National Grid Rhode Island

2016 Commercial and Industrial Programs Free-Ridership and Spillover Study (Draft)

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1.0 EXECUTIVE SUMMARY

This executive summary summarizes the findings of the Free-Ridership and Spillover Study conducted for National Grid Rhode Island for their 2016 Commercial and Industrial (C&I) gas and electric programs. The purpose of this study was to assess program free-ridership and spillover for the programs. These programs include Custom and Prescriptive programs for both new construction and retrofit projects (gas) and projects completed through the Design 2000plus (electric), Energy Initiative (electric), and Small Business programs (electric and gas), and the upstream lighting program, Bright Opportunities, in 2016.

1.1 STUDY OBJECTIVE

The primary objective of the 2016 program year Free-Ridership and Spillover Study was to assist National Grid in quantifying the net impacts of their commercial and industrial electric and natural gas energy efficiency programs in Rhode Island by estimating the extent of:

- Program free-ridership
- Early participant “like” and “unlike” spillover
- Nonparticipant “like” spillover.

This executive summary first provides a summary of the study methodology. It also includes the free-ridership, participant like spillover, and nonparticipant like spillover estimates at the program and statewide levels by fuel type. The full report provides more detail on the results for each individual program at the measure type. Early observations of participant “unlike” spillover are also included the full report.

1.2 STUDY METHODOLOGY

The methodology used for this study follows the 2011 and 2013 Commercial and Industrial Programs Free-ridership and Spillover Study conducted for National Grid Rhode Island.[1] For the upstream lighting program, the study follows the methodology implemented by KEMA in Massachusetts[2] and used in the 2013 Commercial and Industrial Programs Free-Ridership and Spillover Study report.

[1] These studies followed the methodology presented in the “National Grid Rhode Island 2011 Commercial and Industrial Programs Free-ridership and Spillover Study Final Report” September 6, 2012 and “National Grid Rhode Island 2013 Commercial and Industrial Programs Free-ridership and Spillover Study Final Report” September 30, 2014.

[2] ”Process Evaluation of the 2012 Bright Opportunities Program Final Report” prepared by KEMA, Inc., June 14, 2014.

To accomplish the above objective, telephone surveys were conducted with a sample of 2016 program participants in each of the C&I electric and natural gas programs and with design professionals and equipment vendors involved in these 2016 installations. The program participant sample consisted of unique *accounts,*[3] not unique customer names. The same customer name, or business identity, can have multiple accounts in multiple locations, but program technical support and incentives are provided on behalf of an individual account. Thus, for the purposes of this study, a customer or participant is defined as a unique account.[4]

The majority of the telephone interviews were completed with program participants between May 30 and June 27, 2017. The duration of interviews with program participants averaged 15 minutes. Prior to the telephone survey, all participating customers were mailed a letter on National Grid letterhead. This letter explained the purpose of the call, informed customers that someone from Tetra Tech would be calling them in the next couple of weeks to ask them some questions about their experiences with the programs, and thanked them for their cooperation in advance. This letter and repeated call attempts (an average of over ten call attempts per customer was made to reach sampled customers during the calling period) resulted in an overall response rate of 21 percent. This rate is lower than the previous study due to the increased portion of upstream records where there was no phone number or contact name available. Additionally, there was a large portion of the sample (72 percent) that was identified as having the same contact name, phone number, or company, which resulted in fewer individual cases to attempt to complete.

The number of survey completions for some measure types is low, because the number of installations within these measure categories for program year 2016 was small (i.e., less than 50). Thus, some caution should be used when interpreting these results for specific measure types.

In addition to the customer surveys, additional surveys were conducted with:

- Design professionals and vendors identified by customers as being the most knowledgeable about the decision to install the energy efficient equipment through the programs. These surveys were used to estimate free-ridership for those installations where customers said the design professional/equipment vendor was more influential in the decision than the customer.
- Design professionals and equipment vendors who had recommended, sold, and/or installed equipment through the C&I programs. These surveys were used for estimating the extent of nonparticipant "like" spillover at a statewide level for all the programs.
- Distributors from the upstream lighting program who sold lighting products at a discounted price. These surveys were used to estimate the free-ridership rate; which is averaged with the participant (end-user) data.

1.2.1 Participant Free-Ridership Methodology

A program's *free-ridership rate* is the percentage of program savings attributed to free-riders. A *free-rider* refers to a program participant who received an incentive or other assistance through an energy efficiency program who would have installed the same high efficiency measure type[5] on their own at

[3] Each account could include multiple applications for efficiency projects. For example, if one account has five hot water heating applications and one HVAC application, this account would show up twice in the sample frame; once for hot water heating (aggregating all the hot water heating applications) and once for HVAC.

[4] Unique accounts with two or more measure types were asked about the two largest saving measures during one interview.

[5] For purposes of this discussion, an "energy efficient measure type" includes high efficiency equipment, an efficiency measure type such as building envelope improvements, or an energy efficient practice such as boiler tune-ups.

that same time if the program had not been offered. For free-riders, the program is assumed to have had no influence or only a slight influence on their decision to install or implement the energy efficient measure type. Consequently, none or only some of the energy savings from the energy efficient measure installed or performed by this group of customers should be attributable to the energy efficiency program.

In addition to simply identifying free-riders, it is important to estimate the *extent* of free-ridership for each customer. Pure free-riders (100 percent) would have adopted exactly the same energy efficient measure type at that same time in the absence of the program. Partial free-riders (1–99 percent) are those customers who would have adopted some measure type on their own, but of a lesser efficiency or a lesser quantity, or at a later time. Thus, the program had some impact on their decision. Non-free-riders (0 percent) are those who would not have installed or implemented any energy efficient measure type (within a specified period of time) absent the program services.

For programs that offer monetary incentives for multiple measure categories, it is important to estimate free-ridership by specific measure type. Category-specific estimates produce feedback on the program at the level at which it actually operates and allows for cost-effectiveness testing by measure category. In addition, for commercial and industrial incentive programs, free-ridership has often been found to be highly variable among measure categories, making it essential to produce measure-specific estimates. The ability to provide reliable estimates by measure type is dependent on the number of installations within that measure type—the fewer installations, the less reliable the estimate.

Once calculated, each individual's free-ridership rate is then applied to the measure savings associated with that project. The total free-ridership estimates in this report include pure, partial, and non-free-riders.

Our approach to estimating free-ridership consisted of a sequential question technique to identify free-riders. This sequential approach asks program participants about the actions they would have taken if the program services had not been offered. This approach addresses the program's impact on project timing, measure quantity, and efficiency levels while explicitly recognizing that the cost of energy efficient equipment can be a barrier to installation in the absence of energy efficiency programs. This method walks survey respondents through their decision process with the objective of helping them recall the program's impact upon all aspects of project decision making.

Program total free-ridership (pure and partial) rates illustrated in the tables in the Results Summary section of this executive summary are weighted by measure therm or kWh savings. Weighting by (therm or kWh) savings ensures that overall measure savings are considered in the overall results. For programs where we were unable to complete any interviews for a given measure type, we were unable to weight by all measure types for that program. In these situations, results do not include those measure types. When reviewing the measure-type free-ridership rates it is important to consider the number of survey completions that the estimate is based upon.

The upstream lighting program starts with the same methodology, and then includes distributor survey information to refine the results. Distributors were asked about customer's decision-making process and how the project would have changed absent the program. These results were then averaged with the participant results to come up with an overall free-ridership rate.

1.2.2 Spillover Methodology

Spillover refers to additional energy efficient measures adopted by a customer due to program influences, but without any financial or technical assistance from the program. *Participant "like" spillover* refers to the situation where a customer installed energy efficient measures through the program, and then installed additional measures of the same type due to program influences. *Participant "unlike"*

spillover is where the customer installs other types of energy efficient measures than those offered through the program, but are influenced by the program to do so.

Survey free-ridership questions were followed by questions designed to estimate "like" and “unlike” spillover. These questions asked about recent purchases (since program participation in 2016) of any additional energy efficient equipment that were made *without* any additional technical or financial assistance from National Grid but were influenced by the program. Surveying customers not long after installation does not allow customers much time to install additional equipment based on their experiences with the program. Therefore, these are *early* indicators of spillover. As time passes, additional equipment may be installed because of their participation in a National Grid program. These early spillover estimates are included in the report tables.

1.2.2.1 Early “Like” Spillover

A “like” spillover estimate was computed based on how much more of the same energy efficient equipment the participant installed outside the program and did so because of their experience with the program.

One of the issues with attempting to quantify spillover savings is how to value the savings of measures installed or conducted outside the program since we are relying on customer self-reports of the quantity and efficiency of any measure type installed. Estimating early “like” spillover uses a conservative approach and reports only those measures installed outside the program that were of the same type and efficiency as the ones installed through the program. This, in turn, makes it possible for us to use the estimated program savings for that measure to calculate the customer’s “like” spillover savings. Program-eligible measures that were installed by the participant but were not of the same type as what was installed through the program are excluded from “like” spillover estimates. These measures would be included in any “unlike” spillover analysis (see discussion below).

Note that the “like” spillover rates illustrated in the Results Summary section of this executive summary are weighted by measure category therm or kWh savings and the disproportionate probability of being surveyed. When reviewing the measure category “like” spillover, it is important to consider the number of survey completions that the estimate is based upon. The number of survey completions for some measure categories is low because very few customers in the sample installed the measure type.

1.2.2.2 Early “Unlike” Spillover

The evaluation team included questions to address “unlike” spillover—energy efficient equipment installed by a participant due to program influence that is not identical to the equipment they received through the program. However, given the difficulties in estimating savings for these installations, we present only observations of “unlike” spillover in the main report and not savings estimates.

1.2.2.3 Nonparticipant “Like” Spillover Estimates

Free-drivers, or nonparticipant spillover, refers to energy efficient measures adopted by program nonparticipants due to the program's influence. The program can have an influence on design professionals and vendors as well as an influence on product availability or practices, product or practice acceptance, customer expectations, and other market effects. All of these may induce nonparticipants to implement energy efficient measures. *Nonparticipant “like” spillover* refers to additional measures of the same type as offered through the program that are adopted due to the program’s influence.

The methodology for the 2016 study estimated only a portion of nonparticipant like-measure type spillover based on responses from design professionals and vendors participating in National Grid's programs.[6] The data for the analysis could have been collected from nonparticipants directly or from the design professionals and vendors who recommended and/or installed qualifying high efficiency equipment. We surveyed the design professionals and vendors primarily because they could typically provide much more accurate information about the efficiency level of installed equipment than could the nonparticipants. Experience has shown that customers cannot provide enough data to a telephone interviewer about the new equipment they have installed to allow for accurate estimates of the energy savings achieved from the equipment. While they usually can report what type of equipment was installed, they typically cannot provide sufficient information about the quantity, size, efficiency, and/or operation of that equipment to allow us to determine whether the equipment is "program-eligible." On the other hand, design professionals and equipment vendors who have worked with the program are typically more knowledgeable about equipment and are familiar with what is and is not "program-eligible."

Another argument in favor of using design professionals and equipment vendors to estimate nonparticipant spillover was that we could use data in the program tracking system database to attach therm or kWh savings estimates to nonparticipant spillover. In the program tracking system database, measure type-specific program therm or kWh savings are associated with each design professional and vendor who participated in the program in 2016.

To determine nonparticipant spillover, design professionals and equipment vendors were asked (by measure type they installed through the program in 2016) what percentage of their sales were program eligible and what percentage of these sales did not receive an incentive through the programs. They were then asked about the program's impact on their decision to recommend/install this efficient equipment outside the program. Using the survey responses and measure type savings data from the program tracking system, the participating vendor nonparticipant "like" spillover savings could be estimated for each design professional/vendor and the results extrapolated to the total savings for all programs.

This method of estimating nonparticipant spillover is a *conservative* estimate for two reasons. First, not all design professionals and equipment vendors who are familiar with the programs specified and/or installed equipment through the program in 2016. Thus, we miss any nonparticipant spillover that was associated with these other design professionals/vendors (although it is less likely these design professionals/vendors had nonparticipant spillover if they were not involved with the program in 2016).

Second, this method only allows us to extrapolate nonparticipant spillover for those same measure type categories that a particular design professional/vendor was associated with for the 2016 programs. Thus, if a vendor installed program-eligible equipment in other measure type categories in the year 2016 outside the program, but none through the program, we did not capture nonparticipant spillover savings with that particular type of equipment. In essence, we measured only "like" nonparticipant spillover; that is, spillover for measure types like those installed through the program in 2016.

It is important to note that nonparticipant spillover was analyzed at the statewide level by measure type. These estimates were then applied to each program that offered that measure type. Participant like spillover estimates are removed from the vendor reported spillover to avoid double counting spillover savings.

[6] Nonparticipant spillover for small business programs was not estimated because of the small number of vendors involved in delivering the program.

1.3 CATEGORIZATION OF MEASURE TYPES

The measure type categories were chosen by National Grid, and measure type was assigned based on the type of equipment installed. Table 1-1 details which types of equipment were assigned to which measure type classification, combining gas and electric measures.

Table 1-1. Breakdown of Equipment in Measure Type Categories

Measure Type	Equipment
Compressed Air	Compressors
Controls	Boiler controls
	Hood controls
	Thermostats
Custom	Control system
	EMS
	Lighting project
	Motors
	Pumps
Food Service	Fryer
	Oven
	Ice machine
HVAC	Boiler
	EMS
	Furnace
	Water heater/boiler combo
HVAC—Distribution	Steam traps
	Heat recovery
HVAC—Plant	Boilers (condensing, custom and steam)
	Furnace
HVAC Non-unitary	Chiller
Insulation	Air sealing
	Attic insulation
	Pipe insulation
Lighting	Custom lighting
	Fluorescent lights (T8)
	LEDs
	Occupancy sensor

Measure Type	Equipment
Non-lighting	Controls
	Cooler
	Custom compressed air
	Custom hot water
	HVAC
	Motors/drives
	Refrigeration
	Vending machine
Other	Comprehensive design/retrofit
	Other
	Replace thermal oxidizers
	Retro commissioning
	Steam traps
VSD	Fans
	Hot water pump
	Motors
	VFDs
Water Heating	Aerator, showerhead
	Salon nozzle
	Spray valves
	Pipe and tank insulation
	Water Heater

1.4 NET-TO-GROSS RESULTS SUMMARY

The detailed results for each measure within each program can be found in Section 6 of this final report.

Table 1-2 summarizes the free-ridership and spillover estimates for electric measures offered through the programs. The statewide free-ridership rate for electric measures installed through these programs is 11.0 percent, the participant ”like” spillover rate is 2.0 percent, and the nonparticipant spillover rate is 1.5 percent, resulting in a statewide net-to-gross rate of 92.5 percent.

Table 1-2. 2016 C&I Electric Free-Ridership and Spillover Results Summary by Program

Program	Surveyed	Population	Population kWh Savings	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate

Program	Surveyed	Population	Population kWh Savings	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Bright Opportunities	127	3,352	20,705,092	5.2%	3.2%	3.6%	4.1%	NA	98.4%
Design 2000plus Program	42	230	11,908,589	18.7%	8.3%	1.3%	0.4%	1.5%	84.1%
Energy Initiative Program[7]	98	429	57,855,783	13.2%	4.0%	1.9%	1.7%	2.4%	91.2%
Small Business Program	68	815	12,897,807	3.2%	1.9%	0.3%	1.2%	0.0%	97.1%
Total	**335**	**4,826**	**103,367,271**	**11.0%**	**2.1%**	**2.0%**	**1.6%**	**1.5%**	**92.5%**

Table 1-3 summarizes the free-ridership and spillover estimates for natural gas measures offered through the programs. The statewide free-ridership rate for natural gas measures installed through these programs is 7.6 percent and with no participant or nonparticipant “like” spillover identified, the statewide net-to-gross rate is 92.4 percent.

Table 1-3. 2016 C&I Natural Gas Free-Ridership and Spillover Results Summary by Program

Program	Surveyed	Population	Population Therm Savings	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Large Commercial New Construction	32	102	450,226	3.4%	10.1%	0.0%	N/A	0.0%	96.6%
Large Commercial Retrofit	63	194	2,060,980	8.7%	3.6%	0.0%	N/A	0.0%	91.3%
Small Business Program	8	51	41,250	1.4%	2.9%	0.0%	N/A	0.0%	98.6%
Total	**103**	**347**	**2,552,455**	**7.6%**	**3.9%**	**0.0%**	**N/A**	**0.0%**	**92.4%**

[7] There was one custom Energy Initiative participant accounting for approximately 10 percent of the program’s savings with a relatively high free-ridership score, which due to its heavy savings weight, substantially impacted the overall net-to-gross estimate for the program. This case was excluded in the final figures. If this case was included in the analysis, the Energy Initiative program free-ridership rate would be 32.6 percent and net-to-gross would be 71.8 percent.

1.5 ORGANIZATION OF REPORT

In Section 2 we review the study's objectives and methodology. Section 3 summarizes the survey questions used to identify the key decision maker and the questions designed to serve as project review for the respondent. Section 3 also describes the questions and approach used to estimate the extent of participant free-ridership, participant "like" spillover, and participant ""unlike" spillover. Section 4 presents the questions and approach for vendors who customers identified as being influential in their decision to participate along with the questions and approach used to estimate nonparticipant "like" spillover. Section 5 presents the questions asked to distributors who sold equipment through the upstream lighting program and how the results were calculated. In Section 6, we present the free-ridership and spillover results at the state level, as well as at the individual program level.

We also present the following appendices:

- Appendix A details the sampling plan for the participant surveys
- Appendix B documents the weighting methodology used to produce the participant free-ridership and "like" spillover estimates
- Appendix C contains the survey instruments
- Appendix D details response rate and program savings coverage
- Appendix E contains an example of the Design Professional and Vendor spillover calculation
- Appendix F charts how the free-ridership and spillover scoring was done.

2.0 INTRODUCTION

This report summarizes the findings of the free-ridership and spillover study conducted for National Grid, Rhode Island for their 2016 Commercial and Industrial (C&I) electric and natural gas programs. The purpose of this study was to assess program free-ridership and spillover for the programs offered by National Grid. These programs include both custom and prescriptive programs for both new construction and retrofit (gas) and projects completed through the Design 2000plus (electric), Energy Initiative (electric), Small Business (electric and gas), and upstream lighting, Bright Opportunities programs in 2016.

One important concept affecting the interpretation of the free-ridership and spillover estimates is the ability to generalize the results. The results of this study can only be generalized to the population of 2016 program year participants, and the design professionals and equipment vendors who were active in the 2016 program year. Essentially, the current study is a performance audit of the year 2016 programs using survey research methods to estimate the free-ridership and spillover rates.

2.1 STUDY OBJECTIVE

The primary objective of the 2016 program year free-ridership and spillover study was to assist National Grid in quantifying the net impacts of their commercial and industrial energy efficiency programs by estimating the extent of:

- Program free-ridership
- Early participant “like” and “unlike” spillover
- Nonparticipant “like” spillover.

A program’s *free-ridership rate* is the percentage of program savings attributed to free-riders. A *free-rider* refers to a program participant who received an incentive or other assistance through an energy efficiency program who would have installed the same high efficiency equipment[8] on their own at that same time if the program had not been offered. For free-riders, the program is assumed to have had no influence or only a slight influence on their decision to install or implement the energy efficient equipment. Consequently, none or only some of the energy savings from the energy efficient equipment taken by this group of customers should be credited to the energy efficiency program.

In addition to simply identifying free-riders, it is important to estimate the extent of free-ridership for each customer. Pure free-riders (100 percent) would have adopted exactly the same energy efficient equipment at that same time in the absence of the program. Partial free-riders (1–99 percent) are those customers who would have adopted some equipment on their own, but of a lesser efficiency or a lesser quantity, or at a later time. Thus, the program had some impact on their decision. Non-free-riders (0 percent) are those who would not have installed or implemented any energy efficient equipment (within a specified period of time) absent the program services.

In contrast, spillover adds benefits to the program, increasing the program savings and benefit–cost ratio. *Spillover* refers to additional energy efficient equipment adopted by a customer due to program influences, but without any financial or technical assistance from the program. *Participant “like” spillover* refers to the situation where a customer installed energy efficient equipment through the program, and then installed additional measures of the same type due to program influences. *Participant “unlike”*

[8] For purposes of this discussion, equipment includes high efficiency equipment, an efficiency measure type such as building envelope improvements, or an energy efficient practice such as boiler tune-ups.

spillover is where the customer installs energy efficient equipment different from those offered through the program, but are influenced by the program to do so.

Free-drivers, or nonparticipant spillover, refers to energy efficient equipment adopted by program nonparticipants due to the program's influence. The program can have an influence on design professionals and vendors as well as an influence on product availability or practices, product or practice acceptance, customer expectations, and other market effects. All of these may induce nonparticipants to take energy efficient equipment. *Nonparticipant "like" spillover* refers to additional equipment of the same type as offered through the program that are adopted due to the program's influence.

2.2 STUDY METHODOLOGY

The methodology used for this study follows the 2011 and 2013 Commercial and Industrial Programs Free-Ridership and Spillover Study conducted for National Grid Rhode Island.[9] For the upstream lighting program, the study follows the methodology implemented by KEMA in Massachusetts[10] and used in the 2013 Commercial and Industrial Programs Free-Ridership and Spillover Study report for Rhode Island.

To accomplish the above objective, telephone surveys were conducted with a sample of 2016 program participants in each of the C&I electric and natural gas programs (see the sampling plan outlined in Appendix A) and with design professionals and equipment vendors involved in these 2016 installations. The following C&I programs were included in the 2016 study:

- New Construction (custom and prescriptive) (gas)
- Retrofit (custom and prescriptive) (gas)
- Small Business (electric and gas)
- Design 2000plus (electric)
- Energy Initiative (electric)
- Bright Opportunities (electric).

[9] These studies followed the methodology presented in the "National Grid Rhode Island 2011 Commercial and Industrial Programs Free-ridership and Spillover Study Final Report" September 6, 2012 and "National Grid Rhode Island 2013 Commercial and Industrial Programs Free-ridership and Spillover Study Final Report" September 30, 2014.

[10] "Process Evaluation of the 2012 Bright Opportunities Program Final Report" prepared by KEMA, Inc., June 14, 2014.

2.2.1 Participant Free-Ridership, "Like" and "Unlike" Spillover Surveys

The program participant sample consisted of unique *accounts*[11], not unique customer names. The same customer name, or business identity, can have multiple accounts in multiple locations, but program technical support and incentives are provided on behalf of an individual account. Thus, for the purposes of this study, a customer or participant is defined as a unique account.[12] Table 2-1 presents the number of participant accounts sampled for the 2016 study, as well as the number of telephone surveys completed for each program.

The majority of the telephone interviews were completed with program participants between May 30 and June 27, 2017. The duration of interviews with program participants averaged 15 minutes. Prior to the telephone survey, all participating customers were mailed a letter on National Grid letterhead. This letter explained the purpose of the call, informed customers that someone from Tetra Tech would be calling them in the next couple of weeks to ask them some questions about their experiences with the programs, and thanked them for their cooperation in advance. This letter and repeated call attempts (an average of over 10 call attempts per customer was made to reach sampled customers during the calling period) resulted in an overall response rate of 21 percent. This rate is lower than the previous study due to the increased portion of upstream records where no phone numbers or contact names were available. Additionally, there was a large portion of the sample (72 percent) that was identified as having the same contact name, phone number, or company, which resulted in fewer individual cases to attempt to complete.

The number of survey completions for some measure types is low because the number of installations within these measure categories for program year 2016 was small (i.e., less than 50). Thus, some caution should be used when interpreting these results for specific measure types.

In addition to the customer surveys, additional surveys were conducted with:

- Design professionals and vendors identified by customers as being the most knowledgeable about the decision to install the energy efficient equipment through the programs. These surveys were used to estimate free-ridership for those installations where customers said the design professional/equipment vendor was more influential in the decision than the customer.
- Design professionals and equipment vendors who had recommended, sold and/or installed equipment through the C&I programs. These surveys were used for estimating the extent of nonparticipant "like" spillover at a statewide level for all the programs.
- Distributors from the upstream lighting program who sold lighting products at a discounted price. These surveys were used to estimate the free-ridership rate, which is averaged with the participant (end-user) data.

[11] Each account could include multiple applications for efficiency projects. For example, if one account has five lighting applications and one VSD application, this account would show up twice in the sample frame; once for lighting (aggregating all the lighting applications) and once for VSD.

[12] Unique accounts with two or more measures were asked about the two largest saving measures during one interview.

Table 2-1. 2016 Participant Free-Ridership and Spillover Survey Cooperation and Response Rate[13]

	Total
Starting Sample	**1,979**
Ineligible—vendor/contractor	24
Adjusted Sample	**1,955**
Does not recall participating	109
Refusal	112
Incompletes (partial surveys)	28
Language barrier	2
Bad phone number[14]	59
Attempted but not completed	1,227
Completed	418
Response Rate	
Response Rate (Completed/Eligible Sample)	**21.4%**

2.2.2 Design Professional/Vendor Surveys

In addition to the customer surveys, surveys were conducted with design professionals and equipment vendors who had installed equipment through the C&I programs in 2016. This survey was used for estimating the extent of nonparticipant like spillover for the programs.

The program tracking system databases contained the names of design professionals and vendors for some of the projects. After removing names that did not appear to be actual vendors (for example, some "vendors" were actually customers such as schools who were responsible for their own installation) and duplicate names, 287 design professionals and vendors remained. We attempted to complete a survey with a subset of this sample (177 records).

Table 2-2 presents the number of designers/vendors sampled and the number surveyed. Multiple attempts (on different days of the week, and different weeks) were made to complete interviews with these designers and vendors in July 2017.

[13] Appendix D contains a detailed response rate by program.
[14] The evaluation team utilized a combination of Internet lookups and directory assistance to attempt to identify working telephone numbers.

Table 2-2. 2016 Nonparticipant Spillover Survey Response Rate

	Total
Starting Sample	**177**
Residential line	1
Adjusted Sample	**176**
Does not recall participating	14
Refusal	15
Bad phone number	8
Attempted but not completed	65
Completed	74
Response Rate	
Response Rate (Completed/Eligible Sample)	**42.0%**

In conjunction with the nonparticipant vendor spillover survey, interviews were completed with 31 of the 52 design professionals and equipment vendors mentioned by customers during the participant surveys as being influential in the decision to install the efficient measures.

3.0 PARTICIPANT SURVEY QUESTIONS

This chapter summarizes the survey questions used to identify the primary decision maker and put the decision making in context by reviewing the project, and the questions used to estimate the extent of free-ridership and participant spillover. Particularly for the free-ridership questions, the skip patterns (which are dependent upon the response to one or more questions) are complex. To simplify discussion of the questions, we have only shown the questions and not the potential response categories or skip patterns. The upstream lighting participants were asked the same series of questions with the exception of customers who were unaware of the discount. These "unaware" customers received questions with modified wording reminding them of the discount they received. Appendix C of this document contains the detailed free-ridership survey questions for participants in both the upstream and downstream programs. Appendix C also contains the participant "like" spillover survey questions, a parallel version of the free-ridership survey suitable for designers/vendors who are the decision makers, and the nonparticipant designer/vendor spillover survey.

