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National Grid Rhode Island

2011 Commercial and Industrial Programs
Free-ridership and Spillover Study

Final Report

September 6, 2012





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1. EXECUTIVE SUMMARY

This Executive Summary summarizes the findings of the Free-ridership and Spillover Study conducted for National Grid Rhode Island for their 2011 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 completed through the Design 2000plus, Energy Initiative, and Small Business programs in 2011.

1.1 STUDY OBJECTIVE

The primary objective of the 2011 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, measure type, and statewide levels. Chapter 5 provides more detail on the results for each individual program at the measure type level. Early indicators of participant “unlike” spillover are included the full report.

1.2 STUDY METHODOLOGY

The methodology used for this study follows the 2009 Commercial and Industrial Programs Free-ridership and Spillover study conducted for National Grid¹. Additionally, this study follows the standardized methodology developed in 2010 and 2011 for the Massachusetts Program Administrators² for use in situations where end-users are able to report on program impacts via self-report methods.

To accomplish the above objective, telephone surveys were conducted with 2011 program participants in each of the C&I electric and natural gas programs and with design professionals and equipment vendors involved in these 2011 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 account⁴.

The majority of the telephone interviews were completed with program participants between May 12 and July 25, 2012. The duration of interviews with program participants averaged 13 minutes. All participating customers were mailed a letter on National Grid letterhead prior to the first telephone attempt. This letter

¹ “2009 Commercial and Industrial Programs Free-ridership and Spillover Study”, prepared for National Grid USA by Tetra Tech, June 21, 2010.

² “Cross-Cutting C&I Free-Ridership and Spillover Methodology Study Final Report”, prepared for the Massachusetts Program Administrators by Tetra Tech, KEMA, and NMR, May 20, 2011.

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.



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 12 call attempts was made to reach sampled customers during the calling period) resulted in an overall cooperation rate of 70 percent.

Despite this high cooperation rate, the number of survey completions for some measure types is low because the number of installations within these measure categories for program year 2011 was small. 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.

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 type⁵ 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 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%) would have adopted exactly the same energy efficient measure type at that time in the absence of the program. Partial free-riders (1–99%) 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%) 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 (e.g., hot water heating, HVAC), 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.

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.



Our approach to estimating free-riders 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.

Note that 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.

In addition to weighting by therm or kWh savings, weighting by the disproportionate probability of being surveyed accounts for any oversampling of a specific measure type as part of our calling effort. When reviewing the measure type free-ridership rates it is important to consider the number of survey completions that the estimate is based upon.

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 2011) of any additional energy efficient equipment that were made without any additional technical or financial assistance from National Grid. 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.

a. 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 positive 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 exactly the same type and efficiency as the ones installed through the program. This conservative approach allows customers to be more certain about whether the equipment they installed outside the program was the same type as the program equipment. 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.

b. 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 indicators of “unlike” spillover in the main report and not savings estimates.

c. Nonparticipant 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 2011 study estimated only a portion of nonparticipant like-measure type spillover based on responses from design professionals and vendors participating in National Grids' programs⁶. 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 2011.

To determine nonparticipant spillover, design professionals and equipment vendors were asked (by measure type they installed through the program in 2011) what percent of their sales were program-eligible and what percent 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

⁶ Nonparticipant spillover for small business programs was not estimated because of the small number of vendors involved in delivering 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 2011. 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 2010).

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 2011 programs. Thus, if a vendor installed program-eligible equipment in other measure type categories in the year 2011 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 2011.

It is important to note that nonparticipant spillover was analyzed at statewide level 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), there was only a small amount of nonparticipant spillover savings found.

1.3 CATEGORIZATION OF MEASURE TYPES

Results are presented for each measure type. 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 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	EMS
	Thermostats
	Boiler controls
	Hood controls
Custom	Lighting project
	Pumps
	Motors
	EMS
	Control system
Food Service	Oven
	Fryer
HVAC	Boiler
	Vending machine
	Water heater/boiler combo
	EMS
HVAC - Distribution	Steam traps
HVAC - Plant	Boilers (condensing, custom and steam)



Measure Type	Equipment
HVAC Non-unitary	Chiller
HVAC Unitary	Heat pump
	ECM motors
	AC equipment
	Economizer/ventilation controls
Insulation	Windows
	Pipe insulation
	Attic insulation
Lighting	CFLs
	Custom lighting
	Daylight dimming system
	Fluorescent lights (T8)
	LEDs
	Occupancy sensor
	Pulse start metal halide
Motor - Failed	Motors
Motor - New	Motors
Non-lighting	Controls
	Custom compressed air
	Custom hot water
	Motors/drives
	Vending machine
	Cooler
Other	Retro commissioning
	Steam traps
	Replace thermo oxidizers
	Other
VSD	Motors
	VFDs
Water Heating	Water Heater
	Tank insulation



1.4 RESULTS SUMMARY

This section presents the results of the 2011 C&I electric and natural gas free-ridership and spillover study conducted for National Grid in Rhode Island. The detailed results for each measure within each program can be found in Chapter 5.

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 15.3 percent, the participant spillover “like” rate is 1.9 percent, and the nonparticipant spillover rate is 0.1 percent, resulting in a statewide net-to-gross rate (NTGR) of 86.6 percent.

Table 1-2. 2011 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 Spillover Rate	Net-to-Gross Rate
Design 2000plus Program	90	197	11,560,616	34.3%	6.1%	2.1%	1.8%	0.0%	67.8%
Energy Initiative Program	168	325	30,847,757	15.1%	3.2%	1.6%	1.1%	0.1%	86.6%
Small Business Program	143	1,233	16,872,108	2.7%	2.1%	2.1%	1.9%	0.1%	99.6%
Total	401	1,755	59,280,481	15.3%	2.6%	1.9%	1.0%	0.1%	86.6%

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 14.6 percent, the participant spillover “like” rate is 53.3 percent, and the nonparticipant spillover rate is 0.0 percent, resulting in a statewide net-to-gross rate of 138.7 percent. Overall, nonparticipant spillover is typically low; with natural gas measure types being lower than electric. In addition, the nonparticipant spillover is based on responses from only seven vendors, so caution should be exercised when using the results.

Table 1-3. 2011 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 Spillover Rate	Net-to-Gross Rate
Large Commercial New Construction	22	35	485,396	13.9%	7.4%	78.0%	8.9%	0.0%	164.1%
Large Commercial Retrofit	33	42	259,692	15.9%	4.8%	7.1%	3.4%	0.0%	91.2%
Total	55	77	745,088	14.6%	4.2%	53.3%	5.9%	0.0%	138.7%



1.5 ORGANIZATION OF THIS REPORT

In Chapter 2 we review the study's objectives and methodology. Chapter 3 summarizes the survey questions used to identify the key decision maker and the questions designed to serve as project review for the respondent. Chapter 3 also describes the questions and approach used to estimate the extent of participant free-ridership, participant "like" spillover, and participant "unlike" spillover. Chapter 4 presents the questions and approach used to estimate nonparticipant "like" spillover approach. In Chapter 5, 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 plans 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. INTRODUCTION

This report summarizes the findings of the free-ridership and spillover study conducted for National Grid, Rhode Island for their 2011 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, Design 2000plus, Energy Initiative and the Small Business projects completed in 2011.

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 2011 program year participants, and the design professionals and equipment vendors who were active in the 2011 program year. The results cannot be used to predict the actions of any future program participants or program vendors. Essentially, the current study is a performance audit of the year 2011 programs using survey research methods to estimate the free-ridership and spillover rates.

2.1 STUDY OBJECTIVE

The primary objective of the 2011 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.

At this point, it is helpful to define free-ridership and 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 equipment⁷ 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%) would have adopted exactly the same energy efficient equipment at that time in the absence of the program. Partial free-riders (1–99%) 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%) 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 benefits 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” 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.

⁷ 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.



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 2009 Commercial and Industrial Programs Free-ridership and Spillover study conducted for National Grid⁸. Additionally, this study follows the standardized methodology developed in 2010 and 2011 for the Massachusetts Program Administrators⁹ for use in situations where end-users are able to report on program impacts via self-report methods.

To accomplish the study objectives, telephone surveys were conducted with samples of 2011 program participants in National Grid's C&I programs and with design professionals and equipment vendors involved in these 2011 installations. The following C&I programs were included in the 2011 study:

- New Construction (Custom and Prescriptive)
- Retrofit (Custom and Prescriptive)
- Small Business
- Design 2000plus
- Energy Initiative.

2.2.1 Participant free-ridership, "like" and "unlike" spillover surveys

The program participant sample consisted of unique *accounts*¹⁰, 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 account¹¹. Table 2-1 presents the number of participant accounts sampled for the 2011 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 12 and July 25, 2012. The duration of interviews with program participants averaged 13 minutes. Prior to the calling, 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

⁸ "2009 Commercial and Industrial Programs Free-ridership and Spillover Study", prepared for National Grid USA by Tetra Tech, June 21, 2010.

⁹ "Cross-Cutting C&I Free-Ridership and Spillover Methodology Study Final Report", prepared for the Massachusetts Program Administrators by Tetra Tech, KEMA, and NMR, May 20, 2011.

¹⁰ 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.

¹¹ Unique accounts with two or more measures were asked about the two largest saving measures during one interview.



12 call attempts was made to reach sampled customers during the calling period) resulted in an overall cooperation rate of 70 percent.

The number of survey completions for some measure types is low because the number of installations within these measure categories for program year 2011 was small. 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 programs. These surveys were used for estimating the extent of nonparticipant “like” spillover at a statewide level for all the programs.

Table 2-1. 2011 Participant Free-ridership and Spillover Survey Cooperation and Response Rate

	Total
Starting Sample	575
Bad phone number	4
No knowledgeable respondent	25
Ineligible - other	2
Language barrier	2
Adjusted Sample	542
Refusal	28
Unable to contact after multiple attempts	132
Completed interviews	382
Cooperation Rate	70%
Response Rate	66%

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 2011. 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) and duplicate names, 156 design professionals and vendors remained. We attempted to complete a survey with a subset of this sample (34 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 June 2012.



Table 2-2. 2011 Cooperation and Response Rates to the Nonparticipant Spillover Survey

	Total
Starting Sample	34
Bad phone number	3
Ineligible - other	2
Adjusted Sample	29
Refusal	2
Unable to contact after multiple attempts	10
Completed interviews	17
Cooperation Rate	77%
Response Rate	50%

In conjunction with the nonparticipant vendor spillover survey, interviews were completed with 21 of the 30 design professionals and equipment vendors mentioned by customers during the participant surveys as being influential in the decision to install the efficient measures. Combined with the survey of designers/vendor from the tracking database, this effort resulted in a combined 75 percent response rate.



3. 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. Appendix C of this document contains the detailed free-ridership survey questions for participants. 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, participation date) into the appropriate questions.

The survey averaged 13 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 zero 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
Study	Indicator of whether the customer received a 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 2011 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 by asking if participants were involved in the decision to purchase the incentivized equipment and asking about the roles of others within or outside the organization that may have been involved.

If the listed contact person was not the primary decision maker, information is collected on the person within or 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 <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 efficient] <MEASURE CATEGORY 1> or <MEASURE CATEGORY 2> was being considered for this facility?



- R1b** Aside from yourself, who else within your company or outside your company was involved in the decision of whether or not to purchase the [EFFICIENCY IS APPLICABLE: energy efficient] <MEASURE CATEGORY 1> or <MEASURE CATEGORY 2> through the <PROGRAM>?

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 company have any corporate policies related to energy efficiency standards that you need to consider when purchasing new equipment or making improvements to this facility?
- R4** Which of the following best describes this policy: 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> projects. 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 equipment¹², 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.

- 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> of the total cost of the [IF EFFECIENCY APPLIES: energy efficient] <MEASURE CATEGORY> project implemented through the program.

[IF <FINANCE> = Yes] National Grid also provided interest-free financing for up to 24 months for your portion of the project costs.

[IF <STUDY> = 1: In addition, as I previously mentioned, National Grid paid a portion of the cost for a <STUDY>.]

If National Grid had not paid a portion of the implementation cost OR provided any technical assistance or education [IF <FINANCE> = Yes: OR provided interest-free financing], would your business have implemented any type of <MEASURE CATEGORY> project at the same time?

