOW PWR	95
6F32EEH	6L4' 32W T8EE/ELEE HIGH PWR	218
6F32EEE	6L4' 32W T8EE/ELEE	168
6F32EEL	6L4' 32W T8EE/ELEE LOW PWR	146
Eight Foot T8 Systems		
1F59SSE	1L8' T8/ELIG	60
1F80SSE	1L8' T8 HO/ELIG	85
2F59SSE	2L8' T8/ELIG	109
2F59SSL	2L8' T8/ELIG LOW PWR	100
2F80SSE	2L8' T8 HO/ELIG	160
LED Lighting Fixtures		
1L002	2 WATT LED	2
1L003	3 WATT LED	3
1L004	4 WATT LED	4
1L005	5 WATT LED	5
1L006	6 WATT LED	6
1L007	7 WATT LED	7
1L008	8 WATT LED	8
1L009	9 WATT LED	9
1L010	10 WATT LED	10
1L011	11 WATT LED	11
1L012	12 WATT LED	12
1L013	13 WATT LED	13
1L014	14 WATT LED	14
1L015	15 WATT LED	15
1L016	16 WATT LED	16
1L017	17 WATT LED	17
1L018	18 WATT LED	18
1L019	19 WATT LED	19
1L020	20 WATT LED	20
1L021	21 WATT LED	21
1L022	22 WATT LED	22
1L023	23 WATT LED	23

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
LED Lighting Fixtures (cont.)		
1L024	24 WATT LED	24
1L025	25 WATT LED	25
1L026	26 WATT LED	26
1L027	27 WATT LED	27
1L028	28 WATT LED	28
1L029	29 WATT LED	29
1L030	30 WATT LED	30
1L031	31 WATT LED	31
1L032	32 WATT LED	32
1L033	33 WATT LED	33
1L034	34 WATT LED	34
1L035	35 WATT LED	35
1L036	36 WATT LED	36
1L037	37 WATT LED	37
1L038	38 WATT LED	38
1L039	39 WATT LED	39
1L040	40 WATT LED	40
1L041	41 WATT LED	41
1L042	42 WATT LED	42
1L043	43 WATT LED	43
1L044	44 WATT LED	44
1L045	45 WATT LED	45
1L046	46 WATT LED	46
1L047	47 WATT LED	47
1L048	48 WATT LED	48
1L049	49 WATT LED	49
1L050	50 WATT LED	50
1L055	55 WATT LED	55
1L060	60 WATT LED	60
1L070	70 WATT LED	70
1L073	73 WATT LED	73
1L075	75 WATT LED	75
1L080	90 WATT LED	90
1L085	85 WATT LED	85
1L090	90 WATT LED	90
1L095	95 WATT LED	95
1L100	100 WATT LED	100
1L106	106 WATT LED	106
1L107	107 WATT LED	107
1L116	116 WATT LED	116
1L120	120 WATT LED	120

Copyright 2015 National Grid
All Rights Reserved

Device Code	Device Description	Rated Watts
LED Lighting Fixtures (cont.)		
1L125	125 WATT LED	125
1L130	130 WATT LED	130
1L135	135 WATT LED	135
1L140	140 WATT LED	140
1L145	145 WATT LED	145
1L150	150 WATT LED	150
1L155	155 WATT LED	155
1L160	160 WATT LED	160
1L165	165 WATT LED	165
1L170	170 WATT LED	170
1L175	175 WATT LED	175
1L180	180 WATT LED	180
1L185	185 WATT LED	185
1L190	190 WATT LED	190
1L200	200 WATT LED	200
1L210	210 WATT LED	210
1L220	220 WATT LED	220
1L240	240 WATT LED	240
Electronic Metal Halide Lamps		
1M0150E	150W METAL HALIDE EB	160
1M0200E	200W METAL HALIDE EB	215
1M0250E	250W METAL HALIDE EB	270
1M0320E	320W METAL HALIDE EB	345
1M0350E	350W METAL HALIDE EB	375
1M0400E	400W METAL HALIDE EB	430
1M0450E	400W METAL HALIDE EB	480
MH Track Lighting		
1M0020E	20W MH SPOT	25
1M0025E	25W MH SPOT	25
1M0035E	35W MH SPOT	44
1M0039E	39W MH SPOT	47
1M0050E	50W MH SPOT	60
1M0070E	70W MH SPOT	80
1M0100E	100W MH SPOT	111
1M0150E	150W MH SPOT	162

Copyright 2015 National Grid
All Rights Reserved

Table 6: Upstream Lighting Savings and Measure Lives

Product type	Annual Savings, kWh	Watts saved	Measure Life	kWh Impact Factor	Summer & Winter kW Factor	Summer Coincident (On-Peak)	Winter Coincident (On-Peak)	Summer Coincident (Seasonal)	Winter Coincident (Seasonal)	RI Annual HOU
T8	13.0	3.5	10	91.6%	85.3%	76.2%	50.6%	68.2%	45.4%	3,684
T5HO	14.7	4.0	10	91.6%	85.3%	76.2%	50.6%	68.2%	45.4%	3,684
T8 - 28	13.0	3.5	10	91.6%	85.3%	76.2%	50.6%	68.2%	45.4%	3,684
T8 - 25	22.7	6.2	10	91.6%	85.3%	76.2%	50.6%	68.2%	45.4%	3,684
U-Bend T8 - 28	13.0	3.5	7	91.6%	85.3%	76.2%	50.6%	68.2%	45.4%	3,684
U-Bend T8 - 25	22.7	6.2	7	91.6%	85.3%	76.2%	50.6%	68.2%	45.4%	3,684
PAR20	115.3	29.8	11	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
PAR30	156.3	40.4	11	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
PAR38	181.1	46.8	11	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
MR16	90.6	23.4	11	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
A-line, 40/60w	129.8	**33.5**	**6**	**119.3%**	**113.0%**	**72.0%**	**52.6%**	**66.8%**	**48.8%**	3,870
A-line, 75/100w	182.3	47.1	6	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
Decoratives	81.5	21.1	5	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
TLED, 4ft	31.4	**8.5**	**12**	**91.6%**	**85.3%**	**76.2%**	**50.6%**	**68.2%**	**45.4%**	3,684
TLED, 2ft	15.7	**4.3**	**12**	**91.6%**	**85.3%**	**76.2%**	**50.6%**	**68.2%**	**45.4%**	3,684
G24 LED	50.1	12.8	13	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
LED Retrofit kit, <25W	157.4	40.7	11	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
LED Retrofit kit, >25W	232.0	60.0	12	119.3%	113.0%	72.0%	52.6%	66.8%	48.8%	3,870
Stairwell Kit, 2ft w/sensor	467.8	53.4	7	100.0%	100.0%	77.6%	85.6%	77.6%	85.6%	8,760
Stairwell Kit, 4ft w/sensor	403.0	46.0	7	100.0%	100.0%	77.6%	85.6%	77.6%	85.6%	8,760

Copyright 2016 National Grid
All Rights Reserved

Table 7: Baseline Efficiency Requirements for C&I Unitary Air Conditioners[c]