Prior to discussing the specific questions used to identify the key decision maker and questions used to review the decision-making process, we discuss the format of the surveys.

3.1 FORMAT

The surveys for free-ridership (and spillover) contain a number of complex skip patterns and repeat questions for each measure category installed. The surveys also automatically incorporate information about each participant's project (i.e., measures installed, incentive amount, and participation date) into the appropriate questions.

The survey averaged 15 minutes in length depending on the customer surveyed and number of measures installed. Many customers, especially the smaller ones, skipped directly to the consistency questions because they were initially 0 percent free-riders. Others skipped questions if they had not had a significant technical assessment study done or if they had not participated in the programs in previous years.

Given that the same survey instrument was used for the different programs, the survey instrument contains a number of areas where fills were used to customize the instrument. These fills are listed and explained in the table below:

Table 3-1. Survey Fills and Explanations

Fill	Explanation
Program	Program name
Address	Street address of project
City	City of project
Date	Date project was completed
Customer	Name of customer
Measure Category 1	First measure installed through program
Measure Category 2	Second measure installed through program
All program assistance	All assistance provided by the program included rebates and technical assistance, as well as financing

Fill	Explanation
Study	Indicator of whether the customer received an assessment (audit) or study funded by the program
Finance	Indicator of whether the customer received financing assistance from the program
Incentive	Amount of financial incentive
Project Cost	Total cost of project for customer

3.2 SUMMARY OF THE 2016 SURVEY QUESTIONS

In order to estimate free-ridership and spillover, the participant survey instrument contains eight key sections.

- Identification of key decision maker(s)
- Project and decision-making review
- Initial free-ridership questions
- Consistency check questions
- Influence of technical assessment (if applicable)
- Influence of past program participation
- Participant “like” spillover questions
- Participant “unlike” spillover questions.

3.2.1 Identification of Key Decision Maker(s)

Identifying and surveying the key decision maker(s) is critical for collecting accurate information on free-ridership and spillover. Therefore, the first part of the survey is devoted to identifying the appropriate decision maker within the organization (i.e., the person involved in the decision making process when the equipment was being considered).

If the listed contact person was not the primary decision maker, information is collected on the person within and outside the company who was the primary decision maker and the survey is conducted with that individual. In cases where the customer tells the interviewer that a designer/vendor was the key decision maker, the interviewer collected contact information for the designer/vendor. In these cases, the survey was still completed with the customer, although attempts were made to complete the designer/vendor survey with the designer/vendor. In cases where the designer/vendor agreed they were the most influential, their responses were used to estimate free-ridership for that customer. If the designer/vendor did not agree that they were the most influential or if attempts to survey the designer/vendor failed, the customer’s responses were used to estimate free-ridership.

Once the appropriate respondent was identified, they were assured their responses would be kept confidential by Tetra Tech and National Grid.

The questions used to identify the key decision maker(s) are detailed below.

I1 Are you the person who was most involved in making the decision to get <ALL ASSISTANCE> through the National Grid program in <DATE> at <ADDRESS> in <CITY>?

I1A Who was primarily responsible for making the decision to get <ALL ASSISTANCE> through the program?

I2 Are you employed by <CUSTOMER> or are you a contractor who provides design and/or installation services for <CUSTOMER>?

R1a Were you involved in the decision-making process when the [EFFICIENCY IS APPLICABLE: energy efficiency] <MEASURE CATEGORY 1> or <MEASURE CATEGORY 2> project was being considered for this facility?

3.2.2 Project and Decision-Making Review

The interview then asks about corporate purchasing policies, important factors that the respondent considers when purchasing any new equipment, and important factors for the specific incentivized project. This section is intended to "prime" the participant by asking them to recall all the various factors that may have been important in the purchase decision. The question text is listed below.

R3 Does your organization have any formal requirements or informal guidelines for the purchase, replacement, or maintenance of energy-using equipment?

R4 Which of the following best describes these requirements or guidelines: purchase energy efficient measures regardless of cost, purchase energy efficient measures if it meets payback or return on investment criteria, purchase standard efficiency measures that meet code, or something else?

FR0 Please think back to the time when you were considering implementing the specific <MEASURE CATEGORY 1 and MEASURE CATEGORY 2> project(s). What factors motivated your business to consider implementing new <MEASURE CATEGORY 1 and MEASURE CATEGORY 2> equipment? What other factors did you consider?

3.2.3 Initial Free-Ridership Questions

The instrument then asks what influence, if any, the program had on the decision to install equipment through the program. As there are several dimensions to the decision to purchase and install new equipment,[15] the battery discusses the timing of the installation and the quantity and the efficiency level of the equipment installed. These questions reference both the overall effect of the program (including staff recommendations and any technical assistance) and the specific effect of the financial incentive. The questions are listed below. Please note that these questions are measure-specific and are repeated for up to two measure categories. For the upstream lighting program, prior to the free-ridership battery, customers were asked if they were aware they received their lighting equipment at a discount. If so, respondents were asked the standard free-ridership questions. Those who were unaware, were asked similar questions, but were reminded of the discount they received. Questions where the wording was revised in these instances are included below.

[15] The instrument is designed to handle both rebated equipment (e.g., HVAC equipment) and rebated services (e.g., boiler tune-ups).

FR5 I'd like to go over all the assistance you received from National Grid. According to our records, the total cost for the project implemented at your facility in <DATE> through the program was about <TOTAL PROJECT COST>. National Grid paid about <INCENTIVE>/a portion of the total cost of the [IF EFFECIENCY APPLIES: high efficiency] <MEASURE CATEGORY> project implemented through the program.

[if rebate amount is missing: National Grid paid a portion of the total cost of the [IF EFFICIENCY IS APPLICABLE; *IF EFF1, EFF2 = 1:* high efficiency] < MEASURE CATEGORY> project implemented through the program.]

[IF <STUDY> = 1: In addition, as I previously mentioned, National Grid paid a portion of the cost for an energy assessment to identify energy saving opportunities.]

If National Grid had not paid a portion of the implementation cost, provided any technical assistance, education, an energy assessment, or financing, would your business have implemented any type of <MEASURE CATEGORY> project?

[upstream lighting unaware question wording] If the <MEASURE CATEGORY> lamps had cost <TOTAL INCENTIVE> more, would your business have installed **any** lighting at all?

FR6A Would you have implemented the <MEASURE CATEGORY> project earlier than you did, at the same time as you did, at a later date, or never?

[upstream lighting unaware question wording] Would you have installed the lighting earlier than you did, at a later date, or never?

FR6B How much [EARLIER/LATER] would you have implemented the <MEASURE CATEGORY> project?

[upstream lighting unaware question wording] How much [earlier/later] would you have installed the lighting?

FR7A Without the National Grid program incentive, technical assistance, energy assessment, or financing, would your business have implemented the exact same quantity or size of <MEASURE CATEGORY> equipment [IF FR5=YES OR DK: at the same time; IF FR5=2: within (TIMEFRAME IN FR6B)]?

[upstream lighting unaware question wording] If the <MEASURE CATEGORY> lamps would have cost <TOTAL INCENTIVE> more, would your business have installed less, more or the exact same quantity of <MEASURE CATEGORY>?

FR7B Compared to the amount of <MEASURE CATEGORY> that you implemented through the National Grid program, what percent of the project do you think your business would have purchased on its own during that timeframe?

[upstream lighting unaware question wording] Compared to the number of <MEASURE CATEGORY > lamps that you installed, what percent more/less do you think your business would have installed if they had cost <TOTAL INCENTIVE> more?

FR8A You said your business would have installed [IF FR7A=YES: all; IF FR7A= NO: (FILL WITH FR7B %), IF FR8 = DK/R, FILL IN WITH "some"] of the equipment on its own if the National Grid program had not been available. Thinking about the <MEASURE CATEGORY> equipment you would have installed on your own, what percent of this equipment would have been in each of the following categories, which should sum to 100%.

Category 1: the same high efficiency as what was rebated through the program,

FR8B Category 2: (What percent would have been of) lower efficiency than what was purchased but higher than standard efficiency or code?

FR8C[16] Category 3: standard efficiency or code?

FR8D [IF QUANTITY > 1] Thinking about the <MEASURE CATEGORY> project you would have implemented on your own if the National Grid program had not been available, would it have been of the same high efficiency as what was installed through the program, lower efficiency than what was purchased but higher than standard efficiency, or standard efficiency or code?

RVL1 [for insulation projects] Thinking about the insulation project you would have implemented on your own if the National Grid program had not been available, would it have been of the same amount of insulation as you did?

RVL2 [for insulation projects] Compared to what you installed through the National Grid program, how much would you have installed? (PROBE: "For example, Would it have been about one-fourth (25 percent), one-half (50 percent), three-fourths (75 percent) as what was installed through the program?")

3.2.4 Consistency Check Questions

The instrument also included questions that would identify and correct inconsistent responses. For example, if participants reported that they were likely to install the equipment without the program but also reported that they would not have installed the energy efficient equipment within four years, the interviewer asked them to confirm which statement was more accurate. These questions are listed below.

FR1 On a scale of 0 to 10, where 0 is "not at all likely" and 10 is "very likely", how likely is it that your business would have implemented the same [IF QUANTITY VARIES: quantity] [IF EFFICIENCY APPLIES: and efficiency of] <MEASURE CATEGORY> at that same time if National Grid had not provided the <ALL ASSISTANCE>?

[upstream lighting unaware question wording] According to our information, the distributor or retailer you bought the <MEASURE CATEGORY> lamps from received a discount of <TOTAL INCENTIVE> from National Grid which was passed on to you. On a scale of 0 to 10, where 0 is "not at all likely" and 10 is "very likely", how likely is it that your business would have implemented the same [IF QUANTITY IS GREATER THAN 1: quantity] [IF EFFICIENCY IS APPLICABLE: and efficiency of] <MEASURE CATEGORY> at that same time if they had cost < TOTAL INCENTIVE > more?

[16] For measures where quantity is not applicable but efficiency levels do vary, this question is combined into one item: FR8D.

C3 On a scale of 0 to 10, where 0 is “no influence” and 10 is “a great deal of influence”, how much influence did the <INCENTIVE> you received from National Grid have on your decision to implement the [IF EFFICIENCY APPLIES: high efficiency] <MEASURE CATEGORY> project?

[upstream lighting unaware question wording] On a scale of 0 to 10, where 0 is “no influence” and 10 is “a great deal of influence”, how much influence did the discounted price have on your decision to install <MEASURE CATEGORY> lamps?

C4A Now I want to focus on what it would have cost your business to install this equipment on its own without the program. On a scale of 0 to 10, where 0 is “not at all likely” and 10 is “very likely”, how likely is it that your business would have paid the additional <INCENTIVE> on top of the amount you already paid, to implement the same quantity and efficiency of <MEASURE CATEGORY> equipment at that same time?

[upstream lighting unaware question wording] Now I want to focus on what it would have cost your business to install this equipment if it had been more expensive. On a scale of 0 to 10, where 0 is “not at all likely” and 10 is “very likely”, how likely is it that your business would have paid the additional <TOTAL INCENTIVE> on top of the amount you already paid, to purchase the same quantity and efficiency of <MEASURE CATEGORY> lamps at that same time?

C8 [ASK IF FR1 > 3 AND FR6b >24/48 MONTHS OR NEVER] Earlier in the interview, you said there was a [FR1 SCORE] in 10 likelihood that you would have implemented the same quantity and efficiency of <MEASURE CATEGORY> equipment at that same time in the absence of the National Grid program assistance. But you also said you would not have implemented the <MEASURE CATEGORY> project within 2/4 years of when you did. Which of these is more accurate?

C9 I'd like to better understand your purchase decision. In your own words, please describe what impact, if any, all the assistance you received through the National Grid program had on your decision to install the amount of high efficiency <MEASURE CATEGORY> equipment at the time you did?

As inputs into the algorithm, Tetra Tech constructed a scoring system based on the influence and consistency check questions above. The scoring calculates two scores—a quantity score and an efficiency score. The quantity score represents the percentage of the incentivized equipment that would have been installed in absence of the program. The efficiency score is the percentage of savings *per unit installed* that would have occurred without the program. For equipment that is reported to be more efficient than standard but less efficient than what was installed through the program, we assume 50 percent of the savings for those measures. Multiplying these two scores together gives the percentage of the incentivized savings that would have occurred without the program. This percentage is the raw free-ridership estimate. Table 3-2 details these calculations.

Table 3-2. Quantity and Efficiency Scores

Score	Responses	Result
Quantity Score (FR_QTY)	If would have installed same quantity without program (FR7A = Yes)	FR_QTY = 1
	If would have installed fewer quantity without program (FR7A = No)	FR_QTY = FR7B
	If never would have installed (FR6A = Never)	FR_QTY = 0
Efficiency Score (FR_EFF)	If would have installed at least some equipment on their own	FR_EFF = FR8A + (FR8B*.50)
	If never would have installed (FR6A = never)	FR_EFF = 0
	If insulation and would not have installed same R value	FR_EFF = RVL2
Initial Free-Ridership Score	The percent of the rebated savings that would have occurred without the program.	FR_EFF * FR_QTY

The product of these two scores is then adjusted by a timing factor. The timing factor adjusts the raw free-ridership estimate downward for all or part of the savings that would have occurred without the program, but not until much later. By doing so, the program is given credit for accelerating the installation of energy efficient equipment. For example, if the participant states that he or she would have installed equipment at the same time regardless of the program, the quantity-efficiency factor is not adjusted. However, if the participant states that, without the program, they would have completed the project more than six months later than they actually did, any free-ridership identified in the quantity-efficiency factor is adjusted downward.[17] The degree of the adjustment depends on the program. As the equipment planning schedule for small businesses is likely shorter than the planning schedule for large businesses, small business programs receive a greater acceleration benefit. This reduced adjustment for small businesses reflects the increased effect the program has on the planning schedule[18]. This adjustment is detailed in Table 3-3 and visualized in Figure 3-1.

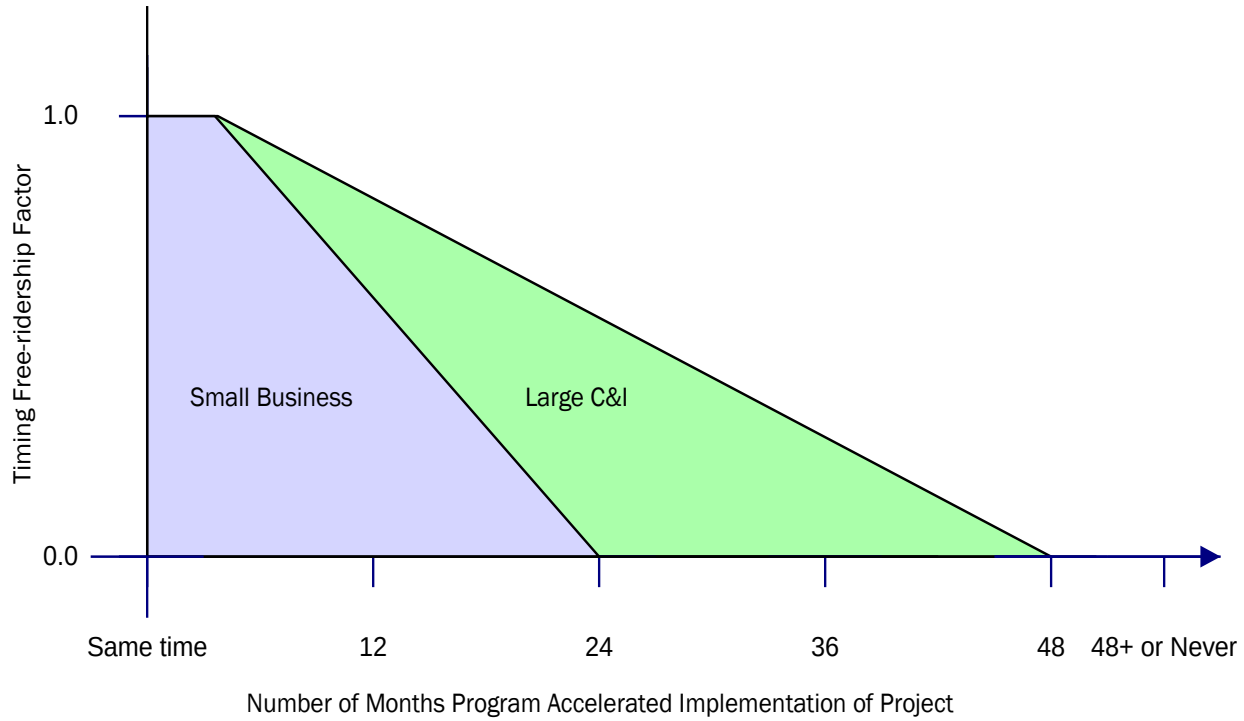
[17] Projects that were accelerated by fewer than 6 months are not adjusted. As installation timelines are subject to shifting, we assume these projects are just as likely to have been installed at the same time.

[18] Business Programs: Acceleration Treatment and Life Cycles Net Savings. State of Wisconsin Public Service Commission of Wisconsin. March 10, 2010. https://focusonenergy.com/sites/default/files/bpaccelerationtreatmentandlcns_evaluationreport.pdf.

Table 3-3. Timing Factor Adjustment

Score	Responses	Result
Timing Factor—Small Business Programs (FR_TIMING)	Would have installed at the same time without the program (FR5 = Yes)	*FR_TIMING = 1*
	Would have installed within six months of when participant actually did without the program (FR6b <= 6 months)	*FR_TIMING = 1*
	Would have installed sometime between 7 and 24 months of when participant actually did without the program (FR6b > 6 months & < 24 months)	*FR_TIMING = 1-((FR6B-6) * .056)*
	Would have installed sometime after 24 months of when participant actually did without the program (FR6b > 24 months)	*FR_TIMING = 0*
	Would have never installed without the program (FR6A = Never)	*FR_TIMING = 0*
Timing Factor—Large Business Programs (FR_TIMING)	Would have installed at the same time without the program (FR5 = Yes)	*FR_TIMING = 1*
	Would have installed within six months of when participant actually did without the program (FR6b ≤ 6 months)	*FR_TIMING = 1*
	Would have installed sometime between 7 and 48 months of when participant actually did without the program (FR6b > 6 months & < 48 months)	*FR_TIMING = 1-((FR6B-6 * .024)*
	Would have installed sometime after 48 months of when participant actually did without the program (FR6b > 48 months)	*FR_TIMING = 0*
	Would have never installed without the program (FR6A = Never)	*FR_TIMING = 0*
Adjusted Free-Ridership Score	*The raw free-ridership estimate adjusted for all or part of the savings that would have occurred without the program, but not until much later*	*FR_TIMING * Initial Free-Ridership Score*

Figure 3-1. Timing Free-Ridership Factor—Number of Months Program Accelerated Implementation by Business Type



This adjusted score is reviewed for consistency and, if applicable, for vendor influence via a follow-up interview with vendors that are rated influential by participants. Questions FR4 and C1 (below) are used to assess vendor influence. Details regarding the Influential Vendor survey are discussed in Section 4 of this report.

FR4 Who was MOST responsible for actually recommending or specifying the [IF EFFICIENCY IS APPLICABLE: high efficiency] <MEASURE CATEGORY> project that was implemented through National Grid's program?

C1 On a scale of 0 to 10, where 0 is "no influence" and 10 is "a great deal of influence", how much influence did (FR4 response) have on your company's decision to implement the [IF EFFICIENCY IS APPLICABLE; high efficiency] <MEASURE CATEGORY> project so that it would qualify for the National Grid program?

3.2.5 Influence of Technical Assessment

The initial free-ridership score is further adjusted by the influence of any program-sponsored technical assistance or audit and by the influence of previous program participation. If a participant rates the influence of the technical assistance as high (7 or greater on a scale of 0–10), the free-ridership score is reduced by half. This reduction is necessary because the previous factors focus on the specific effect of the program incentive and the overall effect of the program. Without this adjustment, the influence of the technical assessment is under-represented.

C2 On a scale of 0 to 10, where 0 is “no influence” and 10 is “a great deal of influence”, how much influence did the information provided by the energy assessment have on your decision to implement the [IF EFFICIENCY IS APPLICABLE*:* high efficiency] <MEASURE CATEGORY> project?

3.2.6 Influence of Past Program Participation

Likewise, if a participant has previously participated in the program, they are asked about the influence of that past participation on their perceptions and behaviors. Participants are asked to state whether they agree or disagree with four statements about the effect past participation has had on their decision making. Based on the number of statements with which they agree, their free-ridership is reduced by 75 percent, 37.5 percent, or not reduced at all. This reduction is done to account for the influence positive program experiences have had on participants’ purchasing decision—with the program administrators, implementers, or the equipment incented.

PP3 I'm going to read you several statements. For each statement, please tell me whether you agree or disagree that this statement applies to your business. There are no right or wrong answers; we just want your honest opinion.

Our previous experience implementing energy efficiency projects through the National Grid program...

a. Has made our firm more likely to consider energy efficiency equipment
b. Has made our firm more likely to install energy efficiency equipment
c. Has given us more confidence in the financial benefits of energy efficiency equipment
d. Has given us more confidence in the nonfinancial benefits of energy efficiency equipment

As mentioned previously, the previous program participation adjustment is made to account for the market effects associated with implementing energy efficiency programs over time. These market effects will result in net savings estimates that do not capture the full cumulative effect of the program. This methodology attempted to capture some of these market effects by making this adjustment for previous program participation. While it could be argued that the influence of previous participation should count as spillover rather than reduced free-ridership, the traditional definition of spillover does not count measures installed through a program as spillover. Table 3-4 details these adjustments.

Table 3-4. Adjustments for the Influence of Technical Assessments and Previous Participation

Adjustment	Responses	Result
Technical Assessment Adjustment	No technical assessment, audit, or study conducted	No adjustment
	Participant would have performed assessment, audit, or study without program assistance or it was not influential (C2 ≤ 6)	No adjustment
	Participant would **not** have performed assessment, audit, or study without program assistance and it was influential (C2 > 6)	Adjusted Free-Ridership Score * .5
Previous Participation Adjustment	No previous participation in program	No adjustment
	Agrees with four statements regarding the positive influence of past participation (PP3)	Adjusted Free-Ridership Score * .25
	Agrees with three statements regarding the positive influence of past participation (PP3)	Adjusted Free-Ridership Score * .625
	Agrees with two or fewer statements regarding the positive influence of past participation (PP3)	No adjustment

Flowchart diagrams detailing these calculations have been included in Appendix F of this report.

3.2.7 Participant "Like" Spillover

The "like" spillover estimates are computed based on how much more of the same energy efficient equipment the participant installed outside the program that were, in fact, influenced by the program. This is a conservative approach because it assumes the exact same equipment, including efficiency level and size. The following questions, in conjunction with the savings assigned to that same equipment by the program, are used to estimate possible spillover savings:

S1A Now I'd like you to think of the time since you participated in the program on <DATE>. Has your company implemented any <MEASURE CATEGORY> projects for this or other facilities in <STATE> **on your own,** that is without a rebate from National Grid?

S1B Was this equipment of **the same efficiency level or a higher level of efficiency** as the equipment you installed through the program?

S1C Was this equipment more energy efficient than standard efficiency or code equipment?

S2A Thinking of the <MEASURE CATEGORY> equipment that you installed on your own, was this more, less or the same amount of <MEASURE CATEGORY> equipment as what you installed through the program?

For respondents that answer "Yes" to S1A and S1B, spillover savings are calculated as the measure-specific savings identified by the program multiplied by the quantity identified in S2A. For respondents that answer "Yes" to S1A and S1C, spillover savings are calculated as 50 percent of the measure-specific savings identified by the program multiplied by the quantity identified in S2A. If the respondent answers "No" to S1A or S1C, there are no identifiable "like" spillover savings.

For those measures, a program-attributable spillover rate is then calculated based on the following questions:

S3A Did a recommendation by the contractor, engineer, or designer who you worked with under the program influence your decision to implement some or all of this [IF EFF = 1: efficient] <MEASURE CATEGORY> equipment on your own?

S3B Did your experience with the energy efficiency projects implemented through the program influence your decision to implement some or all of this [IF EFF = 1: efficient] <MEASURE CATEGORY> equipment on your own?

S3C Did your participation in any past program offered by National Grid influence your decision to implement some or all of this [IF EFF = 1: efficient] <MEASURE CATEGORY> equipment on your own?

S3D On a scale of 0 to 10, where 0 is "no influence at all" and 10 is "a great deal of influence", how much influence did your participation in the National Grid program have on your decision to install this equipment without an incentive?

S4a Why didn't you implement this <MEASURE CATEGORY> project through a National Grid program?

S4b [IF THE EQUIPMENT WOULD NOT QUALITY] Why wouldn't the equipment qualify?

If the respondent reports that the contractor influenced their decision to install the like equipment on their own, we attribute the program with 50 percent of those savings based on the influence the program has on the trade allies. If the respondent reports that either their experience with the program-sponsored project or past programs influenced their decision to implement the like equipment, we attribute the program with 100 percent of the spillover savings.

To summarize:

If (S3A=yes AND (S3B = no AND S3C = no)), spillover rate = 50%.

If (S3B=yes OR S3C = yes), spillover rate = 100%.

That rate, applied to the estimated spillover savings, results in the program-attributable spillover savings for that participants.

3.2.8 Participant "Unlike" Spillover

In addition to "like" spillover, the 2016 study also asked about "unlike" spillover (i.e., measures outside of those installed through the program). To establish spillover savings, program eligibility was used as a proxy for energy efficiency. The following questions were used to identify "unlike" spillover.

S5 Since participating in the program, has your company purchased, installed, or implemented any other type of energy efficient equipment **on your own**, that is, without a rebate from National Grid?

S6a What type of equipment did you install? [Record type:]

S6b [IF S5=1] What quantity of equipment did you install? [Record quantity:]

S6c [IF S5=1] What was the size or capacity of the equipment you installed? [Record size or quantity:]

S7A Would this project have qualified for an incentive through the program from National Grid?

Once identified, program influence needs to be established. Using the same methodology as with “like” spillover, we ask a series of questions to determine if the spillover is program-attributable spillover:

S7B Did a recommendation by the contractor, engineer, or designer who you worked with under the program influence your decision to implement some or this equipment on your own?

S7C Did your experience with the energy efficiency project implemented through the program influence your decision to implement some or this equipment on your own?

S7D Did your participation in any past program offered by National Grid influence your decision to implement some or all of this equipment on your own?