¹² The instrument is designed to handle both rebated equipment (e.g., HVAC equipment) and rebated services (e.g. boiler tune-ups). However, as this study only addresses equipment, the memo does not include any references to rebated services.



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

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

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

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?

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

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

FR8C¹³ And of 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?

RVL1¹⁴ 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 R Value as what was installed through the program?

RVL2 Compared to what you installed through the National Grid program, what R Value would you have installed? (PROBE: "For example, would it have been 50% as much 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, 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 VARIES: quantity] [IF

¹³ For measures where quantity is not applicable but efficiency levels do vary, this question is combined into one item: FR8D.

¹⁴ RVL1 and RVL2 were added for insulation projects.

3. Participant Survey Questions



EFFICIENCY APPLIES: efficiency of] <MEASURE CATEGORY> at that same time if the National Grid had not provided the <ALL ASSISTANCE>?

- 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 <INC> you received from National Grid have on your decision to implement the [IF EFFICIENCY APPLIES: high efficiency] <MEASURE CATEGORY> project?
- C4A** Now I want to focus on what it would have cost your business to install this equipment on its own without the National Grid 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 <INC> on top of the amount you already paid, to implement the same quantity and efficiency of <MEASURE CATEGORY> equipment 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 energy efficient <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 percent 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 downward¹⁵. 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. This adjustment is detailed in Table 3-3 and visualized in Figure 3-1.

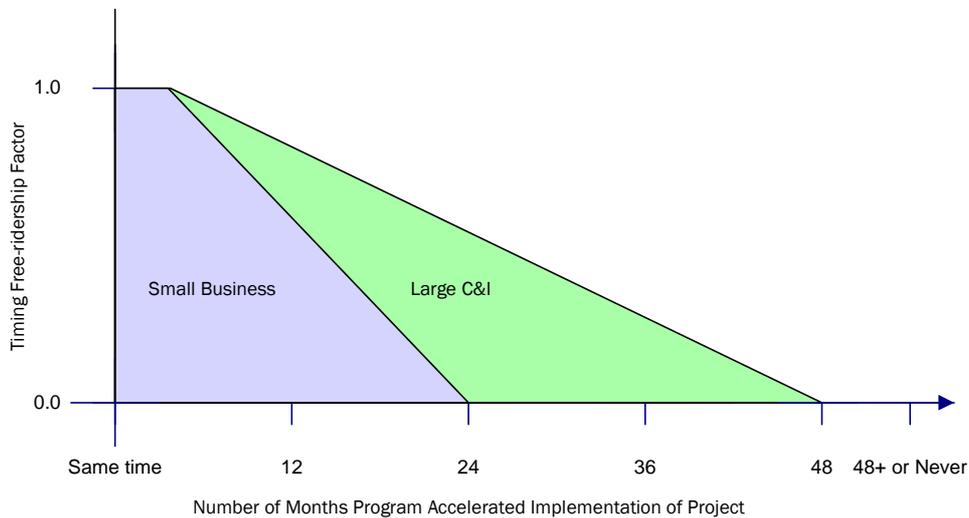
Table 3-3. Timing Factor Adjustment

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)	$FR_TIMING = 0$
<i>Adjusted Free-ridership Score</i>	<i>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</i>	$FR_TIMING * Initial Free-ridership Score$

¹⁵ 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.



Figure 3-1. Timing Free-ridership Factor by Number of Months the Program Accelerated Implementation



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 the next section.

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

C1 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; 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, with 0 being no influence and 10 being a great deal of influence, how much influence did the information provided by the <STUDY> 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 efficient projects through the National Grid program. . . .

- a. Has made our firm more likely to consider energy efficient equipment
- b. Has made our firm more likely to install energy efficient equipment
- c. Has given us more confidence in the financial benefits of energy efficient equipment
- d. Has given us more confidence in the nonfinancial benefits of energy efficient 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 in <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, how does the quantity compare to what you installed through the program at <SERVICE ADDRESS>? Did you install more, less or the same amount of <MEASURE CATEGORY>?

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 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 efficient 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 QUALIFY] 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

3. Participant Survey Questions



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 2011 study also measured “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>, had your company purchased, installed, or implemented any other type of energy efficient equipment **on your own**, that is without a rebate from National Grid?
- S6** What did you install (RECORD TYPE, QUANTITY, and SIZE or CAPACITY)?
- 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 efficient projects 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 indicators of “unlike” spillover and not savings estimates.



4. 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 natural gas 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, 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 <MEASURE CATEGORY> 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 2011 through the <PROGRAM>. This includes equipment such as <DETAILED DESCRIPTION>. Is that correct?
- VNP2** Please think about all the program-eligible <MEASURE CATEGORY> you specified, sold and/or installed for National Grid customers in 2011. 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) What percent of all of this program-eligible <MEASURE CATEGORY> you specified, sold and/or installed for National Grid customers in 2011 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 term 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%



a. *Nonparticipant spillover consistency checks*

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

VNP4 In 2011, 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. 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.¹⁶

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 motors were sold outside the program, the potential nonparticipant spillover savings would be $(2,000 \text{ therm} * 0.25 / (1 - 0.25)) = 667 \text{ therms}$. If this vendor was assigned (in Step 2) a nonparticipant spillover rate of 100 percent for motors, 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 motors, the nonparticipant spillover therm savings for that vendor was $667 * 0.5 = 334 \text{ therms}$. 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 demonstrated nonparticipant spillover for the same measure category. This conservative approach was based on the

¹⁶ 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:

$$\begin{aligned} &\text{Total therm for all program-eligible equipment} = \text{therm savings for efficient equipment sold through program} \\ &+ \text{therm savings for efficient equipment sold outside the program} = a + x \\ &b = \text{nonparticipant spillover} / \text{total therm} = x / (a + x) \end{aligned}$$

Therefore:

$$\begin{aligned} &b = x / (a + x) \\ &\text{solving for } x \text{ yields} \\ &x = b * a / (1 - b) \end{aligned}$$

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



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. FREE-RIDERSHIP AND SPILLOVER STUDY RESULTS

This section presents the results of the 2011 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 measure type and by program, along with corresponding error margins. We then present indicators 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 lighting measure type to the electric programs.

5.1 STATEWIDE RESULTS

Table 5-1 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 15.3 percent, the participant spillover “like” rate is 1.9 percent, and the nonparticipant spillover rate is 0.1 percent, resulting in a statewide net-to-gross rate (NTGR) of 86.6 percent.

Table 5-1. 2011 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 Spillover Rate	Net-to-Gross Rate
Design 2000plus Program	90	197	11,560,616	34.3%	6.1%	2.1%	1.8%	0.0%	67.8%
Energy Initiative Program	168	325	30,847,757	15.1%	3.2%	1.6%	1.1%	0.1%	86.6%
Small Business Program	143	1,233	16,872,108	2.7%	2.1%	2.1%	1.9%	0.1%	99.6%
Total	401	1,755	59,280,481	15.3%	2.6%	1.9%	1.0%	0.1%	86.6%

Table 5-2 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 these programs is 14.6 percent, the participant spillover “like” rate is 53.3 percent, and the nonparticipant spillover rate is 0.0 percent, resulting in a statewide net-to-gross rate of 138.7 percent. Overall, nonparticipant spillover is typically low; with natural gas measure types being lower than electric. In addition, the nonparticipant spillover is based on responses from only seven vendors, so caution should be exercised when using the results.



Table 5-2. 2011 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 Spillover Rate	Net-to-Gross Rate
Large Commercial New Construction	22	35	485,396	13.9%	7.4%	78.0%	8.9%	0.0%	164.1%
Large Commercial Retrofit	33	42	259,692	15.9%	4.8%	7.1%	3.4%	0.0%	91.2%
Total	55	77	745,088	14.6%	4.2%	53.3%	5.9%	0.0%	138.7%

5.2 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 5-3 details which equipment were assigned to which measure type classification, combining gas and electric measures.

Table 5-3. Breakdown of Equipment in Measure Type Categories

Measure Type	Equipment
Compressed Air	Compressors
Controls	EMS
	Thermostats
	Boiler controls
	Hood controls
Custom	Lighting project
	Pumps
	Motors
	EMS
	Control system
Food Service	Oven
	Fryer
HVAC	Boiler
	Vending machine
	Water heater/boiler combo
	EMS
HVAC - Distribution	Steam traps
HVAC - Plant	Boilers (condensing, custom and steam)
HVAC Non-unitary	Chiller
HVAC Unitary	Heat pump
	ECM motors
	AC equipment



Measure Type	Equipment
	Economizer/ventilation controls
Insulation	Windows
	Pipe insulation
	Attic insulation
Lighting	CFLs
	Custom lighting
	Daylight dimming system
	Fluorescent lights (T8)
	LEDs
	Occupancy sensor
Motor - Failed	Motors
Motor - New	Motors
Non-lighting	Controls
	Custom compressed air
	Custom hot water
	Motors/drives
	Vending machine
	Cooler
Other	Retro commissioning
	Steam traps
	Replace thermo oxidizers
	Other
VSD	Motors
	VFDs
Water Heating	Water Heater
	Tank insulation

5.2.1 Detailed program results

Table 5-4 presents National Grid’s free-ridership and spillover rates for each electric measure type by program. The net-to-gross rate is 86.6 percent. Within the Energy Initiative program, the HVAC measure type had the lowest free-ridership rate (0.0 percent) followed by the lighting measure type for the Small Business program (2.1 percent). The highest participant like spillover rate was with HVAC equipment for the Energy Initiative and Design 2000plus programs (12.9 percent and 11.4 percent, respectively). The highest free-ridership rate appears with VSD measure types for both Design 2000plus and Energy Initiative programs, although both have relatively few responses. For Design 2000plus HVAC, all of the participant like spillover is due to the non-unitary HVAC measure type.



Table 5-4. C&I Electric Free-ridership and Spillover Results by Program and Measure Type

Program	Measure Type	Surveyed	Population	Population kWh Savings	Free-ridership Rate	90% Margin Error (±)	Participant “Like” Spillover Rate	90% Margin Error (±)	Nonparticipant Spillover Rate	Net-to-Gross Rate
Design 2000plus Program	Compressed Air	17	38	919,129	19.2%	11.7%	0.0%	0.0%	0.0%	80.8%
	Custom	11	23	8,337,191	36.8%	17.3%	0.8%	3.3%	0.0%	64.0%
	HVAC (Non-unitary and Unitary)	27	67	630,497	24.2%	10.5%	11.4%	7.8%	0.0%	87.2%
	Lighting	20	42	1,393,771	31.3%	12.3%	7.0%	6.8%	0.1%	75.8%
	Motor (Failed and New)	9	18	46,531	23.3%	16.4%	0.0%	0.0%	0.0%	76.7%
	VSD	6	9	233,497	51.9%	19.4%	3.3%	6.9%	0.0%	51.4%
	Total		90	197	11,560,616	34.3%	6.1%	2.1%	1.8%	0.0%
Energy Initiative Program	Compressed Air	5	6	79,249	13.4%	10.2%	0.0%	0.0%	0.0%	86.6%
	Custom	53	97	11,423,395	12.7%	5.1%	0.3%	0.9%	0.0%	87.6%
	HVAC	5	8	672,000	0.0%	0.0%	12.9%	15.1%	0.0%	112.9%
	Lighting	94	193	16,775,893	13.2%	4.1%	1.4%	1.4%	0.1%	88.3%
	VSD	11	21	1,897,220	51.8%	17.1%	7.5%	9.0%	0.0%	55.7%
	Total		168	325	30,847,757	15.1%	3.2%	1.6%	1.1%	0.1%
Small Business Program	Lighting	95	1,121	15,535,456	2.1%	2.3%	1.4%	1.9%	0.1%	99.4%
	Non-lighting	48	112	1,336,652	9.1%	5.2%	10.4%	5.5%	0.0%	101.3%
	Total	143	1,233	16,872,108	2.7%	2.1%	2.1%	1.9%	0.1%	99.6%
Total		401	1,755	59,280,481	15.3%	2.6%	1.9%	1.0%	0.1%	86.6%

Table 5-5 presents detailed free-ridership and participant like spillover rates for each natural gas measure type and program. The New Construction Custom program has the highest net-to-gross rate (171.9 percent) due to low free-ridership and high participant like spillover. The New Construction Prescriptive program has the lowest net-to-gross rate (62.6 percent) driven by the high free-ridership rate (37.4 percent) and lack of participant like spillover (0.0 percent).