Equipment Type	Size Category	Subcategory or Rating Condition	Baseline Efficiency After 1/2014
Air conditioners, air cooled	<65,000 Btu/h[b]	Split system	13.0 SEER
		Single package	13.0 SEER
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.2 EER[a] 11.4 IEER[a]
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	11.0 EER[a] 11.2 IEER[a]
	≥240,000 Btu/h and <760,000 Btu/h	Split system and single package	10.0 EER[a] 10.1 IEER[a]
	≥760,000 Btu/h	Split system and single package	9.7 EER[a] 9.8 IEER[a]
Air conditioners, Water cooled	<65,000 Btu/h	Split system and single package	12.1 EER 12.3 IEER
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	12.1 EER[a] 12.3 IEER[a]
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	12.5 EER[a] 12.7 IEER[a]
	≥240,000 Btu/h	Split system and single package	12.4 EER[a] 12.6 IEER[a]
Air conditioners, evaporatively cooled	<65,000 Btu/h	Split system and single package	12.1 EER 12.3 IEER
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	12.1 EER[a] 12.3 IEER[a]
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	12.0 EER[a] 12.2 IEER[a]
	≥240,000 Btu/h	Split system and single package	11.9 EER[a] 12.1 IEER[a]

a. Deduct 0.2 from the required EERs for units with a heating section other than electric heat.[1]

b. Single-phase air-cooled air conditioners <65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

c. Baseline determined by International Code Council (2012). *2012 International Energy Conservation Code;* Page C-38, Table C403.2.3(1)

Baseline determined by International Code Council (2012). 2012 International Energy Conservation Code; Page C-38, Table C403.2.3(1)

The Program does not differentiate units by heating section types, therefore the highest baseline efficiency is assumed for all heating section types in each equipment category

Copyright 2016 National Grid
All Rights Reserved

Table 8: Baseline Efficiency Requirements for C&I Heat Pumps

Equipment Type	Size Category (Cooling Capacity)	Subcategory or Rating Condition	Baseline Efficiency After 1/1/2014[i]	
			Cooling Mode	Heating Mode
Air cooled	<65,000 Btu/h[b]	Split system	13.0 SEER	7.7 HSPF
		Single package	13.0 SEER	7.7 HSPF
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package / 47°F db/43°F wb outdoor air	11.0 EER[a] 11.2 IEER[a]	3.3 COP
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package / 47°F db/43°F wb outdoor air	10.6 EER[a] 10.7 IEER[a]	3.2 COP
	≥240,000 Btu/h	Split system and single package / 47°F db/43°F wb outdoor air	9.5 EER[a] 9.6 IEER[a]	3.2 COP
Water source	<17,000 Btu/h	86°F entering water (Cooling Mode) / 68°F entering water (Heating Mode)	11.2 EER	4.2 COP
	≥17,000 Btu/h and <135,000 Btu/h	86°F entering water / 68°F entering water (Heating Mode)	12.0 EER	4.2 COP
Groundwater source	<135,000 Btu/h	59°F entering water (Cooling Mode) / 50°F entering water (Heating Mode)	16.2 EER	3.6 COP
Ground source	<135,000 Btu/h	77°F entering water / 32°F entering water (Heating Mode)	13.4 EER	3.1 COP

db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F.

a. Deduct 0.2 from the required EERs for units with a heating section other than electric heat[1].

b. Single-phase air-cooled air conditioners <65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

[i] International Code Council (2012). 2012 International Energy Conservation Code. Page C-40, Table C403.2.3(2)
The Program does not differentiate units by heating section types, therefore the highest baseline efficiency is assumed for all heating section types in each equipment category

Copyright 2016 National Grid
All Rights Reserved

Table 9: Water Chilling Packages - Minimum Efficiency Requirements

Equipment Type	Size Category (Tons)	Units	Path A		Path B	
			Full Load	IPLV	Full Load	IPLV
Air-cooled chillers	< 150	EER	9.562	12.5	NA	NA
	≥ 150	EER	9.562	12.75	NA	NA
Water cooled, electrically operated, positive displacement (rotary screw and scroll)	< 75	kW/ton	0.78	0.63	0.8	0.6
	≥ 75 and < 150	kW/ton	0.775	0.615	0.79	0.586
	≥ 150 and < 300	kW/ton	0.68	0.58	0.718	0.54
	≥ 300	kW/ton	0.62	0.54	0.639	0.49
Water cooled, electrically operated, centrifugal	< 150	kW/ton	0.634	0.596	0.639	0.45
	≥ 150 and < 300	kW/ton	0.634	0.596	0.639	0.45
	≥ 300 and < 600	kW/ton	0.576	0.549	0.6	0.4
	≥ 600	kW/ton	0.57	0.539	0.59	0.4

Note: Compliance with this standard may be obtained by meeting the minimum requirements of Path A or B, however, both the Full Load and IPLV must be met to fulfill the requirements of Path A or B.

Copyright 2016 National Grid
All Rights Reserved

Table 10: Chiller Load Factors

Equipment Type	Full Load	IPLV
Air-cooled chillers	0.715	0.715
Water cooled chillers <300 Tons	0.882	0.823
Water cooled chillers >300 Tons	0.762	0.765

National Grid load factors based on a 1994 study.

Copyright 2016 National Grid
All Rights Reserved

Table 11: Cooling and Heating Equivalent Full Load Hours

Building (or Space) Type	Cooling Full Load Hours ($EFLH_{cool}$)	Heating Full Load Hours ($EFLH_{heat}$)
National Grid RI (NE – South Coastal)	817	1137

Average Cooling EFLHs from the 2010 NEEP HVAC Loadshape study.[1]
Average Heating EFLHs derived from 2010 NEEP HVAC Loadshape study[2] and the Connecticut Program

[1] KEMA (2011). C&I Unitary AC LoadShape Project – Final Report. Prepared for the Regional Evaluation, Measurement & Verification Forum.
[2] Ibid.
[3] United Illuminating Company, Connecticut Light & Power Company (2010). UI and CL&P Program Savings Documentation for 2011 Program Year.

Copyright 2016 National Grid
All Rights Reserved

Table 12: Savings Factors for ECM HVAC Fan Motors

Factor	Box Size	Value	Units
Box Size Factor	< 1000 CFM	0.32	Watts/CFM
Box Size Factor	≥ 1000 CFM	0.21	Watts/CFM
$\%Flow_{ANNUAL}$	ALL	0.52	-
$\%Flow_{SP}$	ALL	0.63	-
$\%Flow_{WP}$	ALL	0.33	-

Factors based on engineering analyses developed at National Grid

Copyright 2016 National Grid
All Rights Reserved

Table 13: Savings Factors for Cooler Night Covers

Cooler Case Temperature	Savings Factor (ΔkW/foot)
Low Temperature (-35 F to -5 F)	0.03
Medium Temperature (0 F to 30 F)	0.02
High Temperature (35 F to 55F)	0.01

CL&P Program Savings Documentation for 2011 Program Year (2010). Factors based on Southern Californi
Effects of the Low Emissive Shields on Performance and Power Use of a Refrigerated Display Case.