As with “like” spillover, if the respondent reports that the contractor influenced their decision to install the like equipment on their own, we attribute the program with 50 percent of those savings based on the influence the program has on the trade allies. If the respondent reports that either their experience with the program-sponsored project or past programs influenced their decision to implement the “unlike “equipment, we attribute the program with 100 percent of the spillover savings.

However, given the difficulties in estimating savings for these installations using regular telephone interviewers, we present only observations of “unlike” spillover and not savings estimates.

4.0 VENDOR/DESIGN PROFESSIONAL SURVEY QUESTIONS

4.1 OVERVIEW OF INFLUENTIAL VENDOR SURVEY QUESTIONS

As mentioned earlier, we attempted to contact vendors and design professionals identified by program participants as being most influential in their decision to install the energy saving measures through the program (Questions FR4 and C1 discussed above). A separate survey tailored to these designers/vendors was administered for the purposes of estimating free-ridership (see Appendix C).

Design professionals'/vendors' responses to the free-ridership questions replaced participants' responses if the designer/vendor agreed they were most influential (VA3 = 4 or 5). If the designer/vendor did not agree they were the most influential (VA3 is less than 4), or if attempts to survey the designer/vendor failed, the customer's responses were used to estimate free-ridership.

4.1.1 Design Professional/Vendor's Identification of Decision maker

Participant-identified design professionals/vendors were first asked a series of introductory questions designed to verify that they were influential in the decision to install the equipment (V1a > 6). The questions are shown below:

Table 4-1. Design Professional/Vendor's Identification of Decision Maker

Item	Text
V1A	First I'd like to ask you about your decisions to recommend <MEASURE CATEGORY> through the program. Were you involved in the decision-making process at the design stage when the <MEASURE CATEGORY> project was specified and agreed upon for this facility?
V1B	*(IF NO)* At what point in the process did you become involved?
V1C	What was your role?
VA1	On a scale of 0 to 10, where 0 is "no influence at all" and 10 is "a great deal of influence", how much influence did your firm have on specifying the efficiency levels or features of the <MEASURE CATEGORY> project so that it would qualify for the program?

4.1.2 Design Professional/Vendor Free-Ridership Questions

The design/vendor free-ridership survey questions are a parallel version of the customer survey questions and are not discussed here. Questions from the customer version of the survey that are inappropriate for designers/vendors were not asked.

4.2 OVERVIEW OF NONPARTICIPANT SPILLOVER SURVEY QUESTIONS

Nonparticipant ***spillover*** refers to energy efficient equipment installed by program nonparticipants due to the program's influence. The program can have an influence on design professionals and vendors as well as an influence on product availability, product acceptance, customer expectations, and other market effects, all of which may induce nonparticipants to buy high efficiency products.

An important issue related to the quantification of nonparticipant spillover savings is how to value the savings of equipment installed outside the program. Experience has shown that customers cannot

provide adequate equipment-specific data on new equipment installed either through or outside a program to a telephone interviewer. Although they are usually able to report what type of equipment was installed, they typically cannot provide sufficient information about the quantity, size, efficiency, and/or operation of that equipment to make a determination about its program eligibility.

Thus, it was decided to survey design professionals and equipment vendors who were more knowledgeable about equipment and who were familiar with what is/is not program-eligible. Since there were electric and natural gas savings associated with design professionals or vendors (by measure category) in the program tracking system database included in the study, we knew for each design professional/vendor the savings attributable to them for eligible equipment installed through the program.

To determine nonparticipant spillover, design professionals and equipment vendors were asked (by measure category) what percent of their sales to the customers of National Grid participating in the nonparticipant component of the study met or exceeded the program standards for each program measure category installed through the program(s) and what percent of these sales did not receive an incentive. They were then asked several questions about the program's impact on their decision to recommend/install this efficient equipment outside the program. Using the survey responses and measure savings data from the program tracking system, the potential nonparticipant spillover savings could be estimated for each design professional/vendor and the results extrapolated to the total program savings.

This method of estimating nonparticipant spillover is a *conservative* estimate for two reasons. First, not all design professionals and equipment vendors who are familiar with the programs will have specified and/or installed equipment through the program during the study period. Thus, we miss any nonparticipant spillover that is associated with these other design professionals/vendors (although it is less likely these design professionals/vendors had nonparticipant spillover if they are not involved with the programs).

Second, this method only allows extrapolation of nonparticipant spillover *for those same measure categories that a particular design professional/vendor is associated with in the program database*. Thus, if a vendor installed program-eligible equipment in other equipment categories outside the program, but none through the program, this method does not capture nonparticipant spillover savings for that particular type of equipment. In essence, this method measures only "like" nonparticipant spillover; that is, spillover for measures like those installed through the program during the study period.

Four steps were used to determine nonparticipant "like" spillover:

- For each design professional/vendor, the survey determined the percentage of all program-eligible equipment sold/installed outside the program in National Grid's territory.
- For each design professional/vendor, the survey determined whether the sale or installation of program-eligible equipment outside the program was due to the program (nonparticipant spillover).
- For each design professional/vendor, savings associated with this "nonparticipant spillover" equipment were determined by examining the participant database and quantities installed.
- Nonparticipant spillover savings were then extrapolated from the survey to the total program savings in the year.

Each of these steps is discussed in more detail below.

4.2.1 Step 1: Determine the percentage of all program-eligible equipment installed outside the program

Using the program database, we identified which equipment design professionals/vendors installed, and how that equipment fit into measure categories. For measure categories they installed through the program, design professionals/vendors were asked what percent of the equipment would have been eligible for the programs and what percent of that eligible equipment did not receive an incentive through the programs. Those who said some of the eligible equipment did not receive an incentive through the programs are included in Step 2 of the nonparticipant spillover analysis.

VNP1a Our records show that your firm specified, sold, and/or installed <MEASURE CATEGORY> to commercial and industrial customers in 2016 through the <PROGRAM>. Is that correct?

VNP2 Please think about all the program-eligible <MEASURE CATEGORY> you specified, sold and/or installed for National Grid customers in 2016. Did you specify, sell, and/or install any of this program-eligible <MEASURE CATEGORY> to customers of National Grid without the customer participating in a National Grid program?

VNP3 (IF VNP2 = Yes) Again, thinking about all the program-eligible <MEASURE CATEGORY> you specified, sold and/or installed for National Grid customers in 2016, what percent did not receive an incentive through a National Grid program?

4.2.2 Step 2: Determine whether the program-eligible equipment specified/installed outside the program was due to the program

A number of additional questions were asked of design professionals/vendors who had program energy savings associated with the types of program-eligible equipment specified/installed outside the program. These questions measured the causal effect of the program on design professionals/vendors actions. These questions and the preliminary nonparticipant "like" spillover rate are shown below.

VNP5 I'm going to read you 3 statements. For each statement, please tell me whether you agree or disagree that this statement applies to your company. There are no right or wrong answers; we just want your honest opinion.

Our past experience specifying or installing <MEASURE CATEGORY> through energy efficiency programs has convinced us that this equipment is cost effective or beneficial even without a program incentive.

VNP6 We are better able to identify opportunities to improve energy efficiency by using high efficiency <MEASURE CATEGORY> because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with National Grid.

VNP7 We are more likely to discuss energy efficient options with all of our customers when developing project plans for <MEASURE CATEGORY> because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with National Grid.

Based on these responses, we calculated a preliminary nonparticipant "like" spillover rate, as shown in the table below.

Table 4-2. Preliminary Nonparticipant "Like" Spillover Rate

# of Agreements to VNP5–VNP7	Preliminary Nonparticipant "Like" Spillover Rate
3	100%
2	50%
1 or 0	0%

4.2.2.1 Nonparticipant Spillover Consistency Checks

To improve the reliability of the nonparticipant spillover estimates, two consistency check questions were also asked:

VNP4 In 2016, you mentioned that about [VNP3] of the <MEASURE CATEGORY> you specified, and/or installed would have been eligible for an incentive through a National Grid program, but did not receive an incentive.

What are the main reasons why your firm did not request a customer incentive for this energy saving equipment you specified/installed?

VNP8 Please describe what impact, if any, the <PROGRAM> had on your decision to specify or install energy efficient <MEASURE CATEGORY> outside of the program.

Note that in the preliminary "like" spillover questions, we asked the respondent to refer to program-eligible equipment. Therefore, we ideally would have no cases that provide the response "did not qualify" to VNP4. However, in the event this response was provided, the preliminary nonparticipant estimate is reduced by 50 percent. We did not completely exclude "did not qualify" measures as nonparticipant spillover since this response only suggested some uncertainty about the eligibility requirements.

The final consistency question was asked to ensure that the responses given to the first set of nonparticipant spillover questions were consistent. The response to this last question was visually examined by two analysts. If the response to the last question contradicted the other responses, the adjusted nonparticipant spillover rate was reduced by one-half or doubled. For example, if a vendor agreed with all 3 statements about the impact of their past experience with the program on the installation of program-eligible equipment outside the program, they received a preliminary nonparticipant spillover estimate of 100 percent. If the main reason why they did not have the customer apply for the incentive was something other than "didn't qualify" (e.g., wasn't worth the paperwork hassle), the adjusted nonparticipant spillover rate remained at 100 percent. If, however, in the open-ended question the vendor said, "I would say that, let's see, it really didn't impact the business because our business is driven by more than rebates" or "I don't think it's had much" or "almost no" impact, the final nonparticipant spillover rate was reduced to 50 percent. These responses may indicate that the program influenced a number of installations/sales but the customer/vendor did not want to prepare the paperwork to get the incentive.

4.2.3 Step 3: Determine the savings associated with this nonparticipant spillover equipment

At the end of Step 2, respondents with nonparticipant spillover were assigned a nonparticipant spillover percent for one or more measure categories. As illustrated in the footnote at the bottom of this page, the third step associated savings with each nonparticipant spillover measure for each respondent.[19]

For example, assume a vendor had 2,000 therm savings in the program tracking system database attributable to HVAC measures. If that vendor said that 25 percent of all their program-eligible HVAC equipment were sold outside the program, the potential nonparticipant spillover savings would be (2,000 therm * 0.25/(1–0.25) = 667 therms). If this vendor was assigned (in Step 2) a nonparticipant spillover rate of 100 percent for HVAC equipment, the nonparticipant spillover therm savings for that vendor remains at 667 therms. But if that same vendor was assigned (in Step 2) a nonparticipant spillover rate of only 50 percent for program-eligible HVAC equipment, the nonparticipant spillover therm savings for that vendor was 667 * 0.5 = 334 therms. This type of calculation was made by measure category for each design professional and vendor who had a nonparticipant spillover rate of more than 0 percent.

As discussed earlier under the measurement of participant spillover, the participating customer survey and analysis included calculations of "like" spillover. "Like" spillover was defined as measures exactly like the participant's measures installed through the program that the participant installed at a later time *and* for which they did not receive an incentive even though they said the program influenced their decision. To avoid double-counting the spillover for the same measures reported by both participants and their design professionals/vendors, we eliminated any savings that had been identified as "like" spillover by participants and that were also associated with a design professional or vendor who had

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[19] The formula for calculating therm savings for each measure was derived as follows:

Definitions:

a = Gross therm in program tracking system database (measures that received an incentive)
b = Percent of program-eligible equipment that received no incentive (survey question)
x = therm nonparticipant spillover (spillover reported by design professional/vendor—"like" spillover by participants associated with design professional/vendor)

Solve for x:

Total therm for all program-eligible equipment= therm savings for efficient equipment sold through program +therm savings for efficient equipment sold outside the program = a+x

b = nonparticipant spillover/total therm = x/(a+x)

Therefore:

b = x/(a+x)
solving for x yields
x = b*a/(1-b)

Nonparticipant spillover = fraction of equipment receiving no incentive * therm in database/(1 - fraction of equipment receiving no incentive).

demonstrated nonparticipant spillover for the same measure category. This conservative approach was based on the assumption that the same design professional or vendor was involved in the participant's "like" spillover project.

4.2.4 Step 4: Extrapolate the survey nonparticipant spillover savings to the total vendor population savings during the study period

The last step in the nonparticipant spillover estimation involved extrapolating the results to all vendors in the program tracking system database for each measure category. This was done by first calculating the ratio of nonparticipant spillover as determined from the vendor survey. This ratio (the estimated spillover percent) was then applied to the savings (both electric and gas) represented by vendors in the program tracking system database.

For example, if the survey covered a total of 857,814 therms in measure category savings and the surveyed nonparticipant spillover totals 62,221 therms for that measure category, surveyed nonparticipant spillover divided by the surveyed total therms savings is 7.3 percent. This identified nonparticipant spillover savings was extrapolated to all vendors related to the programs by proportionally applying the identified savings to each program at the measure-level.

5.0 DISTRIBUTOR SURVEY QUESTIONS AND RESULTS

As mentioned earlier, we attempted to contact distributors who offered lighting products at a discounted price through the Bright Opportunities program. A separate survey tailored to these distributors was administered for the purposes of estimating free-ridership (see Appendix C).

Distributor responses were used to calculate a free-ridership score. This score was then averaged with the participant free-ridership score to come up with an overall free-ridership score for the upstream lighting program and at the measure type level.

5.1 DISTRIBUTOR'S IDENTIFICATION OF DECISION MAKER

The survey first asked distributors an introductory question designed to verify that they were knowledgeable about their company's participation in the program. Contacts who were knowledgeable about their company's participation were then asked about specific customers who participated. The questions are shown below:

Table 5-1. Distributor's Identification of Decision Maker

Item	Text
I1	According to our records, your company has been selling lighting products as part of Bright Opportunities initiative. [If needed, name some recent projects that used the program discounts]. We would like to ask you some questions about your participation in this program. Who would be most familiar with your participation? [If respondent is not familiar with the program, ask for someone who may be familiar and repeat I1]
PI0	According to our records you sold some lighting products that were discounted by the Bright Opportunities initiative to [CUSTOMER] in 2016. Do you recall this sale?

5.2 DISTRIBUTOR FREE-RIDERSHIP QUESTIONS

The distributor free-ridership survey questions are a similar to the questions asked of the participating customers. These questions were asked for each lighting type that the customer purchased.

Table 5-2. Distributor's Free-Ridership Questions

Item	Text
PI3	According to our records you sold the [TYPE] bulbs/lamps at a [PROMOTIONAL PRICE] which was [BUYDOWN AMOUNT] less than your normal retail price for a discount of [DISCOUNT] percent. If this discount had not been available, do you think you would have sold any of these types of bulbs/lamps to this customer?
PI4	[IF RESPONSE TO PI3 <> "NO"] If this discount of [DISCOUNT] percent had not been available, would your sales of these [TYPE] bulbs/lamps to [CUSTOMER] been the same, lower, or higher?
PI4a	[IF SAME OR HIGHER] Why do you say this?
PI4b	[IF LOWER] By what percentage do you estimate your sales of these [TYPE] bulbs/lamps to [CUSTOMER] to be lower in the absence of the discount?

The free-ridership score was then calculated for each lighting type as follows:

Table 5-3. Distributor Free-Ridership Calculations

Responses	Result
If customer would not have purchased any equipment without program (PI3 = No)	FR = 0%
If would have purchased fewer quantity without program (PI3 = Yes or Don't know)	FR = PI4b/100
If would have purchased same amount regardless of the program (PI3 = Yes and PI4 = same)	FR = 100%

Free-ridership results from the distributors were then averaged with the results from the participant surveys. This method follows the approach used in the 2013 Commercial and Industrial Programs Free-Ridership and Spillover Study report and one done by KEMA in the evaluation of the Massachusetts Bright Opportunities program.[20]

Table 5-4. Upstream Lighting Free-Ridership Rates by Lamp Type

Type	End-User Free-Ridership Rate	Distributor Free-Ridership Rate	Recommended Free-Ridership Rate
Fixture	19.1%	0.0%	9.5%
LED retrofit kits	6.5%	0.0%	3.3%
Screw-ins	5.4%	3.0%	4.2%
TLEDs	2.3%	18.1%	10.2%
Total	**6.5%**	**3.9%**	**5.2%**

[20] Process Evaluation of the 2012 Bright Opportunities Program Final Report. KEMA, Inc. June 14, 2013.

6.0 FREE-RIDERSHIP AND SPILLOVER STUDY RESULTS

This section presents the results of the 2016 electric and natural gas free-ridership and spillover study. First, we present summary tables that include statewide figures. Following the summary tables, we present detailed results for each program. The detailed results include free-ridership and spillover rates by program type, measure type and by program, along with corresponding error margins. We then present observations of participant "unlike" spillover.

Nonparticipant spillover was assessed at the statewide level, resulting in statewide estimates by measure type. These estimates were then applied to each program that offered that measure type**.** Once the identified participant spillover savings were removed from the nonparticipant estimate (to avoid double-counting spillover projects), we were only able to attribute nonparticipant spillover savings for the compressed air and VSD measure types to the electric programs and the HVAC measure type for the gas programs.

6.1 STATEWIDE RESULTS

Table 6-1 summarizes the free-ridership and spillover estimates for electric measures offered through the programs. The statewide free-ridership rate for electric measures installed through these programs is 11.0 percent, the participant spillover "like" rate is 2.0 percent, and the nonparticipant spillover rate is 1.5 percent, resulting in a statewide net-to-gross rate of 92.5 percent.

Table 6-1. 2016 Statewide C&I Electric Free-Ridership and Spillover Results Summary by Program

Program	Surveyed	Population	Population kWh Savings	Free-Ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Bright Opportunities	127	3,352	20,705,092	5.2%	3.2%	3.6%	4.1%	NA	98.4%
Design 2000plus Program	42	230	11,908,589	18.7%	8.3%	1.3%	0.4%	1.5%	84.1%
Energy Initiative Program[21]	98	429	57,855,783	13.2%	4.0%	1.9%	1.7%	2.4%	91.2%
Small Business Program	68	815	12,897,807	3.2%	1.9%	0.3%	1.2%	0.0%	97.1%
Total	**335**	**4,826**	**103,367,271**	**11.0%**	**2.1%**	**2.0%**	**1.6%**	**1.5%**	**92.5%**

Table 6-2 summarizes the free-ridership and spillover estimates for natural gas measures offered through the programs. The statewide free-ridership rate for natural gas measures installed through

[21] There was one custom Energy Initiative participant accounting for approximately 10 percent of the program's savings with a relatively high free-ridership score, which due to its heavy savings weight, substantially impacted the overall net-to-gross estimate for the program. This case has been removed in the final figures. If this case was included in the analysis, the Energy Initiative program free-ridership rate would be 32.6 percent and net-to-gross would be 71.8 percent.

these programs is 7.6 percent and with no participant and nonparticipant “like” spillover identified, the resulting statewide net-to-gross rate is 92.4 percent.

Table 6-2. 2016 Statewide C&I Natural Gas Free-Ridership and Spillover Results Summary by Program

Program	Surveyed	Population	Population Therm Savings	Free-Ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Large Commercial New Construction	32	102	450,226	3.4%	10.1%	0.0%	N/A	0.0%	96.6%
Large Commercial Retrofit	63	194	2,060,980	8.7%	3.6%	0.0%	N/A	0.0%	91.3%
Small Business Program	8	51	41,250	1.4%	2.9%	0.0%	N/A	0.0%	98.6%
Total	**103**	**347**	**2,552,455**	**7.6%**	**3.9%**	**0.0%**	**N/A**	**0.0%**	**92.4%**

6.2 DETAILED RESULTS

In this section, results are presented for each measure type. The measure type categories were chosen by National Grid, and measure type was assigned based on the equipment installed. Table 6-3 details which equipment were assigned to which measure type classification, combining gas and electric measures.

Table 6-3. Breakdown of Equipment in Measure Type Categories

Measure Type	Equipment
Compressed Air	Compressors
Controls	Boiler controls
	Hood controls
	Thermostats
Custom	Control system
	EMS
	Lighting project
	Motors
	Pumps
Food Service	Fryer
	Oven
	Ice machine

Measure Type	Equipment
HVAC	Boiler
	EMS
	Furnace
	Water heater/boiler combo
HVAC—Distribution	Steam traps
	Heat recovery
HVAC—Plant	Boilers (condensing, custom and steam)
	Furnace
HVAC Non-unitary	Chiller
Insulation	Air sealing
	Attic insulation
	Pipe insulation
Lighting	Custom lighting
	Fluorescent lights (T8)
	LEDs
	Occupancy sensor
Non-lighting	Controls
	Cooler
	Custom compressed air
	Custom hot water
	HVAC
	Motors/drives
	Refrigeration
	Vending machine
Other	Comprehensive design/retrofit
	Other
	Replace thermal oxidizers
	Retro commissioning
	Steam traps

Measure Type	Equipment
VSD	Fans
	Hot water pump
	Motors
	VFDs
Water Heating	Aerator, showerhead
	Salon nozzle
	Spray valves
	Pipe and tank insulation
	Water Heater

6.2.1 Detailed Program Results

Table 6-4 presents National Grid's free-ridership and spillover rates for each electric measure type by program. The net-to-gross rate is 92.5 percent. The highest free-ridership rates were within the Design 2000plus program although this program had the lowest number of participants and electric savings. The highest participant like spillover rate was with upstream lighting—TLEDs followed by upstream lighting—LED retrofit kits for the Bright Opportunities program (15.4 percent and 8.2 percent, respectively). The lowest free-ridership rate appears with the Small Business program.

Table 6-4. C&I Electric Free-Ridership and Spillover Results by Program and Measure Type

Program	Measure Type	Surveyed	Population	Population Savings	Free-Ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Bright Opportunities[22]	Lighting—fixture	26	316	2,079,316	9.5%	12.1%	0.1%	6.6%	NA	90.6%
	Lighting—LED retrofit kits	22	688	3,128,662	3.3%	4.8%	8.2%	16.4%	NA	104.9%
	Lighting—screw-ins	47	1,519	12,347,196	4.2%	3.9%	0.0%	NA	NA	95.8%
	Lighting—TLEDs	32	829	3,149,918	10.2%	5.0%	15.4%	11.2%	NA	105.2%
	Total	**127**	**3,352**	**20,705,092**	**5.2%**	**3.2%**	**3.6%**	**4.1%**	**NA**	**98.4%**
Design 2000plus Program	Compressed Air	10	56	1,496,316	8.1%	17.5%	0.0%	NA	11.8%	103.7%
	Custom	10	41	6,031,953	8.5%	18.1%	2.5%	1.8%	0.0%	94.0%
	Food Service	1	3	2,640	81.5%	NA	0.0%	NA	0.0%	18.5%
	HVAC Non-unitary	2	3	170,497	30.5%	78.9%	0.0%	NA	NA	69.5%
	Lighting	19	127	4,207,183	36.5%	13.5%	0.0%	NA	0.0%	63.5%
	Total	**42**	**230**	**11,908,589**	**18.7%**	**8.3%**	**1.3%**	**0.4%**	**1.5%**	**84.1%**
Energy Initiative Program	Custom[23]	20	101	31,994,110	15.8%	11.3%	0.0%	NA	0.0%	84.2%
	HVAC	7	39	1,860,712	9.3%	20.3%	0.0%	NA	0.0%	90.7%
	Lighting	62	255	21,166,766	9.8%	4.3%	5.2%	2.7%	0.0%	95.4%
	VSD	9	34	2,834,194	11.6%	20.2%	0.0%	NA	50.0%	138.4%
	Total	**98**	**429**	**57,855,783**	**13.2%**	**4.0%**	**1.9%**	**1.7%**	**2.4%**	**91.2%**
Small Business program	Lighting	58	787	12,364,104	3.4%	2.2%	0.3%	1.4%	0.0%	97.0%
	Non-lighting	10	28	533,703	0.0%	NA	0.0%	NA	NA	100.0%
	Total	**68**	**815**	**12,897,807**	**3.2%**	**1.9%**	**0.3%**	**1.2%**	**0.0%**	**97.1%**
Total		**335**	**4,826**	**103,367,271**	**11.0%**	**2.1%**	**2.0%**	**1.6%**	**1.5%**	**92.5%**

Table 6-5 presents detailed free-ridership and participant like spillover rates for each natural gas measure type and program. The Commercial New Construction—Custom program has the highest net-to-gross rate (100.0 percent) due to no free-ridership. The Commercial New Construction—Prescriptive program has the lowest net-to-gross rate (88.5 percent) driven by the high free-ridership rate (11.6 percent).

[22] The free-ridership rate is an average of the participant (end user) and distributor results (see Section 5). Number surveyed and participant like spillover are based on participant data.

[23] There was one custom Energy Initiative participant accounting for approximately 10 percent of the program's savings with a relatively high free-ridership score, which due to its heavy savings weight, substantially impacted the overall net-to-gross estimate for the program. This case has been removed in the final figures. If this case was included in the analysis, the Energy Initiative program free-ridership rate would be 32.6 percent and net-to-gross would be 71.8 percent.

Table 6-5. C&I Natural Gas Free-Ridership and Spillover Results by Program and Measure Type

Program	Measure Type	Surveyed	Population	Population Savings	Free-Ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Commercial New Construction—Custom	Controls	1	2	56,532	0.0%	NA	0.0%	NA	0.0%	100.0%
	HVAC—Plant	1	9	60,725	0.0%	NA	0.0%	NA	NA	100.0%
	Insulation	1	1	568	25.0%	NA	0.0%	NA	0.0%	75.0%
	Other	1	5	200,480	0.0%	NA	0.0%	NA	0.0%	100.0%
	Total[24]	**4**	**17**	**318,304**	**0.0%**	**14.7%**	**0.0%**	**NA**	**0.0%**	**100.0%**
Commercial New Construction — Prescriptive	Food Service	3	13	10,522	9.4%	18.2%	0.0%	NA	0.0%	90.6%
	HVAC	21	59	114,220	9.2%	11.7%	0.0%	NA	0.1%	90.9%
	Water Heating	4	13	7,180	53.0%	67.9%	0.0%	NA	NA	47.0%
	Total	**28**	**85**	**131,922**	**11.6%**	**11.3%**	**0.0%**	**NA**	**0.1%**	**88.5%**
Large Commercial Retrofit—Custom	Controls	4	36	590,141	2.8%	8.4%	0.0%	NA	0.0%	97.2%
	HVAC—Distribution	5	19	377,494	12.8%	26.8%	0.0%	NA	0.0%	87.2%
	HVAC—Plant	1	4	9,773	0.0%	NA	0.0%	NA	NA	100.0%
	Insulation	37	49	191,828	5.0%	0.9%	0.0%	NA	0.0%	95.0%
	Other	3	20	437,908	23.7%	55.2%	0.0%	NA	0.0%	76.3%
	Total	**50**	**128**	**1,607,144**	**11.1%**	**3.1%**	**0.0%**	**NA**	**0.0%**	**88.9%**
Large Commercial Retrofit—Prescriptive	Controls	2	8	1,898	38.1%	260.4%	0.0%	NA	0.0%	61.9%
	Other	6	10	440,961	0.0%	NA	0.0%	NA	0.0%	100.0%
	Water Heating	5	48	10,977	0.0%	NA	0.0%	NA	NA	100.0%
	Total	**13**	**66**	**453,836**	**0.2%**	**13.7%**	**0.0%**	**NA**	**0.0%**	**99.8%**
Small Business program	Controls	2	13	1,673	0.0%	NA	0.0%	NA	0.0%	100.0%
	Water Heating	6	38	39,577	1.4%	4.1%	0.0%	NA	NA	98.6%
	Total	**8**	**51**	**41,250**	**1.4%**	**2.9%**	**0.0%**	**NA**	**0.0%**	**98.6%**
Total		**103**	**347**	**2,552,455**	**7.6%**	**3.9%**	**0.0%**	**NA**	**0.0%**	**92.4%**

[24] While the insulation measure type has a NTG of 75.0%, the savings associated with that measure type represent less than one percent of the program's savings, making the program's overall NTG 99.96%, which is rounded to 100.0%.