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

Program	Measure Type	Surveyed	Population	Population Therm Savings	Free-ridership Rate	90% Margin Error (±)	Participant “Like” Spillover Rate	90% Margin Error (±)	Nonparticipating Spillover Rate	Net-to-Gross Rate
Large Commercial New Construction Program - Custom	Controls	1	3	6,858	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	HVAC - Plant	2	4	32,305	12.2%	26.9%	48.9%	41.1%	0.0%	136.7%
	Insulation	1	1	8,603	2.2%	0.0%	0.0%	0.0%	0.0%	97.8%
	Other	1	1	403,011	12.5%	0.0%	90.0%	0.0%	0.0%	177.5%
	Total	5	9	450,777	12.1%	16.0%	84.0%	18.0%	0.0%	171.9%
Large Commercial New Construction Program - Prescriptive	Food Service	6	7	7,776	27.9%	11.4%	0.0%	0.0%	NA	72.1%
	HVAC	8	15	24,633	41.6%	19.6%	0.0%	0.0%	NA	58.4%
	Water Heating	3	4	2,210	25.0%	20.6%	0.0%	0.0%	0.0%	75.0%
	Total	17	26	34,619	37.4%	11.4%	0.0%	0.0%	0.0%	62.6%
Large Commercial Retrofit Program - Custom	Controls	7	8	55,114	25.3%	9.6%	0.0%	0.0%	0.0%	74.7%
	HVAC - Distribution	5	6	111,892	11.5%	9.6%	0.0%	0.0%	0.0%	88.5%
	HVAC - Plant	6	7	23,756	14.1%	8.8%	8.2%	7.0%	0.0%	94.2%
	Insulation	3	5	,782	62.4%	29.1%	0.0%	0.0%	0.0%	37.6%
	Other	6	7	38,980	14.1%	8.8%	33.1%	11.9%	0.0%	119.0%
	Water Heating	2	3	7,538	10.0%	20.1%	47.8%	33.5%	0.0%	137.9%
	Total	29	36	245,062	16.8%	5.0%	7.5%	3.6%	0.0%	90.7%
Large Commercial Retrofit Program - Prescriptive	Controls	2	4	462	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Other	2	2	14,168	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	4	6	14,630	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Total		55	77	745,088	14.6%	4.2%	53.3%	5.9%	0.0%	138.7%

Table 5-6 presents statewide free-ridership and spillover rates for each measure type combined across all electric programs. The HVAC measure type has the lowest level of free-ridership (0.0 percent) while the failed motors measure type has the highest free-ridership rate (61.1 percent), followed by the VSD measure type at 51.8 percent. Participant like spillover is highest for the HVAC non-unitary measure (44.2 percent).



Table 5-6. 2011 Statewide C&I Electric Free-ridership and Spillover Results by Measure Type

Measure Type	Surveyed	Population	Population kWh Savings	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant Spillover Rate	Net-to-Gross Rate
Compressed Air	22	44	998,378	18.8%	9.7%	0.0%	0.0%	0.0%	81.2%
Custom	64	120	19,760,586	22.9%	5.9%	0.5%	1.0%	0.0%	77.6%
HVAC	5	8	672,000	0.0%	0.0%	12.9%	15.1%	0.0%	112.9%
HVAC Non-unitary	7	8	162,555	15.6%	8.0%	44.2%	10.9%	NA	128.6%
HVAC Unitary	20	59	467,942	27.2%	13.3%	0.0%	0.0%	0.0%	72.8%
Lighting	209	1,356	33,705,120	8.8%	3.0%	1.6%	1.3%	0.1%	92.9%
Motor - Failed	3	6	14,688	61.1%	32.7%	0.0%	0.0%	NA	38.9%
Motor - New	6	12	31,843	5.8%	11.1%	0.0%	0.0%	0.0%	94.2%
Non-lighting	48	112	1,336,652	9.1%	5.2%	10.4%	5.5%	0.0%	101.3%
VSD	17	30	2,130,717	51.8%	13.1%	7.0%	6.7%	0.0%	55.3%
Total	401	1,755	59,280,481	15.3%	2.6%	1.9%	1.0%	0.1%	86.6%

Table 5-7 presents statewide free-ridership and spillover rates for each measure type combined across all natural gas programs. The HVAC - distribution measure type has the lowest level of free-ridership (11.5 percent) while the HVAC measure type has the highest free-ridership rate (41.6 percent). Participant 'like' spillover is highest for the other measure type (82.3 percent), followed by water heating and HVAC – plant.

Table 5-7. 2011 Statewide C&I Natural Gas Free-ridership and Spillover Results by Measure Type

Measure Type	Surveyed	Population	Population Therm Savings	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant Spillover Rate	Net-to-Gross Rate
Controls	10	15	62,434	22.3%	12.5%	0.0%	0.0%	0.0%	77.7%
Food Service	6	7	7,776	27.9%	11.4%	0.0%	0.0%	NA	72.1%
HVAC	8	15	24,633	41.6%	19.6%	0.0%	0.0%	NA	58.4%
HVAC - Distribution	5	6	111,892	11.5%	9.6%	0.0%	0.0%	0.0%	88.5%
HVAC - Plant	8	11	56,061	13.0%	10.2%	31.7%	14.1%	0.0%	118.7%
Insulation	4	6	16,385	30.8%	21.9%	0.0%	0.0%	0.0%	69.2%
Other	9	10	456,159	12.2%	5.7%	82.3%	6.6%	0.0%	170.1%
Water Heating	5	7	9,748	13.4%	13.4%	37.0%	19.0%	0.0%	123.6%
Total	55	77	745,088	14.6%	4.2%	53.3%	5.9%	0.0%	138.7%



5.3 “UNLIKE” SPILLOVER INDICATORS

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 using regular telephone interviewers, we present only indicators of “unlike” spillover and not savings estimates.

Seven 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.

- Three respondents indicated they installed new lighting. One of these respondents indicated they installed six new T8 lights. Another respondent indicated they installed four outside lights for a parking lot and the other respondent was not able to provide details on the lighting project.
- Two respondents installed HVAC units or systems. One installed five 10-ton units while the other installed 16 RTUs on the ground which were 24-30 tons each.
- One respondent installed two freezers, one refrigerator and four air conditioning units of unknown size.
- One respondent installed 10-12 motors that varied in size from 2 hp to 10 hp.



APPENDIX A: PARTICIPANT SAMPLING PLAN

This appendix presents our sample plan submitted to National Grid for the 2011 electric and natural gas free-ridership and spillover study in Rhode Island.

MEMORANDUM

TO: Jeremy Newberger, National Grid
FROM: Carrie Koenig and Pam Rathbun
CC: Kimberly Crossman
SUBJECT: 2011 National Grid Rhode Island Free-ridership and Spillover Study Proposed Sample Plan
DATE: April 29, 2012

This memorandum presents our proposed sample plan for National Grid's Rhode Island 2011 electric and gas free-ridership and spillover study revised to keep all custom measures together.

The data files transferred to us by National Grid provides information for Rhode Island participants in the Energy Initiative, Design 2000plus, New Construction-Custom, New Construction-Prescriptive, Retrofit-Custom, Retrofit-Prescriptive, and Small Business programs. As the files contained data regarding rebates dating back to 2009, only records installed in 2011 (installed_date, construction_completed_date, FinalPaymentApplInstalldate) were included in the sampling. In addition, 3 measures where therm or kWh saving was zero or no therm or kWh savings¹⁷ was included were removed from the sample.

Each record in the data represents a measure installed through a program for a particular location. One account may have multiple measures categories. 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 account¹⁸.

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.

This is followed by:

¹⁷ For electric records, the variable “kWh reduction” was used to identify kwh savings.

¹⁸ An account is defined as a unique Account Number (prim_bill_acct_no, bill_acct_no, BillingAccountNo) and program is defined by “program_name”.



- Characterization of the proposed sample plan

The current sample plan estimates 391 completed participant surveys at the measure level and 327 completed surveys at the account level (some accounts represent multiple measures). We will only bill for the actual number of surveys completed at the account level.

A.1 PREPARATION OF THE DATA FILE AND AGGREGATION OF THE PARTICIPANT DATA

- 1) **Identify program and measure category participation.** The study estimates free-ridership at the measure category level. The first step in sample preparation is to assign measures to a measure category. Using the information provided in the data files¹⁹, we identify the measure categories within the following programs:
 - a. The Design 2000plus program consists of the measure categories: compressed air, custom, HVAC non-unitary, HVAC unitary, lighting, motor-failed, motor-new, and VSD
 - b. The Energy Initiative program consists of the measure categories: compressed air, custom, HVAC, lighting, and VSD
 - c. The Small Business program consists of the measure categories: lighting and non-lighting
 - d. The Large Commercial New Construction custom program consists of the measure categories: controls, HVAC-plant, insulation and other
 - e. The Large Commercial New Construction prescriptive program consists of the measure categories: food service, HVAC and water heating
 - f. The Large Commercial Retrofit custom program consists of the measure categories: controls, HVAC-distribution, HVAC-plant, insulation and other
 - g. The Large Commercial Retrofit prescriptive program consists of the measure categories: controls and other.
- 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 kWh savings, therm savings, quantity of measures installed, the measure cost and authorized incentive²⁰ so that the values are represented at an account level. The detailed measure descriptions are retained. These descriptions are used when describing to customers what equipment is included in a measure category.

¹⁹ The field used to identify measure categories was “MEASURE_DESCR” and in some cases the field “measure_code” was also used in combination with the “measure_descr” field. For electric records, the field “measure description” was used in combination with “sub program”. For the Small Business program, “Lighting Indicator SBSOnly” was also utilized.

²⁰ For the prescriptive gas program, we used “quantity”, “purchase_price”, “total_rebate”, and “annual_therm_savings” to identify quantity installed, the cost of the measure, the total rebate amount, and the total therm savings associated with that measure respectively. For the custom gas program, we used “quantity”, “cust_measure_cost”, “incentive_amount” and “annual_therms_saved” to identify quantity installed, the cost of the measure, the total rebate amount, and the total therm savings associated with that measure respectively. For the electric records, we used “quantity”, “incentive amt (LCI)” and “copay amt (SBS)”, “cost of installed ECMs” and “kWh reduction”. Those who received technical assistance were flagged using the variable “tech review request code”.



A.2 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 the National Grid Rhode Island sample, we will pull a census of all accounts for each program with the exception of the Energy Initiative and Small Business programs for lighting measures. For the Small Business program, we selected lighting records with the top 5 percent of savings and those with multiple measure types. The remaining sample was randomly selected from the remaining cases. For Energy Initiative, we selected lighting records with the top 10 percent of savings and those with multiple measure types first. The remaining sample was randomly selected from the remaining records.

In the interviews, 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 5 or 10 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.

These prioritization steps resulted in the removal of 24 measures that were included in the sample as part of the measure category census.

A.3 PREPARATION OF SAMPLE FOR DATA COLLECTION

The next step is to restructure the sample file so that one 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 kWh/therm savings and detailed descriptions are represented in associated columns (e.g., kWh1, kWh2, therms1, therms2).

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

A.4 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:

- 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.

A.5 CHARACTERIZATION OF THE PROPOSED SAMPLE PLAN AND SAMPLE

Table A-1 outlines the sampling plan for National Grid's Rhode Island 2011 electric and gas study.

