

The Opportunity for Energy Efficiency that is Cheaper than Supply in Rhode Island

Appendix A - Detailed Methodology and Model Description



Prepared for: Rhode Island Energy Efficiency and Resource Management Council (EERMC)

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August 26, 2010

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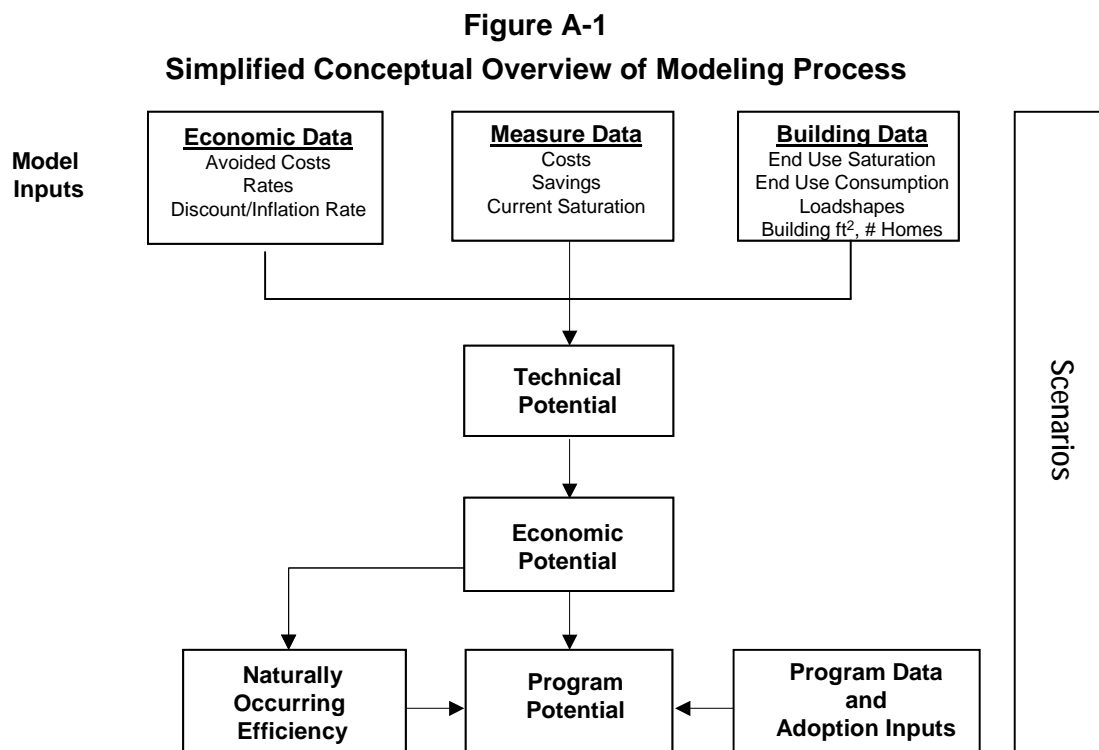
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A. Appendix A: Detailed Methodology and Model Description

In this appendix we present and discuss our basic methodology for conducting market potential studies. We also present an overview of DSM ASSYST™, our model used to develop market potential estimates. Information presented here has been extracted from several recent energy efficiency potential reports.

A.1 Overview of DSM Forecasting Method

The crux of any DSM forecasting process involves carrying out a number of systematic analytical steps that are necessary to produce accurate estimates of energy efficiency (EE) effects on system load. A simplified overview of these basic analytical steps is shown in Figure A-1.



Developing a DSM forecast is viewed by KEMA as a five-step process. The steps include:

Step 1: Develop Initial Input Data

- Develop list of EE measure opportunities to include in scope
- Gather and develop technical data (costs and savings) on efficient measure opportunities
- Gather, analyze, and develop information on building characteristics, including total square footage and households, electricity consumption and intensity by end use, end-use consumption load patterns by time of day and year (i.e., load shapes), market shares of key electric consuming equipment, and market shares of EE technologies and practices.

Step 2: Estimate Technical Potential and Develop Supply Curves

- Match and integrate data on efficient measures to data on existing building characteristics to produce estimates of technical potential and EE supply curves.

Step 3: Estimate Economic Potential

- Gather economic input data such as current and forecasted retail electric prices and current and forecasted costs of electricity generation, along with estimates of other potential benefits of reducing supply, such as the value of reducing environmental impacts associated with electricity production
- Match and integrate measure and building data with economic assumptions to produce indicators of costs from different viewpoints (e.g., utility, societal, and consumer)
- Estimate total economic potential using supply curve approach

Step 4: Estimate Achievable Program and Naturally Occurring Potentials

- Gather and develop estimates of program costs (e.g., for administration and marketing) and historic program savings
- Develop estimates of customer adoption of EE measures as a function of the economic attractiveness of the measures, barriers to their adoption, and the effects of program intervention
- Estimate achievable program and naturally occurring potentials; calibrate achievable and naturally occurring potential to recent program and market data
- Develop alternative economic estimates associated with alternative future scenarios

Step 5: Scenario Analyses and Resource Planning Inputs

- Recalculate potentials under alternate economic scenarios and deliver data in format required for resource planning.

Provided below is additional discussion of KEMA's modeling approaches for technical, economic, and achievable DSM forecasts.

A.1.1 Estimate Technical Potential and Develop Energy-Efficiency Supply Curves

Technical potential refers to the amount of energy savings or peak demand reduction that would occur with the *complete* penetration of all measures analyzed in applications where they were deemed *technically* feasible from an *engineering* perspective. Total technical potential is developed from estimates of the technical potential of individual measures as they are applied to discrete market segments (commercial building types, residential dwelling types, etc.).

A.1.1.1 Core Equation

The core equation used to calculate the energy technical potential for each individual efficiency measure, by market segment, is shown below (using a commercial example):¹

$$\begin{array}{ccccccc} \text{Technical} & & \text{Total} & & \text{Base} & & \text{Not} \\ \text{Potential of} & = & \text{Square} & \times & \text{Case} & \times & \text{Complete} \\ \text{Efficient} & & \text{Feet} & & \text{Equipment} & \times & \text{Feasibility} \\ \text{Measure} & & & & \text{EUI} & \times & \text{Savings} \\ & & & & & & \text{Factor} \end{array}$$

Where:

- **Square feet** is the total floor space for all buildings in the market segment. For the residential analysis, the **number of dwelling units** is substituted for square feet.
- **Base-case equipment EUI** is the energy used per square foot by each base-case technology in each market segment. This is the consumption of the energy-using equipment that the efficient technology replaces or affects. For example, if the efficient measure were a CFL, the base EUI would be the annual kWh per square foot of an equivalent incandescent lamp. For the residential analysis, unit energy consumption (UECs), energy used per dwelling, are substituted for EUIs.

¹ Note that stock turnover is not accounted for in our estimates of technical and economic potential, stock turnover *is* accounted for in our estimates of achievable potential. Our definition of technical potential assumes instantaneous replacement of standard-efficiency with high-efficiency measures.

- **Applicability factor** is the fraction of the floor space (or dwelling units) that is applicable for the efficient technology in a given market segment; for the example above, the percentage of floor space lit by incandescent bulbs.
- **Not complete factor** is the fraction of applicable floor space (or dwelling units) that has not yet been converted to the efficient measure; that is, (1 minus the fraction of floor space that already has the EE measure installed).
- **Feasibility factor** is the fraction of the applicable floor space (or dwelling units) that is technically feasible for conversion to the efficient technology from an *engineering* perspective.
- **Savings factor** is the reduction in energy consumption resulting from application of the efficient technology.

Technical potential for peak demand reduction is calculated analogously.

An example of the core equation is shown in Table A-1 for the case of a prototypical 4-lamp 4-foot standard T-8 lighting fixture, which is replaced by a 4-lamp 4-foot premium T-8 fixture in the office segment of a large utility service territory.

Table A-1
Example of Technical Potential Calculation—Replace 4-Lamp 4-Foot Standard T-8s with
4-Lamp 4-Foot Premium T-8s in the Office Segment of a Utility Service Territory
(Note: Data are illustrative only)

Technical Potential of Efficient Measure	=	Total square feet	×	Base Case Equipment UEC	×	Applicability Factor	×	Not Complete Factor	×	Feasibility Factor	×	Savings Factor
57 million kWh		195 million		5.74		0.34		0.95		1.00		0.16

Technical EE potential is calculated in two steps. In the first step, all measures are treated *independently*; that is, the savings of each measure are not marginalized or otherwise adjusted for overlap between competing or synergistic measures. By treating measures independently, their relative economics are analyzed without making assumptions about the order or combinations in which they might be implemented in customer buildings. However, the total technical potential across measures cannot be estimated by summing the individual measure potentials directly. The cumulative savings cannot be estimated by adding the savings from the

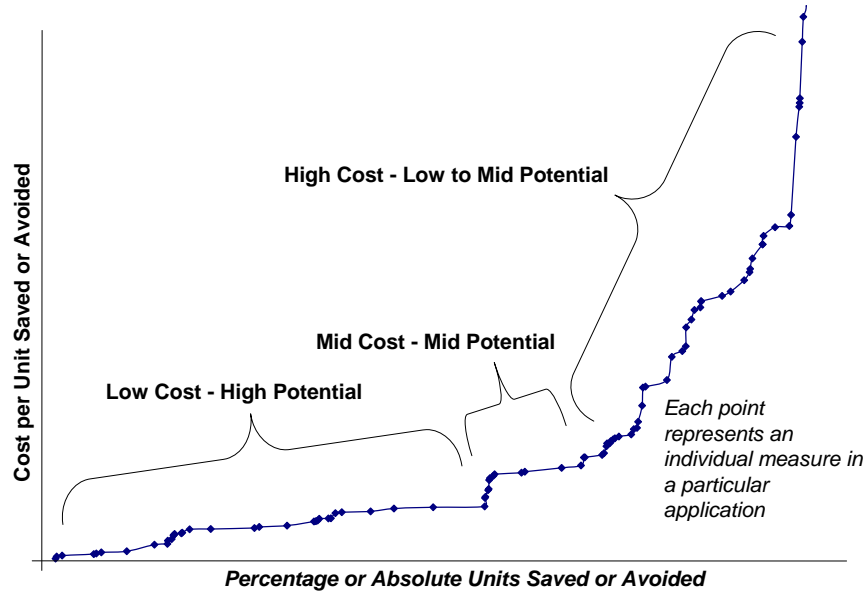
individual savings estimates because some savings would be double counted. For example, the savings from a measure that reduces heat gain into a building, such as window film, are partially dependent on other measures that affect the efficiency of the system being used to cool the building, such as a high-efficiency chiller; the more efficient the chiller, the less energy saved from the application of the window film.

A.1.1.2 Use of Supply Curves

In the second step, cumulative technical potential is estimated using an EE supply curve approach.² This method eliminates the double-counting problem. In Figure A-2, we present a generic example of a supply curve. As shown in the figure, a supply curve typically consists of two axes—one that captures the cost per unit of saving a resource or mitigating an impact (e.g., \$/kWh saved or \$/ton of carbon avoided) and the other that shows the amount of savings or mitigation that could be achieved at each level of cost. The curve is typically built up across individual measures that are applied to specific base-case practices or technologies by market segment. Savings or mitigation measures are sorted on a least-cost basis, and total savings or impacts mitigated are calculated incrementally with respect to measures that precede them. Supply curves typically, but not always, end up reflecting diminishing returns, i.e., as costs increase rapidly and savings decrease significantly at the end of the curve.

² This section describes conservation supply curves as they have been defined and implemented in numerous studies. Readers should note that Stoft 1995 describes several technical errors in the definition and implementation of conservation supply curves in the original and subsequent conservation supply curve studies. Stoft concludes that conservation supply curves are not “true” supply curves in the standard economic sense but can still be useful (albeit with his recommended improvements) for their intended purpose (demonstration of cost-effective conservation opportunities).

Figure A-2
Generic Illustration of EE Supply Curve



As noted above, the cost dimension of most EE supply curves is usually represented in dollars per unit of energy savings. Costs are usually annualized (often referred to as "levelized") in supply curves. For example, EE supply curves usually present levelized costs per kWh or kW saved by multiplying the initial investment in an efficient technology or program by the "capital recovery rate" (CRR):

$$\text{CRR} = \frac{d}{1 - (1 + d)^{-n}}$$

where d is the real discount rate and n is the number of years over which the investment is written off (i.e., amortized).

Thus,

$$\text{Levelized Cost per kWh Saved} = \text{Initial Cost} \times \text{CRR} / \text{Annual Energy Savings}$$

$$\text{Levelized Cost per kW Saved} = \text{Initial Cost} \times \text{CRR} / \text{Peak Demand Savings}$$

The levelized cost per kWh and kW saved are useful because they allow simple comparison of the characteristics of EE with the characteristics of energy supply technologies. However, the levelized cost per kW saved is a biased indicator of cost-effectiveness because all of the efficiency measure costs are arbitrarily allocated to peak savings.

Returning to the issue of EE supply curves, Table A-2 shows a simplified numeric example of a supply curve calculation for several EE measures applied to commercial lighting for a hypothetical population of buildings. What is important to note is that in an EE supply curve, the measures are sorted by relative cost—from least to most expensive. In addition, the energy consumption of the system being affected by the efficiency measures goes down as each measure is applied. As a result, the savings attributable to each subsequent measure decrease if the measures are interactive. For example, the occupancy sensor measure shown in Table 1-2 would save more at less cost per unit saved if it were applied to the base-case consumption before the T8 lamp and electronic ballast combination. Because the T8 electronic ballast combination is more cost-effective, however, it is applied first, reducing the energy savings potential for the occupancy sensor. Thus, in a typical EE supply curve, the base-case end-use consumption is reduced with each unit of EE that is acquired. Notice in Table 1-2 that the total end-use GWh consumption is recalculated after each measure is implemented, thus reducing the base energy available to be saved by the next measure.

Table A-2 shows an example that would represent measures for one base-case technology in one market segment. These calculations are performed for all of the base-case technologies, market segments, and measure combinations in the scope of a study. The results are then ordered by levelized cost and the individual measure savings are summed to produce the EE potential for the entire sector.

In the next subsection, we discuss how economic potential is estimated as a subset of the technical potential.

Table A-2
Sample Technical Potential Supply Curve Calculation for Commercial Lighting
(Note: Data are illustrative only)

Measure	Total End Use Consumption of Population (GWh)	Applicable, Not Complete and Feasible (1000s of ft ²)	Average kWh/ft ² of population	Savings %	GWh Savings	Levelized Cost (\$/kWh saved)
Base Case: T12 lamps with Magnetic Ballast	425	100,000	4.3	N/A	N/A	N/A
1. T8 w. Elec. Ballast	425	100,000	4.3	21%	89	\$0.04
2. Occupancy Sensors	336	40,000	3.4	10%	13	\$0.11
3. Perimeter Dimming	322	10,000	3.2	45%	14	\$0.25
With all measures	309		3.1	27%	116	

A.1.2 Estimation of Economic Potential

Economic potential is typically used to refer to the *technical potential* of those energy conservation measures that are cost effective when compared to either supply-side alternatives or the price of energy. Economic potential takes into account the fact that many EE measures cost more to purchase initially than do their standard-efficiency counterparts. The incremental costs of each efficiency measure are compared to the savings delivered by the measure to produce estimates of energy savings per unit of additional cost. These estimates of EE resource costs can then be compared to estimates of other resources such as building and operating new power plants.

A.1.2.1 Cost Effectiveness Tests

To estimate economic potential, it is necessary to develop a method by which it can be determined that a measure or program is *economic*. There is a large body of literature that debates the merits of different approaches to calculating whether a public purpose investment in EE is cost effective (Chamberlin and Herman 1993, RER 2000, Ruff 1988, Stoft 1995, and Sutherland 2000). We usually utilize the total resource cost (TRC) test to assess cost effectiveness. The TRC is a form of societal benefit-cost test. Other tests that have been used in analyses of program cost-effectiveness by EE analysts include the utility cost, ratepayer impact measure (RIM), and participant tests. These tests are discussed in detail the CASPM.

Before discussing the TRC test and how it is often used in our DSM forecasts, we present below a brief introduction to the basic tests as described in the CASPM:³

- **Total Resource Cost Test**—The TRC test measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. The test is applicable to conservation, load management, and fuel substitution programs. For fuel substitution programs, the test measures the net effect of the impacts from the fuel not chosen versus the impacts from the fuel that is chosen as a result of the program. TRC test results for fuel substitution programs should be viewed as a measure of the economic efficiency implications of the total energy supply system (gas and electric). A variant on the TRC test is the societal test. The societal test differs from the TRC test in that it includes the effects of externalities (e.g. environmental, national security), excludes tax credit benefits, and uses a different (societal) discount rate.
- **Participant Test**—The participant test is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.
- **Utility (Program Administrator) Test**—The program administrator cost test measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.
- **Ratepayer Impact Measure Test**—The ratepayer impact measure (RIM) test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills will go up if revenues collected after program implementation are less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

The key benefits and costs of the various cost-effectiveness tests are summarized in Table A-3.

³ These definitions are direct excerpts from the California Standard Practice Manual, October 2001.

Table A-3
Summary of Benefits and Costs of California Standard Practice Manual Tests

Test	Benefits	Costs
TRC Test	Generation, transmission and distribution savings Participants avoided equipment costs (fuel switching only)	Generation costs Program costs paid by the administrator Participant measure costs
Participant Test	Bill reductions Incentives Participants avoided equipment costs (fuel switching only)	Bill increases Participant measure costs
Utility (Program Administrator) Test	Generation, transmission and distribution savings	Generation costs Program costs paid by the administrator Incentives
Ratepayer Impact Measure Test	Generation, transmission and distribution savings Revenue gain	Generation costs Revenue loss Program costs paid by the administrator Incentives

Generation, transmission and distribution savings (hereafter, energy benefits) are defined as the economic value of the energy and demand savings stimulated by the interventions being assessed. These benefits are typically measured as induced changes in energy consumption, valued using some mix of avoided costs. Statewide values of avoided costs are prescribed for use in implementing the test. Electricity benefits are valued using three types of avoided electricity costs: avoided distribution costs, avoided transmission costs, and avoided electricity generation costs.

Participant costs are comprised primarily of incremental measure costs. Incremental measure costs are essentially the costs of obtaining EE. In the case of an add-on device (say, an adjustable-speed drive or ceiling insulation), the incremental cost is simply the installed cost of the measure itself. In the case of equipment that is available in various levels of efficiency (e.g., a central air conditioner), the incremental cost is the excess of the cost of the high-efficiency unit over the cost of the base (reference) unit.

Administrative costs encompass the real resource costs of program administration, including the costs of administrative personnel, program promotions, overhead, measurement and evaluation, and shareholder incentives. In this context, administrative costs are not defined to include the costs of various incentives (e.g., customer rebates and salesperson incentives) that may be offered to encourage certain types of behavior. The exclusion of these incentive costs reflects

the fact that they are essentially transfer payments. That is, from a societal perspective they involve offsetting costs (to the program administrator) and benefits (to the recipient).

A.1.2.2 Use of the Total Resource Cost to Estimate Economic Potential

We often use the TRC test in two ways in our model. First, we develop an estimate of economic potential by calculating the TRC of individual measures and applying the methodology described below. Second, we develop estimates of whether different program scenarios are cost effective.

Economic potential can be defined either inclusively or exclusively of the costs of programs that are designed to increase the adoption rate of EE measures. *In many of our projects, we define economic potential to **exclude** program costs.* We do so primarily because program costs are dependent on a number of factors that vary significantly as a function of program delivery strategy. There is no single estimate of program costs that would accurately represent such costs across the wide range of program types and funding levels possible. Once an assumption is made about program costs, one must also link those assumptions to expectations about market response to the types of interventions assumed. Because of this, we believe it is more appropriate to factor program costs into our analysis of *program potential*. Thus, our definition of *economic potential* is that portion of the technical potential that passes our economic screening test (described below) exclusive of program costs. Economic potential, like technical potential, is a theoretical quantity that will exceed the amount of potential we estimate to be achievable through current or more aggressive program activities.

As implied in Table A-3 and defined in the CASPM 2001, the TRC focuses on resource savings and counts benefits as utility-avoided supply costs and costs as participant costs and utility program costs. It ignores any impact on rates. It also treats financial incentives and rebates as transfer payments; i.e., the TRC is not affected by incentives. The somewhat simplified benefit and cost formulas for the TRC are presented in Equations A-1 and A-2 below.

Equation A-1

$$\text{Benefits} = \sum_{t=1}^N \frac{\text{Avoided Costs of Supply}_{p,t}}{(1+d)^{t-1}}$$

Equation A-2

$$\text{Costs} = \sum_{t=1}^N \frac{\text{Program Cost}_t + \text{Participant Cost}_t}{(1 + d)^{t-1}}$$

Where:

- d = the discount rate
- p = the costing period
- t = time (in years)
- n = 20 years

A nominal discount rate is typically used in the analysis, as inflation is taken into account separately. We use a *normalized* measure life of 20 years to capture the benefit of long-lived measures. Measures with measure lives shorter than 20 years are “re-installed” in our analysis as many times as necessary to reach the normalized 20-year life of the analysis.

The avoided costs of supply are calculated by multiplying measure energy savings and peak demand impacts by per-unit avoided costs by costing period. Energy savings are allocated to costing periods and peak impacts estimated using load shape factors.

As noted previously, in the *measure-level* TRC calculation used to estimate economic potential, program costs are excluded from Equation A-2. Using the supply curve methodology discussed previously, measures are ordered by TRC (highest to lowest) and then the *economic* potential is calculated by summing the energy savings for all of the technologies for which the marginal TRC test is greater than 1.0. In the example in Table A-4, the economic potential would include the savings for measures 1 and 2, but exclude saving for measure 3 because the TRC is less than 1.0 for measure 3. The supply curve methodology, when combined with estimates of the TRC for individual measures, produces estimates of the economic potential of efficiency improvements. By definition and intent, this estimate of economic potential is a theoretical quantity that will exceed the amount of potential we estimate to be achievable through program activities in the final steps of our analyses.

Table A-4
Sample Use of Supply Curve Framework to Estimate Economic Potential
(Note: Data are illustrative only)

Measure	Total End Use Consumption of Population (GWh)	Applicable, Not Complete and Feasible Sq.Feet (000s)	Average kWh/ft ² of population	Savings %	GWh Savings	Total Resource Cost Test	Savings Included in Economic Potential?
Base Case: T12 lamps with Magnetic Ballast	425	100,000	4.3	N/A	N/A	N/A	N/A
1. T8 w. Elec. Ballast	425	100,000	4.3	21%	89	2.5	Yes
2. Occupancy Sensors	336	40,000	3.4	10%	13	1.3	Yes
3. Perimeter Dimming	322	10,000	3.2	45%	14	0.8	No
Technical Potential with all measures				27%	116		
Economic Potential with measures for which TRC Ratio > 1.0				24%	102		

A.1.3 Estimation of Program and Naturally occurring Potentials

In this section we present the method we employ to estimate the fraction of the market that adopts each EE measure in the presence and absence of EE programs. We define:

- **Program potential** as the amount of savings that would occur in response to one or more specific market interventions
- **Naturally occurring potential** as the amount of savings estimated to occur as a result of normal market forces, that is, in the absence of any utility or governmental intervention.

Our estimates of program potential are typically the most important results of the modeling process. Estimating technical and economic potentials are necessary steps in the process from which important information can be obtained; however, the end goal of the process is better understanding how much of the remaining potential can be captured in programs, whether it would be cost-effective to increase program spending, and how program costs may be expected to change in response to measure adoption over time.

A.1.3.1 Adoption Method Overview

We use a method of estimating adoption of EE measures that applies equally to be our program and naturally occurring analyses. Whether as a result of natural market forces or aided by a

program intervention, the rate at which measures are adopted is modeled in our method as a function of the following factors:

- The availability of the adoption opportunity as a function of capital equipment turnover rates and changes in building stock over time
- Customer awareness of the efficiency measure
- The cost-effectiveness of the efficiency measure
- Market barriers associated with the efficiency measure.

The method we employ is executed in the measure penetration module of KEMA's DSM ASSYST™ model.

In many of our projects, only measures that pass the measure-level TRC test are put into the penetration module for estimation of customer adoption.

A.1.3.2 Availability

A crucial part of the model is a stock accounting algorithm that handles capital turnover and stock decay over a period of up to 20 years. In the first step of our achievable potential method, we calculate the number of customers for whom each measure will apply. The input to this calculation is the total floor space available for the measure from the technical potential analysis, i.e., the total floor space multiplied by the applicability, not complete, and feasibility factors described previously. We call this the *eligible* stock. The stock algorithm keeps track of the amount of floor space available for each efficiency measure in each year based on the total eligible stock and whether the application is new construction, retrofit, or replace-on-burnout.⁴

Retrofit measures are available for implementation by the entire eligible stock. The eligible stock is reduced over time as a function of adoptions⁵ and building decay.⁶ Replace-on-burnout measures are available only on an annual basis, approximated as equal to the inverse of the

⁴ Replace-on-burnout measures are defined as the efficiency opportunities that are available only when the base equipment turns over at the end of its service life. For example, a high-efficiency chiller measure is usually only considered at the end of the life of an existing chiller. By contrast, retrofit measures are defined to be constantly available, for example, application of a window film to existing glazing.

⁵ That is, each square foot that adopts the retrofit measure is removed from the eligible stock for retrofit in the subsequent year.

⁶ Buildings do not last forever. An input to the model is the rate of decay of the existing floor space. Floor space typically decays at a very slow rate.

service life.⁷ The annual portion of the eligible market that does not accept the replace-on-burnout measure does not have an opportunity again until the end of the service life.

New construction applications are available for implementation in the first year. Those customers that do not accept the measure are given subsequent opportunities corresponding to whether the measure is a replacement or retrofit-type measure.

A.1.3.3 Awareness

In our modeling framework, customers cannot adopt an efficient measure merely because there is stock available for conversion. Before they can make the adoption choice, they must be aware and informed about the efficiency measure. Thus, in the second stage of the process, the model calculates the portion of the available market that is *informed*. An initial user-specified parameter sets the initial level of awareness for all measures. Incremental awareness occurs in the model as a function of the amount of money spent on awareness/information building and how well those information-building resources are directed to target markets. User-defined program characteristics determine how well information-building money is targeted. Well-targeted programs are those for which most of the money is spent informing only those customers that are in a position to implement a particular group of measures. Untargeted programs are those in which advertising cannot be well focused on the portion of the market that is available to implement particular measures. The penetration module in DSM ASSYST has a target effectiveness parameter that is used to adjust for differences in program advertising efficiency associated with alternative program types.

The model also controls for information retention. An information decay parameter in the model is used to control for the percentage of customers that will retain program information from one year to the next. Information retention is based on the characteristics of the target audience and the temporal effectiveness of the marketing techniques employed.

⁷ For example, a base-case technology with a service life of 15 years is only available for replacement to a high-efficiency alternative each year at the rate of 1/15 times the total eligible stock. For example, the fraction of the market that does not adopt the high-efficiency measure in year t will not be available to adopt the efficient alternative again until year $t + 15$.

A.1.3.4 Adoption

The portion of the total market this is available and informed can now face the choice of whether or not to adopt a particular measure. Only those customers for whom a measure is available for implementation (stage 1) and, of those customers, only those who have been informed about the program/measure (stage 2), are in a position to make the implementation decision.

In the third stage of our penetration process, the model calculates the fraction of the market that adopts each efficiency measure as a function of the participant test. The participant test is a benefit-cost ratio that is generally calculated as follows:

Equation A-3

$$\text{Benefits} = \sum_{t=1}^N \frac{\text{Customer Bill Savings (\$)}_t}{(1+d)^{t-1}}$$

Equation A-4

$$\text{Costs} = \sum_{t=1}^N \frac{\text{Participant Costs (\$)}_t}{(1+d)^{t-1}}$$

Where:

- d = the discount rate
- t = time (in years)
- n = 20 years

We use a *normalized* measure life of 20 years in order to capture the benefits associated with long-lived measures. Measures with lives shorter than 20 years are “re-installed” in our analysis as many times as necessary to reach the normalized 20-year life of the analysis.

The bill reductions are calculated by multiplying measure energy savings and customer peak demand impacts by retail energy and demand rates.

The model uses measure implementation curves to estimate the percentage of the informed market that will accept each measure based on the participant’s benefit-cost ratio. The model provides enough flexibility so that each measure in each market segment can have a separate implementation rate curve. The functional form used for the implementation curves is:

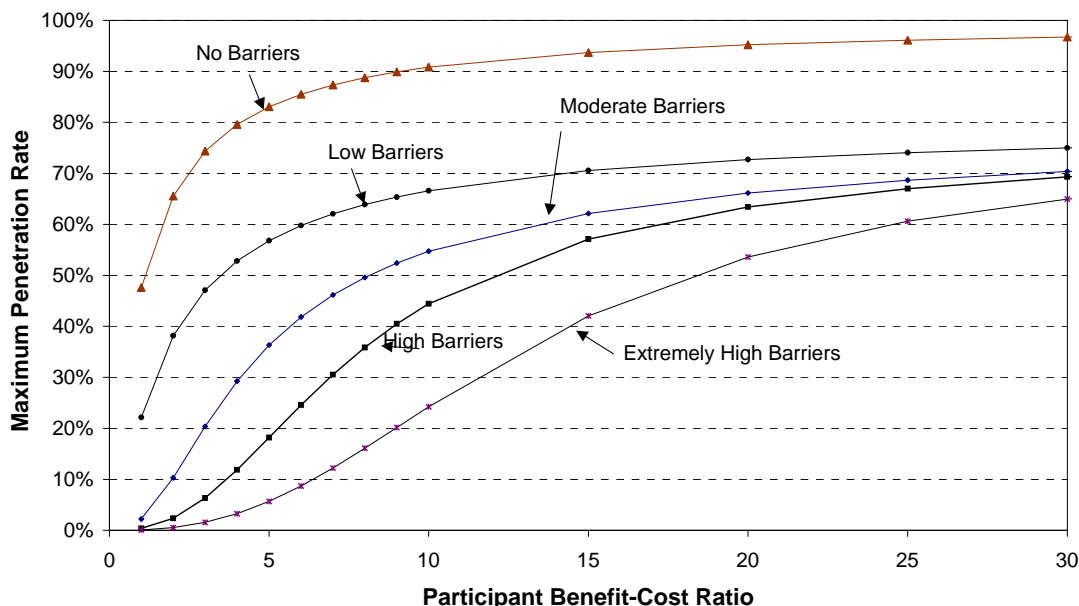
$$y = \frac{a}{\left(1 + e^{-\ln \frac{x}{4}}\right) \times \left(1 + e^{-c \ln(bx)}\right)}$$

where:

- y = the fraction of the market that installs a measure in a given year from the pool of informed applicable customers;
- x = the customer's benefit-cost ratio for the measure;
- a = the maximum annual acceptance rate for the technology;
- b = the inflection point of the curve. It is generally 1 over the benefit-cost ratio that will give a value of 1/2 the maximum value; and
- c = the parameter that determines the general shape (slope) of the curve.

The primary curves utilized in our model are shown in Figure A-3. These curves produce base year program results that are calibrated to actual measure implementation results associated with major IOU commercial efficiency programs over the past several years. Different curves are used to reflect different levels of market barriers for different efficiency measures. A list of market barriers is shown in Table A-5. It is the existence of these barriers that necessitates program interventions to increase the adoption of EE measures.

Figure A-3
Primary Measure Implementation Curves Used in Adoption Model



Note that for the moderate, high barrier, and extremely high curves, the participant benefit-cost ratios have to be very high before significant adoption occurs. This is because the participant benefit-cost ratios are based on a 15-percent discount rate. This discount rate reflects likely adoption if there were no market barriers or market failures, as reflected in the no-barriers curve in the figure. Experience has shown, however, that actual adoption behavior correlates with implicit discount rates several times those that would be expected in a perfect market.⁸

⁸ For some, it is easier to consider adoption as a function of simple payback. However, the relationship between payback and the participant benefit-cost ratio varies depending on measure life and discount rate. For a long-lived measure of 15 years with a 15-percent discount rate, the equivalent payback at which half of the market would adopt a measure is roughly 6 months, based on the high barrier curve in Figure 2-3. At a 1-year payback, one-quarter of the market would adopt the measure. Adoption reaches near its maximum at a 3-month payback. The curves reflect the real-world observation that implicit discount rates can average up to 100 percent.

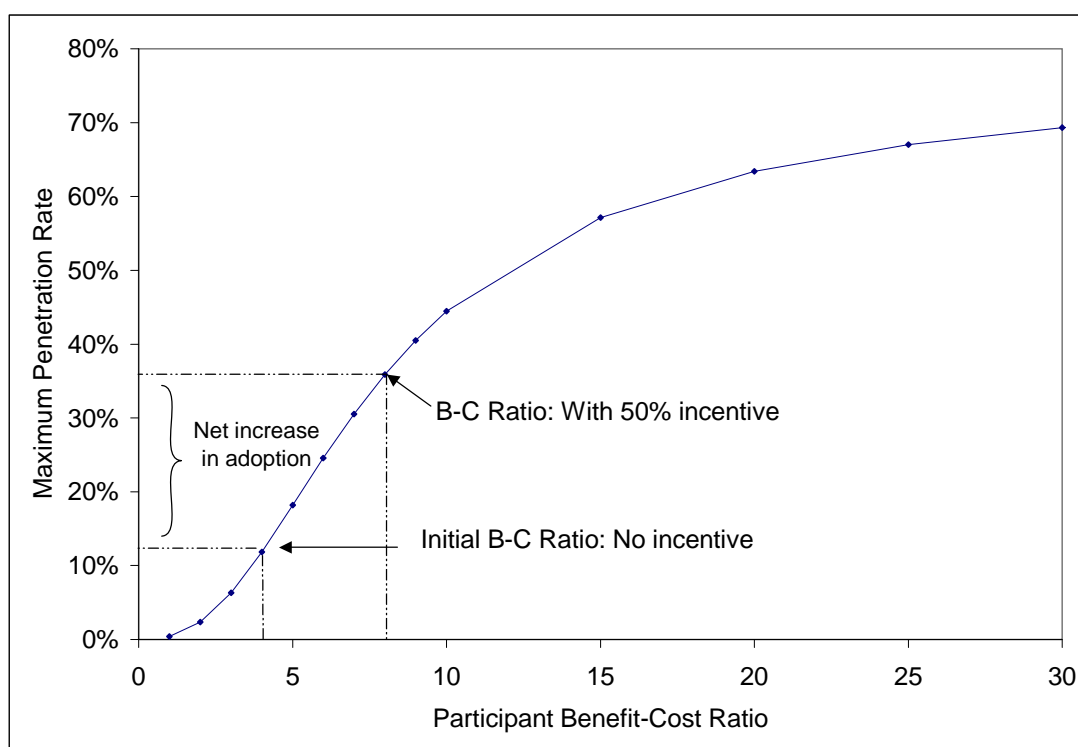
Table A-5
Summary Description of Market Barriers from Eto, Prah, Schlegel 1997

Barrier	Description
Information or Search Costs	The costs of identifying energy-efficient products or services or of learning about energy-efficient practices, including the value of time spent finding out about or locating a product or service or hiring someone else to do so.
Performance Uncertainties	The difficulties consumers face in evaluating claims about future benefits. Closely related to high search costs, in that acquiring the information needed to evaluate claims regarding future performance is rarely costless.
Asymmetric Information and Opportunism	The tendency of sellers of energy-efficient products or services to have more and better information about their offerings than do consumers, which, combined with potential incentives to mislead, can lead to sub-optimal purchasing behavior.
Hassle or Transaction Costs	The indirect costs of acquiring EE, including the time, materials and labor involved in obtaining or contracting for an energy-efficient product or service. (Distinct from search costs in that it refers to what happens once a product has been located.)
Hidden Costs	Unexpected costs associated with reliance on or operation of energy-efficient products or services - for example, extra operating and maintenance costs.
Access to Financing	The difficulties associated with the lending industry's historic inability to account for the unique features of loans for energy savings products (i.e., that future reductions in utility bills increase the borrower's ability to repay a loan) in underwriting procedures.
Bounded Rationality	The behavior of an individual during the decision-making process that either seems or actually is inconsistent with the individual's goals.
Organization Practices or Customs	Organizational behavior or systems of practice that discourage or inhibit cost-effective EE decisions, for example, procurement rules that make it difficult to act on EE decisions based on economic merit.
Misplaced or Split incentives	Cases in which the incentives of an agent charged with purchasing EE are not aligned with those of the persons who would benefit from the purchase.
Product or Service Unavailability	The failure of manufacturers, distributors or vendors to make a product or service available in a given area or market. May result from collusion, bounded rationality, or supply constraints.
Externalities	Costs that are associated with transactions, but which are not reflected in the price paid in the transaction.
Non-externality Pricing	Factors other than externalities that move prices away from marginal cost. An example arises when utility commodity prices are set using ratemaking practices based on average (rather than marginal) costs.
Inseparability of Product Features	The difficulties consumers sometimes face in acquiring desirable EE features in products without also acquiring (and paying for) additional undesired features that increase the total cost of the product beyond what the consumer is willing to pay.
Irreversibility	The difficulty of reversing a purchase decision in light of new information that may become available, which may deter the initial purchase, for example, if energy prices decline, one cannot resell insulation that has been blown into a wall.

The model estimates adoption under both naturally occurring and program intervention situations. There are only two differences between the naturally occurring and program

analyses. First, in any program intervention case in which measure incentives are provided, the participant benefit-cost ratios are adjusted based on the incentives. Thus, if an incentive that pays 50 percent of the incremental measure cost is applied in the program analysis, the participant benefit-cost ratio for that measure will double (since the costs have been halved). The effect on the amount of adoption estimated will depend on where the pre- and post-incentive benefit-cost ratios fall on the curve. This effect is illustrated in Figure A-4.

Figure A-4
Illustration of Effect of Incentives on Adoption Level
as Characterized in Implementation Curves



In many of our projects achievable potential EE forecasts are developed for several scenarios, ranging from base levels of program intervention, through moderate levels, up to an aggressive EE acquisition scenario. Uncertainty in rates and avoided costs are often characterized in alternate scenarios. The final results produced are annual streams of achievable program impacts (energy and demand by time-of-use period) and all societal and participant costs (program costs plus end-user costs).

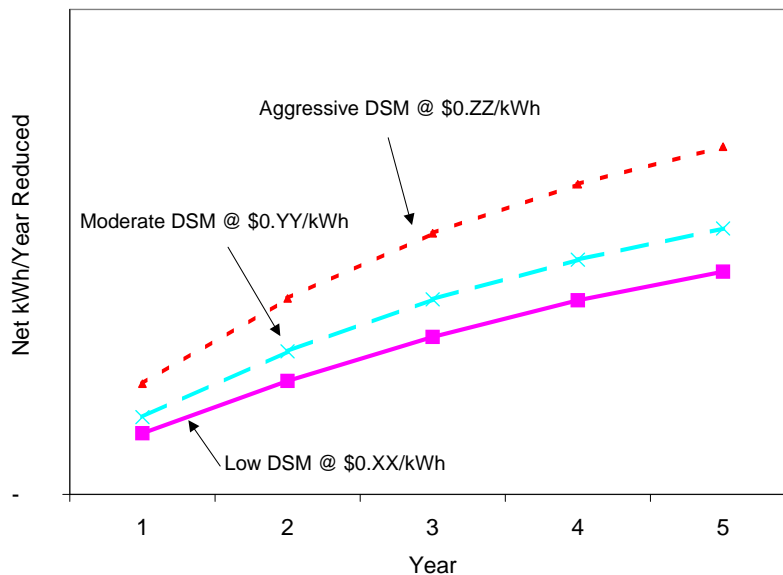
A.1.4 Scenario Analyses

Achievable potential forecasts can be developed for multiple scenarios. For example, program savings can be modeled under low levels of program intervention, through moderate levels, up to an aggressive DSM acquisition scenario. Uncertainty in rates and avoided costs can be characterized in alternate scenarios as well. The final results produced will be annual streams of achievable DSM program impacts (energy and demand by time-of-use period) and all societal and participant costs. An example of the types of outputs that have been produced for similar studies in the past is shown in Table A-6 and Figure A-5.

Table A-6
Example Format of DSM ASSYST Achievable Potential Outputs

DSM ASSYST Program Output	2006	2007	2008	etc.
Annual Energy Savings (kWh)				
Summer Period Energy Savings (kWh)				
Non Summer Period Energy Savings (kWh)				
Net Annual Energy Savings (kWh)				
Summer Period Net Energy Savings (kWh)				
Non Summer Period Net Energy Savings (kWh)				
Peak Demand Savings (kW)				
Net Peak Demand Savings (kW)				
Annual Program Costs				
Supplemental Customer Costs				

Figure A-5
Example of DSM Scenario Outputs



A.1.5 Measure “Bundles” for Complex End Uses

Although potential can be estimated through measure-specific analyses for many sectors and end uses, there are some cases where the measure-specific approach becomes problematic because of the complexity or heterogeneity of the base-case energy systems being addressed. Two key examples are industrial processes and some aspects of residential and commercial new construction.

In the industrial case, there may be dozens or even hundreds of individual measures that can be applied to industrial processes throughout the population of industrial facilities in a service territory; however, analyzing each of these opportunities, though possible, is impractical within a resource and time-constrained study such as this one.

In the case of new construction, the problem is sometimes that an equipment substitution paradigm does not fit the real-world circumstances in which efficiency levels are improved. For example, in commercial lighting, virtually all new buildings tend to have electronic ballasts and T-8 lamps, as well as CFLs, and other high-efficiency components. These high-efficiency components are generally needed to meet Title 24 efficiency requirements; however, the overall

lighting system efficiency can often be increased by using these same components in smarter designs configurations or by combining with other features such as daylighting.

For both of these situations, our approach on recent related work has been to bundle multiple individual efficiency measures into somewhat simplified efficiency levels. For example, lighting levels for commercial new construction might be set at 10- and 20-percent improvement over Title 24 standards (as they are often specified in the Savings by Design program planning documents). Similarly, for industrial compressed air systems, we have bundled savings opportunities into three levels where both savings and costs increase with each level. We then estimate an incremental cost for achieving each of the efficiency levels. An example of these results developed in a recent study for industrial motors, compressed air, and processes in California is shown in Table A-7.

Once the levels efficiency are specified in terms of costs and savings, they are run through the modeling system as if they were individual measures. Thus, cost-effectiveness indicators are calculated for each level, those that pass the TRC are included in the achievable potential forecasting, and adoption is modeled using the same process as described above. Although we recommend using this approach for complex end uses in the proposed study because it creates a manageable forecasting process, care must be taken in developing the levels and recognizing that this approach results in some aggregation bias.

A.2 DSM ASSYST™ Model Description

DSM ASSYST™ (Demand-Side Management Technology Assessment System) is a tool developed to assess the technical, economic and market potential of DSM technologies in the residential, commercial and industrial sectors. Based on user-specified information about base technologies, conservation technologies, load shapes, utility avoided costs, utility service rates, and economic parameters, DSM ASSYST yields numeric data for a variety of criteria. The user can then evaluate and compare technologies. DSM ASSYST allows the user to analyze each DSM technology in multiple combinations of building types, market segments, end uses, and vintages both individually and compared to other DSM technology options.

Table A-7

Example of Industrial Efficiency Levels Developed for a Recent California Potential Study

DSM ASSYST ADDITIVE SUPPLY ANALYSIS			Year				
Vintage: Existing			2011				
Sector: Industrial Scenario: Base							
End Use	Measure Number	Measure	GWH Savings	MW Savings	Levelized Cost per KWh Saved \$/kWh	Levelized Cost per KW Saved \$/kW	Total Resource Cost Test TRC
Motors	101	Replace 1-5 HP Motor	248.7	34.1	\$0.10	\$698	0.8
Motors	102	Add 1-5 HP VSD	447.1	61.3	\$0.14	\$1,019	0.6
Motors	103	Motor Practices Level 1	607.0	83.2	\$0.06	\$440	1.3
Motors	104	Motor Practices Level 2	539.1	73.9	\$0.24	\$1,764	0.3
Motors	121	Replace 21-50 HP Motor	78.1	10.7	\$0.09	\$661	0.9
Motors	122	Add 21-50 HP VSD	319.0	43.7	\$0.04	\$278	2.1
Motors	123	Motor Practices Level 1	404.3	55.4	\$0.03	\$211	2.7
Motors	124	Motor Practices Level 2	361.9	49.6	\$0.12	\$840	0.7
Motors	151	Replace 201-500 HP Motor	143.5	19.7	\$0.03	\$201	2.8
Motors	152	Add 201-500 HP VSD	516.6	70.8	\$0.01	\$106	5.4
Motors	153	Motor Practices Level 1	598.6	82.0	\$0.02	\$152	3.7
Motors	154	Motor Practices Level 2	554.9	76.0	\$0.08	\$586	1.0
Compressed Air	202	CAS Level 1	433.9	59.5	\$0.02	\$168	3.4
Compressed Air	203	CAS Level 2	453.6	62.2	\$0.05	\$362	1.6
Compressed Air	204	CAS Level 3	325.5	44.6	\$0.13	\$936	0.6
Other Process	301	Process Level 1	1,031.8	141.4	\$0.03	\$190	3.0
Other Process	302	Process Level 2	1,219.7	167.1	\$0.05	\$345	1.7
Other Process	303	Process Level 3	767.3	105.1	\$0.25	\$1,831	0.3

The current version of DSM ASSYST uses a combination of Microsoft Excel spreadsheets and Visual Basic (VB) programming software. All input and output data are stored in spreadsheets. The VB modules read input data from various spreadsheets, perform the various analyses, and store output results into spreadsheets.

There are three major VB analysis modules: Basic, Supply, and Penetration. Figure A-6 provides an overview of the model process and key inputs. Each module is briefly described below.

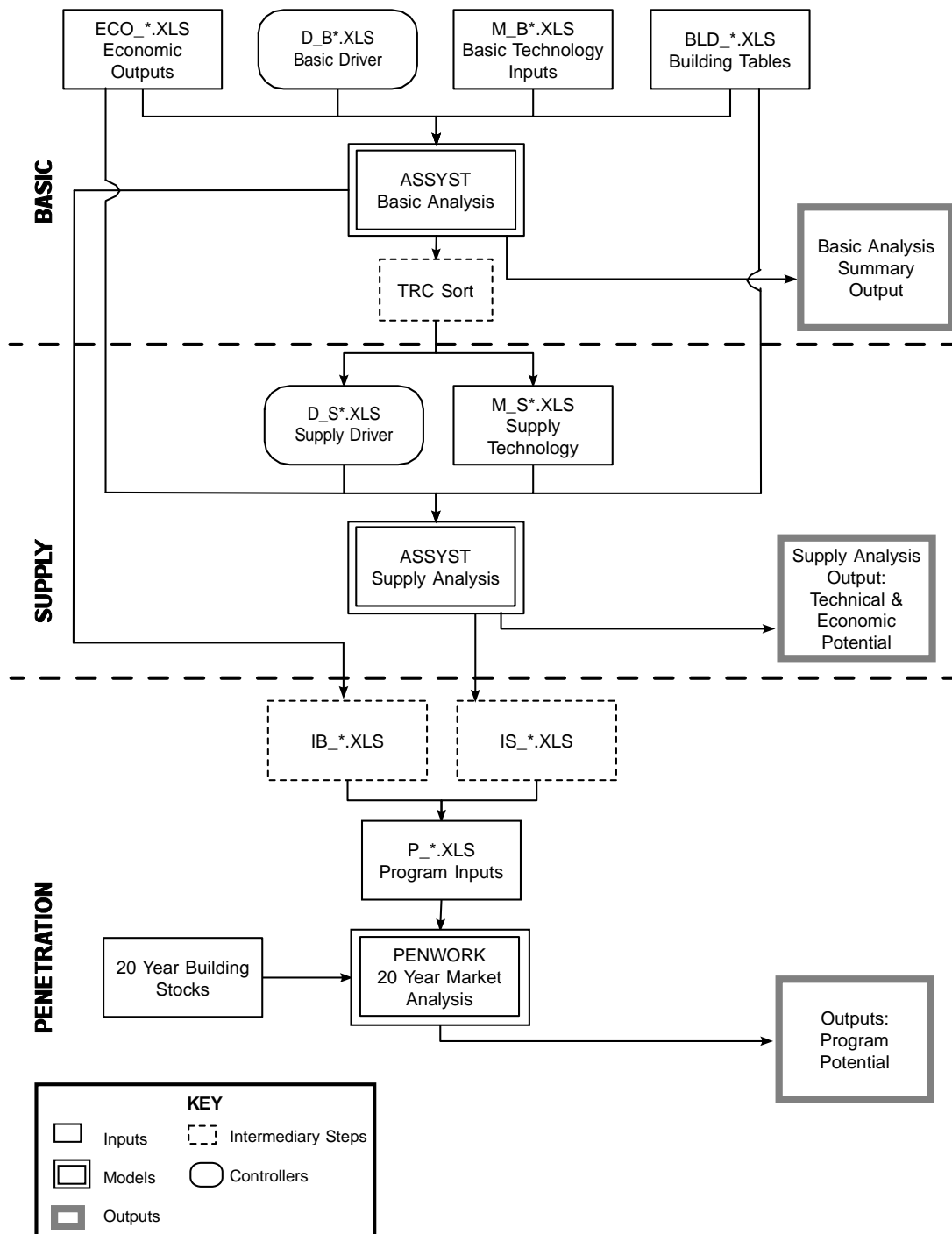
A.2.1 Basic Module

In the Basic module, each technology is assessed individually by comparing it to a base case. Comparisons are made at a high degree of segmentation. The segmentation may include, but is not limited to sector, building type, end use, vintage and geographic area.

The Basic module reads four types of information, contained within four spreadsheet files. These files include:

- **Economic:** containing utility rates paid by customers, discount rates, avoided costs, and other utility-specific economic parameters
- **Building:** containing square footage or number of households and load shape data
- **Measure:** containing technology based inputs for the Basic Analysis
- **Driver:** containing information that drives the analysis process.

Figure A-6
DSM ASSYST Analytic Flow



The output files produced by the Basic module include a Summary Basic Output file that contains an assessment of how much energy and demand each technology will save relative to the base case within each segment. In addition, the summary contains cost data, savings fractions, before and after EUIs or UECs, service life, the levelized costs of implementing the technology, and results of economic tests including the TRC test, participant test, and customer payback.

This module also produces a second file that contains all the measures that were assessed in the Basic Analysis sorted in the highest to lowest TRC order within each market segment and end use. This file serves as an input file for the Supply module.

A.2.2 Supply Module

In the Supply Module each technology, within each market segment, is stacked, or implemented, such that all energy savings are realized from preceding technologies prior to the implementation of all subsequent technologies. The stacking order generally follows the TRC sort order, highest to lowest, resulting from the Basic module.

The Supply module requires two input files: a Driver file and a modified output file from the Basic module. As in the Basic module, the Driver file contains instructions for the analysis process. The output file from the basic analysis must be modified in Excel to address overlapping measures, such as different SEER levels or measures that are direct substitutes for each other.

Output from the Supply module contains the technical and economic potential plus energy and demand supply curves. The Supply module produces measure-level information that can be incorporated into the input file for the Penetration module.

A.2.3 Penetration Module

The Penetration (or Program Potential) module of ASSYST is designed to calculate the costs and net energy and demand savings from DSM programs under a variety of marketing scenarios. This module estimates the net impact and cost of a program over time by forecasting the naturally occurring penetration of each measure as well as the penetration of each measure given the program activities (i.e., incentives and awareness building).

Using a stock accounting algorithm over a period of 20 years, this module first calculates the number of customers for whom the measure will apply. Second, the model calculates the number of informed customers based on the amount of money spent on advertising. Third, the

model calculates the number of customers who will implement the technology based on their benefit/cost ratio. Finally, the model compares the number of customers that implement the technology due to the program with those who would take the technology anyway (naturally occurring). Per-unit energy and demand savings are applied to the net number of customers (total minus naturally occurring) over the 20-year period. After completing the analysis, the results are automatically summed across measures to provide program-level costs and savings for 20 years, and formatted for input into Integrated Resource Planning models.

A program input file is used to define a program and provide the building stock forecast. The program characterization variables include:

- Incentive Levels
- Incentive Budget Constraints
- Yearly Incentive Adjuster
- Technology Acceptance Curve Parameters
- Administration Budgets
- Advertising Budgets
- Awareness Decay Rate
- Target Effectiveness
- Advertising Effective Ratio.



The Opportunity for Energy Efficiency that is Cheaper than Supply in Rhode Island

Appendix B – Measure Descriptions



Prepared for: Rhode Island Energy Efficiency and Resource Management Council (EERMC)

Prepared by

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August 26, 2010

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B. Appendix B. Measure Descriptions

This appendix describes the energy efficiency measures used in the study.

B.1 Residential Electric Measures

This subsection provides brief descriptions of the residential electric measures included in this study. Measures are grouped by end use.

B.1.1 HVAC Equipment

Central Air Conditioner Upgrade: Air conditioner equipment includes a compressor, an air-cooled or evaporatively-cooled condenser (located outdoors), an expansion valve, and an evaporator coil (located in the supply air duct near the supply fan). Cooling efficiencies vary based on the quality of the materials used, the size of equipment, the condenser type, and the configuration of the system. Central air conditioners may be of the unitary variety (all components housed in a factory-built assembly) or be a split system (an outdoor condenser section and an indoor evaporator section connected by refrigerant lines and with the compressor at either the outdoor or indoor location). Efficient air conditioner measures involve the upgrade of a standard efficiency unit (13 SEER) to a higher efficiency unit (17 SEER or higher).

Central Air Conditioner Early Replacement: For this measure we assume replacement of an older central air conditioner (SEER 11) with a new high-efficiency unit (EER 11.3). Energy savings are diminished to account for the fact that a fraction of the associated energy savings would have been realized at the end of the older unit's useful life, when a minimum SEER unit would have been purchased as a replacement.

Proper Refrigerant Charging and Air Flow: This measure involves diagnostic and repair services for existing central air conditioners to improve their efficiency. Inspection and services of AC systems involves checking the refrigerant level, cleaning the coils, cleaning the blower, cleaning or replacing filters, and making sure air is flowing properly through the system.

AC Maintenance and Repair: This measure is another type of maintenance service measure for existing central air conditioners or heat pumps to improve their operating efficiency. Cleaning the indoor and outdoor condenser coils to remove build up improves airflow around the coils

and therefore heat transfer rates. Indoor coils tend to be less accessible compared to outdoor coils.

High Efficiency Room Air Conditioner: Window (or wall) mounted room air conditioners are designed to cool individual rooms or spaces. This type of unit incorporates a complete air-cooled refrigeration and air-handling system in an individual package. Cooled air is discharged in response to thermostatic control to meet room requirements. Each unit has a self-contained, air-cooled direct expansion (DX) cooling system and associated controls. Room air conditioners are rated by energy efficiency ratio (EER), which is cooling output divided by power consumption. The efficient room air conditioner measure involves the upgrade of a standard efficiency unit (8.5 EER) to one of two higher efficiency units (10.8 or 11.3 EER).

Room Air Conditioner Early Replacement: For this measure we assume replacement of an older room air conditioner (EER 8.5) with a new high-efficiency unit (EER 11.3). Energy savings are diminished to account for the fact that a fraction of the associated energy savings would have been realized at the end of the older unit's useful life, when a minimum EER unit would have been purchased as a replacement.

High-Efficiency Dehumidifier: ENERGY STAR® qualified dehumidifiers use less energy to remove moisture from the air on account of more efficient refrigeration coils, fans, and compressors.

Whole House Fans: Whole house fans keep a home cool during the cooling months instead of running the air conditioner. These fans typically consume 0.22kW (1/3 hp), about one-third the consumption of a central air conditioner. These fans pull cool air from the outside, move air through the house, and/or remove hot air through the attic.

Ceiling Fans: ENERGY STAR Ceiling Fans save energy through improved motors and blade designs. Ceiling fans save energy from space conditioning in the summer by creating a wind chill, and during the winter by distributing hot air evenly throughout the room.

Portable Fans: Portable fans save energy from space conditioning in the summer by creating a wind chill.

Attic Venting: Attic venting reduces heat gain into attic spaces (where residential duct systems are commonly located). Reductions in attic heat gain reduce radiative losses in the duct system and in turn result in significant reductions in cooling loads.

Variable Speed Furnace/AC Fans: Air handler models with the lowest electrical use ratings employ electronically commutated motors (ECMs). ECMs, also known as brushless DC motors or variable speed blower motors, have two principal advantages over the typical permanent-magnet split capacitor (PSC) blower motors found in the majority of air handlers. First, ECMs are claimed to be 20% to 30% more efficient than standard blower motors. Second, the typical ECM blower can produce a much wider range of airflow than a PSC blower, which typically has only three or four set speeds over a fairly narrow range. Because power consumption by an air handler rises with the cube of airflow, the ability to reduce airflow when appropriate can dramatically reduce the electrical power draw by the air handler.

Programmable Thermostat: ENERGY STAR® programmable thermostats come pre-programmed with settings intended to deliver energy savings without sacrificing comfort. The settings vary for the cooling and heating months, with specific temperature ranges and setback points for the morning, daytime, evening, and night. Programmable thermostat settings may also be changed to reflect individual schedules and preferences.

B.1.2 Building Envelope

Duct Repair: An ideal duct system would be free of leaks, especially when the ducts are outside the conditioned space. Leakage in unsealed ducts varies considerably with the fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. To seal ducts, a wide variety of sealing methods and products exist. Care should be taken to tape or otherwise seal all joints to minimize leakage in all duct systems and the sealing material should have a projected life of 20 to 30 years. Current duct sealing methods include use of computer-controlled aerosol and pre- and post-sealing duct pressurization testing.

Duct Insulation: Insulation material inhibits the transfer of heat through the air-supply duct. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated flexible duct, duct board, duct wrap, tacked or glued rigid insulation, and water proof hard shell materials for exterior ducts. Duct insulation for existing construction involves wrapping un-insulated ducts with an R-4 insulating material.

Sealed Attic w/Sprayed Foam Insulated Roof Deck: By applying expanding sprayed foam insulation directly to the underside of the roof down to the soffit areas and gable end walls, this measure seals the entire attic space and significantly reduces heat gain from the exterior roof. This effectively brings the duct system into the conditioned space of the house, resulting in

reduced attic temperatures and reduced radiative losses in the duct system, as well as reduced humidity and infiltration.

ENERGY STAR® Windows: Windows which meet the ENERGY STAR® requirements have U-value and solar heat gain coefficients (SHGC) specified by climate zone, and are certified by the National Fenestration Rating Council (NFRC). These are modeled as a replace on burnout measure, so the costs are not the full cost of the window and installation, but rather the cost compared to installing a new non-ENERGY STAR® window.

Comprehensive Shell Air Sealing - Infiltration Reduction: Professional installation of weather stripping, caulking, and expanding foam insulation aided by a blower door test. These measures reduce energy consumption by improving the tightness of the building shell and limiting heat gain and loss.

Self-Install Weatherization: Installation of weather stripping, caulking, and expanding foam insulation from a spray can to fix easily found leaks and reduce air infiltration, completed by the homeowner.

Ceiling and Floor Insulation: Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. By inhibiting the flow of heat energy, thermal insulation can conserve energy by reducing heat loss or gain of a structure. An important characteristic of insulating materials is the thermal resistivity, or R-value. The R-value of a material is the reciprocal of the time rate of heat flow through a unit of this material in a direction perpendicular to two areas of different temperatures.

Basement Insulation. Basement walls are typically insulated by constructing a stud wall inside the house foundation, and insulating it as any interior wall. This increases the cost of basement insulation compared to crawlspace insulation (in addition to the taller wall height to be insulated). The cost-effectiveness of basement insulation depends on whether the basement will be conditioned. Basement insulation includes rim joist insulation.

Wall Insulation: For existing construction, this measure involves adding R-13 insulation to un-insulated walls. This is usually accomplished by drilling holes into the building's siding or interior walls and blowing in insulation material.