Table 6-6 presents free-ridership and spillover rates for each measure type combined across all electric programs. The non-lighting measure type has the lowest level of free-ridership (0.0 percent) while the food service measure type has the highest free-ridership rate (81.5 percent) although this is based on one respondent. Participant “like” spillover is highest for the upstream lighting-TLEDs measure type (15.4 percent).

Table 6-6. 2016 C&I Electric Free-Ridership and Spillover Results by Measure Type

Measure Type	Surveyed	Population	Population Savings	Free-Ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Compressed Air	10	56	1,496,316	8.1%	17.5%	0.0%	NA	11.8%	103.7%
Custom[25]	30	142	38,026,063	14.6%	9.1%	0.4%	0.6%	0.0%	85.8%
Food Service	1	3	2,640	81.5%	NA	0.0%	NA	0.0%	18.5%
HVAC	7	39	1,860,712	9.3%	20.3%	0.0%	NA	0.0%	90.7%
HVAC Non-unitary	2	3	170,497	30.5%	78.9%	0.0%	NA	NA	69.5%
Lighting	139	1,169	37,738,054	10.7%	2.9%	3.0%	1.3%	0.0%	92.4%
Non-lighting	10	28	533,703	0.0%	NA	0.0%	NA	NA	100.0%
VSD	9	34	2,834,194	11.6%	20.2%	0.0%	NA	50.0%	138.4%
Upstream Lighting—fixture[26]	26	316	2,079,316	9.5%	12.1%	0.1%	6.6%	NA	90.6%
Upstream Lighting—LED retrofit kits[27]	22	688	3,128,662	3.3%	4.8%	8.2%	16.4%	NA	104.9%
Upstream Lighting—screw-ins[28]	47	1,519	12,347,196	4.2%	3.9%	0.0%	NA	NA	95.8%
Upstream Lighting—TLEDs[29]	32	829	3,149,918	10.2%	5.0%	15.4%	11.2%	NA	105.2%
Total	**335**	**4,826**	**103,367,271**	**11.0%**	**2.1%**	**2.0%**	**1.6%**	**1.5%**	**92.5%**

[25] There was one custom Energy Initiative participant accounting for approximately 10 percent of the program’s savings with a relatively high free-ridership score, which due to its heavy savings weight, substantially impacted the overall net-to-gross estimate for the program. This case has been removed in the final figures. If this case was included in the analysis, the Energy Initiative program free-ridership rate would be 32.6 percent and net-to-gross would be 71.8 percent.

[26] The free-ridership rate is an average of the participant (end user) and distributor results (see Section 5). Number surveyed and participant like spillover are based on participant data.

[27] Ibid.

[28] Ibid.

[29] Ibid.

Table 6-7 presents free-ridership and spillover rates for each measure type combined across all natural gas programs. The HVAC-plant and controls measure types had the lowest level of free-ridership (0.0 percent and 2.6 percent, respectively) while the HVAC-distribution measure type had the highest free-ridership rate (12.8 percent). Only the HVAC measure type had nonparticipant "like" spillover (0.1 percent).

Table 6-7. 2016 C&I Natural Gas Free-Ridership and Spillover Results by Measure Type

Measure Type	Surveyed	Population	Population Savings	Free-Ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Controls	9	59	650,244	2.6%	20.2%	0.0%	NA	0.0%	97.4%
Food Service	3	13	10,522	9.4%	18.2%	0.0%	NA	0.0%	90.6%
HVAC	21	59	114,220	9.2%	11.7%	0.0%	NA	0.1%	90.9%
HVAC—Distribution	5	19	377,494	12.8%	26.8%	0.0%	NA	0.0%	87.2%
HVAC—Plant	2	13	70,498	0.0%	NA	0.0%	NA	NA	100.0%
Insulation	38	50	192,396	5.0%	1.4%	0.0%	NA	0.0%	95.0%
Other	10	35	1,079,348	9.6%	11.5%	0.0%	NA	0.0%	90.4%
Water Heating	15	99	57,733	7.6%	15.9%	0.0%	NA	NA	92.4%
Total	**103**	**347**	**2,552,455**	**7.6%**	**3.9%**	**0.0%**	**NA**	**0.0%**	**92.4%**

Table 6-8 presents free-ridership and spillover rates for the electric programs by program type. Overall the custom projects had a NTG rate of 85.8 percent being driving by a free-ridership rate of 14.6 percent. Prescriptive projects had a higher NTG rate, 96.4 percent with a free-ridership rate of 8.9 percent. The Bright Opportunities and Small Business programs only had prescriptive projects and had the highest NTG rates, 98.4 percent and 97.1 percent respectively. The Energy Initiative prescriptive projects had the highest participant "like" and nonparticipant "like" spillover (4.3 percent and 5.5 percent respectively).

Table 6-8. 2016 C&I Electric Free-Ridership and Spillover Results by Program and Program Type

Program	Program Type	Surveyed	Population	Population Savings	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Bright Opportunities	Prescriptive	127	3,352	20,705,092	5.2%	3.2%	3.6%	4.1%	NA	98.4%
	Total	**127**	**3,352**	**20,705,092**	**5.2%**	**3.2%**	**3.6%**	**4.1%**	**NA**	**98.4%**
Design 2000plus	Custom	10	41	6,031,953	8.5%	18.1%	2.5%	1.8%	0.0%	94.0%
	Prescriptive	32	189	5,876,636	29.1%	9.7%	0.0%	NA	3.0%	73.9%
	Total	**42**	**230**	**11,908,589**	**18.7%**	**8.3%**	**1.3%**	**0.4%**	**1.5%**	**84.1%**
Energy Initiative	Custom	20	101	31,994,110	15.8%	11.3%	0.0%	NA	0.0%	84.2%
	Prescriptive	78	328	25,861,673	10.0%	4.3%	4.3%	2.1%	5.5%	99.8%
	Total	**98**	**429**	**57,855,783**	**13.2%**	**4.0%**	**1.9%**	**1.7%**	**2.4%**	**91.2%**
Small Business	Prescriptive	68	815	12,897,807	3.2%	1.9%	0.3%	1.2%	0.0%	97.1%
	Total	**68**	**815**	**12,897,807**	**3.2%**	**1.9%**	**0.3%**	**1.2%**	**0.0%**	**97.1%**
Total	Custom	30	142	38,026,063	14.6%	9.1%	0.4%	0.6%	0.0%	85.8%
	Prescriptive	305	4,684	65,341,208	8.9%	2.1%	2.9%	1.8%	2.4%	96.4%
	Total	**335**	**4,826**	**103,367,271**	**11.0%**	**2.1%**	**2.0%**	**1.6%**	**1.5%**	**92.5%**

Table 6-9 presents free-ridership and spillover rates by natural gas programs and program type. Overall the custom projects had a free-ridership rate of 9.2 percent and no participant or nonparticipant "like" spillover which resulted in a NTG rate of 90.8 percent. Prescriptive projects had an overall NTG rate of 97.4 percent which was driven by a free-ridership rate of 2.7 percent and no participant and nonparticipant "like" spillover.

Table 6-9. 2016 C&I Natural Gas Free-Ridership and Spillover Results by Program and Program Type

Program	Program Type	Surveyed	Population	Population Savings	Free-ridership Rate	90% Margin Error (±)	Participant Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Commercial New Construction	Custom	4	17	318,304	0.0%	14.7%	0.0%	NA	0.0%	100.0%
	Prescriptive	28	85	131,922	11.6%	11.3%	0.0%	NA	0.1%	88.5%
	Total	**32**	**102**	**450,226**	**3.4%**	**10.1%**	**0.0%**	**NA**	**0.0%**	**96.6%**
Large Commercial Retrofit	Custom	50	128	1,607,144	11.1%	3.1%	0.0%	NA	0.0%	88.9%
	Prescriptive	13	66	453,836	0.2%	13.7%	0.0%	NA	0.0%	99.8%
	Total	**63**	**194**	**2,060,980**	**8.7%**	**3.6%**	**0.0%**	**NA**	**0.0%**	**91.3%**
Small Business	Prescriptive	8	51	41,250	1.4%	2.9%	0.0%	NA	0.0%	98.6%
	Total	**8**	**51**	**41,250**	**1.4%**	**2.9%**	**0.0%**	**NA**	**0.0%**	**98.6%**
Total	Custom	54	145	1,925,448	9.2%	3.0%	0.0%	NA	0.0%	90.8%
	Prescriptive	49	202	627,007	2.7%	7.5%	0.0%	NA	0.0%	97.4%
	Total	**103**	**347**	**2,552,455**	**7.6%**	**3.9%**	**0.0%**	**NA**	**0.0%**	**92.4%**

6.2.2 "Unlike" Spillover Observations

The evaluation team included questions to address "unlike" spillover—energy efficient equipment installed by a participant due to program influence that was not identical to the equipment they received through the program. However, given the difficulties in estimating savings for these installations using regular telephone interviewers, we present only observations of "unlike" spillover and not savings estimates.

Four National Grid respondents reported that they have installed other types of energy efficient equipment outside of a National Grid program and that National Grid's programs were influential in the installation. Below we list out the different types of equipment identified and any additional information provided about the equipment.

- One respondent indicated they installed two refrigerators—1 large refrigerator and 1 medium size refrigerator.
- One respondent installed an energy efficient motor, under 5 hp. This respondent also mentioned putting inverters on equipment but could not provide any additional details.
- One respondent said they installed six dozen 60-watt equivalent high efficiency light bulbs.
- One respondent installed four different pieces of equipment that included the following:
    - Four tankless water heaters (1999 Btu)

- Two washers; one 44-pound unit and one 65-pound unit
- Two 775-pound dryers
- 20 heat pumps (75000 Btu).

APPENDIX A: PARTICIPANT SAMPLING PLAN

To:	Mark Sevier, National Grid
Cc:	Pam Rathbun
From:	Carrie Koenig, Steve Drake
Date:	May 11, 2017
Subject:	2016 National Grid Rhode Island Free-Ridership and Spillover Study Sample Plan

This memorandum presents our sample plan for National Grid's Rhode Island 2016 free-ridership and spillover study. The 2016 free-ridership study includes gas, electric and upstream lighting customers.

The tracking data files transferred to us by National Grid provide information for Rhode Island participants in the New Construction-Custom, New Construction-Prescriptive, Retrofit-Custom, Retrofit-Prescriptive, Small Business and the Bright Opportunities programs[30]. The data files provided included measures installed between January 1, 2016 and December 31, 2016.[31] From the files that were provided, we dropped the following records:

- 6330 upstream lighting records from the electric Installed Measures worksheet. These records are duplicates with the records provided in a separate file with preferable customer contact information.
- 174 Cool Choice (upstream HVAC) records. These records are out of the scope of this study.
- 162 upstream gas records. These records are out of the scope of this study.

After dropping these records 17,187 records remained in the data file. Each record in the data represents a measure installed through a program for a particular location. A single account may have installed multiple different measures. Therefore, it is necessary to take steps to collapse—or aggregate—the data through the sampling process, yet retain all the measure-specific information for each account[32].

In this document we discuss the steps to be used in:

- Preparation of the data file and aggregation of the participant data
- Selection of the sample
- Preparation of sample for data collection
- Review of the sample to identify companies with multiple sampled locations

[30] C&I direct install, C&I MF, Commercial New Construction, Large Commercial Retrofit, Small Business.
[31] Files used for sampling include the following: DSM_EVAL_(025-G)_Gas_Participation(1).xls, DSM_Eval_(015)_Free_Ridership-Spillover_LCI-SBS(1).xls, 2016 RI upstream lighting.xlsx, and 2016_RI_GAS_Program_Customer_Details.xls.
[32] An account is defined as a unique Account Number (acct_no, bill_acct_no) and program is defined by "program" and "PrescrCustom."

This is followed by a characterization of the proposed sample plan.

The current sample plan estimates 487 (124 gas and 363 electric) completed participant surveys at the measure level and 434 completed surveys at the account level (some accounts represent multiple measures).

Preparation of the Data File and Aggregation of the Participant Data

The following steps are taken to prepare the tracking data for sampling:

1) **Identify program and measure category participation**. The study estimates free-ridership at the measure category level as well as free-ridership at the program and program type (custom vs prescriptive) levels. The first step in sample preparation is to assign measures to a measure category. Using the information provided in the data files[33], we identify the measure categories within the following programs:

    a. The Design 2000plus program consists of the electric measure categories: compressed air, custom, food service, HVAC, HVAC non-unitary, lighting, other, and VSD.

    b. The Energy Initiative program consists of the electric measure categories: custom, HVAC, lighting, other, and VSD.

    c. The Small Business program electric measure categories consists of the Lighting and non-lighting measure categories while gas measure categories include: controls, insulation, other, and water heating.

    d. The Commercial New Construction custom program consists of the gas measure categories: controls, HVAC-distribution, HVAC-plant, insulation, and other.

    e. The Commercial New Construction prescriptive program consists of the gas measure categories: food service, HVAC, other, and non-upstream water heating.

    f. The Large Commercial Retrofit custom program consists of the gas measure categories: controls, HVAC-distribution, HVAC-plant, insulation, other, and water heating.

    g. The Large Commercial Retrofit prescriptive program consists of the gas measure categories: controls, other, and water heating.

    h. The Bright Opportunities program consists of the upstream lighting measure category broken into the following types: fixture, LED retrofit kits, screw-ins, and TLEDs.[34]

2) **Aggregate the records by Program, Account Number, and Measure Category**. This aggregation sets the file up so that we have one record for each account for each measure category within a program. As we do the aggregation we sum the therm and kwh savings[35],

[33] The field used to identify measure categories was “InstalledMeasureDescription,” “MeasureDescr,” and “ProductTypeName” and in some cases the field “MeasureCode” was also used in combination with the “MeasureDescr” field.

[34] Based on the variable “ProductTypeName.”

[35] For the gas programs, we used “GrossAnnualGasThermsSaving” to identify the total therm savings associated with that measure. For the electric programs, we used “TotalGrosskwh” and for the upstream program we used “TotalGrossAnnualKWh.”

quantity of measures installed[36], the measure cost and authorized incentive[37] so that the values are represented at an account level[38]. The detailed measure descriptions are retained. These descriptions are used when describing to customers what equipment is included in a measure category. In addition, we identified customers who received technical assistance using the variables "Vendor Service" and "ESR Activity".

After aggregation, 56 customer accounts were dropped where therm or kwh savings were zero or negative at the measure category level. This resulted in 5,380 records remaining in the data file.

Selection of the Sample

In general, we always want to pull a census of measure categories with less than or equal to 50 accounts associated with them within a program. For this study, we will pull a census of all accounts for each program with the exception of lighting measures for the Small Business, Energy Initiative and Bright Opportunities programs. For the Small Business and Energy Initiative programs, we selected the records with the top 10 percent of savings then randomly selected the remaining cases. For the Bright Opportunities program lighting measures we selected the top 3 percent then randomly selected the remaining cases.

To limit respondent burden, in the interview we discuss no more than two measure categories for each account and program the account participated in. There were a number of accounts that had measures installed in more than two measure types. In these instances, we apply a set of rules to select which measure types we want to include in the study.

1) First select measure types in the top 10th or 3rd percentile of savings for that specific program and measure type ("priority" category).

2) Select rare measure types, defined as the measure type with the least number of records. There were a few exceptions where we selected the non-rare measure type because it represented a large share of the program's savings.

These prioritization steps resulted in the removal of 107 measures that were included in the sample as part of the measure category census.

Preparation of Sample for Data Collection

The next step is to restructure the sample file so that each record represents one participant account within a program (an account may show up more than once in the dataset but never more than one time in a program). Each measure type sampled for a given account is represented in a separate column in this new data file (i.e., MeasureCategory1, MeasureCategory2, etc.). Correspondingly, measure category therm/kWh savings and detailed descriptions are represented in associated columns (e.g., therms1, therms2, kWh1, kWh2).

Using this file structure, participants will be taken through the net-to-gross questions for each measure category sampled for that account (up to two measure categories). This approach allows for us to assess free-ridership and like-spillover for each measure type.

[36] For the gas programs, we used "quantity" and the electric programs we used "InstalledQuantity" and the upstream program we used "TotalQuantity" to identify quantity installed.

[37] The project costs and incentive amounts provided in the sample will not be used as they are the calculated incentive and not the authorized incentive amounts.

[38] Account numbers were not provided for Upstream Lighting participants; accounts were defined by unique customer name and customer address for these records.

Review of Sample to Identify Companies with Multiple Sampled Accounts

Prior to survey implementation, we attempt to identify records that appear in the sample more than one time ("multiples"). Records that appear to potentially be the same facility, the same company, or have the same contact point are grouped and flagged so they are attempted at the same time. We manually sort and review the sample on the following criteria:

- Account number
- Customer name
- Contact name
- Telephone number
- Address.

All sample records are loaded into the Computer Assisted Telephone Interview (CATI) system. Any cases identified and flagged as "multiples" using the criteria above are put on hold. Senior interviewers are specially trained on how to deal with these multiples. Once we are a few days into the calling, our senior interviewers are responsible for calling multiples.

During our initial contact with the respondent, our first step is to verify whether the respondent is the appropriate person to provide information for each of the accounts. If not, we determine which accounts should be assigned to that respondent, and which should be discussed with someone else.

For contact persons associated with multiple accounts, we will ask these contacts about up to 2 measures per account for each program they participate in. Therefore, the interview may be slightly longer for these contacts.

Characterization of the Proposed Sample Plan and Sample

Table A-1 and Table A-2 outline the sampling plan for National Grid's Rhode Island 2016 study, gas and electric programs. This sample plan also includes the structure on how results will be reported; including free-ridership results at the program, program type and measure type levels.

Table A-1. National Grid Rhode Island Proposed Sample Plan—Gas Programs

Program Type	Program	Measure Type	Population of Measures	Projected Sample of Measures	Population Therm Savings	Projected Sampled Therm Savings	Percent of Therm Savings Sampled*	Expected Completed Measures from Survey **	+/- 90% Confidence Interval at Measure Level ***
Custom	Large Commercial New Construction—Custom	Controls	2	2	56,532	56,532	100%	1	NA
		HVAC—Distribution	1	1	10,009	10,009	100%	0	NA
		HVAC—Plant	9	9	60,725	60,725	100%	3	NA
		Insulation	1	1	568	568	100%	0	NA
		Other	5	5	200,480	200,480	100%	2	NA
		Total	**18**	**18**	**328,313**	**328,313**	**100%**	**6**	**NA**
	Large Commercial Retrofit—Custom	Controls	36	36	590,141	590,141	100%	13	NA
		HVAC—Distribution	19	19	377,494	377,494	100%	7	NA
		HVAC—Plant	4	4	9,773	9,773	100%	1	NA
		Insulation	49	49	191,828	191,828	100%	17	NA
		Other	20	20	437,908	437,908	100%	7	NA
		Water Heating	2	2	5,228	5,228	100%	1	NA
		Total	**130**	**130**	**1,612,372**	**1,612,372**	**100%**	**46**	**NA**
	Small Business	Controls	2	2	5,738	5,738	100%	1	NA
		Insulation	1	1	1,101	1,101	100%	0	NA
		Other	1	1	66	66	100%	0	NA
		Total	**4**	**4**	**6,905**	**6,905**	**100%**	**1**	**NA**
	Total		**152**	**152**	**1,947,590**	**1,947,590**	**100%**	**53**	**NA**
Prescriptive	Large Commercial New Construction—Prescriptive	Food Service	13	13	10,522	10,522	100%	5	NA
		HVAC	59	59	114,220	114,220	100%	21	NA
		Other	1	1	50,000	50,000	100%	0	NA
		Water Heating	13	13	7,180	7,180	100%	5	NA
		Total	**86**	**86**	**181,922**	**181,922**	**100%**	**30**	**NA**
	Large Commercial Retrofit—Prescriptive	Controls	8	8	1,898	1,898	100%	3	NA
		Other	10	10	440,961	440,961	100%	4	NA
		Water Heating	48	48	10,977	10,977	100%	17	NA
		Total	**66**	**66**	**453,836**	**453,836**	**100%**	**23**	**NA**
	Small Business	Controls	13	13	1,673	1,673	100%	5	NA
		Water Heating	38	37	39,577	39,411	100%	13	NA
		Total	**51**	**50**	**41,250**	**41,084**	**100%**	**18**	**NA**
	Total		**203**	**202**	**677,007**	**676,841**	**100%**	**71**	**NA**
Total Gas			**355**	**354**	**2,624,597**	**2,624,432**	**100%**	**124**	**NA**

*Sampled therm/kWh savings divided by the population of therm/kWh savings.
** Assumes a 35 percent response rate of sampled measures. We will strive for a higher response rate.
*** When a census of the population is sampled, confidence intervals cannot be estimated.

Table A-2. National Grid Rhode Island Proposed Sample Plan—Electric Programs

Program Type	Program	Measure Type	Population of Measures	Projected Sample of Measures	Population kWh Savings	Projected Sampled kWh Savings	Percent of kWh Savings Sampled*	Expected Completed Measures from Survey **	+/- 90% Confidence Interval at Measure Level ***
Custom	Design 2000	Custom	41	41	6,031,953	6,031,953	100%	14	NA
		Total	**41**	**41**	**6,031,953**	**6,031,953**	**100%**	**14**	**NA**
	Energy Initiative	Custom	101	101	31,994,110	31,994,110	100%	35	NA
		Total	**101**	**101**	**31,994,110**	**31,994,110**	**100%**	**35**	**NA**
	Total		**142**	**142**	**38,026,063**	**38,026,063**	**100%**	**50**	**NA**
Prescriptive	Bright Opportunities	(Upstream) Lighting—fixture	322	99	2,079,316	1,200,433	58%	35	13.1%
		(Upstream) Lighting—LED retrofit kits	745	99	3,128,662	1,401,253	45%	35	13.6%
		(Upstream) Lighting—screw-ins	1,595	98	12,413,296	4,608,779	37%	34	14.0%
		(Upstream) Lighting—TLEDs	875	99	3,149,918	1,482,606	47%	35	13.6%
		Total	**3,537**	**395**	**20,771,191**	**8,693,072**	**42%**	**138**	**6.9%**
	Design 2000	Compressed Air	56	56	1,496,316	1,496,316	100%	20	NA
		Food Service	3	3	2,640	2,640	100%	1	NA
		HVAC	4	4	2,760	2,760	100%	1	NA
		HVAC Non-unitary	3	3	170,497	170,497	100%	1	NA
		Lighting	127	124	4,207,183	4,053,049	96%	43	NA
		Other	1	1	3,158,000	3,158,000	100%	0	NA
		VSD	6	6	329,833	329,833	100%	2	NA
		Total	**200**	**197**	**9,367,229**	**9,213,095**	**98%**	**69**	**NA**
	Energy Initiative	HVAC	39	39	1,860,712	1,860,712	100%	14	NA
		Lighting	255	100	21,166,766	14,689,119	69%	35	12.9%
		Other	3	3	197,528	197,528	100%	1	NA
		VSD	34	34	2,834,194	2,834,194	100%	12	NA
		Total	**331**	**176**	**26,059,201**	**19,581,553**	**75%**	**62**	**NA**
	Small Business	Lighting	787	100	12,364,104	4,509,291	36%	35	13.6%
		Non-lighting	28	28	533,703	533,703	100%	10	NA
		Total	**815**	**128**	**12,897,807**	**5,042,994**	**39%**	**45**	**NA**
	Total		**4,883**	**896**	**69,095,429**	**42,530,714**	**62%**	**314**	**NA**
Total Electric			**5,025**	**1,038**	**107,121,492**	**80,556,777**	**75%**	**363**	**NA**

*Sampled therm/kWh savings divided by the population of therm/kWh savings.
** Assumes a 35 percent response rate of sampled measures. We will strive for a higher response rate.
*** When a census of the population is sampled, confidence intervals cannot be estimated.

APPENDIX B: WEIGHTING METHODOLOGY

This appendix outlines the steps necessary to prepare the free-ridership data for analysis.

1. Calculating the sample weight (Phase 1 Weight)

Completed surveys must be weighted to represent population savings unless a census of all measures and customers is sampled ***and*** all customers respond to the survey.

The data were first weighted to correct for disproportional sampling and non-response to the survey. These weights—hereafter referred to as measure weights—were applied when analyzing the participant free-ridership and spillover results.

Because our population of interest was technically the savings, we used *measure category savings* to determine the weight that should be applied to each case. The measure category savings were stratified by priority and non-priority cases.[39] Priority cases were sampled at 100 percent. Including this stratification in the weighting scheme ensured the premises sampled at 100 percent were not overrepresented, and the sampled premises (sampled at less than 100 percent) were represented appropriately.

The following table is an example of weights applied to a sample stratified by measure category for a given program. The measure-related savings in the program tracking system database are listed in the population column. The corresponding savings accounted for by completed surveys and weights are listed under the "Surveyed Savings" and "Measure Weight" columns respectively. To calculate the "Measure Weight" for a given measure type, we divided the population of savings by the surveyed savings.

Table B-1. Examples of Weighting Calculations Using Three Measure Categories

	Strata (priority/non-priority)	Population of savings	Surveyed savings	Measure weight
HVAC	Census	4,110,798	1,165,510	3.52
Lighting	Non-priority	5,326,009	1,265,701	5.00
	Priority	6,438,192	1,243,262	5.18
VSD	Census	6,767,628	4,027,164	1.68

To make sure measure weights are assigned correctly, we apply the weight to the energy savings of each surveyed case and check to make sure the total weighted energy savings for each measure category and overall match the total population savings.

2. Extrapolating the data to the expected savings (Phase 2 Weight)

The next step in preparing for the analysis is extrapolating the weight to the expected savings. To do this, the measure weight is multiplied by the kwh savings (or therms) per account surveyed. The data are then analyzed taking into account the kwh (or therm) savings.

[39] As discussed in the sampling plan, priority cases are cases that are considered multi-measure accounts, and accounts that represent the top 10 percentile of measure category savings.