Table A-1: National Grid Rhode Island Proposed Sample Plan

Program	Measure Type	Population of Measures	Sample of Measures	Population kWh Savings	Sampled Kwh Savings	Population Therm Savings	Sampled Therm Savings	Percent of kWh Savings Sampled*	Percent of Therm Savings Sampled*	Expected Completed Measures from Survey**	+/- 90% Confidence Interval at Measures Level***
Design 2000plus	Compressed Air	38	37	919,129	915,866			100%		19	NA
	Custom	23	21	8,337,191	7,551,611			91%		11	NA
	HVAC Non-unitary	8	8	162,555	162,555			100%		4	NA
	HVAC Unitary	59	55	467,942	465,569			99%		28	NA
	Lighting	42	38	1,393,771	1,301,906			93%		19	NA
	Motor - Failed	6	6	14,688	14,688			100%		3	NA
	Motor - New	12	9	31,843	18,274			57%		5	NA
	VSD	9	9	233,497	233,497			100%		5	NA
	Total	197	183	11,560,616	10,663,966	-	-	92%		92	
Energy Initiative	Compressed Air	6	6	79,249	79,249			100%		3	NA
	Custom	97	97	11,423,395	11,423,395			100%		49	NA
	HVAC	8	8	672,000	672,000			100%		4	NA
	Lighting	193	139	16,775,893	14,069,472			84%		70	7.8%
	VSD	21	20	1,897,220	1,747,642			92%		10	NA
	Total	325	270	30,847,757	27,991,758	-	-	91%		135	
Small Business	Lighting	1,121	140	15,535,456	5,810,663			37%		70	9.5%
	Non-lighting	112	112	1,336,652	1,336,652			100%		56	NA
	Total	1,233	252	16,872,108	7,147,315	-	-	42%		126	
Large Commercial New Construction - Custom	Controls	3	3			6,858	6,858		100%	2	NA
	HVAC - Plant	4	4			32,305	32,305		100%	2	NA
	Insulation	1	1			8,603	8,603		100%	1	NA
	Other	1	1			403,011	403,011		100%	1	NA
	Total	9	9	-	-	450,777	450,777		100%	5	

A: Participant Sampling Plan



Program	Measure Type	Population of Measures	Sample of Measures	Population kWh Savings	Sampled Kwh Savings	Population Therm Savings	Sampled Therm Savings	Percent of kWh Savings Sampled*	Percent of Therm Savings Sampled*	Expected Completed Measures from Survey**	+/- 90% Confidence Interval at Measures Level***
Large Commercial New Construction - Prescriptive	Food Service	7	7			7,776	7,776		100%	4	NA
	HVAC	15	15			24,633	24,633		100%	8	NA
	Water Heating	4	4			2,210	2,210		100%	2	NA
	Total	26	26	-	-	34,619	34,619		100%	13	
Large Commercial Retrofit - Custom	Controls	8	8			55,114	55,114		100%	4	NA
	HVAC - Distribution	6	6			111,892	111,892		100%	3	NA
	HVAC - Plant	7	7			23,756	23,756		100%	4	NA
	Insulation	5	5			7,782	7,782		100%	3	NA
	Other	7	6			38,980	38,730		99%	3	NA
	Water Heating	3	3			7,538	7,538		100%	2	NA
	Total	36	35	-	-	245,062	244,812		100%	18	
Large Commercial Retrofit - Prescriptive	Controls	4	4			462	462		100%	2	NA
	Other	2	2			14,168	14,168		100%	1	NA
	Total	6	6	-	-	14,630	14,630		100%	3	
Total		1,832	781	59,280,481	45,803,039	745,088	744,838	77%	100%	391	

* Sampled savings / Population savings

** Assumes a 50 percent response rate. We will strive for a higher response rate, but given our experience we have chosen to be conservative in our estimate.

*** When you take a census of the population, confidence intervals do not apply.



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 cases²¹. Priority cases were sampled at 100%. Including this stratification in the weighting scheme ensured the premises sampled at 100% were not overrepresented, and the sampled premises (sampled at less than 100%) 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	672,000	230,391	2.92
Lighting	Non-priority	8,315,987	3,536,867	2.35
	Priority	8,459,906	5,931,724	1.43
VSD	Census	1,897,220	1,897,220	2.77

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.

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

²¹ 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.



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 = 1.43	Measure weight = 2.35
Step 2: Compute measure category-weighted kwh	
Adjusted kwh = $10,000 * 1.43 = 14,300$	Adjusted kwh = $1,000 * 2.35 = 2,350$
Step 3: Calculate kwh associated with the free-ridership based on the measure category weighted kwh, calculated in Step 1	
FR savings = $14,300 * .75 = 10,725$	FR savings = $2,350 * .25 = 587.50$
Step 4: Sum the free-ridership attributed savings and population savings.	
Total FR attributed savings:	$10,725 + 587.5 = 11,312.5$ kwh
Population savings:	$14,300 + 2,350 = 16,650$ kwh
Step 5: Divide the Total FR attributed savings by population savings to determine free-ridership rate.	
Net free-ridership rate = $11,312.5 / 16,650 = 67.9$ 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 terms associated with that measure and account.

$$\text{Measure weight} = \text{sample weight} * \text{individual kwh savings}$$

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
- <TOTMEAS>** Indicator of number of measures (at project level)
- 1 = One measure
 - 2 = Two measures
- <PRGCODE>** Numeric representation of programs
- 71 = Design 2000plus program
 - 72 = Energy Initiative program
 - 73 = Large Commercial New Construction program – Custom
 - 74 = Large Commercial New Construction program – Prescriptive
 - 75 = Large Commercial Retrofit program – Custom
 - 76 = Large Commercial Retrofit Program – Prescriptive
 - 77 = Small Business Program
- <MULT>** Multiple identifier
- 0 = Non-multiple
 - 1 = Multiple
- <MULTID>** Unique identifier for multiples
- <ACCOUNT>** Account number
- <THERM1, THERM2>** Gross therms savings for first sampled NTG measure, second sampled NTG measure
- <KWH1, KWH2>** kWh savings for first sampled NTG measure, second sampled NTG measure
- <CST1, CST2>** Cost of project – measure one, measure two
- <TOP1, TOP 2>** Top 10 percent of savings flag for electric savings – measure one, measure two
- <DATE>** Project date
- <PROGRAM>** Program respondent participated in
- Design 2000plus program
 - Energy Initiative program
 - Large Commercial New Construction program – Custom
 - Large Commercial New Construction program – Prescriptive
 - Large Commercial Retrofit program – Custom
 - Large Commercial Retrofit Program – Prescriptive
 - Small Business Program
- <QTY1, QTY2>** Quantity of first sample NTG measure, second NTG measure
- <EFF1, EFF2>** Efficiency flag, measure one, measure two
- 0 = Insulation – no efficiency level
 - 1 = All measures – efficiency level
- <MEAS1A – MEAS1H>** Detailed description of first through eight measure installed under first sampled measure category
- <MEAS2A – MEAS2H>** Detailed description of first through eight measure installed under second sampled measure category
- <STUDY>** Indicator of receipt of technical study
- 0 = Did not receive a study
 - 1 = Received a study
- <INTERVIEWER>** = Interviewer Name
- <CONTACT>** = Customer Contact Name
- <NGrid CONTACT INFORMATION>** = National Grid Contact Name and Phone Number.
- <CUST>** = Customer/Facility Name



- <DATE>** = Date of participation
- <YEAR>** = Year of participation
- <FUEL>** = electric or natural gas
- <ADDR>** = Service address where measure was installed
- <MEASCAT1, MEASCAT2>** = End-use Category (i.e. lighting)
- <QTYFLAG1, QTYFLAG2>**
 - 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
- <EFF1, EFF2>**
 - 0 = efficiency is not applicable for this measure category (e.g., insulation, VFD, delamping, recycling, occupancy sensors)
 - 1 = efficiency is applicable
- <EQUIP1, EQUIP2>** = 0 if installed measure is not equipment that is operational (e.g., insulation), 1=if installed measure is operational
- <MEAS1a-MEAS1h>, <MEAS2a-MEAS2h>** = detailed measure descriptions
- <STUDY>** = Technical Assessment Study, Technical Feasibility Study, Audit
- <INC1, INC2>** = Incentive for specific measure categories
- < ASSIST>** = Description of all technical assistance, financing, and rebates for measures installed through program
- <FINANCE>** = project received interest-free financing

NOTE:

For all questions, “DON’T KNOW” and “REFUSED” will be coded if offered as a response. Interviewers will probe as needed to minimize the amount of missing data.

For any case where the interview terminates early, respondent doesn’t recall measures, measures are not installed, or the contact no longer work at the company and we cannot locate a knowledgeable respondent, the case will be pulled and sent to National Grid for review.



Introduction

Hello, my name is <INTERVIEWER>, and I'm calling on behalf of National Grid regarding your firm's participation in their commercial and industrial energy efficiency programs, for example the <PROGRAM>. May I please speak with <CONTACT>?

- 1 Yes
- 2 No [ATTEMPT TO CONVERT. MENTION ADVANCE LETTER THEY SHOULD HAVE RECEIVED REGARDING THE CALL.]

11 Are you the person who was most involved in making the decision to get <ASSIST> through the <PROGRAM> in <DATE> at <ADDR> in <CITY>?

- 1 Yes [SKIP TO I2]
- 2 No [SKIP TO I1A]
- D (DK) [PROBE TO IDENTIFY SOMEONE RESPONSIBLE FOR MAKING DECISIONS ABOUT ENERGY USING EQUIPMENT AT THAT FACILITY; IF DK, THANK AND TERMINATE]
- R (REFUSED) [THANK AND TERMINATE]

11a. Who was primarily responsible for making the decision to get <ASSIST> through the program?

[RECORD NAME AND DISPOSITION]

- 1 Transfers you
- 2 Can only give contact information [RECORD CONTACT INFO; THANK AND TERMINATE]
- D (DK) [THANK AND TERMINATE]
- R (REFUSED) [THANK AND TERMINATE]

12. Are you employed by <CUST> or are you a contractor who provides design and/or installation services for <CUST>?
(INTERVIEWER NOTE: CODE UNPAID MEMBERS OF AN ADVISORY BOARD OR COMMITTEE AS EMPLOYEES)

- 1 Work directly for company/Employee/Volunteer
- 2 Vendor/Contractor [TERMINATE and USE VENDOR SURVEY]

INTRO1.

I'm with Tetra Tech, an independent research firm. On behalf of National Grid, we are following up with customers who participated in an energy efficiency program in 2011 to learn about their experiences. You or someone at your facility may have received a letter from National Grid 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 <ADDR>. Your individual responses will be kept confidential by Tetra Tech and National Grid. This should take about 15 minutes.

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

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 National Grid. If you would like to talk with someone from National Grid, you can call <NGrid CONTACT INFORMATION>.)

(Who is doing this study: National Grid 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 National Grid 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 15 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.)

Decision Making

INTRO2.

In the remainder of this interview, I'd like to focus on the <MEASCAT1, MEASCAT2> you implemented through the <PROGRAM>.

REPEAT R1A THROUGH R1D FOR MEASCAT1 AND MEASCAT2.

R1a. According to our records, the [EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1): energy efficient] <MEASCAT1, MEASCAT2> project you implemented through the program included <MEAS1a-MEAS1h, MEAS2a-MEAS2h>.

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

- 1 Yes
- 2 No
- D (DK)
- R (REFUSED)



R1b. Aside from yourself, who else within your company or outside your company was involved in the decision of whether or not to purchase the [EFFICIENCY IS APPLICABLE (IF EFF1, EFF2 = 1): energy efficient] <MEASCAT1, MEASCAT2> through the <PROGRAM>?

(PROBE: IF MORE THAN ONE DECISION MAKER, ASK R WHO WAS RESPONSIBLE FOR MAKING THE ULTIMATE DECISION)

- 1 No one else [SKIP TO R1C]
- 2 (SPECIFY):

Name	Title	Phone number	Probe for role:

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?

- 1 Yes [SKIP TO NEXT MEASURE]
- 2 No
- D (DK)
- R (REFUSED)

R1d. 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 VERBATIM RESPONSE)

(IF RESPONDENT WAS MOST INVOLVED IN THE DECISION AND MEASURE IS STILL OPERATING, ASK FREE RIDERSHIP QUESTIONS RELATED TO MEASCAT1, MEASCAT2)

(IF NOT PRIMARY DECISION MAKER FOR EITHER MEASURE, SKIP TO I1 AND DIAL THE MAIN DECISION MAKER IN R1b)

R3. Does your company have any corporate policies related to energy efficiency standards that you need to consider when purchasing new equipment or making improvements to this facility?

- 1 Yes
- 2 No [SKIP TO R6i]
- D (DK) [SKIP TO R6i]
- R (REFUSED) [SKIP TO R6i]



R4. Which of the following best describes this policy? (READ LIST)

- 1 Purchase energy efficient measures regardless of cost
- 2 Purchase energy efficient measures if it meets payback or return on investment criteria
- 3 Purchase standard efficiency measures that meet code
- 4 Something else (SPECIFY)
- D (DK)
- R (REFUSED)

R6i. [IF STUDY <>1] Did your company receive a technical assessment as part of your participation in the <PROGRAM>?