B.1.3 Lighting

Compact Fluorescent Lighting (CFLs): Compact fluorescent lamps are designed to replace standard incandescent lamps. They are approximately four times more efficient than incandescent light sources. Screw-in modular lamps have reusable ballasts that typically last the life of four lamps. This study takes into account recently enacted Federal standards under the Energy Policy and Conservation Act. The standards mandate an increase in efficiency of approximately 30% for the majority of residential incandescent light bulbs using a phased approach, beginning with 100 watt bulbs in 2012 and ending with 40 watt bulbs in 2014. It was assumed that this would result in a shift to CFL bulbs as a baseline for the specified bulb types.

LED General Purpose Lighting: A light emitting diode (LED) is a solid state lighting (SSL) technology that produces light by passing electrons through a semiconductor material, which is mounted on a heat sink and encased in a lens. Each LED is 7 mm to 9 mm on a side, and typically mounted in arrays on a circuit board, which is in turn mounted on another heat sink and encased in a fixture or bulb. This technology is revolutionizing the field in terms of light quality, energy efficiency, and design. However, poor manufacture has led to a range of problems in early products, notably color degradation and prematurely dimmed diodes from under-performing heat sinks, and “burnt out” diodes from faulty circuit boards. ENERGY STAR provides rigorous standards to certify quality LED lighting fixtures, which are commercially available and currently rebated in numerous energy efficiency programs, and has recently completed an LED bulb specification around which products are being rapidly developed.

B.1.4 Water Heat

Heat Pump Water Heater: Air-to-water heat pump water heaters extract low-grade heat from the air then transfer this heat to the water by means of an immersion coil. This is the most commonly utilized residential heat pump water heater. The air-to-water heat pump unit includes a compressor, air-to-refrigerant evaporator coil, evaporator fan, water circulating pump, refrigerant-to-water condenser coil, expansion valve, and controls. Residential heat pump water heaters replace base electric units with the same tank capacities.

High Efficiency Water Heater: Higher efficiency water heaters have greater insulation to reduce standby heat loss.

Low-Flow Showerhead: Many households are still equipped with showerheads using 3+ gallons per minute. Low flow showerheads can significantly reduce water heating energy for a

nominal cost. Typical low-flow showerheads use 1.0-2.5 gallons per minute compared to conventional flow rate of 3.5-6.0 gallons per minute. The reduction in shower water use can substantially lower water heating energy use since showering accounts for about one-fourth of total domestic hot water energy use.

Pipe Wrap: Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. By inhibiting the flow of heat energy, thermal insulation can conserve energy by reducing heat loss or gain.

Faucet Aerators: Water faucet aerators are threaded screens that attach to existing faucets. They reduce the volume of water coming out of faucets while introducing air into the water stream. A standard non-conserving faucet aerator has a typical flow rate of 3-5 gallons per minute. A water-saving aerator can reduce the flow to 1-2 gallons per minute. The reduction in the flow rate will lower hot water use and save energy (kitchen and bathroom sinks utilize approximately 7 percent of total domestic hot water energy use).

Water Heater Blanket: Adding water heater blankets to the hot water storage tank can prevent standby heat loss. This measure is especially effective when installed on older, less insulated tanks. Insulation levels on automatic storage heaters can be increased by installing a fiberglass blanket on the outside of the tank. This increase in insulation reduces standby losses and saves energy. This measure only applies to older water heater tanks as new ones have sufficient levels of insulation built in.

B.1.5 Appliances

High Efficiency Refrigerator: We model both an ENERGY STAR® and a CEE Tier 2 refrigerator. ENERGY STAR® refrigerators must exceed the stringent July 1, 2001 minimum federal standards for refrigerator energy consumption by at least 10%. As specified for this study, the average efficiency improvement is 20% for ENERGY STAR® and 25% for CEE Tier II. An energy efficient refrigerator/freezer is designed by improving the various components of the cabinet and refrigeration system. These component improvements include cabinet insulation, compressor efficiency, evaporator fan efficiency, defrost controls, mullion heaters, oversized condenser coils, and improved door seals.

High Efficiency Refrigerator Early Replacement: For this measure we assume replacement of an older refrigerator with a new Energy Star unit. The early replacement assumes that the

same new refrigerator would have been bought, only six years later. Savings for this measure result for six years because the newer refrigerators, given the stringent efficiency standards implemented in 2001, use much less energy than older units.

Refrigerator/Freezer Recycling: For this measure we assume replacement of an older, second refrigerator (10 years old or more) that is not replaced by the customer.

High Efficiency Freezer: Stand-alone freezers include either upright or chest models. Efficient freezers should exceed standard efficiencies by 10 percent or more. As specified for this study, the average efficiency improvement is 15 percent.

ENERGY STAR® Dishwasher: ENERGY STAR® labeled dishwashers save by using both improved technology for the primary wash cycle, and by using less hot water to clean. They include more effective washing action, energy efficient motors and other advanced technology such as sensors that determine the length of the wash cycle and the temperature of the water necessary to clean the dishes.

High Efficiency Clothes Washer: A standard clothes washer uses various temperatures, water levels, and cycle durations to wash clothes depending on the clothing type and size of the laundry load. A high-efficiency vertical-axis clothes washer, which eliminates the warm rinse option and utilizes a spray technology to rinse clothes, can significantly reduce washer-related energy. Such machines also utilize a spin cycle that eliminates more water from the clothes than conventional clothes washers and are generally driven by more efficient motors. A horizontal axis clothes washer utilizes a cylinder that rotates horizontally to wash, rinse, and spin the clothes. These types of washing machines can be top loading or front loading, and utilize significantly less water (hot and cold) than the standard vertical axis machines. A vertical axis machine generally fills the tub until all of the clothes are immersed in water. In contrast, the horizontal axis machine only requires about one third of the tub to be full, since the rotation of the drum around its axis forces the clothes into the water and thus can drastically reduce the total energy use for washing. These machines are also easier on clothes and use less detergent.

High Efficiency Clothes Dryer: High efficiency clothes dryers incorporate moisture sensors and prevent the frequency and magnitude of over-drying compared to clothes dryers without moisture sensors. The Federal minimum Energy Factor (pounds of clothing per kilowatt hour) is 3.01, and does not vary widely between models currently on the market.

Heat Pump Clothes Dryer: These clothes dryers are sometimes referred to as “ventless” dryers because the warm, moist process air is passed in a closed-loop cycle from the tumbler through a heat pump. The refrigerant first takes energy out of the process air sufficient to cool it to the ambient dew point in order to condense any water vapor, which is then drained. Then the cycle transfers heat back into the dehumidified process air, which is passed into the clothes tumbler, and the cycle repeats.

B.1.6 Home Electronics

ENERGY STAR® Home Electronics (Televisions and Laptop and Desktop Computers): ENERGY STAR® qualified televisions and computers have maximum allowable power draws for both active and standby (“off”) mode. Some home electronic devices spend the vast majority of their time in off-mode but often continue to draw a small “trickle charge” to maintain clock or other memory functions. Reductions in off-mode power draws can thus produce significant reductions in total energy consumption without changing on-mode power consumption characteristics. Savings from ENERGY STAR® home electronics considered in this study were estimated based on reductions in active- and off-mode power draw from standard to ENERGY STAR® levels.

Smart Power Strip: These power strips use a variety of controls to reduce standby power consumption of home electronics, including timers, occupancy sensors, and secondary outlets which automatically turn off in tandem with a pre-specified outlet.

B.1.7 Whole House Measures

Behavioral Conservation: Indirect feedback approaches utilize energy information report mailers that motivate customers to use less, while direct feedback interventions use in-home energy-use monitors.

Residential New Construction: We model both an ENERGY STAR® New Home and a 40% Savings Home measure. Costs and savings were directly based on Chicago estimates completed for the ENERGY STAR Qualified Homes 2011 Savings & Cost Estimate Summary.

B.1.8 Other End Uses

Two Speed Pool Pump: Two speed pool pumps saves energy by reducing the energy used during ongoing pool filtering operation.

Variable-Speed Pool Pump: This measure saves energy much in the same way as two-speed pool pumps, with the exception that variable-speed pumps are able to further optimize pump operation and pool water flows to match the specific needs and requirements of individual owners.

B.2 Commercial Electric Measures

This subsection provides brief descriptions of the commercial measures included in this study.

B.2.1 Lighting

Super T-8 Lamps with Electronic Ballast: T-8 lamps are a smaller diameter fluorescent lamp than T-12 lamps. When paired with specially designed electronic ballasts, T-8 lamps provide more lumens per watt, resulting in energy savings. Electronic ballasts replace the standard core and coil technology in magnetic ballasts with solid-state components. This technology allows for more consistent control over ballast output and converts power to higher frequencies, causing the fluorescent lamps to operate more efficiently. For existing first generation T-8 systems, this measure is specified as an upgrade to efficiency levels associated with optimal Super T-8 lamp-ballast combinations on a replace-on-burnout basis.

T-5 High-Output Lighting with Electronic Ballast: Like T8 lamps, straight tube T5 lamps are available in nominal 2', 3', 4', and 5' lengths. Standard T-5 lamps have light output and efficiency comparable to T-8/electronic ballast systems. High output T-5 lamps have considerably higher light output: a 1-lamp high output T-5 cross-section can replace a 2-lamp T-8 cross-section. The 5/8" bulb diameter of the T-5 lamp lends itself to low profile luminaires well-suited for cove lighting and display case lighting. Its smaller scale allows for sleeker fluorescent indirect and direct/indirect pendants and shallower profile recessed troffer type luminaires. Because of variances in actual lamp lengths and a different socket design, the T-5 lamp cannot easily be retrofitted in existing T-12 and T-8 luminaires. Consequently, use the T-5 lamp to its best advantage in specially designed luminaires.

Induction Lamps: The primary difference between induction lighting and conventional fluorescent lamps is that induction lighting does not have an electrical connection going inside the glass bulb (electrodeless). Instead, energy is transferred wirelessly into the glass envelope via electromagnetic induction. Induction lamps typically take the place of HID lamps. Their advantage is both long life and quick start, which unlike HID lamps, allows them to be turned off and on with the demand. Although induction lamps have a longer service life than other lamp technology they are also more expensive. They are most often used in places where the lamps are difficult to reach and replace. Induction lamps have very long lifetimes (100,000 hours), excellent color rendering, and perform well in a wide temperature range. They have better lumen maintenance than HID lamps. Our study looks at two applications for induction lighting--high bay lighting and streetlighting.

Ceramic Metal Halide Lamps: Metal halide lamps are HID lamps, which are approximately four times more efficacious than incandescent lamps. Metal halide (MH) lamps are a form of high intensity discharge (HID) lighting with good lighting efficiency and excellent color rendition.

Pulse-Start Metal Halide Lamps: Pulse start lamps have a greater light output than standard metal halide, provide a white light and require special ballasts and fixtures for each specific lamp. The pulse start metal halide combined with new, more efficient low current crest factor ballasts using high voltage ignitors provides higher light levels initially (20% more) and significantly more maintained light over time (40% more) than today's standard metal halide.

Compact Fluorescent Lighting (CFLs): Compact fluorescent lamps are designed to replace standard incandescent lamps. They are approximately four times more efficacious than incandescent light sources. Screw-in modular lamps have reusable ballasts that typically last for four lamp lives.

Cold Cathode Fluorescent Lamps: The term cold cathode refers to the fact that the cathode is not independently heated, as it is in conventional fluorescent lamps. Unlike conventional fluorescent lamps, cold cathode lamps reach full brightness instantly, can be operated in rapid on off cycles without degrading the lamp lifetime, and operate in cold ambient temperatures. This makes them appropriate for some applications where a conventional fluorescent lamp would not be appropriate. Cold cathode lamps are significantly more expensive than conventional fluorescents but have a much longer life.

High Pressure Sodium Lamps: In many situations, 400 watt mercury vapor lamps can be replaced by 250 watt high pressure sodium (HPS) lamps. HPS lamps are HID lighting and emit a golden-white or yellow light. The color rendition for HPS lamps is worse than for MV lamps, but the number of lumens per watt, although dependent on the size of the lamps, is much improved over MV lamps.

Reflectors: Optical reflectors are mirrored surfaces installed in fluorescent fixtures to direct light toward a specific area or work surface. By installing optical reflectors, four-lamp and three-lamp fluorescent fixtures can be reduced to two lamp fixtures and still meet the needed lighting levels.

Lighting Control Tune-up: This involves various measures to optimize the customer's current lighting control systems, with measures such as: relocating/tuning occupancy sensors, relocating photocells, optimizing sweep timers, repairing lighting timers, and adjust lighting schedules.

Occupancy Sensors: Occupancy sensors (infrared or ultrasonic motion detection devices) turn lights on upon entry of a person into a room, and then turn the lights off from ½ minute to 20 minutes after they have left. Occupancy sensors require proper installation and calibration. Their savings depend on the mounting type.

Continuous Dimming: (Emerging Technology) Dimming electronic ballasts can be incorporated into a daylighting strategy around the perimeter of office buildings or in areas under skylights. These systems use photocells to reduce power consumption and light output when daylight is available.

Outdoor Lighting Controls (Photocells and Timeclocks): Photocells can be used to automatically control both outdoor lamps and indoor lamps adjacent to skylights and windows. When lights do not need to be on all night, a photocell in series with a time clock provides maximum savings and eliminates the need for manual operation and seasonal time clock adjustments. Time clocks enable users to turn on and off electrical equipment at specific times during the day or week.

LED Lighting: A light emitting diode (LEDs) is a semiconductor light source. They have been use for many years in niche application (such as indicator lights), but it was not until the late 1990's that high-output white LEDs became feasible. Over the last decade, LEDs have begun appearing in a variety of illumination applications. LEDs have the potential to be more efficient than fluorescent lighting, although efficacy varies widely between products (but in general continues to improve). They have long lifetimes (about 50,000 hours), are shock resistant and dimmable, can be cycled rapidly, and they perform well in low temperatures. The light from LEDs is highly directional, creating challenges for luminaire design, which is reflected in highly variable luminaire performance. This study considers LED lighting as a measures for indoor lighting, outdoor lighting, and streetlighting.

LED technology, both in the LEDs themselves and in luminaire design, continues to change rapidly. In certain applications (architectural lighting, undercabinet lighting, streetlighting), highly effective LED products available and competitive on a life-cycle-cost basis with incandescent and fluorescent technologies. In other applications, such as commercial ambient lighting, LED

products are not yet competitive on a performance or cost basis. That could easily change in the next few years, given the rapid pace of technological change and innovation.

LED Exit Sign: Exit signs were an early application of LED technology. Since exit signs are typically red or green, colored LEDs could be used directly, without the colored filter necessary when using a white light source. LED exit signs require significantly less maintenance than incandescent or CFL exit sign. Even a CFL would need to be replaced every year or two, while an LED sign could go without maintenance for up to 10 years. Because exit signs are operated continuously, the energy savings are significant.

Bi-Level LED Outdoor Lighting: Bi-level lighting is designed to operate at a minimum level of light output until occupancy is detected (e.g. through a motion sensor), then temporarily increase to a higher level of illumination.

High Performance Lighting Retrofit/Replacement: Because of the interaction between lighting measures (daylighting, controls, etc.), the costs and benefits may not be additive. We allocate a percent of the applicable stock to comprehensive lighting retrofits, at a 25 percent savings level.

B.2.2 Space Cooling

Chiller Efficiency Upgrade: Centrifugal chillers are used in building types which normally use water-based cooling systems and have cooling requirements greater than 200 tons. Centrifugal chillers reject heat through a water cooled condenser or cooling tower. In general, efficiency levels for centrifugal chillers start at 0.80 kW/ton (for older units) and may go as high as 0.4 kW/ton. This measure involves installation of a high-efficiency chiller (0.51 kW per ton) versus a standard unit (0.58 kW per ton). This measure also serves in the potential analysis as a proxy for other non-centrifugal chiller systems.

High-Efficiency Chiller Motors: This measure involves replacement of standard efficiency motors that power compressor systems on chillers. High-efficiency chiller motors have typically have efficiencies exceeding 90% and are typically electronically-commutated motors, which produce higher average operating efficiencies at partial loads compared to standard efficiency, brushed DC compressor motors.

VSD – Cooling Circulation Pumps: Variable speed drives installed on chilled water pumps can reduce energy use by varying the pump speed according to the building's demand for cooling. There is also a reduction in piping losses associated with this measure, which can have a major impact on the heating loads and energy use for a building. Pump speeds, however, can generally only be reduced to a minimum specified rate, because chillers and the control valves may require a minimum flow rate to operate.

VSD – Cooling Tower Fans: Energy usage in cooling tower fans can be reduced by installing electronic variable speed drives (VSDs). VSDs are a far more efficient method of regulating speed or torque than other control mechanisms. Energy required to operate a fan motor can be reduced significantly during reduced load conditions by installing a VSD.

Chiller Tune-up/Diagnostics: In addition to some of the activities conducted in a DX tune-up, an optimization of the chilled water plant can include activities such as: optimizing CW/CHW setpoints, improving chiller staging, trimming pump impellers, resetting chilled water supply temperature, and staging cooling tower fan operation.

Energy Management System: The term Energy Management System (EMS) refers to a complete building control system which usually can include controls for both lighting and HVAC systems. The HVAC control system may include on/off scheduling and warm-up routines. The complete lighting and HVAC control systems are generally integrated using a personal computer and control system software.

EMS Optimization: Energy management systems are frequently underutilized and have hundreds of minor inefficiencies throughout the system. Optimization of the existing system frequently results in substantial savings to the measures controlled by the EMS (e.g. lighting, HVAC) by minimizing waste. Improvements can include: building start-up schedule adjustments, improving integrated sequence of operations, calibration of sensors, and relocation of OA sensors.

Cool Roof: The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface. By using an appropriate reflective material to coat the roof, the roof will absorb less solar radiation and consequently reduce the cooling load.

DX Packaged System Efficiency Upgrade: A single-package A/C unit consists of a single package (or cabinet housing) containing a condensing unit, a compressor, and an indoor fan/coil. An additional benefit of package units is that there is no need for field-installed

refrigerant piping, thus minimizing labor costs and the possibility of contaminating the system with dirt, metal, oxides or non-condensing gases. We look at three efficiency levels, an EER of 10.9, an EER of 11.5 and an EER of 13.4, compared to a base case unit with EER=10.3.

Tune up/Advanced Diagnostics: The assumed tune-up includes cleaning the condenser and evaporator coils, establishing optimal refrigerant levels, and purging refrigerant loops of entrained air. The qualifying relative performance range for a tune-up is between 60 and 85 percent of the rated efficiency of the unit. Includes fresh air economizer controls providing demand control ventilation and consisting of a logic module, enthalpy sensor(s), and CO2 sensors in appropriate applications.

Window Film: Reflective window film is an effective way to reduce solar energy gains, thus reducing mechanical cooling energy consumption. Windows affect building energy use through thermal heat transfer (U-value), solar heat gains (shading coefficient), daylighting (visible light transmittance), and air leakage.

Programmable Thermostat: Setback programmable thermostats are appropriate controls for HVAC equipment that serve spaces with regular occupied and unoccupied periods, resulting in long periods of time when heating and cooling setpoints can be adjusted.

Roof / Ceiling Insulation: Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. By inhibiting the flow of heat energy, thermal insulation can conserve energy by reducing heat loss or gain of a structure. An important characteristic of insulating materials is the thermal resistance, or R-value. The R-value of a material is the reciprocal of the time rate of heat flow through a unit of this material in a direction perpendicular to two areas of different temperatures.

Installation of Air-Side Economizers: Air-side economizers reduce the energy consumption associated with cooling by providing access to outside air – when temperatures permit – in lieu of using mechanical cooling of recirculated indoor air.

Duct Insulation. Insulation material inhibits the transfer of heat through air supply ducts or hot water pipes. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated flexible duct, duct board, duct wrap, tacked or glued rigid insulation, and water proof hard shell materials for exterior ducts.

Duct Repair and Sealing. An ideal duct system would be free of leaks, especially when the ducts are outside the conditioned space. Leakage in unsealed ducts varies considerably with the fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. To seal ducts, a wide variety of sealing methods and products exist. Care should be taken to tape or otherwise seal all joints to minimize leakage in all duct systems and the sealing material should have a projected life of 20-30 years. Current duct sealing methods include use of computer-controlled aerosol and pre- and post-sealing duct pressurization testing.

DX Coil cleaning: A dirty coil cannot supply proper heat transfer, leading to higher energy consumption and reduced cooling capacity. Coil cleaning should be a routine maintenance measure, but in practice many systems operate with fouled coils.

B.2.3 Ventilation

Motor Efficiency Upgrade: Premium-efficiency motors use additional copper to reduce electrical losses and better magnetic materials to reduce core losses, and are generally built to more precise tolerances. Consequently, such motors are more reliable, resulting in reduced downtime and replacement costs. Premium-efficiency motors may also carry longer manufacturer's warranties.

VFD on Motor Installation: Energy usage in HVAC systems can be reduced by installing electronic variable frequency drives (VFDs) on ventilation fans. VFDs are a far more efficient method of regulating speed or torque than throttling valves, inlet vanes and fan dampers. Energy required to operate a fan motor can be reduced as much as 85% during reduced load conditions by installing a VFD.

Installation of Demand-Controlled Ventilation (via Occupancy Sensors, CO2 Sensors, Etc.): Often, usage of a building's ventilation control goes beyond what is necessary to maintain a healthy and comfortable environment. A variety of controls can save energy by limiting the use of the ventilation system to minimum amount necessary. Sensors that detect critical contaminants activate ventilations systems only when necessary. Occupancy sensors limit the operation ventilation systems to periods when the building is in use.

Air Handler Optimization: Optimization of a building's air-handling system is concerned principally with the proper sizing and configuration of its HVAC units. Energy savings can result

from a variety of improvements, including reduced equipment loads and better functionality of existing equipment.

Electronically Commutated Motors (ECM) on air-handler unit: Air handler models with the lowest electrical use ratings employ ECMs. ECMs, also known as brushless DC motors or variable speed blower motors, have two principal advantages over the typical permanent magnet split capacitor (PSC) blower motors found in the majority of air handlers. First, ECMs are claimed to be 20% to 30% more efficient than standard blower motors. Second, the typical ECM blower can produce a much wider range of airflow than a PSC blower, which typically has only three or four set speeds over a narrow range. Because power consumption by an air handler rises with the cube of airflow, the ability to reduce airflow when appropriate can dramatically reduce the electrical power draw by the air handler.

Energy Recovery Ventilation: These systems provide a controlled way of ventilating a building while minimizing energy loss. Heating energy requirements are reduced during the winter season by transferring heat from the warm inside air being exhausted to the fresh (but cold) supply air. Similarly, in the summer, the inside air being exhausted cools the warmer supply air and reduces cooling energy requirements.

Separate Makeup Air/Exhaust Hoods: Ventilation requirements in restaurants and grocery stores are driven both by occupancy and by the need to exhaust fumes from food preparation activities. Standard ventilation and exhaust systems operate at constant speeds that are most often matched to maximum ventilation requirements. Systems that modulate both exhaust and make-up air flow rates in response to measurements of “smoke” and temperature in the exhaust hood reduce exhaust and make-up air flow rates when full exhaust capacity is not required, and can thereby produce significant reduction in fan power and space conditioning energy use.

B.2.4 Refrigeration

Motor Efficiency Upgrade for Fans and Compressors: In addition to saving energy, premium-efficiency motors are more reliable, resulting in reduced downtime and replacement costs.

Strip Curtains: Installing strip curtains on doorways to walk-in boxes and refrigerated warehouses can produce energy savings due to decreased infiltration of outside air into the

refrigerated space. Although refrigerated spaces have doors, these doors are often left open, for example during product delivery and store stocking activities.

Night Covers: Installing film or blanket type night covers on display cases can significantly reduce the infiltration of warm ambient air into the refrigerated space. This reduction in display case loads in turn reduces the electric use of the central plant, including compressors and condensers, thus saving energy. The target market for this measure is small, independently owned grocery stores and other stores that are typically closed at night and restock their shelves during the day. The target cases are vertical displays, with a single- or double-air curtain, and tub (coffin) type cases.

Evaporator Fan Controller for Medium Temperature Walk-Ins: In response to the temperature setpoint being satisfied in a medium temperature walk-in cooler, evaporator fans are cycled to maintain minimum necessary air flow, which prevents ice build-up on the evaporator coils. In conventional systems, fans run constantly whether the temperature setpoint is satisfied or not.

Variable Speed Compressor Retrofit: A variable speed compressor is a screw or reciprocating compressor whose current is modulated by a frequency inverter. A controller senses the compressor suction pressure and modulates the current and therefore the motor speed in response to changes in this pressure. When low load conditions exist, the current to the compressor motor is decreased, decreasing the compressor work done on the refrigerant.

Floating Head Pressure Controls: Floating head pressure controls allow a refrigeration system to operate under lower condensing temperature and pressure settings, where compressor operation is most efficient, working against a relatively low head pressure. The condensing temperature is allowed to float below the design setpoint of, say, 95 deg. F under lower outdoor temperatures, which in-turn lowers the condensate pressure. In a conventional system a higher fixed condensing temperature setpoint is used which results in a lowered capacity for the system, requires extra power, and may overload the compressor motor. Energy savings can be realized if the refrigeration system head pressure is allowed to float during periods of low ambient temperature, when the condensing temperature can be dramatically reduced.

Refrigeration Commissioning: Refrigeration commissioning refers to a process whereby refrigeration systems are subject to inspection on a variety of criteria to ensure efficiency. The

commissioning process can involve tests that cover a system's controls for humidity and temperature, anti-condensation, and heat recovery, among others.

Demand Defrost: Defrost of a refrigeration system is critical to its efficient operation. Demand defrost uses a pressure-sensing device to activate the defrost cycle when it detects a significant drop in pressure of the air across the refrigeration coil. Because load during defrost can be three times that of normal operation, defrosting on demand only – not when an individual operator deems it necessary – can save energy by minimizing the amount of time spent on defrosting.

Humidistat Controls: A humidistat control is a control device to turn refrigeration display case anti-sweat heaters off when ambient relative humidity is low enough that sweating will not occur. Anti-sweat heaters evaporate moisture by heating the door rails, case frame and glass of display cases. Savings result from reducing the operating hours of the anti-sweat heaters, which without a humidistat control generally run continuously. There are various types of control strategies including cycling on a fixed schedule.

LED Display lighting: This measure involves the replacement of standard fluorescent tube lighting fixtures within medium and low-temperature display cases with LED fixtures. The higher luminous efficacy of LED lamps compared to T-8 and T-5 fluorescent lamps delivers significant energy savings and also results in lower heat gains inside refrigerator and freezer cases, which in turn reduces the effective load served by the compressor. LED fixtures also exhibit much longer service lives compared to T-8 or T-5 fixtures and very little maintenance requirements.

Fiber Optic display lighting: Fiber optics can be used to distribute light from a single light source located outside the refrigerator system to multiple display cases. Lighting energy use is reduced, because a single high efficiency light source (e.g. metal halide) serves multiple cases. But the bigger savings are in the refrigeration: by taking the light source outside the refrigerated space, it reduces the load on the compressor. While this technology has been used in demonstration projects, it is not a mature technology.

High R-Value Glass Doors: This measure involves the replacement of standard glass doors on refrigerated display cases with advanced glass doors that incorporate heat-reflective treated glass and/or low-conductivity gas fills between panes to produce high R-values. The greater insulation properties of the insulated glass doors reduce condensation buildup and reduce or eliminate the need for anti-sweat heaters.

Multiplex Compressor Systems: Multiplex refrigeration systems involve the use of multiple compressors in parallel, rather than single compressors, to serve specific refrigeration loads. Multiplex systems are designed so that compressors can be selectively selected and cycled in order to better match changes in refrigeration load dynamically and increase the overall operational efficiency of the compressors.

Oversized Air Cooled Condenser: The use of oversized condensers can provide additional “natural sub-cooling” of the condensed refrigerant, which results in lower-temperature refrigerant liquid in the system, lower evaporator temperatures, and reduced load on the compressor.

Freezer/Cooler Replacement Gaskets: Worn out freezer/cooler door gaskets can result in significant leakage and increased cooling energy consumption. Regular replacement of worn door gaskets reduces unnecessary air leaks and can lead to significant refrigeration energy savings.

B.2.5 Office Equipment

Power Management Enabling: Most PCs, monitors, printers and copiers have the capability of entering a low-power “sleep” mode when idle. However devices may come with this feature disabled or users may disable it for a variety of reasons. Enabling power management reduces energy use when devices are left idle during the day, or when a device is left on overnight. Most savings occur off-peak. This measure can be applied to PCs, PC monitors, printers and copiers.

Energy Star or Better Office Equipment. For many years, virtually all PCs and monitors met the Energy Star efficiency requirements, which required only that devices be capable of entering a low-power “sleep” mode after a period of inactivity. The Environmental Protection Agency (EPA) has tightened its requirements, adding active-mode power requirements to the specifications. Choosing Energy Star PCs, monitors, copiers and printers can reduce energy use both in all power modes.

Data Center Energy Efficiency: Data centers are facilities that are densely packed with electronic equipment for data processing, data storage, and networking. Ranging from a server closet in a small building to building that provide remote data operations to multiple clients, data centers are extremely energy intensive, both for the information architecture and the for cooling

required to support it. We analyze three scenarios for reduce energy use in data centers, taken from a 2007 EPA report:¹ (1) Improved operations focuses on operational improvements with little or no capital investment. (1) Best Practices assumes the adoption of practices and technologies used in the most energy-efficient of today's data centers. (3) State of the Art Practices represents the maximum efficiency achievable using available technologies.

B.2.6 Water Heating

High Efficiency Water Heater: Higher efficiency water heater have greater insulation to reduce standby heat loss. For this study, efficiency of the base unit (measured as the Energy Factor) is specified as 0.88, whereas the efficiency of the high efficiency electric water heater is specified as 0.93.

Heat Pump Water Heater: Air-to-water heat pump water heaters extract low-grade heat from the air then transfer this heat to the water by means of an immersion coil. This is the most commonly utilized residential heat pump water heater. The air-to-water heat pump unit includes a compressor, air-to-refrigerant evaporator coil, evaporator fan, water circulating pump, refrigerant-to-water condenser coil, expansion valve, and controls. Residential heat pump water heaters replace base electric units with the same tank capacities. For this study, efficiency of the base unit (measured as the Energy Factor) is specified as 0.88, whereas the efficiency of the heat pump water heater is specified as 2.9.

Solar Water Heater: Heat transfer technology that uses the sun's energy to warm water. Solar water heaters preheat water supplied to a conventional domestic hot water heating system. The energy savings for the system depend on solar radiation, air temperatures, water temperatures at the site, and the hot water use pattern.

Demand-Controlled Circulating Systems: Hot water circulation systems are designed to maintain water in hot water pipes at a pre-determined temperature and prevent excess water demand (and associated water heating energy) from waiting for hot water to arrive from the water heater. Demand-controlled circulating systems provide additional savings by optimizing pumping energy requirements to only specific moments of hot water demand. This is achieved

¹ EPA, 2007. *Report to Congress on Server and Data Center Energy Efficiency, Public Law 109-431*. Available at: http://www.energystar.gov/ia/partners/prod_development/downloads/EPA_Datacenter_Report_Congress_Final1.pdf

through the integration of an electronic controller on the circulation pump that is triggered by a switch engaged by the consumer at the point of hot water demand.

Heat Recovery Units: This measure is heat transfer strategy that uses the heat rejected during the refrigerant cycle on air conditioning units to heat water.

Pipe Wrap: Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. By inhibiting the flow of heat energy, thermal insulation can conserve energy by reducing heat loss or gain.

Heat Trap: Heat traps are valves or loops of pipe, which allow water to flow into the water heater tank but prevent unwanted hot-water flow out of the tank that would otherwise occur due to convection.

Tankless Water Heater. Tankless water heaters eliminate the standby tank (and associated losses) of a standard water heater. The water is heated instantaneously by a high energy heat source that can be either gas or electric.

B.2.7 Cooking

Convection Oven. Convection ovens use a small fan to circulate hot air within the oven cavity. Circulating air can heat food more efficiently than the still air found in conventional ovens. The hot air in the oven can be heated by gas or electricity. In general, a convection oven will save 30% of the energy used by an oven. These savings result from burners cycling off for a longer period.

Energy Star Fryer. Fryers cook foods by submerging them in hot animal or vegetable oils, and utilize a range of different burner types. In order to qualify as ENERGY STAR, electric fryers must meet a minimum cooking efficiency 80 percent while also meeting a maximum idle energy rate of 1,000 watts. Energy efficient fryers offer shorter cook times and higher production rates through advanced burner and heat exchanger designs. Frypot insulation reduces standby losses resulting in a lower idle energy rate.

Energy Star Steamer. Commercial steam cookers are versatile appliances which can be used to quickly prepare any foods that do not require a crust. Steamers come in a variety of configurations but generally resemble an oven, with between one and four gasketed and windowless compartments. The stacked compartments typically accommodate a standard 12 by 20-inch hotel pan. Pressure steamers have an external boiler that produces potable steam

under pressure, and atmospheric steamers have a steam generator located directly below the compartments. Both require a water line and drain hookup. In contrast, the connectionless steamer is a closed loop system with a reservoir that is periodically drained and refilled. Significant improvements in water- and energy- efficiency are achieved because no steam is allowed to escape down the condensate drain.

Energy Star Hot Food Holding Cabinet. Hot food holding cabinets maintain heated foods at a safe temperature for commercial food service. ENERGY STAR units use 65 percent less energy than standard models. ENERGY STAR units must meet a maximum idle energy rate of 40 watts/ft³. Models that meet this requirement incorporate better insulation to reduce heat loss. Other energy-saving features, such as magnetic door gaskets, auto-door closures, and dutch doors, may also be incorporated.

Vending Misers. The Vending Miser is an after-market energy control technology for refrigerated vending machines. It incorporates an occupancy sensor, thermostat, and timer to power down the vending machine for extended period, while periodically repowering the device to ensure that the product stays cold.

B.2.8 Whole Building Measures

High Performance Building/Design: For new construction, we consider the savings possible from taking a holistic approach toward energy efficiency beginning at the design phase. We consider three different levels of whole-building performance—30 percent over standard construction, 50 percent improvement, and “Near Zero Energy,” which assumes an average 70% efficiency savings, with the remaining energy being supplied by solar or cogeneration (this study only addresses the efficiency aspects of such buildings).

B.3 Industrial Electric Measures

This subsection provides brief descriptions of the industrial measures included in this study. First measure that cut across industries are described, followed by descriptions of industry-specific measures.

B.3.1 Cross-Cutting Electricity Efficiency Measures

Replace motors: This measure refers to the replacement of existing motors with high-efficiency motors. High-efficiency motors reduce energy losses through improved design, better materials, tighter tolerances, and improved manufacturing techniques. With proper installation, high-efficiency motors can run cooler than standard motors and can consequently have higher service factors, longer bearing life, longer insulation life, and less vibration.

Adjustable speed drives (ASDs): Adjustable speed drives better match motor speed to load and can therefore lead to significant energy savings compared to constant speed motors. Typical energy savings associated with ASDs range from 7-60%.

Motor practices: This measure refers to proper motor maintenance. The purposes of motor maintenance are to prolong motor life and to foresee a motor failure. Motor maintenance measures can be categorized as either preventive or predictive. Preventive measures, whose purpose is to prevent unexpected downtime of motors, include electrical consideration, voltage imbalance minimization, motor ventilation, alignment, and lubrication, and load consideration. The purpose of predictive motor maintenance is to observe ongoing motor temperature, vibration, and other operating data to identify when it becomes necessary to overhaul or replace a motor before failure occurs. The savings associated with ongoing motor maintenance could range from 2-30% of total motor system energy use.

Compressed air - operation and maintenance (O&M): Inadequate maintenance can lower compression efficiency and increase air leakage or pressure variability, as well as lead to increased operating temperatures, poor moisture control, and excessive contamination. Improved maintenance will reduce these problems and save energy. Proper maintenance includes regular motor lubrication, replacement of air lubricant separators, fan and pump inspection, and filter replacement.

Compressed air – controls: The objective of any control strategy is to shut off unneeded compressors or delay bringing on additional compressors until needed. Energy savings for sophisticated controls have been around 12% annually. Available controls for compressed air

systems include start/stop, load/unload, throttling, multi-step, variable speed, and network controls.

Compressed air - system optimization: This is a general measure that refers to compressed air system improvements (besides sizing, controls, and maintenance) that allow it to perform at maximum energy efficiency. Such improvements could include reducing leaks, better load management, minimizing pressure drops throughout the system, reducing air inlet temperatures, and recovering waste compressor heat for other facility applications.

Compressed air – sizing: This measure refers to the proper sizing of compressors, regulators, and distribution pipes. Oversizing of compressors can result in wasted energy. By properly sizing regulators, compressed air will be saved that is otherwise wasted as excess air. Pipes must be sized correctly for optimal performance or resized to fit the current compressor system. Increasing pipe diameters typically reduces annual energy consumption by 3%.

Pumps - operation and maintenance (O&M): Inadequate maintenance can lower pump system efficiency, cause pumps to wear out more quickly, and increase costs. Better maintenance will reduce these problems and also save energy. Proper pump system maintenance includes bearing inspection and repair, bearing lubrication, replacement of worn impellers, and inspection and replacement of mechanical seals.

Pumps – controls: The objective of pump control strategies is to shut off unneeded pumps or, alternatively, to reduce pump load until needed. In addition to energy savings, proper pump control can lead to reduced maintenance costs and increased pump life.

Pumps - system optimization: This is a general measure that refers to pump system improvements (besides sizing, controls, and maintenance) that allow it to perform at maximum energy efficiency. Such improvements could include pump demand reduction, high-efficiency pumps, impeller trimming, and installing multiple pumps for variable loads.

Pumps – sizing: Pumps that are sized inappropriately result in unnecessary losses. Where peak loads can be reduced, pump size can also be reduced. Replacing oversized pumps with pumps that are properly sized can save 15-25% of the electricity consumption of a pumping system (on average for U.S. industry).

Fans - operation and maintenance (O&M): This measure refers to the improvement of general O&M practice for fans, such as tightening belts, cleaning fans, and changing filters regularly.

Fans – controls: The objective of fan control strategies is to shut off unneeded fans or, alternatively, to reduce fan load until needed. In addition to energy savings, proper fan control can lead to reduced maintenance costs and increased pump life.

Fans - system optimization: This measure refers to general strategies for optimizing fans from a systems perspective, and includes such actions as better inlet and outlet design and reduction of fan sizing, where appropriate.

Fans - improve components: This measure refers to the improvement of fan components, such as replacing standard v-belts with cog v-belts and upgrading to the most energy efficient motors possible.

Replace T-12 by T-8 and electronic ballasts: T-12 tubes consume significant amounts of electricity, and also have extremely poor efficacy, lamp life, lumen depreciation, and color rendering index. Replacing T-12 lamps with T-8 lamps (smaller diameter) approximately doubles the efficacy of the former. Electronic ballasts save 12-30% power over their magnetic predecessors; typical energy savings associated with replacing magnetic ballasts by electronic ballasts are estimated to be roughly 25%.

Metal halides/fluorescents: Metal halide lamps can replace mercury or fluorescent lamps with energy savings of 50%. For even further savings, high-intensity fluorescent lamps can be installed, which can yield 50% electricity savings over standard metal halide (high-intensity discharge) systems.

Compact Fluorescent Lighting (CFLs): Compact fluorescent lighting fixtures are designed to replace standard incandescent lighting fixtures. They are approximately four times more efficacious than incandescent light sources.

Controls/sensors: Lights can be shut off during non-working hours by automatic controls, such as occupancy sensors, which turn off lights when a space becomes unoccupied. Manual controls can also be used in addition to automatic controls to save additional energy in small areas.

Chiller Efficiency Upgrade: Centrifugal chillers are used in building types which normally use water-based cooling systems and have cooling requirements greater than 200 tons. Centrifugal chillers reject heat through a water cooled condenser or cooling tower. In general, efficiency levels for centrifugal chillers start at 0.80 kW/ton (for older units) and may go as high as 0.4 kW/ton. This measure involves installation of a high-efficiency chiller (0.51 kW per ton) versus a standard unit (0.58 kW per ton). This measure also serves in the potential analysis as a proxy for other non-centrifugal chiller systems.

HVAC management system: An energy monitoring and control system supports the efficient operation of HVAC systems by monitoring, controlling, and tracking system energy consumption. Such systems continuously manage and optimize HVAC system energy consumption while also providing building engineers and energy managers with a valuable diagnostic tool for tracking energy consumption and identifying potential HVAC system problems.

Cooling circulation pumps – variable speed drives (VSDs): Variable speed drives better match motor speed to load and can therefore lead to significant energy savings compared to constant speed drives. This measure considers the installation of VSDs on cooling circulation pumps.

DX tune up/advanced diagnostics: The tune-up includes cleaning the condenser and evaporator coils, establishing optimal refrigerant levels, and purging refrigerant loops of entrained air. The qualifying relative performance range for a tune-up is between 60 and 85 percent of the rated efficiency of the unit. Includes fresh air economizer controls providing demand control ventilation and consisting of a logic module, enthalpy sensor(s), and CO² sensors in appropriate applications.

DX packaged system, EER=10.9, 10 tons: A single-package A/C unit consists of a single package (or cabinet housing) containing a condensing unit, a compressor, and an indoor fan/coil. An additional benefit of package units is that there is no need for field-installed refrigerant piping, thus minimizing labor costs and the possibility of contaminating the system with dirt, metal, oxides or non-condensing gases. This measure involves installation of a TIER 2 high-efficiency unit (EER=10.9) versus a standard unit (EER=10.3).

Window film: Low-emittance windows are an effective strategy for improving building insulation. Low-emittance windows can lower the heat transmitted into a building and therefore increase its insulating ability. There are two types of Low-E glass, high solar transmitting (for

regions with higher winter utility bills) and low solar transmitting (for regions with higher summer utility bills).

Programmable thermostat: A programmable thermostat allows to control temperature settings of space heating and cooling, and optimizing settings based on occupancy and use of the building. This will reduce unnecessary heating and cooling outside hours of building use. It may also help in building cooling using nighttime cooling.

Chiller O&M/tune up: This measure refers to the proper inspection and maintenance of chilled water systems. This can include setting correct head pressure, maintaining correct levels of refrigerant, and selecting and running appropriate compressors for part load. Energy saving can also be achieved by cleaning the condensers and evaporators to prevent scale buildup.

Cool Roof: The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface. By using an appropriate reflective material to coat the roof, the roof will absorb less solar radiation and consequently reduce the cooling load.

Replace v-belts: Inventory data suggest that 4% of pumps have V-belt drives, many of which can be replaced with direct couplings to save energy. Based on assessments in several industries, the savings associated with V-belt replacement are estimated at 4%.

B.3.2 Sector-Specific Efficiency Measures (Electricity)

B.3.2.1 NAICS 311: Food Manufacturing

NAICS 312: Beverage and Tobacco Product Manufacturing

Efficient refrigeration – operations: Refrigeration is an important energy user in the food industries. Operations of refrigeration systems can be improved by applying appropriate settings, opening refrigerated space as short as possible, reducing leakage by controlling doorways, making sure that refrigerated space is used optimally, optimization of defrosting cycle, as well as other small operational changes.

Optimization refrigeration: The refrigeration system can be optimized by improving the operation of the compressors, selecting cooling systems with high COP values, reducing losses in the coolant distribution system, improved insulation of the cooled space, variable speed drives on cooling system, and optimizing the temperature setting of the cooling system.

Bakery – process: Process improvements in the bakery can reduce electricity consumption through selection of energy-efficient equipment for the different processes, optimization of electric ovens, and good housekeeping (e.g. switching equipment off when not in use).

Bakery – process (mixing): About 35% of electricity in bakeries is used to mix and knead the dough. When selecting equipment electricity use should be one of the considerations as energy is the largest cost on a life-cycle basis. Today, energy use is not a criterion. High-efficiency motors, speed control and other measures may reduce electricity consumption.

B.3.2.2 NAICS 313: Textile Mills

NAICS 314: Textile Product Mills

NAICS 315: Textile Product Mills

NAICS 316: Leather and Allied Product Manufacturing

Drying (UV/IR): This measure refers to the use of direct heating methods, such as infrared dryers. Direct heating provides significant energy savings because it eliminates the inefficiency of transferring heat to air and from the air to the wet material. The energy efficiency of direct heating is about 90%.

Membranes for wastewater: Membrane technologies focus on separating the water from the contaminants using semi-permeable membranes and applied pressure differentials. Membrane filtration of wastewater is typically more energy efficient than evaporation methods, and can lead to significant reductions in facility freshwater intake.

O&M/drives spinning machines: Electric motors are the single largest electricity user in spinning mills. Optimization of motor use, proper maintenance procedures (e.g. preventative maintenance), use of new high-efficiency motors instead of re-winding, switching off equipment when not in use can help improve energy efficiency.

B.3.2.3 NAICS 321: Wood Product Manufacturing

NAICS 337: Household and Institutional Furniture and Kitchen Cabinet Manufacturing

Air conveying systems: Pneumatic or air conveying systems are used to transport material (e.g. sawdust, fibers) in the lumber industry. Energy efficiency improvement is feasible by optimizing the lay-out of the systems, reducing leakages, reducing bends in the system, and improving compressor operations (see also with compressed air systems).

Optimize drying processes: This is a general measure, which refers to the optimization of drying systems through such actions as the use of controls, heat recovery, insulation, and good housekeeping/maintenance.

Heat pumps – drying: This measure refers to the recovery of low grade heat from the drying process via a heat pump, where cost effective.

B.3.2.4 NAICS 322: Paper Manufacturing

Gap forming paper machine: The gap former produces a paper of equal and uniform quality at a higher rate of speed. Coupling the former with a press section rebuild or an improvement in the drying capacity increases production capacity by as much as 30%. Energy savings from gap formers come from reduced electricity consumption per ton of product produced.

High consistency forming: In high consistency forming, the furnish (process pulp) which enters at the forming stage has more than double the consistency (3%) than normal furnish. This measure increases forming speed, and reduces dewatering and vacuum power requirements. Application of this technology is limited to specific paper grades, especially low-basis weight grades such as tissue, toweling, and newsprint. Electricity savings are estimated at 8%.

Optimization control PM: Large electric motors are used to run the paper machine. Optimization of the paper machine will reduce electricity use of the drives. Improved control strategies will improve throughput, reduce breakage and downtime, improving the energy efficiency per unit of throughput. Variable speed drives may help to optimize the energy use in water pumps in the paper machine.

B.3.2.5 NAICS 323: Printing and Related Support Activities

Efficient practices printing press: Optimizing the use of the printing press by reducing production losses, switching off of the press when not in use and other improved operational practices.

Efficient printing press (fewer cylinders): New printing press designs allow the use of fewer cylinders (or rollers). This reduces the electricity use to drive the printing machine.

Light cylinders: Reducing the weight of the cylinders (or rollers) in the printing machine will reduce the power needed to drive the machine. Using lightweight materials for cylinders has been demonstrated in Europe.

B.3.2.6 NAICS 324: Petroleum and Coal Products

Process controls (batch + site): This is a general measure to implement computer-based process controls, where applicable, to monitor and optimize various processes from an energy consumption perspective. In general, by monitoring key process parameters, processes can be fine tuned to minimize energy consumption while still meeting quality and productivity requirements. Control systems can also reduce the time required to perform complex tasks and can often improve product quality and consistency while optimizing process operations. This measure could include the installation of controls based on neural networks, knowledge based systems, or improved sensor technology.

Power recovery: Various processes run at elevated pressures, enabling the opportunity for power recovery from the pressure in the flue gas. The major application for power recovery in the petroleum refinery is the fluid catalytic cracker (FCC). However, power recovery can also be applied to hydrocrackers or other equipment operated at elevated pressures. A power recovery turbine or turbo expander is used to recover energy from the pressure. The recovered energy can be used to drive the FCC compressor or to generate power.

Efficient desalter: Alternative designs for desalting include multi-stage desalters and a combination of AC and DC fields. These alternative designs may lead to increased efficiency and lower energy consumption.

B.3.2.7 NAICS 325: Chemical Manufacturing

Clean room – controls: Reduced recirculation air change rates, while still meeting quality control and regulatory standards can reduce energy use, optimized chilled water systems, reduction of cleanroom exhaust, and, occasionally, a cleanroom is classified at a higher cleanliness level than is necessary for its current use, and by declassifying energy can be saved.

Clean room – new designs: When designing a clean room, energy use should be a primary consideration. Benchmarking tools and design tools are being developed to help improve the energy efficiency of new cleanroom systems. Furthermore, in the design phase the system can

be optimized for improved air filtration quality and efficiency, and the use of cooling towers in lieu of water chillers.

Process controls (batch + site): See discussion for NAICS 324.

B.3.2.8 NAICS 326: Plastics and Rubber Products Manufacturing

O&M – extruders/injection molding: Improved operation and maintenance procedures of extruders, optimization of extruder settings, optimization of the extruder screw shape, optimization of the shape/thickness of the product, and reduction of standby time.

Extruders/injection molding – multipump: The use of multiple pumps and an appropriate control system allow to reduce energy use of the extruder when not working at full capacity, only using the pump(s) needed.

Direct drive extruders: Use of a direct drive, instead of a gearbox or belt, will reduce the losses by approximately 15% in extruders.

Injection molding – impulse cooling: Impulse cooling regulates the cooling water use increasing the cooling rate and reducing productivity (and downtime).

Injection molding – direct drive: Use of a direct drive, instead of a gearbox or belt, will reduce the losses by approximately 20% in injection molding machines.

B.3.2.9 NAICS 327: Nonmetallic Mineral Product Manufacturing

Efficient grinding: This is a general measure that refers to efficient grinding technologies, which can include the use of high-efficiency classifiers or separators.

Process controls: See discussion for NAICS 324.

Autoclave optimization: In various processes autoclaves are used to press materials. Multiple autoclaves are used. By synchronizing the time of the use of the individual autoclaves, energy can be reduced by re-using the output of one to operate the other autoclave.

Top-heating (glass): Most electric furnaces use electrodes in the batch to melt the raw materials into glass. Newer designs with top-mounted electrodes can improve and maintain product quality, and obtain a higher share of salable glass, which leads to lower energy intensities (energy per kg of glass produced).

B.3.2.10 NAICS 331: Primary Metal Manufacturing

Process controls: See discussion for NAICS 324.

Efficient electric melting: Electric arc furnaces are used in the steel industry to melt scrap. Only one minimill is operating in California. Multiple options are available to reduce the electricity consumption of the furnace, e.g. foamy slag, oxy-fuel injection, improved transformers, eccentric bottom tapping (EBT), as well as scrap preheating.

Near net shape casting: Near net shape casting is the direct casting of the metal into very nearly the final shape, thereby eliminating other processing steps such as hot rolling, which can lead to significant energy savings.

B.3.2.11 NAICS 332: Fabricated Metal Products

NAICS 333: Machinery Manufacturing

NAICS 336: Transportation Equipment

Optimization process (M&T): This is a general measure for optimizing the efficiency of painting processes, via such actions as the use of process controls, proper maintenance, and reducing the airflow rates in paint booths.

Scheduling: Optimization of the scheduling of various pieces of equipment can reduce downtime and hence save energy. Furthermore, improved control strategies can reduce standby energy use of equipment as part of an optimized scheduling system.

Efficient curing ovens: Efficiency options for curing ovens include the optimization of oven insulation, the use of heat recovery techniques, and the use of direct heating methods, such as infrared heating, microwave heating, and ultraviolet heating.

Machinery: Many machines (e.g. metal processing) use electricity or compressed air to drive the equipment. The use of compressed air systems should be minimized and replaced by direct drive systems, because of the low efficiency of the compressed air supply. Furthermore, many machines do not use high-efficiency motors or speed controls.

B.3.2.12 NAICS 334: Computers and Electronic Products

NAICS 335: Electrical Equipment, Appliance, and Component Manufacturing

Scheduling: See previous subsection.

Efficient curing ovens: See previous subsection.

Machinery: See previous subsection.

Efficient processes (welding, etc.): New more power efficient welding technology is developed. For welding robots, new servo-based systems reduce energy use. See also new transformers welding.

B.3.2.13 NAICS 339: Miscellaneous Manufacturing

Scheduling: See discussion for SIC 34.

Efficient Machinery: See discussion for SIC 34.

Process heating: Induction furnaces are often used for electric process heating. Improved operation and maintenance can reduce part-load operation, downtime and tap-to-tap time. Furthermore, high-frequency induction furnaces improve energy use.

Process controls: See discussion for NAICS 324.

B.3.2.14 NAICS 212: Mining

Process controls: See discussion for NAICS 324.

Efficient Grinding: See discussion for NAICS 327.

Process Optimization: See discussion for NAICS 327.

Efficient Machinery: See discussion for NAICS 332.

B.3.2.15 Water/Wastewater

Efficient Machinery: See discussion for NAICS 332.



The Opportunity for Energy Efficiency that is Cheaper than Supply in Rhode Island

Appendix C – Economic Inputs



Prepared for: Rhode Island Energy Efficiency and Resource Management Council (EERMC)

Prepared by

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August 26, 2010

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C. Appendix C: Economic Inputs

This appendix presents economic data used for the EERMC Energy That is Cheaper than Supply Study. These data include discount rates, inflation rates, loss rates, avoided cost forecasts, and customer rate forecasts. The avoided cost forecasts are provided by time-of-use (TOU) period. The following TOU period definitions are used.