Conducting this next step determines the net free-ridership rate and spillover rates, and ensures the overall free-ridership rates are computed taking into consideration the therm (or MMBtu) savings for each individual account. The free-ridership and spillover rates would be skewed if the savings were not taken into account when determining free-ridership. This also means that large energy savers can have significant impacts on the overall free-ridership and spillover rates, particularly when the sample sizes are small.

Below we illustrate the preparation procedures, and effect of the procedures, using two cases.

Case A:	**Case B:**
Situation	
Received Lighting measures	Received Lighting measures
Flagged as a priority case	Flagged as non-priority
Has a free-ridership rate of 75 percent	Has a free-ridership rate of 25 percent
Recorded a savings of 10,000 kwh	Recorded a savings of 1,000 kwh
Step 1: Compute measure weight (discussed in prior section)	
Measure weight = 5.18	Measure weight =5.00
Step 2: Compute measure category-weighted kwh	
Adjusted kwh =10,000*5.18 = 51,800	Adjusted kwh = 1,000*5.00 = 5,000
Step 3: Calculate kwh associated with the free-ridership based on the measure category weighted kwh, calculated in Step 1	
FR savings = 51,800*.75 = 38,850	FR savings = 5,000*.25 = 1,250
Step 4: Sum the free-ridership attributed savings and population savings.	
Total FR attributed savings: 38,850 + 1,250 = 40,100 kwh Population savings: 51,800 + 5,000 = 56,800 kwh	
Step 5: Divide the Total FR attributed savings by population savings to determine free-ridership rate.	
Net free-ridership rate = 40,100/56,800 = 70.6 percent	

As illustrated above, the net free-ridership rate takes into account the savings of each account. As such, the estimates are *weighted for the disproportionate probability of being surveyed and measure category savings.*

3. Creating a one-stage weighting scheme

Creating two weighting variables introduces the risk of error in reporting the data. To eliminate the risk, the analysis syntax only includes one weighting variable. This variable multiplies the weight calculated in Phase 1 with the energy units associated with that measure and account, for example:

Measure weight = sample weight * individual kwh savings

The measure weight was applied when running any analysis to determine net free-ridership and spillover rates.

APPENDIX C: SURVEY INSTRUMENTS

C.1 FREE-RIDERSHIP AND SPILLOVER SURVEY USING CUSTOMER SELF REPORT APPROACH

Variable List

<CASEID> Unique case identifier

<MULTID> Unique identifier for multiples

<MULTFLAG> Multiple identifier
0 Non-multiple
1 Multiple

<FIRST_CASE>
1 first case of a multiple or a singles case
0 subsequent case of a multiple

<UTILITY> National Grid

<UTILITY_CONT> National Grid Contact Name and Phone Number.

<ACCOUNT> Account number

<CONTACT_NAME> Customer Contact Name

<PREMISE_ADDR>, <PREMISE_CITY>, <PREMISE_ST>, <PREMISE_ZIP> Service address where measure was installed

<DATE> Date of participation

<COMPANY_NAME> Facility Name

<SMALL> Flag for if a customer is a small business

<PROGRAM> Program respondent participated in
Bright Opportunities
New Construction
Program
Retrofit
Small Business

<TOTMEAS> Indicator of number of measures (at project level)
1 = One measure
2 = Two measures

<ProgramType1, ProgramType2> Type of program; Prescriptive or Custom

<ULFLAG> Indicator of whether respondent received an upstream incentive
- 0 Did not receive upstream incentive
- 1 Received upstream incentive

<ASSIST> Description of all technical assistance, financing, and rebates for measures installed through program

<STUDY> Indicator of receipt of an energy assessment
- 0 Did not receive a study
- 1 Received a study
- 2 Unknown

<CST1, CST2> Cost of projects

<MEASCAT1, MEASCAT2> End-use Category
- 1 (Upstream) Lighting
- 2 Compressed Air
- 3 Controls
- 4 Custom
- 5 Food Service
- 6 HVAC
- 7 HVAC—Distribution
- 8 HVAC—Plant
- 9 HVAC Non-unitary
- 10 Insulation
- 11 Lighting
- 12 Non-lighting
- 13 Other
- 14 VSD
- 15 Water Heating
- 20 (Upstream) Lighting—fixture
- 21 (Upstream) Lighting—LED retrofit kits
- 22 (Upstream) Lighting—screw-ins
- 23 (Upstream) Lighting—TLEDs

<QTY1, QTY2> Quantity of sampled NTG measures

<QTYFLAG1, QTYFLAG2> Flag for if quantity is greater than 1
- 0 quantity is not applicable for this measure category (measure count 1 or quantity is not relevant as in delamping, recycling)
- 1 quantity greater than 1

<INC1, INC2> PA incentive for specific measure categories
- 0 no costs provided

<EQUIP1, EQUIP2> Flag for if the measure is operational or not
- 0 if installed measure is not equipment that is operational (e.g., insulation)
- 1 if installed measure is operational

<EFF1, EFF2> Efficiency flag

0 efficiency is not applicable for this measure category (e.g., insulation, VFD, delamping, recycling, occupancy sensors)

1 efficiency is applicable

<KWH1, KWH2> Gross kWh savings for first sampled NTG measure, second sampled NTG measure

<THERM1, THERM2> Gross therms savings for first sampled NTG measure, second sampled NTG measure

<FUEL> Fuel type (electric or natural gas) for measure

<MEASDES1, MEASDES2> Detailed description of the measure(s) installed under the sampled measure category

<TOP1, TOP2> Top 10 percent of savings flag for electric savings

<PROGRAMCODE1, PROGRAMCODE2>

VEN_CONTACT, VEN_COMPANY, VEN_EMAIL, VEND_PHONE Vendor contact information for each measure

PREMISENO Premise number

Introduction

INT01 Hello, my name is _____ from Tetra Tech, and I'm calling on behalf of <UTILITY> regarding your firm's participation in their commercial and industrial energy efficiency programs. May I please speak with <CONTACT_NAME> or the person who decided to participate in <UTILITY>'s program?

01 Yes
02 No [ATTEMPT TO CONVERT. MENTION ADVANCE LETTER THEY SHOULD HAVE RECEIVED REGARDING THE CALL.]

MULTCHK [ASK IF MULTFLAG=1]
[INTERVIEWER: Is the first case of a multiple?]

01 Yes, first case of a multiple
02 No, subsequent case of a multiple [SKIP TO Decision Making Section]

I1 Are you the person who was most involved in making the decision to get <ASSIST> through a <UTILITY> program in <DATE> at <ADDR> in <CITY>?

01	Yes, that is correct	[SKIP TO I2]
02	Yes, we participated but that information is incorrect [SPECIFY]	
02	No, I don't recall participating	[SKIP TO OTHER_R]
88	Don't know	[SKIP TO OTHER_R]
99	Refused	[THANK AND TERMINATE 91]

I1O [ASK IF I1=2] Specify incorrect information.

OTHER_R Who else was primarily responsible for making the decision to get <ASSIST> through the program?

[RECORD NAME AND DISPOSITION]

01	Yes, there's somebody else [RECORD CONTACT INFORMATION FOR CALL NOTES]	
02	Nobody else	[THANK AND TERMINATE 81]
88	Don't know	[THANK AND TERMINATE 81]
99	Refused	[THANK AND TERMINATE 91]

AVAILABLE_R May I please speak with that person?

01	Yes	[SKIP TO INT01]
02	Yes, but R is not currently available	[INT15—CALLBACK]
03	No	[INT91—REFUSAL]
88	Don't know	[INT81—INELIGIBLE]
99	Refused	[INT91—REFUSAL]

I2 Are you employed by <COMPANY_NAME> or are you a contractor who provides design and/or installation services for <COMPANY_NAME>?

[INTERVIEWER NOTE: CODE UNPAID MEMBERS OF AN ADVISORY BOARD OR COMMITTEE AS EMPLOYEES]

01 Work directly for company/Employee/Volunteer/Board or Committee Members
02 Vendor/Contractor [TERMINATE and USE VENDOR SURVEY 86]

PREAMBLE

I'm with Tetra Tech, an independent research firm. On behalf of <UTILITY>, we are following up with customers who participated in a <UTILITY> energy efficiency program in 2016 to learn about their experiences. You or someone at your facility may have received a letter from <UTILITY> letting you know to expect this call. I'm not selling anything; I'd just like to ask about the energy efficiency project you implemented through this program at <PREMISE_ADDR> in <PREMISE_CITY>. Your individual responses will be kept confidential by Tetra Tech and <UTILITY>.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

FAQ READ FOLLOWING ONLY AS NEEDED:

(Sales concern: I am not selling anything; I simply want to understand what factors were important to your company when deciding to implement this new energy efficiency project and receive an incentive through this program. Your responses will be kept confidential by our firm and <UTILITY>. If you would like to talk with someone from <UTILITY>, you can call <UTILITY_CONT>.)

(Who is doing this study: <UTILITY> has hired our firm to evaluate the program. As part of the evaluation, we're talking with customers that participated in the program to better understand their experiences with the program.)

(Why are you conducting this study: Studies like this help <UTILITY> better understand customers' need for and interest in energy efficiency programs and services, and to improve the effectiveness of their programs.)

(Timing: This survey should take about 20 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.)

Q1 [IF MULTCHK = 2, SKIP TO Decision Making Section] First, how did you learn about the rebate or financial assistance available through <UTILITY>'s <PROGRAM>? [DO NOT READ LIST. SELECT ALL THAT APPLY]

For Q1C01 through Q1C99
0 Not mentioned
1 Mentioned

Q1C01 Through my <UTILITY> account representative
Q1C02 Another <UTILITY> staff member [PROBE: Who?]
Q1C03 Information from <UTILITY> in general (i.e. bill inserts, direct mailings)
Q1C04 From an equipment vendor or contractor [PROBE: Who?]
Q1C05 From a colleague or coworker at my company
Q1C06 Previous experience with a <UTILITY> program
Q1C07 An online resource (i.e. a website, blog, or online ad)
Q1C08 A mass advertising campaign
Q1C09 Saw an article in a newspaper, magazine, or newsletter
Q1C10 Other [SPECIFY—probe for organization]
Q1C88 Don't know
Q1C99 Refused

Q1C04o [ASK IF Q1C04=1] Vendor or contractor specified.

Q1C10o [ASK IF Q1C04=1] Other method specified.

Decision Making

LOOP R1A THROUGH R10E FOR EACH MEASCAT
***R1 for MEASCAT1**
***R2 for MEASCAT2**

R1a [SHOW ONCE: "In the remainder of this interview, I'd like to focus on the <MEASCAT1, MEASCAT2> you implemented through the <PROGRAM>."]

According to our records, the [EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1) SHOW: "high efficiency"] <MEASCAT1, MEASCAT2> project you implemented through the program included <MEASDES1, MEASDES2>.

This equipment will be referred to as the <MEASCAT1, MEASCAT2> project.

Were you involved in the decision-making process when the [EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1): high efficiency] <MEASCAT1, MEASCAT2> project was being considered for this facility?

01 Yes
02 No
88 Don't know
99 Refused

R1c Is this <MEASCAT1, MEASCAT2> equipment still at least partially installed [IF INSTALLED MEASURE IS OPERATIONAL; (IF EQUIP1, EQUIP2=1): and operating] at this facility?

01	Yes	[SKIP TO R10bb]
02	No	
88	Don't know	[SKIP TO R10bb]
99	Refused	[SKIP TO R10bb]

R1do Why is the <MEASCAT1, MEASCAT2> equipment no longer installed [IF INSTALLED MEASURE IS OPERATIONAL; (IF EQUIP1, EQUIP2=1): or no longer operating] at this facility?

(RECORD RESPONSE VERBATIM)

R10bb Did the <MEASCAT1, MEASCAT2> you received replace any existing <MEASCAT1, MEASCAT2>? [SELECT ONE]

01	Yes	
02	No	[SKIP TO NEXT MEASURE]
88	Don't know	[SKIP TO NEXT MEASURE]
99	Refused	[SKIP TO NEXT MEASURE]

R10cc Would you say the old equipment was less than 5 years old, 5 to 9 years old, 10 to 20 years old, or more than 20 years old? [SELECT ONE]

01	Less than 5 years old
02	5 to 9 years old
03	10 to 20 years old
04	More than 20 years old
88	Don't know

R10d What was the condition of the old <MEASCAT1, MEASCAT2> equipment? Would you say it was running with no performance issues, running but in need of repair, or broken and did not work? [SELECT ONE]

01	Running with no performance issues
02	Running but in need of repair
03	Broken and did not work
88	Don't know

R10e Was the old <MEASCAT1, MEASCAT2> scheduled to be replaced before you decided to install the new equipment through the program? [SELECT ONE]

01	Yes
02	No
88	Don't know

END OF DECISION MAKING LOOP

C_MULT_SKIP1 [SKIP TO NEXT SECTION IF MULTCHK=2]

R3 Does your organization have any formal requirements or informal guidelines for the purchase, replacement, or maintenance of energy-using equipment? [SELECT ONE]

01	Yes	
02	No	[SKIP TO R4bb]
88	Don't know	[SKIP TO R4bb]
99	Refused	[SKIP TO R4bb]

R4 Which of the following best describes these requirements or guidelines? (READ LIST; SELECT ONE)

01	Purchase high efficiency measures regardless of cost
02	Purchase high efficiency measures if it meets payback or return on investment criteria
03	Purchase standard efficiency measures that meet code
04	Something else (SPECIFY)
88	Don't know
99	Refused

R4o [ASK IF R4=4] Other description specified.

R4bb Does your organization have a dedicated account representative from <UTILITY>? [SELECT ONE]

01	Yes	
02	No	[SKIP TO R6i]
88	Don't know	[SKIP TO R6i]

R4bc Did your account representative assist you with any part of the <MEASCAT1> [IF TOTMEAS = 2, SHOW, “or <MEASCAT2>”] project that you implemented through the program? This could have included identifying potential energy saving opportunities, specifying program-qualifying equipment, or providing assistance during project implementation. [SELECT ONE]

01	Yes
02	No
88	Don't know
99	Refused

R6i [ASK IF STUDY = 2] Did your company receive an energy assessment as part of your participation in the program?

01	Yes	[STUDY = 1]
02	No	
88	Don't know	
99	Refused	

C_STUDY_NEW [IF R6i=1 THEN C_STUDY_NEW=1 ELSE C_STUDY_NEW=STUDY]

C_R6i_skip [IF C_STUDY_NEW=0 OR R6i = 2, SKIP TO UL01]

R6 If <UTILITY> had not paid a portion of the cost, would your company have paid to have a similar energy assessment done?

01	Yes	
02	No	[SKIP TO C2_1]
88	Don't know	[SKIP TO C2_1]
99	Refused	[SKIP TO C2_1]

R7 Would you have paid to have the energy assessment done earlier than you did, at the same time as you did, at a later date, or never?

01	Earlier	
02	Same time	
03	Later	
04	Never	[SKIP TO C2_1]
88	Don't know	
99	Refused	

R8 [ASK IF R7 = EARLIER OR LATER (ASK IF R7 = 1 OR 3)] How much [earlier/later] would you have had the assessment done?

R8_yr	___	YEARS	[0-75]
R8_mo	___	MONTHS	[0-11]
	88	Don't know	
	99	Refused	

C2_1 [ASK IF R6=2, 88, 99] On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the information provided by the energy assessment have on your decision to implement the [IF EFFICIENCY IS APPLICABLE; IF EFF1 = 1: high efficiency] <MEASCAT1> project?

_____	(ENTER INFLUENCE RANKING)
88	Don't know
99	Refused

C2_2 [ASK IF R6=2, 88, 99 AND TOTMEAS=2] On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the information provided by the energy assessment have on your decision to implement the [IF EFFICIENCY IS APPLICABLE; IF EFF2 = 1*:* high efficiency] <MEASCAT2> project?

_____ (ENTER INFLUENCE RANKING)
88 Don't know
99 Refused

START OF MEASURE LOOP
MEASCHK through S4b will be asked of each measure category recalled that are still installed and operating—up to TWO measure categories.
***R1 for MEASCAT1**
***R2 for MEASCAT2**

MEASCHK [ASK IF MULTCHK=2] [INTERVIEWER: Is <MEASCAT1, MEASCAT2> equipment the same as a previous <MEASCAT1, MEASCAT2> equipment?]

1 Yes
2 No [SKIP TO UL1]

DECISIONCHK [ASK IF MEASCHK=1] Was the decision making process for the <MEASCAT1, MEASCAT2> equipment the same or different from a previous <MEASCAT1, MEASCAT2> equipment?]

1 Yes, same decision making process [SKIP TO NEXT MEASURE]
2 No, different decision making process [SKIP TO UL1]

Awareness (for Upstream Lighting)

UL1 [ASK IF MEASCAT1, MEASCAT2=01, 20, 21, 22, 23 UPSTREAM LIGHTING] Were you aware the <MEASCAT1, MEASCAT2> you purchased received a price discount sponsored by <UTILITY>? [SELECT ONE]

01 Yes
02 No
88 Don't know
99 Refused

UL2 [ASK IF UL1=1] Where did you learn about the price discount? (DO NOT READ; SELECT ONE)

01 Contractor or equipment vendor
02 <UTILITY> (my electricity provider)
03 Internet other than the utility provider
04 Colleagues within organization
05 Colleagues outside organization
06 Other (SPECIFY –be as specific as possible, include the organization)
88 Don't know
99 Refused

UL2o [ASK IF UL2=6] Other ways specified.

Free-Ridership

FR0 [ASK ONCE ON FIRST LOOP] Please think back to the time when you were considering implementing the specific <MEASCAT1> [IF TOTMEAS=2 SHOW: "and <MEASCAT2>] project(s).

What factors motivated your business to consider implementing new <MEASCAT1> [IF TOTMEAS=2 SHOW: "and <MEASCAT2>] equipment? (PROBE: What other factors did you consider?)

[DO NOT READ LIST. SELECT ALL THAT APPLY]

For FR0C01 through FR0C99
0 Not mentioned
1 Mentioned

FR0C01 Old equipment failed
FR0C02 Old equipment working poorly
FR0C03 Old equipment scheduled for replacement
FR0C04 Wanted to reduce maintenance costs
FR0C05 The incentive being offered through the program
FR0C06 The technical assistance offered through the program
FR0C07 Wanted to reduce energy bills
FR0C08 Wanted to save energy
FR0C09 Recommendation of third party contractor/engineer/design professional
FR0C10 Recommendation of <UTILITY> staff
FR0C11 Recommendation of internal staff
FR0C12 Past experience with the program
FR0C13 Other (SPECIFY)
FR0C88 Don't know
FR0C99 Refused

FR0C13o [ASK IF FR0C13=1] Other factors specified.

C_FRSKIP_R1A ASK SECTION IF MEASURE IS RECALLED:
ASK SECTION IF R1a=1, 88, 99 OTHERWISE SKIP TO NEXT MEASURE

C_FRSKIP_R1C ASK SECTION IF MEASURE IS STILL INSTALLED AND OPERATING:
ASK SECTION IF R1c=1, 88, 99 OTHERWISE SKIP TO NEXT MEASURE

FR_INTRO3a

[ASK IF FIRST LOOP] Now, I'd like to ask you about your decision to implement the <MEASCAT1> project. [IF THERE IS ALSO A SECOND MEASURE: Then, I'll repeat these questions for <MEASCAT2>].

01 Continue

FR_INTRO3b

[ASK IF SECOND LOOP] Now I'd like to review the <MEASCAT2> project you implemented.

01 Continue

C_UPLIT_DECS

[ASK IF SECOND LOOP AND MEASCAT2=01,20,21,22,23 AND MEASCAT1=01,20,21,22,23] Was your decision to implement the <MEASCAT2> project the same as the <MEASCAT1> project that we just reviewed?

01 Yes, same decision [SKIP TO NEXT MEASURE]
02 No, different decision

C_FR1_SKIP00 [SKIP TO C_FR2_SKIP0 IF MEASCAT1, MEASCAT2 = 01,20,21,22,23 UPSTREAM LIGHTING AND UL1=2,88,99]

FR1 On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your business would have implemented the same [IF QUANTITY IS GREATER THAN (IF QTYFLAG1, QTYFLAG2 = 1): quantity] [IF EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1): and efficiency of] <MEASCAT1, MEASCAT2> at that same time if <UTILITY> had not provided the <ASSIST>?

___ (0 TO 10)
88 Don't know
99 Refused

FR2 Did your company have any funds allocated to implement the <MEASCAT1, MEASCAT2> project before you talked with anyone about the program?

01	Yes	
02	No	[SKIP TO FR4]
88	Don't know	[SKIP TO FR4]
99	Refused	[SKIP TO FR4]

FR3a Was it necessary to change the timing of the implementation, [IF QUANTITY IS GREATER THAN 1 (IF QTYFLAG1, QTYFLAG2 = 1): the quantity of equipment] [IF EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1): or the efficiency level] of the <MEASCAT1, MEASCAT2> in order to qualify for the program through <UTILITY>?

01	Yes	
02	No	[SKIP TO FR4]
88	Don't know	[SKIP TO FR4]
99	Refused	[SKIP TO FR4]

FR3b What changes were necessary? [DO NOT READ; SELECT ALL THAT APPLY]

For FR0C01 through FR0C99

0	Not mentioned
1	Mentioned

FR3bC01 Installation occurred SOONER than planned
FR3bC02 Installation occurred LATER than planned
FR3bC03 Installed MORE equipment than planned
FR3bC04 Installed LESS equipment than planned
FR3bC05 Equipment was MORE efficient than planned
FR3bC06 Equipment was LESS efficient than planned
FR3bC07 Removed MORE equipment than planned
FR3bC08 Removed LESS equipment than planned
FR3bC09 Other (SPECIFY)
FR3bC88 Don't know
FR3bC99 Refused

FR3bC09o [ASK IF FR3BC09=1] Other changes specified.

FR4 Who was MOST responsible for actually recommending or specifying the [IF EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1): high efficiency] <MEASCAT1, MEASCAT2> project that was implemented through <UTILITY>'s program?

DO NOT READ LIST, RECORD ONLY ONE

01 Respondent
02 Someone else in company (SPECIFY AND PROBE TO SEE IF SHOULD BE SPEAKING WITH THIS R)
03 <UTILITY> account manager
04 Third-party design professional/architect
05 Third-party engineer
06 Contractor/Vendor
07 Manufacturer's representative
08 Auditor
09 Someone else (SPECIFY)
88 Don't know
99 Refused

FR4o [ASK IF FR4=9] Other person specified.

C1 [ASK IF FR4= <UTILITY> ACCOUNT MANAGER, THIRD-PARTY DESIGN PROFESSIONAL/ARCHITECT, THIRD-PARTY ENGINEER, CONTRACTOR, MANUFACTURER'S REPRESENTATIVE, OR AUDITOR
(ASK IF FR4=3, 4, 5, 6, 7, 8, 9)]

On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did (FR4 response) have on your company's decision to implement the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: high efficiency] <MEASCAT1, MEASCAT2> project so that it would qualify for the <UTILITY> program?

_____ (ENTER INFLUENCE RANKING)
88 Don't know
99 Refused

FR5i I'd like to go over all the assistance you received from <UTILITY>. According to our records:

(IF CST1,CST2 > 0) the total cost for the project implemented at your facility in <DATE> through the program was about <CST1,CST2>. <UTILITY> paid [IF <INC1, INC2> IS >0 SHOW: "about <INC1, INC2>" OR IF <INC1, INC2> = 0 SHOW "a portion"] of the total cost of the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: high efficiency] <MEASCAT1, MEASCAT2> project implemented through the program.

(IF CST1,CST2 = 0) <UTILITY> paid a portion of the total cost of the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: high efficiency] <MEASCAT1, MEASCAT2> project implemented through the program.

[IF C_STUDY_NEW =1 SHOW: "In addition, as I previously mentioned, <UTILITY> paid a portion of the cost for an energy assessment to identify energy saving opportunities."]

01 Continue

FR5 If <UTILITY> had not paid a portion of the implementation cost, provided any technical assistance, education, an energy assessment, or financing would your business have implemented any type of <MEASCAT1, MEASCAT2> project?

01	Yes	
02	No	[SKIP TO C3]
88	Don't know	[SKIP TO C_FR1_SKIP1]
99	Refused	[SKIP TO C_FR1_SKIP1]

FR6a Would you have implemented the <MEASCAT1, MEASCAT2> project earlier than you did, at the same time as you did, at a later date, or never?

01	Earlier	
02	Same time	
03	Later	
04	Never	[SKIP TO C3]
88	Don't know	[SKIP TO C_FR1_SKIP1]
99	Refused	[SKIP TO C_FR1_SKIP1]

FR6b [IF FR6a=1,3] How much [earlier/later] would you have implemented the <MEASCAT1, MEASCAT2> project?

FR6b_1a	___	YEARS
FR6b_1b	___	MONTHS
	88	Don't know

C_FR1_SKIP1 [IF QUANTITY IS NOT APPLICABLE FOR THIS MEASURE CATEGORY (IF QTYFLAG1, QTYFLAG2 = 0), SKIP TO C_FR1_SKIP4]

C_FR1_SKIP2 [IF FR6b_1a = 88 OR FR6b_1b = -8, SKIP TO C3]

FR7a Without the <UTILITY> program incentive, technical assistance, energy assessment, or financing would your business have implemented the exact same quantity or size of <MEASCAT1, MEASCAT2> equipment [IF FR5=1 YES or 88 DK: at that same time; IF FR5=2 NO: during that time frame]?

01	Yes	[SKIP TO C_FR1_SKIP4]
02	No	
88	Don't know	[SKIP TO C_FR1_SKIP4]
99	Refused	[SKIP TO C_FR1_SKIP4]

FR7b Compared to the amount of <MEASCAT1, MEASCAT2> that you implemented through <UTILITY>'s program, what percent of the project do you think your business would have purchased on its own during that timeframe?

(PROBE: Would you have purchased about one-fourth (25%), one-half (50%), three-fourths (75%) of what you installed through the <UTILITY> program?)

____	(ENTER PERCENTAGE: 1-99%)
88	Don't know
99	Refused

C_FR1_SKIP4 [IF EFFICIENCY IS NOT APPLICABLE FOR THIS MEASURE CATEGORY (IF EFF1, EFF2 = 0), SKIP TO RVL1]

FR8 You said your business would have installed [IF FR7A=01 YES SHOW "all"; IF FR7A= 2 NO: (FILL WITH FR7B %); IF (FR7A=88, 99 OR FR7B=88,99), FILL WITH "some"] of the equipment on your own if the <UTILITY> program had not been available.

Thinking about the <MEASCAT1, MEASCAT2> equipment you would have installed on your own, what percent of this equipment would have been in each of the following categories, which should sum to 100 percent.
Category 1: the same high efficiency as what was rebated through the program, Category 2: lower efficiency than what was purchased but higher than standard efficiency or code,
Category 3: standard efficiency or code.
What percent would've been... ?