- 1 Yes [STUDY = Yes, STUDYTYPE = "technical assessment"]
- 2 No
- D (DK)
- R (REFUSED)

[IF NO <STUDY>, SKIP TO R9]

R6. If National Grid had not paid a portion of the cost, would your company have paid to have a similar <STUDY> done at that same time?

- 1 Yes [SKIP TO R9]
- 2 No
- D (DK) [SKIP TO R9]
- R (REFUSED) [SKIP TO R9]

R7. Would you have paid to have the study done earlier than you did, at a later date, or never?

- 1 Earlier
- 2 Same time [REPEAT R6]
- 3 Later
- 4 Never [SKIP TO C2]
- D (DK)
- R (REFUSED)

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

___ YEARS (AND/OR) ___ MONTHS

- D DK
- R (REFUSED)



C2. [IF R6=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 <STUDY> have on your decision to implement the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: high efficiency] <MEASCAT1,MEASCAT2> project? (REPEAT FOR EACH MEASURE)

- _____ (ENTER INFLUENCE RANKING)
- D (DK)
- R (REFUSED)

[REPEAT FOR EACH MEASURE]

R9. Did you receive interest-free financing from National Grid which allowed you to pay for your portion of the project cost over time?

- 1 Yes
- 2 No
- D DK

Free-Ridership

FR0. [IF MULTASK=1] Please think back to the time when you were considering implementing the specific <MEASCAT1 and MEASCAT2> projects.

What factors motivated your business to consider implementing new <MEASCAT1 and MEASCAT2> equipment? (PROBE: What other factors did you consider?)

DO NOT READ LIST. PLEASE CHOOSE ALL THAT APPLY.

- 1 (Old equipment failed)
- 2 (Old equipment working poorly)
- 3 (Old equipment scheduled for replacement)
- 4 (Wanted to reduce maintenance costs)
- 5 (The incentive being offered through the program)
- 6 (The technical assistance offered through the program)
- 7 (Wanted to reduce energy bills)
- 8 (Wanted to save energy)
- 9 (Recommendation of third party contractor/engineer/design professional)
- 10 (Recommendation of National Grid staff)
- 11 (Recommendation of internal staff)
- 12 (Past experience with the program)
- 13 (Other - specify)
- 14 Switching from oil to gas
- 15 Environmental concerns
- 16 Improve reliability/safety of equipment
- 17 Comfort
- 18 Implemented alongside another project
- 19 ROI/payback
- 20 Availability of financing
- 21 Improve efficiency level of equipment
- 22 Cost savings – unspecified
- D (DK)
- R (REFUSED)



START OF MEASURE LOOP

FR1-C9 will be asked of each measure category recalled that are still installed and operating - up to TWO measure categories.

INTRO3a

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>].

INTRO3b

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

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 the National Grid had not provided the <ALL ASSISTANCE>?

- ___ (0 TO 10)
- D (DK)
- R (REFUSED)

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

- 1 Yes
- 2 No [SKIP TO FR4]
- D (DK) [SKIP TO FR4]
- R (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 National Grid?

- 1 Yes
- 2 No [SKIP TO FR4]
- D (DK) [SKIP TO FR4]
- R (REFUSED) [SKIP TO FR4]



FR3b. [IF FR3a=1] What changes were necessary? [DO NOT READ; SELECT ALL THAT APPLY]

- 1 (Installation occurred SOONER than planned)
- 2 (Installation occurred LATER than planned)
- 3 (Installed MORE equipment than planned)
- 4 (Installed LESS equipment than planned)
- 5 (Equipment was MORE efficient than planned)
- 6 (Equipment was LESS efficient than planned)
- 7 (Removed MORE equipment than planned)
- 8 (Removed LESS equipment than planned)
- 9 (Other) (SPECIFY)
- D (DK)
- R (REFUSED)

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 National Grid's <PROGRAM>?

DO NOT READ LIST, RECORD ONLY ONE

- 1 Respondent
- 2 Someone else in company (SPECIFY AND PROBE TO SEE IF SHOULD BE SPEAKING WITH THIS R)
- 3 Third-party design professional
- 4 Third-party engineer
- 5 Contractor/Vendor
- 6 Manufacturer's representative
- 7 National Grid account manager
- 8 Someone else (SPECIFY)
- 9 Auditor
- D (DK)
- R (REFUSED)

C1. [IF FR4= THIRD-PARTY DESIGN PROFESSIONAL, THIRD-PARTY ENGINEER, CONTRACTOR MANUFACTURER'S REPRESENTATIVE, OR NATIONAL GRID ACCOUNT MANAGER (IF FR4=3, 4, 5, 6, 7, or 11)]

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 National Grid program?

- _____ (ENTER INFLUENCE RANKING)
- D (DK)
- R (REFUSED)



FR5i. I'd like to go over all the assistance you received from National Grid. According to our records:

(IF CST > 0) the total cost for the project implemented at your facility in <DATE> through the <PROGRAM> was about <CST>. National Grid paid about <INC1, INC2 or, if INC1 or INC2=0 "a portion"> of the total cost of the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: energy efficient] <MEASCAT1, MEASCAT2> project implemented through the program.

(IF CST = 0) National Grid paid a portion of the total cost of the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: energy efficient] <MEASCAT1, MEASCAT2> project implemented through the program.

[IF <STUDY=1>: In addition, as I previously mentioned, National Grid paid a portion of the cost for a <STUDY>.]

[IF <R9=1> = Yes] National Grid also provided interest-free financing for up to 24 months for your portion of the project costs.

[PRESS '1' TO CONTINUE]

FR5. If National Grid had not paid a portion of the implementation cost OR provided any technical assistance or education [IF <FINANCE> = Yes: OR provided interest-free financing], would your business have implemented any type of <MEASCAT1, MEASCAT2> project at the same time?

- 1 Yes [SKIP TO FR7a]
- 2 No
- D (DK)
- R (REFUSED)

FR6a. [IF FR5<>1] Would you have implemented the <MEASCAT1, MEASCAT2> project earlier than you did, at a later date, or never?

- 1 Earlier
- 2 Same time [REPEAT FR5]
- 3 Later
- 4 Never [SKIP TO C3]
- D (DK) [SKIP TO C3]
- R (REFUSED) [SKIP TO C3]

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

___ YEARS
 ___ MONTHS

- D DK [SKIP TO C3]
- R (REFUSED)



[IF QUANTITY IS NOT APPLICABLE FOR THIS MEASURE CATEGORY (IF QTYFLAG1, QTYFLAG2 = 0), SKIP TO FR8D]

[IF FR6b_1a = 88 & FR6b_1b = 88, SKIP TO C3]

FR7a. Without the National Grid program incentive, technical assistance, or financing, would your business have implemented the exact same quantity of <MEASCAT1, MEASCAT2> equipment [IF FR5=YES or DK: at that same time; IF FR5=2: within (TIMEFRAME IN FR6b)]?

- 1 Yes [SKIP TO FR8]
- 2 No
- D (DK) [SKIP TO FR8]
- R (REFUSED) [SKIP TO FR8]

FR7b. Compared to the amount of <MEASCAT1, MEASCAT2> that you implemented through National Grid'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 National Grid program?)

- _____ (ENTER PERCENTAGE: 1-99%)
- D (DK) [SKIP TO C3]
- R (REFUSED) [SKIP TO C3]

[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=YES: all; IF FR7A= NO: (FILL WITH FR7B %); IF (FR7B=DK/RF), fill with "some"] of the equipment on its own if the National Grid program had not been available. [ALL] Thinking about the <MEASCAT1, MEASCAT2> equipment you would have installed on your own, what percent of this equipment would have been . . . ?

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

- a. of the same high efficiency as what was installed through the National Grid program?
 _____ (ENTER PERCENTAGE: 0-100%)
 D (DK)
- b. lower efficiency than what was purchased but higher than standard efficiency or code?
 _____ (ENTER PERCENTAGE: 0-100%)
 D (DK)
- c. standard efficiency or code
 _____ (ENTER PERCENTAGE: 0-100%)
 D (DK)

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



FR8ck1 [IF FR8_1a + FR8_1b + FR8_1c <> 100] The quantities that you have given me do not add up to 100. Can you please tell me which to correct?

Here is what you have given me:

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

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

% standard efficiency or code

[PLEASE BACK UP AND CORRECT]

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

FR8d. [IF QTYFLAG<>1] Thinking about the <MEASCAT1, MEASCAT2> 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?

- 1 Of the same high efficiency as what was installed through the program?
- 2 Lower efficiency than what was purchased but higher than standard efficiency
- 3 Standard efficiency or code
- D (DK)
- R (REFUSED)

RVL1 **[IF measure type=Insulation]** 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 R Value as what was installed through the program?

- 1 Yes [SKIP TO C3]
- 2 No
- D (DK)
- R (REFUSED)

RVL2 **[ASK IF measure type=Insulation]** Compared to what you installed through the National Grid program, what R Value would you have installed? (PROBE: "For example, would it have been 50% as much as what was installed through the National Grid program?")

- ___ [1-99%]
- D (DK)
- R (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 <INC1,INC2> you received from National Grid have on your decision to implement the [IF EFFICIENCY IS APPLICABLE; IF EFF1, EFF2 = 1: high efficiency] <MEASCAT1,MEASCAT2> project?

- _____ (ENTER INFLUENCE RANKING)
- D (DK)
- R (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; IF FR5=1 AND FR7a=1 AND (FR8a=100% or FR8d = 1), ASK C4a-C7c, ELSE SKIP TO C8]

C4a. Now I want to focus on what it would have cost your business to install this equipment on its own without the National Grid 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)
- D (DK)
- R (REFUSED)

C4b. [IF C4a < 8] 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 incentive provided by the National Grid program. Which of these is more accurate?

- 1 Installed same quantity & efficiency at same time [SKIP TO C9]
- 2 Likelihood of installing this without the program assistance was (C4a SCORE)
- 3 Something else (SPECIFY)

C5. [IF C4B <> 1] How would your project have changed if National Grid had not contributed to the cost of the <MEASCAT1, MEASCAT2>? (INDICATE ALL THAT APPLY) (DO NOT READ)

- 1 (Would not have changed) [SKIP TO C8A]
- 2 (Would have postponed the project) [SKIP TO C5_1mon]
- 3 (Would have cancelled the project altogether)
- 4 (Would have repaired existing equipment)
- 5 (Kept using existing equipment)
- 6 (Purchased less efficient equipment) (ASK C7)
- 7 (Purchased fewer quantity) (ASK C6)
- 8 (Installed DIFFERENT type of equipment than planned) (SPECIFY)
- 9 (Other) (SPECIFY)
- D (DK)
- R (REFUSED)



C5_1mon [IF C5=2] How many months would you have postponed the project?

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

C6. [IF C5=PURCHASED FEWER QUANTITY; IF C5=7] Compared to the amount of <MEASCAT1, MEASCAT2> that you implemented through the National Grid 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 National Grid program?)

____ (ENTER PERCENTAGE: 1-99%)
D (DK)
R (REFUSED)

C7. [IF C5=PURCHASED LESS EFFICIENT EQUIPMENT; IF C5=6] Thinking about the equipment you would have implemented on your own, what percent of this equipment would have been . . . ?

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

a. of the same high efficiency as what was installed through the National Grid program?

____ (ENTER PERCENTAGE: 0-100%)
D (DK)

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

____ (ENTER PERCENTAGE: 0-100%)
D (DK)

c. standard efficiency or code

____ (ENTER PERCENTAGE: 0-100%)
D (DK)

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



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 (FR1 > 3 AND FR6b > 24 MONTHS OR NEVER) 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 National Grid 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?

- 1 The likelihood of installing this without the National Grid program assistance was (FR1 SCORE)
- 2 Would not have installed anything within 2 years
- 3 Something else (SPECIFY)
- D (DK)
- R (REFUSED)

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 (FR1 > 3 AND FR6b > 48 MONTHS OR NEVER) 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 National Grid 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?

- 1 The likelihood of installing this without the National Grid program assistance was (FR1 SCORE)
- 2 Would not have installed anything within 4 years
- 3 Something else (SPECIFY)
- D (DK)
- R (REFUSED)

Additional Consistency Check

C9a (IF 100% FREE-RIDER; IF FR5=1 AND FR7a=1 AND (FR8a=100% or FR8d = 1) AND C4b = 1 AND (C2 > 6 OR C3 > 6)) **PROMPT:** "Previously you stated that you would have installed the exact same equipment at the same time without the National Grid program. But, you also stated that the ...