June - September (Weekdays)			June - September (Weekends)		
Month	Peak	Off-Peak	Month	Peak	Off-Peak
June July August September	7 AM - 11 PM	11 PM - 7 AM	June July August September	-	12AM - 12 PM

October - May (Weekdays)			October - May (Weekends)		
Month	Peak	Off-Peak	Month	Peak	Off-Peak
October November December January February March April May	7 AM - 11 PM	11 PM - 7 AM	October November December January February March April May	-	12AM - 12 PM

ECONOMIC PARAMETERS

UTILITY NAME	nationalgrid
SECTOR	Res
BATCH #	1
UTILITY DISCOUNT RATE	3.63%
CUSTOMER DISCOUNT RATE	15.0%
GENERAL INFLATION RATE (Measure)	2.5%
BASE YEAR	2011
START YEAR	2011
DIFFERENCE	0
UTILITY LINE LOSS RATE	5.42%

Rate/Time Periods	1	2	3	4	5	6	
	Summer On- Peak	Summer Off- Peak	Winter On- Peak	Winter Off- Peak	n/a	n/a	
Name	SP	SOP	WP	WOP	n/a	n/a	TOTAL
Hours	1320	1608	2580	3252	0	0	8760
Monthly Adjustment for rates					0	0	

ENERGY COSTS AND RATES

Segment 1	Existing
RATE TYPE	Residential
ENERGY UNITS	\$/kWh
DEMAND UNITS	\$/kW



Year	AVOIDED ENERGY COSTS BY TIME PERIOD						AVOIDED DEMAND COSTS BY TIME PERIOD						Residential ENERGY RATES						Residential DEMAND RATES						Environmental Adder to be Subtracted for RIM
	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	
2011	0.16615	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.15188	0.15188	0.15188	0.15188	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2012	0.17856	0.12101	0.18712	0.13792	0.00000	0.00000	129.54659	0.00000	0.00000	0.00000	0.00000	0.00000	0.16603	0.16603	0.16603	0.16603	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2013	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.12237	0.12237	0.12237	0.12237	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2014	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.12141	0.12141	0.12141	0.12141	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2015	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.11875	0.11875	0.11875	0.11875	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2016	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.11863	0.11863	0.11863	0.11863	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2017	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.12178	0.12178	0.12178	0.12178	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2018	0.13236	0.09961	0.12956	0.10553	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.12368	0.12368	0.12368	0.12368	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2019	0.13134	0.09869	0.12957	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.12373	0.12373	0.12373	0.12373	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2020	0.12755	0.09719	0.12598	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.12016	0.12016	0.12016	0.12016	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2021	0.12268	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.11570	0.11570	0.11570	0.11570	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2022	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.11553	0.11553	0.11553	0.11553	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2023	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.12142	0.12142	0.12142	0.12142	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2024	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.12995	0.12995	0.12995	0.12995	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2025	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	185.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.13449	0.13449	0.13449	0.13449	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2026	0.15292	0.11339	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.13919	0.13919	0.13919	0.13919	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2027	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.14407	0.14407	0.14407	0.14407	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2028	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	261.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.14913	0.14913	0.14913	0.14913	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2029	0.16969	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.15437	0.15437	0.15437	0.15437	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2030	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.15980	0.15980	0.15980	0.15980	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2031	0.18193	0.13485	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.16544	0.16544	0.16544	0.16544	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2032	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.17128	0.17128	0.17128	0.17128	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2033	0.19507	0.14428	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.17733	0.17733	0.17733	0.17733	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2034	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.18360	0.18360	0.18360	0.18360	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2035	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.19011	0.19011	0.19011	0.19011	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2036	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.19685	0.19685	0.19685	0.19685	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2037	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.20384	0.20384	0.20384	0.20384	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2038	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.21108	0.21108	0.21108	0.21108	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2039	0.24068	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.21859	0.21859	0.21859	0.21859	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2040	0.24670	0.18214	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.22406	0.22406	0.22406	0.22406	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2041	0.25287	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.22966	0.22966	0.22966	0.22966	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2042	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.23540	0.23540	0.23540	0.23540	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2043	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.24129	0.24129	0.24129	0.24129	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2044	0.27231	0.20105	0.25674	0.20883	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.24732	0.24732	0.24732	0.24732	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2045	0.27912	0.20608	0.26315	0.21405	0.00000	0.00000	457.90045	0.00000	0.00000	0.00000	0.00000	0.00000	0.25350	0.25350	0.25350	0.25350	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2046	0.28609	0.21123	0.26973	0.21940	0.00000	0.00000	469.34796	0.00000	0.00000	0.00000	0.00000	0.00000	0.25984	0.25984	0.25984	0.25984	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2047	0.29325	0.21651	0.27648	0.22489	0.00000	0.00000	481.08166	0.00000	0.00000	0.00000	0.00000	0.00000	0.26633	0.26633	0.26633	0.26633	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2048	0.30058	0.22192	0.28339	0.23051	0.00000	0.00000	493.10870	0.000																	

ENERGY COSTS AND RATES

Segment 2 Existing
 RATE TYPE Low Income
 ENERGY UNITS \$/kWh
 DEMAND UNITS \$/kW

Year	AVOIDED ENERGY COSTS BY TIME PERIOD						AVOIDED DEMAND COSTS BY TIME PERIOD						Low Income ENERGY RATES						Low Income DEMAND RATES						Environmental Adder to be Subtracted for RIM \$/kWh
	SP	SOP	WP	WOP			SP	SOP	WP	WOP			SP	SOP	WP	WOP			SP	SOP	WP	WOP			
	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kW	\$/kW	\$/kW	\$/kW	\$/kW	\$/kW	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kWh	\$/kW	\$/kW	\$/kW	\$/kW	\$/kW	\$/kW	
2011	0.16615	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.12943	0.12943	0.12943	0.12943	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2012	0.17656	0.12101	0.18712	0.13792	0.00000	0.00000	129.54659	0.00000	0.00000	0.00000	0.00000	0.00000	0.14217	0.14215	0.14215	0.14215	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2013	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.10477	0.10477	0.10477	0.10477	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2014	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.10395	0.10395	0.10395	0.10395	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2015	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.10167	0.10167	0.10167	0.10167	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2016	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.10157	0.10157	0.10157	0.10157	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2017	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.10427	0.10427	0.10427	0.10427	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2018	0.13236	0.09961	0.12956	0.10553	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.10590	0.10590	0.10590	0.10590	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2019	0.13134	0.09869	0.12967	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.10594	0.10594	0.10594	0.10594	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2020	0.12755	0.09719	0.12598	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.10288	0.10288	0.10288	0.10288	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2021	0.12268	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.09906	0.09906	0.09906	0.09906	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2022	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.09891	0.09891	0.09891	0.09891	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2023	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.10396	0.10396	0.10396	0.10396	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2024	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.11126	0.11126	0.11126	0.11126	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2025	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	185.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.11514	0.11514	0.11514	0.11514	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2026	0.15292	0.11339	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.11917	0.11917	0.11917	0.11917	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2027	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.12335	0.12335	0.12335	0.12335	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2028	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	281.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.12768	0.12768	0.12768	0.12768	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2029	0.16969	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.13217	0.13217	0.13217	0.13217	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2030	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.13682	0.13682	0.13682	0.13682	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2031	0.18193	0.13465	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.14164	0.14164	0.14164	0.14164	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2032	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.14664	0.14664	0.14664	0.14664	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2033	0.19507	0.14428	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.15182	0.15182	0.15182	0.15182	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2034	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.15720	0.15720	0.15720	0.15720	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2035	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.16276	0.16276	0.16276	0.16276	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2036	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.16854	0.16854	0.16854	0.16854	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2037	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.17452	0.17452	0.17452	0.17452	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2038	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.18072	0.18072	0.18072	0.18072	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2039	0.24068	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.18715	0.18715	0.18715	0.18715	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2040	0.24670	0.18261	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.19183	0.19183	0.19183	0.19183	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2041	0.25287	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.19663	0.19663	0.19663	0.19663	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2042	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.20154	0.20154	0.20154	0.20154	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2043	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.20658	0.20658	0.20658	0.20658	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2044	0.27231	0.20105	0.25674	0.20883	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.21175	0.21175	0.21175	0.21175	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2045	0.27912	0.20608	0.26315	0.21405	0.00000	0.00000	457.90045	0.00000	0.00000	0.00000	0.00000	0.00000	0.21704	0.21704	0.21704	0.21704	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2046	0.28609	0.21123	0.26973	0.21940	0.00000	0.00000	469.34796	0.00000	0.00000	0.00000	0.00000	0.00000	0.22247	0.22247	0.22247	0.22247	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
2047	0.29325	0.21651	0.27648	0.22489	0.00000	0.00000	481.08166	0.00000	0.00000	0.00000	0.00000	0.00000	0.22803	0.22803	0.22803</										



Year	AVOIDED ENERGY COSTS BY TIME PERIOD						AVOIDED DEMAND COSTS BY TIME PERIOD						Residential ENERGY RATES						Residential DEMAND RATES						Environmental Adder to be Subtracted for RIM \$/kWh
	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	SP \$/kWh	SOP \$/kWh	WP \$/kWh	WOP \$/kWh	\$/kWh	\$/kWh	
2010	0.16615	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.15188	0.15188	0.15188	0.15188	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2011	0.17656	0.12101	0.18712	0.13792	0.00000	0.00000	129.54659	0.00000	0.00000	0.00000	0.00000	0.00000	0.16603	0.16603	0.16603	0.16603	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2012	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.12237	0.12237	0.12237	0.12237	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2013	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.12141	0.12141	0.12141	0.12141	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2014	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.11875	0.11875	0.11875	0.11875	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2015	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.11863	0.11863	0.11863	0.11863	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2016	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.12178	0.12178	0.12178	0.12178	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2017	0.13236	0.09961	0.12956	0.10553	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.12368	0.12368	0.12368	0.12368	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2018	0.13134	0.09869	0.12957	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.12373	0.12373	0.12373	0.12373	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2019	0.12755	0.09719	0.12598	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.12016	0.12016	0.12016	0.12016	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2020	0.12268	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.11570	0.11570	0.11570	0.11570	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2021	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.11553	0.11553	0.11553	0.11553	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2022	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.12142	0.12142	0.12142	0.12142	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2023	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.12995	0.12995	0.12995	0.12995	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2024	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	185.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.13449	0.13449	0.13449	0.13449	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2025	0.15292	0.11339	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.13919	0.13919	0.13919	0.13919	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2026	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.14407	0.14407	0.14407	0.14407	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2027	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	261.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.14913	0.14913	0.14913	0.14913	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2028	0.16869	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.15437	0.15437	0.15437	0.15437	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2029	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.15980	0.15980	0.15980	0.15980	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2030	0.18193	0.13485	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.16544	0.16544	0.16544	0.16544	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2031	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.17128	0.17128	0.17128	0.17128	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2032	0.19507	0.14428	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.17733	0.17733	0.17733	0.17733	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2033	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.18360	0.18360	0.18360	0.18360	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2034	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.19011	0.19011	0.19011	0.19011	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2035	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.19685	0.19685	0.19685	0.19685	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2036	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.20384	0.20384	0.20384	0.20384	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2037	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.21108	0.21108	0.21108	0.21108	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2038	0.24068	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.21859	0.21859	0.21859	0.21859	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2039	0.24670	0.18214	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.22406	0.22406	0.22406	0.22406	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2040	0.25287	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.22966	0.22966	0.22966	0.22966	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2041	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.23540	0.23540	0.23540	0.23540	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2042	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.24129	0.24129	0.24129	0.24129	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2043	0.27231	0.20105	0.25674	0.20883	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.24732	0.24732	0.24732	0.24732	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2044	0.27912	0.20608	0.26315	0.21405	0.00000	0.00000	457.90045	0.00000	0.00000	0.00000	0.00000	0.00000	0.25350	0.25350	0.25350	0.25350	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2045	0.28609	0.21123	0.26973	0.21940	0.00000	0.00000	469.34796	0.00000	0.00000	0.00000	0.00000	0.00000	0.25984	0.25984	0.25984	0.25984	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2046	0.29325	0.21651	0.27648	0.22489	0.00000	0.00000	481.08166	0.00000	0.00000	0.00000	0.00000	0.00000	0.26633	0.26633	0.26633	0.26633	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2047	0.30058	0.22192	0.28339	0.23051	0.00000	0.00000	493.10870																		



Year	AVOIDED ENERGY COSTS BY TIME PERIOD						AVOIDED DEMAND COSTS BY TIME PERIOD						Low Income ENERGY RATES						Low Income DEMAND RATES						Environmental Adder to be Subtracted for RIM \$/Kwh
	SP \$/Kwh	SOP \$/Kwh	WP \$/Kwh	WOP \$/Kwh	\$/Kwh	\$/Kwh	SP \$/KW	SOP \$/KW	WP \$/KW	WOP \$/KW	\$/KW	\$/KW	SP \$/Kwh	SOP \$/Kwh	WP \$/Kwh	WOP \$/Kwh	\$/Kwh	\$/Kwh	SP \$/KW	SOP \$/KW	WP \$/KW	WOP \$/KW	\$/KW	\$/KW	
2010	0.16615	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.12943	0.12943	0.12943	0.12943	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2011	0.17856	0.12101	0.18712	0.13792	0.00000	0.00000	129.54659	0.00000	0.00000	0.00000	0.00000	0.00000	0.14215	0.14215	0.14215	0.14215	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2012	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.10477	0.10477	0.10477	0.10477	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2013	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.10395	0.10395	0.10395	0.10395	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2014	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.10167	0.10167	0.10167	0.10167	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2015	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.10157	0.10157	0.10157	0.10157	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2016	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.10427	0.10427	0.10427	0.10427	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2017	0.13236	0.09961	0.12956	0.10553	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.10590	0.10590	0.10590	0.10590	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2018	0.13134	0.09869	0.12967	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.10594	0.10594	0.10594	0.10594	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2019	0.12755	0.09719	0.12598	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.10288	0.10288	0.10288	0.10288	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2020	0.12288	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.09906	0.09906	0.09906	0.09906	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2021	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.09891	0.09891	0.09891	0.09891	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2022	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.10396	0.10396	0.10396	0.10396	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2023	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.11126	0.11126	0.11126	0.11126	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2024	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	185.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.11514	0.11514	0.11514	0.11514	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2025	0.15292	0.11339	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.11917	0.11917	0.11917	0.11917	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2026	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.12335	0.12335	0.12335	0.12335	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2027	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	261.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.12768	0.12768	0.12768	0.12768	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2028	0.16869	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.13217	0.13217	0.13217	0.13217	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2029	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.13682	0.13682	0.13682	0.13682	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2030	0.18193	0.13485	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.14164	0.14164	0.14164	0.14164	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2031	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.14664	0.14664	0.14664	0.14664	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2032	0.19507	0.14428	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.15182	0.15182	0.15182	0.15182	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2033	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.15720	0.15720	0.15720	0.15720	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2034	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.16276	0.16276	0.16276	0.16276	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2035	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.16854	0.16854	0.16854	0.16854	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2036	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.17452	0.17452	0.17452	0.17452	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2037	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.18072	0.18072	0.18072	0.18072	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2038	0.24068	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.18715	0.18715	0.18715	0.18715	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2039	0.24670	0.18214	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.19183	0.19183	0.19183	0.19183	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2040	0.25287	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.19663	0.19663	0.19663	0.19663	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2041	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.20154	0.20154	0.20154	0.20154	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2042	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.20658	0.20658	0.20658	0.20658	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2043	0.27231	0.20105	0.25674	0.20883	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.21175	0.21175	0.21175	0.21175	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2044	0.27912	0.20608	0.26315	0.21405	0.00000	0.00000	457.90045	0.00000	0.00000	0.00000	0.00000	0.00000	0.21704	0.21704	0.21704	0.21704	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2045	0.28609	0.21123	0.26973	0.21940	0.00000	0.00000	469.34796	0.00000	0.00000	0.00000	0.00000	0.00000	0.22247	0.22247	0.22247	0.22247	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2046	0.29325	0.21651	0.27648	0.22489	0.00000	0.00000	481.08166	0.00000	0.00000	0.00000	0.00000	0.00000	0.22803	0.22803	0.22803	0.22803	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2047	0.30058	0.22192	0.28339	0.23051	0.00000	0.00000	493.10970	0.00000																	

ECONOMIC PARAMETERS

UTILITY NAME nationalgrid
 SECTOR Com
 BATCH # 1
 UTILITY DISCOUNT RATE 3.63%
 CUSTOMER DISCOUNT RATE 15.0%
 GENERAL INFLATION RATE (Measure) 2.5%
 BASE YEAR 2011
 START YEAR 2011
 DIFFERENCE 0
 UTILITY LINE LOSS RATE 4.29%

Rate/Time Periods	1	2	3	4	5	6	
Name	Summer On-Peak	Summer Off-Peak	Winter On-Peak	Winter Off-Peak	n/a	n/a	
Abbreviation	SON	SOFF	WON	WOFF	n/a	n/a	TOTAL
Hours	1360	1568	2624	3208	0	0	8760
Monthly Adjustment for rates					0	0	

ENERGY COSTS AND RATES

Segment 1 Existing
 RATE TYPE Commercial
 ENERGY UNITS \$/kWh
 DEMAND UNITS \$/kW

	AVOIDED ENERGY COSTS BY TIME PERIOD						AVOIDED DEMAND COSTS BY TIME PERIOD						Commercial ENERGY RATES						Commercial DEMAND RATES						Environmental	
Year	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	\$/kWh	Adder to be Subtracted for RIM \$/kWh
2011	0.16615	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.10504	0.10504	0.10504	0.10504	0.00000	0.00000	5.47983	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2012	0.17666	0.12101	0.18712	0.13792	0.00000	0.00000	129.84659	0.00000	0.00000	0.00000	0.00000	0.00000	0.11536	0.11536	0.11536	0.11536	0.00000	0.00000	5.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2013	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.08497	0.08497	0.08497	0.08497	0.00000	0.00000	4.32028	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2014	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.08430	0.08430	0.08430	0.08430	0.00000	0.00000	4.42828	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2015	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.08246	0.08246	0.08246	0.08246	0.00000	0.00000	4.59700	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2016	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.08237	0.08237	0.08237	0.08237	0.00000	0.00000	4.77138	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2017	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.08456	0.08456	0.08456	0.08456	0.00000	0.00000	4.89067	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2018	0.13236	0.09961	0.12956	0.10563	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.08586	0.08586	0.08586	0.08586	0.00000	0.00000	5.07540	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2019	0.13134	0.09869	0.12967	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.08590	0.08590	0.08590	0.08590	0.00000	0.00000	5.20229	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2020	0.12755	0.09719	0.12538	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.08341	0.08341	0.08341	0.08341	0.00000	0.00000	5.39798	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2021	0.12268	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.08031	0.08031	0.08031	0.08031	0.00000	0.00000	5.60020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2022	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.08019	0.08019	0.08019	0.08019	0.00000	0.00000	5.80916	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2023	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.08428	0.08428	0.08428	0.08428	0.00000	0.00000	6.02507	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2024	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.09022	0.09022	0.09022	0.09022	0.00000	0.00000	6.24814	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2025	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	165.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.09337	0.09337	0.09337	0.09337	0.00000	0.00000	7.14690	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2026	0.15292	0.11133	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.09664	0.09664	0.09664	0.09664	0.00000	0.00000	8.08669	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2027	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.10002	0.10002	0.10002	0.10002	0.00000	0.00000	9.06901	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2028	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	261.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.10354	0.10354	0.10354	0.10354	0.00000	0.00000	10.09539	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2029	0.16969	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.10717	0.10717	0.10717	0.10717	0.00000	0.00000	11.16742	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2030	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.11095	0.11095	0.11095	0.11095	0.00000	0.00000	12.20273	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2031	0.18193	0.13465	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.11486	0.11486	0.11486	0.11486	0.00000	0.00000	12.50780	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2032	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.11891	0.11891	0.11891	0.11891	0.00000	0.00000	12.82050	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2033	0.19507	0.14428	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.12312	0.12312	0.12312	0.12312	0.00000	0.00000	13.14101	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2034	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.12747	0.12747	0.12747	0.12747	0.00000	0.00000	13.46953	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2035	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.13199	0.13199	0.13199	0.13199	0.00000	0.00000	13.80627	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2036	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.13667	0.13667	0.13667	0.13667	0.00000	0.00000	14.15143	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2037	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.14152	0.14152	0.14152	0.14152	0.00000	0.00000	14.50521	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2038	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.14655	0.14655	0.14655	0.14655	0.00000	0.00000	14.86785	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2039	0.24068	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.15177	0.15177	0.15177	0.15177	0.00000	0.00000	15.23954	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2040	0.24670	0.18214	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.15556	0.15556	0.15556	0.15556	0.00000	0.00000	15.62053	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2041	0.25287	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.15945	0.15945	0.15945	0.15945	0.00000	0.00000	16.01104	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2042	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.16344	0.16344	0.16344	0.16344	0.00000	0.00000	16.41132	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2043	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.16752	0.16752	0.16752	0.16752	0.00000	0.00000	16.82160	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2044	0.27231	0.20105	0.25674	0.20883	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.17171	0.17171	0.17171	0.17171	0.00000	0.00000	17.							

Year	AVOIDED ENERGY COSTS BY TIME PERIOD						AVOIDED DEMAND COSTS BY TIME PERIOD						Commercial ENERGY RATES						Commercial DEMAND RATES						Environmental Adder to be Subtracted for RIM \$/kWh
	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	SON \$/kWh	SOFF \$/kWh	WON \$/kWh	WOFF \$/kWh	\$/kWh	\$/kWh	
2011	0.16815	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.10504	0.10504	0.10504	0.10504	0.00000	0.00000	5.47983	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2012	0.17656	0.11832	0.17599	0.13274	0.00000	0.00000	129.54659	0.00000	0.00000	0.00000	0.00000	0.00000	0.11135	0.11135	0.11135	0.11135	0.00000	0.00000	5.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2013	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.08497	0.08497	0.08497	0.08497	0.00000	0.00000	4.32028	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2014	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.08430	0.08430	0.08430	0.08430	0.00000	0.00000	4.42828	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2015	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.08246	0.08246	0.08246	0.08246	0.00000	0.00000	4.59700	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2016	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.08237	0.08237	0.08237	0.08237	0.00000	0.00000	4.77138	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2017	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.08456	0.08456	0.08456	0.08456	0.00000	0.00000	4.89067	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2018	0.13236	0.09961	0.12956	0.10553	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.08586	0.08586	0.08586	0.08586	0.00000	0.00000	5.07540	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2019	0.13134	0.09869	0.12967	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.08590	0.08590	0.08590	0.08590	0.00000	0.00000	5.20229	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2020	0.12755	0.09719	0.12598	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.08341	0.08341	0.08341	0.08341	0.00000	0.00000	5.39798	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2021	0.12268	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.08031	0.08031	0.08031	0.08031	0.00000	0.00000	5.60020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2022	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.08019	0.08019	0.08019	0.08019	0.00000	0.00000	5.80916	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2023	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.08428	0.08428	0.08428	0.08428	0.00000	0.00000	6.02507	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2024	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.09022	0.09022	0.09022	0.09022	0.00000	0.00000	6.24814	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2025	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	185.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.09337	0.09337	0.09337	0.09337	0.00000	0.00000	7.14699	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2026	0.15292	0.11339	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.09664	0.09664	0.09664	0.09664	0.00000	0.00000	8.08669	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2027	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.10002	0.10002	0.10002	0.10002	0.00000	0.00000	9.06901	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2028	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	261.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.10354	0.10354	0.10354	0.10354	0.00000	0.00000	10.09539	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2029	0.16969	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.10717	0.10717	0.10717	0.10717	0.00000	0.00000	11.16742	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2030	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.11095	0.11095	0.11095	0.11095	0.00000	0.00000	12.20273	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2031	0.18193	0.13465	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.11486	0.11486	0.11486	0.11486	0.00000	0.00000	12.50780	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2032	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.11891	0.11891	0.11891	0.11891	0.00000	0.00000	12.82050	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2033	0.19507	0.14399	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.12312	0.12312	0.12312	0.12312	0.00000	0.00000	13.14101	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2034	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.12747	0.12747	0.12747	0.12747	0.00000	0.00000	13.46953	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2035	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.13199	0.13199	0.13199	0.13199	0.00000	0.00000	13.80627	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2036	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.13667	0.13667	0.13667	0.13667	0.00000	0.00000	14.15143	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2037	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.14152	0.14152	0.14152	0.14152	0.00000	0.00000	14.50521	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2038	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.14655	0.14655	0.14655	0.14655	0.00000	0.00000	14.86785	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2039	0.24068	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.15177	0.15177	0.15177	0.15177	0.00000	0.00000	15.23954	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2040	0.24670	0.18214	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.15556	0.15556	0.15556	0.15556	0.00000	0.00000	15.62053	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2041	0.25267	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.15945	0.15945	0.15945	0.15945	0.00000	0.00000	16.01104	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2042	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.16344	0.16344	0.16344	0.16344	0.00000	0.00000	16.41132	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2043	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.16752	0.16752	0.16752	0.16752	0.00000	0.00000	16.82160	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2044	0.27231	0.20105	0.25674	0.20883	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.17171	0.17171	0.17171	0.17171	0.00000	0.00000	17.24214	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2045	0.27912	0.20608	0.26315	0.21405	0.00000	0.00000	457.90045	0.00000	0.00000	0.00000	0.00000	0.00000	0.17600	0.17600	0.17600	0.17600	0.00000	0.00000	17.67320	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2046																									

ECONOMIC PARAMETERS

UTILITY NAME	nationalgrid
SECTOR	Ind
BATCH #	1
UTILITY DISCOUNT RATE	3.63%
CUSTOMER DISCOUNT RATE	15.0%
GENERAL INFLATION RATE (Measure)	2.5%
BASE YEAR	2011
START YEAR	2011
DIFFERENCE	0
UTILITY LINE LOSS RATE	4.29%

Rate/Time Periods	1	2	3	4	5	6	
Name	Winter On-Peak	Winter Off-Peak	Summer On-Peak	Summer Off-Peak	n/a	n/a	
Abbreviation	SP	SOP	WP	WOP	n/a	n/a	TOTAL
Hours	1320	1608	2580	3252	0	0	8760
Monthly Adjustment for rates					0	0	

ENERGY COSTS AND RATES

Segment 1	All
RATE TYPE	Industrial
ENERGY UNITS	\$/kWh
DEMAND UNITS	\$/kW

AVOIDED ENERGY COSTS BY TIME PERIOD							AVOIDED DEMAND COSTS BY TIME PERIOD							Industrial ENERGY RATES							Industrial DEMAND RATES							Environmental Adder to be Subtracted for RIM
Year	WP \$/kWh	WOP \$/kWh	SP \$/kWh	SOP \$/kWh	\$/kWh	\$/kWh	WP \$/kWh	WOP \$/kWh	SP \$/kWh	SOP \$/kWh	\$/kWh	\$/kWh	WP \$/kWh	WOP \$/kWh	SP \$/kWh	SOP \$/kWh	\$/kWh	\$/kWh	WP \$/kWh	WOP \$/kWh	SP \$/kWh	SOP \$/kWh	\$/kWh	\$/kWh				
2011	0.16615	0.11155	0.16763	0.12488	0.00000	0.00000	141.97865	0.00000	0.00000	0.00000	0.00000	0.00000	0.10214	0.10214	0.10214	0.10214	0.10214	0.10214	4.92325	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2012	0.17656	0.12101	0.18712	0.13792	0.00000	0.00000	129.54659	0.00000	0.00000	0.00000	0.00000	0.00000	0.11218	0.11218	0.11218	0.11218	0.11218	0.11218	4.49216	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2013	0.12780	0.09471	0.13274	0.10398	0.00000	0.00000	111.93546	0.00000	0.00000	0.00000	0.00000	0.00000	0.08268	0.08268	0.08268	0.08268	0.08268	0.08268	3.88147	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2014	0.12798	0.09513	0.12976	0.10364	0.00000	0.00000	114.73384	0.00000	0.00000	0.00000	0.00000	0.00000	0.08203	0.08203	0.08203	0.08203	0.08203	0.08203	3.97851	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2015	0.12798	0.09178	0.12582	0.10172	0.00000	0.00000	119.10515	0.00000	0.00000	0.00000	0.00000	0.00000	0.08023	0.08023	0.08023	0.08023	0.08023	0.08023	4.13009	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2016	0.12790	0.09234	0.12517	0.10170	0.00000	0.00000	123.62332	0.00000	0.00000	0.00000	0.00000	0.00000	0.08015	0.08015	0.08015	0.08015	0.08015	0.08015	4.28676	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2017	0.13108	0.09546	0.12822	0.10437	0.00000	0.00000	126.71390	0.00000	0.00000	0.00000	0.00000	0.00000	0.08228	0.08228	0.08228	0.08228	0.08228	0.08228	4.39393	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2018	0.13236	0.09961	0.12956	0.10553	0.00000	0.00000	131.50028	0.00000	0.00000	0.00000	0.00000	0.00000	0.08357	0.08357	0.08357	0.08357	0.08357	0.08357	4.55990	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2019	0.13134	0.09869	0.12967	0.10643	0.00000	0.00000	134.78778	0.00000	0.00000	0.00000	0.00000	0.00000	0.08360	0.08360	0.08360	0.08360	0.08360	0.08360	4.67390	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2020	0.12755	0.09719	0.12598	0.10264	0.00000	0.00000	139.85794	0.00000	0.00000	0.00000	0.00000	0.00000	0.08118	0.08118	0.08118	0.08118	0.08118	0.08118	4.84972	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2021	0.12268	0.09249	0.12092	0.09972	0.00000	0.00000	145.09737	0.00000	0.00000	0.00000	0.00000	0.00000	0.07817	0.07817	0.07817	0.07817	0.07817	0.07817	5.03140	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2022	0.12360	0.09322	0.11915	0.09998	0.00000	0.00000	150.51135	0.00000	0.00000	0.00000	0.00000	0.00000	0.07806	0.07806	0.07806	0.07806	0.07806	0.07806	5.21913	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2023	0.13122	0.09879	0.12515	0.10419	0.00000	0.00000	156.10535	0.00000	0.00000	0.00000	0.00000	0.00000	0.08204	0.08204	0.08204	0.08204	0.08204	0.08204	5.41311	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2024	0.14270	0.10590	0.13466	0.10993	0.00000	0.00000	161.88498	0.00000	0.00000	0.00000	0.00000	0.00000	0.08780	0.08780	0.08780	0.08780	0.08780	0.08780	5.61352	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2025	0.14771	0.10958	0.13939	0.11375	0.00000	0.00000	185.17129	0.00000	0.00000	0.00000	0.00000	0.00000	0.09086	0.09086	0.09086	0.09086	0.09086	0.09086	6.42100	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2026	0.15292	0.11339	0.14429	0.11771	0.00000	0.00000	209.52075	0.00000	0.00000	0.00000	0.00000	0.00000	0.09404	0.09404	0.09404	0.09404	0.09404	0.09404	7.26534	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2027	0.15831	0.11734	0.14936	0.12182	0.00000	0.00000	234.97194	0.00000	0.00000	0.00000	0.00000	0.00000	0.09734	0.09734	0.09734	0.09734	0.09734	0.09734	8.14789	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2028	0.16390	0.12144	0.15462	0.12608	0.00000	0.00000	261.56475	0.00000	0.00000	0.00000	0.00000	0.00000	0.10076	0.10076	0.10076	0.10076	0.10076	0.10076	9.07002	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2029	0.16969	0.12568	0.16008	0.13049	0.00000	0.00000	289.34034	0.00000	0.00000	0.00000	0.00000	0.00000	0.10430	0.10430	0.10430	0.10430	0.10430	0.10430	10.03317	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2030	0.17570	0.13008	0.16574	0.13507	0.00000	0.00000	316.16449	0.00000	0.00000	0.00000	0.00000	0.00000	0.10797	0.10797	0.10797	0.10797	0.10797	0.10797	10.96332	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2031	0.18193	0.13465	0.17160	0.13981	0.00000	0.00000	324.06860	0.00000	0.00000	0.00000	0.00000	0.00000	0.11178	0.11178	0.11178	0.11178	0.11178	0.11178	11.23741	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2032	0.18838	0.13937	0.17767	0.14473	0.00000	0.00000	332.17031	0.00000	0.00000	0.00000	0.00000	0.00000	0.11572	0.11572	0.11572	0.11572	0.11572	0.11572	11.51834	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2033	0.19507	0.14428	0.18397	0.14983	0.00000	0.00000	340.47457	0.00000	0.00000	0.00000	0.00000	0.00000	0.11981	0.11981	0.11981	0.11981	0.11981	0.11981	11.80630	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2034	0.20201	0.14936	0.19050	0.15511	0.00000	0.00000	348.98644	0.00000	0.00000	0.00000	0.00000	0.00000	0.12405	0.12405	0.12405	0.12405	0.12405	0.12405	12.10146	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2035	0.20920	0.15463	0.19727	0.16059	0.00000	0.00000	357.71110	0.00000	0.00000	0.00000	0.00000	0.00000	0.12845	0.12845	0.12845	0.12845	0.12845	0.12845	12.40399	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2036	0.21665	0.16009	0.20429	0.16627	0.00000	0.00000	366.65388	0.00000	0.00000	0.00000	0.00000	0.00000	0.13300	0.13300	0.13300	0.13300	0.13300	0.13300	12.71409	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2037	0.22437	0.16575	0.21156	0.17215	0.00000	0.00000	375.82022	0.00000	0.00000	0.00000	0.00000	0.00000	0.13772	0.13772	0.13772	0.13772	0.13772	0.13772	13.03195	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2038	0.23238	0.17162	0.21910	0.17825	0.00000	0.00000	385.21573	0.00000	0.00000	0.00000	0.00000	0.00000	0.14262	0.14262	0.14262	0.14262	0.14262	0.14262	13.35774	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2039	0.24058	0.17770	0.22692	0.18458	0.00000	0.00000	394.84612	0.00000	0.00000	0.00000	0.00000	0.00000	0.14769	0.14769	0.14769	0.14769	0.14769	0.14769	13.69169	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2040	0.24670	0.18214	0.23259	0.18919	0.00000	0.00000	404.71727	0.00000	0.00000	0.00000	0.00000	0.00000	0.15138	0.15138	0.15138	0.15138	0.15138	0.15138	14.03398	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2041	0.25287	0.18670	0.23840	0.19392	0.00000	0.00000	414.83521	0.00000	0.00000	0.00000	0.00000	0.00000	0.15517	0.15517	0.15517	0.15517	0.15517	0.15517	14.38483	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2042	0.25919	0.19136	0.24436	0.19877	0.00000	0.00000	425.20609	0.00000	0.00000	0.00000	0.00000	0.00000	0.15905	0.15905	0.15905	0.15905	0.15905	0.15905	14.74445	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2043	0.26567	0.19615	0.25047	0.20374	0.00000	0.00000	435.83624	0.00000	0.00000	0.00000	0.00000	0.00000	0.16302	0.16302	0.16302	0.16302	0.16302	0.16302	15.11306	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2044	0.27231	0.20105	0.25674	0.20893	0.00000	0.00000	446.73214	0.00000	0.00000	0.00000	0.00000	0.00000	0.16710	0.16710	0.16710	0.16710	0.16710	0.16710	15.49089	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2045	0.27912	0.20608	0.26315	0.21405	0.00000	0.00000	457.90045	0.00000	0.00000	0.00000	0.00000	0.00000	0.17128	0.17128	0.17128	0.17128	0.17128	0.17128	15.87816	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000			
2046</																												



The Opportunity for Energy Efficiency that is Cheaper than Supply in Rhode Island

Appendix D – Building and Time of Use (TOU) Factor Inputs.



Prepared for: Rhode Island Energy Efficiency and Resource Management Council (EERMC)

Prepared by

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August 26, 2010

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D. Appendix D: Building and TOU Inputs

This appendix presents building and TOU (time of use) data used for the EERMC Energy that is Cheaper than Supply Study. Data are shown by sector: residential, commercial, and industrial.

Residential Building Stock Table

Units: Number of Dwellings			
Segment	Single Fam	Mult Fam	Low Income
Existing	219,549	153,834	51,399
New Construction	922	646	216

(per year)

End Use Definition	
End Use	End Use Definition
1	Space Cooling
2	Lighting
3	Refrigeration
4	Freezer
5	Water Heating
6	Clothes Washer
7	Clothes Dryer
8	Dishwashers
9	Pool Pump
10	Furnace Fan
11	Space Heating
12	Cooking
13	Home Electronics
14	Miscellaneous
15	House

End Use Load Shape Table

Fraction of Annual Use in Cost Period

Building	End Use 1						End Use 2						End Use 3						End Use 4					
	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a
SF	0.5538	0.4171	0.0136	0.0155	0.00	0.00	0.1653	0.1388	0.3604	0.3355	0.00	0.00	0.1731	0.1909	0.2879	0.3481	0.00	0.00	0.18	0.19	0.28	0.35	0.00	0.00
MF	0.5538	0.4171	0.0136	0.0155	0.00	0.00	0.1653	0.1388	0.3604	0.3355	0.00	0.00	0.1731	0.1909	0.2879	0.3481	0.00	0.00	0.18	0.19	0.28	0.35	0.00	0.00
LI	0.5538	0.4171	0.0136	0.0155	0.00	0.00	0.1653	0.1388	0.3604	0.3355	0.00	0.00	0.1731	0.1909	0.2879	0.3481	0.00	0.00	0.18	0.19	0.28	0.35	0.00	0.00

Building	End Use 5						End Use 6						End Use 7						End Use 8					
	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a
SF	0.1555	0.1156	0.3869	0.3420	0.00	0.00	0.22	0.12	0.44	0.23	0.00	0.00	0.19	0.11	0.44	0.27	0.00	0.00	0.20	0.10	0.46	0.24	0.00	0.00
MF	0.1555	0.1156	0.3869	0.3420	0.00	0.00	0.22	0.12	0.44	0.23	0.00	0.00	0.19	0.11	0.44	0.27	0.00	0.00	0.20	0.10	0.46	0.24	0.00	0.00
LI	0.1555	0.1156	0.3869	0.3420	0.00	0.00	0.22	0.12	0.44	0.23	0.00	0.00	0.19	0.11	0.44	0.27	0.00	0.00	0.20	0.10	0.46	0.24	0.00	0.00

Building	End Use 9						End Use 10						End Use 11						End Use 12					
	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a
SF	0.7000	0.3000	0.0000	0.0000	0.00	0.00	0.01	0.01	0.45	0.54	0.00	0.00	0.01	0.01	0.45	0.54	0.00	0.00	0.20	0.10	0.46	0.24	0.00	0.00
MF	0.7000	0.3000	0.0000	0.0000	0.00	0.00	0.01	0.01	0.45	0.54	0.00	0.00	0.01	0.01	0.45	0.54	0.00	0.00	0.20	0.10	0.46	0.24	0.00	0.00
LI	0.7000	0.3000	0.0000	0.0000	0.00	0.00	0.01	0.01	0.45	0.54	0.00	0.00	0.01	0.01	0.45	0.54	0.00	0.00	0.20	0.10	0.46	0.24	0.00	0.00

Building	End Use 13						End Use 14						End Use 15					
	SP	SPP	SOP	WP	WPP	WOP	SP	SPP	SOP	WP	WPP	WOP	SP	SPP	SOP	WP	WPP	WOP
SF	0.18	0.15	0.34	0.32	0.00	0.00	0.13	0.16	0.34	0.37	0.00	0.00	0.23	0.19	0.30	0.27	0.00	0.00
MF	0.18	0.15	0.34	0.32	0.00	0.00	0.13	0.16	0.34	0.37	0.00	0.00	0.23	0.19	0.30	0.27	0.00	0.00
LI	0.18	0.15	0.34	0.32	0.00	0.00	0.13	0.16	0.34	0.37	0.00	0.00	0.23	0.19	0.30	0.27	0.00	0.00

Peak To Energy Relationship Table (Utility Coincidence)

Peak = Average kW* Factor

used same as refrigeration

Building Type	End Use 1						End Use 2						End Use 3						End Use 4					
	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a
SF	2.47235	3.97737	0.00000	0.00000	0.00000	0.00000	0.80867	1.99750	1.26428	1.89064	0.00000	0.00000	1.0505	1.04472	0.96349	0.93188	0.00000	0.00000	1.12155	1.02396	0.89001	0.86996	0.00000	0.00000
MF	2.47235	3.97737	0.00000	0.00000	0.00000	0.00000	0.80867	1.99750	1.26428	1.89064	0.00000	0.00000	1.0505	1.04472	0.96349	0.93188	0.00000	0.00000	1.12155	1.02396	0.89001	0.86996	0.00000	0.00000
LI	2.47235	3.97737	0.00000	0.00000	0.00000	0.00000	0.80867	1.99750	1.26428	1.89064	0.00000	0.00000	1.0505	1.04472	0.96349	0.93188	0.00000	0.00000	1.12155	1.02396	0.89001	0.86996	0.00000	0.00000

Building Type	End Use 5						End Use 6						End Use 7						End Use 8					
	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a
SF	0.7009071	0.88056	1.0756	1.45663	0.00000	0.00000	0.85070	0.73618	0.32823	0.39225	0.00000	0.00000	0.92970	1.10005	0.77756	1.36475	0.00000	0.00000	0.48973	1.30232	1.27857	0.36645	0.00000	0.00000
MF	0.7009071	0.88056	1.0756	1.45663	0.00000	0.00000	0.85070	0.73618	0.32823	0.39225	0.00000	0.00000	0.92970	1.10005	0.77756	1.36475	0.00000	0.00000	0.48973	1.30232	1.27857	0.36645	0.00000	0.00000
LI	0.7009071	0.88056	1.0756	1.45663	0.00000	0.00000	0.85070	0.73618	0.32823	0.39225	0.00000	0.00000	0.92970	1.10005	0.77756	1.36475	0.00000	0.00000	0.48973	1.30232	1.27857	0.36645	0.00000	0.00000

Building Type	End Use 9						End Use 10						End Use 11						End Use 12					
	SP	SOP	WP	WOP	n/a	n/a	SP	SOP	WP	WOP	n/a	n/a	SP	SPP	SOP	WP	WPP	WOP	SP	SPP	SOP	WP	WPP	WOP
SF	1.06949	0.11453	0.13627	0.11062	0.00000	0.00000	0.00000	0.00000	2.59102	2.07157	0.00000	0.00000	0.00000	0.00000	2.59102	2.07157	0.00000	0.00000	0.98793	0.41097	2.07731	0.59846	0.00000	0.00000
MF	1.06949	0.11453	0.13627	0.11062	0.00000	0.00000	0.00000	0.00000	2.59102	2.07157	0.00000	0.00000	0.00000	0.00000	2.59102	2.07157	0.00000	0.00000	0.98793	0.41097	2.07731	0.59846	0.00000	0.00000
LI	1.06949	0.11453	0.13627	0.11062	0.00000	0.00000	0.00000	0.00000	2.59102	2.07157	0.00000	0.00000	0.00000	0.00000	2.59102	2.07157	0.00000	0.00000	0.98793	0.41097	2.07731	0.59846	0.00000	0.00000

Building Type	End Use 13						End Use 14						End Use 15					
	SP	SPP	SOP	WP	WPP	WOP	SP	SPP	SOP	WP	WPP	WOP	SP	SPP	SOP	WP	WPP	WOP
SF	0.8937576	2.74912	1.66169	2.50556	0.00000	0.00000	0.82063	2.07267	2.34554	2.01570	0.00000	0.00000	1.5204	2.31465	1.3275	1.40385	1.00000	1.00000
MF	0.8937576	2.74912	1.66169	2.50556	0.00000	0.00000	0.82063	2.07267	2.34554	2.01570	0.00000	0.00000	1.5204	2.31465	1.3275	1.40385	1.00000	1.00000
LI	0.8937576	2.74912	1.66169	2.50556	0.00000	0.00000	0.82063	2.07267	2.34554	2.01570	0.00000	0.00000	1.5204	2.31465	1.3275	1.40385	1.00000	1.00000

Commercial Building Stock Table

Units: Square Feet											
Segment	Office	Restaurant	Retail	Grocery	Warehouse	School	College	Health	Lodging	Other	
Existing	178,991,437	8,497,953	48,346,277	6,296,924	99,895,880	29,501,289	24,945,636	21,644,543	10,411,657	13,538,087	
New	5,280,247	250,690	1,426,215	185,759	2,946,928	870,288	735,896	638,514	307,144	399,374	

End Use Definition	
End Use	End Use Definition
1	Indoor Lighting
2	Outdoor Lighting
3	Cooling
4	Ventilation
5	Refrigeration
6	Office Equipment
7	Water Heating
8	Vending
9	Cooking
10	Heating
11	Miscellaneous
12	Whole Building

End Use Load Shape Table

Fraction of Annual Use in Cost Period

Building Type	End Use 1				End Use 2				End Use 3			
	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	0.2307	0.1031	0.45688	0.2093	0.0842	0.22673	0.18775	0.50136	0.38317	0.13893	0.34302	0.13488
Restaurant	0.2040	0.13158	0.39213	0.27233	0.0999	0.21438	0.21131	0.47442	0.34648	0.19879	0.29235	0.16238
Retail	0.2055	0.12928	0.40125	0.26396	0.1030	0.21579	0.20761	0.47363	0.41399	0.18684	0.27656	0.12261
Grocery	0.1833	0.15126	0.35484	0.31058	0.0861	0.22303	0.19526	0.49563	0.36065	0.21596	0.26373	0.15966
Warehouse	0.2240	0.10858	0.45243	0.21502	0.0773	0.22741	0.18562	0.50969	0.53828	0.14281	0.26641	0.0525
School	0.2185	0.08039	0.52532	0.1758	0.0888	0.22109	0.19151	0.49855	0.52481	0.05658	0.39179	0.02682
College	0.2102	0.09646	0.47632	0.21699	0.0708	0.23091	0.1807	0.51761	0.37651	0.14898	0.33044	0.14407
Health	0.1851	0.15018	0.36005	0.3047	0.0806	0.22827	0.18649	0.50461	0.31956	0.21863	0.27528	0.18653
Lodging	0.1747	0.16063	0.3357	0.329	0.0793	0.23013	0.18033	0.51024	0.3166	0.22807	0.25679	0.19854
Other	0.2114	0.12166	0.41988	0.24704	0.1038	0.20805	0.22053	0.46759	0.41434	0.19328	0.26422	0.12816

Building Type	End Use 4				End Use 5				End Use 6			
	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	0.2195	0.13119	0.39898	0.25033	0.1633	0.1725	0.31361	0.3506	0.1938	0.14045	0.37975	0.28602
Restaurant	0.1972	0.16587	0.34364	0.29324	0.1661	0.1761	0.30913	0.34872	0.2046	0.13099	0.39449	0.26993
Retail	0.2099	0.14785	0.37264	0.2696	0.1685	0.17845	0.30673	0.34631	0.2095	0.12545	0.40976	0.25525
Grocery	0.1785	0.16738	0.33197	0.32216	0.1744	0.18358	0.30153	0.34049	0.2010	0.13366	0.39026	0.27509
Warehouse	0.2443	0.12358	0.39994	0.23221	0.1972	0.20499	0.2821	0.31572	0.2335	0.10043	0.46664	0.1994
School	0.2672	0.0461	0.5479	0.13881	0.1643	0.17301	0.31535	0.3473	0.2052	0.09593	0.48284	0.216
College	0.2209	0.1204	0.41999	0.23868	0.1642	0.17008	0.31948	0.34625	0.1972	0.10559	0.45512	0.24205
Health	0.1674	0.17338	0.31221	0.34702	0.1649	0.17353	0.31276	0.34877	0.1863	0.14806	0.36414	0.30149
Lodging	0.1676	0.17754	0.30148	0.35342	0.1641	0.17291	0.31297	0.35005	0.1809	0.15448	0.34903	0.31554
Other	0.2141	0.149	0.35829	0.27859	0.1679	0.17812	0.30695	0.34703	0.2161	0.11704	0.4298	0.23709

Building Type	End Use 10				End Use 11				End Use 12			
	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	0.1067	0.09419	0.43727	0.36188	0.2077	0.1273	0.40612	0.25886	0.2404	0.12969	0.3925	0.23741
Restaurant	0.0147	0.01982	0.4579	0.50753	0.1895	0.14623	0.3609	0.30337	0.2095	0.15809	0.34704	0.28535
Retail	0.0185	0.03733	0.44602	0.49816	0.2064	0.12937	0.40135	0.2629	0.2292	0.14843	0.36077	0.26162
Grocery	0.0077	0.01584	0.3149	0.66157	0.1863	0.14831	0.36557	0.29985	0.1886	0.17518	0.31598	0.32021
Warehouse	0.0130	0.01574	0.66218	0.30905	0.2185	0.11724	0.43027	0.234	0.2232	0.14895	0.37115	0.25671
School	0.0168	0.01207	0.58346	0.38768	0.2046	0.08048	0.51997	0.19493	0.2517	0.09176	0.45995	0.19661
College	0.1401	0.09866	0.43572	0.32548	0.1874	0.10871	0.43732	0.26655	0.2187	0.12261	0.41183	0.24683
Health	0.0983	0.14823	0.31213	0.44138	0.1860	0.14855	0.36329	0.30212	0.2015	0.17079	0.32653	0.30118
Lodging	0.0440	0.07006	0.29253	0.59338	0.1778	0.15983	0.33766	0.32471	0.1943	0.17552	0.30882	0.32134
Other	0.0387	0.04658	0.42177	0.49298	0.2072	0.12608	0.40894	0.25781	0.2163	0.1476	0.36218	0.27394

Peak To Energy Relationship Table (Utility Coincidence)

Peak = Average kW* Factor

Building	End Use 1				End Use 2				End Use 3			
Type	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	1.13860	0.87617	0.80008	0.93579	0.14231	1.58082	2.55641	1.46280	2.06896	1.08391	0.83345	1.23790
Restaurant	1.19621	0.87036	1.10908	1.13876	0.24213	1.59004	2.56969	1.52780	1.74691	1.04508	2.13423	0.74621
Retail	1.17214	0.60068	0.86524	0.79033	0.10368	1.62680	2.96770	1.56645	2.08493	0.74861	2.09296	0.57469
Grocery	1.03923	0.86829	0.99477	1.00490	0.25624	1.54682	2.29531	1.43503	1.82161	1.15501	2.18492	0.97310
Warehouse	1.13849	0.86581	0.77122	1.02920	0.05293	1.57217	2.74301	1.44311	2.37340	1.74144	1.25349	1.83711
School	1.05319	0.86319	0.43699	0.83094	0.03849	1.74048	2.97014	1.60261	1.76766	0.61813	0.06638	0.19089
College	1.26918	1.07222	1.02618	1.31854	0.00386	1.53536	3.12253	1.41084	1.76405	1.02307	1.60213	0.67285
Health	1.06588	0.80795	0.89456	0.82077	0.14070	1.52548	2.31541	1.41187	1.80147	1.16902	1.59091	1.68729
Lodging	0.92419	0.93340	1.19652	1.14444	0.10464	1.51921	2.63823	1.44875	1.83163	1.20892	1.99533	0.46970
Other	1.16427	0.67400	0.77899	0.83006	0.26853	1.64731	3.11802	1.66059	2.14751	1.03181	1.32046	0.47462

Building	End Use 4				End Use 5				End Use 6			
Type	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	1.28086	0.99733	0.82484	0.99098	1.01487	0.98787	0.94716	0.99282	1.07201	0.91813	0.70824	0.92438
Restaurant	1.14593	1.03278	1.13070	1.11964	1.04178	0.97372	1.00720	1.00143	1.20259	0.71001	1.04564	0.95732
Retail	1.20444	0.82915	1.07025	0.95469	1.04213	0.95058	1.00907	1.00092	1.19999	0.61609	0.74952	0.73983
Grocery	1.05089	0.98355	1.04287	1.03209	1.06356	0.95440	1.04276	1.03188	1.14323	0.64655	0.91809	0.82908
Warehouse	1.38537	1.40500	0.80204	1.27234	1.11509	0.99493	1.13427	1.11496	1.11683	0.76135	0.60844	0.85648
School	1.14055	0.68997	0.27724	1.75315	0.99857	0.98383	0.91665	0.98889	0.73783	1.03880	0.36432	0.94075
College	1.13587	0.98475	1.03633	1.38025	1.04141	1.00127	1.00464	1.03492	1.21583	0.95882	0.86867	1.08966
Health	1.07418	0.99594	0.98786	0.99097	1.02853	0.96424	0.96753	0.97412	1.10597	0.81760	0.71276	0.82153
Lodging	1.10883	0.99398	1.06295	1.00456	1.02694	0.96653	0.99743	0.98929	1.08160	0.82937	0.92645	0.99066
Other	1.28416	0.97268	0.95757	1.02247	1.03623	0.96225	0.99680	0.98038	1.12095	0.70339	0.62440	0.77120

Building	End Use 7				End Use 8				End Use 9			
Type	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	1.08018	0.94428	0.79878	0.89441	1.07912	0.87199	0.67316	0.88102	1.03981	0.44496	0.38219	0.45904
Restaurant	1.16490	0.58134	0.85483	0.81881	1.09891	1.02566	1.17730	1.18985	1.15325	0.67205	1.08766	0.97853
Retail	1.17227	0.59515	0.74539	0.69857	1.15786	0.67343	0.86855	0.85205	1.15417	0.32232	0.64957	0.58375
Grocery	1.10209	0.62318	0.90261	0.76264	1.10324	0.66783	0.87941	0.80231	0.94890	0.50695	0.78667	0.71354
Warehouse	1.15462	0.85297	0.61389	0.85893	1.13532	1.02922	0.89271	1.20777	1.05730	0.45119	0.50979	0.56236
School	0.64026	0.76318	0.33377	0.92651	0.74651	0.99532	0.34320	0.88398	0.66190	0.61106	0.17303	0.62352
College	1.18961	1.20004	0.92825	1.68511	1.28562	1.06550	1.00272	1.20180	1.21860	0.96960	0.99854	1.29875
Health	1.04641	0.87569	0.67186	0.82141	1.05354	0.77912	0.71501	0.78443	1.11630	0.26346	0.84250	0.30826
Lodging	0.99341	0.70313	0.94386	0.90967	1.07494	0.96353	1.15314	1.04722	1.02545	0.27253	1.10367	0.98885
Other	1.12881	0.73752	0.91229	1.00529	1.12580	0.72550	0.81159	0.88195	1.06372	0.49294	0.90635	0.84000

Building	End Use 10				End Use 11				End Use 12			
Type	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF	SON	SOFF	WON	WOFF
Office	0.73826	0.83257	0.69962	0.64774	1.07912	0.87199	0.67316	0.88102	1.36376	0.99499	0.80441	1.00125
Restaurant	0.17101	0.75369	0.09776	1.17436	1.09891	1.02566	1.17730	1.18985	1.22108	0.95014	1.24541	1.05295
Retail	0.43060	0.28768	0.05840	0.67449	1.15786	0.67343	0.86855	0.85205	1.34757	0.78576	1.10824	0.90163
Grocery	0.19025	0.37445	0.02840	0.54030	1.10324	0.66783	0.87941	0.80231	1.12713	0.94959	1.09357	1.01625
Warehouse	0.07462	0.48594	0.06334	0.11839	1.13532	1.02922	0.89271	1.20777	1.24625	1.03787	0.92511	1.11738
School	0.21165	0.28464	0.67818	1.93889	0.74651	0.99532	0.34320	0.88398	1.17150	1.06316	0.47589	1.15867
College	0.65844	0.96148	0.69629	2.20313	1.28562	1.06550	1.00272	1.20180	1.27731	1.09268	1.13086	1.32851
Health	0.66143	0.86139	0.65975	0.72323	1.05354	0.77912	0.71501	0.78443	1.23282	0.95877	1.00050	0.97869
Lodging	0.81027	0.59923	0.27225	2.16436	1.07494	0.96353	1.15314	1.04722	1.20259	1.01454	1.28904	1.09251
Other	0.80515	0.63427	0.30633	2.09587	1.12580	0.72550	0.81159	0.88195	1.26081	0.93866	0.99303	1.02289

Industrial Building Stock Table

Segment	Food	Textiles-Apparel	Lumber-Furniture	Paper	Printing	Chemicals	Petroleum	Rubber-Plastics	Stone-Clay-Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc Ind	Water/WW
All	36,372,914	85,390,877	10,996,951	23,368,713	56,114,164	126,862,818	4,343,432	187,701,950	28,241,636	59,736,680	87,592,515	95,669,791	56,612,719	40,094,887	43,041,658	20,035,317

End Use Definition (One End Use Definition for All Segments)

End Use	End Use Definition
1	Compressed Air
2	Fans
3	Pumping
4	Drives
5	Heating
6	Refrigeration
7	Other Process
8	Cooling
9	Lighting
10	Other

End Use Load Shape Table

Building Type	End Use 1				End Use 2				End Use 3				End Use 4			
	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP
Food	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347
Textiles-Apparel	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037
Lumber-Furniture	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293
Paper	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418
Printing	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338
Chemicals	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341
Petroleum	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341
Rubber-Plastics	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317
Stone-Clay-Glass	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370
Prim Metals	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275
Fab Metals	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301
Ind Mach	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259
Electronics	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338
Transp Equip	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298
Misc Ind	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371
Water/WW	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371

Building Type	End Use 5				End Use 6				End Use 7				End Use 8			
	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP
Food	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347
Textiles-Apparel	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037
Lumber-Furniture	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293
Paper	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418
Printing	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338
Chemicals	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341
Petroleum	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341
Rubber-Plastics	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317
Stone-Clay-Glass	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370
Prim Metals	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275
Fab Metals	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301
Ind Mach	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259
Electronics	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338
Transp Equip	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298
Misc Ind	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371
Water/WW	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371

Building Type	End Use 9				End Use 10			
	SP	SOP	WP	WOP	SP	SOP	WP	WOP
Food	0.163	0.159	0.331	0.347	0.163	0.159	0.331	0.347
Textiles-Apparel	0.544	0.281	0.139	0.037	0.544	0.281	0.139	0.037
Lumber-Furniture	0.202	0.150	0.355	0.293	0.202	0.150	0.355	0.293
Paper	0.112	0.128	0.342	0.418	0.112	0.128	0.342	0.418
Printing	0.179	0.179	0.304	0.338	0.179	0.179	0.304	0.338
Chemicals	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341
Petroleum	0.178	0.245	0.235	0.341	0.178	0.245	0.235	0.341
Rubber-Plastics	0.186	0.180	0.316	0.317	0.186	0.180	0.316	0.317
Stone-Clay-Glass	0.152	0.176	0.302	0.370	0.152	0.176	0.302	0.370
Prim Metals	0.200	0.126	0.400	0.275	0.200	0.126	0.400	0.275
Fab Metals	0.191	0.165	0.343	0.301	0.191	0.165	0.343	0.301
Ind Mach	0.225	0.124	0.392	0.259	0.225	0.124	0.392	0.259
Electronics	0.172	0.174	0.316	0.338	0.172	0.174	0.316	0.338
Transp Equip	0.194	0.151	0.357	0.298	0.194	0.151	0.357	0.298
Misc Ind	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371
Water/WW	0.152	0.170	0.306	0.371	0.152	0.170	0.306	0.371

Peak To Energy Relationship Table (Utility Coincidence)

Building Type	End Use 1				End Use 2				End Use 3				End Use 4			
	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP
Food	1.023	1.150	1.008	1.147	1.023	1.150	1.008	1.147	1.023	1.150	1.008	1.147	1.023	1.150	1.008	1.147
Textiles-Apparel	1.259	0.875	0.228	0.659	1.259	0.875	0.228	0.659	1.259	0.875	0.228	0.659	1.259	0.875	0.228	0.659
Lumber-Furniture	1.054	1.292	0.998	1.260	1.054	1.292	0.998	1.260	1.054	1.292	0.998	1.260	1.054	1.292	0.998	1.260
Paper	0.966	1.018	1.015	0.984	0.966	1.018	1.015	0.984	0.966	1.018	1.015	0.984	0.966	1.018	1.015	0.984
Printing	0.994	1.134	0.968	1.103	0.994	1.134	0.968	1.103	0.994	1.134	0.968	1.103	0.994	1.134	0.968	1.103
Chemicals	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924
Petroleum	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924
Rubber-Plastics	1.012	1.171	1.017	1.205	1.012	1.171	1.017	1.205	1.012	1.171	1.017	1.205	1.012	1.171	1.017	1.205
Stone-Clay-Glass	0.996	1.003	1.006	1.013	0.996	1.003	1.006	1.013	0.996	1.003	1.006	1.013	0.996	1.003	1.006	1.013
Prim Metals	0.964	1.621	0.944	1.575	0.964	1.621	0.944	1.575	0.964	1.621	0.944	1.575	0.964	1.621	0.944	1.575
Fab Metals	1.051	1.114	0.901	1.175	1.051	1.114	0.901	1.175	1.051	1.114	0.901	1.175	1.051	1.114	0.901	1.175
Ind Mach	1.336	2.148	0.712	0.346	1.336	2.148	0.712	0.346	1.336	2.148	0.712	0.346	1.336	2.148	0.712	0.346
Electronics	1.024	1.068	0.947	1.034	1.024	1.068	0.947	1.034	1.024	1.068	0.947	1.034	1.024	1.068	0.947	1.034
Transp Equip	1.030	1.257	0.937	1.269	1.030	1.257	0.937	1.269	1.030	1.257	0.937	1.269	1.030	1.257	0.937	1.269
Misc Ind	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014
Water/WW	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014

Building Type	End Use 5				End Use 6				End Use 7				End Use 8			
	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP	SP	SOP	WP	WOP
Food	1.023	1.150	1.008	1.147	1.023	1.150	1.008	1.147	1.023	1.150	1.008	1.147	1.116	1.150	1.008	1.147
Textiles-Apparel	1.259	0.875	0.228	0.659	1.259	0.875	0.228	0.659	1.259	0.875	0.228	0.659	1.373	0.875	0.228	0.659
Lumber-Furniture	1.054	1.292	0.998	1.260	1.054	1.292	0.998	1.260	1.054	1.292	0.998	1.260	1.150	1.292	0.998	1.260
Paper	0.966	1.018	1.015	0.984	0.966	1.018	1.015	0.984	0.966	1.018	1.015	0.984	1.054	1.018	1.015	0.984
Printing	0.994	1.134	0.968	1.103	0.994	1.134	0.968	1.103	0.994	1.134	0.968	1.103	1.084	1.134	0.968	1.103
Chemicals	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.943	1.015	0.789	0.924
Petroleum	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924	0.943	1.015	0.789	0.924
Rubber-Plastics	1.012	1.171	1.017	1.205	1.012	1.171	1.017	1.205	1.012	1.171	1.017	1.205	1.104	1.171	1.017	1.205
Stone-Clay-Glass	0.996	1.003	1.006	1.013	0.996	1.003	1.006	1.013	0.996	1.003	1.006	1.013	1.087	1.003	1.006	1.013
Prim Metals	0.964	1.621	0.944	1.575	0.964	1.621	0.944	1.575	0.964	1.621	0.944	1.575	1.051	1.621	0.944	1.575
Fab Metals	1.051	1.114	0.901	1.175	1.051	1.114	0.901	1.175	1.051	1.114	0.901	1.175	1.147	1.114	0.901	1.175
Ind Mach	1.336	2.148	0.712	0.346	1.336	2.148	0.712	0.346	1.336	2.148	0.712	0.346	1.457	2.148	0.712	0.346
Electronics	1.024	1.068	0.947	1.034	1.024	1.068	0.947	1.034	1.024	1.068	0.947	1.034	1.118	1.068	0.947	1.034
Transp Equip	1.030	1.257	0.937	1.269	1.030	1.257	0.937	1.269	1.030	1.257	0.937	1.269	1.123	1.257	0.937	1.269
Misc Ind	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.093	1.029	1.004	1.014
Water/WW	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014	1.093	1.029	1.004	1.014

Building Type	End Use 9				End Use 10			
	SP	SOP	WP	WOP	SP	SOP	WP	WOP
Food	1.023	1.150	1.008	1.147	1.023	1.150	1.008	1.147
Textiles-Apparel	1.259	0.875	0.228	0.659	1.259	0.875	0.228	0.659
Lumber-Furniture	1.054	1.292	0.998	1.260	1.054	1.292	0.998	1.260
Paper	0.966	1.018	1.015	0.984	0.966	1.018	1.015	0.984
Printing	0.994	1.134	0.968	1.103	0.994	1.134	0.968	1.103
Chemicals	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924
Petroleum	0.864	1.015	0.789	0.924	0.864	1.015	0.789	0.924
Rubber-Plastics	1.012	1.171	1.017	1.205	1.012	1.171	1.017	1.205
Stone-Clay-Glass	0.996	1.003	1.006	1.013	0.996	1.003	1.006	1.013
Prim Metals	0.964	1.621	0.944	1.575	0.964	1.621	0.944	1.575
Fab Metals	1.051	1.114	0.901	1.175	1.051	1.114	0.901	1.175
Ind Mach	1.336	2.148	0.712	0.346	1.336	2.148	0.712	0.346
Electronics	1.024	1.068	0.947	1.034	1.024	1.068	0.947	1.034
Transp Equip	1.030	1.257	0.937	1.269	1.030	1.257	0.937	1.269
Misc Ind	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014
Water/WW	1.002	1.029	1.004	1.014	1.002	1.029	1.004	1.014



The Opportunity for Energy Efficiency that is Cheaper than Supply in Rhode Island

Appendix E – Measure Inputs.



Prepared for: Rhode Island Energy Efficiency and Resource Management Council (EERMC)

Prepared by

KEMA, Inc.
Burlington, Massachusetts

August 26, 2010

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E. Appendix E: Electric Measure Inputs

This appendix presents measure data used for the EERMC Energy Efficiency that is Cheaper than Supply Study. Data are shown by sector: residential, commercial, and industrial.