(PROBE: Would about one-fourth (25%), one-half (50%), three-fourths (75%) been of equal efficiency?)

FOR FR8a through FR8c

____ (ENTER PERCENTAGE: 0-100%)
88 Don't know

FR8a of the same high efficiency as what was rebated through the <UTILITY> program?

FR8b lower efficiency than what was purchased but higher than standard efficiency or code?

FR8c standard efficiency or code

(CHECK THAT THE THREE % SUM TO 100%; PROBE TO CLARIFY)

FR8bco [ASK IF FR8b > 0 and <>88 OR FR8c > 0 and <>88] What specific efficiency level(s) were you considering before you spoke with a contractor or a program representative?

(RECORD RESPONSE VERBATIM)

C_FR1_SKIP3 [IF QUANTITY IS GREATER THAN 1 (IF QTYFLAG1, QTYFLAG2 = 1), SKIP TO C3]

FR8d [ASK IF QTYFLAG<>1] Thinking about the <MEASCAT1, MEASCAT2> project you would have implemented on your own if the <UTILITY> program had not been available, would it have been of the same high efficiency as what was installed through the program, lower efficiency than what was purchased but higher than standard efficiency, or standard efficiency or code?

01 Of the same high efficiency as what was installed through the program
02 Lower efficiency than what was purchased but higher than standard efficiency
03 Standard efficiency or code
88 Don't know
99 Refused

FR8dao [ASK IF FR8d=2,3] What specific efficiency level were you considering before you spoke with a contractor or program representative?

(RECORD RESPONSE VERBATIM)

RVL1 [ASK IF MEASCAT= 10 Insulation] Thinking about the insulation project you would have implemented on your own if the <UTILITY> program had not been available, would you have installed the same amount of insulation as you did?

01 Yes [SKIP TO C3]
02 No
88 Don't know
99 Refused

RVL2 [ASK IF MEASCAT= 10 Insulation] Compared to what you installed through the <UTILITY> program, how much insulation would you have installed? (PROBE: “Would about one-fourth (25%), one-half (50%), three-fourths (75%) been of equal efficiency?”)

__ [1-99%]
88 Don't know
99 Refused

C3 On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the (IF INC1, INC2 > 0: “<INC1,INC2>”, ELSE “the incentive”) you received from <UTILITY> have on your decision to implement the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: high efficiency] <MEASCAT1,MEASCAT2> project?

_____ (ENTER INFLUENCE RANKING)
88 Don't know
99 Refused

100% Free Ridership Consistency Check
[IF WOULD HAVE PURCHASED AT THE SAME TIME, IN THE SAME QUANTITY, AND OF THE SAME EFFICIENCY LEVEL;
IF FR5=1 AND FR7a=1 AND (FR8a=100% or FR8d = 1), ASK C4a-C7bc, ELSE SKIP TO C8a]

C4a Now I want to focus on what it would have cost your business to install this equipment on its own without the program. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your business would have paid the additional (IF INC1, INC2 > 0: "<INC1,INC2>", ELSE "cost of the equipment") on top of the amount you already paid, to implement the same quantity and efficiency of <MEASCAT1,MEASCAT2> equipment at that same time?

___ (0 TO 10) [IF 8, 9, or 10,88,99 SKIP TO C8a]
88 Don't know
99 Refused

C4b [ASK IF C4a =0,1,2,3,4,5,6,7] You said that you would have installed the same quantity and efficiency of equipment at that same time, but you also just said that there was a (FILL WITH C4a SCORE) in 10 likelihood of you paying the additional cost covered by the incentive provided by the <UTILITY> program. Which of these is more accurate?

01 Installed same quantity & efficiency at same time [SKIP TO C9a]
02 Likelihood of installing this without the program assistance was <C4a SCORE>
03 Something else (SPECIFY)

C4bo [ASK IF C4b=3] Something else specified.

C5 [ASK IF C4b <> 1] How would your project have changed if <UTILITY> had not contributed to the cost of the <MEASCAT1, MEASCAT2>?
(SELECT ALL THAT APPLY) (DO NOT READ)

For C5C01 through C5C99
0 Not mentioned
1 Mentioned

C5C01 Would not have changed [SKIP TO C8A]
C5C02 Would have postponed the project
C5C03 Would have cancelled the project altogether
C5C04 Would have repaired existing equipment
C5C05 Kept using existing equipment
C5C06 Purchased less efficient equipment
C5C07 Purchased fewer quantity
C5C08 Installed DIFFERENT type of equipment than planned (SPECIFY)
C5C09 Other (SPECIFY)
C5C88 Don't know
C5C99 Refused

C5C09o [ASK IF C5C09=1] Other change specified.

C5_mon [ASK IF C5=2] How many months would you have postponed the project?

__ [RECORD NUMBER OF MONTHS]
88 Don't know
99 Refused

C6 [ASK IF C5=PURCHASED FEWER QUANTITY; ASK IF C5=7) Compared to the amount of <MEASCAT1, MEASCAT2> that you implemented through the <UTILITY> program, what percent do you think your business would have purchased on its own at that same time? (PROBE: Would you have purchased about one-fourth (25%), one-half (50%), three-fourths (75%) of what you installed through the <UTILITY> program?)

____ (ENTER PERCENTAGE: 1-99%)
88 Don't know
99 Refused

C7 [ASK IF C5=PURCHASED LESS EFFICIENT EQUIPMENT; ASK IF C5=6) Thinking about the equipment you would have implemented on your own, what percent of this equipment would have been in each of the following categories, which should sum to 100%. Category 1: the same high efficiency as what was installed through the program, Category 2: lower efficiency than what was purchased but higher than standard efficiency or code, Category 3: standard efficiency or code. What percent would've been ... ?

(PROBE: Would about one-fourth (25%), one-half (50%), three-fourths (75%) been of equal efficiency?)

FOR C7a through C7c
___ (ENTER PERCENTAGE: 0-100%)
88 Don't know

C7a of the same high efficiency as what was installed through the <UTILITY> program?

C7b lower efficiency than what was purchased but higher than standard efficiency or code?

C7c standard efficiency or code?

(CHECK THAT THE THREE % SUM TO 100%; PROBE TO CLARIFY).

C7bco [IF (C7b > 0 AND <>88) OR (C7c > 0 AND <>88)] What specific efficiency level were you considering before you spoke with a contractor or program representative?

[RECORD RESPONSE VERBATIM]

0% Free Ridership Consistency Check

C8A (IF SMALL BUSINESS (IF SMALL=1] & IF AT LEAST SOMEWHAT LIKELY TO HAVE INSTALLED THE MEASURE WITHOUT THE PROGRAM BUT LATER STATES WOULD HAVE WAITED AT LEAST TWO YEARS;
ASK IF SMALL=1 AND (FR1 = 4, 5, 6, 7, 8, 9, 10) AND (FR6b > 24 MONTHS OR NEVER AND NOT 88) AND FR5<>1)

Earlier in the interview, you said there was a (FR1 SCORE) in 10 likelihood that you would have implemented the same quantity and efficiency of <MEASCAT1, MEASCAT2>equipment at that same time in the absence of the <UTILITY> program assistance. But you also said you would not have implemented the <MEASCAT1, MEASCAT2> project within 2 years of when you did. Which of these is more accurate?

01 The likelihood of installing this without the <UTILITY> program assistance was (FR1 SCORE)
02 Would not have installed anything within 2 years
03 Something else (SPECIFY)
88 Don't know
99 Refused

C8ao [ASK IF C8a=3] Something else specified.

C8B (IF SMALL<>1 & IF AT LEAST SOMEWHAT LIKELY TO HAVE INSTALLED THE MEASURE WITHOUT THE PROGRAM BUT LATER STATES WOULD HAVE WAITED AT LEAST FOUR YEARS;
ASK IF (SMALL<>1 AND FR1 = 4, 5, 6, 7, 8, 9, 10 AND FR6b > 48 MONTHS OR NEVER AND NOT 88) and FR5<>1)

Earlier in the interview, you said there was a (FR1 SCORE) in 10 likelihood that you would have implemented the same quantity and efficiency of <MEASCAT1, MEASCAT2>equipment at that same time in the absence of the <UTILITY> program assistance. But you also said you would not have implemented the <MEASCAT1, MEASCAT2> project within 4 years of when you did. Which of these is more accurate?

01 The likelihood of installing this without the <UTILITY> program assistance was (FR1 SCORE)
02 Would not have installed anything within 4 years
03 Something else (SPECIFY)
88 Don't know
99 Refused

C8bo [ASK IF C8b=3] Something else specified.

Additional Consistency Check

C9a (READ IF 100% FREE-RIDER; IF FR5=1 AND FR7a=1 AND (FR8a=100% or FR8d = 1) AND C4b = 1 AND (C2 = 7,8,9,10 OR C3 = 7,8,9,10)) Previously you stated that you would have installed the exact same equipment at the same time without the <UTILITY> program. But, you also stated that the …

(IF C2 > 6 FILL: program-sponsored assessment)
(IF C3 > 6 FILL: program incentive and financing options)
(IF C2 > 6 & C3 > 6 FILL: program-sponsored assessment, incentive, and financing options)

… was/were influential in your decision.

01 Continue [SKIP TO C9c]

C9b (READ IF 0% FREE-RIDER: IF FR6a = 04 NEVER OR -8 DK AND (C2 = 0,1,2,3,4 OR C3 < 0,1,2,3,4) Previously you stated that you would not have installed any equipment without the <UTILITY> program. You also stated that the …

(IF C2 < 5 FILL: program-sponsored assessment)
(IF C3 < 5 FILL: program incentive and financing options)
(IF C2 < 5 & C3 < 5 FILL: program-sponsored assessment, incentive, and financing options)

… was/were not influential in your decision.

01 Continue

C9co [ASK ALL] I'd like to better understand your purchase decision. In your own words, please describe what impact, if any, all the assistance you received through the <UTILITY> program had on your decision to install the amount of high efficiency <MEASCAT1, MEASCAT2> equipment at the time you did?

[RECORD RESPONSE VERBATIM]
88 Don't know
99 Refused

Free-Ridership if not aware of Lighting Incentive (not aware of UL1 <> 1)

C_FR2_SKIP00 [ASK SECTION IF MEASCAT1, MEASCAT2 = 01,20,21,22,23 UPSTREAM LIGHTING AND UL1=2,88,99 ELSE SKIP TO S1a]

FR41

According to our information, the distributor or retailer you bought the <MEASCAT1, MEASCAT2> lamps from received a discount [IF INC1,INC2>0 SHOW "of <INC1, INC2>"] from <UTILITY> which was passed on to you. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your business would have implemented the same [IF QUANTITY IS GREATER THAN (IF QTYFLAG1, QTYFLAG2 = 1): quantity] [IF EFFICIENCY IS APPLICABLE (IF EFF1): and efficiency of] <MEASCAT1, MEASCAT2> at that same time if they had cost [IF INC1,INC2>0 SHOW <INC1, INC2>] more?

___	(0 TO 10)
88	Don't know
99	Refused

FR45 If the <MEASCAT1, MEASCAT2> lamps had cost [IF INC1,INC2>0 SHOW <INC1, INC2>] more, would your business have installed **any** lighting at all?

[IF NEEDED: "And by any lighting, I mean <MEASCAT1, MEASCAT2> or any other kind of lamps."]

01	Yes	
02	No	[SKIP TO C43]
88	Don't know	[SKIP TO FR47a]
99	Refused	[SKIP TO FR47a]

FR46a Would you have installed the lighting earlier than you did, at a later date, or never?

01	Earlier	
02	Same time	[SKIP TO FR47a]
03	Later	
04	Never	[SKIP TO C43]
88	Don't know	[SKIP TO FR47a]
99	Refused	[SKIP TO FR47a]

FR46b How much [earlier/later] would you have installed the lighting?

FR46b_yr	___	YEARS
FR46b_mo	___	MONTHS
	88	Don't know

FR47a If the <MEASCAT1, MEASCAT2> lamps would have cost [IF INC1,INC2>0 SHOW <INC1, INC2>] more, would your business have installed less, more or the exact same quantity of <MEASCAT1, MEASCAT2>?

01	Less	
02	More	
03	Exact same amount	[SKIP TO FR48]
88	Don't know	[SKIP TO FR48]
99	Refused	[SKIP TO FR48]

FR47b [ASK IF FR47a= 1] Compared to the number of <MEASCAT1, MEASCAT2> lamps that you installed, what percent less do you think your business would have installed if they had cost [IF INC1,INC2>0 SHOW <INC1, INC2>] more?

(PROBE: Would you have purchased about one- fourth (25%), one-half (50%), three fourths (75%) of what you installed through the <UTILITY> program?)

____	(ENTER PERCENTAGE: 1-99%)	
88	Don't know	[SKIP TO C43]
99	Refused	[SKIP TO C43]

FR47c [ASK IF FR47a = 2] Compared to the number of <MEASCAT1, MEASCAT2> lamps that you installed, what percent **more** do you think your business would have installed if they had cost [IF INC1,INC2>0 SHOW <INC1, INC2>] more?

(PROBE: Would you have purchased about one- fourth (25%), one-half (50%), three fourths (75%) of what you installed through the <UTILITY> program?)

____	(ENTER PERCENTAGE: 1-99%)	
88	Don't know	[SKIP TO C43]
99	Refused	[SKIP TO C43]

FR48 You said your business would have installed [IF FR47A=3: all; IF FR47A= 1: FILL WITH FR47b % or FR47A=2: FILL WITH FR47c%; IF (FR7A=88,99 OR FR47a=88,99 OR FR47b=88,99), FILL WITH "some"] of the equipment on your own if the <UTILITY> program had not been available.

Thinking about the <MEASCAT1, MEASCAT2> equipment you would have installed on your own, what percent of this equipment would have been in each of the following categories, which should sum to 100%.
Category 1: the same high efficiency as what was rebated through the program, Category 2: lower efficiency than what was purchased but higher than standard efficiency or code, Category 3: standard efficiency or code.
What percent would've been... ?

[PROBE: Would about one-fourth (25%), one-half (50%), three fourths (75%) been of equal efficiency?]

FOR FR48a to FR48c:

____ (ENTER PERCENTAGE: 0-100%)
88 Don't know

FR48a of the same high efficiency as what was installed through the <UTILITY> program

FR48b lower efficiency than what was purchased but higher than standard efficiency or code

F**R48c** standard efficiency or code

(CHECK THAT THE THREE % SUM TO 100%; PROBE TO CLARIFY)

FR48bco [ASK IF FR48b > 0 and <>88 or FR48c > 0 and <>88] What specific efficiency level(s) were you considering before you spoke with a contractor or program representative?

[RECORD RESPONSE VERBATIM]

C43 On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the discounted price have on your decision to install <MEASCAT1, MEASCAT2> lamps?

_____ (ENTER INFLUENCE RANKING)
88 Don't know
99 Refused

Consistency Check Prompts

100% Free Ridership Consistency Check
[IF WOULD HAVE PURCHASED AT THE SAME TIME, IN THE SAME QUANTITY, AND OF THE SAME EFFICIENCY LEVEL;
ASK IF FR41=1 AND FR47a=1 AND (FR48a=100%), ASK C44a- C45_1mon, ELSE SKIP TO C49a]

C44a Now I want to focus on what it would have cost your business to install this equipment if it had been more expensive. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your business would have paid the additional [IF INC1, INC2 > 0: "<INC1,INC2>", ELSE "cost of the equipment"] on top of the amount you already paid, to purchase the same quantity and efficiency of <MEASCAT1, MEASCAT2> lamps at that same time?

___ (0 TO 10) [IF 8,9,10 ,88,-9SKIP TO C49a]
88 Don't know
99 Refused

C44b [ASK IF C44a =0,1,2,3,4,5,6,7] You said that you would have installed the same quantity and efficiency of equipment at that same time, but you also just said that there was a (FILL WITH C44a SCORE) in 10 likelihood of you would have paid more for the lighting equipment. Which of these is more accurate?

01 Installed same quantity & efficiency at same time [SKIP TO C49a]
02 Likelihood of installing this without the program assistance was (C44a SCORE)
03 Something else (SPECIFY)

C44bo [ASK IF C44b=3] Something else specified.

C45 [ASK IF C44B <> 1] How would your project have changed if <UTILITY> had not contributed to the cost of the <MEASCAT1, MEASCAT2>?
(SELECT ALL THAT APPLY) (DO NOT READ)

For C45C01 through C45C99
0 Not mentioned
1 Mentioned

C45C01 Would not have changed
C45C02 Would have postponed the project
C45C03 Would have cancelled the project altogether
C45C04 Would have repaired existing equipment
C45C05 Kept using existing equipment
C45C06 Purchased less efficient equipment
C45C07 Purchased fewer quantity
C45C08 Installed DIFFERENT type of equipment than planned [SPECIFY]
C45C09 Other [SPECIFY]
C45C88 Don't know
C45C99 Refused

C45c08 [ASK IF C45c08=1] Other changes

C45_mon [ASK IF C45=2] How many months would you have postponed the project?

__ [RECORD NUMBER OF MONTHS]
88 Don't know
99 Refused

Additional Consistency Check

C49a (READ IF 100% FREE-RIDER; IF FR45=1 AND FR47a=1 AND (FR48a=100%) AND C44b = 1 AND (C2 = 7,8,9,10 OR C43 = 7,8,9,10)) Previously you stated that you would have installed the exact same equipment at the same time without the <UTILITY> program. But, you also stated that the …

(IF C2 > 6 FILL: program-sponsored assessment)
(IF C43 > 6 FILL: program incentive and financing options)
(IF C2 > 6 & C43 > 6 FILL: program-sponsored assessment, incentive, and financing options)

… was/were influential in your decision.)

01 [CONTINUE] [SKIP TO C49c]

C49b (READ IF 0% FREE-RIDER: IF (FR46a = 3 OR 88) AND (C2 = 0,1,2,3,4 OR C43 = 0,1,2,3) Previously you stated that you would not have installed any equipment without the <UTILITY> program. You also stated that the …

(IF C2 < 5 FILL: program-sponsored assessment)
(IF C3 < 5 FILL: program incentive and financing options)
(IF C2 < 5 & C3 < 5 FILL: program-sponsored assessment, incentive, and financing options)

… was not influential in your decision.)

01 [CONTINUE]

C49c (ASK ALL) I'd like to better understand your purchase decision. In your own words, please describe what impact, if any, all the assistance you received through the <UTILITY> program had on your decision to install the amount of high efficiency <MEASCAT1, MEASCAT2> equipment at the time you did?

(RECORD VERBATIM RESPONSE)
88 Don't know
99 Refused

Like Spillover

S1a Now I'd like you to think of the time since you participated in the program on <DATE>.

Has your company implemented any <MEASCAT1, MEASCAT2> projects for this or other facilities in <PREMISE_ST> **on your own,** that is without a rebate from <UTILITY>?

01	Yes	
02	No	[SKIP TO SECTION]
88	Don't know	[SKIP TO SECTION]

S1b [IF EFFICIENCY IS NOT APPLICABLE; IF EFF1, EFF2 = 0, SKIP TO S2a]
Was this equipment of **the same efficiency level or a higher level of efficiency** as the equipment you installed through the program?

01	Yes	[SKIP TO S2a]
02	No	
88	Don't know	

S1c Was this equipment more energy efficient than standard efficiency or code equipment?

01	Yes	
02	No	[SKIP TO SECTION]
88	Don't know	[SKIP TO SECTION]

S2a Thinking of the <MEASCAT1, MEASCAT2> equipment that you installed on your own, was this more, less or the same amount of <MEASCAT1, MEASCAT2> equipment as what you installed through the program?

01 More
02 Less
03 Same
88 Don't know

S2aM [ASK IF S2a = 1] Compared to the amount of <MEASCAT1, MEASCAT2> equipment that you installed through the program at <PREMISE_ADDR> in <PREMISE_CITY>, how much <MEASCAT1, MEASCAT2> equipment did you install on your own?

We're looking for a percent compared to the amount installed through the program. For example, if it was about twice as much as what you installed through the program you would say 200%. (Enter whole number)

____ Enter percentage: 101-999%
88 Don't know

S2aL [ASK IF S2a = 2] Compared to the amount of <MEASCAT1, MEASCAT2> equipment that you installed through the program at <PREMISE_ADDR> in <PREMISE_CITY>, how much <MEASCAT1, MEASCAT2> equipment did you install on your own?
We're looking for a percent compared to the amount installed through the program. For example, if it was about half as much as what you installed through the program you would say 50%. (Enter whole number)

____ Enter percentage: 1-99%
88 Don't know

S2b [ASK IF S2a=1,2 AND S2aM<>88 and S2aL<>88] So the additional high efficiency equipment you bought on your own was <percentage from S2aM or S2aL> more/less than as much as you got through the program?

01 Yes
02 No [correct S2a]

S3a Did a recommendation by the contractor, engineer, or designer who you worked with under the program influence your decision to implement some or all of this [IF EFFICIENCY IS APPLICABLE; (IF EFF1, EFF2 = 1): efficient] <MEASCAT1, MEASCAT2> equipment on your own?

01 Yes
02 No
88 Don't know
99 Refused

S3b Did your experience with the high efficiency project implemented through the program influence your decision to implement some or all of this [IF EFFICIENCY IS APPLICABLE; (IF EFF1, EFF2 = 1): efficient] <MEASCAT1, MEASCAT2> equipment on your own?

01 Yes
02 No
88 Don't know
99 Refused

S3c Did your participation in any past program offered by <UTILITY> influence your decision to implement some or all of this [IF EFFICIENCY IS APPLICABLE; (IF EFF1, EFF2 = 1): efficient] <MEASCAT1, MEASCAT2> equipment on your own?

01 Yes
02 No
88 Don't know
99 Refused

S3d On a scale of 0 to 10, where 0 is no influence at all and 10 is a great deal of influence, how much influence did your participation in the <UTILITY> program have on your decision to install this equipment without an incentive?

__ 0-10 rating
88 Don't know

S4a Why didn't you implement this <MEASCAT1, MEASCAT2> project through a <UTILITY> program?
[DO NOT READ—SELECT ALL THAT APPLY]

For S4aC01 through S4aC99
0 Not mentioned
1 Mentioned

S4aC01 Too much paperwork
S4aC02 Cost savings not worth the effort of applying
S4aC03 Takes too long for approval
S4aC04 The equipment would not qualify
S4aC05 Vendor does not participate in program
S4aC06 Outside <UTILITY>'s service territory
S4aC07 No time—needed equipment immediately
S4aC08 Thought the program ended
S4aC09 Didn't know the equipment qualified under another program
S4aC10 Just didn't think of it
S4aC11 Unable to get rebate--unsure why
S4aC12 Other (SPECIFY)
S4aC88 Don't know
S4aC99 Refused

S4aC12o [ASK IF S4aC12=1] Other reason specified.

S4bo [ASK IF S4a = THE EQUIPMENT WOULD NOT QUALIFY; ASK IF S4a = 4) Why wouldn't the equipment qualify?

[RECORD RESPONSE VERBATIM]

Impact of Previous Program Participation

C_PP_SKIP0 [ASK SECTION IF NEVER WOULD HAVE INSTALLED OR ALL EQUIPMENT WOULD HAVE BEEN OF STANDARD EFFICIENCY AND UNLIKELY TO HAVE PURCHASED WITHOUT PROGRAM;
[SKIP SECTION IF
(FR1<>missed AND (FR6A=4 OR FR8A=0 OR FR8D=2,3,88,99) AND FR1=0,1,2,3) OR
(FR41<>missed AND (FR46A=4 OR FR48A=0) AND FR41=0,1,2,3))]

PP1 Had your business previously participated in a <UTILITY> program before you implemented the high efficiency project around <DATE>?

01	Yes	
02	No	[SKIP TO NEXT SECTION]
88	Don't know	[SKIP TO NEXT SECTION]
99	Refused	[SKIP TO NEXT SECTION]

PP2 On a scale of 0 to 10, with 0 being not at all important and 10 being very important, how important was your previous experience with a <UTILITY> program when making the decision to implement the <MEASCAT1, MEASCAT2> project at this facility around <DATE>?

__	[RECORD RATING 0—10]
88	Don't know

PP3 I'm going to read you several statements. For each statement, please tell me whether you agree or disagree that this statement applies to your business. There are no right or wrong answers; we just want your honest opinion.
(REPEAT IF NECESSARY)
Our previous experience implementing high efficiency projects through a <UTILITY> program ...

For PP3a to PP3d
01 Agree
02 Disagree
88 Don't know
99 Refused

PP3a Has made our firm more likely to consider high efficiency equipment
PP3b Has made our firm more likely to install high efficiency equipment
PP3c Has given us more confidence in the financial benefits of high efficiency equipment
PP3d Has given us more confidence in the nonfinancial benefits of high efficiency equipment

END OF MEASURE LOOP

Unlike Spillover

C_MULT_SKIP2 [SKIP SECTION IF MULTCHK=2]

S5 Since participating in the program, has your company purchased, installed, or implemented any **other** type of energy efficiency equipment **on your own,** that is without a rebate from <UTILITY>?

01 Yes
02 No [SKIP TO FIRM1]
88 Don't know [SKIP TO FIRM1]

S6ao What type of equipment did you install?

[Record type]

S6bo What quantity of equipment did you install?

[Record quantity]

S6co What was the size or capacity of the equipment you installed?

[Record size or quantity]

S7a Would this project have qualified for an incentive through the program from <UTILITY>?

01	Yes	
02	Yes, implemented through a program	[SKIP TO FIRM1]
03	No	[SKIP TO FIRM1]
88	Don't know	[SKIP TO FIRM1]

S7b Did a recommendation by the contractor, engineer, or designer who you worked with under the program influence your decision to implement some of this equipment on your own?

01	Yes
02	No
88	Don't know
99	Refused

S7c Did your experience with the high efficiency project implemented through the program influence your decision to implement some of this equipment on your own?

01	Yes
02	No
88	Don't know
99	Refused

S7d Did your participation in any past program offered by <UTILITY> influence your decision to implement some or all of this equipment on your own?

01	Yes
02	No
88	Don't know
99	Refused

S7e On a scale of 0 to 10, where 0 is no influence at all and 10 is a great deal of influence, how much influence did your participation in the <UTILITY> program have on your decision to install this equipment without an incentive?

__	0-10 rating
88	Don't know

C_MULT_SKIP3 [SKIP TO A4_1 IF MULTCHK=2]

FIRM1 What is the main business activity at <PREMISE_ADDR> in <PREMISE_CITY>?