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

... was influential in your decision.)

[PRESS 1 TO CONTINUE] [SKIP TO C9c]



C9b (IF 0% FREE-RIDER: IF FR6a = NEVER OR DK AND (C2 < 5 OR C3 < 5) **PROMPT:** “Previously you stated that you would not have installed any equipment without the National Grid program. You also stated that the ...

(IF C2 < 5 FILL: program-sponsored study)

(IF C3 < 5 FILL: program incentive and financing options)

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

... was not influential in your decision.)

[PRESS 1 TO CONTINUE] [SKIP TO C9c]

C9c (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 National Grid program had on your decision to install the amount of energy efficient <MEASCAT1, MEASCAT2> equipment at the time you did?

(RECORD VERBATIM RESPONSE)

MDiff1 [IF Mult=1 OR MultAsk=1] Would any of your answers for the previous section be any different for the other project(s)?

1 Yes

2 No

N [NOT MULTIPLE MEASURE]

SKIP1

(REPEATS QUESTIONS BEGINNING FROM INTRO3B FOR SECOND MEASURE – IF NO OTHER MEASURES – CONTINUE)

[IF MEAS2 = 1 GO TO INTRO3B]

[IF MEAS2 = 0 GO TO PP!]

Impact of Previous Program Participation

[IF NEVER WOULD HAVE INSTALLED OR ALL EQUIPMENT WOULD HAVE BEEN OF STANDARD EFFICIENCY AND UNLIKELY TO HAVE PURCHASED WITHOUT PROGRAM ((IF FR6A = NEVER OR FR8A = 0% OR FR8D <> 1) AND FR1 < 4) SKIP TO COM]

PP1. Had your business previously participated in a National Grid program before you implemented the energy efficient project around <DATE>?

1 Yes

2 No [SKIP TO S1a]

D (DK) [SKIP TO S1a]

R (REFUSED) [SKIP TO S1a]



PP2. [IF PP1=1] 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 National Grid program when making the decision to implement the <MEASCAT1, MEASCAT2> project at this facility around <DATE>?

___ [RECORD RATING 0 - 10]
D (DK)

PP3. [IF PP1=1] 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)

- 1 Agree
- 2 Disagree
- D (DK)
- R (REFUSED)

Our previous experience implementing energy efficient projects through a National Grid program

- PP3_1. Has made our firm more likely to consider energy efficient equipment
- PP3_3. Has made our firm more likely to install energy efficient equipment
- PP3_3. Has given us more confidence in the financial benefits of energy efficient equipment
- PP3_4. Has given us more confidence in the nonfinancial benefits of energy efficient equipment

Like Spillover²²

START OF MEASURE LOOP

S1a-S4b will be asked of each measure category recalled - up to TWO measure categories.

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

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

- 1 Yes
- 2 No [SKIP TO SKIP2]
- D (DK) [SKIP TO SKIP2]

[IF EFFICIENCY IS NOT APPLICABLE; IF EFF1, EFF2 = 0, SKIP TO S2a]

S1b. Was this equipment of **the same efficiency level or a higher level of efficiency** as the equipment you installed through the program?

- 1 Yes [SKIP TO S2a]
- 2 No
- D (DK)

²² As these surveys are being conducted soon after implementation, estimates of like and unlike spillover are likely to be limited as participants have not had adequate time to install additional equipment.



S1c. [IF S1b<>1] Was this equipment more energy efficient than standard efficiency or code equipment?

- 1 Yes
- 2 No [SKIP TO SKIP2]
- D (DK) [SKIP TO SKIP2]

S2a. [F S1a=1 or S1c=1] Thinking of the <MEASCAT 1, MEASCAT 2> equipment that you installed on your own, how does the quantity compare to what you installed through the program at [insert service address]? Did you install more, less or the same amount of <MEASCAT 1, MEASCAT 2>?

(PROBE: We're looking for a percent compared to the amount installed through the program. For example, was it about one- fourth of what you installed through the program, one-half of what you installed through the program, the same (100%) amount as you installed through the program, twice as much as what you installed through the program (200%) or some other amount?)

- 1 More (How much more? Enter percentage: 1-1000%)
- 2 Less (How much less? Enter percentage: 1-99%)
- 3 Same
- D (DK)

S2b. [IF S2a <> SAME AMOUNT OF <MEASCAT 1, MEASCAT 2>; IF S2a <> 3 and S2a<>DK] So the additional energy efficient equipment you bought on your own was <percentage from S2a> as much as you got through the program?

- 1 Yes
- 2 No [correct S2a]

S3a. [S1c=1 & S1a=1] 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?

- 1 Yes
- 2 No
- D (DK)
- R (REFUSED)

S3b. [S1c=1 & S1a=1] Did your experience with the energy efficient projects 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?

- 1 Yes
- 2 No
- D (DK)
- R (REFUSED)



S3c. [S1c=1 & S1a=1] Did your participation in any past program offered by National Grid 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?

- 1 Yes
- 2 No
- D (DK)
- R (REFUSED)

S3d. [S1c=1 & S1a=1] 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?

- 0-10 rating
- D (DK)

S4a. [S1c=1 & S1a=1] Why didn't you implement this <MEASCAT1, MEASCAT2> project through a National Grid program?

[DO NOT READ - SELECT ALL THAT APPLY]

- 1 (Too much paperwork)
- 2 (Cost savings not worth the effort of applying)
- 3 (Takes too long for approval)
- 4 (The equipment would not qualify)
- 5 (Vendor does not participate in program)
- 6 (Outside National Grid's service territory)
- 7 (No time - needed equipment immediately)
- 8 (Thought the program ended)
- 9 (Didn't know the equipment qualified under another program)
- 10 (Just didn't think of it)
- 11 (Unable to get rebate--unsure why)
- 12 (Other) (SPECIFY)
- D (DK)

S4b. [IF S4a = THE EQUIPMENT WOULD NOT QUALIFY; IF S4a = 4] Why wouldn't the equipment qualify?

(RECORD VERBATIM RESPONSE)

SKIP2

(REPEATS SPILLOVER QUESTIONS FOR SECOND MEASURE – IF NO OTHER MEASURES – CONTINUE)

[IF MEAS2 = 1 GO TO S1A]

[IF MEAS2 = 0 GO TO S5]



Unlike Spillover

S5. Since participating in <PROGRAM>, had your company purchased, installed, or implemented any other type of energy efficiency equipment **on your own**, that is without a rebate from National Grid?

1 Yes
2 No [SKIP TO NE1]
D (DK) [SKIP TO NE1]

S6. [IF S5=1] What did you install?

S6a Record type: _____
S6b Record quantity: _____
S6c Record size or capacity: _____

S7a. [IF S5=1] Would this project have qualified for an incentive through the <PROGRAM> from National Grid?

1 Yes
2 Yes, implemented through a program [SKIP TO NE1]
2 No [SKIP TO NE1]
D (DK) [SKIP TO NE1]

S7b. [IF S5=1 & S7a=1] 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?

1 Yes
2 No
D (DK)
R (REFUSED)

S7c. [IF S5=1 & S7a=1] Did your experience with the energy efficient projects implemented through the <PROGRAM> influence your decision to implement some or this equipment on your own?

1 Yes
2 No
D (DK)
R (REFUSED)

S7d. [IF S5=1 & S7a=1] 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?

1 Yes
2 No
D (DK)
R (REFUSED)



S7e. [IF S5=1 & S7a=1] 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?

___ 0-10 rating
D (DK)

S8a. [IF S5=1 & S7a=1] Why didn't you implement this project through a National Grid program?

DO NOT READ - SELECT ALL THAT APPLY

- 1 (Too much paperwork)
- 2 (Cost savings not worth the effort of applying)
- 3 (Takes too long for approval)
- 4 (The equipment would not qualify)
- 5 (Vendor does not participate in program)
- 6 (Outside National Grid's service territory)
- 7 (No time - needed equipment immediately)
- 8 (Thought the program ended)
- 9 (Didn't know the equipment qualified under another program)
- 10 (Just didn't think of it)
- 11 (Unable to get rebate--unsure why)
- 12 (Other) (SPECIFY)
- D (DK)

S8b. [IF S8a = EQUIPMENT WOULD NOT QUALIFY (IF S8a = 4)] Why wouldn't the project qualify?

(RECORD VERBATIM RESPONSE)

Expected NEI

NE1. Prior to participating in the program, did you expect any impacts other than energy savings?

- 1 Yes
- 2 No [SKIP TO COM]
- D (DK)[SKIP TO COM]

NE2. [IF NE1=1] Did you view these effects as a negative or positive benefit?

- 1 Negative [SKIP TO COM]
- 2 Positive
- D (DK)



NE3. [IF NE1=1 & NE2<>1] What were the positive benefits? (SELECT ALL THAT APPLY)

- 1 Sales
- 2 Production/productivity
- 3 Equipment life
- 4 Maintenance costs
- 5 Waste generation
- 6 Personnel needs
- 7 Injury or illness
- 8 Other (SPECIFY)

NE4. [IF POSITIVE BENEFIT, NE2 = 2] Did the expected positive benefits influence your decision to participate in the program?

- 1 Yes
- 2 No
- D (DK)

NE5. [IF NE1=1 & NE2=2] Did the program influence your expectations of the positive benefits?

- 1 Yes
- 2 No
- D (DK)

Wrap-up

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

(RECORD VERBATIM RESPONSE)

QRNAME.

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

(RECORD VERBATIM RESPONSE)

CLARIFY.

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

- 1 Yes
- 2 No



- A4. [ASK IF C1 > 6]
We would like to talk to the person who was most influential in recommending or specifying the efficient <MEASCAT1, MEASCAT2> equipment to install through the program. Earlier you mentioned that this was [FILL WITH FR4 RESPONSE]. Could you give me the name and telephone number of this person?
- 1 Yes (Record contact information)
 - 2 No, REFUSED to give this information
 - 3 No, no outside advisor involved
 - 4 [IF SECOND MEASURE] (SAME CONTACT INFO AS PREVIOUS MEASURE)
 - D (DK)

END 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 DESIGN PROFESSIONAL/VENDOR FREE-RIDERSHIP SURVEY

Variable List

<CONTACT>	Customer Contact Name
<CUST>	Customer/Facility Name
<ADDR>	Service address where equipment was installed
<MEASCAT1, MEASCAT2>	End-use Category (i.e. lighting)
<MEASCAT1a-MEASCAT1h>	Detailed measure descriptions
<MEASCAT2a-MEASCAT2h>	Detailed measure descriptions
<TA>	"1" if a Technical Assessment Study was conducted
<TA%>	Percent of TA study paid by utility/sponsor (by program)
<TACOST>	Total cost paid by utility/sponsor for TA study (by program)
<INC1, INC2>	Utility/sponsor incentive for Measure categories
<QTYFLAG1, QTYFLAG2>	0=quantity is not applicable for this measure category (measure qty = 1 or quantity is not relevant as in delamping, recycling), 1=quantity greater than 1
<EFF1, EFF2>	0=efficiency is not applicable for this measure category (e.g., insulation, VFD, delamping, recycling), 1=efficiency is applicable
<EQUIP1, EQUIP2>	0 if installed measure isn't equipment that is operational (e.g., insulation), 1=if installed measure is operational
<TOTCOST>	Total project cost (customer cost+utility cost) for an account (by program)

Procedure

The customer-identified vendors will be exported from the participant study and used for the sample file. This file will be checked for missing contact information and we will fill in phone numbers where possible. Cases will then be sorted by contact, and phone number to identify "multiples". Cases with the same contact names will be called together and the contact will be alerted that they have been referred by more than one customer. This set of sample cases will receive the free-rider questions only.

Introduction

INTRO

Hello, my name is ___, and I am calling on behalf of National Grid. We are talking with some of the design professionals and contactors who were involved with the natural gas efficiency programs in 2011. 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 this/these program(s) in 2011.

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



(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 the National Grid. If you would like to talk with someone from there, you can call [CONTACT NAME AND PHONE NUMBER FOR SPONSORS INCLUDED IN THIS CALL].

Free-Ridership Questions

INTRO2

I'd like to review the <MEASCAT1, MEASCAT2> project(s) you recommended or specified through the program for National Grid.

VR1 Do you recall recommending the <MEASCAT1> project, which included <DESC1> for <CUST> at <ADDR> through the <PROGRAM> in 2011?