Measure Costs - Existing**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGrid	BATCH: 1
SECTOR: RES	ANALYSIS: Basic
SEGMENT: All Electric	VINTAGE: Existing

APPENDIX E

RESIDENTIAL

MEASURE INPUT DATA

MEASURE COSTS				NPV of														Full = 1				Implementation			
Segment: Existing				Lifetime Implementation				Cost Units		Incr. = 0															
		Savings	Cost	Unit	Unit	O & M	Cost	per Savings	Service	Initial	Replace	Unit cion Factors							Type						
Measure #	Measure Description	Units	Units	Equipment	Labor	Cost	Cost	Unit	Life	Cost	Cost	SP	SOP	WP	WOP	n/a	n/a	End Use	1=1 time 2=ROB						
100	Base, 13 SEER Split-System Air Conditioner	home	unit	\$0.00	\$448.01	\$0.00	\$448.01	1	18	1	1	\$448.01	1.00	1.00	1.00	1.00	1.00	1	2						
102	15 SEER Split-System Air Conditioner	home	unit	\$512.00	\$448.01	\$0.00	\$960.01	1	18	0	0	\$960.01	1.00	1.00	1.00	1.00	1.00	1	2						
103	17 SEER Split-System Air Conditioner	home	unit	\$1,406.00	\$448.01	\$0.00	\$1,854.01	1	18	0	0	\$1,854.01	1.00	1.00	1.00	1.00	1.00	1	2						
105	Programmable Thermostat	home	unit	\$56.37	\$16.96	\$0.00	\$73.33	1	10	1	1	\$73.33	0.80	1.10	1.00	1.00	1.00	1	1						
109	Portable Fans	home	unit	\$25.00	\$0.00	\$0.00	\$25.00	1	10	1	1	\$25.00	0.50	1.00	1.00	1.00	1.00	1	1						
110	Ceiling Fans	home	unit	\$80.00	\$40.00	\$0.00	\$120.00	1	15	1	1	\$120.00	0.50	1.00	1.00	1.00	1.00	1	1						
111	Whole House Fans	home	unit	\$243.17	\$269.72	\$0.00	\$512.89	1	15	1	1	\$512.89	0.50	1.00	1.00	1.00	1.00	1	1						
112	Attic Venting	home	unit	\$41.00	\$100.00	\$0.00	\$141.00	1	10	1	1	\$141.00	0.50	1.00	1.00	1.00	1.00	1	1						
113	Proper Refrigerant Charging and Air Flow	home	ton	\$14.11	\$28.23	\$0.00	\$42.34	1	10	1	1	\$42.34	1.00	1.00	1.00	1.00	1.00	1	1						
114	Duct Repair	home	ton	\$16.67	\$91.24	\$0.00	\$107.91	1	18	1	1	\$107.91	1.00	1.00	1.00	1.00	1.00	1	1						
115	Duct Insulation	home	linear foot	\$0.68	\$2.40	\$0.00	\$3.08	1	18	1	1	\$3.08	1.00	1.00	1.00	1.00	1.00	1	1						
116	AC maintenance and repair	home	unit	\$0.00	\$125.00	\$0.00	\$125.00	1	5	1	1	\$125.00	1.00	1.00	1.00	1.00	1.00	1	1						
117	Single Pane Windows to Double Pane with Gas	home	sq ft	\$2.25	\$0.00	\$0.00	\$2.25	1	25	1	1	\$2.25	0.90	1.00	1.00	1.00	1.00	1	2						
118	Double Pane Windows to Double Pane with Gas	home	sq ft	\$2.25	\$0.00	\$0.00	\$2.25	1	25	1	1	\$2.25	0.90	1.00	1.00	1.00	1.00	1	2						
119	Attic Insulation	home	sq ft	\$1.90	\$0.00	\$0.00	\$1.90	1	40	1	1	\$1.90	0.86	2.02	1.00	1.00	1.00	1	1						
120	Ceiling R-0 to R-19 Insulation	home	sq ft	\$0.19	\$0.00	\$0.00	\$0.19	1	25	1	1	\$0.19	0.80	1.05	1.00	1.00	1.00	1	1						
121	Ceiling R-19 to R-38 Insulation	home	sq ft	\$0.11	\$0.00	\$0.00	\$0.11	1	25	1	1	\$0.11	0.75	1.00	1.00	1.00	1.00	1	1						
122	Ceiling R-0 to R-49 Insulation	home	sq ft	\$0.50	\$0.00	\$0.00	\$0.50	1	25	1	1	\$0.50	0.80	1.05	1.00	1.00	1.00	1	1						
123	Ceiling R-19 to R-49 Insulation	home	sq ft	\$0.30	\$0.00	\$0.00	\$0.30	1	25	1	1	\$0.30	0.75	1.00	1.00	1.00	1.00	1	1						
124	Wall 2x4 R-0 to Blow-In R-13 Insulation	home	sq ft	\$0.15	\$0.00	\$0.00	\$0.15	1	25	1	1	\$0.15	1.13	1.00	1.00	1.00	1.00	1	1						
125	Self Install Weatherization	home	home	\$5.74	\$0.00	\$0.00	\$5.74	1	10	1	1	\$5.74	0.07	0.04	1.00	1.00	1.00	1	1						
126	Infiltration Reduction	home	home	\$265.63	\$0.00	\$0.00	\$265.63	1	10	1	1	\$265.63	0.07	0.04	1.00	1.00	1.00	1	1						
130	Base Early Replacement 10 SEER Split-System AC	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	18	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1	1						
131	15 SEER Split-System AC Early Replacement	home	unit	\$514.00	\$0.00	\$0.00	\$514.00	1	18	0	0	\$514.00	1.00	1.00	1.00	1.00	1.00	1	1						
140	Base Room Air Conditioner - EER 9.7	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	12	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1	2						
141	HE Room Air Conditioner - Energy star EER 10.8	home	unit	\$50.00	\$0.00	\$0.00	\$50.00	1	12	1	1	\$50.00	1.00	1.00	1.00	1.00	1.00	1	2						
142	HE Room Air Conditioner - CEE Tier 1 EER 11.3	home	unit	\$53.00	\$0.00	\$0.00	\$53.00	1	12	1	1	\$53.00	1.00	1.00	1.00	1.00	1.00	1	2						
145	Ceiling Fans	home	unit	\$80.00	\$40.00	\$0.00	\$120.00	1	15	1	1	\$120.00	0.50	1.00	1.00	1.00	1.00	1	1						
146	Whole House Fans	home	unit	\$243.17	\$0.00	\$0.00	\$243.17	1	10	1	1	\$243.17	0.50	1.00	1.00	1.00	1.00	1	1						
148	Portable Fans	home	unit	\$25.00	\$0.00	\$0.00	\$25.00	1	10	1	1	\$25.00	0.50	1.00	1.00	1.00	1.00	1	1						
149	Single Pane Windows to Double Pane with Gas	home	sq ft	\$2.25	\$0.00	\$0.00	\$2.25	1	25	1	1	\$2.25	0.90	1.00	1.00	1.00	1.00	1	2						
151	Double Pane Windows to Double Pane with Gas	home	sq ft	\$2.25	\$0.00	\$0.00	\$2.25	1	25	1	1	\$2.25	0.90	1.00	1.00	1.00	1.00	1	2						
152	Ceiling R-0 to R-19 Insulation	home	sq ft	\$0.19	\$0.00	\$0.00	\$0.19	1	25	1	1	\$0.19	0.80	1.05	1.00	1.00	1.00	1	1						
153	Ceiling R-19 to R-38 Insulation	home	sq ft	\$0.11	\$0.00	\$0.00	\$0.11	1	25	1	1	\$0.11	0.75	1.00	1.00	1.00	1.00	1	1						
154	Ceiling R-0 to R-49 Insulation	home	sq ft	\$0.50	\$0.00	\$0.00	\$0.50	1	25	1	1	\$0.50	0.80	1.05	1.00	1.00	1.00	1	1						
155	Ceiling R-19 to R-49 Insulation	home	sq ft	\$0.30	\$0.00	\$0.00	\$0.30	1	25	1	1	\$0.30	0.75	1.00	1.00	1.00	1.00	1	1						
156	Wall 2x4 R-0 to Blow-In R-13 Insulation	home	sq ft	\$0.15	\$0.00	\$0.00	\$0.15	1	25	1	1	\$0.15	1.13	1.00	1.00	1.00	1.00	1	1						
157	Self Install Weatherization	home	home	\$10.00	\$0.00	\$0.00	\$10.00	1	10	1	1	\$10.00	0.07	0.04	1.00	1.00	1.00	1	1						
158	Infiltration Reduction	home	home	\$265.63	\$0.00	\$0.00	\$265.63	1	10	1	1	\$265.63	0.07	0.04	1.00	1.00	1.00	1	1						
159	Ductless Split Heat Pump	home	unit	\$238.92	\$0.00	\$0.00	\$238.92	1	18	1	1	\$238.92	1.00	1.00	1.00	1.00	1.00	1	1						
160	Base Early Replacement Room Air Conditioner- EER 9.0	home	Unit	\$0.00	\$0.00	\$0.00	\$0.00	1	12	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1	1						
161	EER 8.5 AC Early Replacement, CEE Tier 1 EER 11.3	home	Unit	\$67.71	\$0.00	\$0.00	\$67.71	1	12	0	0	\$67.71	1.00	1.00	1.00	1.00	1.00	1	1						
170	Base Dehumidifier (EF =1.20)	home	unit	\$100.00	\$0.00	\$0.00	\$100.00	1	12	1	1	\$100.00	1.00	1.00	1.00	1.00	1.00	1	2						
171	Energy Star Dehumidifier (ROB)	home	unit	\$110.00	\$0.00	\$0.00	\$110.00	1	12	0	0	\$110.00	1.00	1.00	1.00	1.00	1.00	1	2						
180	Base Furnace Fans	home	Unit	\$0.00	\$0.00	\$0.00	\$0.00	1	18	1	1	\$0.00	1.13	0.85	1.00	1.00	1.00	10	2						
181	Variable speed furnace fans (RET)	home	Unit	\$200.00	\$0.00	\$0.00	\$200.00	1	18	1	1	\$200.00	0.60	0.60	0.60	1.00	1.00	10	1						
182	Variable speed furnace fans (ROB)	home	Unit	\$15.00	\$0.00	\$0.00	\$15.00	1	18	0	0	\$15.00	0.60	0.60	0.60	1.00	1.00	10	2						
190	Base Resistance Space Heating	home	Unit	\$0.00	\$0.00	\$0.00	\$0.00	1	18	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	11	2						
191	Single Pane Windows to Double Pane with Gas	home	sq ft	\$2.25	\$0.00	\$0.00	\$2.25	1	25	1	1	\$2.25	1.00	1.00	1.00	1.00	1.00	11	2						
192	Double Pane Windows to Double Pane with Gas	home	sq ft	\$2.25	\$0.00	\$0.00	\$2.25	1	25	1	1	\$2.25	1.00	1.00	1.00	1.00	1.00	11	2						
193	Ceiling R-0 to R-38 Insulation	home	sq ft	\$0.84	\$0.00	\$0.00	\$0.84	1	25	1	1	\$0.84	1.00	1.00	1.00	1.00	1.00	11	1						
194	Ceiling R-11 to R-38 Insulation	home	sq ft	\$0.54	\$0.00	\$0.00	\$0.54	1	25	1	1	\$0.54	1.00	1.00	1.00	1.00	1.00	11	1						
195	Ceiling R-19 to R-38 Insulation	home	sq ft	\$0.63	\$0.00	\$0.00	\$0.63	1	25	1	1	\$0.63	1.00	1.00	1.00	1.00	1.00	11	1						
196	Ceiling R-0 to R-49 Insulation	home	sq ft	\$1.10	\$0.00	\$0.00	\$1.10	1	25	1	1	\$1.10	1.00	1.00	1.00	1.00	1.00	11	1						
197	Ceiling R-19 to R-49 Insulation	home	sq ft	\$0.66	\$0.00	\$0.00	\$0.66	1	25	1	1	\$0.66	1.00	1.00	1.00	1.00	1.00	11	1						
198	Ceiling R-30 to R-49 Insulation	home	sq ft	\$0.63	\$0.00	\$0.00	\$0.63	1	25	1	1	\$0.63	1.00	1.00	1.00	1.00	1.00	11	1						
199	Wall Blow-in R-0 to R-13 Insulation	home	sq ft	\$0.15	\$1.17	\$0.00	\$1.32	1	20	1	1	\$1.32	1.00	1.00	1.00	1.00	1.00	11	1						
200	Floor R-0 to R-19 Insulation	home	sq ft	\$0.38	\$0.51	\$0.00	\$0.89	1	20	1	1	\$0.89	1.00	1.00	1.00	1.00	1.00	11	1						
201	Basement Insulation	home	sq ft	\$0.29	\$0.58	\$0.00	\$0.87	1	30	1	1	\$0.87	1.00	1.00	1.00	1.00	1.00	11	1						
202	Programmable Thermostat	home	unit	\$56.37	\$16.96	\$0.00	\$73.33	1	12	1	1	\$73.33	0.80	1.10	1.00	1.00	1.00	11	1						
203	Infiltration Reduction	home	sq ft	\$265.63	\$0.00	\$0.00	\$265.63	1	10	1	1	\$265.63	1.00	1.00	1.00	1.00	1.00	11	1						
204	Self Install Weatherization	home	home	\$10.00	\$0.00	\$0.00	\$10.00	1	10	1	1	\$10.00	0.07	0.04	1.00	1.00	1.00	11	1						
205	Ductless Split Heat Pump	home	sq ft	\$5,734.08	\$0.00	\$0.00	\$5,734.08	1	18	1	1	\$5,734.08	1.												

EERMC

Energy Efficiency that is Cheaper than Supply

APPENDIX E

RESIDENTIAL

MEASURE INPUT DATA

MEASURE COSTS		Implementation																		
Segment:	Existing	Unit		NPV of		Cost Units		Full = 1		Full		Full		Full		Full		Full		Type
Measure #	Measure Description	Savings Units	Cost Units	Equipment Cost	Labor Cost	O & M Cost	Cost Factor	per Savings Unit	Service Life	Initial Cost	Replace Cost	Unit Cost	SP	SOP	WP	WOP	n/a	n/a	End Use	1=1 time 2=ROB
220	Base Lighting 15 Watt CFL, 1.8 hours per day	home	lamp	\$1.25	\$0.00		1.25	1	8000	1	1	1.25	1.00	1.00	1.00	1.00	1.00	1.00	2	1
221	LEDs w/ CFL Baseline	home	lamp	\$8.50	\$0.00		8.50	1	35000	1	1	\$8.50	1.00	1.00	1.00	1.00	1.00	1.00	2	1
300	door ice)	home	unit	\$451.00	\$0.00		\$451.00	1	12	1	1	\$451.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
301	Mount)	home	unit	\$530.00	\$0.00		\$530.00	1	12	0	0	\$530.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
302	HE Refrigerator - CEE tier 2 (Top Mount)	home	unit	\$630.00	\$0.00		\$630.00	1	12	0	0	\$630.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
310	Base Early 18 cf Top Mount Replacement Refrigerator, no through door ice	home	unit	\$0.00	\$0.00		\$0.00	1	12	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
311	Energy Star	home	unit	\$94.91	\$0.00		\$94.91	1	12	0	0	\$94.91	1.00	1.00	1.00	1.00	1.00	1.00	3	1
320	Base Refrigerator (21 cf w/ side by side freezer, no through-door ice)	home	unit	\$1,052.00	\$0.00		\$1,052.00	1	12	1	1	\$1,052.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
321	HE Refrigerator - Energy Star version of above (side by side freezer)	home	unit	\$1,131.00	\$0.00		\$1,131.00	1	12	0	0	\$1,131.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
322	HE Refrigerator - CEE Tier 2 (side by side freezer)	home	unit	\$1,231.00	\$0.00		\$1,231.00	1	12	0	0	\$1,231.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
330	Base Early Replacement 21 cf w/ side by side freezer	home	unit	\$0.00	\$0.00		\$0.00	1	12	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
331	Refrigerator - Early Replacement w/ side by side freezer to 2008 Energy Star	home	unit	\$119.79	\$0.00		\$119.79	1	12	0	0	\$119.79	1.00	1.00	1.00	1.00	1.00	1.00	3	1
340	Base Second Refrigerator	home	unit	\$0.00	\$0.00		\$0.00	1	19	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
341	Second Refrigerator Recycling	home	unit	\$25.00	\$0.00		\$25.00	1	19	0	0	\$25.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
400	Base Freezer	home	unit	\$420.00	\$0.00		\$420.00	1	12	1	1	\$420.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
401	Energy Star Freezer	home	unit	\$479.99	\$0.00		\$479.99	1	12	0	0	\$479.99	1.00	1.00	1.00	1.00	1.00	1.00	4	2
410	Base Early Replacement Freezer	home	unit	\$0.00	\$0.00		\$0.00	1	12	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	4	1
411	Early Replacement Freezer to 2008 Energy Star	home	unit	\$75.28	\$0.00		\$75.28	1	12	0	0	\$75.28	1.00	1.00	1.00	1.00	1.00	1.00	4	1
500	Base 40 gal. Water Heating (EF=0.88)	home	unit	\$251.11	\$0.00		\$251.11	1	15	1	1	\$251.11	1.00	1.00	1.00	1.00	1.00	1.00	5	2
501	Heat Pump Water Heater (EF=2.5)	home	unit	\$1,539.13	\$122.83		\$1,661.96	1	10	0	0	\$1,661.96	1.00	1.00	1.00	1.00	1.00	1.00	5	2
502	HE Water Heater (EF=0.93)	home	unit	\$323.41	\$0.00		\$323.41	1	10	0	0	\$323.41	1.00	1.00	1.00	1.00	1.00	1.00	5	2
505	Low Flow Showerhead	home	unit	\$22.95	\$15.00		\$37.95	1	5	1	1	\$37.95	1.00	1.00	1.00	1.00	1.00	1.00	5	1
506	Pipe Wrap	home	linear foot	\$0.37	\$2.44		\$2.81	1	15	1	1	\$2.81	1.00	1.00	1.00	1.00	1.00	1.00	5	1
507	Faucet Aerators	home	unit	\$7.12	\$5.58		\$12.70	1	5	1	1	\$12.70	1.00	1.00	1.00	1.00	1.00	1.00	5	1
508	Water Heater Blanket	home	unit	\$15.00	\$10.00		\$25.00	1	5	1	1	\$25.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
509	2011 Energy Star Clotheswasher (MEF 2.00)	home	unit	\$166.24	\$0.00		\$166.24	1	11	1	1	\$166.24	1.00	1.00	1.00	1.00	1.00	1.00	6	2
510	Tier 3 CW (MEF=2.20)	home	unit	\$393.16	\$0.00		\$393.16	1	11	1	1	\$393.16	1.00	1.00	1.00	1.00	1.00	1.00	6	2
511	Energy Star Dishwasher (EF=0.68)	home	unit	\$143.22	\$0.00		\$143.22	1	11	1	1	\$143.22	1.00	1.00	1.00	1.00	1.00	1.00	8	2
512	CEE Tier 2 DW (EF=0.72)	home	unit	\$222.56	\$0.00		\$222.56	1	11	1	1	\$222.56	1.00	1.00	1.00	1.00	1.00	1.00	8	2
550	Base Early Replacement Water Heating to Heat Pump Water Heater	home	unit	\$0.00	\$0.00		\$0.00	1	10	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
551	Heater	home	unit	\$1,374.36			\$1,374.36	1	10	0	0	\$1,374.36	1.00	1.00	1.00	1.00	1.00	1.00	5	1
600	Base Clotheswasher (MEF=1.26)	home	unit	\$95.39	\$0.00		\$95.39	1	11	1	1	\$95.39	1.00	1.00	1.00	1.00	1.00	1.00	6	2
601	Energy Star Clotheswasher (MEF 2.00)	home	unit	\$129.15	\$0.00		\$129.15	1	11	0	0	\$129.15	1.00	1.00	1.00	1.00	1.00	1.00	6	2
602	Tier 3 CW (MEF=2.20)	home	unit	\$175.23	\$0.00		\$175.23	1	11	0	0	\$175.23	1.00	1.00	1.00	1.00	1.00	1.00	6	2
700	Base Clothes Dryer (EF=3.01)	home	unit	\$319.02	\$0.00		\$319.02	1	12	1	1	\$319.02	1.00	1.00	1.00	1.00	1.00	1.00	7	2
710	High Efficiency CD (EF=3.01 w/moisture sensor)	home	unit	\$557.25	\$0.00		\$557.25	1	12	0	0	\$557.25	1.00	1.00	1.00	1.00	1.00	1.00	7	2
711	Heat Pump Dryer	home	unit	\$2,000.00	\$0.00		\$2,000.00	1	12	0	0	\$2,000.00	1.00	1.00	1.00	1.00	1.00	1.00	7	2
800	Base Dishwasher (EF=0.65)	home	unit	\$292.65	\$0.00		\$292.65	1	11	1	1	\$292.65	1.00	1.00	1.00	1.00	1.00	1.00	8	2
900	Base Single Speed Pool Pump (RET)	home	unit	\$273.32	\$357.12		\$630.4376	1	10	1	1	\$630.4376	1.00	1.00	1.00	1.00	1.00	1.00	9	1
901	Variable Speed Pool Pump (1.5 hp)	home	unit	\$707.73	\$357.12		\$1,064.85	1	10	1	1	\$1,064.85	1.00	1.00	1.00	1.00	1.00	1.00	9	1
905	Base Two Speed Pool Pump (1.5 hp) (ROB)	home	unit	\$313.26	\$357.12		\$670.3776	1	10	1	1	\$670.3776	1.00	1.00	1.00	1.00	1.00	1.00	9	2
906	Variable Speed Pool Pump (1.5 hp)	home	unit	\$707.73	\$357.12		\$1,064.85	1	10	0	0	\$1,064.85	1.00	1.00	1.00	1.00	1.00	1.00	9	2
910	Base Plasma Screen TV	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	6	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
911	Energy Star Plasma Screen TV	home	unit	\$1.00	\$0.00	\$0.00	\$1.00	1	6	1	1	\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
920	Base LCD Screen TV	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	6	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
921	Energy Star LCD TV	home	unit	\$1.00	\$0.00	\$0.00	\$1.00	1	6	1	1	\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
930	Base Other TV	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	6	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
931	Energy Star LCD TV	home	unit	\$1.00	\$0.00	\$0.00	\$1.00	1	6	1	1	\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
940	Base Laptop Computer	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	4	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
941	Energy Star Laptop Computer	home	unit	\$1.00	\$0.00	\$0.00	\$1.00	1	4	1	1	\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
945	Base Desktop Computer	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	4	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
946	Energy Star Desktop Computer	home	unit	\$1.00	\$0.00	\$0.00	\$1.00	1	4	1	1	\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	13	2
950	Base Cooking	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	15	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	12	2
960	Base Miscellaneous	home	unit	\$0.00	\$0.00	\$0.00	\$0.00	1	10	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	14	2
962	Plug Load Controls - Smart Power Strip	home	unit	\$25.00	\$0.00	\$0.00	\$25.00	1	5	1	1	\$25.00	1.00	1.00	1.00	1.00	1.00	1.00	14	1
970	Base House Practices	home	home	\$0.00	\$0.00	\$0.00	\$0.00	1	5	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	15	1
971	Conservation Practices	home	home	\$10.00	\$0.00	\$0.00	\$10.00	1	5	1	1	\$10.00	1.00	1.00	1.00	1.00	1.00	1.00	15	1

Measure Costs - New**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGRID BATCH: 1
 SECTOR: RES ANALYSIS: Basic
 SEGMENT: All VINTAGE: NEW

MEASURE COSTS				NPV of																Implement:	
Segment	New	Savings	Cost	Unit	Unit	Lifetime Implementation		Cost Units		Life	Cost	Cost	Full	Relative Energy Reduction Factors						End Use	Type
Measure #	Measure Description	Units	Units	Building Type 3	Labor Cost	O & M Cost	Factor	per Savings	Unit					SP	SPP	SOP	WP	WPP	WOP		
100	Base Code Home - 2011 Energy Star	home	home	\$0.00	\$0.00	\$0.00	\$0.00	1	20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	15	2
101	2011 ENERGY STAR Home	home	home	\$1,427.46	\$0.00	\$0.00	\$1,427.46	1	20	1	1	\$1,427.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	15	2
200	Dummy Measure	home	home	\$0.00	\$0.00	\$0.00	\$0.00	1	20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	15	2
201	Dummy Upgrade	home	home	\$1,427.46	\$0.00	\$0.00	\$1,427.46	1	20	1	1	\$1,427.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	15	2

Base Technology EUC - Existing**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGrid	BATCH: 1
SECTOR: RES	ANALYSIS: Basic
SEGMENT: All Electric	VINTAGE: Existing

BASE TECHNOLOGY EUCs -- Existing (kWh/square foot)					
Segment	Measure #	Measure Description	Single Fam Building Type 1	Multifam Building Type 2	Low Income Building Type 3
Existing	100	Base, 10 SEER Split-System Air Conditioner	1800	1200	1000
Existing	130	Base Early Replacement 10 SEER Split-System AC	1800	1200	1000
Existing	140	Base EER 9.7 Room Air Conditioner	699	699	525
Existing	160	Base Early Replacement Room Air Conditioner- EER 9.0 to CEE Tier 1 EER 11.3	776	776	583
Existing	170	Base Dehumidifier (35-45 pints/day; EF = 1.20)	950	950	900
Existing	180	Base Furnace Fans (Retrofit)	898	898	898
Existing	190	Base Resistance Space Heating (Electric)	7252	1843	3617
Existing	210	Base Lighting 60 Watt Incandescent, 1.8 hours per day	1439	1116	999
Existing	220	Base Lighting 15 Watt CFL, 1.8 hours per day	123	115	102
Existing	300	Base Refrigerator (top-mount)	759	711	719
Existing	310	Base Early Replacement Top Mount Refrigerator	759	711	719
Existing	320	Base Refrigerator (side by side)	1,018	930	943
Existing	330	Base Early Replacement Refrigerator w/ side by side freezer	1,018	930	943
Existing	340	Base Second Refrigerator	793	793	793
Existing	400	Base Freezer	700	821	720
Existing	410	Base Early Replacement Freezer	700	821	720
Existing	500	Base 40 gal. Water Heating (EF=0.90)	3,642	3010	3669
Existing	550	Base Early Replacement Water Heating to Heat Pump Water Heater	3,642	3010	3669
Existing	600	Base Clotheswasher (MEF=1.26)	80.7	81	81
Existing	700	Base Clothes Dryer (EF=.46)	969	583	776
Existing	800	Base Dishwasher (EF=0.58)	162	162	162
Existing	900	Base Single Speed Pool Pump to Variable RET	822	822	822
Existing	905	Base Two Spped Pool Pump to Variable ROB	357	357	357
Existing	910	Base Plasma Screen TV	931	1118	946
Existing	920	Base LCD TV	450	500	460
Existing	930	Base Other TV	127	111	118
Existing	940	Base Laptop Computer	105	102	93
Existing	945	Base Desktop Computer	399	347	375
Existing	950	Base Cooking	316	316	316
Existing	960	Base Miscellaneous	1087	732	763
Existing	970	Base House Practices	8565	5765	6004

Base Technology EUC - New**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGRID BATCH: 1
 SECTOR: RES ANALYSIS: Basic
 SEGMENT: All VINTAGE: NEW

BASE TECHNOLOGY EUC - New (kWh/square foot)						
Segment	Measure #	Measure Description	Single Family	Multi Family	Low Income	
			Building Type 1	Building Type 2	Building Type 3	
New	100	Base Code Home -2011 Energy Star	8,565	5,765	6,004	
New	200	Dummy Measure	8,565	5,765	6,004	

Applicability Factor - Existing**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGrid	BATCH: 1
SECTOR: RES	ANALYSIS: Basic
SEGMENT: All Electric	VINTAGE: Existing

APPLICABILITY FACTOR (percent)					
Segment	Existing		Single Fam	Multifam	Low Income
Measure #	Measure Description		Building Type 1	Building Type 2	Building Type 3
100	Base, 13 SEER Split-System Air Conditioner		26.7%	10.9%	9.4%
102	15 SEER Split-System Air Conditioner		26.7%	10.9%	9.4%
103	17 SEER Split-System Air Conditioner		26.7%	10.9%	9.4%
105	Programmable Thermostat		26.7%	10.9%	9.4%
109	Portable Fans		26.7%	10.9%	9.4%
110	Ceiling Fans		26.7%	10.9%	9.4%
111	Whole House Fans		26.7%	10.9%	9.4%
112	Attic Venting		26.7%	10.9%	9.4%
113	Proper Refrigerant Charging and Air Flow		26.7%	10.9%	9.4%
114	Duct Repair		26.7%	10.9%	9.4%
115	Duct Insulation		26.7%	10.9%	9.4%
116	AC maintenance and repair		26.7%	10.9%	9.4%
117	Single Pane Windows to Double Pane with Gas		26.7%	10.9%	9.4%
118	Double Pane Windows to Double Pane with Gas		26.7%	10.9%	9.4%
119	Attic Insulation		26.7%	10.9%	9.4%
120	Ceiling R-0 to R-19 Insulation		26.7%	10.9%	9.4%
121	Ceiling R-19 to R-38 Insulation		26.7%	10.9%	9.4%
122	Ceiling R-0 to R-49 Insulation		26.7%	10.9%	9.4%
123	Ceiling R-19 to R-49 Insulation		26.7%	10.9%	9.4%
124	Wall 2x4 R-0 to Blow-In R-13 Insulation		26.7%	10.9%	9.4%
125	Self Install Weatherization		26.7%	10.9%	9.4%
126	Infiltration Reduction		26.7%	10.9%	9.4%
130	Base Early Replacement 10 SEER Split-System AC		4.8%	1.9%	1.7%
131	15 SEER Split-System AC Early Replacement		4.8%	1.9%	1.7%
140	Base Room Air Conditioner - EER 9.7		45.6%	61.8%	60.2%
141	HE Room Air Conditioner - Energy star EER 10.8		45.6%	61.8%	60.2%
142	HE Room Air Conditioner - CEE Tier 1 EER 11.3		45.6%	61.8%	60.2%
145	Ceiling Fans		45.6%	61.8%	60.2%
146	Whole House Fans		45.6%	61.8%	60.2%
148	Portable Fans		45.6%	61.8%	60.2%
149	Single Pane Windows to Double Pane with Gas		45.6%	61.8%	60.2%
151	Double Pane Windows to Double Pane with Gas		45.6%	61.8%	60.2%
152	Ceiling R-0 to R-19 Insulation		45.6%	61.8%	60.2%
153	Ceiling R-19 to R-38 Insulation		45.6%	61.8%	60.2%
154	Ceiling R-0 to R-49 Insulation		45.6%	61.8%	60.2%
155	Ceiling R-19 to R-49 Insulation		45.6%	61.8%	60.2%
156	Wall 2x4 R-0 to Blow-In R-13 Insulation		45.6%	61.8%	60.2%
157	Self Install Weatherization		45.6%	61.8%	60.2%
158	Infiltration Reduction		45.6%	61.8%	60.2%
159	Ductless Split Heat Pump		1.4%	6.4%	5.6%
160	Base Early Replacement Room Air Conditioner- EER 9.0		8.0%	10.8%	10.6%
161	EER 8.5 AC Early Replacement, CEE Tier 1 EER 11.3		8.0%	10.8%	10.6%
170	Base Dehumidifier (EF =1.20)		47.8%	16.7%	25.0%
171	Energy Star Dehumidifier (ROB)		47.8%	16.7%	25.0%
180	Base Furnace Fans		38.3%	23.7%	24.2%
181	Variable speed furnace fans (RET)		38.3%	23.7%	24.2%

APPLICABILITY FACTOR (percent)				
Segment	Exisiting	Single Fam	Multifam	Low Income
Measure #	Measure Description	Building Type 1	Building Type 2	Building Type 3
182	Variable speed furnace fans (ROB)	38.3%	23.7%	24.2%
190	Base Resistance Space Heating	4.1%	12.8%	8.3%
191	Single Pane Windows to Double Pane with Gas	4.1%	12.8%	8.3%
192	Double Pane Windows to Double Pane with Gas	4.1%	12.8%	8.3%
193	Ceiling R-0 to R-38 Insulation	4.1%	12.8%	8.3%
194	Ceiling R-11 to R-38 Insulation	4.1%	12.8%	8.3%
195	Ceiling R-19 to R-38 Insulation	4.1%	12.8%	8.3%
196	Ceiling R-0 to R-49 Insulation	4.1%	12.8%	8.3%
197	Ceiling R-19 to R-49 Insulation	4.1%	12.8%	8.3%
198	Ceiling R-30 to R-49 Insulation	4.1%	12.8%	8.3%
199	Wall Blow-in R-0 to R-13 Insulation	4.1%	12.8%	8.3%
200	Floor R-0 to R-19 Insulation	4.1%	12.8%	8.3%
201	Basement Insulation	4.1%	12.8%	8.3%
202	Programmable Thermostat	4.1%	12.8%	8.3%
203	Infiltration Reduction	4.1%	12.8%	8.3%
204	Self Install Weatherization	4.1%	12.8%	8.3%
205	Ductless Split Heat Pump	1.4%	6.4%	5.6%
210	Base Lighting 60-Watt incandescent, 1.8 hr/hday	100.0%	100.0%	100.0%
211	CFL (15-Watt integral ballast), 1.8 hr/day	100.0%	100.0%	100.0%
212	LEDs w/ Incandescent Baseline	100.0%	100.0%	100.0%
220	Base Lighting 15 Watt CFL, 1.8 hours per day	100.0%	100.0%	100.0%
221	LEDs w/ CFL Baseline	100.0%	100.0%	100.0%
300	Base Refrigerator (18 cf w/top-mount freezer, no through-door ice)	53.2%	62.0%	61.1%
301	HE Refrigerator - Energy Star version of above (Top Mount)	53.2%	62.0%	61.1%
302	HE Refrigerator - CEE tier 2 (Top Mount)	53.2%	62.0%	61.1%
310	Base Early 18 cf Top Mount Replacement Refrigerator, no through door ice	9.4%	11.0%	10.8%
311	Refrigerator - Early Replacement Top Mount to 2008 Energy Star	9.4%	11.0%	10.8%
320	Base Refrigerator (21 cf w/ side by side freezer, no through-door ice)	31.8%	23.0%	23.9%
321	HE Refrigerator - Energy Star version of above (side by side freezer)	31.8%	23.0%	23.9%
322	HE Refrigerator - CEE Tier 2 (side by side freezer)	31.8%	23.0%	23.9%
330	Base Early Replacement 21 cf w/ side by side freezer	5.6%	4.0%	4.2%
331	Refrigerator - Early Replacement w/ side by side freezer to 2008 Energy Star	5.6%	4.0%	4.2%
340	Base Second Refrigerator	27.0%	11.5%	16.7%
341	Second Refrigerator Recycling	27.0%	11.5%	16.7%
400	Base Freezer	21.8%	9.8%	16.5%
401	Energy Star Freezer	21.8%	9.8%	16.5%
410	Base Early Replacement Freezer	3.9%	1.7%	2.9%
411	Early Replacement Freezer to 2008 Energy Star	3.9%	1.7%	2.9%
500	Base 40 gal. Water Heating (EF=0.88)	13.5%	11.3%	13.1%
501	Heat Pump Water Heater (EF=2.5)	13.5%	11.3%	13.1%

APPLICABILITY FACTOR					
(percent)					
Segment	Existing	Single Fam	Multifam	Low Income	
Measure #	Measure Description	Building Type 1	Building Type 2	Building Type 3	
502	HE Water Heater (EF=0.93)	13.5%	11.3%	13.1%	
505	Low Flow Showerhead	13.5%	11.3%	13.1%	
506	Pipe Wrap	13.5%	11.3%	13.1%	
507	Faucet Aerators	13.5%	11.3%	13.1%	
508	Water Heater Blanket	13.5%	11.3%	13.1%	
509	2011 Energy Star Clotheswasher (MEF 2.00)	12.72%	4.90%	7.46%	
510	Tier 3 CW (MEF=2.20)	12.72%	4.90%	7.46%	
511	Energy Star Dishwasher (EF=0.68)	9.6%	4.0%	4.2%	
512	CEE Tier 2 DW (EF=0.72)	9.6%	4.0%	4.2%	
550	Base Early Replacement Water Heating to Heat Pump Water Heater	0.7%	0.6%	0.7%	
551	Early Replacement Water Heating to Heat Pump Water Heater	0.7%	0.6%	0.7%	
600	Base Clotheswasher (MEF=1.26)	94.1%	43.6%	56.9%	
601	Energy Star Clotheswasher (MEF 2.00)	94.1%	43.6%	56.9%	
602	Tier 3 CW (MEF=2.20)	94.1%	43.6%	56.9%	
700	Base Clothes Dryer (EF=3.01)	67.6%	26.9%	38.9%	
710	High Efficiency CD (EF=3.01 w/moisture sensor)	67.6%	26.9%	38.9%	
711	Heat Pump Dryer	67.6%	26.9%	38.9%	
800	Base Dishwasher (EF=0.65)	70.7%	35.9%	31.9%	
900	Base Single Speed Pool Pump (RET)	4.5%	0.0%	4.1%	
901	Variable Speed Pool Pump (1.5 hp)	4.5%	0.0%	4.1%	
905	Base Two Speed Pool Pump (1.5 hp) (ROB)	0.1%	0.0%	0.1%	
906	Variable Speed Pool Pump (1.5 hp)	0.1%	0.0%	0.1%	
910	Base Plasma Screen TV	21.6%	12.8%	15.3%	
911	Energy Star Plasma Screen TV	21.6%	12.8%	15.3%	
920	Base LCD Screen TV	36.9%	33.3%	25.0%	
921	Energy Star LCD TV	36.9%	33.3%	25.0%	
930	Base Other TV	77.0%	71.8%	70.8%	
931	Energy Star other TV	77.0%	71.8%	70.8%	
940	Base Laptop Computer	39.6%	35.9%	20.8%	
941	Energy Star Laptop Computer	39.6%	35.9%	20.8%	
945	Base Desktop Computer	67.1%	57.7%	44.4%	
946	Energy Star Desktop Computer	67.1%	57.7%	44.4%	
950	Base Cooking	63.5%	56.4%	56.9%	
960	Base Miscellaneous	100.0%	100.0%	100.0%	
962	Plug Load Controls - Smart Power Strip	100.0%	100.0%	100.0%	
970	Base House Practices	100.0%	100.0%	100.0%	
971	Conservation Practices	100.00%	100.00%	100.00%	

Applicability Factor - New**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGRID BATCH: 1
 SECTOR: RES ANALYSIS: Basic
 SEGMENT: All VINTAGE: NEW

APPLICABILITY FACTOR					
(percent)					
Segment	Measure #	Measure Description	SF	MF	Low Income
			Building Type 1	Building Type 2	Building Type 3
New	100	Base Code Home - 2011 Energy Star	100.00%	100.00%	100.00%
New	101	2011 ENERGY STAR Home	100.00%	100.00%	100.00%
New	200	Dummy Measure	0.00%	0.00%	0.00%
New	201	Dummy Upgrade	0.00%	0.00%	0.00%

Estimated Savings – Existing**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGrid	BATCH: 1
SECTOR: RES	ANALYSIS: Basic
SEGMENT: All Electric	VINTAGE: Existing

ENERGY SAVINGS				
(percent)				
Existing				
Measure #	Measure Description	Single Fam Building Type	Multifam Building Type	Low Income Building Type 3
100	Base, 13 SEER Split-System Air Conditioner	0.00%	0.00%	0.00%
102	15 SEER Split-System Air Conditioner	13.33%	13.33%	13.33%
103	17 SEER Split-System Air Conditioner	23.53%	23.53%	23.53%
105	Programmable Thermostat	2.00%	2.00%	2.00%
109	Portable Fans	5.00%	5.00%	5.00%
110	Ceiling Fans	5.00%	5.00%	5.00%
111	Whole House Fans	20.00%	20.00%	20.00%
112	Attic Venting	11.00%	9.10%	7.20%
113	Proper Refrigerant Charging and Air Flow	12.60%	10.90%	9.20%
114	Duct Repair	8.76%	13.14%	15.77%
115	Duct Insulation	4.00%	4.00%	4.00%
116	AC maintenance and repair	4.00%	4.00%	4.00%
117	Single Pane Windows to Double Pane with Gas	16.00%	16.00%	16.00%
118	Double Pane Windows to Double Pane with Gas	6.00%	6.00%	6.00%
119	Attic Insulation	9.00%	9.00%	9.00%
120	Ceiling R-0 to R-19 Insulation	17.9%	17.9%	17.9%
121	Ceiling R-19 to R-38 Insulation	2.8%	2.8%	2.8%
122	Ceiling R-0 to R-49 Insulation	20.2%	20.2%	20.2%
123	Ceiling R-19 to R-49 Insulation	2.8%	2.8%	2.8%
124	Wall 2x4 R-0 to Blow-In R-13 Insulation	7.90%	7.90%	7.90%
125	Self Install Weatherization	2.00%	2.00%	2.00%
126	Infiltration Reduction	20.00%	20.00%	20.00%
130	Base Early Replacement 10 SEER Split-System AC	0.00%	0.00%	0.00%
131	15 SEER Split-System AC Early Replacement	20.2%	20.2%	20.2%
140	Base Room Air Conditioner - EER 9.7	0.00%	0.00%	0.00%
141	HE Room Air Conditioner - Energy star EER 10.8	10.19%	10.19%	10.19%
142	HE Room Air Conditioner - CEE Tier 1 EER 11.3	14.16%	14.16%	14.16%
145	Ceiling Fans	5.00%	5.00%	5.00%
146	Whole House Fans	20.00%	20.00%	20.00%
148	Portable Fans	5.00%	5.00%	5.00%
149	Single Pane Windows to Double Pane with Gas	16.00%	16.00%	16.00%
151	Double Pane Windows to Double Pane with Gas	6.00%	6.00%	6.00%
152	Ceiling R-0 to R-19 Insulation	17.9%	17.9%	17.9%
153	Ceiling R-19 to R-38 Insulation	2.8%	2.8%	2.8%
154	Ceiling R-0 to R-49 Insulation	20.21%	20.2%	20.2%
155	Ceiling R-19 to R-49 Insulation	2.78%	2.8%	2.8%
156	Wall 2x4 R-0 to Blow-In R-13 Insulation	33.1%	33.1%	33.1%
157	Self Install Weatherization	2.00%	2.00%	2.00%
158	Infiltration Reduction	6.40%	6.40%	6.40%
159	Ductless Split Heat Pump	31.67%	31.67%	33.22%
160	Base Early Replacement Room Air Conditioner- EER 9.0	0.00%	0.00%	0.00%
161	EER 8.5 AC Early Replacement, CEE Tier 1 EER 11.3	18.2%	18.2%	18.2%
170	Base Dehumidifier (EF =1.20)	0.00%	0.00%	
171	Energy Star Dehumidifier (EF=1.50)	20.0%	20.0%	20.0%
180	Base Furnace Fan - Furnace & CAC	0.00%	0.00%	0.00%
181	Variable speed furnace fans (RET)	50.00%	50.00%	50.00%

ENERGY SAVINGS (percent)				
Existing		Single Fam	Multifam	Low Income
Measure #	Measure Description	Building Type	Building Type	Building Type 3
182	Variable speed furnace fans (ROB)	50.00%	50.00%	50.00%
190	Base Resistance Space Heating	0.00%	0.00%	0.00%
191	Single Pane Windows to Double Pane with Gas	32.0%	32.0%	32.0%
192	Double Pane Windows to Double Pane with Gas	6.0%	6.0%	6.0%
193	Ceiling R-0 to R-38 Insulation	16.72%	16.72%	16.72%
194	Ceiling R-11 to R-38 Insulation	4.98%	4.98%	4.98%
195	Ceiling R-19 to R-38 Insulation	2.19%	2.19%	2.19%
196	Ceiling R-0 to R-49 Insulation	17.15%	17.15%	17.15%
197	Ceiling R-19 to R-49 Insulation	2.69%	2.69%	2.69%
198	Ceiling R-30 to R-49 Insulation	1.21%	1.21%	1.21%
199	Wall Blow-in R-0 to R-13 Insulation	33.40%	33.40%	33.40%
200	Floor R-0 to R-19 Insulation	10.00%	10.00%	10.00%
201	Basement Insulation	18.20%	18.20%	18.20%
202	Programmable Thermostat	5.00%	5.00%	5.00%
203	Infiltration Reduction	6.40%	8.10%	9.80%
204	Self Install Weatherization	2.00%	2.00%	2.00%
205	Ductless Split Heat Pump	59.99%	59.99%	59.99%
210	Base Lighting 60-Watt incandescent, 1.8 hr/day	0.00%	0.00%	0.00%
211	CFL (15-Watt integral ballast), 1.8 hr/day	75.0%	75.0%	75.0%
212	LEDs w/ Incandescent Baseline	90.00%	90.00%	90.00%
220	Base Lighting 15 Watt CFL, 1.8 hours per day	0.00%	0.00%	0.00%
221	LEDs w/ CFL Baseline	60.00%	60.00%	60.00%
300	Base Refrigerator (18 cf w/top-mount freezer, no through-door ice)	0.00%	0.00%	0.00%
301	HE Refrigerator - Energy Star version of above (Top Mount)	20.00%	20.00%	20.00%
302	HE Refrigerator - CEE tier 2 (Top Mount)	25.00%	25.00%	25.00%
310	Base Early 18 cf Top Mount Replacement Refrigerator, no through door ice	0.00%	0.00%	0.00%
311	Refrigerator - Early Replacement Top Mount to 2008 Energy Star	27.63%	27.63%	27.63%
320	Base Refrigerator (21 cf w/ side by side freezer, no through-door ice)	0.00%	0.00%	0.00%
321	HE Refrigerator - Energy Star version of above (side by side freezer)	20.00%	20.00%	20.00%
322	HE Refrigerator - CEE Tier 2 (side by side freezer)	25.00%	25.00%	25.00%
330	Base Early Replacement 21 cf w/ side by side freezer	0.00%	0.00%	0.00%
331	Refrigerator - Early Replacement w/ side by side freezer to 2008 Energy Star	27.63%	27.63%	27.63%
340	Base Second Refrigerator	0.0%	0.0%	0.0%
341	Second Refrigerator Recycling	100.0%	100.0%	100.0%
400	Base Freezer	0.00%	0.00%	0.00%
401	Energy Star Freezer	15.00%	15.00%	15.00%
410	Base Early Replacement Freezer	0.00%	0.00%	0.00%
411	Early Replacement Freezer to 2008 Energy Star	15.20%	15.20%	15.20%
500	Base 40 gal. Water Heating (EF=0.88)	0.00%	0.00%	0.00%
501	Heat Pump Water Heater (EF=2.5)	64.8%	64.8%	64.8%
502	HE Water Heater (EF=0.93)	5.40%	5.40%	5.40%
505	Low Flow Showerhead	7.50%	7.50%	7.50%
506	Pipe Wrap	4.00%	4.00%	4.00%
507	Faucet Aerators	3.00%	3.00%	3.00%
508	Water Heater Blanket	10.00%	10.00%	10.00%
509	2011 Energy Star Clotheswasher (MEF 2.00)	3.87%	4.68%	3.84%

ENERGY SAVINGS				
(percent)				
Existing				
Measure #	Measure Description	Single Fam Building Type	Multifam Building Type	Low Income Building Type 3
510	Tier 3 CW (MEF=2.20)	4.05%	4.90%	4.02%
511	Energy Star Dishwasher (EF=0.68)	2.14%	2.14%	2.14%
512	CEE Tier 2 DW (EF=0.72)	2.38%	2.38%	2.38%
550	Base Early Replacement Water Heating to Heat Pump Water Heater	0.00%	0.00%	0.00%
551	Early Replacement Water Heating to Heat Pump Water Heater	63.58%	63.58%	63.58%
600	Base Clotheswasher (MEF=1.26)	0.00%	0.00%	0.00%
601	Energy Star Clotheswasher (MEF 2.00)	29.49%	29.49%	29.49%
602	Tier 3 CW (MEF=2.20)	31.76%	31.76%	31.76%
700	Base Clothes Dryer (EF=3.01)	0.00%	0.00%	0.00%
710	High Efficiency CD (EF=3.01 w/moisture sensor)	15.00%	15.00%	15.00%
711	Heat Pump Dryer	60.00%	60.00%	60.00%
800	Base Dishwasher (EF=0.65)	0.00%	0.00%	0.00%
900	Base Single Speed Pool Pump (RET)	0.00%	0.00%	0.00%
901	Variable Speed Pool Pump (1.5 hp)	90.00%	90.00%	90.00%
905	Base Two Speed Pool Pump (1.5 hp) (ROB)	0.00%	0.00%	0.00%
906	Variable Speed Pool Pump (1.5 hp)	33.00%	33.00%	33.00%
910	Base Plasma Screen TV	0.00%	0.00%	0.00%
911	Energy Star Plasma Screen TV	30.00%	30.00%	30.00%
920	Base LCD Screen TV	0.00%	0.00%	0.00%
921	Energy Star LCD TV	30.00%	30.00%	30.00%
930	Base Other TV	0.00%	0.00%	0.00%
931	Energy Star other TV	40.00%	40.00%	40.00%
940	Base Laptop Computer	0.00%	0.00%	0.00%
941	Energy Star Laptop Computer	13.40%	13.40%	13.40%
945	Base Desktop Computer	0.00%	0.00%	0.00%
946	Energy Star Desktop Computer	17.90%	17.90%	17.90%
950	Base Cooking	0.00%	0.00%	0.00%
960	Base Miscellaneous	0.00%	0.00%	0.00%
962	Plug Load Controls - Smart Power Strip	2.00%	2.00%	2.00%
970	Base House Practices	0.00%	0.00%	0.00%
971	Conservation Practices	2.20%	2.20%	2.20%

Energy Savings - New**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGRID BATCH: 1
 SECTOR: RES ANALYSIS: Basic
 SEGMENT: All VINTAGE: NEW

ENERGY SAVINGS**(percent)**

Segment	New	SF	MF	Low Income
Measure #	Measure Description	Building Type 1	Building Type 2	Building Type 3
100	Base Code Home - 2011 Energy Star	0.0%	0.0%	0.0%
101	2011 ENERGY STAR Home	19.2%	19.2%	19.2%
200	Dummy Measure	0.0%	0.0%	0.00%
201	Dummy Upgrade	0.0%	0.0%	0.00%

Measure Costs - Existing**DSM TECHNOLOGY INPUT TABLES**

UTILITY:	Ngrid	BATCH:	1
SECTOR:	COM	ANALYSIS:	Basic
SEGMENT:	All Electric	VINTAGE:	Existing

MEASURE COSTS				NPV of					Full = 1															Implementa	
Vintage:	Existing	Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units	Service	Initial	Replace	Full	Relative Energy Reduction Factors										Type		
Measure #	Measure Description	Units	Units	Equipment	Labor	O & M	Cost	per Savings	Life	Cost	Cost	Cost	Unit	SON	SOFF	WON	WOFF	N/A	N/A	End Use	1=1 time	2=ROB			
100	Base Fluorescent Fixture, 4L4T12, 34W, 2EEMAG	sqft	fixture	\$27.00	\$23.32	\$0.00	\$50.32	1	9	1	1	\$50.32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
101	RET 4L4' Premium T8, 1EB, base 4L4T12	sqft	fixture	\$35.00	\$23.32	\$0.00	\$58.32	1	14	1	0	\$58.32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
102	RET 2L4' Premium T8, 1EB, Reflector, base 4L4T12	sqft	fixture	\$46.74	\$22.09	\$0.00	\$68.83	1	14	1	0	\$68.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
103	LED Indoor Lighting - Base 4L4T12	sqft	fixture	\$180.00	\$23.32	(\$11.44)	\$191.88	1	100,000	1	0	\$191.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
104	Occupancy Sensor, 4L4' Fluorescent Fixtures - Base 4L	sqft	sq ft	\$0.14		\$0.00	\$0.14	1	9	1	1	\$0.14	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1	1				
105	Continuous Dimming, 5L4' Fluorescent Fixtures - Base 4	sqft	sq ft	\$0.75		\$0.00	\$0.75	1	10	1	1	\$0.75	1.00	0.50	0.00	1.00	1.00	1.00	1.00	1	1				
106	Lighting Control Tuneup	sqft	sqft		\$0.01		\$0.01	1	6	1	1	\$0.01	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
107	High Performance Lighting Remod/Renov - 25% Savings:	sqft	sqft	\$0.20			\$0.20	1	20	1	1	\$0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
120	Base Fluorescent Fixture, 2L4T12, 34W, 1EEMAG	sqft	fixture	\$16.19	\$23.32	\$0.00	\$39.51	1	9	1	1	\$39.51	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
121	RET 2L4' Premium T8, 1EB -- base 2L4T12	sqft	fixture	\$25.74	\$23.32	\$0.00	\$49.06	1	14	1	0	\$49.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
122	RET 1L4' Premium T8, 1EB, Reflector OEM - Base 2L4'	sqft	fixture	\$44.09	\$22.09	\$0.00	\$66.18	1	14	1	0	\$66.18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
123	LED Indoor Lighting - Base 2L4T12	sqft	fixture	\$90.00	\$23.32	(\$11.44)	\$101.88	1	100,000	1	0	\$101.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
124	Occupancy Sensor, 8L4' Fluorescent Fixtures - Base 2L	sqft	sq ft	\$0.14		\$0.00	\$0.14	1	8	1	1	\$0.14	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1	1				
125	Continuous Dimming, 10L4' Fluorescent Fixtures - Base	sqft	sq ft	\$0.75		\$0.00	\$0.75	1	10	1	1	\$0.75	1.00	0.50	0.00	1.00	1.00	1.00	1.00	1	1				
126	Lighting Control Tuneup - Base 2L4T12	sqft	sqft		\$0.01		\$0.01	1	6	1	1	\$0.01	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
127	High Performance Lighting Remod/Renov - 25% Savings:	sqft	sqft	\$0.20			\$0.20	1	20	1	1	\$0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
130	Base Fluorescent Fixture, 2L8T12, 60W, 1EEMAG	sqft	fixture	\$36.00	\$17.00	\$0.00	\$53.00	1	9	1	1	\$53.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8T12	sqft	fixture	\$51.48	\$46.64	\$0.00	\$98.12	1	14	1	0	\$98.12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM - Base 2	sqft	fixture	\$88.18	\$44.18	\$0.00	\$132.36	1	14	1	0	\$132.36	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
133	LED Indoor Lighting - Base 2L8T12	sqft	fixture	\$180.00	\$46.64	(\$8.34)	\$218.30	1	100,000	1	0	\$218.30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
134	Occupancy Sensor, 4L8' Fluorescent Fixtures - Base 2L	sqft	sq ft	\$0.14		\$0.00	\$0.14	1	9	1	1	\$0.14	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1	1				
135	Continuous Dimming, 5L8' Fluorescent Fixtures - Base 2	sqft	sq ft	\$0.75		\$0.00	\$0.75	1	10	1	1	\$0.75	1.00	0.50	0.00	1.00	1.00	1.00	1.00	1	1				
136	High Performance Lighting Remod/Renov - 25% Savings:	sqft	sqft	\$0.20			\$0.20	1	20	1	1	\$0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
140	Base Incandescent Flood, 75W to Screw-in Replaceme	sqft	fixture	\$0.68	\$4.91	\$0.00	\$5.59	1	1.25	1	1	\$5.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
141	CFL Screw-in 18W	sqft	fixture	\$7.97	\$4.91	\$0.00	\$12.88	1	5	0	0	\$12.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
142	Cold Cathode Lamps	sqft	fixture	\$22.00	\$4.91	\$0.00	\$26.91	1	25,000	0	0	\$26.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
143	Screw-in LED--Base Incandescent	sqft	fixture	\$75.00	\$4.91	\$0.00	\$79.91	1	100,000	0	0	\$79.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
145	Base CFL to screw-in replacement	sqft	fixture	\$7.97	\$4.91	\$0.00	\$12.88	1	5	1	1	\$12.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
146	Screw-in LED--Base CFL	sqft	fixture	\$75.00	\$4.91	\$0.00	\$79.91	1	100,000	0	0	\$79.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
150	Base Incandescent Flood, 75W to Hardwired CFL	sqft	fixture	\$0.61	\$3.77	\$0.00	\$4.38	1	1.40	1	1	\$4.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
151	CFL Hardwired, Modular 18W	sqft	fixture	\$19.00	\$27.00	\$0.00	\$46.00	1	14	1	1	\$46.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
152	Ceramic Metal Halide	sqft	fixture	\$90.00	\$27.00	\$0.00	\$117.00	1	10,000	1	1	\$117.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				

APPENDIX E

COMMERCIAL

MEASURE INPUT DATA

MEASURE COSTS				NPV of										Full = 1										Implementa	
Measure #	Measure Description	Savings Units	Cost Units	Unit Equipment Cost	Unit Labor Cost	Lifetime O & M Cost	Implementation Cost	Cost Factor	Units per Savings	Service Life	Initial Cost	Replace Cost	Full Unit Cost	Relative Energy Reduction Factors								N/A	N/A	End Use	Type 1=1 time 2=ROB
153	Hardwired LED fixture-Base Incandescent	sqft	fixture	\$94.61	\$30.77	(\$32.62)	\$92.76	1	100,000	0	0	0	\$92.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
155	Base CFL to Hardwired replacement	sqft	fixture	\$19.61	\$30.77	\$0.00	\$50.38	1	14	1	1	1	\$50.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
156	Hardwired LED fixture-Base CFL	sqft	fixture	\$94.61	\$30.77	(\$5.89)	\$119.49	1	100,000	0	0	0	\$119.49	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
160	Base High Bay Probe-start Metal Halide, 400W	sqft	fixture	\$200.00	\$60.00		\$260.00	1	14	1	1	1	\$260.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
161	High Bay T5 - Base Std MH	sqft	fixture	\$290.00	\$60.00		\$350.00	1	14	0	0	0	\$350.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
162	PSMH + electronic ballast	sqft	fixture	\$413.60	\$60.00		\$473.60	1	45,000	0	0	0	\$473.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
163	Induction High Bay Lighting - Base Std MH	sqft	fixture	\$480.00	\$60.00		\$540.00	1	100,000	0	0	0	\$540.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
164	Occupancy Sensor, High Bay T5 - Base Std MH	sqft	sq ft	\$0.14		\$0.00	\$0.14	1	40,000	1	1	1	\$0.14	0.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
165	High Performance Lighting Remod/Renov - 25% Saving:	sqft	sqft	\$0.20			\$0.20	1	20	1	1	1	\$0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
180	Base 4L4T8, 1EB	sqft	fixture	\$0.00	\$0.00	\$0.00	\$0.00	1	14	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
181	ROB 4L4' Premium T8, 1EB - Base 4L4T8	sqft	fixture	\$7.00	\$0.00	\$0.00	\$7.00	1	14	1	1	1	\$7.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
182	Occupancy Sensor, 4L4' Fluorescent Fixtures - Base 4L	sqft	sq ft	\$0.14		\$0.00	\$0.14	1	9	1	1	1	\$0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
183	Lighting Control Tuneup - Base 4L4T8	sqft	sqft		\$0.01		\$0.01	1	6	1	1	1	\$0.01	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
184	LED Indoor Lighting - Base 4L4T8	sqft	fixture	\$180.00	\$23.32	(\$11.44)	\$191.88	1	100,000	1	0	0	\$191.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
185	High Performance Lighting Remod/Renov - 25% Saving:	sqft	sqft	\$0.20			\$0.20	1	20	1	1	1	\$0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
190	Base 2L4T8, 1EB	sqft	fixture	\$0.00	\$0.00	\$0.00	\$0.00	1	14	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
191	ROB 2L4' Premium T8, 1EB - Base 2L4T8	sqft	fixture	\$5.00	\$0.00	\$0.00	\$5.00	1	14	1	1	1	\$5.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
192	Occupancy Sensor, 8L4' Fluorescent Fixtures - Base 2L	sqft	sq ft	\$0.14		\$0.00	\$0.14	1	9	1	1	1	\$0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
193	Lighting Control Tuneup - Base 2L4T8	sqft	sqft		\$0.01		\$0.01	1	6	1	1	1	\$0.01	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
194	LED Indoor Lighting - Base 2L4T8	sqft	fixture	\$90.00	\$23.32	(\$11.44)	\$101.88	1	100,000	1	0	0	\$101.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
196	High Performance Lighting Remod/Renov - 25% Saving:	sqft	sqft	\$0.20			\$0.20	1	20	1	1	1	\$0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2
200	Base Exit Sign	sqft	fixture	\$0.00			\$0.00	1	13	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
201	LED Exit Sign	sqft	fixture	\$50.00			\$50.00	1	13	1	1	1	\$50.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1
210	Base Outdoor Mercury Vapor 400W Lamp	sqft	fixture			\$0.00	\$0.00	1	14	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	2
211	High Pressure Sodium 250W Lamp	sqft	fixture	\$89.00	\$60.00	\$0.00	\$149.00	1	14	1	1	1	\$149.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	2
212	LED Outdoor Area Lighting	sqft	fixture	400.00	\$57.00	(\$198.58)	\$258.42	1	100,000	1	1	1	\$258.42	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1
213	LED Outdoor Bi-level Fixtures	sqft	fixture	\$1,300.00	\$57.00	(\$198.58)	\$1,158.42	1	100,000	1	1	1	\$1,158.42	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1
214	Outdoor Lighting Controls (Photocell/Timeclock)	sqft	fixture	\$51.00	\$57.00	\$0.00	\$108.00	1	14	1	1	1	\$108.00	0.00	1.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1
220	Base Street Lighting	sqft	fixture	\$118.00	\$150.00		\$268.00	1	18,000	1	1	1	\$268.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1
221	Induction Streetlighting	sqft	fixture	\$400.00	\$150.00	\$10.03	\$560.03	1	100,000	1	0	0	\$560.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1
222	LED Streetlighting	sqft	fixture	\$400.00	\$150.00	(\$198.58)	\$351.42	1	90,000	1	0	0	\$351.42	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1
300	Base Centrifugal Chiller, 0.58 kW/ton, 500 tons	sqft	ton	\$220.00		\$0.00	\$220.00	1	20	1	1	1	\$220.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2