Copyright 2016 National Grid
All Rights Reserved

Table 14: Savings Factors for C&I VSDs (kWh/HP and kW/HP)

	Building Exhaust Fan	Cooling Tower Fan	Chilled Water Pump	Boiler Feed Water Pump	Hot Water Circulating. Pump	MAF - Make-up Air Fan	Return Fan	Supply Fan	WS Heat Pump Circulating Loop
Annual Energy Savings Factors (kWh/HP)									
University/College	3,641	449	745	2,316	2,344	3,220	1,067	1,023	3,061
Elm/H School	3,563	365	628	1,933	1,957	3,402	879	840	2,561
Multi-Family	3,202	889	1,374	2,340	2,400	3,082	1,374	1,319	3,713
Hotel/Motel	3,151	809	1,239	2,195	2,239	3,368	1,334	1,290	3,433
Health	3,375	1,705	2,427	2,349	2,406	3,002	1,577	1,487	3,670
Warehouse	3,310	455	816	2,002	2,087	3,229	1,253	1,205	2,818
Restaurant	3,440	993	1,566	1,977	2,047	2,628	1,425	1,363	3,542
Retail	3,092	633	1,049	1,949	2,000	2,392	1,206	1,146	2,998
Grocery	3,126	918	1,632	1,653	1,681	2,230	1,408	1,297	3,285
Offices	3,332	950	1,370	1,866	1,896	3,346	1,135	1,076	3,235
Summer Demand Savings Factors (kW/HP_{SP})									
University/College	0.109	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.056
Elm/H School	0.377	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.275
Multi-Family	0.109	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.056
Hotel/Motel	0.109	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.056
Health	0.109	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.056
Warehouse	0.109	-0.023	0.056	0.457	0.457	0.261	0.102	0.064	0.056
Restaurant	0.261	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.178
Retail	0.109	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.056
Grocery	0.261	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.178
Offices	0.109	-0.023	0.056	0.457	0.457	0.109	0.102	0.064	0.056
Winter Demand Savings Factors (kW/HP_{WP})									
University/College	0.377	-0.006	0.457	0.457	0.457	0.109	0.113	0.113	0.457
Elementary/High School	0.457	-0.006	0.457	0.457	0.457	0.109	0.113	0.113	0.457
Multi-Family	0.109	-0.006	0.457	0.355	0.384	0.109	0.113	0.113	0.355
Hotel/Motel	0.109	-0.006	0.457	0.418	0.444	0.109	0.113	0.113	0.418
Health	0.377	-0.006	0.457	0.275	0.298	0.109	0.113	0.113	0.275
Warehouse	0.377	-0.006	0.457	0.178	0.193	0.261	0.113	0.113	0.178
Restaurant	0.109	-0.006	0.457	0.355	0.384	0.109	0.113	0.113	0.355
Retail	0.109	-0.006	0.457	0.275	0.298	0.109	0.113	0.113	0.275
Grocery	0.457	-0.006	0.457	0.418	0.444	0.109	0.113	0.113	0.418
Offices	0.457	-0.006	0.457	0.418	0.444	0.109	0.113	0.113	0.418

Chan, Tumin (2010). Formulation of a Prescriptive Incentive for the VFD and Motors & VFD impact tables at NSTAR. Prepared for NSTAR.

Copyright 2016 National Grid
All Rights Reserved

Table 15: Baseline Efficiency Requirements for Gas and Electric Commercial Ovens

Equipment Type	Baseline Efficiency	Efficiency Requirement
Gas-Fired Convection Oven	30%	>=44%
Gas-Fired Combination Oven	35%	>=44%
Gas-Fired Conveyor Oven	20% Heavy Load	>=44%
Gas-Fired Rack Oven	30%	>=50%
Commercial Electric Oven	Convection Cooking: 65% at 80lb/hr, 3.0 kW idle mode, 3.0 kW preheat Steam Cooking: 40% at 100lb/hr, 10.0 kW idle mode, 3.0kW preheat	

Copyright 2016 National Grid
All Rights Reserved

Table 16: HVAC Interactive Effects for C&I Lighting

Program	Lighting Type	Gas Impact (MMBtu/ΔkWh)[i]	Oil Impact (MMBtu/ΔkWh)[ii]
C&I New Construction	Lighting Systems	-0.00043	-0.00083
	Lighting Controls	-0.00028	-0.00055
	Upstream Lighting - LEDs	-0.0003	-0.0006
	Upstream Lighting - Fluorescents	-0.00039	-0.00077
C&I Retrofit	Lighting Systems	-0.00043	-0.00083
	Lighting Controls	-0.00028	-0.00055

[i] C&I Lighting Interactive Effects 2015
[ii] C&I Lighting Interactive Effects 2015

Copyright 2016 National Grid
All Rights Reserved

Table 17: Default kW Reduction per CFM by CAIR Dryer Capacity

Dryer Capacity (CFM_{DRYER})	kW Reduction per CFM [1]
<100	0.00474
≥100 and <200	0.00359
≥200 <300	0.00316
≥300 <400	0.0029
≥400	0.00272

[1] From NSTAR analysis based on metering data. The location of the original data and analysis is unknown; however, these values are supported by multipled 3rd party impact evaluations.

Copyright 2016 National Grid
All Rights Reserved

Table 18: CAIR Compressor kW Reduction per Horsepower

Control Type	Nominal Horsepower (HP)	kW Reduction per Horsepower [1]	
		New Construction	Retrofit
Load/No Load	≥15 and <25	0.076	0.102
Load/No Load	≥25 and <75	0.114	0.102
VSD	≥15 and <25	0.159	0.207
VSD	≥25 and <75	0.228	0.206
Variable Displacement	≥50 and <75	0.11	0.116

[1] From NSTAR Analysis based on metering data. The location of original data and analysis is unknown; however, these values are supported by multiple 3rd party impact evaluations.