- 1 Yes [SKIP TO V1a]
- 2 No
- 3 This equipment was never installed [IF NUMBER OF MEASURE CATEGORIES=2, SKIP TO VR2; ELSE SKIP TO END]
- D (DK)
- R (Refused)

VR1a Is there someone else at your firm who would be more familiar with this project?

- 1 Yes - Continue [ENTER CONTACT INFO & TRANSFER. GO THROUGH INTERVIEW WITH OTHER CONTACT IF AVAILABLE, OTHERWISE SET CALLBACK AND UPDATE CONTACT INFORMATION.]
- 2 Yes – Not available [ENTER CONTACT INFO & EXIT]
- 3 No [SKIP TO NEXT MEASURE]

V1a First I'd like to ask you about your decisions to recommend <MEASCAT1> through the program. Were you involved in the decision-making process at the design stage when the <MEASCAT1> project was specified and agreed upon for this facility?

- 1 Yes [IF # OF MEASURE CATEGORIES = 2, SKIP TO VR2, ELSE SKIP TO VR9]
- 2 No
- D (DK)

V1b At what point in the process did you become involved?

- (RECORD VERBATIM RESPONSE)
- (DK)
- (REFUSED)



V1c What was your role?

(RECORD VERBATIM RESPONSE)
(DK)
(REFUSED)

[IF NO SECOND MEASURE, SKIP TO VR9]

VR2 Do you recall recommending the <MEASCAT2> project which included <DESC2> for <CUST> at <ADDR> through the program in 2011?

- 1 Yes [SKIP TO V2a]
- 2 No
- 3 This equipment was never installed [SKIP TO VP0A IF INSTALLED MEASURE CATEGORY 1; ELSE SKIP TO END]
- D (DK)

VR2a Is there someone else at your firm who would be more familiar with this project?

- 1 Yes - Continue [ENTER CONTACT INFO & TRANSFER IF NOT CONTACT FOR MEASURE 1]
- 2 Yes – Not available [ENTER CONTACT INFO & EXIT IF NOT CONTACT FOR MEASURE 1]
- 3 No – Continue
- 4 Contact no longer with the company

[IF DIDN'T RECALL MEASURES 1 AND 2, MEASURES 1 AND 2 WERE NOT INSTALLED, OR R WAS NOT THE CONTACT FOR MEASURES 1 AND 2, SKIP TO END; ELSE SKIP TO VR9 AND ONLY ASK QUESTIONS FOR MEASURE 1]

V2a Were you involved in the decision-making process at the design stage when the <MEASCAT2> project was specified and agreed upon for this facility?

- 1 Yes [SKIP TO VR9]
- 2 No
- D (DK)

V2b At what point in the process did you become involved?

(RECORD VERBATIM RESPONSE)
(DK)
(REFUSED)



V2c What was your role?

(RECORD VERBATIM RESPONSE)
(DK)
(REFUSED)

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

1 Yes
2 No

[INTERVIEWER: START OF MEASURE LOOPS. VA1 THROUGH VF9 WILL BE ASKED OF EACH MEASURE CATEGORY RECALLED - UP TO TWO MEASURES.]

INTRO3a [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.]

INTRO3b [IF SECOND MEASURE]

Now I'd like to review the <MEASCAT2> project you recommended.

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 <MEASCAT1, MEASCAT2> so that it would qualify for the program?

— (0-10)
D (DK)

(IF VA1 < 7 AND NO OTHER MEASURE, SKIP TO END; IF VA1<7 AND ANOTHER MEASURE CATEGORY, REASK VA1 OF SECOND MEASURE CATEGORY; ELSE SKIP TO VP1a)

FR The next set of questions ask about <CUST>'s planning and installation decisions through the program in 2011.

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

1 Yes
2 Yes, but don't remember specifics [SKIP TO ATXT3]
3 No [SKIP TO ATXT3]
D (DK) [SKIP TO ATXT3]
R (Refused) [SKIP TO ATXT3]



VP1b (IF YES) What plans existed?

(RECORD VERBATIM RESPONSE)
(DK)
(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?

- 1 Yes
- 2 Yes, but don't remember specifics [SKIP TO ATXT3]
- 3 No [SKIP TO ATXT3]
- D (DK) [SKIP TO ATXT3]
- R (Refused) [SKIP TO ATXT3]

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

- 1 (Installation occurred SOONER than planned)
- 2 (Installation occurred LATER than planned)
- 3 (Installed MORE equipment than planned)
- 4 (Installed LESS equipment than planned)
- 5 (Equipment was MORE efficient than planned)
- 6 (Equipment was LESS efficient than planned)
- 7 (Other - specify)
- D (Don't know)
- R (Refused)

ATXT3

According to our records, the total cost for all equipment installed at <CUST>'s facility was about <CST1, CST2>. National Grid paid about <INC1, INC2> of the total cost of the <MEASCAT1, MEASCAT2>.

<CUST> may have also received some technical assistance from National Grid or a contribution toward the cost of a technical assessment study.

VF1 If National Grid had not paid a portion of the implementation cost, would your company have recommended or specified any type of <MEASCAT1, MEASCAT2> equipment to <CUST> at the same time?

- 1 Yes
- 2 No [SKIP TO VC3]
- D (DK) [SKIP TO VC3]

[IF QTYFLAG1, QTYFLAG2 = 0, SKIP TO VF3d]



VF2a Without the program incentive, technical assistance, or education, would your company have recommended or specified the exact same quantity of <MEASCAT1, MEASCAT2> for <CUST> at the same time?

- 1 Yes [SKIP TO VF3]
- 2 No
- D (DK)

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 National Grid?

(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%, 998=DK)

[IF VF2b = 0, SKIP TO VC3]

[IF MEASCAT = "Insulation" SKIP TO VRVL1]

[IF EFF1, EFF2 = 0, SKIP TO VC3]

VF3 You said you would have recommended or specified [IF VF2a=1: all the] [IF VF2a=2 OR D SHOW: at least some] <MEASCAT1, MEASCAT2> for <CUST> if the program had not been available.

What percent of the equipment that you would have recommended would have been...

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

____ (ENTER PERCENTAGE: 0-100%)
D (DK)

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

____ (ENTER PERCENTAGE: 0-100%)
D (DK)

c. standard efficiency or code?

____ (ENTER PERCENTAGE: 0-100%)
D (DK)



[IF QTYFLAG1, QTYFLAG2 = 1, SKIP TO VC3]
[IF EFF1, EFF2 = 0, SKIP TO VC3]

VF3d 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?

- 1 Of the same high efficiency as what was installed through the program?
- 2 Lower efficiency than what was purchased but higher than standard efficiency
- 3 Standard efficiency or code
- D (DK)
- R (REFUSED)

[IF MEASCAT <> "Insulation" SKIP TO VC3]

VRVL1 Thinking about the insulation project you would have recommended if the program had not been available, would it have been of the same R Value as what was installed through the program?

- 1 Yes [SKIP TO VC3]
- 2 No
- D (DK)
- R (REFUSED)

VRVL2 Compared to what you recommended through the program, what R Value would you have recommended? (PROBE: "For example, would it have been 50% as much as what was installed through the program?")

- ___ [1-99%]
- D (DK)
- R (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 <INC1,INC2> <CUST> received from National Grid have on your decision to recommend the [IF EFF1, EFF2 = 1:high efficiency] <MEASCAT1,MEASCAT2> project?

- _____ (ENTER INFLUENCE RANKING)
- D (DK)
- R (REFUSED)

(IF VF1=1 AND VF2a=1 AND VF3a=100%, ASK VF4-VF7; ELSE SKIP TO VF8)



VF4 Now I want to focus on what it would have cost <**CUST**> 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 <**INC1,INC2**> on top of the amount they already paid, to implement the same quantity and efficiency of <**MEASCAT1, MEASCAT2**> equipment at that same time?

- ___ (0 TO 10)
- D (DK)
- R (REFUSED)

(IF VF4 > 7 SKIP TO VF8)

VF5 How would their project have changed if the program had not contributed to the cost of the <**MEASCAT1, MEASCAT2**>?
(INDICATE ALL THAT APPLY) (DO NOT READ)

- 1 Would not have changed [SKIP TO VF8]
- 2 (Would have postponed the project) (SPECIFY # MONTHS)
- 3 (Would have cancelled the project altogether)
- 4 (Would have repaired existing equipment)
- 5 (Kept using existing equipment)
- 6 (Purchased less efficient equipment) (ASK VF7)
- 7 (Purchased fewer quantity) (ASK VF6)
- 8 (Installed DIFFERENT type of equipment than planned) (SPECIFY)
- 9 (Other) (SPECIFY)
- D (DK)
- R (REFUSED)

VF6 (IF VF5=7) Compared to the amount of <**MEASCAT1, MEASCAT2**> that <**CUST**> 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%)
- D (DK)
- R (REFUSED)



[IF VF6 = 0 SKIP TO VF8]
[IF QTYFLAG1, QTYFLAG2 = 0 SKIP TO VF8]

VF7 (IF VF5=6) Thinking about the equipment <**CUST**> would have implemented on their own, what percent of this equipment would have been . . . ?

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

- a. of the same high efficiency as what was installed through the program?
_____ (ENTER PERCENTAGE: 0-100%)
D _____ (DK)

- b. lower efficiency than what was purchased but higher than standard efficiency or code?
_____ (ENTER PERCENTAGE: 0-100%)
D _____ (DK)

- c. standard efficiency or code
_____ (ENTER PERCENTAGE: 0-100%)
D _____ (DK)

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

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 National Grid program when making the decision to recommend or install <**MEASCAT1**, **MEASCAT2**>for this customer?

- _____ (DK)
- N NA – No previous program experience



VF9 (IF VF1=1 AND VF2a=1 AND (VF3a=100% or VF3d = 1) AND VF5 = 1 AND VC3 > 6) PROMPT: “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 = NO OR DK AND VC3 < 5) PROMPT: “Previously you stated that <CUST> 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>’s purchase decision. Please describe what impact, if any, the program had <CUST>’s decision to install the energy efficient <MEASCAT1,MEASCAT2> equipment at the time they did?

(RECORD VERBATIM RESPONSE)
(DK)
(REFUSED)

END We are almost finished calling customers about their experience with the program. If another customer identifies you as being influential in their decision to install energy efficient equipment, would it be alright for us to call you back for just a couple of questions?

- 1 YES
- 2 NO

VRNAME

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

(RECORD VERBATIM RESPONSE)

COMMENTS

That is all the questions I have for you. Thank you for your participation. Do you have any comments?

(RECORD VERBATIM RESPONSE)



C.3 DESIGN PROFESSIONAL/VENDOR NONPARTICIPANT SPILLOVER SURVEY

Variable List

<CONTACT>	Customer Contact Name
<PROGRAMS>	Programs the vendor has been involved with
<ME1-ME18>	Types of equipment specified/sold as part of spillover questions
<DESC>	Types of equipment specified/sold as part of spillover questions

Procedure

The vendors identified in the sponsor databases will be asked the nonparticipant spillover questions. We will focus on reaching the contacts listed in the database.

Introduction

INTRO4

Hello, my name is _____, and I am calling from Tetra Tech on behalf of National Grid. We are talking with some of the design professionals, vendors, and contactors who were involved with the <PROGRAMS> in 2011. 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 this/these program(s) in 2011.

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

(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 National Grid. If you would like to talk with someone from there, you can call [CONTACT NAME AND PHONE NUMBER FOR SPONSORS INCLUDED IN THIS CALL].



[VNP1a-VNP8 WILL BE ASKED FOR EACH MEASURE WHERE MEx=1 where x=measure category number defined below].

MEx Measure Category
DESC: Measure Description

VNP1a Our records show that your firm specified, sold, and/or installed <MEx> to commercial and industrial customers in 2011 through the <PROGRAMS>. This includes equipment such as <DESC>.

Is that correct?

[INTERVIEWER: PLEASE VERIFY EACH TYPE OF EQUIPMENT THAT SHOWS FOR THE VENDOR]

- 1 Yes
- 2 No [SKIP TO NEXT CATEGORY]
- D Don't know [SKIP TO NEXT CATEGORY]
- R Refused [SKIP TO NEXT CATEGORY]

Note: The measure categories listed above will closely match measure categories as defined in the customer sample. When asking vendors about each measure category, we will reference the specific measure-level descriptions noted in the database.