MEASURE COSTS				NPV of					Full = 1											Implementa	
Vintage:	Existing	Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units	Service	Incr. = 0	Replace	Full	Unit	Relative Energy Reduction Factors						Type	
Measure #	Measure Description	Units	Units	Equipment	Labor	O & M	Cost	per Savings	Life	Cost	Cost	Cost	Cost	SON	SOFF	WON	WOFF	N/A	N/A	End Use	1=1 time 2=ROB
301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	sqft	ton	\$255.00		\$0.00	\$255.00	1	20	0	0	\$255.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
302	Window Film (Standard)	sqft	sf-window	\$2.06	\$0.64	\$0.13	\$2.84	1	10	1	1	\$2.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
303	EMS - Chiller	sqft	ton	\$60.00		\$0.00	\$60.00	1	15	1	1	\$60.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
304	Cool Roof - Chiller	sqft	sf-roof	\$0.35		\$0.13	\$0.48	1	10	1	1	\$0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
305	Chiller Tune Up/Diagnostics	sqft	sqft	\$0.10		\$0.10	\$0.10	1	10	1	1	\$0.10	0.50	1.00	1.00	1.00	1.00	1.00	1.00	3	1
306	VSD for Chiller Pumps and Towers	sqft	ton	\$32.00	\$10.00	\$0.00	\$42.00	1	15	1	1	\$42.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
307	EMS Optimization	sqft	sqft	\$0.00		\$0.03	\$0.03	1	5	1	1	\$0.03	0.25	1.00	1.00	1.00	1.00	1.00	1.00	3	1
308	Economizer - Chiller	sqft	ton	\$126.76	\$43.34	\$0.00	\$170.10	1	15	1	1	\$170.10	0.25	1.00	1.00	1.00	1.00	1.00	1.00	3	1
309	Duct/Pipe Insulation - Chiller	sqft	sqft-insulation	\$3.08			\$3.08	1	10	1	1	\$3.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
311	High Efficiency Chiller Motors	sqft	ton	\$19.49			\$19.49	1	20	1	1	\$19.49	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
350	Base DX Packaged System, EER=10.3, 10 tons	sqft	ton	\$460.83	\$308.85	\$0.00	\$769.68	1	15	1	1	\$769.68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
351	DX Tune Up/ Advanced Diagnostics	sqft	sqft			\$0.13	\$0.13	1	10	1	1	\$0.13	0.50	1.00	1.00	1.00	1.00	1.00	1.00	3	1
352	DX Packaged System, EER=10.9, 10 tons	sqft	ton	\$487.48	\$308.85	\$0.00	\$796.33	1	15	0	0	\$796.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
353	DX Packaged System, EER=11.5, 10 tons	sqft	ton	\$567.50	\$308.85	\$0.00	\$876.35	1	15	0	0	\$876.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
354	DX Packaged System, EER=13.4, 10 tons	sqft	ton	\$1,500.00	\$308.85	\$0.00	\$1,808.85	1	15	0	0	\$1,808.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
356	Ductless (Mini Split) Cooling System	sqft					\$0.00	1	15			\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	2
357	Window Film (Standard)	sqft	sf-window	\$2.06	\$0.64	\$0.13	\$2.84	1	10	1	1	\$2.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
358	Prog. Thermostat - DX	sqft	ton	\$5.50	\$15.00	\$0.00	\$20.50	1	8	1	1	\$20.50	0.25	1.00	1.00	1.00	1.00	1.00	1.00	3	1
359	Cool Roof - DX	sqft	sf-roof	\$0.35		\$0.13	\$0.48	1	10	1	1	\$0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
360	Optimize Controls	sqft	sqft			\$0.04	\$0.04	1	5	1	1	\$0.04	0.25	1.00	1.00	1.00	1.00	1.00	1.00	3	1
361	Economizer	sqft	ton	\$126.76	\$43.34	\$0.00	\$170.10	1	15	1	1	\$170.10	0.25	1.00	1.00	1.00	1.00	1.00	1.00	3	1
362	Aerosol Duct Sealing - DX	sqft	ton	\$16.67	\$91.24	(\$90.05)	\$17.86	1	15	1	1	\$17.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
363	Ceiling/roof Insulation - DX	sqft	sf-ceiling	\$0.38	\$0.24	(\$0.23)	\$0.38	1	20	1	1	\$0.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
364	Duct/Pipe Insulation - DX	sqft	sqft	\$0.68	\$2.40	(\$0.48)	\$2.60	1	10	1	1	\$2.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
365	DX Coil Cleaning	sqft	ton	\$8.77			\$8.77	1	5	1	1	\$8.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1
400	Base Fan Motor, 5hp, 1800rpm, 87.5%	sqft	HP	\$52.00		\$0.00	\$52.00	1	20	1	1	\$52.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
401	Fan Motor, 5hp, 1800rpm, 89.5%	sqft	HP	\$72.00		\$0.00	\$72.00	1	20	0	0	\$72.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
402	Variable Speed Drive Control, 5 HP	sqft	HP	\$214.00	\$171.00	\$0.00	\$385.00	1	15	1	1	\$385.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	4	1
403	Demand Controlled Ventilation	sqft	sqft	\$0.48		(\$0.36)	\$0.125	1	15	1	1	\$0.125	0.50	1.00	1.00	1.00	1.00	1.00	1.00	4	1
410	Base Fan Motor, 15hp, 1800rpm, 91.0%	sqft	HP	\$43.00		\$0.00	\$43.00	1	20	1	1	\$43.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
411	Fan Motor, 15hp, 1800rpm, 92.4%	sqft	HP	\$54.00		\$0.00	\$54.00	1	20	0	0	\$54.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
412	Variable Speed Drive Control, 15 HP	sqft	HP	\$129.00	\$102.00	\$0.00	\$231.00	1	20	1	1	\$231.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	4	1

APPENDIX E

COMMERCIAL

MEASURE INPUT DATA

MEASURE COSTS					NPV of			Full = 1												Implementa		
Vintage:	Existing	Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost	Cost Units	Service	Initial	Replace	Full	Unit	Relative Energy Reduction Factors							Type
Measure #	Measure Description	Units	Units	Equipment	Labor	Cost	Factor	per Savings	Unit	Life	Cost	Cost	Cost	Cost	SON	SOFF	WON	WOFF	N/A	N/A	End Use	1=1 time
413	Air Handler Optimization, 15 HP	sqft	sqft	\$0.00		\$0.03	\$0.03	1	8	1	1		\$0.03	0.25	1.00	1.00	1.00	1.00	1.00	1.00	4	1
414	Energy Recovery Ventilation	sqft	ton	\$130.95			\$130.95	1	20	1	1		\$130.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	1
415	Electronically Commutated Motors (ECM) on an air hand	sqft	ton	\$27.76			\$27.76	1	15	1	1		\$27.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
416	Separate Makeup Air/Exhaust Hoods AC	sqft	HP	\$3.00			\$3.00	1	15	1	1		\$3.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	1
417	Demand Controlled Ventilation	sqft	sqft	\$0.48		(\$0.36)	\$0.12	1	15	1	1		\$0.12	0.50	1.00	1.00	1.00	1.00	1.00	1.00	4	1
420	Base Fan Motor, 40hp, 1800rpm, 93.0%	sqft	HP	\$37.00		\$0.00	\$37.00	1	20	1	1		\$37.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
421	Fan Motor, 40hp, 1800rpm, 94.1%	sqft	HP	\$47.00		\$0.00	\$47.00	1	20	0	0		\$47.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2
422	Variable Speed Drive Control, 40 HP	sqft	HP	\$120.00	\$37.00	\$0.00	\$157.00	1	20	1	1		\$157.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	4	1
423	Air Handler Optimization, 40 HP	sqft	sqft	\$0.00		\$0.03	\$0.03	1	8	1	1		\$0.03	0.25	1.00	1.00	1.00	1.00	1.00	1.00	4	1
424	Demand Controlled Ventilation	sqft	sqft	\$0.48		(\$0.36)	\$0.12	1	15	1	1		\$0.12	0.50	1.00	1.00	1.00	1.00	1.00	1.00	4	1
500	Base Non-Commercial Refrigerator	sqft	refrigerator	\$1,052.00	\$0.00		\$1,052.00	1	13	1	1		\$1,052.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
501	Energy Star Refrigerator	sqft	refrigerator	\$1,131.00	\$0.00		\$1,131.00	1	13	0	0		\$1,131.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
502	HE Refrigerator - CEE Tier 2 (side by side freezer)	sqft	refrigerator	\$1,231.00	\$0.00		\$1,231.00	1	13	0	0		\$1,231.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
520	Base Refrigeration System	sqft	40,000 sqft store	\$0.00	\$0.00	\$0.00	\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
521	High-efficiency fan motors	sqft	40,000 sqft store	\$46,429.20	\$0.00	\$0.00	\$46,429.20	1	20	1	1		\$46,429.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
522	Strip curtains for walk-ins	sqft	40,000 sqft store	\$1,995.00	\$0.00	\$0.00	\$1,995.00	1	4	1	1		\$1,995.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
523	Night covers for display cases	sqft	linear ft. display	\$9.25	\$0.00	\$0.00	\$9.25	1	4.8	1	1		\$9.25	0.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
524	Evaporator fan controller for MT walk-ins	sqft	controller	\$300.00	\$0.00	\$0.00	\$300.00	1	10	1	1		\$300.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
525	Efficient compressor motor	sqft	40,000 sqft store	\$3,510.00	\$0.00	\$0.00	\$3,510.00	1	10	1	1		\$3,510.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
526	Compressor VSD retrofit	sqft	40,000 sqft store	\$16,200.00	\$0.00	\$0.00	\$16,200.00	1	13	1	1		\$16,200.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	5	1
527	Floating head pressure controls	sqft	40,000 sqft store	\$4,995.00	\$0.00	\$0.00	\$4,995.00	1	14	1	1		\$4,995.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
528	Refrigeration Commissioning	sqft	Ton of Load	\$113.00	\$0.00	\$0.00	\$113.00	1	3	1	1		\$113.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
529	Demand Hot Gas Defrost	sqft	HP	\$25.00	\$0.00	\$0.00	\$25.00	1	10	1	1		\$25.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
530	Demand Defrost Electric	sqft	HP	\$25.00	\$0.00	\$0.00	\$25.00	1	10	1	1		\$25.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
531	Anti-sweat (humidistat) controls	sqft	40,000 sqft store	\$6,450.40	\$0.00	\$0.00	\$6,450.40	1	12	1	1		\$6,450.40	0.50	1.00	1.00	1.00	1.00	1.00	1.00	5	1
532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)	sqft	ice maker	\$1.00	\$0.00	\$0.00	\$1.00	1	10	1	1		\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
533	Freezer-Cooler Replacement Gaskets	sqft	lin ft doors	\$5.00	\$0.00	\$0.00	\$5.00	1	4	1	1		\$5.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
534	High R-Value Glass Doors	sqft	lin ft glass doors	\$100.28	\$0.00	\$0.00	\$100.28	1	10	1	1		\$100.28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
535	Multiplex Compressor System	sqft	tons	\$1,750.00	\$0.00	\$0.00	\$1,750.00	1	14	1	1		\$1,750.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
536	Oversized Air-Cooled Condenser	sqft	tons	\$350.00	\$0.00	\$0.00	\$350.00	1	16	1	1		\$350.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
537	LED Display Lighting	sqft	lin ft glass doors	\$100.00	\$0.00	\$0.00	\$100.00	1	10	1	1		\$100.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
538	Fiber Optic Display Lighting	sqft	lin ft glass doors	\$114.08	\$0.00	\$0.00	\$114.08	1	10	1	1		\$114.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1
539	Beverage Merchandisers	sqft	merchandiser	\$166.00	\$0.00	\$0.00	\$166.00	1	10	1	1		\$166.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
540	Reach-In Refrigerators	sqft	merchandiser	\$60.00	\$0.00	\$0.00	\$60.00	1	10	1	1		\$60.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
541	Reach-In Freezers	sqft	merchandiser	\$250.00	\$0.00	\$0.00	\$250.00	1	10	1	1		\$250.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
542	Walk-Ins	sqft	walk-in		\$0.00	\$0.00	\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2
610	Base Desktop PC	sqft	PC	\$0.00	\$0.00	\$0.00	\$0.00	1	4	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6	2
611	Energy Star or Better PC	sqft	PC	\$1.00	\$0.00	\$0.00	\$1.00	1	4	1	1		\$1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	6	2

MEASURE COSTS																					Implementa	
Vintage: Existing		Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units		Full = 1			Full	Relative Energy Reduction Factors					Type			
Measure #	Measure Description	Units	Units	Equipment	Labor	O & M	Cost	per Savings	Service	Incr. = 0	Initial	Replace	Unit	SON	SOFF	WON	WOFF	N/A	N/A	End Use	1=1 time	
				Cost	Cost	Cost	Factor	Unit	Life	Cost	Cost		Cost								2=ROB	
612	PC Manual Power Management Enabling	sqft	PC	\$0.00	7.50	\$0.00	\$7.50	1	4	1	1		\$7.50	0.66	1.00	1.00	1.00	1.00	1.00	6	1	
613	PC Network Power Management Enabling	sqft	PC	\$0.00	7.50	\$0.00	\$7.50	1	4	1	1		\$7.50	0.66	1.00	1.00	1.00	1.00	1.00	6	1	
620	Base Monitor, CRT	sqft	PC	\$0.00	\$0.00	\$0.00	\$0.00	1	4	1	1			1.00	1.00	1.00	1.00	1.00	1.00	6	2	
621	Energy Star or Better Monitor - CRT	sqft	PC	\$1.00	\$0.00	\$0.00	\$1.00	1	4	1	1		\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	6	2	
622	Monitor Power Management Enabling - CRT	sqft	PC	\$0.00	7.50	\$0.00	\$7.50	1	4	1	1		\$7.50	0.66	1.00	1.00	1.00	1.00	1.00	6	1	
630	Base Monitor, LCD	sqft	Monitor	\$0.00	\$0.00	\$0.00	\$0.00	1	4	1	1			1.00	1.00	1.00	1.00	1.00	1.00	6	2	
631	Energy Star or Better Monitor - LCD	sqft	Monitor	\$1.00	\$0.00	\$0.00	\$1.00	1	4	1	1		\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	6	2	
632	Monitor Power Management Enabling - LCD	sqft	Monitor	\$0.00	7.50	\$0.00	\$7.50	1	4	1	1		\$7.50	0.66	1.00	1.00	1.00	1.00	1.00	6	1	
640	Base Copier	sqft	Copier	\$0.00	\$0.00	\$0.00	\$0.00	1	6	1	1			1.00	1.00	1.00	1.00	1.00	1.00	6	2	
641	Energy Star or Better Copier	sqft	Copier	\$1.00	\$0.00	\$0.00	\$1.00	1	6	1	1		\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	6	2	
642	Copier Power Management Enabling	sqft	Copier	\$0.00	\$45.00	\$0.00	\$45.00	1	6	1	1		\$45.00	0.66	1.00	1.00	1.00	1.00	1.00	6	1	
650	Base Laser Printer	sqft	Printer	\$0.00	\$0.00	\$0.00	\$0.00	1	5	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	6	2	
651	Printer Power Management Enabling	sqft	Printer	\$0.00	\$45.00	\$0.00	\$45.00	1	5	1	1		\$45.00	0.66	1.00	1.00	1.00	1.00	1.00	6	1	
660	Base Data Center/Server Room	sqft	data center	sqft			\$0.00	1	10	1	1			1.00	1.00	1.00	1.00	1.00	1.00	6	2	
661	Data Center Improved Operations	sqft	data center	sqft	\$0.10		\$0.10	1	10	1	1		\$0.10	1.00	1.00	1.00	1.00	1.00	1.00	6	1	
662	Data Center Best Practices	sqft	data center	sqft	\$0.50		\$0.50	1	10	1	1		\$0.50	1.00	1.00	1.00	1.00	1.00	1.00	6	1	
663	Data Center State of the Art practices	sqft	data center	sqft	\$1.00		\$1.00	1	10	1	1		\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	6	1	
700	Base Water Heating	sqft	kBtu/hr	\$0.00	\$0.00	\$0.00	\$0.00	1	15	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	7	2	
701	Demand controlled circulating systems	sqft	unit	\$59.00	\$165.00	\$0.00	\$224.00	1	15	1	1		\$224.00	1.00	1.00	1.00	1.00	1.00	1.00	7	1	
702	High Efficiency Water Heater (electric)	sqft	kBtu/hr	\$1.31	\$0.00	\$0.00	\$1.31	1	15	1	1		\$1.31	1.00	1.00	1.00	1.00	1.00	1.00	7	2	
703	Heat Pump Water Heater (air source)	sqft	kBtu/hr	\$30.22	\$0.00	\$0.00	\$30.22	1	15	1	1		\$30.22	1.00	1.00	1.00	1.00	1.00	1.00	7	2	
704	Hot Water Pipe Insulation	sqft	Lin Ft Pipe	\$0.37	\$2.44	\$0.00	\$2.81	1	15	1	1		\$2.81	1.00	1.00	1.00	1.00	1.00	1.00	7	1	
705	Faucet Aerators	sqft						1										1.00	1.00	7	1	
706	Heat Recovery Unit	sqft	sqft	\$0.08	\$0.00	\$0.00	\$0.08	1	10	1	1		\$0.08	1.00	1.00	1.00	1.00	1.00	1.00	7	1	
707	Heat Trap	sqft	kBtu/hr	\$0.36	\$2.00	\$0.00	\$2.36	1	10	1	1		\$2.36	1.00	1.00	1.00	1.00	1.00	1.00	7	1	
708	Tankless Water Heater	sqft	kBtu/hr	\$6.73	\$4.54	\$0.00	\$11.27	1	20	1	1		\$11.27	1.00	1.00	1.00	1.00	1.00	1.00	7	1	
709	Solar Water Heater	sqft	kBtu/hr	\$94.50	\$0.00	\$0.00	\$94.50	1	20	0	0		\$94.50	1.00	1.00	1.00	1.00	1.00	1.00	7	2	
710	Pre-rinse spray valves	sqft						1										1.00	1.00	7	2	
800	Base Vending Machines	sqft	machine	\$0.00	\$0.00	\$0.00	\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	8	2	
801	Vending Misers (cooled machines only)	sqft	machine	\$179.00	\$35.50	\$0.00	\$214.50	1	10	1	1		\$214.50	0.66	1.00	1.00	1.00	1.00	1.00	8	2	
900	Base Cooking	sqft		\$0.00	\$0.00	\$0.00	\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	9	2	
901	Convection Oven	sqft	single oven	\$750.00	\$0.00	\$0.00	\$750.00	1	10	1	1		\$750.00	1.00	1.00	1.00	1.00	1.00	1.00	9	2	
902	Efficient Fryer	sqft	unit	\$1,344.00	\$0.00	\$0.00	\$1,344.00	1	10	1	1		\$1,344.00	1.00	1.00	1.00	1.00	1.00	1.00	9	2	
903	Efficient Steamer	sqft	unit	\$2,490.00	\$0.00	\$0.00	\$2,490.00	1	10	1	1		\$2,490.00	1.00	1.00	1.00	1.00	1.00	1.00	9	2	
904	Energy Star Hot Food Holding Cabinets	sqft	cu ft	\$1,713.00	\$0.00	\$0.00	\$1,713.00	1	10	1	1		\$1,713.00	1.00	1.00	1.00	1.00	1.00	1.00	9	2	
MEASURE COSTS																					Implementa	
Vintage: Existing		Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units		Full = 1			Full	Relative Energy Reduction Factors					Type			
Measure #	Measure Description	Units	Units	Equipment	Labor	O & M	Cost	per Savings	Service	Incr. = 0	Initial	Replace	Unit	SON	SOFF	WON	WOFF	N/A	N/A	End Use	1=1 time	
				Cost	Cost	Cost	Factor	Unit	Life	Cost	Cost		Cost								2=ROB	
940	Base Heating	sqft					\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	10	1	
941	XHeat	sqft					\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	10	1	
970	Base Miscellaneous	sqft					\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	11	1	
971	XMisc	sqft					\$0.00	1	10	1	1		\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	11	1	

Measure Costs - New**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGrid BATCH: 1
 SECTOR: COM ANALYSIS: Basic
 SEGMENT: All Electric VINTAGE: New

MEASURE COSTS			NPV of										Full = 1										Implementation	
			Unit		Unit		Lifetime	Implementation		Cost Units		Incr. = 0		Full		Relative Energy Reduction Factors						Type		
Segment	Measure #	Measure Description	Savings	Cost	Equipment	Labor	O & M	Cost	per Savings	Service	Initial	Replace	Unit	Relative Energy Reduction Factors						1=1 time				
			Units	Units	Cost	Cost	Cost	Factor	Unit	Life	Cost	Cost	Cost	SP	SPP	SOP	WP	WPP	WOP	End Use	2=ROB			
New	100	Base Bldg Design - 30%	sqft	sqft	\$0.00		\$0.00	\$0.00	1	20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	12	2			
New	101	High Performance Building/Int Design - Tier 1 30%	sqft	sqft	\$0.50		\$0.00	\$0.50	1	20	1	1	\$0.50	1.00	1.00	1.00	1.00	1.00	1.00	12	2			
New	200	Base Bldg Design - 50%	sqft	sqft	\$0.00		\$0.00	\$0.00	1	20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	12	2			
New	201	High Performance Building/Int Design - Tier 2 50%	sqft	sqft	\$1.00		\$0.00	\$1.00	1	20	1	1	\$1.00	1.00	1.00	1.00	1.00	1.00	1.00	12	2			
New	300	Base Bldg Design - 70%	sqft	sqft	\$0.00		\$0.00	\$0.00	1	20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	12	2			
New	301	Near Zero Energy (60-75%)	sqft	sqft	\$3.00		\$0.00	\$3.00	1	20	1	1	\$3.00	1.00	1.00	1.00	1.00	1.00	1.00	12	2			

Technology Saturation - Existing**DSM TECHNOLOGY INPUT TABLES**

UTILITY:	Ngrid	BATCH:	1
SECTOR:	COM	ANALYSIS:	Basic
SEGMENT:	All Electric	VINTAGE:	Existing

TECHNOLOGY SATURATION (units/square foot)											
Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
100	Base Fluorescent Fixture, 4L4'T12, 34W, 2f	0.0133	0.0072	0.0112	0.0132	0.0688	0.0151	0.0085	0.0103	0.0075	0.0105
101	RET 4L4' Premium T8, 1EB, base 4L4'T12	0.0133	0.0072	0.0112	0.0132	0.0688	0.0151	0.0085	0.0103	0.0075	0.0105
102	RET 2L4' Premium T8, 1EB, Reflector, base	0.0133	0.0072	0.0112	0.0132	0.0688	0.0151	0.0085	0.0103	0.0075	0.0105
103	LED Indoor Lighting - Base 4L4'T12	0.0133	0.0072	0.0112	0.0132	0.0688	0.0151	0.0085	0.0103	0.0075	0.0105
104	Occupancy Sensor, 4L4' Fluorescent Fixture	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
105	Continuous Dimming, 5L4' Fluorescent Fixture	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
106	Lighting Control Tuneup	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
107	High Performance Lighting Remod/Renov -	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
120	Base Fluorescent Fixture, 2L4'T12, 34W, 1f	0.0267	0.0143	0.0223	0.0265	0.1376	0.0301	0.0170	0.0205	0.0149	0.0209
121	RET 2L4' Premium T8, 1EB -- base 2L4'T12	0.0267	0.0143	0.0223	0.0265	0.1376	0.0301	0.0170	0.0205	0.0149	0.0209
122	RET 1L4' Premium T8, 1EB, Reflector OEM	0.0267	0.0143	0.0223	0.0265	0.1376	0.0301	0.0170	0.0205	0.0149	0.0209
123	LED Indoor Lighting - Base 2L4'T12	0.0267	0.0143	0.0223	0.0265	0.1376	0.0301	0.0170	0.0205	0.0149	0.0209
124	Occupancy Sensor, 8L4' Fluorescent Fixture	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
125	Continuous Dimming, 10L4' Fluorescent Fixture	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
126	Lighting Control Tuneup - Base 2L4'T12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
127	High Performance Lighting Remod/Renov -	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
130	Base Fluorescent Fixture, 2L8'T12, 60W, 1f	0.0156	0.0084	0.0131	0.0155	0.0806	0.0176	0.0100	0.0120	0.0087	0.0123
131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8"	0.0156	0.0084	0.0131	0.0155	0.0806	0.0176	0.0100	0.0120	0.0087	0.0123
132	RET 2 - 1L4' Premium T8, 1EB, Reflector O	0.0156	0.0084	0.0131	0.0155	0.0806	0.0176	0.0100	0.0120	0.0087	0.0123
133	LED Indoor Lighting - Base 2L8'T12	0.0156	0.0084	0.0131	0.0155	0.0806	0.0176	0.0100	0.0120	0.0087	0.0123
134	Occupancy Sensor, 4L8' Fluorescent Fixture	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
135	Continuous Dimming, 5L8' Fluorescent Fixture	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
136	High Performance Lighting Remod/Renov -	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
140	Base Incandescent Flood, 75W to Screw-in	0.0095	0.0082	0.0196	0.0378	0.0085	0.0027	0.0016	0.0149	0.0010	0.0225
141	CFL Screw-in 18W	0.0095	0.0082	0.0196	0.0378	0.0085	0.0027	0.0016	0.0149	0.0010	0.0225
142	Cold Cathode Lamps	0.0095	0.0082	0.0196	0.0378	0.0085	0.0027	0.0016	0.0149	0.0010	0.0225
143	Screw-in LED--Base Incandescent	0.0095	0.0082	0.0196	0.0378	0.0085	0.0027	0.0016	0.0149	0.0010	0.0225
145	Base CFL to screw-in replacement	0.0064	0.0007	0.0251	0.0000	0.0050	0.0002	0.0000	0.0000	0.0028	0.0054
146	Screw-in LED--Base CFL	0.0064	0.0007	0.0251	0.0000	0.0050	0.0002	0.0000	0.0000	0.0028	0.0054
150	Base Incandescent Flood, 75W to Hardwire	0.0085	0.0086	0.0012	0.0707	0.0165	0.0025	0.0058	0.0027	0.0033	0.0018
151	CFL Hardwired, Modular 18W	0.0085	0.0086	0.0012	0.0707	0.0165	0.0025	0.0058	0.0027	0.0033	0.0018
152	Ceramic Metal Halide	0.0085	0.0086	0.0012	0.0707	0.0165	0.0025	0.0058	0.0027	0.0033	0.0018
153	Hardwired LED fixture--Base Incandescent	0.0085	0.0086	0.0012	0.0707	0.0165	0.0025	0.0058	0.0027	0.0033	0.0018
155	Base CFL to Hardwired replacement	0.0070	0.0013	0.0472	0.0084	0.0167	0.0000	0.0152	0.0051	0.0036	0.0013
156	Hardwired LED fixture--Base CFL	0.0070	0.0013	0.0472	0.0084	0.0167	0.0000	0.0152	0.0051	0.0036	0.0013
160	Base High Bay Probe-start Metal Halide, 40	0.0049	0.0027	0.0041	0.0049	0.0255	0.0056	0.0031	0.0038	0.0028	0.0039
161	High Bay T5 - Base Std MH	0.0049	0.0027	0.0041	0.0049	0.0255	0.0056	0.0031	0.0038	0.0028	0.0039
162	PSMH + electronic ballast	0.0049	0.0027	0.0041	0.0049	0.0255	0.0056	0.0031	0.0038	0.0028	0.0039
163	Induction High Bay Lighting - Base Std MH	0.0049	0.0027	0.0041	0.0049	0.0255	0.0056	0.0031	0.0038	0.0028	0.0039
164	Occupancy Sensor, High Bay T5 - Base Std	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

TECHNOLOGY SATURATION (units/square foot)											
Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
165	High Performance Lighting Remod/Renov -	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
180	Base 4L4'T8, 1EB	0.0099	0.0053	0.0083	0.0183	0.0950	0.0111	0.0117	0.0076	0.0055	0.0077
181	ROB 4L4' Premium T8, 1EB - Base 4L4'T8	0.0099	0.0053	0.0083	0.0183	0.0950	0.0111	0.0117	0.0076	0.0055	0.0077
182	Occupancy Sensor, 4L4' Fluorescent Fixtur	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
183	Lighting Control Tuneup - Base 4L4'T8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
184	LED Indoor Lighting - Base 4L4'T8	0.0099	0.0053	0.0083	0.0183	0.0950	0.0111	0.0117	0.0076	0.0055	0.0077
185	High Performance Lighting Remod/Renov -	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
190	Base 2L4'T8, 1EB	0.0190	0.0102	0.0159	0.0228	0.1187	0.0215	0.0147	0.0146	0.0107	0.0149
191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	0.0190	0.0102	0.0159	0.0228	0.1187	0.0215	0.0147	0.0146	0.0107	0.0149
192	Occupancy Sensor, 8L4' Fluorescent Fixtur	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
193	Lighting Control Tuneup - Base 2L4'T8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
194	LED Indoor Lighting - Base 2L4'T8	0.0190	0.0102	0.0159	0.0228	0.1187	0.0215	0.0147	0.0146	0.0107	0.0149
196	High Performance Lighting Remod/Renov -	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
200	Base Exit Sign	0.0003	0.0005	0.0002	0.0001	0.0004	0.0001	0.0002	0.0005	0.0003	0.0001
201	LED Exit Sign	0.0003	0.0005	0.0002	0.0001	0.0004	0.0001	0.0002	0.0005	0.0003	0.0001
210	Base Outdoor Mercury Vapor 400W Lamp	0.0011	0.0027	0.0008	0.0014	0.0015	0.0008	0.0002	0.0003	0.0004	0.0007
211	High Pressure Sodium 250W Lamp	0.0011	0.0027	0.0008	0.0014	0.0015	0.0008	0.0002	0.0003	0.0004	0.0007
212	LED Outdoor Area Lighting	0.0011	0.0027	0.0008	0.0014	0.0015	0.0008	0.0002	0.0003	0.0004	0.0007
213	LED Outdoor Bi-level Fixtures	0.0011	0.0027	0.0008	0.0014	0.0015	0.0008	0.0002	0.0003	0.0004	0.0007
214	Outdoor Lighting Controls (Photocell/Timec	0.0003	0.0007	0.0002	0.0003	0.0004	0.0002	0.0000	0.0001	0.0001	0.0002
220	Base Street Lighting	0.000	0.000	0.000	0.000	0.000	0.000	0.0000	0.000	0.000	0.0026
221	Induction Streetlighting										0.0026
222	LED Streetlighting										0.0026
300	Base Centrifugal Chiller, 0.58 kW/ton, 500 t	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
302	Window Film (Standard)	0.0877	0.0284	0.0409	0.0460	1.0172	0.0242	0.0625	0.0171	0.0171	0.0284
303	EMS - Chiller	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
304	Cool Roof - Chiller	0.5000	1.0000	1.0000	1.0000	0.0833	1.5000	0.4333	1.0000	1.0000	1.0000
305	Chiller Tune Up/Diagnostics	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
306	VSD for Chiller Pumps and Towers	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
307	EMS Optimization	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
308	Economizer - Chiller	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
309	Duct/Pipe Insulation - Chiller	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
311	High Efficiency Chiller Motors	0.0024	0.0034	0.0021	0.0025	0.0018	0.0033	0.0026	0.0035	0.0028	0.0039
350	Base DX Packaged System, EER=10.3, 10	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
351	DX Tune Up/ Advanced Diagnostics	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
352	DX Packaged System, EER=10.9, 10 tons	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
353	DX Packaged System, EER=11.5, 10 tons	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
354	DX Packaged System, EER=13.4, 10 tons	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
356	Ductless (Mini Split) Cooling System	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020

TECHNOLOGY SATURATION (units/square foot)											
		Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
Measure #	Measure Description	Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
357	Window Film (Standard)	0.0877	0.0284	0.0409	0.0460	1.0172	0.0242	0.0625	0.0171	0.0171	0.0284
358	Prog. Thermostat - DX	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
359	Cool Roof - DX	0.5000	1.0000	1.0000	1.0000	0.0833	0.5000	0.4333	1.0000	1.0000	1.0000
360	Optimize Controls	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
361	Economizer	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
362	Aerosol Duct Sealing - DX	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
363	Ceiling/roof Insulation - DX	0.5000	1.0000	1.0000	1.0000	0.0833	0.5000	0.4333	1.0000	1.0000	1.0000
364	Duct/Pipe Insulation - DX	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
365	DX Coil Cleaning	0.0030	0.0030	0.0030	0.0025	0.0189	0.0025	0.0026	0.0025	0.0035	0.0020
400	Base Fan Motor, 5hp, 1800rpm, 87.5%	0.0003	0.0018	0.0003	0.0005	0.0003	0.0004	0.0001	0.0003	0.0003	0.0005
401	Fan Motor, 5hp, 1800rpm, 89.5%	0.0003	0.0018	0.0003	0.0005	0.0003	0.0004	0.0001	0.0003	0.0003	0.0005
402	Variable Speed Drive Control, 5 HP	0.0003	0.0018	0.0003	0.0005	0.0003	0.0004	0.0001	0.0003	0.0003	0.0005
403	Demand Controlled Ventilation	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
410	Base Fan Motor, 15hp, 1800rpm, 91.0%	0.0002	0.0010	0.0013	0.0000	0.0000	0.0007	0.0003	0.0002	0.0000	0.0009
411	Fan Motor, 15hp, 1800rpm, 92.4%	0.0002	0.0010	0.0013	0.0000	0.0000	0.0007	0.0003	0.0002	0.0000	0.0009
412	Variable Speed Drive Control, 15 HP	0.0002	0.0010	0.0013	0.0000	0.0000	0.0007	0.0003	0.0002	0.0000	0.0009
413	Air Handler Optimization, 15 HP	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
414	Energy Recovery Ventilation	0.0024	0.0037	0.0016	0.0035	0.0004	0.0026	0.0020	0.0042	0.0017	0.0014
415	Electronically Commutated Motors (ECM) o	0.0024	0.0037	0.0016	0.0035	0.0004	0.0026	0.0020	0.0042	0.0017	0.0014
416	Separate Makeup Air/Exhaust Hoods AC	0.0002	0.0010	0.0013	0.0000	0.0000	0.0007	0.0003	0.0002	0.0000	0.0009
417	Demand Controlled Ventilation	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
420	Base Fan Motor, 40hp, 1800rpm, 93.0%	0.0012	0.0000	0.0019	0.0000	0.0004	0.0000	0.0005	0.0000	0.0000	0.0024
421	Fan Motor, 40hp, 1800rpm, 94.1%	0.0012	0.0000	0.0019	0.0000	0.0004	0.0000	0.0005	0.0000	0.0000	0.0024
422	Variable Speed Drive Control, 40 HP	0.0012	0.0000	0.0019	0.0000	0.0004	0.0000	0.0005	0.0000	0.0000	0.0024
423	Air Handler Optimization, 40 HP	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
424	Demand Controlled Ventilation	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
500	Base Non-Commercial Refrigerator	0.0005	0.0005	0.0001	0.0000	0.0001	0.0004	0.0000	0.0007	0.0009	0.0001
501	Energy Star Refrigerator	0.0005	0.0005	0.0001	0.0000	0.0001	0.0004	0.0000	0.0007	0.0009	0.0001
502	HE Refrigerator - CEE Tier 2 (side by side f	0.0005	0.0005	0.0001	0.0000	0.0001	0.0004	0.0000	0.0007	0.0009	0.0001
520	Base Refrigeration System	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
521	High-efficiency fan motors	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
522	Strip curtains for walk-ins	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
523	Night covers for display cases	0.00015	0.00615	0.00123	0.01230	0.00123	0.00123	0.00015	0.00021	0.00015	0.00123
524	Evaporator fan controller for MT walk-ins	0.00000	0.00008	0.00002	0.00015	0.00002	0.00002	0.00000	0.00000	0.00000	0.00002
525	Efficient compressor motor	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
526	Compressor VSD retrofit	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
527	Floating head pressure controls	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
528	Refrigeration Commissioning	0.00002	0.00078	0.00016	0.00155	0.00016	0.00016	0.00002	0.00003	0.00002	0.00016
529	Demand Hot Gas Defrost	0.00002	0.00065	0.00013	0.00130	0.00013	0.00013	0.00002	0.00002	0.00002	0.00013
530	Demand Defrost Electric	0.00002	0.00065	0.00013	0.00130	0.00013	0.00013	0.00002	0.00002	0.00002	0.00013
531	Anti-sweat (humidistat) controls	0.00000	0.00001	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)										
533	Freezer-Cooler Replacement Gaskets	0.00009	0.00346	0.00069	0.00692	0.00069	0.00069	0.00009	0.00012	0.00009	0.00069

TECHNOLOGY SATURATION (units/square foot)											
Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
534	High R-Value Glass Doors	0.00002	0.00065	0.00013	0.00130	0.00013	0.00013	0.00002	0.00002	0.00002	0.00013
535	Multiplex Compressor System	0.00002	0.00078	0.00016	0.00155	0.00016	0.00016	0.00002	0.00003	0.00002	0.00016
536	Oversized Air-Cooled Condenser	0.00002	0.00078	0.00016	0.00155	0.00016	0.00016	0.00002	0.00003	0.00002	0.00016
537	LED Display Lighting	0.00002	0.00065	0.00013	0.00130	0.00013	0.00013	0.00002	0.00002	0.00002	0.00013
538	Fiber Optic Display Lighting	0.00002	0.00065	0.00013	0.00130	0.00013	0.00013	0.00002	0.00002	0.00002	0.00013
539	Beverage Merchandisers	0.00002	0.00021	0.00170	0.00020	0.00000	0.00001	0.00000	0.00001	0.00000	0.00003
540	Reach-In Refrigerators	0.00001	0.00047	0.00029	0.00008	0.00000	0.00001	0.00001	0.00002	0.00002	0.00008
541	Reach-In Freezers	0.00000	0.00027	0.00026	0.00494	0.00000	0.00001	0.00000	0.00000	0.00003	0.00000
542	Walk-Ins	0.00000	0.00061	0.00022	0.00023	0.00006	0.00001	0.00000	0.00001	0.00000	0.00003
610	Base Desktop PC	0.0013	0.0007	0.0006	0.0006	0.0002	0.0016	0.0030	0.0031	0.0003	0.0007
611	Energy Star or Better PC	0.0013	0.0007	0.0006	0.0002	0.0002	0.0016	0.0030	0.0015	0.0001	0.0007
612	PC Manual Power Management Enabling	0.0013	0.0007	0.0006	0.0002	0.0002	0.0016	0.0030	0.0015	0.0001	0.0007
613	PC Network Power Management Enabling	0.0013	0.0007	0.0006	0.0002	0.0002	0.0016	0.0030	0.0015	0.0001	0.0007
620	Base Monitor, CRT	0.0006	0.0008	0.0003	0.0007	0.0001	0.0005	0.0001	0.0004	0.0004	0.0001
621	Energy Star or Better Monitor	0.0006	0.0008	0.0004	0.0004	0.0001	0.0005	0.0001	0.0004	0.0004	0.0001
622	Monitor Power Management Enabling	0.0006	0.0008	0.0004	0.0004	0.0001	0.0005	0.0001	0.0004	0.0004	0.0001
630	Base Monitor, LCD	0.0014	0.0005	0.0006	0.0002	0.0001	0.0012	0.0029	0.0028	0.0002	0.0006
631	Energy Star or Better Monitor	0.0014	0.0005	0.0006	0.0001	0.0001	0.0012	0.0029	0.0013	0.0001	0.0006
632	Monitor Power Management Enabling	0.0014	0.0005	0.0006	0.0001	0.0001	0.0012	0.0029	0.0013	0.0001	0.0006
640	Base Copier	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
641	Energy Star or Better Copier	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
642	Copier Power Management Enabling	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
650	Base Laser Printer	0.0010	0.0002	0.0001	0.0002	0.0001	0.0006	0.0012	0.0005	0.0003	0.0002
651	Printer Power Management Enabling	0.0010	0.0002	0.0001	0.0002	0.0001	0.0006	0.0012	0.0005	0.0003	0.0002
660	Base Data Center/Server Room	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126
661	Data Center Improved Operations	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126
662	Data Center Best Practices	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126
663	Data Center State of the Art practices	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126	0.0126
700	Base Water Heating	0.0015	0.0027	0.0013	0.0021	0.0080	0.0025	0.0025	0.0026	0.0038	0.0016
701	Demand controlled circulating systems	0.0001	0.0002	0.0001	0.0001	0.0002	0.0001	0.0000	0.0000	0.0001	0.0001
702	High Efficiency Water Heater (electric)	0.0015	0.0027	0.0013	0.0021	0.0080	0.0025	0.0025	0.0026	0.0038	0.0016
703	Heat Pump Water Heater (air source)	0.0015	0.0027	0.0013	0.0021	0.0080	0.0025	0.0025	0.0026	0.0038	0.0016
704	Hot Water Pipe Insulation	0.0011	0.0021	0.0010	0.0016	0.0061	0.0019	0.0019	0.0020	0.0029	0.0012
705	Faucet Aerators										
706	Heat Recovery Unit	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
707	Heat Trap	0.0015	0.0027	0.0013	0.0021	0.0080	0.0025	0.0025	0.0026	0.0038	0.0016
708	Tankless Water Heater	0.0015	0.0027	0.0013	0.0021	0.0080	0.0025	0.0025	0.0026	0.0038	0.0016
709	Solar Water Heater	0.0015	0.0027	0.0013	0.0021	0.0080	0.0025	0.0025	0.0026	0.0038	0.0016
710	Pre-rinse spray valves										
800	Base Vending Machines	0.0001	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0005	0.0001
801	Vending Misers (cooled machines only)	0.0001	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0005	0.0001
900	Base Cooking	0.00003	0.00060	0.00001	0.00014	0.00000	0.00006	0.00000	0.00001	0.00002	0.00002
901	Convection Oven	0.00000	0.00034	0.00001	0.00004	0.00000	0.00005	0.00000	0.00000	0.00002	0.00000
902	Efficient Fryer	0.00001	0.00005	0.00000	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001
903	Efficient Steamer	0.00001	0.00032	0.00000	0.00004	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
904	Energy Star Hot Food Holding Cabinets	0.00006	0.00002	0.00007	0.00000	0.00045	0.00003	0.00007	0.00000	0.00002	0.00001
940	Base Heating	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
941	XHeat	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
970	Base Miscellaneous	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
971	XMisc	0.00001	0.00005	0.00000	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001

Technology Saturation - New**DSM TECHNOLOGY INPUT TABLES**

UTILITY: NGrid BATCH: 1
 SECTOR: COM ANALYSIS: Basic
 SEGMENT: All Electric VINTAGE: New

TECHNOLOGY SATURATION (units/square foot)			Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
Segment	Measure #	Measure Description	Building Type 1	Building Type 3	Building Type 2	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
New	100	Base Bldg Design - 30%	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New	101	High Performance Building/Int Design - Tier 1 30%	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New	200	Base Bldg Design - 50%	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New	201	High Performance Building/Int Design - Tier 2 50%	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New	300	Base Bldg Design - 70%	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New	301	Near Zero Energy (60-75%)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Hour Adjustment For Lighting (Hours/year)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
Existing	100	Base Fluorescent Fixture, 4L4'T12, 34W, 2EEMAG	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	101	RET 4L4' Premium T8, 1EB, base 4L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	102	RET 2L4' Premium T8, 1EB, Reflector, base 4L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	103	LED Indoor Lighting - Base 4L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	104	Occupancy Sensor, 4L4' Fluorescent Fixtures - Base 4L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	105	Continuous Dimming, 5L4' Fluorescent Fixtures - Base 4L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	106	Lighting Control Tuneup	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	107	High Performance Lighting Remod/Renov - 25% Savings - Base 4L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	120	Base Fluorescent Fixture, 2L4'T12, 34W, 1EEMAG	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	121	RET 2L4' Premium T8, 1EB -- base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	122	RET 1L4' Premium T8, 1EB, Reflector OEM - Base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	123	LED Indoor Lighting - Base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	124	Occupancy Sensor, 8L4' Fluorescent Fixtures - Base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	125	Continuous Dimming, 10L4' Fluorescent Fixtures - Base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	126	Lighting Control Tuneup - Base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	127	High Performance Lighting Remod/Renov - 25% Savings - Base 2L4'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	130	Base Fluorescent Fixture, 2L8'T12, 60W, 1EEMAG	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM - Base 2L8'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	133	LED Indoor Lighting - Base 2L8'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	134	Occupancy Sensor, 4L8' Fluorescent Fixtures - Base 2L8'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	135	Continuous Dimming, 5L8' Fluorescent Fixtures - Base 2L8'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	136	High Performance Lighting Remod/Renov - 25% Savings - Base 2L8'T12	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	140	Base Incandescent Flood, 75W to Screw-in Replacement	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	141	CFL Screw-in 18W	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	142	Cold Cathode Lamps	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	143	Screw-in LED--Base Incandescent	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	145	Base CFL to screw-in replacement	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	146	Screw-in LED--Base CFL	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	150	Base Incandescent Flood, 75W to Hardwired CFL	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	151	CFL Hardwired, Modular 18W	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	152	Ceramic Metal Halide	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	153	Hardwired LED fixture--Base Incandescent	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	155	Base CFL to Hardwired replacement	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	156	Hardwired LED fixture--Base CFL	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	160	Base High Bay Probe-start Metal Halide, 400W	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	161	High Bay T5 - Base Std MH	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	162	PSMH + electronic ballast	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	163	Induction High Bay Lighting - Base Std MH	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	164	Occupancy Sensor, High Bay T5 - Base Std MH	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	165	High Performance Lighting Remod/Renov - 25% Savings - Base High Bay PSMH	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	180	Base 4L4'T8, 1EB	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	181	ROB 4L4' Premium T8, 1EB - Base 4L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	182	Occupancy Sensor, 4L4' Fluorescent Fixtures - Base 4L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	183	Lighting Control Tuneup - Base 4L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	184	LED Indoor Lighting - Base 4L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	185	High Performance Lighting Remod/Renov - 25% Savings - Base 4L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	190	Base 2L4'T8, 1EB	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	192	Occupancy Sensor, 8L4' Fluorescent Fixtures - Base 2L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	193	Lighting Control Tuneup - Base 2L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	194	LED Indoor Lighting - Base 2L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	196	High Performance Lighting Remod/Renov - 25% Savings - Base 2L4'T8	4,732	2,477	2,615	4,346	2,799	2,484	3,449	5,638	2,743	2,716
Existing	200	Base Exit Sign	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Existing	201	LED Exit Sign	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Existing	210	Base Outdoor Mercury Vapor 400W Lamp	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	211	High Pressure Sodium 250W Lamp	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	212	LED Outdoor Area Lighting	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	213	LED Outdoor Bi-level Fixtures	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	214	Outdoor Lighting Controls (Photocell/Timeclock)	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	220	Base Street Lighting	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	221	Induction Streetlighting	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Existing	222	LED Streetlighting	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380

BASE TECHNOLOGY EUIs (kWh/square foot)												
Segment	Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel/Motel Building Type 9	Miscellaneous Building Type 10
Existing	100	Base Fluorescent Fixture, 4L4'T12, 34W, 2EEMAG	4.0	11.9	6.6	12.9	0.9	3.3	7.55	5.4	11.4	4.5
Existing	120	Base Fluorescent Fixture, 2L4'T12, 34W, 1EEMAG	4.0	11.9	6.6	12.9	0.9	3.3	7.55	5.4	11.4	4.5
Existing	130	Base Fluorescent Fixture, 2L8'T12, 60W, 1EEMAG	4.0	11.9	6.6	12.9	0.9	3.3	7.55	5.4	11.4	4.5
Existing	140	Base Incandescent Flood, 75W to Screw-in CFL	3.0	3.2	2.5	3.5	0.7	0.3	0.20	4.4	10.2	4.2
Existing	145	Base screw-in CFL to screw-in LED	0.6	0.1	0.9	0.0	0.1	0.0	0.00	0.0	5.9	0.3
Existing	150	Base Incandescent Flood, 75W to Hardwired CFL	2.6	3.4	0.2	6.6	1.4	0.3	0.71	0.8	3.0	0.3
Existing	155	Base CFL to Hardwired CFL	0.6	0.1	1.7	0.2	0.4	0.0	0.52	0.4	2.1	0.1
Existing	160	Base High Bay Metal Halide, 400W	4.1	12.2	6.8	13.3	1.0	3.4	7.76	5.6	11.7	4.7
Existing	180	Base 4L4'T8, 1EB	2.3	6.8	3.8	7.4	0.5	1.9	4.34	3.1	6.5	2.6
Existing	190	Base 2L4'T8, 1EB	2.3	6.8	3.8	7.4	0.5	1.9	4.34	3.1	6.5	2.6
Existing	200	Base Exit Sign (13 w)	0.1	0.1	0.1	0.0	0.0	0.0	0.04	0.1	0.3	0.1
Existing	210	Base Mercury Vapor 400W Lamp	0.4	1.7	0.7	1.0	0.0	0.4	0.99	0.4	0.5	1.8
Existing	220	Base Street Lighting										4.2
Existing	300	Base Centrifugal Chiller, 0.58 kW/ton, 500 tons	1.7	3.9	2.0	4.7	1.4	1.3	2.28	2.4	1.8	3.7
Existing	350	Base DX Packaged System, EER=10.3, 10 tons	2.9	6.7	3.4	8.2	2.4	2.3	3.96	4.2	3.1	6.4
Existing	400	Base Fan Motor, 5hp, 1800rpm, 87.5%	0.8	2.9	0.8	5.2	0.1	0.3	0.83	5.0	1.4	0.4
Existing	410	Base Fan Motor, 15hp, 1800rpm, 91.0%	0.3	1.5	2.0	0.0	0.0	0.6	1.82	2.4	0.0	0.7
Existing	420	Base Fan Motor, 40hp, 1800rpm, 93.0%	2.1	0.0	2.6	0.0	0.1	0.0	2.81	0.0	0.0	1.6
Existing	500	Base Non-Commercial Refrigerator	0.1	0.3	0.0	0.0	0.0	0.1	0.01	0.3	0.4	0.1
Existing	520	Base Refrigeration System	0.7	6.9	2.6	22.1	25.2	0.5	2.36	0.3	0.5	2.2
Existing	610	Base Desktop PC	0.4	0.3	0.3	0.1	0.0	0.5	2.09	0.7	0.1	0.7
Existing	620	Base Monitor, 17" CRT	0.1	0.3	0.1	0.2	0.0	0.1	0.06	0.1	0.1	0.1
Existing	630	Base Monitor, 17" LCD	0.2	0.1	0.1	0.0	0.0	0.2	1.18	0.4	0.0	0.3
Existing	640	Base Copier	0.1	0.1	0.1	0.7	0.1	0.2	0.09	0.3	0.0	0.4
Existing	650	Base Laser Printer	0.2	0.3	0.3	0.4	0.2	0.5	0.29	0.5	0.0	0.6
Existing	660	Base Data Center/Server Room	2.2	3.4	3.0	4.7	0.7	2.3	4.92	3.2	3.8	6.8
Existing	700	Base Water Heating	0.1	1.6	0.2	0.5	0.0	0.1	0.25	0.2	0.8	0.5
Existing	800	Base Vending Machines	0.1	0.0	0.3	0.1	0.0	0.1	0.12	0.1	0.1	0.1
Existing	900	Base Cooking	0.1	7.5	0.2	2.1	0.0	0.1	0.33	0.3	0.6	0.4
Existing	940	Base Heating	0.6	0.5	0.5	1.2	0.1	0.2	2.2	1.5	0.9	1.3
Existing	970	Base Miscellaneous	0.4	0.8	0.5	1.0	0.1	0.2	0.7	1.1	0.8	1.5

BASE TECHNOLOGY EUIs (kWh/square foot)												
			Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
Segment	Measure #	Measure Description	Building Type 1	Building Type 3	Building Type 2	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
New	100	Base Bldg Design - 30%	7.21	29.65	9.87	41.47	1.70	4.99	12.10	14.93	10.43	18.78
New	200	Base Bldg Design - 50%	7.21	29.65	9.87	41.47	1.70	4.99	12.10	14.93	10.43	18.78
New	300	Base Bldg Design - 70%	7.21	29.65	9.87	41.47	1.70	4.99	12.10	14.93	10.43	18.78

Standards Adjustment Factor (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
Existing	100	Base Fluorescent Fixture, 4L4T12, 34W, 2l	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	101	RET 4L4' Premium T8, 1EB, base 4L4T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	102	RET 2L4' Premium T8, 1EB, Reflector, base	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	103	LED Indoor Lighting - Base 4L4T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	104	Occupancy Sensor, 4L4' Fluorescent Fixtur	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	105	Continuous Dimming, 5L4' Fluorescent Fxt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	106	Lighting Control Tuneup	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	107	High Performance Lighting Remod/Renov -	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Existing	120	Base Fluorescent Fixture, 2L4T12, 34W, 1l	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	121	RET 2L4' Premium T8, 1EB -- base 2L4T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	122	RET 1L4' Premium T8, 1EB, Reflector OEM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	123	LED Indoor Lighting - Base 2L4T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	124	Occupancy Sensor, 8L4' Fluorescent Fixtur	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	125	Continuous Dimming, 10L4' Fluorescent Fix	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	126	Lighting Control Tuneup - Base 2L4T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	127	High Performance Lighting Remod/Renov -	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Existing	130	Base Fluorescent Fixture, 2L8T12, 60W, 1l	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8"	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	132	RET 2 - 1L4' Premium T8, 1EB, Reflector O	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	133	LED Indoor Lighting - Base 2L8T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	134	Occupancy Sensor, 4L8' Fluorescent Fixtur	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	135	Continuous Dimming, 5L8' Fluorescent Fxt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	136	High Performance Lighting Remod/Renov -	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Existing	140	Base Incandescent Flood, 75W to Screw-in	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	141	CFL Screw-in 18W	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	142	Cold Cathode Lamps	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	143	Screw-in LED--Base Incandescent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	145	Base CFL to screw-in replacement	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	146	Screw-in LED--Base CFL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	150	Base Incandescent Flood, 75W to Hardwire	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	151	CFL Hardwired, Modular 18W	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	152	Ceramic Metal Halide	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	153	Hardwired LED fixture--Base Incandescent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	155	Base CFL to Hardwired replacement	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	156	Hardwired LED fixture--Base CFL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	160	Base High Bay Probe-start Metal Halide, 40	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	161	High Bay T5 - Base Std MH	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	162	PSMH + electronic ballast	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	163	Induction High Bay Lighting - Base Std MH	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	164	Occupancy Sensor, High Bay T5 - Base Std	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	165	High Performance Lighting Remod/Renov -	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
Existing	180	Base 4L4T8, 1EB	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	181	ROB 4L4' Premium T8, 1EB - Base 4L4T8	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	182	Occupancy Sensor, 4L4' Fluorescent Fixtur	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	183	Lighting Control Tuneup - Base 4L4T8	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	184	LED Indoor Lighting - Base 4L4T8	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Standards Adjustment Factor (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
Existing	185	High Performance Lighting Remod/Renov -	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	190	Base 2L4'T8, 1EB	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	192	Occupancy Sensor, 8L4' Fluorescent Fixtur	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	193	Lighting Control Tuneup - Base 2L4'T8	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	194	LED Indoor Lighting - Base 2L4'T8	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	196	High Performance Lighting Remod/Renov -	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	200	Base Exit Sign	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	201	LED Exit Sign	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	210	Base Outdoor Mercury Vapor 400W Lamp	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	211	High Pressure Sodium 250W Lamp	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	212	LED Outdoor Area Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	213	LED Outdoor Bi-level Fixtures	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	214	Outdoor Lighting Controls (Photocell/Timec	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	220	Base Street Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	221	Induction Streetlighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	222	LED Streetlighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	300	Base Centrifugal Chiller, 0.58 kW/ton, 500 t	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	302	Window Film (Standard)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	303	EMS - Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	304	Cool Roof - Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	305	Chiller Tune Up/Diagnostics	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	306	VSD for Chiller Pumps and Towers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	307	EMS Optimization	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	308	Economizer - Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	309	Duct/Pipe Insulation - Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	311	High Efficiency Chiller Motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	350	Base DX Packaged System, EER=10.3, 10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	351	DX Tune Up/ Advanced Diagnostics	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	352	DX Packaged System, EER=10.9, 10 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	353	DX Packaged System, EER=11.5, 10 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	354	DX Packaged System, EER=13.4, 10 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	356	Ductless (Mini Split) Cooling System	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	357	Window Film (Standard)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	358	Prog. Thermostat - DX	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	359	Cool Roof - DX	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	360	Optimize Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	361	Economizer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	362	Aerosol Duct Sealing - DX	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	363	Ceiling/roof Insulation - DX	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	364	Duct/Pipe Insulation - DX	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	365	DX Coil Cleaning	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	400	Base Fan Motor, 5hp, 1800rpm, 87.5%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	401	Fan Motor, 5hp, 1800rpm, 89.5%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	402	Variable Speed Drive Control, 5 HP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	403	Demand Controlled Ventilation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Standards Adjustment Factor (percent)													
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Existing	410	Base Fan Motor, 15hp, 1800rpm, 91.0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	411	Fan Motor, 15hp, 1800rpm, 92.4%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	412	Variable Speed Drive Control, 15 HP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	413	Air Handler Optimization, 15 HP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	414	Energy Recovery Ventilation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	415	Electronically Commutated Motors (ECM) o	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	416	Separate Makeup Air/Exhaust Hoods AC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	417	Demand Controlled Ventilation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	420	Base Fan Motor, 40hp, 1800rpm, 93.0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	421	Fan Motor, 40hp, 1800rpm, 94.1%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	422	Variable Speed Drive Control, 40 HP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	423	Air Handler Optimization, 40 HP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	424	Demand Controlled Ventilation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	500	Base Non-Commercial Refrigerator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	501	Energy Star Refrigerator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	502	HE Refrigerator - CEE Tier 2 (side by side f	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	520	Base Refrigeration System	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	521	High-efficiency fan motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	522	Strip curtains for walk-ins	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	523	Night covers for display cases	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	524	Evaporator fan controller for MT walk-ins	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	525	Efficient compressor motor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	526	Compressor VSD retrofit	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	527	Floating head pressure controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	528	Refrigeration Commissioning	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	529	Demand Hot Gas Defrost	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	530	Demand Defrost Electric	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	531	Anti-sweat (humidistat) controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)											
Existing	533	Freezer-Cooler Replacement Gaskets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	534	High R-Value Glass Doors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	535	Multiplex Compressor System	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	536	Oversized Air-Cooled Condenser	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	537	LED Display Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	538	Fiber Optic Display Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	539	Beverage Merchandisers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	540	Reach-In Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	541	Reach-In Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	542	Walk-Ins	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	610	Base Desktop PC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	611	Energy Star or Better PC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	612	PC Manual Power Management Enabling	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	613	PC Network Power Management Enabling	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	620	Base Monitor, CRT	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Standards Adjustment Factor (percent)												
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Existing	621	Energy Star or Better Monitor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	622	Monitor Power Management Enabling	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	630	Base Monitor, LCD	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	631	Energy Star or Better Monitor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	632	Monitor Power Management Enabling	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	640	Base Copier	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	641	Energy Star or Better Copier	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	642	Copier Power Management Enabling	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	650	Base Laser Printer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	651	Printer Power Management Enabling	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	660	Base Data Center/Server Room	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	661	Data Center Improved Operations	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	662	Data Center Best Practices	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	663	Data Center State of the Art practices	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	700	Base Water Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	701	Demand controlled circulating systems	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	702	High Efficiency Water Heater (electric)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	703	Heat Pump Water Heater (air source)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	704	Hot Water Pipe Insulation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	705	Faucet Aerators										
Existing	706	Heat Recovery Unit	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	707	Heat Trap	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	708	Tankless Water Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	709	Solar Water Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	710	Pre-rinse spray valves										
Existing	800	Base Vending Machines	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	801	Vending Misers (cooled machines only)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	900	Base Cooking	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	901	Convection Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	902	Efficient Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	903	Efficient Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	904	Energy Star Hot Food Holding Cabinets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	940	Base Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	941	XHeat	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	970	Base Miscellaneous	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Existing	971	XMisc	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Standards Adjustment Factor (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
New	100	Base Bldg Design - 30%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	101	High Performance Building/Int Design - Tier 1 30%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	200	Base Bldg Design - 50%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	201	High Performance Building/Int Design - Tier 2 50%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	300	Base Bldg Design - 70%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	301	Near Zero Energy (60-75%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