Copyright 2016 National Grid
All Rights Reserved

Table 19: Baseline Efficiency Requirements for C&I Gas-Fired Boilers

Equipment Type	Subcategory	Size Category (Input)	Minimum Efficiency[a]	Test Procedure
Boilers, hot water	Gas-fired	<300,000 Btu/h	80% AFUE	10 CFR Part 430
		>=300,000 Btu/h and <=2,500,000 Btu/h[b]	80% E_t	10 CFR Part 431
		>2,500,000 Btu/h[c]	82% E_c	10 CFR Part 430

a. Annual Fuel Utilization Efficiency (AFUE), Thermal efficiency (Et), Combustion efficiency (Ec)
b. Maximum capacity – min. and max. ratings as provided for and allowed by the units controls
c. These requirements apply to boilers with rated input of 8 MMBtu/h or less that are not packaged boilers and to all packaged boilers. Minimum efficiency requirements for boilers cover all capacities of packaged boilers

Adapted from 2012 International Energy Conservation Code; Table 6.8.1F

Copyright 2016 National Grid
All Rights Reserved

Appendix B: Non-Energy Impacts

Per Measure Residential Non-Energy Impacts for Electric and Gas Programs

End Use	TRM Measures	NEI	Description	Value or Algorithm	Basis	Duration
Lighting	Indoor Fixture Outdoor Fixture LED Fixture	Lighting Quality and Lifetime	O&M savings due to more efficient fixtures	$3.50	per measure	One Time
	CFL Bulb LED Bulb	Lighting Quality and Lifetime	O&M savings due to more efficient bulbs	$3.00	per measure	One Time
Products	Refrigerator/Freezer Recycling	Refrigerator/Freezer Turn-in	Non-energy benefits of turning in a refrigerator and/or freezer as part of the MA turn-in program. The total benefit is comprised of 3 parts: $1.06 for avoided landfill space, $1.25 for recycling of plastics and glass, and $170.22 for incineration insulating foam.	$172.53	per measure	One Time
HVAC	Heating System (Retrofit and Rebate)	Improved Safety	Reduced incidence of fire and carbon monoxide exposure as a result of installing a new heating system	$45.05	per measure	Annual
	Window AC (Retrofit)	Window Air Conditioner Replacement	Non-energy benefits associated with installing a new room air conditioner replacement	$49.50	per measure	Annual

© 2015 National Grid

ALL RIGHTS RESERVED

End Use	TRM Measures	NEI	Description	Value or Algorithm	Basis	Duration
Various	All Measures with oil savings	National Security	Reducing the need for foreign energy imports thereby increasing national security	MMBTU Oil Savings * $1.83	per measure	Annual
	All electric measures with kWh savings and all gas measures with MMBTU savings.	Rate Discounts	Financial savings to utility as a result of a smaller portion of energy being sold at the low income rate	**Elec:** (kwh savings per measure)*(A16-A60) **Gas:** (therms savings per measure)*(R12-R13)	per measure	Annual

(1) The NEIs in this table represent impacts that accrue specifically measures in the 2016 RI portfolio of programs.

© 2015 National Grid

ALL RIGHTS RESERVED

Per Measure Commercial and Industrial Non-Energy Impacts for Electric and Gas Programs

End Use	TRM Measures	NEI	Description	Value	Basis	Type
Lighting	Large Retrofit Prescriptive Lighting	Varies (1)	A compiled value representing a number of NEI categories studied in the referenced evaluation.	$0.027	Net kWh Saved	Annual
	New Construction CFL O&M	O&M Savings (2)	Operation & Maintenance savings from fewer replacements over the life of the more efficient measure	$17.93	Unit	Annual
	New Construction LED Traffic Light O&M	O&M Savings (2)	Operation & Maintenance savings from fewer replacements over the life of the more efficient measure	$30.02	Unit	Annual
	New Construction Control/Sensor O&M	O&M Savings (2)	Operation & Maintanence savings from fewer replacements over the life of the more efficient measure	$6.69	kW Saved	Annual
Electric HVAC	Large Retrofit Prescriptive HVAC	Multiple (1)	A compiled value representing a number of NEI categories studied in the referenced evaluation.	$0.097	Net kWh Saved	Annual
Electric Custom	Large Retrofit Custom Electric	Multiple (1)	A compiled value representing a number of NEI categories studied in the referenced evaluation.	$0.037	Net kWh Saved	Annual

© 2015 National Grid

ALL RIGHTS RESERVED

End Use	TRM Measures	NEI	Description	Value	Basis	Type
CHP	Large Retrofit CHP	Economic development	Economic development benefits, as required by the amendment to the Least Cost Procurement law, R.I.G.L. § 39-1-27.7(c)(6)(ii) – (iv) enacted in June 2012	$0.39	Net kWh Saved	One-Time
		Multiple (1)	A compiled value representing a number of NEI categories studied in the referenced evaluation.	-$0.015	Net kWh Saved	Annual
Gas HVAC	Retrofit Boiler, Reset Controls, Retrofit Thermostat	Multiple (1)	A compiled value representing a number of NEI categories studied in the referenced evaluation.	$0.135	Net kWh Saved	Annual
Gas Custom	Large Retrofit Custom Gas	Multiple (1)	A compiled value representing a number of NEI categories studied in the referenced evaluation.	$0.250	Net kWh Saved	Annual

(1) Source is Tetra Tech Inc. "Massachusetts Program Administrators Final Report - Commercial & Industrial Non-Energy Impacts Study, 6/29/2012

(2) (2) Source is Optimal Energy, Inc. MEMO "Non-Electric Benefits Analysis Update" 11/7/2008

© 2015 National Grid

ALL RIGHTS RESERVED

Per Participant Non-Energy Impacts for Residential Electric Measures

Program	NEI	Description	Measure Category	Value	Duration
Residential New Construction	Thermal Comfort	Greater participant-perceived comfort in home	N/A	$77.00	Annual
	Noise Reduction	Less participant-perceived noise in the home		$40.00	Annual
	Property Value Increase	Increased value of property and expected ease of selling home		$72.00	Annual
Residential Cooling and Heating Equipment	Thermal Comfort	Greater participant-perceived comfort in home	Heating System	$48.63	Annual
			Cooling System	$3.92	
			Heating and Cooling System	$5.05	
	Noise Reduction	Less participant-perceived noise in the home	Cooling System	$2.83	Annual
			Heating and Cooling System	$1.42	
	Home Durability	Increased home durability from better quality heating, cooling and structural materials	Heating System	$17.42	Annual
			Cooling System	$1.54	
			Heating and Cooling System	$1.98	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$102.40	Annual
			Cooling System	$7.54	
			Heating and Cooling System	$9.42	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Heating System	$1.56	Annual
			Cooling System	$0.13	
			Heating and Cooling System	$0.16	
	Property Value Increase	Increased value of property and expected ease of selling home	Heating System	$678.52	One Time
			Cooling System	$62.65	
			Heating and Cooling System	$80.69	
			Air Sealing	$0.32	
			Air Sealing	$135.83	

© 2015 National Grid

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
Single Family - Income Eligible Services	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay their lower bills	N/A	$2.61	Annual
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annual
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation Air Sealing Heating System	$25.38 $30.23 $28.01	Annual
	Noise Reduction	Less participant-perceived noise in the home	Insulation Air Sealing	$13.56 $16.39	Annual
	Home Durability	Increased home durability from better quality heating, cooling and structural materials	Insulation Air Sealing Heating System	$8.76 $10.61 $9.72	Annual
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$27.43	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Insulation Air Sealing Heating System	$4.77 $5.69 $5.27	Annual

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
Single Family - Income Eligible Services	Property Value Increase	Increased value of property and expected ease of selling home	Insulation Air Sealing Heating System	$223.63 $144.93 $249.20	Annual
	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System	$8.43	Annual
EnergyWise Single Family and Multifamily	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$25.15	Annual
			Air Sealing	$10.13	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$11.54	Annual
			Air Sealing	$4.88	
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation	$9.82	Annual
			Air Sealing	$3.95	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$0.80	Annual
			Air Sealing	$0.32	
	Property Value Increase	Increased value of property and expected ease of selling home	Insulation	$378.05	One Time
			Air Sealing	$135.83	