01 Office/Professional
02 Warehouse or distribution center
03 Food sales
04 Food service
05 Retail (other than mall)
06 Mercantile (enclosed or strip malls)
07 Education
08 Religious worship
09 Public assembly
10 Health care
11 Lodging
12 Public order and safety
13 Industrial/manufacturing [SPECIFY]
14 Agricultural [SPECIFY]
15 Vacant (majority of floor space is unused)
16 Other [SPECIFY]
88 Don't know

FIRM1C13o [ASK IF FIRM1=13] Industrial/manufacturing specified.

FIRM1C14o [ASK IF FIRM1=14] Agricultural specified.

FIRM1C16o [ASK IF FIRM1=16] Other business activity specified.

FIRM2 Are your company's budget decisions made locally, regionally, nationally, worldwide, or something else?

01 Locally
02 Regionally
03 Nationally
04 Worldwide
05 Other (SPECIFY)
88 Don't know

FIRM2o [ASK IF FIRM2=5] Other budget decisions specified.

COM Do you have any comments or suggestions for the program?

1 Yes (RECORD RESPONSE VERBATIM)
2 No

COMo [ASK IF COM=1] Respondent's comments specified.

QRNAMEo

For verification purposes, would you spell your first and last name for me?

(RECORD RESPONSE VERBATIM)

CLARIFY

If we would need to clarify some of the information I asked you, would it be alright if we called you back?

01 Yes
02 No

A4_1 [ASK IF FR4 =4,5,6,7,8,9 AND C1 =7,8,9,10]
We would like to talk to the person who was most influential in recommending or specifying the efficient <MEASCAT1> equipment to install through the program. Earlier you mentioned that this was <FILL WITH FR4 RESPONSE>. Could you give me the contact information for this person?

01 Yes (Record contact information)
02 No, no outside advisor involved
88 Don't know/Doesn't have
99 No, REFUSED to give this information

[ASK IF A4_1 = 1]
A4_COMPANY_1o
A4_NAME_1o
A4_PHONE_1o
A4_EMAIL_1o

A4_2 [ASK IF FR4 =4,5,6,7,8,9 AND C1 =7,8,9,10]
We would like to talk to the person who was most influential in recommending or specifying the efficient < MEASCAT2> equipment to install through the program. Earlier you mentioned that this was <FILL WITH FR4 RESPONSE>. Could you give me the contact information for this person?

01 Yes (Record contact information)
02 No, no outside advisor involved
03 SAME CONTACT INFO AS PREVIOUS MEASURE
88 Don't know/Doesn't have
99 No, REFUSED to give this information

[ASK IF A4_2 = 1]
A4_COMPANY_2o
A4_NAME_2o
A4_PHONE_2o
A4_EMAIL_2o

INT99
[SKIP IF MULTCHK=02] Those are all the questions I have for you. I'd like to thank you for your time with this important evaluation.

INT98
[ASK IF MULTCHK=01] [INTERVIEWER, If R has more surveys to complete read: "Now I'd like to ask you a smaller selection of questions about another location we have on record for your firm."
OTHERWISE READ: Those are all the questions I have for you. I'd like to thank you for your time with this important evaluation.

C.2 INFLUENTIAL VENDOR FREE-RIDERSHIP AND VENDOR NONPARTICIPANT SURVEY

VCASEID Vendor case identification number

VEND_CONTACT Vendor Name

VEND_ADDR Vendor Address

VEND_COMPANY Vendor company name

VEND_EMAIL Vendor email

MULTFLAG case is part of a multiple
- 0 Not a multiple
- 1 Multiple

PRIMARYCASE Primary case for multiples, also flagged for all single records
- 0 Not a primary case
- 1 Primary case

INF_VEND1 Flag if vendor was identified as an influential vendor for first measure (from the customer survey)
- 0 not an influential vendor
- 1 influential vendor

INF_VEND2 Flag if vendor was identified as an influential vendor for second measure (from the customer survey)
- 0 not an influential vendor
- 1 influential vendor

CUST_CASEID Customer case identification number

UTILITY 1 National Grid

PROGRAM Utility/sponsor programs the vendor has been involved with
- Bright Opportunities
- Design 2000
- Energy Initiative
- Large Commercial New Construction—Custom
- Large Commercial New Construction—Prescriptive
- Large Commercial Retrofit—Custom
- Large Commercial Retrofit—Prescriptive

CUST_NAME Customer Contact First Name

CUST_COMPANY Customer/Facility Name

<PREMISE_ADDR>, <PREMISE_CITY>, <PREMISE_ST>, <PREMISE_ZIP>
Service address where equipment was installed

STUDY Flag if customer received a technical assessment

0 did not receive technical assessment
1 received technical assessment
2 Unknown if customer received a technical assessment

INC1, INC2 Utility/sponsor incentive for Measure categories

TOTMEAS Total number of measures customer said influential for

MEASCAT1, MEASCAT2 Customer-specific end-use category (i.e. lighting)

1 (Upstream) Lighting
2 Compressed Air
3 Controls
4 Custom
5 Food Service
6 HVAC
7 HVAC—Distribution
8 HVAC—Plant
9 HVAC Non-unitary
10 Insulation
11 Lighting
12 Non-lighting
13 Other
14 VSD
15 Water Heating
20 (Upstream) Lighting—fixture
21 (Upstream) Lighting—LED retrofit kits
22 (Upstream) Lighting—screw-ins
23 (Upstream) Lighting—TLEDs

QTYFLAG1, QTYFLAG2 Flag for quantity greater than 1

0 quantity is not applicable for this measure category (measure count 1 or quantity is not relevant as in delamping, recycling)
1 quantity greater than 1

EQUIP1, EQUIP2 Flag for if rebated equipment is operational

0 if installed measure is not equipment that is operational (e.g., insulation)
1 if installed measure is operational

EFF1, EFF2 Flag for if efficiency applies

0 efficiency is not applicable for this measure category (e.g., insulation, VFD, delamping, recycling, occupancy sensors)
1 efficiency is applicable

KWH1, KWH2 Gross kWh savings for first sampled NTG measure, second sampled NTG measure

THERM1, THERM2 Gross therms savings for first sampled NTG measure, second sampled NTG measure

ProgramType1, ProgramType2

ProgramCode1, ProgramCode2

ME1-ME15 Types of equipment specified/sold as part of spillover questions

0 Not sold
1 Sold

ME1 Upstream Lighting Equipment
ME2 Compressed Air Equipment
ME3 Energy Efficiency Controls
ME4 Custom Projects
ME5 Energy Efficient Food Service Equipment
ME6 Energy Efficient Heating or Cooling Equipment
ME7 Energy Efficient Heating or Cooling Equipment (Distribution)
ME8 Energy Efficient Heating or Cooling Equipment (Plant)
ME9 Energy Efficient Heating or Cooling Equipment (Non-unitary)
ME10 High Efficiency Rated Insulation
ME11 Energy Efficient Lighting
ME12 Energy Efficient Non-Lighting Equipment
ME13 Custom Projects (Other)
ME14 Variable Speed Drives
ME15 Water Heating Equipment

PROGx Program that ME# corresponds to
PROG1 National Grid program
PROG2 National Grid program
PROG3 Retrofit program
PROG4 National Grid program
PROG5 New Construction program
PROG6 New Construction program
PROG7 Retrofit program
PROG8 National Grid program
PROG9 National Grid program
PROG10 Retrofit program
PROG11 National Grid program
PROG12 National Grid program
PROG13 National Grid program
PROG14 National Grid program
PROG15 National Grid program

GAS1—GAS15 Gas savings associated with nonparticipant vendors

ELEC1—ELEC15 Electric savings associated with nonparticipant vendors

Introduction

INT01 Hello, my name is _____, and I am calling on behalf of **<UTILITY>**. We are talking with some of the design professionals and contractors who were involved with energy efficiency programs offered by **<UTILITY>** Rhode Island in 2016.

I'm not selling anything; I'd just like to ask you about the types of equipment that your firm recommended, sold, or installed through these programs in 2016.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

[IF NEEDED: May I speak with <VEND_CONTACT> or the person who specified or sold equipment through a National Grid program?]

FAQ Read if needed:
(Timing: This survey will take less than 15 minutes of your time. IF NOT A GOOD TIME, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070)

(Sales concern: I am not selling anything. Your responses will be kept confidential by our firm and **<UTILITY>**. If you would like to talk with someone from there, you can call [CONTACT NAME AND PHONE NUMBER FOR SPONSORS INCLUDED IN THIS CALL].

MULTCHK [ASK IF MULTFLAG=1]
[INTERVIEWER: Is the first case of a multiple?]

01 Yes, first case of a multiple
02 No, subsequent case of a multiple

Confirmation

[ASK OF ALL]

C_VNP_SKIP1 [IF Inf_Vend1 = 0, SKIP TO C_VNP_SKIP2]

VR_INTRO
I'd like to review the <**MEASCAT1>** [IF TOTMEAS=2 SHOW: "and **<MEASCAT2>**"] project(s) you recommended or specified through the program for **<UTILITY>** Rhode Island.

01 Continue

VR1_1 Do you recall recommending the <**MEASCAT1**> project for **<CUST_COMPANY>** at **<PREMISE_ADDR>** in **<PREMISE_CITY>** through the <**PROGRAM**> in 2016?

01	Yes, does recall	[SKIP TO V1a_1]
02	No, does not recall	
03	This equipment was never installed	[SKIP TO C_KNOWLEDG_1]
88	Don't know	
99	Refused	

OTHER_R_1 Is there someone else at your firm who would be more familiar with this project?

01	Yes	[RECORD CONTACT INFO FOR CALL NOTES]
02	No	[SKIP TO C_KNOWLEDG_1]
88	Don't know	[SKIP TO C_KNOWLEDG_1]
99	Refused	[INT91—REFUSAL]

AVAIL_R_1 May I please speak with that person?

01	Yes, currently available	[SKIP TO INT01]
02	Yes, but R is not currently available	[INT15—CALLBACK]
03	No	[INT91—REFUSAL]
88	Don’t know	[INT81—INELIGIBLE]
99	Refused	[INT91—REFUSAL]

V1a_1 Were you involved in the decision-making process at the design stage when the <**MEASCAT1**> project was specified and agreed upon for this facility?

01	Yes	[SKIP TO C_KNOWLEDG_1]
02	No	
88	Don't know	

V1b_1 At what point in the process did you become involved?

[RECORD RESPONSE VERBATIM]
88 Don’t know
99 Refused

V1c_1 What was your role?

[RECORD RESPONSE VERBATIM]
88 Don’t know
99 Refused

C_KNOWLEDG_1 [SET TO 0 IF VR1_1 = 3 OR OTHER_R_1 = 2, 88 OR V1a_1=2,88 OTHERWISE SET TO 1]

0 Respondent is not valid for Free-ridership section
1 Respondent is valid for Free-ridership section

C_VNP_SKIP2 [IF Inf_Vend2 = 0, SKIP TO NEXT SECTION]

VR1_2 [SKIP TO NEXT SECTION IF TOTMEAS<>2]
Do you recall recommending the <**MEASCAT2**> project for **<CUST_COMPANY>** at **<PREMISE_ADDR>** in **<PREMISE_CITY>** through the program in 2016?

01	Yes	[SKIP TO V1a_2]
02	No	
03	This equipment was never installed	[SKIP TO C_KNOWLEDG_2
88	Don't know	
99	Refused	

OTHER_R_2 Is there someone else at your firm who would be more familiar with this project?

01	Yes—Continue	[RECORD CONTACT INFO FOR CALL NOTES]]
02	No	[SKIP TO C_KNOWLEDG_2]
88	Don't know	[SKIP TO C_KNOWLEDG_2]
99	Refused	[INT91—REFUSAL]

AVAIL_R_2 May I please speak with that person?

01	Yes, currently available	[SKIP TO INT01]
02	Yes, but R is not currently available	[INT15—CALLBACK]
03	No	[INT91—REFUSAL]
88	Don’t know	[INT81—INELIGIBLE]
99	Refused	[INT91—REFUSAL]

V1a_2 Were you involved in the decision-making process at the design stage when the <**MEASCAT2**> project was specified and agreed upon for this facility?

01	Yes	[SKIP TO C_KNOWLEDGE_2]
02	No	
88	Don't know	

V1b_2 At what point in the process did you become involved?

[RECORD VERBATIM]
Don’t know
Refused

V1c_2 What was your role?

[RECORD VERBATIM]
Don’t know
Refused

C_KNOWLEDG_2 [SET TO 0 IF VR1_2 = 3 OR OTHER_R_2 = 2, 88 OR V1a_2=2,88 OTHERWISE SET TO 1]

0 Respondent is not valid for Freeridership section
1 Respondent is valid for Freeridership section

Free-Ridership—Influential Vendors

[START OF FREE-RIDERSHIP LOOP. ASK VP0a THROUGH VF9 FOR EACH MEASURE CATEGORY (MEASCAT) RECALLED (UP TO TWO MEASURES).]

C_FR_SKIP0 [SKIP TO NEXT MEASURE IF C_KNOWLEDG_1,2 =0]

MEASCHK/DECISIONCHK

VP0a [IF STUDY<>1 SKIP TO VR9] According to our records, **<UTILITY>** paid a portion of the cost to conduct a technical assessment for **<CUST_COMPANY>** to determine the cost-effectiveness of installing the <**MEASCAT1**, **MEASCAT2**> equipment.

If **<UTILITY>** had not paid a portion of the cost, do you think **<CUST_COMPANY>** would have paid that portion of the cost to have a similar [IF **STUDY**=1 SHOW "technical assessment"] done at the same time?

01 Yes
02 No
88 Don't know

VC2 [ASK IF VP0a = 2,88] On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the information provided by the technical assessment have on your decision to recommend the [IF **EFF1**, **EFF2** = 1: high efficiency] <**MEASCAT1**,**MEASCAT2**> project?

_____ (ENTER INFLUENCE RANKING)
88 Don't know
99 Refused

VR9 To the best of your knowledge, did **<CUST_COMPANY>** receive interest-free financing from **<UTILITY>** which allowed them to pay for their portion of the project cost over time?

01 Yes
02 No
88 Don't know

FR_INTRO3a [IF FIRST MEASURE]
Now I'd like to ask you some questions about your decision to recommend the <**MEASCAT1**> project. [IF THERE IS ALSO A SECOND MEASURE: Then, I'll repeat these questions for the <**MEASCAT2**> project.]

01 Continue

FR_INTRO3b [IF SECOND MEASURE]
Now I'd like to review the <**MEASCAT2**> project you recommended.

01 Continue

VA1 On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did your firm have on specifying the efficiency levels or features of the <**MEASCAT1, MEASCAT2**> project so that it would qualify for the program?

__ (0-10) [IF VA1 < 7 SKIP TO NEXT MEASURE/SECTION]
88 Don't know [SKIP TO NEXT MEASURE/SECTION]

FR_INTRO The next set of questions ask about **<CUST_COMPANY>**'s planning and installation decisions through the program in 2016.

01 Continue

VP1a As far as you know, did **<CUST_COMPANY>** have funds allocated to install any part of this project before you talked with them about the program?

01	Yes	
02	Yes, but don't remember specifics	[SKIP TO VF1]
03	No	[SKIP TO VF1]
88	Don't know	[SKIP TO VF1]
99	Refused	[SKIP TO VF1]

VP1b What plans existed?

[RECORD VERBATIM]
88 Don't know
99 Refused

VP2a Was it necessary to change the timing of the installation, the quantity of equipment installed or the efficiency level of the <**MEASCAT1**, **MEASCAT2**> project installed in order to qualify for the program?

01	Yes	
02	Yes, but don't remember specifics	[SKIP TO VF1]
03	No	[SKIP TO VF1]
88	Don't know	[SKIP TO VF1]
99	Refused	[SKIP TO VF1]

VP2b What changes were necessary? [SELECT ALL THAT APPLY]

01	Installation occurred SOONER than planned
02	Installation occurred LATER than planned
03	Installed MORE equipment than planned
04	Installed LESS equipment than planned
05	Equipment was MORE efficient than planned
06	Equipment was LESS efficient than planned
07	Other [SPECIFY]
88	Don't know
99	Refused

VF1

[IF INC > 0 SHOW "**<UTILITY>** paid about $<**INC1**, **INC2**> of the total cost of the <**MEASCAT1**, **MEASCAT2**> ELSE IF INC=0 SHOW "**<UTILITY>** offered a rebate to incentivize the project." **<CUST_COMPANY>** may have also received some technical assistance from **<UTILITY>** or a contribution toward the cost of a technical assessment study.

If **<UTILITY>** had not paid a portion of the implementation cost, would your company have recommended or specified any type of <**MEASCAT1**, **MEASCAT2**> equipment to **<CUST_COMPANY>** at the same time?

01	Yes	
02	No	[SKIP TO VC3]
88	Don't know	[SKIP TO VC3]

VF2a [IF QTYFLAG1, QTYFLAG2 = 0, SKIP TO VF3d]
Without the program incentive, technical assistance, or education, would your company have recommended or specified the exact same quantity of <**MEASCAT1**, **MEASCAT2**> for **<CUST_COMPANY>** at the same time?

01	Yes	[SKIP TO VF3]
02	No	
88	Don't know	

VF2b Compared to the amount that you recommended through the program, what percentage of the overall quantity of <**MEASCAT1**, **MEASCAT2**> project do you think your company would have recommended or specified without assistance from **<UTILITY>**?

(PROBE: Would you have recommended/specified about one-fourth (25%), one-half (50%), three fourths (75%) of what was installed through the program?)

____ ENTER PERCENTAGE (0-100%, 888=Don't know)
[IF 0 SKIP TO VC3]

VF3 [IF MEASCAT = 10 Insulation SKIP TO VRVL1]
[IF EFF1, EFF2 = 0, SKIP TO VC3]
You said you would have recommended or specified [IF VF2a=1: all the] [IF VF2a=2 OR 88 SHOW: at least some] <**MEASCAT1**, **MEASCAT2**> for **<CUST_COMPANY>** if the program had not been available.

What percent of the equipment that you would have recommended would have been in each of the following categories, which should sum to 100%?
Category 1: the same high efficiency as what was rebated through the program,
Category 2: lower efficiency than what was purchased but higher than standard efficiency or code,
Category 3: standard efficiency or code.

What percent would've been... ?

(PROBE: Would about one-fourth (25%), one-half (50%), three-fourths (75%) been of equal efficiency?)

For VF3a through VF3c
____ (ENTER PERCENTAGE: 0-100%)
888 Don't know

VF3a of the same high efficiency as what was installed through the program

VF3b lower efficiency than what was purchased but higher than standard efficiency or code

VF3c standard efficiency or code

(CHECK THAT THE THREE % SUM TO 100%; PROBE TO CLARIFY).

VF3bc [ASK IF VF3b > 0 AND <>888 or VF3c > 0 and <>888] What specific efficiency levels would you have recommended?

[RECORD VERBATIM]
88 Don't know
99 Refused

VF3d [IF QTYFLAG1, QTYFLAG2 = 1, SKIP TO VC3]
[IF EFF1, EFF2 = 0, SKIP TO VRVL1]
Thinking about the <**MEASCAT1**, **MEASCAT2**> equipment you would have recommended if the program had not been available, would it have been of the same high efficiency as what was installed through the program, lower efficiency than what was purchased but higher than standard efficiency, or standard efficiency or code?

01 Of the same high efficiency as what was installed through the program
02 Lower efficiency than what was purchased but higher than standard efficiency
03 Standard efficiency or code
88 Don't know
99 Refused

VF3d2 [ASK IF VF3d = 2 or 3] What specific efficiency levels would you have recommended?

[RECORD VERBATIM]
88 Don't know
99 Refused

VRVL1 [IF MEASCAT <> 10 Insulation SKIP TO VC3]
Thinking about the insulation project you would have recommended if the program had not been available, would you have recommended the same amount of insulation as what was installed through the program?

01 Yes [SKIP TO VC3]
02 No
88 Don't know
99 Refused

VRVL2 Compared to what you recommended through the program, how much insulation would you have recommended?
(PROBE: “Would about one-fourth (25%), one-half (50%), three-fourths (75%) been of equal efficiency?”)

__ [1-99%]
888 Don't know
999 Refused

VC3 On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the [IF INC=0 SHOW “rebate that” ELSE SHOW $<**INC1**,**INC2**>] **<CUST_COMPANY>** received from **<UTILITY>** have on your decision to recommend the [IF **EFF1**, **EFF2** = 1 SHOW "high efficiency"] <**MEASCAT1**,**MEASCAT2**> project?

_____ (ENTER INFLUENCE RANKING)
88 Don't know
99 Refused

VF4 [ASK VF4-VF7 IF VF1=1 AND VF2a=1 AND VF3a=100%, ELSE SKIP TO VF8]
Now I want to focus on what it would have cost **<CUST_COMPANY>** to install this equipment on its own without the program. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely would they have been to pay the additional [IF INC=0 SHOW "rebate total", ELSE $<**INC1**,**INC2**>] on top of the cost they already paid, to implement the same quantity and efficiency of <**MEASCAT1**, **MEASCAT2**> equipment at that same time?

___ (0 TO 10)
88 Don't know
99 Refused

VF5 [IF VF4 =8,9,10 SKIP TO VF8] How would their project have changed if the program had not contributed to the cost of the <**MEASCAT1**, **MEASCAT2**>?
(SELECT ALL THAT APPLY) (DO NOT READ)

01 Would not have changed [SKIP TO VF8]
02 Would have postponed the project
03 Would have cancelled the project altogether
04 Would have repaired existing equipment
05 Kept using existing equipment
06 Purchased less efficient equipment
07 Purchased fewer quantity
08 Installed DIFFERENT type of equipment than planned (SPECIFY)
09 Other (SPECIFY)
88 Don't know
99 Refused

VF5C02O [ASK IF VF5=2] How many months would you have postponed the project?

__ Specify months 0-75
88 Don't know
99 Refused

VF6 [ASK IF VF5=7] Compared to the amount of <**MEASCAT1**, **MEASCAT2**> that **<CUST_COMPANY>** implemented through the program, what percent do you think they would have purchased on their own at that same time?

(PROBE: Would you have purchased about one- fourth (25%), one-half (50%), three fourths (75%) of what you installed through the program?)

____ (ENTER PERCENTAGE: 0-99%)
0 [SKIP TO VF8]
888 Don't know
999 Refused

VF7 [ASK IF VF5=6] [IF QTYFLAG1, QTYFLAG2 = 0 SKIP TO VF8]
Thinking about the equipment **<CUST_COMPANY>** would have implemented on their own, what percent of this equipment would have been in each of the following categories, which should sum to 100%?
Category 1: the same high efficiency as what was installed through the program,
Category 2: lower efficiency than what was purchased but higher than standard efficiency or code,
Category 3: standard efficiency or code.

What percent would've been... ?

(PROBE: Would about one-fourth (25%), one-half (50%), three-fourths (75%) been of equal efficiency?)

(PROBE: Would about one-fourth (25%), one-half (50%), three fourths (75%) been of equal efficiency?)

For VF7a to VF7c

____ (ENTER PERCENTAGE: 0-100%)
888 Don't know

VF7a of the same high efficiency as what was installed through the program?

VF7b lower efficiency than what was purchased but higher than standard efficiency or code?

VF7c standard efficiency or code

(CHECK THAT THE THREE % SUM TO 100%; PROBE TO CLARIFY).

VF7bc [ASK IF VF7b > 0 AND <>888 OR VF7c > 0 AND <>888] What specific efficiency levels would they have likely installed?

[RECORD VERBATIM]
88 Don't know
99 Refused

VF8 On a scale of 0 to 10, with 0 being 'not at all important and 10 being 'very important', how important was your previous experience with a **<UTILITY>** program when making the decision to recommend or install the <**MEASCAT1**, **MEASCAT2**> project for this customer?

_____
77 NA—No previous program experience
88 Don't know
99 Refused

VF9 (IF VF1=1 AND VF2a=1 AND (VF3a=100% or VF3d = 1) AND VF5 = 1
AND VC3 > 6 SHOW: “Previously you stated that you would have recommended the exact same equipment at the same time without the program. But, you also stated that the program incentive was influential in your decision to make the recommendations that you did.")

(IF VF1 = 2 OR 88 AND VC3 = 4,3,2,1,0 SHOW: “Previously you stated that **<CUST_COMPANY>** would not have installed any equipment without the program. You also stated that the program incentive was not influential in their decision.")

I’d like to better understand **<CUST_COMPANY>**’s purchase decision. Please describe what impact, if any, the program had **<CUST_COMPANY>**’s decision to install the energy efficient <**MEASCAT1**, **MEASCAT2**> equipment at the time they did?

[RECORD VERBATIM]
88 Don’t know
99 Refused

[END FREE-RIDERSHIP LOOP]

[SKIP TO END IF MULTCHK=2]

VNP_INTRO These next series of questions ask about all the types of equipment that your firm recommended, sold, or installed through **<UTILITY>**'s commercial programs in 2016.

01 Continue

[START OF NONPARTICIPANT LOOP. ASK VNP1a THROUGH VNP8 FOR EACH MEASURE SOLD (ME1, ME2, ME3… UP TO 14 MEASURES).]

VNP1a Our records show that your firm specified, sold, and/or installed <**MEx**> to commercial and industrial customers in 2016 through the <**PROGx**>.

Is that correct?
[INTERVIEWER: PLEASE VERIFY EACH TYPE OF EQUIPMENT THAT SHOWS FOR THE VENDOR]

01	Yes	
02	No	[SKIP TO NEXT CATEGORY]
88	Don't know	[SKIP TO NEXT CATEGORY]
99	Refused	[SKIP TO NEXT CATEGORY]

VNP1b Prior to participating in the **<UTILITY>** program, in what percentage of your commercial projects did you install <**MEx**>?

___ [ENTER PERCENTAGE 0-100]
888 Don't know
999 Refused

VNP1c And during the past year, in what percentage of your commercial projects did you install <**MEx**>?

___ [ENTER PERCENTAGE 1-100]
88 Don't know
99 Refused

VNP2 Please think about all the program-eligible <**MEx**> you specified, sold, and/or installed for **<UTILITY>** customers in 2016.

Did you specify, sell and/or install any of this program-eligible <**MEx**> to customers of **<UTILITY>** without the customer participating in a **<UTILITY>** program?

01	Yes	
02	No	[SKIP TO NEXT CATEGORY]
88	Don't know	[SKIP TO NEXT CATEGORY]
99	Refused	[SKIP TO NEXT CATEGORY]

VNP3 Again, thinking about all the program-eligible <**MEx**> you specified, sold, and/or installed for **<UTILITY>** customers in 2016, what percent did not receive an incentive through a **<UTILITY>** program?

___	[ENTER PERCENTAGE 0-100]	
0		[SKIP TO NEXT CATEGORY]
888	Don't know	[SKIP TO NEXT CATEGORY]
999	Refused	[SKIP TO NEXT CATEGORY]

VNP4 In 2016, you mentioned that about <VNP3> of the <**MEx**> you specified and/or installed would have been eligible for an incentive through a **<UTILITY>** program, but did not receive an incentive.
What are the main reasons why your firm or the customer did not request a customer incentive for this energy saving equipment you specified/installed?
(DO NOT READ—SELECT ALL THAT APPLY; PROBE, WHAT ELSE?)