APPLICABILITY FACTOR (percent)												
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Segment	Measure #	Measure Description	Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
1	100	Base Fluorescent Fixture, 4L4'T12, 34W, 2l	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	101	RET 4L4' Premium T8, 1EB, base 4L4'T12	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	102	RET 2L4' Premium T8, 1EB, Reflector, base	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	103	LED Indoor Lighting - Base 4L4'T12	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	104	Occupancy Sensor, 4L4' Fluorescent Fixture	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	105	Continuous Dimming, 5L4' Fluorescent Fixture	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	106	Lighting Control Tuneup	0.5%	0.00%	0.3%	0.0%	4.9%	0.00%	0.13%	0.0%	0.0%	0.5%
1	107	High Performance Lighting Remod/Renov -	6.0%	4.75%	3.7%	0.0%	9.5%	0.00%	0.60%	0.5%	0.0%	3.4%
1	120	Base Fluorescent Fixture, 2L4'T12, 34W, 1l	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	121	RET 2L4' Premium T8, 1EB -- base 2L4'T12	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	122	RET 1L4' Premium T8, 1EB, Reflector OEM	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	123	LED Indoor Lighting - Base 2L4'T12	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	124	Occupancy Sensor, 8L4' Fluorescent Fixture	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	125	Continuous Dimming, 10L4' Fluorescent Fixture	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	126	Lighting Control Tuneup - Base 2L4'T12	0.8%	0.00%	0.6%	0.0%	3.1%	0.00%	0.21%	0.1%	0.0%	0.3%
1	127	High Performance Lighting Remod/Renov -	9.9%	1.89%	7.5%	9.6%	6.0%	0.00%	0.98%	1.8%	1.9%	2.3%
1	130	Base Fluorescent Fixture, 2L8'T12, 60W, 1l	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8"	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	133	LED Indoor Lighting - Base 2L8'T12	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	134	Occupancy Sensor, 4L8' Fluorescent Fixture	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	135	Continuous Dimming, 5L8' Fluorescent Fixture	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	136	High Performance Lighting Remod/Renov -	4.8%	4.05%	5.1%	36.2%	3.3%	0.00%	0.00%	0.0%	0.0%	1.0%
1	140	Base Incandescent Flood, 75W to Screw-in	15.8%	24.61%	9.7%	3.8%	0.5%	3.33%	0.6%	5.6%	4.7%	32.8%
1	141	CFL Screw-in 18W	14.2%	22.2%	8.7%	3.4%	0.4%	3.0%	0.6%	5.1%	4.3%	29.5%
1	142	Cold Cathode Lamps	1.6%	2.5%	1.0%	1.7%	0.0%	0.3%	10.9%	0.6%	0.5%	3.3%
1	143	Screw-in LED--Base Incandescent	15.8%	24.6%	9.7%	3.8%	0.5%	3.3%	0.6%	5.6%	4.7%	32.8%
1	145	Base CFL to screw-in replacement	5.5%	13.4%	0.5%	0.0%	0.8%	0.2%	0.0%	8.8%	8.7%	5.2%
1	146	Screw-in LED--Base CFL	5.5%	13.4%	0.5%	0.0%	0.8%	0.2%	0.0%	8.8%	8.7%	5.2%
1	150	Base Incandescent Flood, 75W to Hardwire	7.1%	5.80%	2.8%	0.8%	0.0%	0.22%	3.6%	15.5%	23.6%	7.2%
1	151	CFL Hardwired, Modular 18W	6.4%	5.2%	2.5%	0.7%	0.0%	0.2%	3.3%	14.0%	21.3%	6.5%
1	152	Ceramic Metal Halide	0.7%	0.6%	0.3%	0.1%	0.0%	0.0%	0.4%	1.6%	2.4%	0.7%
1	153	Hardwired LED fixture--Base Incandescent	7.1%	5.8%	2.8%	0.8%	0.0%	0.2%	3.6%	15.5%	23.6%	7.2%
1	155	Base CFL to Hardwired replacement	19.6%	7.5%	0.2%	0.5%	0.1%	0.1%	6.1%	25.3%	61.0%	5.7%
1	156	Hardwired LED fixture--Base CFL	19.6%	7.5%	0.2%	0.5%	0.1%	0.1%	6.1%	25.3%	61.0%	5.7%
1	160	Base High Bay Probe-start Metal Halide, 40	0.6%	0.00%	8.2%	7.1%	6.0%	11.21%	2.75%	0.3%	0.0%	14.7%
1	161	High Bay T5 - Base Std MH	0.6%	0.00%	8.2%	7.1%	6.0%	11.21%	2.75%	0.3%	0.0%	14.7%
1	162	PSMH + electronic ballast	0.6%	0.00%	8.2%	7.1%	6.0%	11.21%	2.75%	0.3%	0.0%	14.7%
1	163	Induction High Bay Lighting - Base Std MH	0.6%	0.00%	8.2%	7.1%	6.0%	11.21%	2.75%	0.3%	0.0%	14.7%
1	164	Occupancy Sensor, High Bay T5 - Base Std	0.6%	0.00%	8.2%	7.1%	6.0%	11.21%	2.75%	0.3%	0.0%	14.7%
1	165	High Performance Lighting Remod/Renov -	0.6%	0.0%	8.2%	7.1%	6.0%	11.2%	2.75%	0.3%	0.0%	14.7%
1	180	Base 4L4'T8, 1EB	12.6%	13.16%	16.9%	0.0%	13.5%	30.05%	34.30%	39.6%	0.0%	18.9%
1	181	ROB 4L4' Premium T8, 1EB - Base 4L4'T8	12.6%	13.16%	16.9%	0.0%	13.5%	30.05%	34.30%	39.6%	0.0%	18.9%
1	182	Occupancy Sensor, 4L4' Fluorescent Fixture	12.6%	13.16%	16.9%	0.0%	13.5%	30.05%	34.30%	39.6%	0.0%	18.9%
1	183	Lighting Control Tuneup - Base 4L4'T8	1.0%	0.00%	1.4%	0.0%	6.9%	9.42%	7.21%	1.8%	0.0%	2.7%
1	184	LED Indoor Lighting - Base 4L4'T8	12.6%	13.16%	16.9%	0.0%	13.5%	30.05%	34.30%	39.6%	0.0%	18.9%

APPLICABILITY FACTOR (percent)												
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1	185	High Performance Lighting Remod/Renov -	12.6%	13.16%	16.9%	0.0%	13.5%	30.05%	34.30%	39.6%	0.0%	18.9%
1	190	Base 2L4'T8, 1EB	18.3%	25.23%	35.9%	18.3%	3.9%	24.89%	48.74%	49.9%	0.0%	8.6%
1	191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	18.3%	25.23%	35.9%	18.3%	3.9%	24.89%	48.74%	49.9%	0.0%	8.6%
1	192	Occupancy Sensor, 8L4' Fluorescent Fixture	18.3%	25.23%	35.9%	18.3%	3.9%	24.89%	48.74%	49.9%	0.0%	8.6%
1	193	Lighting Control Tuneup - Base 2L4'T8	1.5%	0.00%	3.0%	0.0%	2.0%	7.80%	10.25%	2.3%	0.0%	1.2%
1	194	LED Indoor Lighting - Base 2L4'T8	18.3%	25.23%	35.9%	18.3%	3.9%	24.89%	48.74%	49.9%	0.0%	8.6%
1	196	High Performance Lighting Remod/Renov -	18.3%	25.23%	35.9%	18.3%	3.9%	24.89%	48.74%	49.9%	0.0%	8.6%
1	200	Base Exit Sign	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.00%	100.0%	100.0%	100.0%
1	201	LED Exit Sign	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.00%	100.0%	100.0%	100.0%
1	210	Base Outdoor Mercury Vapor 400W Lamp	67.0%	100.0%	81.5%	47.3%	88.7%	79.2%	100.00%	96.7%	100.0%	88.4%
1	211	High Pressure Sodium 250W Lamp	67.0%	100.0%	81.5%	47.3%	88.7%	79.2%	100.00%	96.7%	100.0%	88.4%
1	212	LED Outdoor Area Lighting	67.0%	100.0%	81.5%	47.3%	88.7%	79.2%	100.00%	96.7%	100.0%	88.4%
1	213	LED Outdoor Bi-level Fixtures	67.0%	100.0%	81.5%	47.3%	88.7%	79.2%	100.00%	96.7%	100.0%	88.4%
1	214	Outdoor Lighting Controls (Photocell/Timeclock)	67.0%	100.0%	81.5%	47.3%	88.7%	79.2%	100.00%	96.7%	100.0%	88.4%
1	220	Base Street Lighting										100%
1	221	Induction Streetlighting										100%
1	222	LED Streetlighting										100%
1	300	Base Centrifugal Chiller, 0.58 kW/ton, 500 tons	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	302	Window Film (Standard)	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	303	EMS - Chiller	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	304	Cool Roof - Chiller	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	305	Chiller Tune Up/Diagnostics	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	306	VSD for Chiller Pumps and Towers	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	307	EMS Optimization	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	308	Economizer - Chiller	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	309	Duct/Pipe Insulation - Chiller	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	311	High Efficiency Chiller Motors	25.0%	0.0%	0.0%	0.0%	0.0%	19.2%	54.95%	15.4%	0.0%	18.4%
1	350	Base DX Packaged System, EER=10.3, 10 tons	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	351	DX Tune Up/ Advanced Diagnostics	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	352	DX Packaged System, EER=10.9, 10 tons	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	353	DX Packaged System, EER=11.5, 10 tons	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	354	DX Packaged System, EER=13.4, 10 tons	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	356	Ductless (Mini Split) Cooling System				97.9%			15.90%			
1	357	Window Film (Standard)	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	358	Prog. Thermostat - DX	20.5%	61.8%	38.7%	44.3%	7.4%	20.5%	12.46%	79.1%	19.2%	38.4%
1	359	Cool Roof - DX	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	360	Optimize Controls	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	361	Economizer	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	362	Aerosol Duct Sealing - DX	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	363	Ceiling/roof Insulation - DX	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	364	Duct/Pipe Insulation - DX	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	365	DX Coil Cleaning	43.0%	87.3%	65.0%	59.9%	12.7%	20.8%	12.46%	82.6%	66.4%	46.7%
1	400	Base Fan Motor, 5hp, 1800rpm, 87.5%	86.0%	72.8%	73.3%	49.3%	68.3%	77.7%	100.00%	47.7%	100.0%	83.6%
1	401	Fan Motor, 5hp, 1800rpm, 89.5%	86.0%	72.8%	73.3%	49.3%	68.3%	77.7%	100.00%	47.7%	100.0%	83.6%

APPLICABILITY FACTOR (percent)												
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1	402	Variable Speed Drive Control, 5 HP	86.0%	72.8%	73.3%	49.3%	68.3%	77.7%	100.00%	47.7%	100.0%	83.6%
1	403	Demand Controlled Ventilation	86.0%	72.8%	73.3%	49.3%	68.3%	77.7%	100.00%	47.7%	100.0%	83.6%
1	410	Base Fan Motor, 15hp, 1800rpm, 91.0%	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	411	Fan Motor, 15hp, 1800rpm, 92.4%	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	412	Variable Speed Drive Control, 15 HP	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	413	Air Handler Optimization, 15 HP	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	414	Energy Recovery Ventilation	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	415	Electronically Commutated Motors (ECM) o	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	416	Separate Makeup Air/Exhaust Hoods AC	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	417	Demand Controlled Ventilation	5.5%	12.1%	9.0%	0.0%	0.0%	42.0%	37.11%	14.3%	0.0%	12.2%
1	420	Base Fan Motor, 40hp, 1800rpm, 93.0%	20.2%	0.0%	13.6%	0.0%	5.7%	0.0%	22.29%	0.0%	0.0%	52.0%
1	421	Fan Motor, 40hp, 1800rpm, 94.1%	20.2%	0.0%	13.6%	0.0%	5.7%	0.0%	22.29%	0.0%	0.0%	52.0%
1	422	Variable Speed Drive Control, 40 HP	20.2%	0.0%	13.6%	0.0%	5.7%	0.0%	22.29%	0.0%	0.0%	52.0%
1	423	Air Handler Optimization, 40 HP	20.2%	0.0%	13.6%	0.0%	5.7%	0.0%	22.29%	0.0%	0.0%	52.0%
1	424	Demand Controlled Ventilation	20.2%	0.0%	13.6%	0.0%	5.7%	0.0%	22.29%	0.0%	0.0%	52.0%
1	500	Base Non-Commercial Refrigerator	95.2%	75.0%	91.6%	36.8%	100.0%	88.7%	37.11%	87.3%	100.0%	97.4%
1	501	Energy Star Refrigerator	95.2%	75.0%	91.6%	36.8%	100.0%	88.7%	37.11%	87.3%	100.0%	97.4%
1	502	HE Refrigerator - CEE Tier 2 (side by side f	95.2%	75.0%	91.6%	36.8%	100.0%	88.7%	37.11%	87.3%	100.0%	97.4%
1	520	Base Refrigeration System	10.7%	100.0%	26.0%	100.0%	2.5%	29.6%	22.3%	81.6%	58.8%	58.0%
1	521	High-efficiency fan motors	10.3%	81.1%	24.4%	70.4%	1.2%	29.6%	0.0%	78.9%	0.0%	60.8%
1	522	Strip curtains for walk-ins	0.0%	75.5%	4.5%	37.4%	1.2%	9.9%	0.0%	26.6%	0.0%	2.4%
1	523	Night covers for display cases	6.4%	0.0%	1.8%	70.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	524	Evaporator fan controller for MT walk-ins	10.3%	57.0%	23.6%	70.4%	2.5%	29.6%	0.0%	78.9%	0.0%	39.2%
1	525	Efficient compressor motor	3.9%	66.3%	27.2%	37.4%	2.5%	29.6%	0.0%	78.9%	0.0%	39.2%
1	526	Compressor VSD retrofit	0.0%	45.5%	13.0%	19.7%	2.5%	0.0%	0.0%	52.3%	0.0%	1.1%
1	527	Floating head pressure controls	0.0%	58.9%	16.8%	67.0%	1.2%	9.9%	0.0%	66.6%	0.0%	1.1%
1	528	Refrigeration Commissioning				100.0%						
1	529	Demand Hot Gas Defrost	0.0%	9.2%	13.9%	100.0%	2.5%	9.9%	0.0%	52.3%	0.0%	0.0%
1	530	Demand Defrost Electric	3.9%	22.6%	14.7%	100.0%	2.5%	21.2%	0.0%	66.6%	0.0%	38.2%
1	531	Anti-sweat (humidistat) controls	0.0%	17.6%	19.9%	100.0%	1.2%	9.9%	0.0%	0.0%	0.0%	21.6%
1	532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)										
1	533	Freezer-Cooler Replacement Gaskets	10.7%	100.0%	26.0%	100.0%	2.5%	29.6%	22.3%	81.6%	58.8%	58.0%
1	534	High R-Value Glass Doors	0	0.0%	15.8%	100.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%
1	535	Multiplex Compressor System	0.0%	45.5%	13.0%	67.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%
1	536	Oversized Air-Cooled Condenser				100.0%						
1	537	LED Display Lighting	6.4%	57.0%	20.5%	70.4%	1.2%	9.9%	0.0%	26.6%	0.0%	21.6%
1	538	Fiber Optic Display Lighting	6.4%	57.0%	20.5%	70.4%	1.2%	9.9%	0.0%	26.6%	0.0%	21.6%
1	539	Beverage Merchandisers	10.7%	9.9%	2.4%	36.8%	0.0%	9.9%	0.0%	14.8%	0.0%	53.9%
1	540	Reach-In Refrigerators	10.7%	69.1%	17.8%	58.9%	0.0%	29.6%	22.3%	68.8%	58.8%	5.9%
1	541	Reach-In Freezers	4.1%	31.2%	23.6%	100.0%	0.0%	18.3%	0.0%	0.0%	58.8%	0.0%
1	542	Walk-Ins	6.7%	100.0%	11.8%	100.0%	2.5%	29.6%	0.0%	81.6%	0.0%	55.5%
1	610	Base Desktop PC	91.0%	72.8%	84.4%	67.0%	100.0%	100.0%	37.11%	100.0%	100.0%	90.5%
1	611	Energy Star or Better PC	91.0%	72.8%	84.4%	67.0%	100.0%	100.0%	37.11%	100.0%	100.0%	90.5%
1	612	PC Manual Power Management Enabling	91.0%	72.8%	84.4%	67.0%	100.0%	100.0%	37.11%	100.0%	100.0%	90.5%
1	613	PC Network Power Management Enabling	91.0%	72.8%	84.4%	67.0%	100.0%	100.0%	37.11%	100.0%	100.0%	90.5%
1	620	Base Monitor, CRT	38.9%	31.5%	54.9%	37.4%	71.2%	69.2%	37.11%	42.2%	4.9%	80.3%
1	621	Energy Star or Better Monitor	38.9%	31.5%	54.9%	37.4%	71.2%	69.2%	37.11%	42.2%	4.9%	80.3%

APPLICABILITY FACTOR (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
1	622	Monitor Power Management Enabling	4.2%	0.0%	4.3%	0.0%	1.7%	0.0%	0.00%	3.0%	0.0%	0.0%
1	630	Base Monitor, LCD	81.8%	47.0%	82.5%	67.0%	80.9%	100.0%	37.11%	100.0%	95.1%	97.9%
1	631	Energy Star or Better Monitor	81.8%	47.0%	82.5%	67.0%	80.9%	100.0%	37.11%	100.0%	95.1%	97.9%
1	632	Monitor Power Management Enabling	35.8%	0.0%	10.7%	19.8%	49.9%	11.3%	4.14%	0.0%	55.9%	10.7%
1	640	Base Copier	94.6%	18.6%	21.8%	54.5%	57.4%	94.6%	100.00%	97.9%	86.7%	65.0%
1	641	Energy Star or Better Copier	94.6%	18.6%	21.8%	54.5%	57.4%	94.6%	100.00%	97.9%	86.7%	65.0%
1	642	Copier Power Management Enabling	85.1%	16.8%	19.6%	49.0%	51.7%	85.2%	90.00%	88.1%	78.0%	58.5%
1	650	Base Laser Printer	99.9%	77.6%	29.3%	72.3%	88.3%	100.0%	100.00%	96.9%	96.4%	76.2%
1	651	Printer Power Management Enabling	99.9%	77.6%	29.3%	72.3%	88.3%	100.0%	100.00%	96.9%	96.4%	76.2%
1	660	Base Data Center/Server Room	0.7%	0.0%	0.0%	0.3%	0.3%	0.3%	5.06%	0.6%	0.3%	0.2%
1	661	Data Center Improved Operations	0.7%	0.0%	0.0%	0.3%	0.3%	0.3%	5.06%	0.6%	0.3%	0.2%
1	662	Data Center Best Practices	0.7%	0.0%	0.0%	0.3%	0.3%	0.3%	5.06%	0.6%	0.3%	0.2%
1	663	Data Center State of the Art practices	0.7%	0.0%	0.0%	0.3%	0.3%	0.3%	5.06%	0.6%	0.3%	0.2%
1	700	Base Water Heating	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	701	Demand controlled circulating systems	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	702	High Efficiency Water Heater (electric)	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	703	Heat Pump Water Heater (air source)	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	704	Hot Water Pipe Insulation	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	705	Faucet Aerators										
1	706	Heat Recovery Unit	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	707	Heat Trap	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	708	Tankless Water Heater	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	709	Solar Water Heater	37.7%	23.9%	83.4%	17.7%	83.7%	24.3%	12.3%	21.1%	31.9%	2.4%
1	710	Pre-rinse spray valves	0.8%	5.0%	13.0%	17.7%	0.0%	8.3%	0.00%	0.0%	0.0%	0.0%
1	800	Base Vending Machines	42.1%	0.0%	48.2%	29.6%	16.3%	45.7%	14.82%	82.1%	2.0%	17.5%
1	801	Vending Misers (cooled machines only)	42.1%	0.0%	48.2%	29.6%	16.3%	45.7%	14.82%	82.1%	2.0%	17.5%
1	900	Base Cooking	1.43%	76.74%	13.02%	47.28%	0.00%	50.89%	0.00%	52.26%	58.82%	24.77%
1	901	Convection Oven	0.00%	76.74%	13.02%	29.55%	0.00%	50.89%	0.00%	0.00%	58.82%	24.77%
1	902	Efficient Fryer	1.43%	24.18%	0.00%	29.55%	0.00%	0.00%	0.00%	0.00%	0.00%	24.77%
1	903	Efficient Steamer	1.43%	43.04%	0.00%	47.28%	0.00%	0.00%	0.00%	52.26%	0.00%	24.77%
1	904	Energy Star Hot Food Holding Cabinets	1.43%	76.74%	6.58%	39.04%	0.00%	39.66%	0.00%	52.26%	46.11%	24.77%
1	940	Base Heating	28.78%	16.55%	2.59%	0.18%	0.14%	0.49%	2.72%	45.07%	64.71%	7.25%
1	941	XHeat	28.78%	16.55%	2.59%	0.18%	0.14%	0.49%	2.72%	45.07%	64.71%	7.25%
1	970	Base Miscellaneous	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	971	XMisc	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

APPLICABILITY FACTOR (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
New	100	Base Bldg Design - 30%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
New	101	High Performance Building/Int Design - Tier	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
New	200	Base Bldg Design - 50%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%
New	201	High Performance Building/Int Design - Tier	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%
New	300	Base Bldg Design - 70%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
New	301	Near Zero Energy (60-75%)	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

INCOMPLETE FACTOR (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
Existing	100	Base Fluorescent Fixture, 4L4'T12, 34W, 2EEMAG	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	101	RET 4L4' Premium T8, 1EB, base 4L4'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	102	RET 2L4' Premium T8, 1EB, Reflector, base 4L4'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	103	LED Indoor Lighting - Base 4L4'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	104	Occupancy Sensor, 4L4' Fluorescent Fixtures - Base	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	105	Continuous Dimming, 5L4' Fluorescent Fixtures - Ba	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	106	Lighting Control Tuneup	25.8%	43.0%	37.9%	62.6%	31.2%	8.4%	0.0%	87.7%	6.9%	60.1%
Existing	107	High Performance Lighting Remod/Renov - 25% Sav	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	120	Base Fluorescent Fixture, 2L4'T12, 34W, 1EEMAG	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	121	RET 2L4' Premium T8, 1EB -- base 2L4'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	122	RET 1L4' Premium T8, 1EB, Reflector OEM - Base 2	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	123	LED Indoor Lighting - Base 2L4'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	124	Occupancy Sensor, 8L4' Fluorescent Fixtures - Base	99.7%	100.0%	100.0%	100.0%	100.0%	100.0%	93.7%	100.0%	100.0%	100.0%
Existing	125	Continuous Dimming, 10L4' Fluorescent Fixtures - B	100.0%	100.0%	100.0%	100.0%	96.4%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	126	Lighting Control Tuneup - Base 2L4'T12	25.8%	43.0%	37.9%	62.6%	31.2%	8.4%	0.0%	87.7%	6.9%	60.1%
Existing	127	High Performance Lighting Remod/Renov - 25% Sav	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	130	Base Fluorescent Fixture, 2L8'T12, 60W, 1EEMAG	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM - Bas	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	133	LED Indoor Lighting - Base 2L8'T12	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	134	Occupancy Sensor, 4L8' Fluorescent Fixtures - Base	97.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	135	Continuous Dimming, 5L8' Fluorescent Fixtures - Ba	100.0%	100.0%	100.0%	100.0%	96.4%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	136	High Performance Lighting Remod/Renov - 25% Sav	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	140	Base Incandescent Flood, 75W to Screw-in Replace	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	141	CFL Screw-in 18W	66.5%	59.8%	94.1%	100.0%	35.8%	94.1%	92.0%	14.5%	26.2%	83.7%
Existing	142	Cold Cathode Lamps	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	143	Screw-in LED--Base Incandescent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	145	Base CFL to screw-in replacement	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	146	Screw-in LED--Base CFL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	150	Base Incandescent Flood, 75W to Hardwired CFL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	151	CFL Hardwired, Modular 18W	29.4%	57.3%	97.2%	61.4%	100.0%	64.1%	37.6%	93.7%	36.0%	61.2%
Existing	152	Ceramic Metal Halide	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
Existing	153	Hardwired LED fixture--Base Incandescent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	155	Base CFL to Hardwired replacement	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	156	Hardwired LED fixture--Base CFL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	160	Base High Bay Probe-start Metal Halide, 400W	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**INCOMPLETE FACTOR
(percent)**

Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
Existing	161	High Bay T5 - Base Std MH	100.0%	100.0%	87.7%	100.0%	46.3%	36.0%	100.0%	100.0%	100.0%	100.0%
Existing	162	PSMH + electronic ballast	100%	100%	100%	58%	100%	79%	68%	100%	100%	74%
Existing	163	Induction High Bay Lighting - Base Std MH	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Existing	164	Occupancy Sensor, High Bay T5 - Base Std MH	100.0%	100.0%	99.5%	100.0%	46.3%	64.9%	100.0%	100.0%	100.0%	100.0%
Existing	165	High Performance Lighting Remod/Renov - 25% Sav	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	180	Base 4L4'T8, 1EB	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	181	ROB 4L4' Premium T8, 1EB - Base 4L4'T8	59.1%	78.0%	62.3%	0.0%	39.0%	100.0%	76.6%	98.6%	0.0%	59.3%
Existing	182	Occupancy Sensor, 4L4' Fluorescent Fixtures - Base	99.4%	100.0%	100.0%	100.0%	100.0%	82.6%	77.4%	97.1%	100.0%	96.3%
Existing	183	Lighting Control Tuneup - Base 4L4'T8	25.8%	43.0%	37.9%	62.6%	31.2%	8.4%	0.0%	87.7%	6.9%	60.1%
Existing	184	LED Indoor Lighting - Base 4L4'T8	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	185	High Performance Lighting Remod/Renov - 25% Sav	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	190	Base 2L4'T8, 1EB	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	59.2%	100.0%	63.3%	0.0%	100.0%	100.0%	74.5%	98.8%	0.0%	54.5%
Existing	192	Occupancy Sensor, 8L4' Fluorescent Fixtures - Base	99.7%	100.0%	97.1%	100.0%	100.0%	87.4%	70.9%	94.0%	100.0%	95.2%
Existing	193	Lighting Control Tuneup - Base 2L4'T8	25.8%	43.0%	37.9%	62.6%	31.2%	8.4%	0.0%	87.7%	6.9%	60.1%
Existing	194	LED Indoor Lighting - Base 2L4'T8	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	196	High Performance Lighting Remod/Renov - 25% Sav	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	200	Base Exit Sign	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	201	LED Exit Sign	3.9%	23.0%	21.8%	50.7%	11.5%	14.8%	46.0%	64.0%	40.0%	60.1%
Existing	210	Base Outdoor Mercury Vapor 400W Lamp	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	211	High Pressure Sodium 250W Lamp	57.5%	62.0%	65.2%	100.0%	88.5%	44.5%	64.9%	73.8%	100.0%	57.4%
Existing	212	LED Outdoor Area Lighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	213	LED Outdoor Bi-level Fixtures	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	214	Outdoor Lighting Controls (Photocell/Timeclock)	36.4%	86.2%	79.4%	100.0%	76.8%	79.2%	62.9%	87.3%	100.0%	62.6%
Existing	220	Base Street Lighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	221	Induction Streetlighting										100.0%
Existing	222	LED Streetlighting										99.0%
Existing	300	Base Centrifugal Chiller, 0.58 kW/ton, 500 tons	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	100.0%	0.0%	100.0%	0.0%	100.0%	100.0%	37.1%	46.2%	0.0%	100.0%
Existing	302	Window Film (Standard)	83.6%	90.4%	69.4%	100.0%	95.0%	100.0%	81.8%	84.8%	100.0%	89.7%
Existing	303	EMS - Chiller	48.7%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	100.0%	4.2%
Existing	304	Cool Roof - Chiller	81.1%	87.9%	77.4%	70.4%	83.7%	74.9%	37.1%	73.4%	41.2%	71.5%
Existing	305	Chiller Tune Up/Diagnostics	0.0%	100.0%	100.0%	100.0%	100.0%	11.2%	29.8%	0.0%	100.0%	8.4%
Existing	306	VSD for Chiller Pumps and Towers	49.1%	0.0%	0.0%	0.0%	0.0%	0.0%	14.8%	0.0%	0.0%	18.5%
Existing	307	EMS Optimization	50.0%	0.0%	0.0%	0.0%	0.0%	37.4%	0.0%	0.0%	0.0%	0.0%
Existing	308	Economizer - Chiller	54.9%	82.1%	74.3%	47.4%	68.8%	63.9%	22.3%	56.8%	0.0%	24.9%
Existing	309	Duct/Pipe Insulation - Chiller	89.8%	77.6%	61.1%	86.7%	85.1%	88.7%	75.7%	86.2%	41.2%	23.9%

INCOMPLETE FACTOR (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
Existing	311	High Efficiency Chiller Motors	36.3%	100.0%	100.0%	0.0%	100.0%	37.4%	0.0%	66.2%	0.0%	0.0%
Existing	350	Base DX Packaged System, EER=10.3, 10 tons	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	351	DX Tune Up/ Advanced Diagnostics	79.0%	47.3%	51.9%	10.6%	92.9%	55.1%	29.8%	0.0%	37.5%	57.4%
Existing	352	DX Packaged System, EER=10.9, 10 tons	89.0%	76.9%	67.7%	100.0%	100.0%	81.3%	22.3%	84.4%	36.8%	80.5%
Existing	353	DX Packaged System, EER=11.5, 10 tons	94.5%	88.4%	83.9%	100.0%	100.0%	90.7%	61.1%	92.2%	68.4%	90.3%
Existing	354	DX Packaged System, EER=13.4, 10 tons	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	356	Ductless (Mini Split) Cooling System	34.6%	0.0%	62.0%	100.0%	100.0%	0.0%	26.17%	47.9%	100.0%	0.0%
Existing	357	Window Film (Standard)	83.6%	90.4%	69.4%	100.0%	95.0%	100.0%	81.8%	84.8%	100.0%	89.7%
Existing	358	Prog. Thermostat - DX	75.8%	58.1%	66.5%	100.0%	6.5%	38.7%	0.0%	100.0%	36.8%	51.7%
Existing	359	Cool Roof - DX	81.1%	87.9%	77.4%	70.4%	83.7%	74.9%	37.1%	73.4%	41.2%	71.5%
Existing	360	Optimize Controls	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%
Existing	361	Economizer	54.9%	82.1%	74.3%	47.4%	68.8%	63.9%	22.3%	56.8%	0.0%	24.9%
Existing	362	Aerosol Duct Sealing - DX	100.0%	91.6%	100.0%	100.0%	97.4%	100.0%	37.1%	100.0%	100.0%	96.0%
Existing	363	Ceiling/roof Insulation - DX	13.9%	21.6%	16.1%	33.0%	53.7%	20.8%	0.0%	0.0%	0.0%	48.1%
Existing	364	Duct/Pipe Insulation - DX	89.8%	77.6%	61.1%	86.7%	85.1%	88.7%	75.7%	86.2%	41.2%	23.9%
Existing	365	DX Coil Cleaning	79.0%	47.3%	51.9%	10.6%	92.9%	55.1%	29.8%	0.0%	37.5%	57.4%
Existing	400	Base Fan Motor, 5hp, 1800rpm, 87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	401	Fan Motor, 5hp, 1800rpm, 89.5%	89.4%	100.0%	100.0%	100.0%	100.0%	71.9%	0.0%	41.4%	100.0%	33.8%
Existing	402	Variable Speed Drive Control, 5 HP	47.3%	100.0%	82.4%	100.0%	100.0%	100.0%	0.0%	84.8%	100.0%	26.5%
Existing	403	Demand Controlled Ventilation	79.6%	76.3%	100.0%	55.9%	100.0%	59.2%	37.1%	100.0%	100.0%	33.5%
Existing	410	Base Fan Motor, 15hp, 1800rpm, 91.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	411	Fan Motor, 5hp, 1800rpm, 89.5%	89.4%	100.0%	100.0%	100.0%	100.0%	71.9%	0.0%	41.4%	100.0%	33.8%
Existing	412	Variable Speed Drive Control, 15 HP	47.3%	100.0%	82.4%	100.0%	100.0%	100.0%	0.0%	84.8%	100.0%	26.5%
Existing	413	Air Handler Optimization, 15 HP	56.2%	100.0%	97.1%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	21.7%
Existing	414	Energy Recovery Ventilation	58.7%	100.0%	97.8%	100.0%	100.0%	100.0%	26.2%	100.0%	100.0%	19.9%
Existing	415	Electronically Commutated Motors (ECM) on an air handler	100.0%	71.8%	100.0%	100.0%	100.0%	80.4%	100.0%	100.0%	100.0%	100.0%
Existing	416	Separate Makeup Air/Exhaust Hoods AC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	417	Demand Controlled Ventilation	79.6%	76.3%	100.0%	55.9%	100.0%	59.2%	37.1%	100.0%	100.0%	33.5%
Existing	420	Base Fan Motor, 40hp, 1800rpm, 93.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	421	Fan Motor, 5hp, 1800rpm, 89.5%	89.4%	100.0%	100.0%	100.0%	100.0%	71.9%	0.0%	41.4%	100.0%	33.8%
Existing	422	Variable Speed Drive Control, 40 HP	47.3%	100.0%	82.4%	100.0%	100.0%	100.0%	0.0%	84.8%	100.0%	26.5%
Existing	423	Air Handler Optimization, 40 HP	56.2%	100.0%	97.1%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	21.7%
Existing	424	Demand Controlled Ventilation	79.6%	76.3%	100.0%	55.9%	100.0%	59.2%	37.1%	100.0%	100.0%	33.5%
Existing	500	Base Non-Commercial Refrigerator	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	501	Energy Star Refrigerator	94.9%	100.0%	100.0%	100.0%	94.4%	75.7%	96.3%	98.4%	41.2%	96.8%
Existing	502	HE Refrigerator - CEE Tier 2 (side by side freezer)	98.5%	100.0%	100.0%	100.0%	98.3%	92.7%	98.9%	99.5%	82.4%	99.0%
Existing	520	Base Refrigeration System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	521	High-efficiency fan motors	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	67.3%
Existing	522	Strip curtains for walk-ins	100.0%	79.5%	100.0%	82.3%	94.3%	100.0%	100.0%	87.3%	100.0%	100.0%
Existing	523	Night covers for display cases	84.3%	100.0%	100.0%	82.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	524	Evaporator fan controller for MT walk-ins	84.3%	94.3%	94.6%	100.0%	88.6%	100.0%	0.0%	100.0%	100.0%	67.3%
Existing	525	Efficient compressor motor	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	67.3%
Existing	526	Compressor VSD retrofit	100.0%	100.0%	98.4%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%
Existing	527	Floating head pressure controls	100.0%	100.0%	100.0%	50.7%	100.0%	100.0%	100.0%	100.0%	100.0%	67.3%
Existing	528	Refrigeration Commissioning	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Existing	529	Demand Hot Gas Defrost	100.0%	100.0%	100.0%	70.4%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

INCOMPLETE FACTOR (percent)												
			Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
Segment	Measure #	Measure Description										
Existing	530	Demand Defrost Electric	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	531	Anti-sweat (humidistat) controls	100.0%	100.0%	98.4%	33.0%	100.0%	100.0%	100.0%	100.0%	100.0%	67.3%
Existing	532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)										
Existing	533	Freezer-Cooler Replacement Gaskets	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Existing	534	High R-Value Glass Doors	100.0%	100.0%	100.0%	70.4%	94.3%	100.0%	100.0%	100.0%	100.0%	67.3%
Existing	535	Multiplex Compressor System	100.0%	100.0%	100.0%	70.4%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	536	Oversized Air-Cooled Condenser	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Existing	537	LED Display Lighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	67.3%
Existing	538	Fiber Optic Display Lighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	539	Beverage Merchandisers	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%
Existing	540	Reach-In Refrigerators	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%	64.0%
Existing	541	Reach-In Freezers	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%
Existing	542	Walk-Ins	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	610	Base Desktop PC	100.0%	100.0%	100.0%	100.0%	100.00%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	611	Energy Star or Better PC	75.0%	5.0%	75.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Existing	612	PC Manual Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Existing	613	PC Network Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Existing	620	Base Monitor, CRT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	621	Energy Star or Better Monitor	89.2%	100.0%	92.2%	100.0%	97.6%	100.0%	100.0%	92.8%	100.0%	100.0%
Existing	622	Monitor Power Management Enabling	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Existing	630	Base Monitor, LCD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	631	Energy Star or Better Monitor	56.3%	100.0%	87.0%	70.4%	38.3%	88.7%	88.9%	100.0%	41.2%	89.1%
Existing	632	Monitor Power Management Enabling	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%
Existing	640	Base Copier	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	641	Energy Star or Better Copier	74.5%	98.6%	74.7%	100.0%	88.8%	63.8%	100.0%	38.9%	39.2%	84.1%
Existing	642	Copier Power Management Enabling	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%
Existing	650	Base Laser Printer	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	651	Printer Power Management Enabling	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Existing	660	Base Data Center/Server Room	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	661	Data Center Improved Operations	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Existing	662	Data Center Best Practices	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
Existing	663	Data Center State of the Art practices	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	700	Base Water Heating	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	701	Demand controlled circulating systems	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	87.7%	100.0%	100.0%	100.0%
Existing	702	High Efficiency Water Heater (electric)	100.0%	100.0%	92.8%	100.0%	100.0%	100.0%	88.5%	100.0%	100.0%	100.0%
Existing	703	Heat Pump Water Heater (air source)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	704	Hot Water Pipe Insulation	83.5%	100.0%	86.2%	100.0%	45.1%	91.7%	91.1%	100.0%	68.1%	100.0%
Existing	705	Faucet Aerators	60.6%	86.6%	93.3%	70.4%	100.0%	59.3%	62.9%	47.7%	41.2%	68.6%
Existing	706	Heat Recovery Unit	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	707	Heat Trap	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Existing	708	Tankless Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	709	Solar Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	710	Pre-rinse spray valves										
Existing	800	Base Vending Machines	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Existing	801	Vending Misers (cooled machines only)	91.6%	100.0%	93.0%	100.0%	98.6%	83.9%	100.0%	100.0%	100.0%	100.0%
Existing	900	Base Cooking	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	901	Convection Oven	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	902	Efficient Fryer	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	903	Efficient Steamer	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	904	Energy Star Hot Food Holding Cabinets	100.00%	100.00%	29.00%	100.00%	100.00%	100.00%	21.00%	100.00%	100.00%	100.00%
Existing	940	Base Heating	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	941	XHeat	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	970	Base Miscellaneous	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Existing	971	XMisc	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

INCOMPLETE FACTOR (percent)			Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
Segment	Measure #	Measure Description										
New	100	Base Bldg Design - 30%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	101	High Performance Building/Int Design - Tier 1 30%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	200	Base Bldg Design - 50%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	201	High Performance Building/Int Design - Tier 2 50%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	300	Base Bldg Design - 70%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	301	Near Zero Energy (60-75%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**FEASIBILITY FACTOR
(percent)**

Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
1	100	Base Fluorescent Fixture, 4L4'T12, 34W, 2I	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	101	RET 4L4' Premium T8, 1EB, base 4L4'T12	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	102	RET 2L4' Premium T8, 1EB, Reflector, base	30.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	103	LED Indoor Lighting - Base 4L4'T12	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	104	Occupancy Sensor, 4L4' Fluorescent Fixture	40.0%	10.0%	10.0%	7.0%	20.0%	50.0%	35.0%	50.0%	20.0%	20.0%
1	105	Continuous Dimming, 5L4' Fluorescent Fixture	40.0%	50.0%	12.0%	18.2%	40.0%	30.0%	21.0%	10.0%	30.0%	30.0%
1	106	Lighting Control Tuneup	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	107	High Performance Lighting Remod/Renov -	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	120	Base Fluorescent Fixture, 2L4'T12, 34W, 1I	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	121	RET 2L4' Premium T8, 1EB - base 2L4'T12	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%
1	122	RET 1L4' Premium T8, 1EB, Reflector OEM	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	123	LED Indoor Lighting - Base 2L4'T12	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	124	Occupancy Sensor, 8L4' Fluorescent Fixture	40.0%	10.0%	10.0%	7.0%	20.0%	50.0%	35.0%	50.0%	20.0%	20.0%
1	125	Continuous Dimming, 10L4' Fluorescent Fixture	40.0%	50.0%	12.0%	18.2%	40.0%	30.0%	21.0%	10.0%	30.0%	30.0%
1	126	Lighting Control Tuneup - Base 2L4'T12	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	127	High Performance Lighting Remod/Renov -	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	130	Base Fluorescent Fixture, 2L8'T12, 60W, 1I	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8"	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	133	LED Indoor Lighting - Base 2L8'T12	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	134	Occupancy Sensor, 4L8' Fluorescent Fixture	40.0%	10.0%	10.0%	7.0%	20.0%	50.0%	35.0%	50.0%	20.0%	20.0%
1	135	Continuous Dimming, 5L8' Fluorescent Fixture	40.0%	50.0%	12.0%	18.2%	40.0%	30.0%	21.0%	10.0%	30.0%	30.0%
1	136	High Performance Lighting Remod/Renov -	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	140	Base Incandescent Flood, 75W to Screw-in	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	141	CFL Screw-in 18W	90.0%	50.0%	50.0%	90.0%	90.0%	90.0%	90.0%	90.0%	70.0%	90.0%
1	142	Cold Cathode Lamps	90.0%	50.0%	50.0%	90.0%	90.0%	90.0%	90.0%	90.0%	70.0%	90.0%
1	143	Screw-in LED--Base Incandescent	90.0%	50.0%	50.0%	90.0%	90.0%	90.0%	90.0%	90.0%	70.0%	90.0%
1	145	Base CFL to screw-in replacement	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	146	Screw-in LED--Base CFL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	150	Base Incandescent Flood, 75W to Hardwire	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	151	CFL Hardwired, Modular 18W	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	152	Ceramic Metal Halide	50.0%	50.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	5.0%	50.0%
1	153	Hardwired LED fixture--Base Incandescent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	155	Base CFL to Hardwired replacement	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	156	Hardwired LED fixture--Base CFL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	160	Base High Bay Probe-start Metal Halide, 40	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	161	High Bay T5 - Base Std MH	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	162	PSMH + electronic ballast	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	163	Induction High Bay Lighting - Base Std MH	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	164	Occupancy Sensor, High Bay T5 - Base Std	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%
1	165	High Performance Lighting Remod/Renov -	30%	30%	30%	30.0%	30%	30%	30.0%	30%	30%	30%
1	180	Base 4L4'T8, 1EB	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	181	ROB 4L4' Premium T8, 1EB - Base 4L4'T8	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	182	Occupancy Sensor, 4L4' Fluorescent Fixture	40.0%	10.0%	10.0%	7.0%	20.0%	50.0%	35.0%	50.0%	20.0%	20.0%
1	183	Lighting Control Tuneup - Base 4L4'T8	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	184	LED Indoor Lighting - Base 4L4'T8	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%

FEASIBILITY FACTOR (percent)												
Segment	Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
1	185	High Performance Lighting Remod/Renov -	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	190	Base 2L4'T8, 1EB	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	192	Occupancy Sensor, 8L4' Fluorescent Fixtur	40.0%	10.0%	10.0%	7.0%	50.0%	50.0%	35.0%	50.0%	20.0%	20.0%
1	193	Lighting Control Tuneup - Base 2L4'T8	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	194	LED Indoor Lighting - Base 2L4'T8	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	196	High Performance Lighting Remod/Renov -	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	200	Base Exit Sign	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	201	LED Exit Sign	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	210	Base Outdoor Mercury Vapor 400W Lamp	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	211	High Pressure Sodium 250W Lamp	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	212	LED Outdoor Area Lighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	213	LED Outdoor Bi-level Fixtures	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
1	214	Outdoor Lighting Controls (Photocell/Timec	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
1	220	Base Street Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	221	Induction Streetlighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	222	LED Streetlighting	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	300	Base Centrifugal Chiller, 0.58 kW/ton, 500 t	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	100.0%	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
1	302	Window Film (Standard)	75.0%	75.0%	50.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	303	EMS - Chiller	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	304	Cool Roof - Chiller	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
1	305	Chiller Tune Up/Diagnostics	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	306	VSD for Chiller Pumps and Towers	66.8%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%
1	307	EMS Optimization	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	308	Economizer - Chiller	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	89.5%
1	309	Duct/Pipe Insulation - Chiller	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
1	311	High Efficiency Chiller Motors	63%	100%	100%	0%	100%	100%	100%	100%	0%	100%
1	350	Base DX Packaged System, EER=10.3, 10	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	351	DX Tune Up/ Advanced Diagnostics	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	352	DX Packaged System, EER=10.9, 10 tons	86.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.7%
1	353	DX Packaged System, EER=11.5, 10 tons	86.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.7%
1	354	DX Packaged System, EER=13.4, 10 tons	86.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.7%
1	356	Ductless (Mini Split) Cooling System	81.1%	0.0%	59.4%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	357	Window Film (Standard)	75.0%	75.0%	50.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	358	Prog. Thermostat - DX	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	359	Cool Roof - DX	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
1	360	Optimize Controls	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	361	Economizer	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	89.5%
1	362	Aerosol Duct Sealing - DX	32.0%	32.0%	32.0%	32.0%	32.0%	32.0%	32.0%	32.0%	32.0%	32.0%
1	363	Ceiling/roof Insulation - DX	22.0%	43.0%	100.0%	100.0%	100.0%	3.0%	100.0%	100.0%	100.0%	100.0%
1	364	Duct/Pipe Insulation - DX	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	365	DX Coil Cleaning	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	400	Base Fan Motor, 5hp, 1800rpm, 87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	401	Fan Motor, 5hp, 1800rpm, 89.5%	94.4%	100.0%	91.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	402	Variable Speed Drive Control, 5 HP	82.6%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%

FEASIBILITY FACTOR (percent)												
			Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
Segment	Measure #	Measure Description	Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
1	403	Demand Controlled Ventilation	78.6%	92.2%	70.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	91.2%
1	410	Base Fan Motor, 15hp, 1800rpm, 91.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	411	Fan Motor, 15hp, 1800rpm, 92.4%	94.4%	100.0%	91.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	412	Variable Speed Drive Control, 15 HP	82.6%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
1	413	Air Handler Optimization, 15 HP	51.0%	24.2%	37.2%	17.7%	24.4%	65.7%	37.1%	27.9%	58.8%	91.4%
1	414	Energy Recovery Ventilation	55.2%	100.0%	100.0%	100.0%	100.0%	69.3%	100.0%	100.0%	100.0%	87.6%
1	415	Electronically Commutated Motors (ECM) o	100.0%	100.0%	100.0%	100.0%	100.0%	81.8%	0.0%	100.0%	100.0%	81.4%
1	416	Separate Makeup Air/Exhaust Hoods AC	0.0%	100.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	417	Demand Controlled Ventilation	78.6%	92.2%	70.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	91.2%
1	420	Base Fan Motor, 40hp, 1800rpm, 93.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	421	Fan Motor, 40hp, 1800rpm, 94.1%	94.4%	100.0%	91.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	422	Variable Speed Drive Control, 40 HP	82.6%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
1	423	Air Handler Optimization, 40 HP	51.0%	24.2%	37.2%	17.7%	24.4%	65.7%	37.1%	27.9%	58.8%	91.4%
1	424	Demand Controlled Ventilation	78.6%	92.2%	70.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	91.2%
1	500	Base Non-Commercial Refrigerator	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	501	Energy Star Refrigerator	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	502	HE Refrigerator - CEE Tier 2 (side by side f	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	520	Base Refrigeration System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	521	High-efficiency fan motors	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
1	522	Strip curtains for walk-ins	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	0.0%	100.0%
1	523	Night covers for display cases	100.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
1	524	Evaporator fan controller for MT walk-ins	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	41.2%
1	525	Efficient compressor motor	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
1	526	Compressor VSD retrofit	0.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	0.0%	100.0%
1	527	Floating head pressure controls	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	0.0%	100.0%
1	528	Refrigeration Commissioning	20.0%	20.0%	20.0%	100.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	529	Demand Hot Gas Defrost	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%
1	530	Demand Defrost Electric	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
1	531	Anti-sweat (humidistat) controls	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%
1	532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)										
1	533	Freezer-Cooler Replacement Gaskets	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	534	High R-Value Glass Doors	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	100.0%	0.0%	0.0%	100.0%
1	535	Multiplex Compressor System	0.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	536	Oversized Air-Cooled Condenser	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	537	LED Display Lighting	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
1	538	Fiber Optic Display Lighting	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
1	539	Beverage Merchandisers	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	540	Reach-In Refrigerators	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	541	Reach-In Freezers	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	542	Walk-Ins	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	610	Base Desktop PC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	611	Energy Star or Better PC	75.0%	100.0%	75.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	612	PC Manual Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	613	PC Network Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	620	Base Monitor, CRT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	621	Energy Star or Better Monitor	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

FEASIBILITY FACTOR (percent)												
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			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
1	622	Monitor Power Management Enabling	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	630	Base Monitor, LCD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	631	Energy Star or Better Monitor	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	632	Monitor Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	640	Base Copier	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	641	Energy Star or Better Copier	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	642	Copier Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	650	Base Laser Printer	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	651	Printer Power Management Enabling	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	660	Base Data Center/Server Room	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	661	Data Center Improved Operations	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
1	662	Data Center Best Practices	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	663	Data Center State of the Art practices	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	700	Base Water Heating	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	701	Demand controlled circulating systems	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	702	High Efficiency Water Heater (electric)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	703	Heat Pump Water Heater (air source)	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
1	704	Hot Water Pipe Insulation	32.0%	5.0%	73.8%	17.7%	75.9%	8.3%	12.3%	18.8%	31.9%	2.4%
1	705	Faucet Aerators										
1	706	Heat Recovery Unit	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	707	Heat Trap	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	708	Tankless Water Heater	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
1	709	Solar Water Heater	76.0%	20.0%	4.0%	20.0%	49.0%	20.0%	0.0%	20.0%	20.0%	0.0%
1	710	Pre-rinse spray valves										
1	800	Base Vending Machines	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1	801	Vending Misers (cooled machines only)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	900	Base Cooking	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	901	Convection Oven	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	902	Efficient Fryer	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	903	Efficient Steamer	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	904	Energy Star Hot Food Holding Cabinets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	940	Base Heating	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	941	XHeat	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	970	Base Miscellaneous	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	971	XMisc	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

FEASIBILITY FACTOR (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
New	100	Base Bldg Design - 30%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	101	High Performance Building/Int Design - Tier	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	200	Base Bldg Design - 50%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	201	High Performance Building/Int Design - Tier	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	300	Base Bldg Design - 70%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
New	301	Near Zero Energy (60-75%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ENERGY SAVINGS (percent)												
Segment	Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
1	100	Base Fluorescent Fixture, 4L4'T12, 34W, 2EEMAG										
1	101	RET 4L4' Premium T8, 1EB, base 4L4'T12	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	102	RET 2L4' Premium T8, 1EB, Reflector, base	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%
1	103	LED Indoor Lighting - Base 4L4'T12	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%
1	104	Occupancy Sensor, 4L4' Fluorescent Fixture	30.0%	20.0%	20.0%	20.0%	30.0%	30.0%	20.0%	20.0%	20.0%	20.0%
1	105	Continuous Dimming, 5L4' Fluorescent Fixture	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
1	106	Lighting Control Tuneup	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	107	High Performance Lighting Remod/Renov -	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	120	Base Fluorescent Fixture, 2L4'T12, 34W, 1EEMAG										
1	121	RET 2L4' Premium T8, 1EB - base 2L4'T12	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	122	RET 1L4' Premium T8, 1EB, Reflector OEM	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%	65.3%
1	123	LED Indoor Lighting - Base 2L4'T12	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%
1	124	Occupancy Sensor, 8L4' Fluorescent Fixture	30.0%	20.0%	20.0%	20.0%	30.0%	30.0%	20.0%	20.0%	20.0%	20.0%
1	125	Continuous Dimming, 10L4' Fluorescent Fixture	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
1	126	Lighting Control Tuneup - Base 2L4'T12	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	127	High Performance Lighting Remod/Renov -	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	130	Base Fluorescent Fixture, 2L8'T12, 60W, 1EEMAG										
1	131	RET 2 - 2L4' Premium T8, 1EB - Base 2L8"	12.9%	12.9%	12.9%	12.9%	12.9%	12.9%	12.9%	12.9%	12.9%	12.9%
1	132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM	59.7%	59.7%	59.7%	59.7%	59.7%	59.7%	59.7%	59.7%	59.7%	59.7%
1	133	LED Indoor Lighting - Base 2L8'T12	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%	58.7%
1	134	Occupancy Sensor, 4L8' Fluorescent Fixture	30.0%	20.0%	20.0%	20.0%	30.0%	30.0%	20.0%	20.0%	20.0%	20.0%
1	135	Continuous Dimming, 5L8' Fluorescent Fixture	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
1	136	High Performance Lighting Remod/Renov -	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	140	Base Incandescent Flood, 75W to Screw-in Replacement										
1	141	CFL Screw-in 18W	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
1	142	Cold Cathode Lamps	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
1	143	Screw-in LED--Base Incandescent	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
1	145	Base CFL to screw-in replacement										
1	146	Screw-in LED--Base CFL	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%
1	150	Base Incandescent Flood, 75W to Hardwired CFL										
1	151	CFL Hardwired, Modular 18W	76.0%	76.0%	76.0%	76.0%	76.0%	76.0%	76.0%	76.0%	76.0%	76.0%
1	152	Ceramic Metal Halide	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%
1	153	Hardwired LED fixture--Base Incandescent	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
1	155	Base CFL to Hardwired replacement										
1	156	Hardwired LED fixture--Base CFL	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%	67.5%
1	160	Base High Bay Probe-start Metal Halide, 400W										
1	161	High Bay T5 - Base Std MH	48.6%	48.6%	48.6%	48.6%	48.6%	48.6%	48.6%	48.6%	48.6%	48.6%
1	162	PSMH + electronic ballast	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
1	163	Induction High Bay Lighting - Base Std MH	37.4%	37.4%	37.4%	37.4%	37.4%	37.4%	37.4%	37.4%	37.4%	37.4%
1	164	Occupancy Sensor, High Bay T5 - Base Std	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	165	High Performance Lighting Remod/Renov -	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	180	Base 4L4'T8, 1EB										
1	181	ROB 4L4' Premium T8, 1EB - Base 4L4'T8	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%
1	182	Occupancy Sensor, 4L4' Fluorescent Fixture	30.0%	20.0%	20.0%	20.0%	30.0%	30.0%	20.0%	20.0%	20.0%	20.0%
1	183	Lighting Control Tuneup - Base 4L4'T8	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	184	LED Indoor Lighting - Base 4L4'T8	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%

ENERGY SAVINGS (percent)												
Segment	Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
1	185	High Performance Lighting Remod/Renov -	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	190	Base 2L4'T8, 1EB										
1	191	ROB 2L4' Premium T8, 1EB - Base 2L4'T8	17.2%	17.2%	17.2%	17.2%	17.2%	17.2%	17.2%	17.2%	17.2%	17.2%
1	192	Occupancy Sensor, 8L4' Fluorescent Fixtur	30.0%	20.0%	20.0%	20.0%	30.0%	30.0%	20.0%	20.0%	20.0%	20.0%
1	193	Lighting Control Tuneup - Base 2L4'T8	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	194	LED Indoor Lighting - Base 2L4'T8	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%	29.1%
1	196	High Performance Lighting Remod/Renov -	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	200	Base Exit Sign										
1	201	LED Exit Sign	80.8%	80.8%	80.8%	80.8%	80.8%	80.8%	80.8%	80.8%	80.8%	80.8%
1	210	Base Outdoor Mercury Vapor 400W Lamp										
1	211	High Pressure Sodium 250W Lamp	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
1	212	LED Outdoor Area Lighting	51.9%	51.9%	51.9%	51.9%	51.9%	51.9%	51.9%	51.9%	51.9%	51.9%
1	213	LED Outdoor Bi-level Fixtures	69.6%	69.6%	69.6%	69.6%	69.6%	69.6%	69.6%	69.6%	69.6%	69.6%
1	214	Outdoor Lighting Controls (Photocell/Timec	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%
1	220	Base Street Lighting										
1	221	Induction Streetlighting	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1	222	LED Streetlighting	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%
1	300	Base Centrifugal Chiller, 0.58 kW/ton, 500 tons										
1	301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%
1	302	Window Film (Standard)	9.3%	10.3%	2.5%	2.5%	9.3%	3.9%	2.5%	1.2%	7.0%	2.5%
1	303	EMS - Chiller	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	304	Cool Roof - Chiller	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%
1	305	Chiller Tune Up/Diagnostics	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
1	306	VSD for Chiller Pumps and Towers	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	307	EMS Optimization	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	308	Economizer - Chiller	27.0%	0.0%	21.0%	21.0%	27.0%	12.0%	21.0%	18.0%	43.0%	0.0%
1	309	Duct/Pipe Insulation - Chiller	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
1	311	High Efficiency Chiller Motors	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
1	350	Base DX Packaged System, EER=10.3, 10 tons										
1	351	DX Tune Up/ Advanced Diagnostics	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	352	DX Packaged System, EER=10.9, 10 tons	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
1	353	DX Packaged System, EER=11.5, 10 tons	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%
1	354	DX Packaged System, EER=13.4, 10 tons	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%
1	356	Ductless (Mini Split) Cooling System										
1	357	Window Film (Standard)	9.3%	10.3%	2.5%	2.5%	9.3%	3.9%	2.5%	1.2%	7.0%	2.5%
1	358	Prog. Thermostat - DX	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	359	Cool Roof - DX	1.8%	6.9%	13.0%	13.0%	1.8%	6.1%	13.0%	0.6%	0.4%	13.0%
1	360	Optimize Controls	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	361	Economizer	21.0%	8.0%	17.0%	1.0%	0.0%	10.0%	10.0%	1.0%	8.0%	8.0%
1	362	Aerosol Duct Sealing - DX	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
1	363	Ceiling/roof Insulation - DX	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%
1	364	Duct/Pipe Insulation - DX	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
1	365	DX Coil Cleaning	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%
1	400	Base Fan Motor, 5hp, 1800rpm, 87.5%										
1	401	Fan Motor, 5hp, 1800rpm, 89.5%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
1	402	Variable Speed Drive Control, 5 HP	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	403	Demand Controlled Ventilation	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
1	410	Base Fan Motor, 15hp, 1800rpm, 91.0%										