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
EnergyWise Income Eligible Multifamily Retrofit	Rental Units Marketability	Financial savings to owners of LI rental housing as a result of increased marketability of the more efficient housing.	N/A	$0.96	Annual
	Property Durability	Financial savings to owners of LI rental housing as a result of more durable and efficient materials being installed.		$36.85	Annual
	Reduced Tenant Complaints	Savings to owners of LI rental housing in terms of staff time and materials as a result of fewer tenant complaints with the more efficient measures.		$19.61	Annual
	Rental Unit Increased Property Value	Owner-perceived increased property value due to more energy efficient measures		$17.03	One Time
	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay lower bills		$2.61	Annual
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annual

© 2015 National Grid

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
EnergyWise Income Eligible Multifamily Retrofit	Thermal Comfort	Greater participant-perceived comfort in home	Insulation Air Sealing	$25.38 $30.23	Annual
	Noise Reduction	Less participant-perceived noise in the home	Insulation Air Sealing	$13.56 $16.39	Annual
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation Air Sealing	$8.76 $10.61	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation Air Sealing	$4.77 $5.69	Annual
	Property Value Increase	Increased value of property and expected ease of selling home	Insulation Air Sealing	$223.63 $144.93	Annual

1) Source of NEIs is "Massachusetts Program Administrators: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation," NMR Group, Inc., Tetra Tech. 8.15.2011

ALL RIGHTS RESERVED

Per Participant Non-Energy Impacts for Residential Gas Programs

Program	NEI	Description	Measure Category	Value	Duration
Residential Heating and Hot Water	Thermal Comfort	Greater participant-perceived comfort in home	Heating System Heating and Hot Water System	$48.63 $1.83	Annual
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Heating System Hot Water System Heating and Hot Water System	$17.42 $2.13 $0.72	Annual
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System Heating and Hot Water System	$102.40 $3.41	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Heating System Heating and Hot Water System	$1.56 $0.06	Annual
	Property Value Increase	Increased value of property and expected ease of selling home	Heating System Hot Water System Heating and Hot Water System	$678.52 $82.56 $29.17	One Time
EnergyWise Single Family	Thermal Comfort	Greater participant-perceived comfort in home	N/A	$25.00	Annual
	Noise Reduction	Less participant-perceived noise in the home		$11.22	Annual
	Home Durability	Increased home durability from better quality heating, cooling and structural materials		$9.57	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization		$0.79	Annual
	Property Value Increase	Increased value of property and expected ease of selling home		$381.28	One Time

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
EnergyWise Multi Family	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$25.15	Annual
			Air Sealing	$10.13	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$11.54	Annual
			Air Sealing	$4.88	
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation	$9.82	Annual
			Air Sealing	$3.95	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$0.80	Annual
			Air Sealing	$0.32	
	Property Value Increase	Increased value of property and expected ease of selling home	Insulation	$378.05	One Time
			Air Sealing	$135.83	

© 2015 National Grid

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
Single Family - Income Eligible Services	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System	$8.43	Annual
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation Air Sealing Heating System	$25.38 $30.23 $28.01	Annual
	Noise Reduction	Less participant-perceived noise in the home	Insulation Air Sealing	$13.56 $16.39	Annual
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation Air Sealing Heating System	$8.76 $10.61 $9.72	Annual
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$27.43	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation Air Sealing Heating System	$4.77 $5.69 $5.27	Annual
	Property Value Increase	Increased value of property and expected ease of selling home	Insulation	$223.63	One Time
			Air Sealing	$144.93	
			Heating System	$249.20	

© 2015 National Grid

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
Single Family - Income Eligible Services	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay their lower bills	N/A	$2.61	Annually
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annually
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annually
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annually
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annually

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
EnergyWise Income Eligible Multifamily Retrofit	Rental Units Marketability	Financial savings to owners of LI rental housing as a result of increased marketability of the more efficient housing.	Air Sealing	$0.07	Annual
	Property Durability	Financial savings to owners of LI rental housing as a result of more durable and efficient materials being installed.	Air Sealing	$2.58	Annual
	Reduced Tenant Complaints	Savings to owners of LI rental housing in terms of staff time and materials as a result of fewer tenant complaints with the more efficient measures.	Air Sealing	$1.37	Annual
	Rental Unit Increased Property Value	Owner-perceived increased property value due to more energy efficient measures	Air Sealing	$1.19	One Time
	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay their lower bills	N/A	$2.61	Annual
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annual

ALL RIGHTS RESERVED

Program	NEI	Description	Measure Category	Value	Duration
EnergyWise Income Eligible Multifamily Retrofit	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System	$8.43	Annual
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$25.38	Annual
			Air Sealing	$30.23	
			Heating System	$28.01	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$13.56	Annual
			Air Sealing	$16.39	
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation	$8.76	Annual
			Air Sealing	$10.61	
			Heating System	$9.72	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$27.43	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$4.77	Annual
			Air Sealing	$5.69	
			Heating System	$5.27	
	Property Value Increase	Increased value of property and expected ease of selling home	Insulation	$223.63	One Time
			Air Sealing	$144.93	
			Heating System	$249.20	

(1) Source of NEIs is "Massachusetts Program Administrators: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation," NMR Group, Inc., Tetra Tech. 8.15.2011

ALL RIGHTS RESERVED

Appendix C: Acronyms

ACRONYM	DESCRIPTION
AC	Air Conditioning
AFUE	Annual Fuel Utilization Efficiency (see the Glossary)
AHU	Air Handling Unit
Btu	British Thermal Unit (see the Glossary)
CF	Coincidence Factor (see the Glossary)
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
COP	Coefficient of Performance (see the Glossary)
DCV	Demand Controlled Ventillation
DHW	Domestic Hot Water
DOER	Department of Energy Resources
DSM	Demand Side Management (see the Glossary)
ECM	Electrically Commutated Motor
EER	Energy Efficiency Ratio (see the Glossary)
EF	Efficiency Factor
EFLH	Equivalent Full Load Hours (see the Glossary)
ES	ENERGY STAR® (see the Glossary)
FCM	Forward Capacity Market
FR	Free-Ridership (see the Glossary)
HE	High-Efficiency
HID	High-Intensity Discharge (a lighting technology)
HP	Horse Power (see the Glossary)
HSPF	Heating Seasonal Performance Factor (see the Glossary)
HVAC	Heating, Ventilating, and Air Conditioning
ISO	Independent System Operator
ISR	In-Service Rate (see the Glossary)
kW	Kilo-Watt, a unit of electric demand equal to 1,000 watts
kWh	Kilowatt-Hour, a unit of energy (1 kilowatt of power supplied for one hour)
LED	Light-Emitting Diode (one type of solid-state lighting)
LCD	Liquid Crystal Display (a technology used for computer monitors and similar displays)
MMBtu	One million British Thermal Units (see “Btu” in the Glossary)
MW	Megawatt – a measure of electric demand equal to 1,000 kilowatts
MWh	Megawatt-hour – a measure of energy equal to 1,000 kilowatt-hours
NEB	Non-Electric Benefit (see the Glossary)
NEI	Non-Energy Impact
NE-ISO	New England Independent System Operator
NTG	Net-to-Gross (see the Glossary)
O&M	Operations and Maintenance
PA	Program Administrator (see the Glossary)
PC	Personal Computer
RR	Realization Rate (see the Glossary)
SEER	Seasonal Energy Efficiency Ratio (see the Glossary)
SO	Spillover (see the Glossary)
SPF	Savings Persistence Factor (see the Glossary)
SSL	Solid-State Lighting (e.g., LED lighting)
VSD	Variable-Speed Drive