01	Not worth the paperwork for our firm to help the customer apply for the incentive
02	Customer did not want the hassle of applying for the incentive
03	Takes too long for approval
04	Reached the maximum amount I could install through the program
05	The equipment would not qualify
06	Vendor does not participate in program
07	Outside [retail company] service territory
08	No time—needed equipment immediately
09	Thought the program ended
10	Didn’t know the equipment qualified under another program
11	Just didn’t think of it
12	Unable to get rebate (unsure why)
13	Other (SPECIFY)
88	Don't know
99	Refused

VNP4a [ASK IF VNP4=5] Why did the equipment not qualify?

[RECORD VERBATIM]

VNP5 I'm going to read you 3 statements. For each statement, please tell me whether you agree or disagree that this statement applies to your company. There are no right or wrong answers; we just want your honest opinion.
Our past experience specifying or installing <**MEx**> through energy efficiency programs has convinced us that this equipment is cost effective or beneficial even without a program incentive.

00 Agree
01 Disagree

VNP6 We are better able to identify opportunities to improve energy efficiency by using high efficiency <**MEx**> because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with **<UTILITY>**.

00 Agree
01 Disagree

VNP7 We are more likely to discuss energy efficient options with all of our customers when developing project plans for <**MEx**> because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with **<UTILITY>**.

00 Agree
01 Disagree

VNP8 Please describe what impact, if any, the <**PROGx**> had on your decision to specify or install <**MEx**> outside of the program.

[PROBE IF NECESSARY: "Can you please elaborate on that?", "What do you mean by.", "Anything else?"]

[RECORD VERBATIM]

[END OF NONPARTICIPANT LOOP]

Closing

VRNAME Thank you for your participation. For verification purposes, would you spell your first and last name for me?

[RECORD VERBATIM]

COM

Do you have any comments or suggestions for the program?

1 Yes (RECORD RESPONSE VERBATIM)
2 No

INT99

Those are all the questions I have for you. I'd like to thank you for your time with this important evaluation.

C.3 UPSTREAM LIGHTING DISTRIBUTOR SURVEY

Distributor Name: <Final_Vendor_Name>
Distributor Phone: <Final_Vendor_Phone>

I1 Hi, my name is _____ and I am calling from Tetra Tech on behalf of National Grid regarding the Rhode Island Upstream Lighting initiative, also known as Bright Opportunities. Bright Opportunities provides buydowns to distributors for TLEDs and screw-in lamps, LED retrofit kits and fixtures.

According to our records, your company has been selling lighting products as part of Bright Opportunities initiative. **[If needed, name some recent projects that used the program discounts].** We would like to ask you some questions about your participation in this program. Who would be most familiar with your participation?

[If respondent is not familiar with the program, ask for someone who may be familiar and repeat I1.]

[IF NEEDED] The objective of this interview is to help us understand if or how the Bright Opportunities initiative impacts the types of lighting you sell.

[IF ASKED] We anticipate this interview will take about 15 minutes. Any information you provide will be treated as confidential.

[IF ASKED] Tetra Tech is an independent research firm hired to do this study. You can verify the legitimacy of this research by calling Mark Sevier of National Grid at 781-907-2182.

Caseid: <V_ID> **Distributor Name**: <Final_Vendor_Name>

Customer: <CustomerName>
<CustomerContact>
<SVC_Street> <SVC_City>, <SVC_State> <SVC_Zip>

[For Distributors who made sales to multiple customers, customers were randomly selected. Distributors who had more than 3 customers are only asked about 3 randomly selected customers]

PI0 According to our records you sold some lighting products that were discounted by the Bright Opportunities initiative to <CustomerName> in 2016. Do you recall this sale? **[If they do not recall sale, skip to the next customer. If they do not recall any sales, SKIP TO PI1]**

PI1 According to our records you sold the following lighting products to <CustomerName> in 2016. **[READ LIST]**

Customer-Specific Quantity Table

	TYPE	Quantity from Tracking Data A.	Revisions to quantities? B.
70	1x4 LED Troffer –Standard		
71	2x2 LED Troffer –Premium		
72	2x2 LED Troffer –Standard		
73	2x4 LED Troffer –Premium		
74	2x4 LED Troffer –Standard		
75	A-line, 40/60W		
76	A-line, 75/100W		
77	Decoratives		
78	G23 LED		
79	G24 LED		
80	LED Retrofit Kit, <25W		
81	LED Retrofit Kit, >25W		
82	MR16		
83	PAR20		
84	PAR30		
85	PAR38		
86	Stairwell Kit, 2ft w/sensor		
87	Stairwell Kit, 4ft w/sensor		
88	T5HO		
89	T8—25		
90	T8—28		
91	TLED, 2ft		
92	TLED, 4ft		
93	U-Bend T8—25		

PI2 Do these sales quantities sound about right to you?

1 Yes
2 No, **[make note of any difference in column B above]**

PI3 According to our records you sold the <A: TYPE> bulbs/lamps at a <B: PROMOTIONAL PRICE> which was <C: BUYDOWN AMOUNT> less than your normal retail price for a discount of <D: DISCOUNT> percent. If this discount had not been available, do you think you would have sold any of these types of bulbs/lamps to this customer?

PI4 **[IF RESPONSE TO PI3 <> "NO"]** If this discount of <DISCOUNT> percent had not been available, would your sales of these <TYPE> bulbs/lamps to <CustomerName> been the same, lower, or higher?

PI4A **[IF SAME OR HIGHER]** Why do you say this?

P14B **[IF LOWER]** By what percentage do you estimate your sales of these <TYPE> bulbs/lamps to <CustomerName> to be lower in absence of the discount?

[REPEAT PI3 AND PI4 FOR EACH LIGHTING TYPE LISTED IN THE TABLE BELOW]

Customer-Specific Discount Table

	TYPE	Retail Price per Bulb/Lamp ($) A.	Promo Price per Bulb/Lamp ($) B.	Buydown Amount ($) C.	Discount (%) D.	Sold Any? (Y/N/DK) PI3	Impact on sales? (Same/Higher/Lower) PI4	% Change in Sales in Absence of Discounts (%) PI4b
70	1x4 LED Troffer –Standard							
71	2x2 LED Troffer –Premium							
72	2x2 LED Troffer –Standard							
73	2x4 LED Troffer –Premium							
74	2x4 LED Troffer –Standard							
75	A-line, 40/60W							
76	A-line, 75/100W							
77	Decoratives							
78	G23 LED							
79	G24 LED							
80	LED Retrofit Kit, <25W							
81	LED Retrofit Kit, >25W							
82	MR16							
83	PAR20							
84	PAR30							
85	PAR38							
86	Stairwell Kit, 2ft w/sensor							
87	Stairwell Kit, 4ft w/sensor							
88	T5HO							
89	T8—25							
90	T8—28							
91	TLED, 2ft							
92	TLED, 4ft							
93	U-Bend T8—25							

APPENDIX D: RESPONSE RATE AND PROGRAM SAVINGS COVERAGE

D.1 DETAILED RESPONSE RATE

Table D-1. Response Rate by Program

	Large Commercial New Construction—Custom	Large Commercial New Construction—Prescriptive	Large Commercial Retrofit—Custom	Large Commercial Retrofit—Prescriptive	Small Business	Design 2000	Energy Initiative	Bright opportunities	Overall
Starting sample	**18**	**76**	**113**	**65**	**255**	**216**	**336**	**900**	**1,979**
Vendor/contractor	0	0	0	0	1	8	8	7	24
Adjusted sample	**18**	**76**	**113**	**65**	**254**	**208**	**328**	**893**	**1,955**
Does not recall participating	1	4	3	8	7	5	4	77	109
Refusal	2	4	2	4	20	18	12	50	112
Incompletes (partial surveys)	0	3	0	2	6	4	3	10	28
Language Barrier	0	0	0	1	0	0	0	1	2
Bad Number	1	7	3	5	7	2	5	29	59
Not completed	10	29	60	31	137	138	210	612	1,227
Completed	4	29	45	14	77	41	94	114	418
Response Rate									
Response Rate (Completed/Eligible Sample)	**22%**	**38%**	**40%**	**22%**	**30%**	**20%**	**29%**	**13%**	**21%**

D.2 DETAILED SAVINGS COVERAGE

Table D-2. Detailed Savings Coverage by Program

Program Type	Program	Measure Type	Population of Measures	Sample of Measures	Population Therm Savings	Surveyed Therm Savings	Population kWh Savings	Surveyed kWh Savings	Percent of kWh Savings Completed*	Percent of Therm Savings Completed*	Measures from Survey	Completed Measures from Survey	+/- 90% Confidence Interval at Measures Level**
Custom	Large Commercial New Construction—Custom	Controls	2	2	56,532	19,578				35%	1	1	NA
		HVAC—Distribution	1	1	10,009	0				0%	0	0	NA
		HVAC—Plant	9	9	60,725	8,796				14%	3	1	NA
		Insulation	1	1	568	568				100%	0	1	NA
		Other	5	5	200,480	6,598				3%	2	1	NA
		Total	**18**	**18**	**328,313**	**35,540**				**11%**	**6**	**4**	**NA**
	Large Commercial Retrofit—Custom	Controls	36	36	590,141	8,757				1%	13	4	NA
		HVAC—Distribution	19	19	377,494	13,630				4%	7	5	NA
		HVAC—Plant	4	4	9,773	6,256				64%	1	1	NA
		Insulation	49	49	191,828	77,225				40%	17	37	NA
		Other	20	20	437,908	79,793				18%	7	3	NA
		Water Heating	2	2	5,228	0				0%	1	0	NA
		Total	**130**	**130**	**1,612,372**	**185,661**				**12%**	**46**	**50**	**NA**
	Small Business	Controls	2	2	5,738	0				0%	1	0	NA
		Insulation	1	1	1,101	0				0%	0	0	NA
		Other	1	1	66	0				0%	0	0	NA
		Total	**4**	**4**	**6,905**	**0**				**0%**	1	**0**	**NA**
	Total		**152**	**152**	**1,947,590**	**221,201**				**11%**	**53**	**54**	**NA**

Program Type	Program	Measure Type	Population of Measures	Sample of Measures	Population Therm Savings	Surveyed Therm Savings	Population kWh Savings	Surveyed kWh Savings	Percent of kWh Savings Completed*	Percent of Therm Savings Completed*	Measures from Survey	Completed Measures from Survey	+/- 90% Confidence Interval at Measures Level**
Prescriptive	Large Commercial New Construction—Prescriptive	Food Service	13	13	10,522	1,224				12%	5	3	NA
		HVAC	59	59	114,220	41,026				36%	21	21	NA
		Other	1	1	50,000	0				0%	0	0	NA
		Water Heating	13	13	7,180	928				13%	5	4	NA
		Total	**86**	**86**	**181,922**	**43,178**				**24%**	**30**	**28**	**NA**
	Large Commercial Retrofit—Prescriptive	Controls	8	8	1,898	128				7%	3	2	NA
		Other	10	10	440,961	252,888				57%	4	6	NA
		Water Heating	48	48	10,977	972				9%	17	5	NA
		Total	**66**	**66**	**453,836**	**253,988**				**56%**	**23**	**13**	**NA**
	Small Business	Controls	13	13	1,673	742				44%	5	2	NA
		Water Heating	38	37	39,577	7,624				19%	13	6	NA
		Total	**51**	**50**	**41,250**	**8,366**				**20%**	**18**	**8**	**NA**
	Total		**203**	**202**	**677,007**	**305,532**				**45%**	**71**	**49**	**NA**
Total Gas			**355**	**354**	**2,624,597**	**526,733**				**20%**	**124**	**103**	**NA**
Custom	Design 2000	Custom	41	41			6,031,953	2,042,131	34%		14	10	NA
		Total	**41**	**41**			**6,031,953**	**2,042,131**	**34%**		**14**	**10**	**NA**
	Energy Initiative	Custom	101	101			31,994,110	8,925,044	28%		35	21	NA
		Total	**101**	**101**			**31,994,110**	**8,925,044**	**28%**		**35**	**21**	**NA**
	Total		**142**	**142**			**38,026,063**	**10,967,175**	**29%**		**50**	**31**	**NA**

Program Type	Program	Measure Type	Population of Measures	Sample of Measures	Population Therm Savings	Surveyed Therm Savings	Population kWh Savings	Surveyed kWh Savings	Percent of kWh Savings Completed*	Percent of Therm Savings Completed*	Measures from Survey	Completed Measures from Survey	+/- 90% Confidence Interval at Measures Level**
Prescriptive	Bright Opportunities	(Upstream) Lighting—fixture	316	97			2,079,316	155,027	7%		34	26	11%
		(Upstream) Lighting—LED retrofit kits	688	96			3,128,662	118,006	4%		34	22	12%
		(Upstream) Lighting—screw-ins	1,519	95			12,347,196	783,853	6%		33	47	8%
		(Upstream) Lighting—TLEDs	829	94			3,149,918	162,935	5%		33	32	10%
		Total	**3,352**	**382**			**20,705,092**	**1,219,821**	**6%**		**134**	**127**	**5%**
	Design 2000	Compressed Air	56	56			1,496,316	287,489	19%		20	10	NA
		Food Service	3	3			2,640	1,364	52%		1	1	NA
		HVAC	4	4			2,760	0	0%		1	0	NA
		HVAC Non-unitary	3	3			170,497	144,142	85%		1	2	NA
		Lighting	127	124			4,207,183	523,702	12%		43	19	NA
		Other	1	1			3,158,000	0	0%		0	0	NA
		VSD	6	6			329,833	0	0%		2	0	NA
		Total	**200**	**197**			**9,367,229**	**956,697**	**10%**		**69**	**32**	**NA**

Program Type	Program	Measure Type	Population of Measures	Sample of Measures	Population Therm Savings	Surveyed Therm Savings	Population kWh Savings	Surveyed kWh Savings	Percent of kWh Savings Completed*	Percent of Therm Savings Completed*	Measures from Survey	Completed Measures from Survey	+/- 90% Confidence Interval at Measures Level**
Prescriptive	Energy Initiative	HVAC	39	39			1,860,712	885,226	48%		14	7	NA
		Lighting	255	98			21,166,766	7,840,366	37%		34	62	7%
		Other	3	3			197,528	0	0%		1	0	NA
		VSD	34	34			2,834,194	459,961	16%		12	9	NA
		Total	**331**	**174**			**26,059,201**	**9,185,552**	**35%**		**61**	**78**	**NA**
	Small Business	Lighting	787	100			12,364,104	1,536,133	12%		35	58	7%
		Non-lighting	28	28			533,703	159,820	30%		10	10	NA
		Total	**815**	**128**			**12,897,807**	**1,695,953**	**13%**		**45**	**68**	**NA**
	Total		**4,698**	**881**			**69,029,330**	**13,058,023**	**19%**		**308**	**305**	**NA**
Total Electric			**4,840**	**1,023**			**107,055,393**	**24,025,198**	**22%**		**358**	**336**	**NA**

*Surveyed therm/kWh savings divided by the population therm/kWh saving
** When a census of the population is sampled, confidence intervals cannot be estimated.

APPENDIX E: DESIGN PROFESSIONAL AND VENDOR SPILLOVER CALCULATION

As an example, assume a vendor had 1,000 kwh savings in the program tracking system database attributable to lighting equipment. If that vendor said that 25 percent of all their energy efficiency lighting equipment were sold outside the program, the potential nonparticipant spillover savings would be (1,000 kwh * 0.25/(1–0.25) = 333 kwh). If this vendor was assigned a nonparticipant spillover rate of 100 percent for lighting equipment, the nonparticipant spillover kwh savings for that vendor was 333 kwh. If that same vendor was assigned a nonparticipant spillover rate of only 50 percent for lighting equipment, the nonparticipant spillover kwh savings for that vendor was 333 * 0.5 = 167 kwh. This type of calculation was made for each design professional and equipment vendor (by measure category) who had a nonparticipant spillover rate of more than 0 percent.

Table E-1. Nonparticipant HVAC Spillover Rate Calculation

% Sold Outside Program (A)	Savings from program tracking system database (B)	Assigned Spillover Rate (C)
25%	1,000	50%

Potential nonparticipant spillover savings = B * A/(1—A)

= 1,000 kwh *0.25/(1–0.25)

= 333 kwh

Nonparticipant spillover savings = potential savings * C

= 333 * 0.5

= 167 kwh

APPENDIX F: SCORING FLOWCHARTS

Figure F-1. 2012 Free-Ridership Scoring

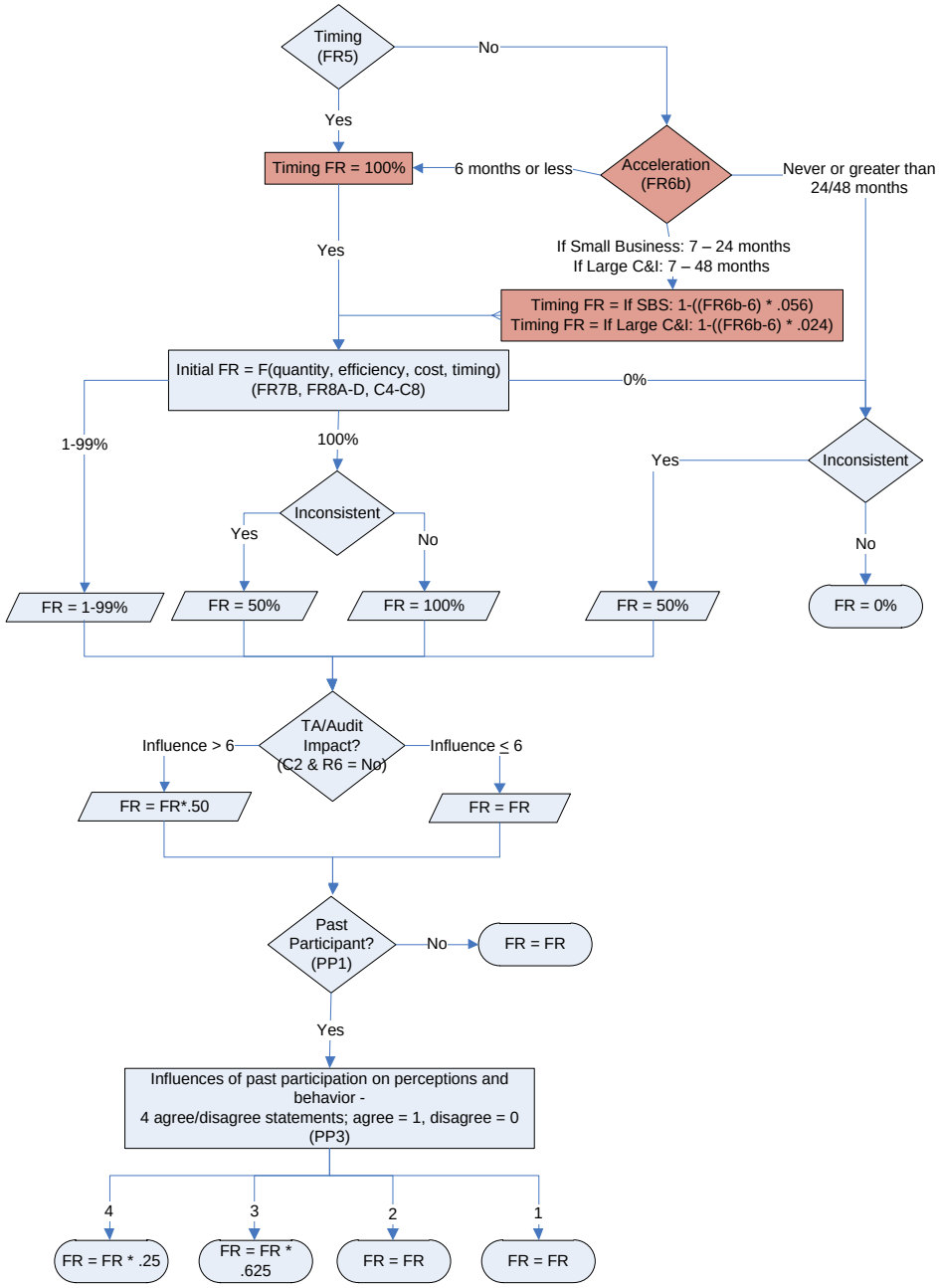

Figure F-2. 2010 Free-Ridership Consistency Checks

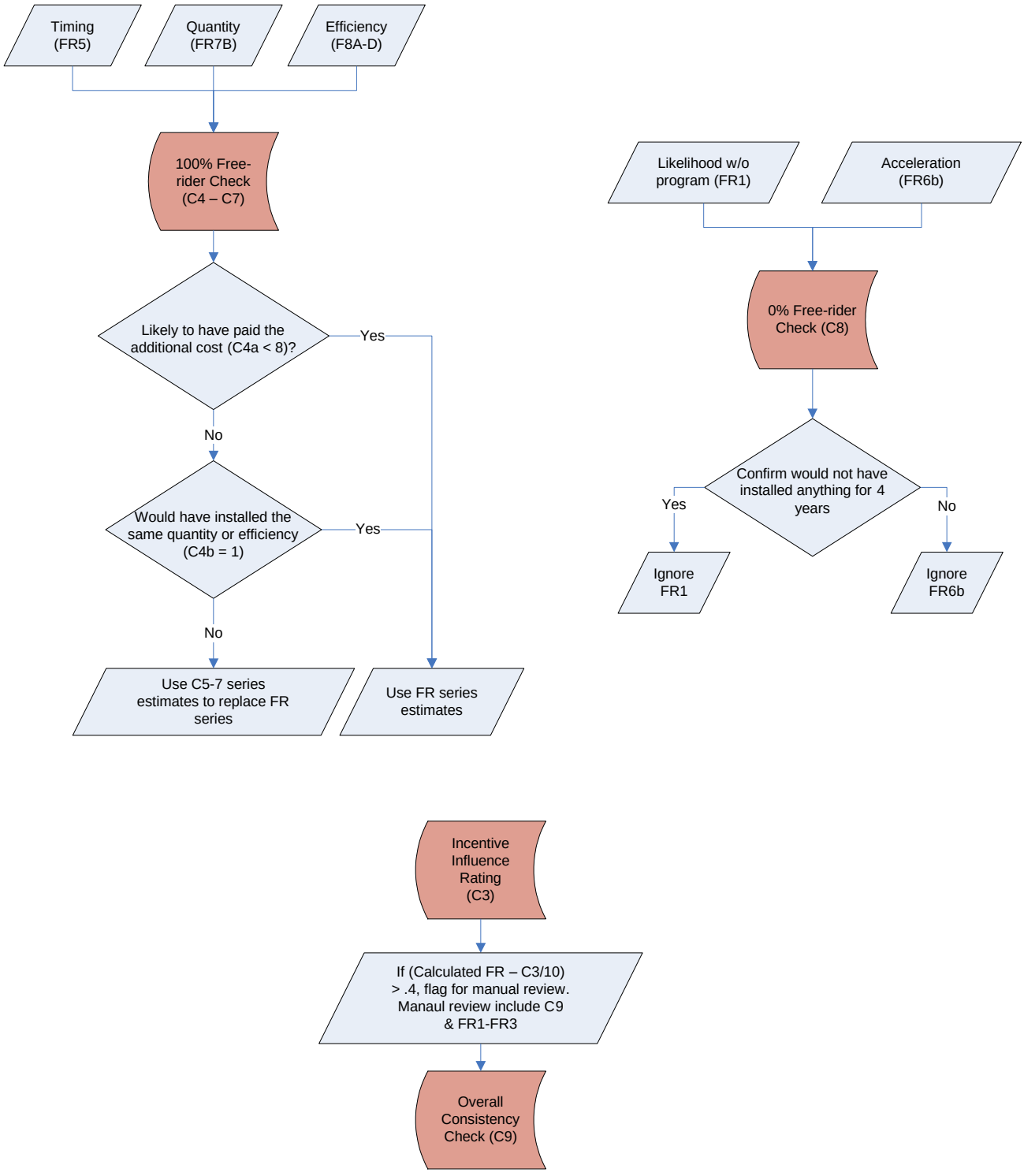

Figure F-3. Vendor Trigger for Free-Ridership Survey

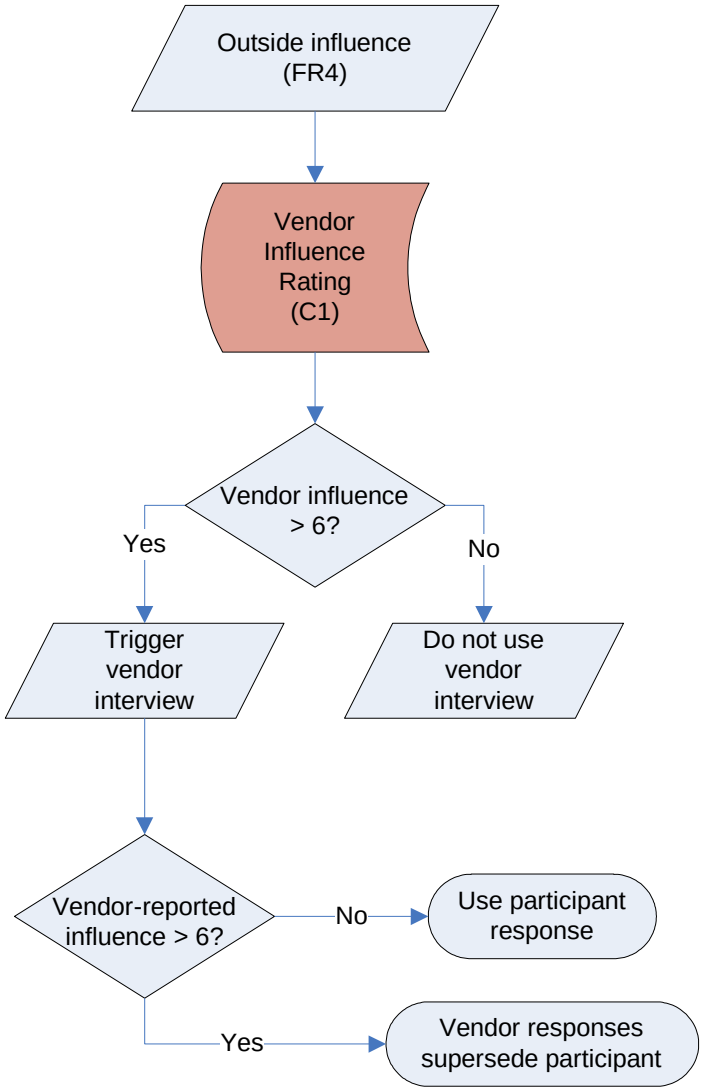

Figure F-4. Nonparticipant Spillover Scoring