ENERGY SAVINGS (percent)												
Segment	Measure #	Measure Description	Office Building Type 1	Restaurant Building Type 2	Retail Building Type 3	Grocery Building Type 4	Warehousing Building Type 5	School Building Type 6	College Building Type 7	Health Care Building Type 8	Hotel Building Type 9	Miscellaneous Building Type 10
1	411	Fan Motor, 15hp, 1800rpm, 92.4%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
1	412	Variable Speed Drive Control, 15 HP	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	413	Air Handler Optimization, 15 HP	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	414	Energy Recovery Ventilation	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
1	415	Electronically Commutated Motors (ECM) o	14.5%	14.5%	14.5%	14.5%	14.5%	14.5%	14.5%	14.5%	14.5%	14.5%
1	416	Separate Makeup Air/Exhaust Hoods AC	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	417	Demand Controlled Ventilation	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
1	420	Base Fan Motor, 40hp, 1800rpm, 93.0%										
1	421	Fan Motor, 40hp, 1800rpm, 94.1%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
1	422	Variable Speed Drive Control, 40 HP	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	423	Air Handler Optimization, 40 HP	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	424	Demand Controlled Ventilation	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
1	500	Base Non-Commercial Refrigerator										
1	501	Energy Star Refrigerator	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	502	HE Refrigerator - CEE Tier 2 (side by side f	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
1	520	Base Refrigeration System										
1	521	High-efficiency fan motors	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
1	522	Strip curtains for walk-ins	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
1	523	Night covers for display cases	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%
1	524	Evaporator fan controller for MT walk-ins	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
1	525	Efficient compressor motor	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
1	526	Compressor VSD retrofit	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%
1	527	Floating head pressure controls	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
1	528	Refrigeration Commissioning	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	529	Demand Hot Gas Defrost	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
1	530	Demand Defrost Electric	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%
1	531	Anti-sweat (humidistat) controls	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	532	Ice-makers (CEC Tier II = 5 kWh/100 lbs ice)	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
1	533	Freezer-Cooler Replacement Gaskets	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%
1	534	High R-Value Glass Doors	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
1	535	Multiplex Compressor System	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%
1	536	Oversized Air-Cooled Condenser	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%
1	537	LED Display Lighting	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
1	538	Fiber Optic Display Lighting	24.5%	24.5%	24.5%	24.5%	24.5%	24.5%	24.5%	24.5%	24.5%	24.5%
1	539	Beverage Merchandisers	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
1	540	Reach-In Refrigerators	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%
1	541	Reach-In Freezers	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
1	542	Walk-Ins										
1	610	Base Desktop PC										
1	611	Energy Star or Better PC	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%
1	612	PC Manual Power Management Enabling	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%
1	613	PC Network Power Management Enabling	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%	68.0%
1	620	Base Monitor, CRT										
1	621	Energy Star or Better Monitor	56.1%	56.1%	56.1%	56.1%	56.1%	56.1%	56.1%	56.1%	56.1%	56.1%
1	622	Monitor Power Management Enabling	53.4%	53.4%	53.4%	53.4%	53.4%	53.4%	53.4%	53.4%	53.4%	53.4%
1	630	Base Monitor, LCD										
1	631	Energy Star or Better Monitor	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%

**ENERGY SAVINGS
(percent)**

Segment	Measure #	Measure Description	Office	Restaurant	Retail	Grocery	Warehousing	School	College	Health Care	Hotel	Miscellaneous
			Building Type 1	Building Type 2	Building Type 3	Building Type 4	Building Type 5	Building Type 6	Building Type 7	Building Type 8	Building Type 9	Building Type 10
1	632	Monitor Power Management Enabling	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%	27.9%
1	640	Base Copier										
1	641	Energy Star or Better Copier	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%
1	642	Copier Power Management Enabling	19.4%	19.4%	19.4%	19.4%	19.4%	19.4%	19.4%	19.4%	19.4%	19.4%
1	650	Base Laser Printer										
1	651	Printer Power Management Enabling	49.2%	49.2%	49.2%	49.2%	49.2%	49.2%	49.2%	49.2%	49.2%	49.2%
1	660	Base Data Center/Server Room										
1	661	Data Center Improved Operations	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	662	Data Center Best Practices	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
1	663	Data Center State of the Art practices	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%
1	700	Base Water Heating										
1	701	Demand controlled circulating systems	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	702	High Efficiency Water Heater (electric)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
1	703	Heat Pump Water Heater (air source)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	704	Hot Water Pipe Insulation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
1	705	Faucet Aerators										
1	706	Heat Recovery Unit	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
1	707	Heat Trap	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
1	708	Tankless Water Heater	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	709	Solar Water Heater	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
1	710	Pre-rinse spray valves										
1	800	Base Vending Machines										
1	801	Vending Misers (cooled machines only)	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
1	900	Base Cooking										
1	901	Convection Oven	3.8%	2.2%	2.4%	3.3%	0.0%	4.0%	0.0%	3.7%	0.9%	4.1%
1	902	Efficient Fryer	2.8%	2.6%	0.0%	2.4%	0.0%	0.3%	0.0%	1.5%	1.0%	2.8%
1	903	Efficient Steamer	4.4%	7.0%	4.1%	4.2%	0.0%	5.5%	0.0%	6.9%	10.5%	7.2%
1	904	Energy Star Hot Food Holding Cabinets	3.4%	12.9%	17.9%	9.6%	0.0%	20.5%	0.0%	17.5%	19.0%	0.0%

ENERGY SAVINGS (percent)												
Segment	Measure #	Measure Description	Office	Restaurant	Retail	FoodStore	Warehouse	School	College	Hospital	Hotel	Miscellaneous
New	100	Base Bldg Design - 30%										
New	101	High Performance Building/Int Design - Tier 1 30%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
New	200	Base Bldg Design - 50%										
New	201	High Performance Building/Int Design - Tier 2 50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
New	300	Base Bldg Design - 70%										
New	301	Near Zero Energy (60-75%)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%

DSM TECHNOLOGY INPUT TABLES

UTILITY: Ngrid
SECTOR: IND
SEGMENT: All Electric

BATCH: 1
ANALYSIS: Basic
VINTAGE: Existing

APPENDIX E

INDUSTRIAL

MEASURE INPUT DATA

MEASURE COSTS				NPV of										Full = 1										Implementat	
Vintage: Existing		Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units		Incr. = 0		Replace	Full	Relative Energy Reduction Factors							Type				
Measure #	Measure Description	Units	Units	Equipment	Labor	O & M	Cost Factor	per Savings	Service	Initial	Cost	Cost	Cost	SP	SPP	SOP	WP	WPP	WOP	End Use	2=ROB				
100	Base Compressed Air	\$/kWh	\$/kWh		\$0.00	\$0.00	\$0.00	1	14.5	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
101	Compressed Air-O&M	\$/kWh	\$/kWh	\$0.01	\$0.0012	\$0.00	\$0.01	1	10	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
102	Compressed Air - Controls	\$/kWh	\$/kWh	\$0.02	\$0.0020	\$0.00	\$0.02	1	10	1	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
103	Compressed Air - System Optimization	\$/kWh	\$/kWh	\$0.01	\$0.0019	\$0.00	\$0.02	1	10	1	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
104	Compressed Air- Sizing	\$/kWh	\$/kWh	\$0.00	\$0.0005	\$0.00	\$0.00	1	10	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
105	Comp Air - Replace 1-5 HP motor	\$/kWh	\$/kWh	\$0.05	\$0.0064	\$0.00	\$0.05	1	14.5	1	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
106	Comp Air - ASD (1-5 hp)	\$/kWh	\$/kWh	\$0.07	\$0.0091	\$0.00	\$0.08	1	14.5	1	1	1	\$0.08	0.09	1.00	1.00	1.00	1.00	1.00	1	1				
107	Comp Air - Motor practices-1 (1-5 HP)	\$/kWh	\$/kWh	\$0.02	\$0.0025	\$0.00	\$0.02	1	14.5	1	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
108	Comp Air - Replace 6-100 HP motor	\$/kWh	\$/kWh	\$0.03	\$0.0035	\$0.00	\$0.03	1	10	1	1	1	\$0.03	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
109	Comp Air - ASD (6-100 hp)	\$/kWh	\$/kWh	\$0.00	\$0.0003	\$0.00	\$0.00	1	10	1	1	1	\$0.00	0.09	1.00	1.00	1.00	1.00	1.00	1	2				
110	Comp Air - Motor practices-1 (6-100 HP)	\$/kWh	\$/kWh	\$0.00	\$0.0006	\$0.00	\$0.01	1	10	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
111	Comp Air - Replace 100+ HP motor	\$/kWh	\$/kWh	\$0.01	\$0.0011	\$0.00	\$0.01	1	6	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	1	2				
112	Comp Air - ASD (100+ hp)	\$/kWh	\$/kWh	\$0.01	\$0.0007	\$0.00	\$0.01	1	6	1	1	1	\$0.01	0.09	1.00	1.00	1.00	1.00	1.00	1	1				
113	Comp Air - Motor practices-1 (100+ HP)	\$/kWh	\$/kWh	\$0.00	\$0.0003	\$0.00	\$0.00	1	6	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
114	Power recovery	\$/kWh	\$/kWh	\$0.00	\$0.0004	\$0.00	\$0.00	1	10	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1				
200	Base Fans	\$/kWh	\$/kWh		\$0.0000	\$0.00	\$0.00	1	14.5	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1				
201	Fans - O&M	\$/kWh	\$/kWh	\$0.00	\$0.0001	\$0.00	\$0.00	1	10	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1				
202	Fans - Controls	\$/kWh	\$/kWh	\$0.084	\$0.0110	\$0.00	\$0.10	1	10	1	1	1	\$0.10	1.00	1.00	1.00	1.00	1.00	1.00	2	2				
203	Fans - System Optimization	\$/kWh	\$/kWh	\$0.055	\$0.0072	\$0.00	\$0.06	1	10	1	1	1	\$0.06	0.47	1.00	1.00	1.00	1.00	1.00	2	1				
204	Fans - Improve components	\$/kWh	\$/kWh	\$0.005	\$0.0006	\$0.00	\$0.01	1	10	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	2	2				
205	Fans - Replace 1-5 HP motor	\$/kWh	\$/kWh	\$0.048	\$0.0064	\$0.00	\$0.05	1	14.5	1	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	2	2				
206	Fans - ASD (1-5 hp)	\$/kWh	\$/kWh	\$0.07	\$0.0091	\$0.00	\$0.08	1	14.5	1	1	1	\$0.08	0.09	1.00	1.00	1.00	1.00	1.00	2	1				
207	Fans - Motor practices-1 (1-5 HP)	\$/kWh	\$/kWh	\$0.02	\$0.0025	\$0.00	\$0.02	1	14.5	1	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	2	1				
208	Fans - Replace 6-100 HP motor	\$/kWh	\$/kWh	\$0.03	\$0.0035	\$0.00	\$0.03	1	10	1	1	1	\$0.03	1.00	1.00	0.50	1.00	1.00	0.50	2	2				
209	Fans - ASD (6-100 hp)	\$/kWh	\$/kWh	\$0.00	\$0.0003	\$0.00	\$0.00	1	10	1	1	1	\$0.00	0.09	0.50	0.00	1.00	0.75	0.00	2	2				
210	Fans - Motor practices-1 (6-100 HP)	\$/kWh	\$/kWh	\$0.00	\$0.0006	\$0.00	\$0.01	1	10	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	2	1				
211	Fans - Replace 100+ HP motor	\$/kWh	\$/kWh	\$0.01	\$0.0011	\$0.00	\$0.01	1	6	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	2	2				
212	Fans - ASD (100+ hp)	\$/kWh	\$/kWh	\$0.01	\$0.0007	\$0.00	\$0.01	1	6	1	1	1	\$0.01	0.09	1.00	0.50	1.00	1.00	0.50	2	1				
213	Fans - Motor practices-1 (100+ HP)	\$/kWh	\$/kWh	\$0.00	\$0.0003	\$0.00	\$0.00	1	6	1	1	1	\$0.00	1.00	0.50	0.00	1.00	0.75	0.00	2	1				
214	Optimize drying process	\$/kWh	\$/kWh	\$0.05	\$0.0060	\$0.00	\$0.05	1	10	1	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	2	1				
215	Power recovery	\$/kWh	\$/kWh	\$0.00	\$0.0004	\$0.00	\$0.00	1	10	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	2	1				
300	Base Pumps	\$/kWh	\$/kWh		\$0.0000	\$0.00	\$0.00	1	14.5	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1				
301	Pumps - O&M	\$/kWh	\$/kWh	\$0.00	\$0.0006	\$0.00	\$0.01	1	10	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	3	1				
302	Pumps - Controls	\$/kWh	\$/kWh	\$0.02	\$0.0032	\$0.00	\$0.03	1	10	1	1	1	\$0.03	1.00	1.00	1.00	1.00	1.00	1.00	3	2				
303	Pumps - System Optimization	\$/kWh	\$/kWh	\$0.06	\$0.0079	\$0.00	\$0.07	1	10	1	1	1	\$0.07	1.00	1.00	1.00	1.00	1.00	1.00	3	1				
304	Pumps - Sizing	\$/kWh	\$/kWh	\$0.02	\$0.0024	\$0.00	\$0.02	1	10	1	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	3	2				
305	Pumps - Replace 1-5 HP motor	\$/kWh	\$/kWh	\$0.05	\$0.0064	\$0.00	\$0.05	1	14.5	1	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	3	2				
306	Pumps - ASD (1-5 hp)	\$/kWh	\$/kWh	\$0.07	\$0.0091	\$0.00	\$0.08	1	14.5	1	1	1	\$0.08	0.09	1.00	1.00	1.00	1.00	1.00	3	1				
307	Pumps - Motor practices-1 (1-5 HP)	\$/kWh	\$/kWh	\$0.02	\$0.0025	\$0.00	\$0.02	1	14.5	1	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	3	1				
308	Pumps - Replace 6-100 HP motor	\$/kWh	\$/kWh	\$0.03	\$0.0035	\$0.00	\$0.03	1	10	1	1	1	\$0.03	1.00	1.00	1.00	1.00	1.00	1.00	3	2				
309	Pumps - ASD (6-100 hp)	\$/kWh	\$/kWh	\$0.00	\$0.0003	\$0.00	\$0.00	1	10	1	1	1	\$0.00	0.09	1.00	1.00	1.00	1.00	1.00	3	1				
310	Pumps - Motor practices-1 (6-100 HP)	\$/kWh	\$/kWh	\$0.00	\$0.0006	\$0.00	\$0.01	1	10	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	3	1				
311	Pumps - Replace 100+ HP motor	\$/kWh	\$/kWh	\$0.01	\$0.0011	\$0.00	\$0.01	1	6	1	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	3	2				
312	Pumps - ASD (100+ hp)	\$/kWh	\$/kWh	\$0.01	\$0.0007	\$0.00	\$0.01	1	6	1	1	1	\$0.01	0.09	1.00	1.00	1.00	1.00	1.00	3	1				
313	Pumps - Motor practices-1 (100+ HP)	\$/kWh	\$/kWh	\$0.00	\$0.0003	\$0.00	\$0.00	1	6	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1				
314	Power recovery	\$/kWh	\$/kWh	\$0.00	\$0.0004	\$0.00	\$0.00	1	10	1	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	3	1				

APPENDIX E

INDUSTRIAL

MEASURE INPUT DATA

MEASURE COSTS				NPV of										Full = 1		Full										Implementati	
Vintage: Existing		Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units	Incr. = 0		Full		Relative Energy		Reduction Factors						Type						
Measure #	Measure Description	Units	Units	Equipment	Labor	O & M	Cost Factor	per Savings	Unit	Life	Initial	Replace	Unit	SP	SPP	SOP	WP	WPP	WOP	End Use	1=1 time	2=ROB					
400	Base Drives	\$/kWh	\$/kWh		\$0.0000	\$0.00	\$0.00	1		20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
401	Bakery - Process (Mixing) - O&M	\$/kWh	\$/kWh	\$0.00	\$0.0006	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
402	O&M/drives spinning machines	\$/kWh	\$/kWh	\$0.03	\$0.0038	\$0.00	\$0.03	1		10	1	1	\$0.03	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
403	Air conveying systems	\$/kWh	\$/kWh	\$0.03	\$0.0045	\$0.00	\$0.04	1		14	1	1	\$0.04	0.24	1.00	1.00	1.00	1.00	1.00	4	2						
404	Replace V-Belts	\$/kWh	\$/kWh	\$0.01	\$0.0007	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
405	Drives - EE motor	\$/kWh	\$/kWh	\$0.01	\$0.0008	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
406	Gap Forming papermachine	\$/kWh	\$/kWh	\$0.01	\$0.0009	\$0.00	\$0.01	1		20	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
407	High Consistency forming	\$/kWh	\$/kWh	\$0.01	\$0.0009	\$0.00	\$0.01	1		20	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
408	Optimization control PM	\$/kWh	\$/kWh	\$0.01	\$0.0015	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
409	Efficient practices printing press	\$/kWh	\$/kWh	\$0.01	\$0.0012	\$0.00	\$0.01	1		20	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
410	Efficient Printing press (fewer cylinders)	\$/kWh	\$/kWh	\$0.05	\$0.0072	\$0.00	\$0.06	1		10	1	1	\$0.06	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
411	Light cylinders	\$/kWh	\$/kWh	\$0.06	\$0.0084	\$0.00	\$0.07	1		10	1	1	\$0.07	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
412	Efficient drives	\$/kWh	\$/kWh	\$0.01	\$0.0007	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
413	Clean Room - Controls	\$/kWh	\$/kWh	\$0.02	\$0.0026	\$0.00	\$0.02	1		10	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
414	Clean Room - New Designs	\$/kWh	\$/kWh	\$0.12	\$0.0158	\$0.00	\$0.14	1		10	1	1	\$0.14	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
415	Drives - Process Controls (batch + site)	\$/kWh	\$/kWh	\$0.02	\$0.0029	\$0.00	\$0.02	1		10	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
416	Process Drives - ASD	\$/kWh	\$/kWh	\$0.00	\$0.0002	\$0.00	\$0.00	1		10	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
417	O&M - Extruders/Injection Moulding	\$/kWh	\$/kWh	\$0.00	\$0.0006	\$0.00	\$0.01	1		12	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
418	Extruders/injection Moulding-multipump	\$/kWh	\$/kWh	\$0.09	\$0.0118	\$0.00	\$0.10	1		12	1	1	\$0.10	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
419	Direct drive Extruders	\$/kWh	\$/kWh	\$0.28	\$0.0368	\$0.00	\$0.32	1		12	1	1	\$0.32	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
420	Injection Moulding - Impulse Cooling	\$/kWh	\$/kWh	\$0.06	\$0.0083	\$0.00	\$0.07	1		12	1	1	\$0.07	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
421	Injection Moulding - Direct drive	\$/kWh	\$/kWh	\$0.09	\$0.0116	\$0.00	\$0.10	1		12	1	1	\$0.10	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
422	Efficient grinding	\$/kWh	\$/kWh	\$0.21	\$0.0276	\$0.00	\$0.24	1		15	1	1	\$0.24	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
423	Process control	\$/kWh	\$/kWh	\$0.00	\$0.0002	\$0.00	\$0.00	1		10	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
424	Process optimization	\$/kWh	\$/kWh	\$0.03	\$0.0036	\$0.00	\$0.03	1		10	1	1	\$0.03	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
425	Drives - Process Control	\$/kWh	\$/kWh	\$0.01	\$0.0018	\$0.00	\$0.02	1		15	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
426	Efficient drives - rolling	\$/kWh	\$/kWh	\$0.01	\$0.0011	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
427	Drives - Optimization process (M&T)	\$/kWh	\$/kWh	\$0.01	\$0.0010	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	1						
428	Drives - Scheduling	\$/kWh	\$/kWh	\$0.01	\$0.0012	\$0.00	\$0.01	1		10	1	1	\$0.01	0.18	1.00	1.00	1.00	1.00	1.00	4	1						
429	Machinery	\$/kWh	\$/kWh	\$0.01	\$0.0015	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
430	Efficient Machinery	\$/kWh	\$/kWh	\$0.01	\$0.0008	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	4	2						
500	Base Heating	\$/kWh	\$/kWh		\$0.0000	\$0.00	\$0.00	1		20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	5	1						
501	Bakery - Process	\$/kWh	\$/kWh	\$0.05	\$0.0060	\$0.00	\$0.05	1		15	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
502	Drying (UV/IR)	\$/kWh	\$/kWh	\$0.07	\$0.0090	\$0.00	\$0.08	1		8	1	1	\$0.08	0.57	1.00	1.00	1.00	1.00	1.00	5	2						
503	Heat Pumps - Drying	\$/kWh	\$/kWh	\$0.16	\$0.0210	\$0.00	\$0.18	1		15	1	1	\$0.18	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
504	Top-heating (glass)	\$/kWh	\$/kWh	\$0.00	\$0.0005	\$0.00	\$0.00	1		8	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
505	Efficient electric melting	\$/kWh	\$/kWh	\$0.03	\$0.0039	\$0.00	\$0.03	1		20	1	1	\$0.03	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
506	Intelligent extruder (DOE)	\$/kWh	\$/kWh	\$0.01	\$0.0019	\$0.00	\$0.02	1		10	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
507	Near Net Shape Casting	\$/kWh	\$/kWh	\$0.01	\$0.0014	\$0.00	\$0.01	1		15	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
508	Heating - Process Control	\$/kWh	\$/kWh	\$0.01	\$0.0018	\$0.00	\$0.02	1		15	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
509	Efficient Curing ovens	\$/kWh	\$/kWh	\$0.07	\$0.0096	\$0.00	\$0.08	1		15	1	1	\$0.08	1.00	1.00	1.00	1.00	1.00	1.00	5	2						
510	Heating - Optimization process (M&T)	\$/kWh	\$/kWh	\$0.01	\$0.0010	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	5	1						
511	Heating - Scheduling	\$/kWh	\$/kWh	\$0.01	\$0.0012	\$0.00	\$0.01	1		10	1	1	\$0.01	0.18	1.00	1.00	1.00	1.00	1.00	5	1						
550	Base Refrigeration	\$/kWh	\$/kWh		\$0.0000	\$0.00	\$0.00	1		20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	6	1						
551	Efficient Refrigeration - Operations	\$/kWh	\$/kWh	\$0.01	\$0.0009	\$0.00	\$0.01	1		10	1	1	\$0.01	1.00	1.00	1.00	1.00	1.00	1.00	6	2						
552	Optimization Refrigeration	\$/kWh	\$/kWh	\$0.10	\$0.0131	\$0.00	\$0.11	1		15	1	1	\$0.11	1.00	1.00	1.00	1.00	1.00	1.00	6	1						
600	Base Other Process	\$/kWh	\$/kWh		\$0.0000	\$0.00	\$0.00	1		15	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	7	1						
601	Other Process Controls (batch + site)	\$/kWh	\$/kWh	\$0.02	\$0.0029	\$0.00	\$0.02	1		10	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	7	2						

MEASURE COSTS					NPV of		Full = 1		Implementatio										Type	
Vintage: Existing		Savings	Cost	Unit	Unit	Lifetime	Implementation	Cost Units	Incr. = 0	Full	Relative Energy	Reduction Factors							End Use	1=1 time
Measure #	Measure Description	Units	Units	Equipment Cost	Labor Cost	O & M Cost	Cost Factor	per Savings Unit	Service Life	Initial Cost	Replace Cost	Unit Cost	SP	SPP	SOP	WP	WPP	WOP		2=ROB
602	Efficient desalter	\$/kWh	\$/kWh	\$0.04	\$0.0048	\$0.00	\$0.04	1	10	1	1	\$0.04	1.00	1.00	1.00	1.00	1.00	1.00	7	2
603	New transformers welding	\$/kWh	\$/kWh	\$0.05	\$0.0060	\$0.00	\$0.05	1	15	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	7	2
604	Efficient processes (welding, etc.)	\$/kWh	\$/kWh	\$0.05	\$0.0060	\$0.00	\$0.05	1	15	1	1	\$0.05	1.00	1.00	1.00	1.00	1.00	1.00	7	2
605	Process control	\$/kWh	\$/kWh	\$0.01	\$0.0019	\$0.00	\$0.02	1	15	1	1	\$0.02	1.00	1.00	1.00	1.00	1.00	1.00	7	2
606	Power recovery	\$/kWh	\$/kWh	\$0.00	\$0.0004	\$0.00	\$0.00	1	10	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	7	1
700	Base Centrifugal Chiller, 0.58 kW/ton, 500 t	\$/ton	\$/ton	\$0.00	\$0.0000		\$0.00	1	20	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	8	2
701	Centrifugal Chiller, 0.51 kW/ton, 500 tons	\$/ton	\$/ton	\$21.14	\$2.7780		\$23.92	1	20	1	1	\$23.92	1.00	1.00	1.00	1.00	1.00	1.00	8	2
702	Window Film - Chiller	\$/sf-window	\$/sf-window	\$3.07	\$0.4034		\$3.47	1	10	1	1	\$3.47	1.00	1.00	1.00	1.00	1.00	1.00	8	1
703	EMS - Chiller	\$/ton	\$/ton	\$60.00	\$7.8845		\$67.88	1	10	1	1	\$67.88	1.00	1.00	1.00	1.00	1.00	1.00	8	1
704	Cool Roof - Chiller	\$/sf-roof	\$/sf-roof	\$0.47	\$0.0618		\$0.53	1	10	1	1	\$0.53	1.00	1.00	1.00	1.00	1.00	1.00	8	1
705	Chiller Tune Up/Diagnostics	\$/ton	\$/ton	\$16.67	\$2.1901	\$20.91	\$18.86	1	10	1	1	\$39.77	1.00	1.00	1.00	1.00	1.00	1.00	8	1
706	Cooling Circ. Pumps - VSD	\$/ton	\$/ton	\$65.04	\$8.5468		\$73.59	1	15	1	1	\$73.59	1.00	1.00	1.00	1.00	1.00	1.00	8	1
710	Base DX Packaged System, EER=10.3, 10	\$/ton	\$/ton	\$0.00	\$0.0000		\$0.00	1	15	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	8	2
711	DX Tune Up/ Advanced Diagnostics	\$/ton	\$/ton	\$78.00	\$10.2498		\$88.25	1	3	1	1	\$88.25	1.00	1.00	1.00	1.00	1.00	1.00	8	1
712	DX Packaged System, EER=10.9, 10 tons	\$/ton	\$/ton	\$51.60	\$6.7807		\$58.38	1	15	1	1	\$58.38	1.00	1.00	1.00	1.00	1.00	1.00	8	2
713	Window Film - DX	\$/sf-window	\$/sf-window	\$3.07	\$0.4034		\$3.47	1	10	1	1	\$3.47	1.00	1.00	1.00	1.00	1.00	1.00	8	1
714	Evaporative Pre-Cooler	\$/ton	\$/ton	\$133.33	\$17.5211		\$150.85	1	10	1	1	\$150.85	1.00	1.00	1.00	1.00	1.00	1.00	8	1
715	Prog. Thermostat - DX	\$/ton	\$/ton	\$5.50	\$0.7227		\$6.22	1	10	1	1	\$6.22	0.25	1.00	1.00	1.00	1.00	1.00	8	1
716	Cool Roof - DX	\$/sf-roof	\$/sf-roof	\$0.47	\$0.0618		\$0.53	1	10	1	1	\$0.53	1.00	1.00	1.00	1.00	1.00	1.00	8	1
800	Base Lighting	fixture	fixture	\$0.00	\$0.0000	\$0.00	\$0.00	1	10	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	9	1
801	RET 2L4' Premium T8, 1EB	fixture	fixture	\$25.00	\$3.2852	\$0.00	\$28.29	1	15	1	1	\$28.29	1.00	1.00	1.00	1.00	1.00	1.00	9	1
802	CFL Hardwired, Modular 36W	fixture	fixture	\$41.70	\$5.4797	(\$8.41)	\$47.18	1	4	1	1	\$38.77	1.00	1.00	1.00	1.00	1.00	1.00	9	1
803	Metal Halide, 50W	fixture	fixture	\$224.70	\$29.5274	\$0.00	\$254.23	1	5	1	1	\$254.23	1.00	1.00	1.00	1.00	1.00	1.00	9	1
804	Occupancy Sensor, 4L4' Fluorescent Fixtur	fixture	fixture	\$12.25	\$1.6098	\$0.00	\$13.86	1	9	1	1	\$13.86	1.00	1.00	0.50	1.00	1.00	0.50	9	1
900	Base Other	\$/kWh	\$/kWh	\$0.0000	\$0.0000	\$0.00	\$0.00	1	15	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	10	1
901	Replace V-belts	\$/kWh	\$/kWh	\$0.00	\$0.0000	\$0.00	\$0.00	1	5	1	1	\$0.00	1.00	1.00	1.00	1.00	1.00	1.00	10	2
902	Membranes for wastewater	\$/kWh	\$/kWh	\$0.03	\$0.0042	\$0.00	\$0.04	1	15	1	1	\$0.04	1.00	1.00	1.00	1.00	1.00	1.00	10	2

TECHNOLOGY SATURATION (units/square foot)																		
Segment	Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
1	100	Base Compressed Air	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	101	Compressed Air-O&M	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	102	Compressed Air - Controls	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	103	Compressed Air - System Optimization	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	104	Compressed Air- Sizing	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	105	Comp Air - Replace 1-5 HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	106	Comp Air - ASD (1-5 hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	107	Comp Air - Motor practices-1 (1-5 HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	108	Comp Air - Replace 6-100 HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	109	Comp Air - ASD (6-100 hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	110	Comp Air - Motor practices-1 (6-100 HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	111	Comp Air - Replace 100+ HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	112	Comp Air - ASD (100+ hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	113	Comp Air - Motor practices-1 (100+ HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	114	Power recovery	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	200	Base Fans	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	201	Fans - O&M	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	202	Fans - Controls	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	203	Fans - System Optimization	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	204	Fans- Improve components	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	205	Fans - Replace 1-5 HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	206	Fans - ASD (1-5 hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	207	Fans - Motor practices-1 (1-5 HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	208	Fans - Replace 6-100 HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	209	Fans - ASD (6-100 hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	210	Fans - Motor practices-1 (6-100 HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	211	Fans - Replace 100+ HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	212	Fans - ASD (100+ hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	213	Fans - Motor practices-1 (100+ HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	214	Optimize drying process	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	215	Power recovery	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	300	Base Pumps	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	301	Pumps - O&M	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	302	Pumps - Controls	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	303	Pumps - System Optimization	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1	304	Pumps - Sizing	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

TECHNOLOGY SATURATION (units/square foot)																			
			Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW	
Segment	Measure #	Measure Description																	
1	305	Pumps - Replace 1-5 HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	306	Pumps - ASD (1-5 hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	307	Pumps - Motor practices-1 (1-5 HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	308	Pumps - Replace 6-100 HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	309	Pumps - ASD (6-100 hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	310	Pumps - Motor practices-1 (6-100 HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	311	Pumps - Replace 100+ HP motor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	312	Pumps - ASD (100+ hp)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	313	Pumps - Motor practices-1 (100+ HP)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	314	Power recovery	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	400	Base Drives	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	401	Bakery - Process (Mixing) - O&M	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	402	O&M/drives spinning machines	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	403	Air conveying systems	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	404	Replace V-Belts	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	405	Drives - EE motor	1.0000	1.0000	1.0000	0.8860	1.0000	1.0000	1.0000	1.0000	0.8330	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	406	Gap Forming papermachine	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	407	High Consistency forming	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	408	Optimization control PM	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	409	Efficient practices printing press	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	410	Efficient Printing press (fewer cylinders)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	411	Light cylinders	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	412	Efficient drives	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	413	Clean Room - Controls	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.2500	1.0000	1.0000	1.0000	
1	414	Clean Room - New Designs	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	415	Drives - Process Controls (batch + site)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	416	Process Drives - ASD	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0320	1.0320	
1	417	O&M - Extruders/Injection Moulding	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	418	Extruders/injection Moulding-multipump	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	419	Direct drive Extruders	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	420	Injection Moulding - Impulse Cooling	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	421	Injection Moulding - Direct drive	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	422	Efficient grinding	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	423	Process control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	424	Process optimization	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1	425	Drives - Process Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	

APPENDIX E

INDUSTRIAL

MEASURE INPUT DATA

[illegible]

APPLICABILITY FACTOR (percent)		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/VWV
Measure #	Measure Description																
100	Base Compressed Air	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
101	Compressed Air-O&M	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
102	Compressed Air - Controls	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
103	Compressed Air - System Optimization	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
104	Compressed Air- Sizing	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
105	Comp Air - Replace 1-5 HP motor	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
106	Comp Air - ASD (1-5 hp)	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
107	Comp Air - Motor practices-1 (1-5 HP)	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
108	Comp Air - Replace 6-100 HP motor	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
109	Comp Air - ASD (6-100 hp)	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
110	Comp Air - Motor practices-1 (6-100 HP)	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
111	Comp Air - Replace 100+ HP motor	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
112	Comp Air - ASD (100+ hp)	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
113	Comp Air - Motor practices-1 (100+ HP)	7%	4%	5%	4%	4%	3%	12%	4%	6%	3%	12%	14%	10%	12%	4%	0%
114	Power recovery	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%
200	Base Fans	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
201	Fans - O&M	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
202	Fans - Controls	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
203	Fans - System Optimization	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
204	Fans- Improve components	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
205	Fans - Replace 1-5 HP motor	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
206	Fans - ASD (1-5 hp)	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
207	Fans - Motor practices-1 (1-5 HP)	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
208	Fans - Replace 6-100 HP motor	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
209	Fans - ASD (6-100 hp)	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
210	Fans - Motor practices-1 (6-100 HP)	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
211	Fans - Replace 100+ HP motor	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
212	Fans - ASD (100+ hp)	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
213	Fans - Motor practices-1 (100+ HP)	8%	7%	9%	15%	7%	7%	7%	7%	14%	7%	7%	5%	3%	6%	7%	30%
214	Optimize drying process	0%	0%	9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
215	Power recovery	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%
300	Base Pumps	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
301	Pumps - O&M	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
302	Pumps - Controls	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
303	Pumps - System Optimization	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
304	Pumps - Sizing	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
305	Pumps - Replace 1-5 HP motor	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
306	Pumps - ASD (1-5 hp)	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
307	Pumps - Motor practices-1 (1-5 HP)	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
308	Pumps - Replace 6-100 HP motor	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
309	Pumps - ASD (6-100 hp)	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
310	Pumps - Motor practices-1 (6-100 HP)	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
311	Pumps - Replace 100+ HP motor	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
312	Pumps - ASD (100+ hp)	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%
313	Pumps - Motor practices-1 (100+ HP)	14%	9%	11%	25%	9%	28%	48%	9%	17%	9%	9%	7%	4%	7%	9%	62%

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
Measure # Measure Description																
314 Power recovery	0%	0%	0%	0%	0%	0%	48%	0%	0%	0%	0%	0%	0%	0%	0%	0%
400 Base Drives	14%	30%	40%	33%	32%	23%	13%	31%	20%	10%	22%	18%	9%	12%	32%	0%
401 Bakery - Process (Mixing) - O&M	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
402 O&M/drives spinning machines	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
403 Air conveying systems	0%	0%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
404 Replace V-Belts	0%	0%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
405 Drives - EE motor	0%	0%	40%	33%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%
406 Gap Forming papermachine	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
407 High Consistency forming	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
408 Optimization control PM	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
409 Efficient practices printing press	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
410 Efficient Printing press (fewer cylinders)	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
411 Light cylinders	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
412 Efficient drives	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
413 Clean Room - Controls	0%	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%
414 Clean Room - New Designs	0%	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
415 Drives - Process Controls (batch + site)	0%	0%	0%	0%	0%	23%	0%	0%	20%	10%	0%	0%	0%	0%	0%	0%
416 Process Drives - ASD	0%	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
417 O&M - Extruders/Injection Moulding	0%	0%	0%	0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%
418 Extruders/injection Moulding-multipump	0%	0%	0%	0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%
419 Direct drive Extruders	0%	0%	0%	0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%
420 Injection Moulding - Impulse Cooling	0%	0%	0%	0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%
421 Injection Moulding - Direct drive	0%	0%	0%	0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%
422 Efficient grinding	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%
423 Process control	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%
424 Process optimization	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%
425 Drives - Process Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
426 Efficient drives - rolling	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
427 Drives - Optimization process (M&T)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	18%	0%	12%	32%	0%
428 Drives - Scheduling	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	18%	9%	12%	32%	0%
429 Machinery	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	18%	9%	12%	32%	0%
430 Efficient Machinery	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	32%	0%
500 Base Heating	8%	11%	8%	8%	4%	7%	7%	16%	23%	29%	20%	9%	15%	15%	4%	1%
501 Bakery - Process	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
502 Drying (UV/IR)	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
503 Heat Pumps - Drying	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
504 Top-heating (glass)	0%	0%	0%	0%	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%
505 Efficient electric melting	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	0%	0%	0%	0%	0%	0%
506 Intelligent extruder (DOE)	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	0%	0%	0%	0%	0%	0%
507 Near Net Shape Casting	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	0%	0%	0%	0%	0%	0%
508 Heating - Process Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	0%	0%	0%	0%	0%	0%
509 Efficient Curing ovens	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	9%	15%	15%	4%	0%	0%
510 Heating - Optimization process (M&T)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	9%	0%	15%	0%	0%
511 Heating - Scheduling	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	9%	0%	0%	0%	0%
550 Base Refrigeration	27%	12%	1%	2%	6%	9%	6%	9%	3%	1%	4%	3%	9%	6%	6%	0%

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
Measure # Measure Description																
551 Efficient Refrigeration - Operations	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
552 Optimization Refrigeration	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
600 Base Other Process	1%	1%	1%	2%	1%	11%	0%	2%	3%	33%	5%	3%	8%	3%	1%	0%
601 Other Process Controls (batch + site)	0%	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
602 Efficient desalter	0%	0%	0%	0%	0%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
603 New transformers welding	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	3%	0%	3%	0.8%	0%
604 Efficient processes (welding, etc.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%
605 Process control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
606 Power recovery	0%	0%	0%	0%	0%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
700 Base Centrifugal Chiller, 0.58 kW/ton, 500 tons	1%	7%	4%	1%	10%	1%	0%	6%	1%	0%	5%	12%	13%	10%	10%	0%
701 Centrifugal Chiller, 0.51 kW/ton, 500 tons	1.1%	7.2%	3.7%	0.6%	10.1%	0.8%	0.4%	5.8%	0.8%	0.4%	5.4%	11.9%	12.8%	10.3%	10.1%	0.3%
702 Window Film - Chiller	1.1%	7.2%	3.7%	0.6%	10.1%	0.8%	0.4%	5.8%	0.8%	0.4%	5.4%	11.9%	12.8%	10.3%	10.1%	0.3%
703 EMS - Chiller	1.1%	7.2%	3.7%	0.6%	10.1%	0.8%	0.4%	5.8%	0.8%	0.4%	5.4%	11.9%	12.8%	10.3%	10.1%	0.3%
704 Cool Roof - Chiller	1.1%	7.2%	3.7%	0.6%	10.1%	0.8%	0.4%	5.8%	0.8%	0.4%	5.4%	11.9%	12.8%	10.3%	10.1%	0.3%
705 Chiller Tune Up/Diagnostics	1.1%	7.2%	3.7%	0.6%	10.1%	0.8%	0.4%	5.8%	0.8%	0.4%	5.4%	11.9%	12.8%	10.3%	10.1%	0.3%
706 Cooling Circ. Pumps - VSD	1.1%	7.2%	3.7%	0.6%	10.1%	0.8%	0.4%	5.8%	0.8%	0.4%	5.4%	11.9%	12.8%	10.3%	10.1%	0.3%
710 Base DX Packaged System, EER=10.3, 10 tons	8%	6%	3%	4%	9%	6%	3%	5%	6%	3%	5%	10%	11%	9%	9%	2%
711 DX Tune Up/ Advanced Diagnostics	7.6%	6.2%	3.2%	4.2%	8.7%	5.7%	2.9%	5.0%	5.6%	3.0%	4.7%	10.3%	11.0%	8.9%	8.7%	2.0%
712 DX Packaged System, EER=10.9, 10 tons	7.6%	6.2%	3.2%	4.2%	8.7%	5.7%	2.9%	5.0%	5.6%	3.0%	4.7%	10.3%	11.0%	8.9%	8.7%	2.0%
713 Window Film - DX	7.6%	6.2%	3.2%	4.2%	8.7%	5.7%	2.9%	5.0%	5.6%	3.0%	4.7%	10.3%	11.0%	8.9%	8.7%	2.0%
714 Evaporative Pre-Cooler	7.6%	6.2%	3.2%	4.2%	8.7%	5.7%	2.9%	5.0%	5.6%	3.0%	4.7%	10.3%	11.0%	8.9%	8.7%	2.0%
715 Prog. Thermostat - DX	7.6%	6.2%	3.2%	4.2%	8.7%	5.7%	2.9%	5.0%	5.6%	3.0%	4.7%	10.3%	11.0%	8.9%	8.7%	2.0%
716 Cool Roof - DX	7.6%	6.2%	3.2%	4.2%	8.7%	5.7%	2.9%	5.0%	5.6%	3.0%	4.7%	10.3%	11.0%	8.9%	8.7%	2.0%
800 Base Lighting	8%	9%	9%	4%	12%	4%	2%	9%	5%	3%	9%	14%	12%	15%	12%	4%
801 RET 2L4' Premium T8, 1EB	4%	4%	4%	2%	6%	2%	1%	4%	3%	2%	5%	7%	6%	8%	6%	2%
802 CFL Hardwired, Modular 36W	0.05%	0.06%	0.06%	0.03%	0.08%	0.03%	0.02%	0.06%	0.04%	0.02%	0.07%	0.10%	0.08%	0.10%	0.08%	0.03%
803 Metal Halide, 50W	3%	3%	3%	2%	5%	2%	1%	3%	2%	1%	4%	6%	5%	6%	5%	2%
804 Occupancy Sensor, 4L4' Fluorescent Fixtures	4%	5%	5%	2%	7%	2%	1%	5%	3%	2%	5%	8%	6%	8%	7%	2%
900 Base Other	4%	4%	9%	2%	7%	3%	1%	4%	3%	1%	3%	4%	7%	5%	7%	0%
901 Replace V-belts	4%	4%	9%	2%	7%	3%	1%	4%	3%	1%	3%	4%	7%	5%	7%	0%
902 Membranes for wastewater	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

INCOMPLETE FACTOR (percent)																		
Segment	Measure #	Measure Description	Food	Textiles,Appreumber,Furnitur	Paper	Printing	Chemicals	Petroleum	Rubber,Plastic,tone,Clay,Glas	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW		
1	100	Base Compressed Air	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	101	Compressed Air-O&M	31%	22%	22%	31%	31%	31%	31%	31%	22%	22%	22%	22%	22%	31%		
1	102	Compressed Air - Controls	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%		
1	103	Compressed Air - System Optimization	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%		
1	104	Compressed Air- Sizing	18%	99%	99%	18%	18%	18%	18%	18%	99%	99%	99%	99%	99%	18%		
1	105	Comp Air - Replace 1-5 HP motor	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%		
1	106	Comp Air - ASD (1-5 hp)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	107	Comp Air - Motor practices-1 (1-5 HP)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	108	Comp Air - Replace 6-100 HP motor	64%	21%	21%	64%	64%	64%	64%	64%	21%	21%	21%	21%	21%	64%		
1	109	Comp Air - ASD (6-100 hp)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	110	Comp Air - Motor practices-1 (6-100 HP)	14%	100%	100%	14%	14%	14%	14%	14%	100%	100%	100%	100%	100%	14%		
1	111	Comp Air - Replace 100+ HP motor	26%	38%	38%	26%	26%	26%	26%	26%	38%	38%	38%	38%	38%	26%		
1	112	Comp Air - ASD (100+ hp)	68%	100%	100%	68%	68%	68%	68%	68%	100%	100%	100%	100%	100%	68%		
1	113	Comp Air - Motor practices-1 (100+ HP)	64%	40%	40%	64%	64%	64%	64%	64%	40%	40%	40%	40%	40%	64%		
1	114	Power recovery	86%	20%	20%	86%	86%	86%	86%	86%	20%	20%	20%	20%	20%	86%		
1	200	Base Fans	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	201	Fans - O&M	84%	13%	13%	84%	84%	84%	84%	84%	13%	13%	13%	13%	13%	84%		
1	202	Fans - Controls	72%	21%	21%	72%	72%	72%	72%	72%	21%	21%	21%	21%	21%	72%		
1	203	Fans - System Optimization	86%	22%	22%	86%	86%	86%	86%	86%	22%	22%	22%	22%	22%	86%		
1	204	Fans - Improve components	68%	36%	36%	68%	68%	68%	68%	68%	36%	36%	36%	36%	36%	68%		
1	205	Fans - Replace 1-5 HP motor	98%	87%	87%	98%	98%	98%	98%	98%	87%	87%	87%	87%	87%	98%		
1	206	Fans - ASD (1-5 hp)	100%	82%	82%	100%	100%	100%	100%	100%	82%	82%	82%	82%	82%	100%		
1	207	Fans - Motor practices-1 (1-5 HP)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	208	Fans - Replace 6-100 HP motor	90%	47%	47%	90%	90%	90%	90%	90%	47%	47%	47%	47%	47%	90%		
1	209	Fans - ASD (6-100 hp)	93%	92%	92%	93%	93%	93%	93%	93%	92%	92%	92%	92%	92%	93%		
1	210	Fans - Motor practices-1 (6-100 HP)	89%	41%	41%	89%	89%	89%	89%	89%	41%	41%	41%	41%	41%	89%		
1	211	Fans - Replace 100+ HP motor	94%	90%	90%	94%	94%	94%	94%	94%	90%	90%	90%	90%	90%	94%		
1	212	Fans - ASD (100+ hp)	94%	11%	11%	94%	94%	94%	94%	94%	11%	11%	11%	11%	11%	94%		
1	213	Fans - Motor practices-1 (100+ HP)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	214	Optimize drying process	100%	80%	80%	100%	100%	100%	100%	100%	80%	80%	80%	80%	80%	100%		
1	215	Power recovery	100%	100%	100%	100%	100%	25%	100%	100%	100%	100%	100%	100%	100%	100%		
1	300	Base Pumps	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	301	Pumps - O&M	18%	55%	55%	18%	18%	18%	18%	18%	55%	55%	55%	55%	55%	18%		
1	302	Pumps - Controls	14%	24%	24%	14%	14%	14%	14%	14%	24%	24%	24%	24%	24%	14%		
1	303	Pumps - System Optimization	15%	79%	79%	15%	15%	15%	15%	15%	79%	79%	79%	79%	79%	15%		
1	304	Pumps - Sizing	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%		
1	305	Pumps - Replace 1-5 HP motor	89%	93%	93%	89%	89%	89%	89%	89%	93%	93%	93%	93%	93%	89%		
1	306	Pumps - ASD (1-5 hp)	100%	80%	80%	100%	100%	100%	100%	100%	80%	80%	80%	80%	80%	100%		
1	307	Pumps - Motor practices-1 (1-5 HP)	40%	54%	54%	40%	40%	40%	40%	40%	54%	54%	54%	54%	54%	40%		
1	308	Pumps - Replace 6-100 HP motor	97%	89%	89%	97%	97%	97%	97%	97%	89%	89%	89%	89%	89%	97%		
1	309	Pumps - ASD (6-100 hp)	98%	47%	47%	98%	98%	98%	98%	98%	47%	47%	47%	47%	47%	98%		
1	310	Pumps - Motor practices-1 (6-100 HP)	63%	81%	81%	63%	63%	63%	63%	63%	81%	81%	81%	81%	81%	63%		
1	311	Pumps - Replace 100+ HP motor	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%		
1	312	Pumps - ASD (100+ hp)	100%	98%	98%	100%	100%	100%	100%	100%	98%	98%	98%	98%	98%	100%		
1	313	Pumps - Motor practices-1 (100+ HP)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
1	314	Power recovery	100%	100%	100%	100%	100%	25%	100%	100%	100%	100%	100%	100%	100%	100%		

APPENDIX E

INDUSTRIAL

MEASURE INPUT DATA

INCOMPLETE FACTOR (percent)																		
Segment	Measure #	Measure Description	Food	Textiles,Appre	lumber,Furnit	Paper	Printing	Chemicals	Petroleum	Rubber,Plastic	stone,Clay,Glas	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/VW
1	400	Base Drives	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	401	Bakery - Process (Mixing) - O&M	70%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	402	O&M/drives spinning machines	100%	40%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	403	Air conveying systems	100%	100%	25%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	404	Replace V-Belts	47%	21%	21%	47%	47%	47%	47%	47%	47%	47%	21%	21%	21%	21%	21%	47%
1	405	Drives - EE motor	63%	14%	14%	63%	63%	63%	63%	63%	63%	63%	14%	14%	14%	14%	14%	63%
1	406	Gap Forming papermachine	100%	100%	100%	10%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	407	High Consistency forming	100%	100%	100%	10%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	408	Optimization control PM	57%	98%	98%	57%	57%	57%	57%	57%	57%	57%	98%	98%	98%	98%	98%	57%
1	409	Efficient practices printing press	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	410	Efficient Printing press (fewer cylinders)	100%	100%	100%	100%	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	411	Light cylinders	100%	100%	100%	100%	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	412	Efficient drives	100%	100%	100%	100%	30%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	413	Clean Room - Controls	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%
1	414	Clean Room - New Designs	100%	100%	100%	100%	100%	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	415	Drives - Process Controls (batch + site)	100%	100%	100%	100%	100%	50%	100%	100%	50%	50%	100%	100%	100%	100%	100%	100%
1	416	Process Drives - ASD	98%	65%	65%	98%	98%	98%	98%	98%	98%	98%	65%	65%	65%	65%	65%	98%
1	417	O&M - Extruders/Injection Moulding	57%	38%	38%	57%	57%	57%	57%	57%	57%	57%	38%	38%	38%	38%	38%	57%
1	418	Extruders/injection Moulding-multipump	79%	100%	100%	79%	79%	79%	79%	79%	79%	79%	100%	100%	100%	100%	100%	79%
1	419	Direct drive Extruders	90%	100%	100%	90%	90%	90%	90%	90%	90%	90%	100%	100%	100%	100%	100%	90%
1	420	Injection Moulding - Impulse Cooling	84%	100%	100%	84%	84%	84%	84%	84%	84%	84%	100%	100%	100%	100%	100%	84%
1	421	Injection Moulding - Direct drive	90%	100%	100%	90%	90%	90%	90%	90%	90%	90%	100%	100%	100%	100%	100%	90%
1	422	Efficient grinding	100%	100%	100%	100%	100%	100%	100%	100%	20%	100%	100%	100%	100%	100%	100%	100%
1	423	Process control	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%
1	424	Process optimization	100%	100%	100%	100%	100%	100%	100%	100%	25%	100%	100%	100%	100%	100%	100%	100%
1	425	Drives - Process Control	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%
1	426	Efficient drives - rolling	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%
1	427	Drives - Optimization process (M&T)	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	100%	40%	100%	100%	100%
1	428	Drives - Scheduling	72%	29%	29%	72%	72%	72%	72%	72%	72%	29%	29%	29%	29%	29%	29%	72%
1	429	Machinery	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	25%	25%	20%	100%	100%
1	430	Efficient Machinery	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	100%
1	500	Base Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	501	Bakery - Process	50%	100%	100%	50%	50%	50%	50%	50%	50%	50%	100%	100%	100%	100%	100%	50%
1	502	Drying (UV/IR)	100%	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	503	Heat Pumps - Drying	100%	100%	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	504	Top-heating (glass)	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%	50%
1	505	Efficient electric melting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	506	Intelligent extruder (DOE)	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	100%	100%	100%	100%	100%	100%
1	507	Near Net Shape Casting	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	100%	100%	100%	100%	100%	100%
1	508	Heating - Process Control	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%
1	509	Efficient Curing ovens	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	25%	25%	25%	25%	25%	100%
1	510	Heating - Optimization process (M&T)	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	100%	40%	100%	100%	100%
1	511	Heating - Scheduling	100%	100%	100%	100%	100%	100%	100%	100%	100%	30%	30%	100%	100%	100%	100%	100%
1	550	Base Refrigeration	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	551	Efficient Refrigeration - Operations	83%	52%	52%	83%	83%	83%	83%	83%	83%	83%	52%	52%	52%	52%	52%	83%
1	552	Optimization Refrigeration	95%	45%	45%	95%	95%	95%	95%	95%	95%	95%	45%	45%	45%	45%	45%	95%
1	600	Base Other Process	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	601	Other Process Controls (batch + site)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	602	Efficient desalter	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	603	New transformers welding	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	100%	50%	100%	100%

INCOMPLETE FACTOR (percent)																		
Segment	Measure #	Measure Description	Food	Textiles,Appre	umber,Furnitur	Paper	Printing	Chemicals	Petroleum	Rubber,Plastic	stone,Clay,Glas	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
1	604	Efficient processes (welding, etc.)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%
1	605	Process control	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	100%
1	606	Power recovery	100%	100%	100%	100%	100%	100%	25%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	700	Base Centrifugal Chiller, 0.58 kW/ton, 500 t	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	701	Centrifugal Chiller, 0.51 kW/ton, 500 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	702	Window Film - Chiller	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1	703	EMS - Chiller	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
1	704	Cool Roof - Chiller	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
1	705	Chiller Tune Up/Diagnostics	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1	706	Cooling Circ. Pumps - VSD	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
1	710	Base DX Packaged System, EER=10.3, 10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	711	DX Tune Up/ Advanced Diagnostics	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1	712	DX Packaged System, EER=10.9, 10 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	713	Window Film - DX	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
1	714	Evaporative Pre-Cooler	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
1	715	Prog. Thermostat - DX	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
1	716	Cool Roof - DX	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%
1	800	Base Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	801	RET 2L4' Premium T8, 1EB	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
1	802	CFL Hardwired, Modular 36W	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	200%	300%
1	803	Metal Halide, 50W	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%
1	804	Occupancy Sensor, 4L4' Fluorescent Fixtur	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%
1	900	Base Other	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1	901	Replace V-belts	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1	902	Membranes for wastewater	100%	15%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

FEASIBILITY FACTOR
 (percent)

Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
100	Base Compressed Air	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
101	Compressed Air-O&M	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
102	Compressed Air - Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
103	Compressed Air - System Optimization	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
104	Compressed Air- Sizing	56%	47%	47%	56%	56%	56%	56%	56%	56%	56%	47%	47%	47%	47%	47%	100%
105	Comp Air - Replace 1-5 HP motor	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
106	Comp Air - ASD (1-5 hp)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
107	Comp Air - Motor practices-1 (1-5 HP)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
108	Comp Air - Replace 6-100 HP motor	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
109	Comp Air - ASD (6-100 hp)	96%	36%	36%	96%	96%	96%	96%	96%	96%	96%	36%	36%	36%	36%	36%	36%
110	Comp Air - Motor practices-1 (6-100 HP)	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
111	Comp Air - Replace 100+ HP motor	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
112	Comp Air - ASD (100+ hp)	87%	100%	100%	87%	87%	87%	87%	87%	87%	87%	100%	100%	100%	100%	100%	59%
113	Comp Air - Motor practices-1 (100+ HP)	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
114	Power recovery	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
200	Base Fans	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
201	Fans - O&M	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
202	Fans - Controls	83%	89%	89%	83%	83%	83%	83%	83%	83%	83%	89%	89%	89%	89%	89%	100%
203	Fans - System Optimization	83%	87%	87%	83%	83%	83%	83%	83%	83%	83%	87%	87%	87%	87%	87%	100%
204	Fans- Improve components	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
205	Fans - Replace 1-5 HP motor	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
206	Fans - ASD (1-5 hp)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
207	Fans - Motor practices-1 (1-5 HP)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
208	Fans - Replace 6-100 HP motor	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
209	Fans - ASD (6-100 hp)	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
210	Fans - Motor practices-1 (6-100 HP)	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
211	Fans - Replace 100+ HP motor	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
212	Fans - ASD (100+ hp)	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
213	Fans - Motor practices-1 (100+ HP)	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
214	Optimize drying process	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
215	Power recovery	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
300	Base Pumps	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
301	Pumps - O&M	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
302	Pumps - Controls	100%	79%	79%	100%	100%	100%	100%	100%	100%	100%	79%	79%	79%	79%	79%	100%
303	Pumps - System Optimization	99%	77%	77%	99%	99%	99%	99%	99%	99%	99%	77%	77%	77%	77%	77%	100%
304	Pumps - Sizing	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
305	Pumps - Replace 1-5 HP motor	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
306	Pumps - ASD (1-5 hp)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
307	Pumps - Motor practices-1 (1-5 HP)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
308	Pumps - Replace 6-100 HP motor	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
309	Pumps - ASD (6-100 hp)	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%

FEASIBILITY FACTOR
 (percent)

Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
310	Pumps - Motor practices-1 (6-100 HP)	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
311	Pumps - Replace 100+ HP motor	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
312	Pumps - ASD (100+ hp)	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
313	Pumps - Motor practices-1 (100+ HP)	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
314	Power recovery	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
400	Base Drives	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
401	Bakery - Process (Mixing) - O&M	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
402	O&M/drives spinning machines	0%	60%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
403	Air conveying systems	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
404	Replace V-Belts	0%	0%	70%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
405	Drives - EE motor	73%	27%	27%	73%	73%	73%	73%	73%	73%	73%	27%	27%	27%	27%	27%	0%
406	Gap Forming papermachine	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
407	High Consistency forming	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
408	Optimization control PM	82%	47%	47%	82%	82%	82%	82%	82%	82%	82%	47%	47%	47%	47%	47%	0%
409	Efficient practices printing press	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
410	Efficient Printing press (fewer cylinders)	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
411	Light cylinders	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
412	Efficient drives	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
413	Clean Room - Controls	0%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%
414	Clean Room - New Designs	0%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
415	Drives - Process Controls (batch + site)	0%	0%	0%	0%	0%	86%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%
416	Process Drives - ASD	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	0%
417	O&M - Extruders/Injection Moulding	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
418	Extruders/injection Moulding-multipump	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
419	Direct drive Extruders	40%	0%	0%	40%	40%	40%	40%	40%	40%	40%	0%	0%	0%	0%	0%	0%
420	Injection Moulding - Impulse Cooling	45%	0%	0%	45%	45%	45%	45%	45%	45%	45%	0%	0%	0%	0%	0%	0%
421	Injection Moulding - Direct drive	46%	0%	0%	46%	46%	46%	46%	46%	46%	46%	0%	0%	0%	0%	0%	0%
422	Efficient grinding	100%	85%	85%	100%	100%	100%	100%	100%	100%	100%	85%	85%	85%	85%	85%	0%
423	Process control	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
424	Process optimization	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%
425	Drives - Process Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
426	Efficient drives - rolling	95%	0%	0%	95%	95%	95%	95%	95%	95%	95%	0%	0%	0%	0%	0%	0%
427	Drives - Optimization process (M&T)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	40%	0%	40%	0%	0%
428	Drives - Scheduling	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	40%	40%	40%	40%	0%
429	Machinery	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	50%	50%	0%	0%
430	Efficient Machinery	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%
500	Base Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
501	Bakery - Process	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
502	Drying (UV/IR)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
503	Heat Pumps - Drying	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
504	Top-heating (glass)	84%	0%	0%	84%	84%	84%	84%	84%	84%	84%	0%	0%	0%	0%	0%	0%
505	Efficient electric melting	0%	0%	0%	0%	0%	0%	0%	0%	0%	90%	0%	0%	0%	0%	0%	0%
506	Intelligent extruder (DOE)	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
507	Near Net Shape Casting	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%
508	Heating - Process Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
509	Efficient Curing ovens	84%	0%	0%	84%	84%	84%	84%	84%	84%	84%	70%	50%	50%	50%	50%	50%
510	Heating - Optimization process (M&T)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	40%	0%	40%	0%	0%
511	Heating - Scheduling	14%	0%	0%	14%	14%	14%	14%	14%	14%	14%	40%	40%	0%	0%	0%	0%
550	Base Refrigeration	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
551	Efficient Refrigeration - Operations	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

FEASIBILITY FACTOR

(percent)

Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
552	Optimization Refrigeration	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
600	Base Other Process	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
601	Other Process Controls (batch + site)	0%	0%	0%	0%	0%	86%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
602	Efficient desalter	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
603	New transformers welding	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	50%	0%	100%	0%	0%
604	Efficient processes (welding, etc.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
605	Process control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
606	Power recovery	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
700	Base Centrifugal Chiller, 0.58 kW/ton, 500 t	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
701	Centrifugal Chiller, 0.51 kW/ton, 500 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
702	Window Film - Chiller	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
703	EMS - Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
704	Cool Roof - Chiller	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
705	Chiller Tune Up/Diagnostics	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
706	Cooling Circ. Pumps - VSD	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
710	Base DX Packaged System, EER=10.3, 10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
711	DX Tune Up/ Advanced Diagnostics	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
712	DX Packaged System, EER=10.9, 10 tons	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
713	Window Film - DX	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
714	Evaporative Pre-Cooler	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
715	Prog. Thermostat - DX	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
716	Cool Roof - DX	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
800	Base Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
801	RET 2L4' Premium T8, 1EB	76%	86%	87%	80%	96%	77%	77%	80%	62%	66%	85%	87%	90%	89%	93%	93%
802	CFL Hardwired, Modular 36W	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	6%
803	Metal Halide, 50W	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
804	Occupancy Sensor, 4L4' Fluorescent Fixtur	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
900	Base Other	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
901	Replace V-belts	73%	71%	80%	79%	39%	0%	7%	53%	70%	20%	53%	40%	33%	55%	55%	55%
902	Membranes for wastewater	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%

APPENDIX E

INDUSTRIAL

MEASURE INPUT DATA

ENERGY SAVINGS (percent)																		
Segment	Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/VW
1	100	Base Compressed Air	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	101	Compressed Air-O&M	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%
1	102	Compressed Air - Controls	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
1	103	Compressed Air - System Optimization	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	104	Compressed Air- Sizing	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
1	105	Comp Air - Replace 1-5 HP motor	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%
1	106	Comp Air - ASD (1-5 hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	107	Comp Air - Motor practices-1 (1-5 HP)	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%
1	108	Comp Air - Replace 6-100 HP motor	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
1	109	Comp Air - ASD (6-100 hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	110	Comp Air - Motor practices-1 (6-100 HP)	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
1	111	Comp Air - Replace 100+ HP motor	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
1	112	Comp Air - ASD (100+ hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	113	Comp Air - Motor practices-1 (100+ HP)	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
1	114	Power recovery	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	200	Base Fans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	201	Fans - O&M	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
1	202	Fans - Controls	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	203	Fans - System Optimization	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%	21.2%
1	204	Fans- Improve components	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	205	Fans - Replace 1-5 HP motor	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%
1	206	Fans - ASD (1-5 hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	207	Fans - Motor practices-1 (1-5 HP)	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%
1	208	Fans - Replace 6-100 HP motor	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
1	209	Fans - ASD (6-100 hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	210	Fans - Motor practices-1 (6-100 HP)	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
1	211	Fans - Replace 100+ HP motor	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
1	212	Fans - ASD (100+ hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	213	Fans - Motor practices-1 (100+ HP)	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
1	214	Optimize drying process	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	215	Power recovery	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	300	Base Pumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	301	Pumps - O&M	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	302	Pumps - Controls	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
1	303	Pumps - System Optimization	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%
1	304	Pumps - Sizing	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	305	Pumps - Replace 1-5 HP motor	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%
1	306	Pumps - ASD (1-5 hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	307	Pumps - Motor practices-1 (1-5 HP)	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%
1	308	Pumps - Replace 6-100 HP motor	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
1	309	Pumps - ASD (6-100 hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	310	Pumps - Motor practices-1 (6-100 HP)	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
1	311	Pumps - Replace 100+ HP motor	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
1	312	Pumps - ASD (100+ hp)	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
1	313	Pumps - Motor practices-1 (100+ HP)	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%

ENERGY SAVINGS (percent)																		
Segment	Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
1	314	Power recovery	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	400	Base Drives	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	401	Bakery - Process (Mixing) - O&M	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	402	O&M/drives spinning machines	0.0%	16.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	403	Air conveying systems	0.0%	0.0%	41.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	404	Replace V-Belts	0.0%	0.0%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	405	Drives - EE motor	0.0%	0.0%	3.5%	3.1%	0.0%	0.0%	0.0%	0.0%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	406	Gap Forming papermachine	0.0%	0.0%	0.0%	7.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	407	High Consistency forming	0.0%	0.0%	0.0%	7.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	408	Optimization control PM	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	409	Efficient practices printing press	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	410	Efficient Printing press (fewer cylinders)	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	411	Light cylinders	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	412	Efficient drives	0.0%	0.0%	0.0%	0.0%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	413	Clean Room - Controls	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%
1	414	Clean Room - New Designs	0.0%	0.0%	0.0%	0.0%	0.0%	30.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	415	Drives - Process Controls (batch + site)	0.0%	0.0%	0.0%	0.0%	0.0%	8.0%	0.0%	0.0%	2.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	416	Process Drives - ASD	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%
1	417	O&M - Extruders/Injection Moulding	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	418	Extruders/injection Moulding-multipump	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	30.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	419	Direct drive Extruders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	420	Injection Moulding - Impulse Cooling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	21.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	421	Injection Moulding - Direct drive	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	422	Efficient grinding	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	21.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	423	Process control	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	424	Process optimization	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	425	Drives - Process Control	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	426	Efficient drives - rolling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	427	Drives - Optimization process (M&T)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	10.0%	0.0%	10.0%	0.0%	0.0%
1	428	Drives - Scheduling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	5.5%	5.0%	5.5%	5.0%	0.0%
1	429	Machinery	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%	7.0%	3.5%	10.8%	0.0%	0.0%
1	430	Efficient Machinery	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.5%	3.5%
1	500	Base Heating	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	501	Bakery - Process	37.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	502	Drying (UV/IR)	0.0%	26.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	503	Heat Pumps - Drying	0.0%	0.0%	22.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	504	Top-heating (glass)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	505	Efficient electric melting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	506	Intelligent extruder (DOE)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	507	Near Net Shape Casting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	508	Heating - Process Control	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	509	Efficient Curing ovens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	20.0%	20.0%	20.0%	0.0%
1	510	Heating - Optimization process (M&T)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	10.0%	0.0%	10.0%	0.0%	0.0%
1	511	Heating - Scheduling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	5.5%	0.0%	0.0%	0.0%	0.0%
1	550	Base Refrigeration	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	551	Efficient Refrigeration - Operations	12.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

ENERGY SAVINGS (percent)																		
Segment	Measure #	Measure Description	Food	Textiles,Apprel	Lumber,Furniture	Paper	Printing	Chemicals	Petroleum	Rubber,Plastics	Stone,Clay,Glass	Prim Metals	Fab Metals	Ind Mach	Electronics	Transp Equip	Misc.	Water/WW
1	552	Optimization Refrigeration	26.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	600	Base Other Process	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	601	Other Process Controls (batch + site)	0.0%	0.0%	0.0%	0.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	602	Efficient desalter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	603	New transformers welding	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	0.0%	25.0%	0.0%	0.0%
1	604	Efficient processes (welding, etc.)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%
1	605	Process control	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%
1	606	Power recovery	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	700	Base Centrifugal Chiller, 0.58 kW/ton, 500 tons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	701	Centrifugal Chiller, 0.51 kW/ton, 500 tons	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%	12.1%
1	702	Window Film - Chiller	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%
1	703	EMS - Chiller	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	704	Cool Roof - Chiller	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
1	705	Chiller Tune Up/Diagnostics	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
1	706	Cooling Circ. Pumps - VSD	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
1	710	Base DX Packaged System, EER=10.3, 10 tons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	711	DX Tune Up/ Advanced Diagnostics	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	712	DX Packaged System, EER=10.9, 10 tons	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
1	713	Window Film - DX	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%
1	714	Evaporative Pre-Cooler	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	715	Prog. Thermostat - DX	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
1	716	Cool Roof - DX	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
1	800	Base Lighting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	801	RET 2L4' Premium T8, 1EB	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%	31.4%
1	802	CFL Hardwired, Modular 36W	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
1	803	Metal Halide, 50W	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%
1	804	Occupancy Sensor, 4L4' Fluorescent Fixtures	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1	900	Base Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	901	Replace V-belts	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
1	902	Membranes for wastewater	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%



The Opportunity for Energy Efficiency that is Cheaper than Supply in Rhode Island

Appendix F – Supply Curve Data.