 Copyright 2015 National Grid All Rights Reserved

Appendix D: Glossary

This glossary provides definitions as they are applied in this TRM for Rhode Island' energy efficiency programs. Alternate definitions may be used for some terms in other contexts.

TERM	DESCRIPTION
Adjusted Gross Savings	Gross savings (as calculated by the measure savings algorithms) that have been subsequently adjusted by the application of all impact factors except the net-to-gross factors (free-ridership and spillover). For more detail, see the section on **Error! Reference source not found.**.
AFUE	Annual Fuel Utilization Efficiency. The measure of seasonal or annual efficiency of a furnace or boiler. AFUE takes into account the cyclic on/off operation and associated energy losses of the heating unit as it responds to changes in the load, which in turn is affected by changes in weather and occupant controls.
Baseline Efficiency	The level of efficiency of the equipment that would have been installed without any influence from the program or, for retrofit cases where site-specific information is available, the actual efficiency of the existing equipment.
Btu	British thermal unit. A Btu is approximately the amount of energy needed to heat one pound of water by one degree Fahrenheit.
Coefficient of Performance (COP)	Coefficient of Performance is a measure of the efficiency of a heat pump, air conditioner, or refrigeration system. A COP value is given as the Btu output of a device divided by the Btu input of the device. The input and output are determined at AHRI testing standards conditions designed to reflect peak load operation.
Coincidence Factor (CF)	Coincidence Factors represent the fraction of connected load expected to occur concurrent to a particular system peak period; separate CF are found for summer and winter peaks. The CF given in the TRM includes both coincidence and diversity factors multiplied into one number. Coincidence factors are provided for peak periods defined by the NE-ISO for FCM purposes and calculated consistent with the FCM methodology.
Connected Load kW Savings	The connected load kW savings is the power saved by the equipment while in use. In some cases the savings reflect the maximum power draw of equipment at full load. In other cases the connected load may be variable, which must be accounted for in the savings algorithm.
Deemed Savings	Savings values (electric, fossil fuel and/or non-energy benefits) determined from savings algorithms with assumed values for all algorithm parameters. Alternatively, deemed savings values may be determined from evaluation studies. A measure with deemed savings will have the same savings per unit since all measure assumptions are the same. Deemed savings are used by program administrators to report savings for measures with well-defined performance characteristics relative to baseline efficiency cases. Deemed savings can simplify program planning and design, but may lead to over- or under-estimation of savings depending on product performance.
Deemed Calculated Savings	Savings values (electric, fossil fuel and/or non-energy benefits) that depend on a standard savings algorithm and for which at least one of the algorithm parameters (e.g., hours of operation) is project specific.
Demand Savings	The reduction in demand due to installation of an energy efficiency measure, usually expressed as kW and measured at the customer's meter (see Connected Load kW Savings).
Demand Side Management (DSM)	Strategies used to manage energy demand including energy efficiency, load management, fuel substitution, and load building.
Diversity	A characteristic of a variety of electric loads whereby individual maximum demands occur at different times. For example, 50 efficient light fixtures may be installed, but they are not necessarily all on at the same time. See Coincidence Factor.

 Copyright 2015 National Grid All Rights Reserved

TERM	DESCRIPTION
Diversity Factor	This TRM uses coincidence factors that incorporate diversity (See Coincidence Factor), thus this TRM has no separate diversity factors. A diversity factor is typically calculated as: 1) the percent of maximum demand savings from energy efficiency measures available at the time of the company's peak demand, or 2) the ratio of the sum of the demands of a group of users to their coincident maximum demand.
End Use	Refers to the category of end use or service provided by a measure or technology (e.g., lighting, cooling, etc.). For the purpose of this manual, the list of end-uses include: Lighting, HVAC Refrigeration, Hot Water Food Service, Behavior Compressed Air, Motors & Drives Products, Custom
Energy Efficiency Ratio (EER)	The Energy Efficiency Ratio is a measure of the efficiency of a cooling system at a specified peak, design temperature, or outdoor temperature. In technical terms, EER is the steady-state rate of heat energy removal (i.e. cooling capacity) of a product measured in Btuh output divided by watts input.
ENERGY STAR® (ES)	Brand name for the voluntary energy efficiency labeling initiative sponsored by the U.S. Environmental Protection Agency.
Energy Costing Period	A period of relatively high or low system energy cost, by season. The energy periods defined by ISO-NE are: • **Summer Peak**: 6am–10pm, Monday–Friday (except ISO holidays), June–September • **Summer Off-Peak:** Summer hours not included in the summer peak hours: 10pm–6am, Monday–Friday, all day on Saturday and Sunday, and ISO holidays, June–September • **Winter Peak:** 6am–10pm, Monday–Friday (except ISO holidays), January–May and October–December • **Winter Off-Peak:** Winter hours not included in the sinter peak hours: 10pm–6am, Monday–Friday, all day on Saturday and Sunday, and ISO holidays, January–May and October–December.
Equivalent Full Load Hours (EFLH)	The equivalent hours that equipment would need to operate at its peak capacity in order to consume its estimated annual kWh consumption (annual kWh/connected kW).
Free Rider	A customer who participates in an energy efficiency program, but would have installed some or all of the same measure(s) on their own, with no change in timing of the installation, if the program had not been available.
Free-Ridership Rate	The percentage of savings attributable to participants who would have installed the measures in the absence of program intervention.
Gross kW	Expected demand reduction based on a comparison of standard or replaced equipment and equipment installed through an energy efficiency program.
Gross kWh	Expected kWh reduction based on a comparison of standard or replaced equipment and equipment installed through an energy efficiency program.
Gross Savings	A saving estimate calculated from objective technical factors. In this TRM, "gross savings" are calculated with the measure algorithms and do not include any application of impact factors. Once impact factors are applied, the savings are called "Adjusted Gross Savings". For more detail, see the section on **Error! Reference source not found.**.
High Efficiency (HE)	Refers to the efficiency measures that are installed and promoted by the energy efficiency programs.
Horsepower (HP)	A unit for measuring the rate of doing work. One horsepower equals about three-fourths of a kilowatt (745.7 watts).