Prepared for: Rhode Island Energy Efficiency and Resource Management Council (EERMC)

Prepared by

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August 26, 2010

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F. Appendix F: Supply Curve Data

This appendix presents supply curve results for the EERMC Energy that is Cheaper than Supply Study. Results are shown by sector and vintage: residential existing, residential new construction, commercial existing, commercial new construction, and industrial.

Energy Supply Curve Residential - Existing					
Measure Number	Measure	Measure GWH Savings	Cumulative Measure GWH Savings	Percent Savings	Marginal Energy Cost \$/kWh
911	Energy Star Plasma Screen TV	12	12	0.39%	0.00
921	Energy Star LCD TV	11	23	0.74%	0.00
211	CFL (15-Watt integral ballast), 1.8 hr/day	354	378	11.97%	0.00
341	Second Refrigerator Recycling	65	443	14.02%	0.00
182	Variable speed furnace fans (ROB)	51	493	15.62%	0.00
946	Energy Star Desktop Computer	10	503	15.95%	0.01
171	Energy Star Dehumidifier (ROB)	17	521	16.50%	0.01
931	Energy Star LCD TV	16	537	17.00%	0.01
971	Conservation Practices	72	608	19.27%	0.02
201	Basement Insulation	9	617	19.54%	0.02
191	Single Pane Windows to Double Pane with Gas	21	638	20.20%	0.02
508	Water Heater Blanket	8	646	20.45%	0.02
506	Pipe Wrap	3	649	20.56%	0.02
204	Self Install Weatherization	1	650	20.60%	0.02
941	Energy Star Laptop Computer	1	652	20.64%	0.03
509	2011 Energy Star Clotheswasher (MEF 2.00)	14	665	21.07%	0.03
156	Wall 2x4 R-0 to Blow-In R-13 Insulation	9	674	21.35%	0.03
120	Ceiling R-0 to R-19 Insulation	1	675	21.38%	0.04
221	LEDs w/ CFL Baseline	32	707	22.38%	0.05
HE Refrigerator - Energy Star version of above (side by side freezer)					
321	side freezer)	10	716	22.68%	0.05
502	HE Water Heater (EF=0.93)	6	722	22.86%	0.05
Refrigerator - Early Replacement w/ side by side freezer					
331	to 2008 Energy Star	6	728	23.05%	0.06
202	Programmable Thermostat	2	730	23.12%	0.06
401	Energy Star Freezer	5	735	23.27%	0.06
Refrigerator - Early Replacement Top Mount to 2008					
311	Energy Star	9	744	23.57%	0.06
HE Refrigerator - Energy Star version of above (Top Mount)					
301	Mount)	20	764	24.19%	0.06
159	Ductless Split Heat Pump	3	767	24.30%	0.06
181	Variable speed furnace fans (RET)	30	797	25.26%	0.07
411	Early Replacement Freezer to 2008 Energy Star	1	799	25.30%	0.07

Capacity Supply Curve Residential - Existing					
Measure Number	Measure	Measure MW Savings	Cumulative Measure MW Savings	Percent Savings	Marginal Capacity Cost \$/kW
171	Energy Star Dehumidifier (ROB)	18	18	2.28%	5
911	Energy Star Plasma Screen TV	1	20	2.47%	6
921	Energy Star LCD TV	1	21	2.64%	14
341	Second Refrigerator Recycling	9	30	3.77%	16
211	CFL (15-Watt integral ballast), 1.8 hr/day	36	66	8.32%	18
156	Wall 2x4 R-0 to Blow-In R-13 Insulation	10	75	9.52%	32
946	Energy Star Desktop Computer	1	76	9.68%	42
120	Ceiling R-0 to R-19 Insulation	1	77	9.80%	48
971	Conservation Practices	19	96	12.22%	59
159	Ductless Split Heat Pump	3	100	12.65%	62
931	Energy Star LCD TV	2	102	12.90%	66
113	Proper Refrigerant Charging and Air Flow	13	115	14.59%	71
152	Ceiling R-0 to R-19 Insulation	1	116	14.74%	112
124	Wall 2x4 R-0 to Blow-In R-13 Insulation	1	117	14.85%	113
161	EER 8.5 AC Early Replacement, CEE Tier 1 EER 11.3	6	123	15.60%	115
122	Ceiling R-0 to R-49 Insulation	1	124	15.72%	129
117	Single Pane Windows to Double Pane with Gas	5	129	16.29%	137
109	Portable Fans	2	130	16.52%	139
142	HE Room Air Conditioner - CEE Tier 1 EER 11.3	22	152	19.26%	144
114 Duct Repair					
102	15 SEER Split-System Air Conditioner	7	171	21.66%	197
508 Water Heater Blanket					
506	Pipe Wrap	0	172	21.78%	220
509	2011 Energy Star Clotheswasher (MEF 2.00)	2	174	22.02%	230
941 Energy Star Laptop Computer					
112	Attic Venting	2	176	22.23%	264
901	Variable Speed Pool Pump (1.5 hp)	3	178	22.57%	292
154	Ceiling R-0 to R-49 Insulation	1	179	22.71%	297
131	15 SEER Split-System AC Early Replacement	5	184	23.36%	306

Energy Supply Curve					
Residential - Existing					
Measure	Measure	Measure	Cumulative Measure	Percent Savings	Marginal Energy Cost
Number			GWH	GWH	\$/kWH
113	Proper Refrigerant Charging and Air Flow	13	812	25.71%	0.07
	Early Replacement Water Heating to Heat Pump Water				
551	Heater	1	812	25.73%	0.08
199	Wall Blow-in R-0 to R-13 Insulation	7	819	25.94%	0.09
505	Low Flow Showerhead	5	824	26.10%	0.09
501	Heat Pump Water Heater (EF=2.5)	11	835	26.46%	0.09
507	Faucet Aerators	4	839	26.58%	0.10
109	Portable Fans	3	842	26.66%	0.10
152	Ceiling R-0 to R-19 Insulation	1	843	26.70%	0.10
193	Ceiling R-0 to R-38 Insulation	1	844	26.72%	0.10
122	Ceiling R-0 to R-49 Insulation	1	845	26.76%	0.12
161	EER 8.5 AC Early Replacement, CEE Tier 1 EER 11.3	6	850	26.94%	0.12
124	Wall 2x4 R-0 to Blow-In R-13 Insulation	1	851	26.96%	0.12
212	LEDs w/ Incandescent Baseline	32	883	27.98%	0.13
117	Single Pane Windows to Double Pane with Gas	5	888	28.12%	0.14
196	Ceiling R-0 to R-49 Insulation	1	889	28.15%	0.14
601	Energy Star Clotheswasher (MEF 2.00)	5	893	28.30%	0.14
142	HE Room Air Conditioner - CEE Tier 1 EER 11.3	21	914	28.96%	0.15
114	Duct Repair	11	926	29.32%	0.16
901	Variable Speed Pool Pump (1.5 hp)	5	930	29.46%	0.17
192	Double Pane Windows to Double Pane with Gas	2	932	29.52%	0.17
710	High Efficiency CD (EF=3.01 w/moisture sensor)	15	947	30.00%	0.18
203	Infiltration Reduction	5	952	30.16%	0.19
112	Attic Venting	2	954	30.23%	0.19
102	15 SEER Split-System Air Conditioner	7	961	30.45%	0.20
111	Whole House Fans	9	970	30.74%	0.25
154	Ceiling R-0 to R-49 Insulation	1	972	30.78%	0.27
205	Ductless Split Heat Pump	19	991	31.39%	0.28
322	HE Refrigerator - CEE Tier 2 (side by side freezer)	6	996	31.56%	0.29
149	Single Pane Windows to Double Pane with Gas	6	1,003	31.76%	0.30
148	Portable Fans	2	1,004	31.81%	0.31

Capacity Supply Curve					
Residential - Existing					
Measure	Measure	Measure	Cumulative Measure	Percent Savings	Marginal Capacity Cost
Number			MW	MW	\$/kW
149	Single Pane Windows to Double Pane with Gas	6	191	24.15%	308
	HE Refrigerator - Energy Star version of above (side by side freezer)	1	192	24.32%	338
321	side freezer)	1	192	24.32%	338
111	Whole House Fans	6	198	25.14%	353
121	Ceiling R-19 to R-38 Insulation	0	199	25.18%	361
401	Energy Star Freezer	1	200	25.27%	395
115	Duct Insulation	2	201	25.52%	402
331	Refrigerator - Early Replacement w/ side by side freezer	1	202	25.62%	423
148	Portable Fans	1	203	25.76%	437
311	Refrigerator - Early Replacement Top Mount to 2008	1	205	25.92%	443
301	HE Refrigerator - Energy Star version of above (Top	3	207	26.26%	446
221	LEDs w/ CFL Baseline	3	211	26.67%	447
411	Early Replacement Freezer to 2008 Energy Star	0	211	26.70%	486
125	Self Install Weatherization	0	211	26.71%	496
146	Whole House Fans	6	217	27.50%	564
105	Programmable Thermostat	1	218	27.57%	610
502	HE Water Heater (EF=0.93)	0	218	27.63%	640
118	Double Pane Windows to Double Pane with Gas	3	221	27.98%	669
906	Variable Speed Pool Pump (1.5 hp)	0	221	27.98%	726
153	Ceiling R-19 to R-38 Insulation	0	221	28.03%	751
116	AC maintenance and repair	2	223	28.28%	877
103	17 SEER Split-System Air Conditioner	9	232	29.37%	925
551	Early Replacement Water Heating to Heat Pump Water	0	232	29.38%	971
110	Ceiling Fans	1	233	29.47%	978
151	Double Pane Windows to Double Pane with Gas	3	236	29.86%	1,008
601	Energy Star Clotheswasher (MEF 2.00)	1	236	29.94%	1,030
505	Low Flow Showerhead	0	237	30.00%	1,079
501	Heat Pump Water Heater (EF=2.5)	1	238	30.11%	1,086
507	Faucet Aerators	0	238	30.15%	1,167
123	Ceiling R-19 to R-49 Insulation	0	238	30.19%	1,208
212	LEDs w/ Incandescent Baseline	3	242	30.60%	1,287



Energy Supply Curve Residential - Existing					
Measure Number	Measure	Measure	Cumulative	Percent	Marginal
		GWH Savings	Measure GWH Savings	Savings	Energy Cost \$/kWh
131	15 SEER Split-System AC Early Replacement	5	1,009	31.97%	0.32
121	Ceiling R-19 to R-38 Insulation	0	1,010	31.98%	0.33
962	Plug Load Controls - Smart Power Strip	8	1,018	32.24%	0.34
194	Ceiling R-11 to R-38 Insulation	0	1,018	32.25%	0.35
200	Floor R-0 to R-19 Insulation	1	1,019	32.28%	0.38
302	HE Refrigerator - CEE tier 2 (Top Mount)	8	1,027	32.54%	0.39
146	Whole House Fans	9	1,036	32.82%	0.40
906	Variable Speed Pool Pump (1.5 hp)	0	1,036	32.82%	0.41
115	Duct Insulation	2	1,038	32.88%	0.42
125	Self Install Weatherization	0	1,038	32.88%	0.44
711	Heat Pump Dryer	80	1,118	35.42%	0.49
105	Programmable Thermostat	1	1,119	35.44%	0.54
511	Energy Star Dishwasher (EF=0.68)	1	1,119	35.46%	0.64
118	Double Pane Windows to Double Pane with Gas	3	1,122	35.55%	0.66
153	Ceiling R-19 to R-38 Insulation	0	1,123	35.56%	0.68
110	Ceiling Fans	1	1,124	35.59%	0.70
197	Ceiling R-19 to R-49 Insulation	0	1,124	35.60%	0.71
195	Ceiling R-19 to R-38 Insulation	0	1,124	35.60%	0.84
116	AC maintenance and repair	2	1,126	35.66%	0.91
103	17 SEER Split-System Air Conditioner	8	1,134	35.93%	0.96
151	Double Pane Windows to Double Pane with Gas	3	1,137	36.03%	1.00
119	Attic Insulation	4	1,141	36.15%	1.07
123	Ceiling R-19 to R-49 Insulation	0	1,142	36.17%	1.09
510	Tier 3 CW (MEF=2.20)	1	1,143	36.20%	1.14
145	Ceiling Fans	2	1,144	36.24%	1.37
512	CEE Tier 2 DW (EF=0.72)	0	1,144	36.25%	1.45
198	Ceiling R-30 to R-49 Insulation	0	1,144	36.25%	1.54
157	Self Install Weatherization	0	1,145	36.25%	1.68
155	Ceiling R-19 to R-49 Insulation	0	1,145	36.27%	1.94
126	Infiltration Reduction	1	1,146	36.29%	2.69
602	Tier 3 CW (MEF=2.20)	0	1,146	36.31%	3.58
158	Infiltration Reduction	0	1,147	36.32%	14.91

Capacity Supply Curve Residential - Existing					
Measure Number	Measure	Measure	Cumulative	Percent	Marginal
		MW Savings	Measure MW Savings	Savings	Capacity Cost \$/kW
710	High Efficiency CD (EF=3.01 w/moisture sensor)	2	244	30.86%	1,335
119	Attic Insulation	3	246	31.19%	1,628
157	Self Install Weatherization	0	246	31.21%	1,881
145	Ceiling Fans	1	247	31.34%	1,916
322	HE Refrigerator - CEE Tier 2 (side by side freezer)	1	248	31.44%	2,118
155	Ceiling R-19 to R-49 Insulation	0	249	31.48%	2,148
302	HE Refrigerator - CEE tier 2 (Top Mount)	1	250	31.63%	2,834
126	Infiltration Reduction	1	250	31.72%	3,015
711	Heat Pump Dryer	11	261	33.08%	3,682
962	Plug Load Controls - Smart Power Strip	1	262	33.16%	4,150
510	Tier 3 CW (MEF=2.20)	0	262	33.18%	8,169
511	Energy Star Dishwasher (EF=0.68)	0	262	33.18%	8,793
158	Infiltration Reduction	0	262	33.24%	16,688
512	CEE Tier 2 DW (EF=0.72)	0	262	33.24%	19,924
602	Tier 3 CW (MEF=2.20)	0	262	33.25%	25,635
181	Variable speed furnace fans (RET)	0	262	33.25%	N/A
182	Variable speed furnace fans (ROB)	0	262	33.25%	N/A
191	Single Pane Windows to Double Pane with Gas	0	262	33.25%	N/A
192	Double Pane Windows to Double Pane with Gas	0	262	33.25%	N/A
193	Ceiling R-0 to R-38 Insulation	0	262	33.25%	N/A
194	Ceiling R-11 to R-38 Insulation	0	262	33.25%	N/A
195	Ceiling R-19 to R-38 Insulation	0	262	33.25%	N/A
196	Ceiling R-0 to R-49 Insulation	0	262	33.25%	N/A
197	Ceiling R-19 to R-49 Insulation	0	262	33.25%	N/A
198	Ceiling R-30 to R-49 Insulation	0	262	33.25%	N/A
199	Wall Blow-in R-0 to R-13 Insulation	0	262	33.25%	N/A
200	Floor R-0 to R-19 Insulation	0	262	33.25%	N/A
201	Basement Insulation	0	262	33.25%	N/A
202	Programmable Thermostat	0	262	33.25%	N/A
203	Infiltration Reduction	0	262	33.25%	N/A
204	Self Install Weatherization	0	262	33.25%	N/A
205	Ductless Split Heat Pump	0	262	33.25%	N/A

Energy Supply Curve					
Residential -- New					
Measure		Measure	Cumulative		Marginal
Number	Measure	GWH Savings	Measure GWH Savings	Percent Savings	Energy Cost \$/kWH
101	2011 ENERGY STAR Home	2	2	12.23%	0.06
201	Dummy Upgrade	0	2	12.23%	N/A

Capacity Supply Curve					
Residential -- New					
Measure		Measure	Cumulative		Marginal
Number	Measure	MW Savings	Measure MW Savings	Percent Savings	Capacity Cost \$/kW
101	2011 ENERGY STAR Home	0	0	12.23%	259
201	Dummy Upgrade	0	0	12.23%	N/A

Energy Supply Curve Commercial -- Existing					
Measure Number	Measure	Cumulative			Marginal Energy Cost \$/kWh
		Measure GWH Savings	Measure GWH Savings	Percent Savings	
661	Data Center Improved Operations	1	1	0.03%	0.00
662	Data Center Best Practices	1	2	0.06%	0.00
416	Separate Makeup Air/Exhaust Hoods AC	0	3	0.07%	0.00
641	Energy Star or Better Copier	7	9	0.25%	0.00
663	Data Center State of the Art practices	0	10	0.26%	0.00
530	Demand Defrost Electric	21	31	0.82%	0.00
621	Energy Star or Better Monitor - CRT	10	40	1.08%	0.00
611	Energy Star or Better PC	17	57	1.53%	0.00
538	Fiber Optic Display Lighting	25	82	2.19%	0.00
529	Demand Hot Gas Defrost	4	86	2.30%	0.01
533	Freezer-Cooler Replacement Gaskets	11	97	2.59%	0.01
525	Efficient compressor motor	13	110	2.93%	0.01
613	PC Network Power Management Enabling	55	164	4.39%	0.01
141	CFL Screw-in 18W	95	259	6.92%	0.01
527	Floating head pressure controls	7	265	7.09%	0.01
	High Performance Lighting Remod/Renov - 25%				
136	Savings - Base 2L8T12	6	272	7.27%	0.01
201	LED Exit Sign	7	279	7.46%	0.02
	High Performance Lighting Remod/Renov - 25%				
127	Savings - Base 2L4T12	8	287	7.68%	0.02
540	Reach-In Refrigerators	2	289	7.73%	0.02
531	Anti-sweat (humidistat) controls	4	293	7.84%	0.02
	High Performance Lighting Remod/Renov - 25%				
107	Savings - Base 4L4T12	5	298	7.97%	0.02
904	Energy Star Hot Food Holding Cabinets	9	307	8.20%	0.02
	High Performance Lighting Remod/Renov - 25%				
165	Savings - Base High Bay PSMH	4	311	8.30%	0.02
	High Performance Lighting Remod/Renov - 25%				
196	Savings - Base 2L4T8	18	328	8.78%	0.02
214	Outdoor Lighting Controls (Photocell/Timeclock)	25	353	9.45%	0.02

Capacity Supply Curve Commercial -- Existing					
Measure Number	Measure	Cumulative			Marginal Capacity Cost \$/kW
		Measure MW Savings	Measure MW Savings	Percent Savings	
661	Data Center Improved Operations	0	0	0.02%	1
662	Data Center Best Practices	0	0	0.04%	4
416	Separate Makeup Air/Exhaust Hoods AC	0	0	0.05%	4
641	Energy Star or Better Copier	1	2	0.17%	6
663	Data Center State of the Art practices	0	2	0.18%	7
530	Demand Defrost Electric	3	5	0.50%	14
621	Energy Star or Better Monitor - CRT	2	6	0.67%	15
611	Energy Star or Better PC	2	8	0.90%	22
538	Fiber Optic Display Lighting	3	12	1.28%	26
362	Aerosol Duct Sealing - DX	8	19	2.16%	45
529	Demand Hot Gas Defrost	1	20	2.23%	48
363	Ceiling/roof Insulation - DX	6	27	2.95%	49
301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	8	35	3.83%	53
533	Freezer-Cooler Replacement Gaskets	1	36	4.00%	54
141	CFL Screw-in 18W	17	53	5.91%	55
525	Efficient compressor motor	2	55	6.11%	56
136	High Performance Lighting Remod/Renov - 25%	1	56	6.23%	67
	High Performance Lighting Remod/Renov - 25%				
127	Savings - Base 2L4T12	1	58	6.40%	84
613	PC Network Power Management Enabling	6	64	7.07%	86
201	LED Exit Sign	1	65	7.20%	90
	High Performance Lighting Remod/Renov - 25%				
107	Savings - Base 4L4T12	1	66	7.31%	105
306	VSD for Chiller Pumps and Towers	2	68	7.50%	110
134	Occupancy Sensor, 4L8' Fluorescent Fixtures	1	68	7.59%	113
365	DX Coil Cleaning	8	76	8.43%	114
	High Performance Lighting Remod/Renov - 25%				
165	Savings - Base High Bay PSMH	1	77	8.50%	114

Energy Supply Curve Commercial -- Existing					
Measure		Measure	Cumulative Measure	Percent	Marginal Energy Cost
Number	Measure	GWH	GWH	Savings	\$/kWh
191	ROB 2L4' Premium T8, 1EB	23	376	10.05%	0.02
522	Strip curtains for walk-ins	4	380	10.16%	0.02
164	Occupancy Sensor, High Bay T5 - Base Std MH	1	381	10.19%	0.03
362	Aerosol Duct Sealing - DX High Performance Lighting Remod/Renov - 25%	14	395	10.56%	0.03
185	Savings - Base 4L4T8	12	407	10.89%	0.03
134	Occupancy Sensor, 4L8' Fluorescent Fixtures	3	411	10.98%	0.03
222	LED Streetlighting	31	441	11.79%	0.03
422	Variable Speed Drive Control, 40 HP	13	455	12.15%	0.03
401	Fan Motor, 5hp, 1800rpm, 89.5%	5	460	12.28%	0.03
622	Monitor Power Management Enabling - CRT	0	460	12.29%	0.03
423	Air Handler Optimization, 40 HP	3	462	12.36%	0.03
181	ROB 4L4' Premium T8, 1EB	15	477	12.75%	0.03
301	Centrifugal Chiller, 0.51 kW/ton, 500 tons	14	491	13.11%	0.03
801	Vending Misers (cooled machines only)	6	496	13.27%	0.03
124	Occupancy Sensor, 8L4' Fluorescent Fixtures	6	503	13.44%	0.03
536	Oversized Air-Cooled Condenser	5	507	13.56%	0.03
363	Ceiling/roof Insulation - DX	10	517	13.81%	0.03
161	High Bay T5 - Base Std MH	20	537	14.36%	0.03
104	Occupancy Sensor, 4L4' Fluorescent Fixtures	4	541	14.46%	0.03
526	Compressor VSD retrofit	5	546	14.61%	0.03
151	CFL Hardwired, Modular 18W	38	585	15.63%	0.04
126	Lighting Control Tuneup - Base 2L4T12	0	585	15.63%	0.04
632	Monitor Power Management Enabling - LCD	1	586	15.65%	0.04
411	Fan Motor, 15hp, 1800rpm, 92.4%	0	586	15.66%	0.04
192	Occupancy Sensor, 8L4' Fluorescent Fixtures	15	601	16.06%	0.04

Energy Supply Curve Commercial -- Existing					
Measure		Measure	Cumulative Measure	Percent	Marginal Energy Cost
Number	Measure	GWH	GWH	Savings	\$/kWh
523	Night covers for display cases	3	604	16.13%	0.04
651	Printer Power Management Enabling	3	606	16.21%	0.04
182	Occupancy Sensor, 4L4' Fluorescent Fixtures	11	618	16.52%	0.04
521	High-efficiency fan motors	22	640	17.12%	0.04
193	Lighting Control Tuneup - Base 2L4T8	0	640	17.12%	0.04
539	Beverage Merchandisers	1	642	17.15%	0.04
421	Fan Motor, 40hp, 1800rpm, 94.1%	1	642	17.17%	0.05
424	Demand Controlled Ventilation	9	651	17.41%	0.05
412	Variable Speed Drive Control, 15 HP Electronically Commutated Motors (ECM) on an air	6	657	17.56%	0.05
415	handler unit	4	661	17.66%	0.05
106	Lighting Control Tuneup	0	661	17.66%	0.05
642	Copier Power Management Enabling	3	664	17.74%	0.06
631	Energy Star or Better Monitor - LCD	1	665	17.78%	0.06
402	Variable Speed Drive Control, 5 HP	44	709	18.96%	0.06
142	Cold Cathode Lamps	7	717	19.16%	0.06
534	High R-Value Glass Doors	2	718	19.20%	0.06
306	VSD for Chiller Pumps and Towers	3	721	19.28%	0.06
183	Lighting Control Tuneup - Base 4L4T8	0	722	19.29%	0.07
365	DX Coil Cleaning	12	734	19.62%	0.07
311	High Efficiency Chiller Motors	1	735	19.64%	0.07
212	LED Outdoor Area Lighting	33	768	20.52%	0.08
358	Prog. Thermostat - DX	9	776	20.75%	0.08
524	Evaporator fan controller for MT walk-ins	1	777	20.76%	0.08
902	Efficient Fryer	0	777	20.78%	0.08
417	Demand Controlled Ventilation	3	780	20.86%	0.09

Capacity Supply Curve Commercial -- Existing					
Measure		Measure	Cumulative Measure	Percent	Marginal Capacity Cost
Number	Measure	MW	MW	Savings	\$/kW
904	Energy Star Hot Food Holding Cabinets	1	78	8.66%	118
196	High Performance Lighting Remod/Renov - 25%	3	81	9.02%	118
191	ROB 2L4' Premium T8, 1EB	4	85	9.47%	124
311	High Efficiency Chiller Motors	0	86	9.52%	125
124	Occupancy Sensor, 8L4' Fluorescent Fixtures	2	87	9.69%	131
540	Reach-In Refrigerators	0	88	9.72%	135
104	Occupancy Sensor, 4L4' Fluorescent Fixtures	1	89	9.83%	135
185	High Performance Lighting Remod/Renov - 25%	2	91	10.08%	143
401	Fan Motor, 5hp, 1800rpm, 89.5%	1	92	10.17%	157
522	Strip curtains for walk-ins	1	92	10.23%	161
181	ROB 4L4' Premium T8, 1EB	3	95	10.52%	170
303	EMS - Chiller	2	97	10.75%	176
161	High Bay T5 - Base Std MH	4	100	11.15%	189
151	CFL Hardwired, Modular 18W	7	107	11.92%	196
353	DX Packaged System, EER=11.5, 10 tons	31	138	15.33%	199
411	Fan Motor, 15hp, 1800rpm, 92.4%	0	138	15.34%	202
192	Occupancy Sensor, 8L4' Fluorescent Fixtures	3	141	15.64%	213
421	Fan Motor, 40hp, 1800rpm, 94.1%	0	141	15.66%	225
182	Occupancy Sensor, 4L4' Fluorescent Fixtures	2	143	15.89%	225
536	Oversized Air-Cooled Condenser	1	144	15.96%	240
531	Anti-sweat (humidistat) controls	0	144	15.99%	244
622	Monitor Power Management Enabling - CRT Electronically Commutated Motors (ECM) on an air	0	144	15.99%	263
415	handler unit	1	145	16.07%	269
801	Vending Misers (cooled machines only)	1	145	16.14%	271
305	Chiller Tune Up/Diagnostics	0	146	16.16%	294

Capacity Supply Curve Commercial -- Existing					
Measure		Measure	Cumulative Measure	Percent	Marginal Capacity Cost
Number	Measure	MW	MW	Savings	\$/kW
521	High-efficiency fan motors	3	149	16.49%	304
142	Cold Cathode Lamps	1	150	16.63%	338
539	Beverage Merchandisers	0	150	16.65%	341
632	Monitor Power Management Enabling - LCD	0	150	16.66%	342
651	Printer Power Management Enabling	0	150	16.70%	357
631	Energy Star or Better Monitor - LCD	0	151	16.72%	368
135	Continuous Dimming, 5L8' Fluorescent Fixtures	2	152	16.89%	371
125	Continuous Dimming, 10L4' Fluorescent Fixtures	3	155	17.18%	394
424	Demand Controlled Ventilation	1	156	17.29%	418
351	DX Tune Up/ Advanced Diagnostics	3	159	17.64%	419
526	Compressor VSD retrofit	0	159	17.69%	421
534	High R-Value Glass Doors	0	160	17.71%	424
358	Prog. Thermostat - DX	2	161	17.89%	438
359	Cool Roof - DX	6	168	18.61%	448
422	Variable Speed Drive Control, 40 HP	1	168	18.70%	463
357	Window Film (Standard)	12	181	20.06%	464
360	Optimize Controls	1	182	20.16%	469
642	Copier Power Management Enabling	0	182	20.20%	498
902	Efficient Fryer	0	182	20.21%	503
423	Air Handler Optimization, 40 HP	0	182	20.23%	506
302	Window Film (Standard)	2	185	20.49%	511
105	Continuous Dimming, 5L4' Fluorescent Fixtures	2	186	20.68%	525
126	Lighting Control Tuneup - Base 2L4T12	0	186	20.68%	664
102	RET 2L4' Premium T8, 1EB, Reflector	2	188	20.88%	668
361	Economizer	6	194	21.52%	693

Energy Supply Curve Commercial – Existing				
Measure Number	Measure	Measure GWH Savings	Cumulative Measure GWH Savings	Marginal Energy Cost \$/kWh
305	Chiller Tune Up/Diagnostics	1	781	20.87%
413	Air Handler Optimization, 15 HP	1	782	20.89%
360	Optimize Controls	5	786	21.02%
303	EMS - Chiller	3	790	21.11%
528	Refrigeration Commissioning	2	792	21.17%
403	Demand Controlled Ventilation	25	817	21.83%
535	Multiplex Compressor System	13	830	22.18%
353	DX Packaged System, EER=11.5, 10 tons	54	883	23.62%
707	Heat Trap	1	885	23.65%
501	Energy Star Refrigerator	8	893	23.88%
211	High Pressure Sodium 250W Lamp	31	924	24.70%
102	RET 2L4' Premium T8, 1EB, Reflector	10	933	24.95%
135	Continuous Dimming, 5L8' Fluorescent Fixtures	5	938	25.07%
132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM	13	951	25.43%
361	Economizer	28	979	26.18%
537	LED Display Lighting	1	980	26.19%
125	Continuous Dimming, 10L4' Fluorescent Fixtures	7	987	26.38%
122	RET 1L4' Premium T8, 1EB, Reflector OEM	6	993	26.54%
307	EMS Optimization	1	994	26.57%
308	Economizer - Chiller	9	1,003	26.82%
351	DX Tune Up/ Advanced Diagnostics	8	1,011	27.03%
706	Heat Recovery Unit	9	1,021	27.28%
105	Continuous Dimming, 5L4' Fluorescent Fixtures	4	1,025	27.40%
903	Efficient Steamer	2	1,027	27.47%
702	High Efficiency Water Heater (electric)	0	1,028	27.48%
901	Convection Oven	1	1,029	27.51%
502	HE Refrigerator - CEE Tier 2 (side by side freezer)	9	1,038	27.76%
359	Cool Roof - DX	11	1,049	28.05%
357	Window Film (Standard)	21	1,071	28.62%
302	Window Film (Standard)	4	1,075	28.73%
708	Tankless Water Heater	2	1,076	28.77%
414	Energy Recovery Ventilation	1	1,078	28.80%
194	LED Indoor Lighting - Base 2L4'T8	20	1,098	29.35%
709	Solar Water Heater	5	1,103	29.49%
704	Hot Water Pipe Insulation	0	1,103	29.49%
304	Cool Roof - Chiller	1	1,105	29.53%
213	LED Outdoor Bi-level Fixtures	14	1,119	29.91%
541	Reach-In Freezers	1	1,120	29.94%
184	LED Indoor Lighting - Base 4L4'T8	15	1,135	30.35%
354	DX Packaged System, EER=13.4, 10 tons	63	1,198	32.02%
701	Demand controlled circulating systems	0	1,198	32.03%
152	Ceramic Metal Halide	1	1,200	32.07%
309	Duct/Pipe Insulation - Chiller	1	1,201	32.10%
364	Duct/Pipe Insulation - DX	5	1,206	32.23%
221	Induction Streetlighting	0	1,206	32.23%
941	XHeat	0	1,206	32.23%
971	XMisc	0	1,206	32.23%

Capacity Supply Curve Commercial -- Existing				
Measure Number	Measure	Measure MW Savings	Cumulative Measure MW Savings	Marginal Capacity Cost \$/kW
307	EMS Optimization	0	194	21.55%
528	Refrigeration Commissioning	0	194	21.58%
707	Heat Trap	0	195	21.60%
308	Economizer - Chiller	2	196	21.81%
132	RET 2 - 1L4' Premium T8, 1EB, Reflector OEM	2	199	22.06%
193	Lighting Control Tuneup - Base 2L4'T8	0	199	22.06%
535	Multiplex Compressor System	2	201	22.27%
122	RET 1L4' Premium T8, 1EB, Reflector OEM	1	202	22.39%
412	Variable Speed Drive Control, 15 HP	0	202	22.42%
417	Demand Controlled Ventilation	0	202	22.46%
501	Energy Star Refrigerator	1	203	22.57%
106	Lighting Control Tuneup	0	203	22.57%
537	LED Display Lighting	0	203	22.58%
402	Variable Speed Drive Control, 5 HP	2	206	22.83%
403	Demand Controlled Ventilation	2	208	23.10%
164	Occupancy Sensor, High Bay T5 - Base Std MH	0	208	23.10%
304	Cool Roof - Chiller	1	209	23.18%
903	Efficient Steamer	0	209	23.23%
706	Heat Recovery Unit	1	211	23.38%
183	Lighting Control Tuneup - Base 4L4'T8	0	211	23.38%
222	LED Streetlighting	1	211	23.45%
702	High Efficiency Water Heater (electric)	0	211	23.46%
901	Convection Oven	0	212	23.48%
354	DX Packaged System, EER=13.4, 10 tons	36	247	27.43%
413	Air Handler Optimization, 15 HP	0	247	27.43%
502	HE Refrigerator - CEE Tier 2 (side by side freezer)	1	248	27.56%
414	Energy Recovery Ventilation	0	248	27.58%
194	LED Indoor Lighting - Base 2L4'T8	4	252	27.99%
708	Tankless Water Heater	0	252	28.02%
704	Hot Water Pipe Insulation	0	252	28.02%
709	Solar Water Heater	1	253	28.10%
184	LED Indoor Lighting - Base 4L4'T8	3	256	28.41%
541	Reach-In Freezers	0	256	28.42%
309	Duct/Pipe Insulation - Chiller	1	257	28.50%
701	Demand controlled circulating systems	0	257	28.50%
212	LED Outdoor Area Lighting	0	257	28.54%
211	High Pressure Sodium 250W Lamp	0	257	28.57%
364	Duct/Pipe Insulation - DX	3	260	28.86%
152	Ceramic Metal Halide	0	260	28.89%
213	LED Outdoor Bi-level Fixtures	0	260	28.90%
214	Outdoor Lighting Controls (Photocell/Timeclock)	0	260	28.90%
221	Induction Streetlighting	0	260	28.90%
523	Night covers for display cases	0	260	28.90%
524	Evaporator fan controller for MT walk-ins	0	260	28.90%
527	Floating head pressure controls	0	260	28.90%
941	XHeat	0	260	28.90%
971	XMisc	0	260	28.90%

Energy Supply Curve Commercial - New					
Measure		Measure	Cumulative		Marginal
Number	Measure	GWH Savings	GWH Savings	Percent Savings	Energy Cost \$/kWH
101	High Performance Building/Int Design - Tier 1 30%	20	20	18.00%	0.01
201	High Performance Building/Int Design - Tier 2 50%	19	39	35.50%	0.02
301	Near Zero Energy (60-75%)	4	43	39.00%	0.04

Capacity Supply Curve Commercial - New					
Measure		Measure	Cumulative		Marginal
Number	Measure	MW Savings	MW Savings	Percent Savings	Capacity Cost \$/kW
101	High Performance Building/Int Design - Tier 1 30%	4	4	18.00%	66
201	High Performance Building/Int Design - Tier 2 50%	4	8	35.50%	79
301	Near Zero Energy (60-75%)	1	9	39.00%	169

Energy Supply Curve Industrial					
Measure Number	Measure	Measure GWH Savings	Cumulative Measure GWH Savings	Percent Savings	Marginal Energy Cost \$/kWH
417	O&M - Extruders/Injection Moulding	4	4	0.37%	0.01
301	Pumps - O&M	4	7	0.73%	0.01
401	Bakery - Process (Mixing) - O&M	0	8	0.77%	0.01
201	Fans - O&M	1	9	0.86%	0.01
309	Pumps - ASD (6-100 hp)	2	11	1.07%	0.01
406	Gap Forming papermachine	0	11	1.08%	0.01
104	Compressed Air- Sizing	2	12	1.24%	0.01
407	High Consistency forming	0	13	1.25%	0.01
409	Efficient practices printing press	1	14	1.35%	0.01
109	Comp Air - ASD (6-100 hp)	2	15	1.54%	0.01
715	Prog. Thermostat - DX	2	17	1.73%	0.01
101	Compressed Air-O&M	3	20	2.04%	0.01
403	Air conveying systems	0	21	2.05%	0.01
551	Efficient Refrigeration - Operations	1	22	2.16%	0.01
507	Near Net Shape Casting	0	22	2.17%	0.01
302	Pumps - Controls	7	29	2.90%	0.01
501	Bakery - Process	1	30	2.97%	0.01
510	Heating - Optimization process (M&T)	1	31	3.04%	0.01
427	Drives - Optimization process (M&T)	1	31	3.13%	0.01
103	Compressed Air - System Optimization	6	38	3.75%	0.01
304	Pumps - Sizing	6	43	4.30%	0.01
204	Fans- Improve components	2	45	4.51%	0.01
209	Fans - ASD (6-100 hp)	1	46	4.58%	0.01
404	Replace V-Belts	0	46	4.58%	0.01
423	Process control	0	46	4.59%	0.01
604	Efficient processes (welding, etc.)	1	47	4.65%	0.02

Capacity Supply Curve Industrial					
Measure Number	Measure	Measure MW Savings	Cumulative Measure MW Savings	Percent Savings	Marginal Capacity Cost \$/kW
104	Compressed Air- Sizing	0	0	0.19%	32
301	Pumps - O&M	1	1	0.57%	33
417	O&M - Extruders/Injection Moulding	1	2	0.86%	37
101	Compressed Air-O&M	1	2	1.15%	42
402	O&M/drives spinning machines	1	3	1.48%	46
201	Fans - O&M	0	3	1.55%	47
409	Efficient practices printing press	0	3	1.63%	49
401	Bakery - Process (Mixing) - O&M	0	3	1.65%	51
427	Drives - Optimization process (M&T)	0	3	1.74%	54
902	Membranes for wastewater	0	3	1.76%	56
507	Near Net Shape Casting	0	3	1.77%	56
510	Heating - Optimization process (M&T)	0	3	1.84%	58
302	Pumps - Controls	1	5	2.50%	58
103	Compressed Air - System Optimization	1	6	3.11%	60
551	Efficient Refrigeration - Operations	0	6	3.19%	62
501	Bakery - Process	0	6	3.24%	78
406	Gap Forming papermachine	0	6	3.24%	79
407	High Consistency forming	0	6	3.24%	80
304	Pumps - Sizing	1	7	3.72%	81
404	Replace V-Belts	0	7	3.72%	82
701	Centrifugal Chiller, 0.51 kW/ton, 500 tons	2	8	4.58%	85
204	Fans- Improve components	0	9	4.77%	86
603	New transformers welding	0	9	4.86%	95
423	Process control	0	9	4.86%	117
604	Efficient processes (welding, etc.)	0	9	4.91%	118
102	Compressed Air - Controls	0	9	5.07%	122

Energy Supply Curve					
Industrial					
Measure		Measure	Cumulative	Measure	Marginal
Number	Measure	GWH Savings	GWH Savings	Percent Savings	Energy Cost \$/kWh
603	New transformers welding	1	48	4.75%	0.02
504	Top-heating (glass)	0	48	4.76%	0.02
701	Centrifugal Chiller, 0.51 kW/ton, 500 tons	7	55	5.48%	0.02
426	Efficient drives - rolling	0	55	5.50%	0.02
102	Compressed Air - Controls	2	57	5.66%	0.02
412	Efficient drives	0	57	5.68%	0.02
405	Drives - EE motor	0	57	5.70%	0.02
429	Machinery	0	58	5.74%	0.02
505	Efficient electric melting	2	59	5.90%	0.02
430	Efficient Machinery	0	59	5.91%	0.02
602	Efficient desalter	0	59	5.91%	0.02
402	O&M/drives spinning machines	1	61	6.03%	0.02
303	Pumps - System Optimization	11	72	7.16%	0.03
425	Drives - Process Control	0	72	7.17%	0.03
801	RET 2L4' Premium T8, 1EB	12	84	8.34%	0.03
902	Membranes for wastewater	0	84	8.35%	0.03
508	Heating - Process Control	0	84	8.39%	0.03
428	Drives - Scheduling	0	85	8.44%	0.03
413	Clean Room - Controls	1	85	8.50%	0.03
511	Heating - Scheduling	0	86	8.51%	0.03
312	Pumps - ASD (100+ hp)	3	89	8.82%	0.03
210	Fans - Motor practices-1 (6-100 HP)	0	89	8.87%	0.03
212	Fans - ASD (100+ hp)	1	90	8.98%	0.03
509	Efficient Curing ovens	2	92	9.15%	0.03

Capacity Supply Curve					
Industrial					
Measure		Measure	Cumulative	Measure	Marginal
Number	Measure	MW Savings	MW Savings	Percent Savings	Capacity Cost \$/kW
715	Prog. Thermostat - DX	0	9	5.14%	122
429	Machinery	0	9	5.18%	128
502	Drying (UV/IR)	0	10	5.28%	133
303	Pumps - System Optimization	2	12	6.46%	139
504	Top-heating (glass)	0	12	6.47%	139
426	Efficient drives - rolling	0	12	6.49%	142
801	RET 2L4' Premium T8, 1EB	2	14	7.70%	153
505	Efficient electric melting	0	14	7.83%	159
412	Efficient drives	0	14	7.85%	163
403	Air conveying systems	0	14	7.85%	167
425	Drives - Process Control	0	14	7.86%	185
110	Comp Air - Motor practices-1 (6-100 HP)	0	14	7.89%	186
509	Efficient Curing ovens	0	14	8.04%	195
508	Heating - Process Control	0	15	8.07%	199
430	Efficient Machinery	0	15	8.08%	202
210	Fans - Motor practices-1 (6-100 HP)	0	15	8.11%	202
602	Efficient desalter	0	15	8.11%	206
713	Window Film - DX	0	15	8.29%	209
901	Replace V-belts	0	15	8.29%	217
214	Optimize drying process	0	15	8.30%	221
804	Occupancy Sensor, 4L4' Fluorescent Fixtures	0	15	8.47%	224
405	Drives - EE motor	0	15	8.48%	226
113	Comp Air - Motor practices-1 (100+ HP)	0	15	8.50%	243
413	Clean Room - Controls	0	15	8.55%	244

Industrial Measure Number	Measure	Cumulative			Marginal Energy Cost \$/kWh
		Measure GWH Savings	Measure GWH Savings	Percent Savings	
112	Comp Air - ASD (100+ hp)	2	94	9.35%	0.03
408	Optimization control PM	0	94	9.36%	0.03
214	Optimize drying process	0	94	9.38%	0.04
410	Efficient Printing press (fewer cylinders)	1	95	9.46%	0.04
418	Extruders/injection Moulding-multipump	15	110	10.92%	0.04
424	Process optimization	0	110	10.92%	0.04
601	Other Process Controls (batch + site)	1	110	10.97%	0.04
110	Comp Air - Motor practices-1 (6-100 HP)	0	111	11.00%	0.04
310	Pumps - Motor practices-1 (6-100 HP)	1	111	11.05%	0.04
202	Fans - Controls	11	122	12.13%	0.04
713	Window Film - DX	2	124	12.29%	0.04
113	Comp Air - Motor practices-1 (100+ HP)	0	124	12.31%	0.04
313	Pumps - Motor practices-1 (100+ HP)	1	125	12.39%	0.04
552	Optimization Refrigeration	2	127	12.62%	0.04
901	Replace V-belts	0	127	12.62%	0.04
416	Process Drives - ASD	0	127	12.63%	0.04
606	Power recovery	0	127	12.63%	0.04
414	Clean Room - New Designs	1	128	12.70%	0.05
415	Drives - Process Controls (batch + site)	1	129	12.83%	0.05
804	Occupancy Sensor, 4L4' Fluorescent Fixtures	1	130	12.97%	0.05
420	Injection Moulding - Impulse Cooling	4	134	13.31%	0.05
502	Drying (UV/IR)	0	134	13.36%	0.05
314	Power recovery	0	134	13.36%	0.05
203	Fans - System Optimization	6	140	13.97%	0.05
215	Power recovery	0	140	13.97%	0.05

Industrial Measure Number	Measure	Cumulative			Marginal Capacity Cost \$/kW
		Measure MW Savings	Measure MW Savings	Percent Savings	
213	Fans - Motor practices-1 (100+ HP)	0	15	8.59%	247
310	Pumps - Motor practices-1 (6-100 HP)	0	16	8.64%	250
418	Extruders/injection Moulding-multipump	2	18	9.80%	256
410	Efficient Printing press (fewer cylinders)	0	18	9.86%	265
202	Fans - Controls	2	19	10.75%	270
313	Pumps - Motor practices-1 (100+ HP)	0	19	10.82%	276
802	CFL Hardwired, Modular 36W	0	20	10.84%	301
207	Fans - Motor practices-1 (1-5 HP)	0	20	10.85%	316
107	Comp Air - Motor practices-1 (1-5 HP)	0	20	10.86%	323
552	Optimization Refrigeration	0	20	11.02%	328
601	Other Process Controls (batch + site)	0	20	11.06%	329
424	Process optimization	0	20	11.06%	330
420	Injection Moulding - Impulse Cooling	1	20	11.34%	353
307	Pumps - Motor practices-1 (1-5 HP)	0	20	11.35%	360
209	Fans - ASD (6-100 hp)	0	20	11.36%	365
503	Heat Pumps - Drying	0	20	11.36%	368
702	Window Film - Chiller	0	21	11.62%	371
416	Process Drives - ASD	0	21	11.63%	383
606	Power recovery	0	21	11.63%	384
712	DX Packaged System, EER=10.9, 10 tons	1	22	12.00%	390
109	Comp Air - ASD (6-100 hp)	0	22	12.02%	394
415	Drives - Process Controls (batch + site)	0	22	12.10%	399
414	Clean Room - New Designs	0	22	12.15%	404
408	Optimization control PM	0	22	12.15%	411
309	Pumps - ASD (6-100 hp)	0	22	12.17%	428

Energy Supply Curve					
Industrial					
Measure		Measure	Cumulative	Measure	Marginal
Number	Measure	GWH Savings	GWH Savings	Percent Savings	Energy Cost \$/kWh
114	Power recovery	0	140	13.97%	0.05
207	Fans - Motor practices-1 (1-5 HP)	0	141	13.98%	0.06
802	CFL Hardwired, Modular 36W	0	141	14.00%	0.06
307	Pumps - Motor practices-1 (1-5 HP)	0	141	14.01%	0.06
107	Comp Air - Motor practices-1 (1-5 HP)	0	141	14.02%	0.06
503	Heat Pumps - Drying	0	141	14.02%	0.06
213	Fans - Motor practices-1 (100+ HP)	0	141	14.05%	0.07
712	DX Packaged System, EER=10.9, 10 tons	3	145	14.39%	0.08
702	Window Film - Chiller	2	147	14.60%	0.08
421	Injection Moulding - Direct drive	3	150	14.94%	0.08
311	Pumps - Replace 100+ HP motor	1	151	15.01%	0.08
111	Comp Air - Replace 100+ HP motor	0	151	15.03%	0.08
422	Efficient grinding	0	151	15.06%	0.09
211	Fans - Replace 100+ HP motor	1	152	15.15%	0.09
411	Light cylinders	0	153	15.18%	0.10
705	Chiller Tune Up/Diagnostics	1	153	15.24%	0.10
419	Direct drive Extruders	7	160	15.92%	0.11
506	Intelligent extruder (DOE)	0	160	15.92%	0.12
716	Cool Roof - DX	2	162	16.10%	0.13
703	EMS - Chiller	3	165	16.42%	0.14
108	Comp Air - Replace 6-100 HP motor	0	165	16.45%	0.15
308	Pumps - Replace 6-100 HP motor	1	166	16.56%	0.15
714	Evaporative Pre-Cooler	1	168	16.69%	0.18
706	Cooling Circ. Pumps - VSD	2	169	16.85%	0.18
306	Pumps - ASD (1-5 hp)	0	170	16.88%	0.19
106	Comp Air - ASD (1-5 hp)	0	170	16.89%	0.20
208	Fans - Replace 6-100 HP motor	0	170	16.93%	0.20
206	Fans - ASD (1-5 hp)	0	170	16.94%	0.21
105	Comp Air - Replace 1-5 HP motor	0	170	16.94%	0.25
305	Pumps - Replace 1-5 HP motor	0	170	16.95%	0.25
205	Fans - Replace 1-5 HP motor	0	170	16.96%	0.27
704	Cool Roof - Chiller	1	172	17.09%	0.27
803	Metal Halide, 50W	15	187	18.56%	0.29
711	DX Tune Up/ Advanced Diagnostics	2	189	18.78%	0.32

Capacity Supply Curve					
Industrial					
Measure		Measure	Cumulative	Measure	Marginal
Number	Measure	MW Savings	MW Savings	Percent Savings	Capacity Cost \$/kW
314	Power recovery	0	22	12.17%	443
111	Comp Air - Replace 100+ HP motor	0	22	12.20%	447
705	Chiller Tune Up/Diagnostics	0	22	12.26%	458
215	Power recovery	0	22	12.26%	467
114	Power recovery	0	22	12.26%	470
211	Fans - Replace 100+ HP motor	0	22	12.35%	507
311	Pumps - Replace 100+ HP motor	0	22	12.40%	549
421	Injection Moulding - Direct drive	0	23	12.67%	572
703	EMS - Chiller	1	24	13.06%	634
716	Cool Roof - DX	0	24	13.26%	681
511	Heating - Scheduling	0	24	13.26%	696
203	Fans - System Optimization	0	24	13.52%	706
411	Light cylinders	0	24	13.54%	711
422	Efficient grinding	0	24	13.56%	742
419	Direct drive Extruders	1	25	14.11%	773
506	Intelligent extruder (DOE)	0	25	14.11%	817
428	Drives - Scheduling	0	25	14.12%	847
706	Cooling Circ. Pumps - VSD	0	26	14.31%	848
714	Evaporative Pre-Cooler	0	26	14.46%	890
108	Comp Air - Replace 6-100 HP motor	0	26	14.48%	966
308	Pumps - Replace 6-100 HP motor	0	26	14.57%	1,038
208	Fans - Replace 6-100 HP motor	0	26	14.61%	1,071
704	Cool Roof - Chiller	0	27	14.77%	1,269
105	Comp Air - Replace 1-5 HP motor	0	27	14.78%	1,410
112	Comp Air - ASD (100+ hp)	0	27	14.80%	1,484
205	Fans - Replace 1-5 HP motor	0	27	14.81%	1,558
803	Metal Halide, 50W	3	29	16.33%	1,582
711	DX Tune Up/ Advanced Diagnostics	0	30	16.57%	1,634
305	Pumps - Replace 1-5 HP motor	0	30	16.58%	1,672
212	Fans - ASD (100+ hp)	0	30	16.59%	1,739
312	Pumps - ASD (100+ hp)	0	30	16.62%	1,873
106	Comp Air - ASD (1-5 hp)	0	30	16.62%	9,869
206	Fans - ASD (1-5 hp)	0	30	16.62%	11,032
306	Pumps - ASD (1-5 hp)	0	30	16.62%	11,951