 Copyright 2015 National Grid All Rights Reserved

TERM	DESCRIPTION
Heating Seasonal Performance Factor (HSPF)	A measure of the seasonal heating mode efficiencies of heat pumps expressed as the ratio of the total heating output to the total seasonal input energy.
Impact Factor	Generic term for a value used to adjust the gross savings estimated by the savings algorithms in order to reflect the actual savings attributable to the efficiency program. In this TRM, impact factors include realization rates, in-service rates, savings persistence, peak demand coincidence factors, free-ridership, spillover and net-to-gross factors. See the section on Impact Factors for more detail.
In-Service Rate	The percentage of units that are actually installed. For example, efficient lamps may have an in-service rate less than 100% since some lamps are purchased as replacement units and are not immediately installed. The in-service rate for most measures is 100%.
Measure Life	The number of years that an efficiency measure is expected to garner savings. These are generally based on engineering lives, but sometimes adjusted based on observations of market conditions.
Lost Opportunity	Refers to a measure being installed at the time of planned investment in new equipment or systems. Often this reflects either new construction, renovation, remodeling, planned expansion or replacement, or replacement of failure.
Measure	A product (a piece of equipment), combination of products, or process designed to provide energy and/or demand savings. Measure can also refer to a service or a practice that provides savings. Measure can also refer to a specific combination of technology and market/customer/practice/strategy (e.g., direct install low income CFL).
Net Savings	The final value of savings that is attributable to a program or measure. Net savings differs from gross savings (or adjusted gross savings) because it includes adjustments due to free-ridership and/or spillover. Net savings is sometimes referred to as "verified" or "final" savings. For more detail see the section on **Error! Reference source not found.**.
Net-to-Gross Ratio	The ratio of net savings to the adjusted gross savings (for a measure or program). The adjusted gross savings include any adjustment by the impact factors other than free-ridership or spillover. Net-to-gross is usually expressed as a percent.
Non-Electric Benefits (NEBs)	Quantifiable benefits (beyond electric savings) that are the result of the installation of a measure. Fossil fuel, water, and maintenance are examples of non-electric benefits. Non-electric benefits can be negative (i.e. increased maintenance or increased fossil fuel usage which results from a measure) and therefore are sometimes referred to as "non-electric impacts".
Non-Participant	A customer who is eligible to participate in a program, but does not. A non-participant may install a measure because of a program, but the installation of the measure is not through regular program channels; as a result, their actions are normally only detected through evaluations.
On-Peak kW	See Summer/Winter On-peak kW
Operating Hours	Hours that a piece of equipment is expected to be in operation, not necessarily at full load (typically expressed per year).
Participant	A customer who installs a measure through regular program channels and receives any benefit (i.e. incentive) that is available through the program because of their participation. Free-riders are a subset of this group.
Prescriptive Measure	A prescriptive measure is generally offered by use of a prescriptive form with a prescribed incentive based on the parameters of the efficient equipment or practice.
Realization Rate (RR)	The ratio of measure savings developed from impact evaluations to the estimated measure savings derived from the TRM savings algorithms. This factor is used to adjust the estimated savings when significant justification for such adjustment exists. The components of the realization rate are described in detail in the section on Impact Factors.

 Copyright 2015 National Grid All Rights Reserved

TERM	DESCRIPTION
Retrofit	The replacement of a piece of equipment or device before the end of its useful or planned life for the purpose of achieving energy savings. "Retrofit" measures are sometimes referred to as "early retirement" when the removal of the old equipment is aggressively pursued.
Savings Persistence Factor (SPF)	Percentage of first-year energy or demand savings expected to persist over the life of the installed energy efficiency equipment. The SPF is developed by conducting surveys of installed equipment several years after installation to determine the operational capability of the equipment. In contrast, *measure persistence* takes into account business turnover, early retirement of installed equipment, and other reasons the installed equipment might be removed or discontinued. Measure persistence is generally incorporated as part of the measure life, and therefore is not included as a separate impact factor.
Seasonal Energy Efficiency Ratio (SEER)	A measurement of the efficiency of a central air conditioner over an entire season. In technical terms, SEER is a measure of equipment the total cooling of a central air conditioner or heat pump (in Btu) during the normal cooling season as compared to the total electric energy input (in watt-hours) consumed during the same period.
Sector	A system for grouping customers with similar characteristics. For the purpose of this manual, the sectors are Commercial and Industrial (C&I), Small Business, Residential, and Low Income.
Spillover Rate	The percentage of savings attributable to the program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of (a) participants in the program who install additional energy efficient measures outside of the program as a result of hearing about the program and (b) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program.
Summer/Winter On-Peak kW	The average demand reduction during the summer/winter on-peak period. The summer on-peak period is 1pm-5pm on non-holiday weekdays in June, July and August; the winter on-peak period is 5pm-7pm on non-holiday weekdays in December and January.
Ton	Unit of measure for determining cooling capacity. One ton equals 12,000 Btu.
Watt	A unit of electrical power. Equal to 1/1000 of a kilowatt.

 Copyright 2015 National Grid All Rights Reserved

Source Description
ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating.
Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.
DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.
DNV KEMA (2013), Process Evaluation of the 2012 Bright Opportunities Program, Final Report, June 14, 2013
Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.
ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations <http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calc
Energy Star Program Requirements for Computers Version 5.0
Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011.
Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances
Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators.
HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCo; Table 9.
HEC, Inc. (1996). Analysis of Savings from Walkiin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco.
HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSCo.
KEMA (2009). Design 2000plus Lighting Hours of Use and Load Shape Measurement Study. Prepared for National
KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19.
KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17.
KEMA (2011). C&I Lighting Load Shape Project FINAL Report. Prepared for the Regional Evaluation, Measurement and
KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation,
KEMA (2011). Impact Evaluation of C&I Custom Gas Installations. Prepared for National Grid.
KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid.
KEMA (2013). Impact Evaluation of 2010 Prescriptive Lighting Installations
KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid.
KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations
KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council
RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and

Copyright 2015 National Grid
All Rights Reserved

Nexus Market Research (2010). HEHE Process and Impact Evaluation. Prepared for GasNetworks
Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public
Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT.
Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. The Cadmus Group,
NMR Group (2012). Rhode Island 2011 Basline Study of Single-Family Residential New Construction. Prepared for
Opinion Dynamics (2013). Massachussetts Cross-Cutting Behavioral Program Evaluation Integrated Report.
RLW Analytics (2004). Massachusetts Utilities 2003 Multiple Small Business Lighting Retrofit Programs Impact Evaluation.
RLW Analytics (2007). Impact Evaluation Analysis of the 2005 Custom SBS Program. Prepared for National Grid. Derivation based on site specific results from the study adjusted for current on peak hours.
RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid.
RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.
Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance.
Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007.
Summit Blue Consulting (2008). Multiple Small Business Services Programs Impact Evaluation 2007. Prepared for Massachusetts Joint Utilities.
Technical Assessment of Commercial Ovens
TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum),
The annual operating hours are assumed to be 8,500 hrs/year, based on NRM field experience.
The Cadmus Group (2012). Impact Evaluation of the 2011-2012 ECM Circulation Pump Pilot Program.
The Cadmus Group (2012). Impact Evaluation of the 2012-2013 Boiler Reset Control Pilot Program. Prepared for the Electric and Gas Energy Efficiency Program Administrators of Massachusetts.
The Cadmus Group (2012). Massachusetts Residential Retrofit and Low Income Program Area: Brushless Fan Motors Impact Evaluation. Prepared for The Electric and Gas Program Administrators of Massachusetts.
The Cadmus Group (2012). Rhode Island EnergyWise Single Family Impact Evaluation. Prepared for National Grid
The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing.
The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation
The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program
The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.
The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co.
The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas
The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller
energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls.
Environmental Protection Agency (2012). ENERGY STAR Desktop & Integrated Computer Product List. August 2,
Consortium for Energy Efficiency (2008). Consumer Electronics Program Guide: Information on Voluntary Approaches for the Promotion of Energy Efficient Consumer Electronics - Products and Practices.

Copyright 2015 National Grid
All Rights Reserved

Top Ten Freezer Calcs.xls
Environmental Protection Agency (2012). ENERGY STAR Desktop & Integrated Computer Product List. August 2,
Environmental Prtection Agency (2012). Refrigerators Qualified Product List. July 18, 2012. Average of all units in category
Environmental Protection Agency (2012). Freezers Qualified Product List. July 18, 2012. Average of all units in
Refrigerator calcs.xls
NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric
Pacific Gas and Electric The Multi-Speed Pool Pump Fact Sheet.
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator; average of savings from all refrigerator models.
Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances.
ECOS 2009 Smart Plug Strips: Draft Report
Environmental Protection Agency (2012). Savings Calculator for ENERGY STAR Qualified Consumer Electronics. Energy use of average screen size within category.
SEDI HE Dryer Screening Ver.2 Using DOE2005.xls
Verifying Thermostatic Valve Showerhead Savings.xls
NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the
Environmental Protection Agency (2012). Refrigerators Qualified Product List. July 18, 2012. Average of all units in
Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid.
energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls.
The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators.
The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid.
Quantec, LLC (2005). Evaluation of National Grid's 2003 Appliance Management Program: Room Air Conditioning Metering and Non-Energy Benefits Study. Prepared for National Grid.
NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid.
Patel, Dinesh (2001). Energy Analysis: Dual Enthalpy Control. Prepared for NSTAR.
RLW Analytics (2005). Impact and Process Evaluation Building Operator Training and Certification (BOC) Program.
The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation.
GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in
National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.
USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.
Homes: Energy Star. LED Light Bulbs for Consumers and MA PAs (2012). 2013-15 MA Lighting Worksheet. Savings multiplied by factor of 1.49 to account for number of bulbs/fixture, as described in NMR Group, Inc. (2013).
PGE Low Flow Showerhead and Thermostatic Restriction Valve
ERS (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of
Environmental Protection Agency (2011). Savings Calculator for ENERGY STAR Qualified Commercial Kitchen Equipment: Steam Cooker Calcs.
Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study.

Copyright 2015 National Grid
All Rights Reserved

Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. Also supported by: GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy
Food Service Technology Center (2011). Gas Griddle Life-Cycle Cost Calculation. Accessed on 10/12/2011.
Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator.
KEMA (2013). Project 25 Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; Page 1-5
NYSERDA Deemed Savings Database (Rev 11).
Food Service Technology Center (2012). Gas Convection Oven Life-Cycle Cost Calculator. http://www.fishnick.com/saveenergy/tools/calculators/govencalc.php.
Food Service Technology Center (2011). Gas Combination Oven Life-Cycle Cost Calculator.
Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council &
The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012.
Nexus Market Research and The Cadmus Group (2010). HEHE Process and Impact Evaluation. Prepared for
RLW Analytics (2007). Validating the Impacts of Programmable Thermostats. Prepared for GasNetworks; Page 2. Conversion factor for CCF to therms is 1.024.
Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR.
The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program
Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential
GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
Sachs, Harvey (2003). Energy Savings from Efficient Furnace Air Handlers in Massachusetts.
Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011.
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Room Air Conditioner.
Environmental Protection Agency (2010). Life Cycle Cost Estimate for ENERGY STAR Office Equipment.
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator.
Environmental Protection Agency (2011). Life Cycle Cost Estimate for ENERGY STAR Freezer. Accessed 9/7/2011.
Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions.
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Television.
Environmental Protection Agency (2013). Most Efficient List 2013
MA Residential Lighting Worksheet 2016, including reference to Market Adoption Model
Nexus Market Research and RLW Analytics (2008). Residential Lighting Measure Life Study. Prepared for New England
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Room Air Conditioner. Interactive Excel Spreadsheet found at
http://www.serta.com/best-mattress-FAQs-mattresses-Serta-Number--1-Best-Selling-Mattress.html
Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council &
ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.

Copyright 2015 National Grid
All Rights Reserved

Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities.
MA LIGHTING WORKSHEET_T12_Standard-wrb v2 RI Calcs.xls.
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Furnace.
DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.
Food Service Technology Center (2011). Electric Griddle Life-Cycle Cost Calculator. Accessed on 10/12/2011.
Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101,
Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Gas Fryer.
Ecotrope, Inc. (2003). Natural Gas Efficiency and Conservation Measure Resource Assessment for the Residential and Commercial Sectors. Prepared for the Energy Trust of Oregon.
Nexant (2006). DSM Market Characterization Report. Prepared for Questar Gas.
ASHRAE Applications Handbook (2003); Page 36.3, assumes combined boiler and water heating systems have a
Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on
Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance.
This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.
NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.
Nexus Market Research & Dorothy Conant (2006). Massachusetts ENERGY STAR® Homes: 2005 Baseline Study: Part II: Homeowner Survey Analysis Incorporating Inspection Data Final Report. Prepared for the Massachusetts Joint
Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on
National Grid assumption based on regional PA working groups. Assumptions based on historical steam trap surveys. Steam losses in lbs/hr are found using “Boiler Efficiency Institute (1987). Steam Efficiency Improvement;
ENERGYSTAR Commercial Kitchen Equipment Savings Calculator: Fryer Calculations. www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls.
DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures
TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014
Note To File, Jeremy Newberger
DNV GL (2014) impact Evaluation of Rhode Island C&I Upstream Lighting Program
DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study
Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation
DNV GL MA 2013 Prescriptive Gas Impact Evaluation: Steam Trap Evaulation Phase 1
National Grid DR Thermostat Demand Savings Calc.xlsx
E-mail correspondence among MA PAs and Ralph Prahl
DNV-GL, Retrofit Lighting Controls Measure Summary of Findings: Final Report (MA), October 2014
Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015
Cadmus Inc., Cool Smart Incremental Cost Study: Final Report, July 2015
Cadmus Inc., Lighting Interactive Effects Study Preliminary Results - Draft, April 2015

Copyright 2015 National Grid
All Rights Reserved