VNP1b Prior to participating in the National Grid program, in what percentage of your commercial projects did you install high efficiency <MEx>?

- _____ ENTER PERCENTAGE
- 888 DON'T KNOW
- 999 REFUSED

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

- _____ ENTER PERCENTAGE
- 888 DON'T KNOW
- 999 REFUSED

VNP2 Please think about all the program-eligible <MEx> you specified, sold and/or installed for National Grid customers in 2011.

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

- 1 Yes
- 2 No [SKIP TO NEXT CATEGORY]
- D Don't know [SKIP TO NEXT CATEGORY]
- R Refused [SKIP TO NEXT CATEGORY]



VNP3 (IF VNP2 = Yes) What percent of all of this program-eligible <ME> you specified, sold and/or installed for National Grid customers in 2011 did not receive an incentive through a National Grid program?

- ____%
- 888 Don't know
- 999 Refused

(ASK VNP4-VNP8 OF EACH MEASURE WHERE VNP3 > 0%)

VNP4 In 2011, you mentioned that about [____%] of the <ME> 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?

(DO NOT READ—INDICATE ALL THAT APPLY; PROBE, WHAT ELSE?)

- 1 Not worth the paperwork for our firm to help the customer apply for the incentive
- 2 Customer did not want the hassle of applying for the incentive
- 3 Takes too long for approval
- 4 Reached the maximum amount I could install through the program
- 5 The equipment would not qualify→ [Why not? (SPECIFY)]
- 6 Vendor does not participate in program
- 7 Outside [retail company] service territory
- 8 No time – needed equipment immediately
- 9 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)
- 14 Don't know

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 <ME> through energy efficiency programs has convinced us that this equipment is cost effective or beneficial even without a program incentive.

- 0 Agree
- 1 Disagree

VNP6 We are better able to identify opportunities to improve energy efficiency by using high efficiency <ME> 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.

- 0 Agree
- 1 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 National Grid.

- 0 Agree
- 1 Disagree

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

(RECORD VERBATIM RESPONSE)

END We are almost finished calling customers about their experience with the program. If a customer identifies you as being influential in their decision to install energy efficient equipment, would it be alright for us to call you back for just a couple of questions?

- 1 YES
- 2 NO

VRNAME

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

COMMENTS

Those are all the questions I have for you. Thank you for your participation. Do you have any comments?



APPENDIX D: CUSTOMER ACCOUNT AND PROGRAM SAVINGS COVERAGE

D.1 DETAILED RESPONSE RATE

Table D-1. Response Rate by Program

	Design 2000plus	Energy Initiative	Large Commercial New Construction - Custom	Large Commercial New Construction - Prescriptive	Large Commercial Retrofit - Custom	Large Commercial Retrofit - Prescriptive	Small Business	Total
Starting Sample	128	190	8	23	29	6	191	575
Bad phone number	0	3	0	0	0	0	1	4
No knowledgeable respondent	9	7	0	0	1	0	8	25
Ineligible - other	0	1	0	0	0	0	1	2
Language barrier	1	0	0	0	0	0	1	2
Adjusted Sample	118	179	8	23	28	6	180	542
Refusal	9	4	0	1	1	0	13	28
Unable to contact after multiple attempts	35	31	3	6	2	2	53	132
Completed interviews	74	144	5	15	26	4	114	382
Cooperation Rate	63%	80%	63%	65%	93%	67%	63%	70%
Response Rate	58%	76%	63%	65%	90%	67%	60%	66%



D.2 DETAILED SAVINGS COVERAGE

Table D-2. Detailed Savings Coverage by Program

Program	Measure Type	Population of Measures	Sample of Measures	Population kWh Savings	Completed Kwh Savings	Population Therm Savings	Completed Therm Savings	Percent of kWh Savings Completed*	Percent of Therm Savings Completed*	Expected Completed Measures from Survey**	Completed Measure Surveys	+/- 90% Confidence Interval at Measures Level***
Design 2000plus	Compressed Air	38	37	919,129	499,658			54%		19	18	NA
	Custom	23	21	8,337,191	5,194,428			62%		11	11	NA
	HVAC Non-unitary	8	8	162,555	141,107			87%		4	7	NA
	HVAC Unitary	59	55	467,942	157,072			34%		28	19	NA
	Lighting	42	38	1,393,771	565,389			41%		19	20	NA
	Motor - Failed	6	6	14,688	3,395			23%		3	3	NA
	Motor - New	12	9	31,843	11,963			38%		5	6	NA
	VSD	9	9	233,497	174,984			75%		5	6	NA
	Total	197	183	11,560,616	6,747,996	-	-	58%		94	90	
Energy Initiative	Compressed Air	6	6	79,249	68,804			87%		3	5	NA
	Custom	97	97	11,423,395	7,946,726			70%		49	54	NA
	HVAC	8	8	672,000	234,356			35%		4	6	NA
	Lighting	193	139	16,775,893	9,999,104			60%		70	96	7.80%
	VSD	21	20	1,897,220	992,664			52%		10	11	NA
	Total	325	270	30847757	19241654	-	-	62%		136	172	
Small Business	Lighting	1,121	140	15,535,456	3,974,719			26%		70	99	9.50%
	Non-lighting	112	112	1,336,652	558,088			42%		56	53	NA
	Total	1,233	252	16,872,108	4,532,807	-	-	27%		126	152	

D: Customer Account and Program Savings Coverage



Program	Measure Type	Population of Measures	Sample of Measures	Population kWh Savings	Completed Kwh Savings	Population Therm Savings	Completed Therm Savings	Percent of kWh Savings Completed*	Percent of Therm Savings Completed*	Expected Completed Measures from Survey**	Completed Measure Surveys	+/- 90% Confidence Interval at Measures Level***
Large Commercial New Construction - Custom	Controls	3	3			6,858	6,494		95%	2	2	NA
	HVAC - Plant	4	4			32,305	13,808		43%	2	2	NA
	Insulation	1	1			8,603	8,603		100%	1	1	NA
	Other	1	1			403,011	403,011		100%	1	1	NA
	Total	9	9		-	450777	431916		96%	6	6	
Large Commercial New Construction - Prescriptive	Food Service	7	7			7,776	4,260		55%	4	6	NA
	HVAC	15	15			24,633	13,766		56%	8	8	NA
	Water Heating	4	4			2,210	1,926		87%	2	3	NA
	Total	26	26		-	34619	19952		58%	14	17	
Large Commercial Retrofit - Custom	Controls	8	8			55,114	43,127		78%	4	7	NA
	HVAC - Distribution	6	6			111,892	95,447		85%	3	5	NA
	HVAC - Plant	7	7			23,756	20,935		88%	4	6	NA
	Insulation	5	5			7,782	1,154		15%	3	3	NA
	Other	7	6			38,980	38,730		99%	3	6	NA
	Water Heating	3	3			7,538	390		5%	2	2	NA
	Total	36	35		-	245,062	199,783		82%	19	29	
Large Commercial Retrofit - Prescriptive	Controls	4	4			462	308		67%	2	2	NA
	Other	2	2			14,168	14,168		100%	1	2	NA
	Total	6	6		-	14,630	14,476		99%	3	4	
Total		1,832	781	59,280,481	30,522,457	745,088	666,127	51%	89%	395	470	



APPENDIX E: DESIGN PROFESSIONAL AND VENDOR SPILLOVER CALCULATION

As an example, assume a vendor had 2,000 therm savings in the program tracking system database attributable to HVAC equipment. If that vendor said that 25 percent of all their energy efficiency HVAC equipment were sold outside the program, the potential nonparticipant spillover savings would be $(2,000 \text{ therms} * 0.25 / (1 - 0.25)) = 667 \text{ therms}$. If this vendor was assigned a nonparticipant spillover rate of 100 percent for HVAC equipment, the nonparticipant spillover therm savings for that vendor was 667 therms. If that same vendor was assigned a nonparticipant spillover rate of only 50 percent for HVAC equipment, the nonparticipant spillover therm savings for that vendor was $667 * 0.5 = 334 \text{ therms}$. 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%	2,000	50%

Potential nonparticipant spillover savings = $B * A / (1 - A)$

$$= 2,000 \text{ therm} * 0.25 / (1 - 0.25)$$

$$= 667 \text{ therms}$$

Nonparticipant spillover savings = potential savings * C

$$= 667 * 0.5$$

$$= 334 \text{ therms}$$



APPENDIX F: SCORING FLOWCHARTS

Figure F-1. 2012 Free-Ridership Scoring

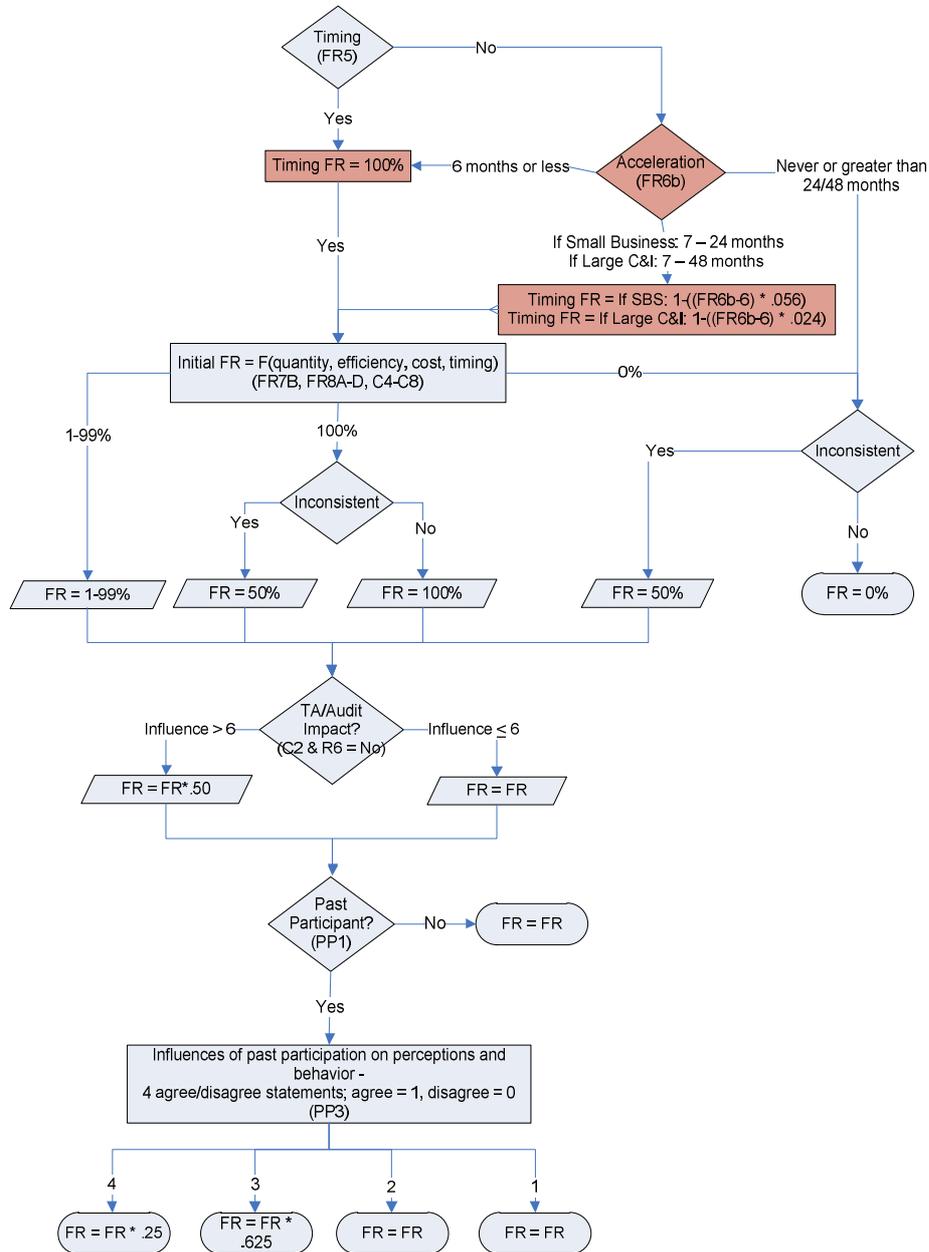




Figure F-2. 2010 Free-Ridership Consistency Checks

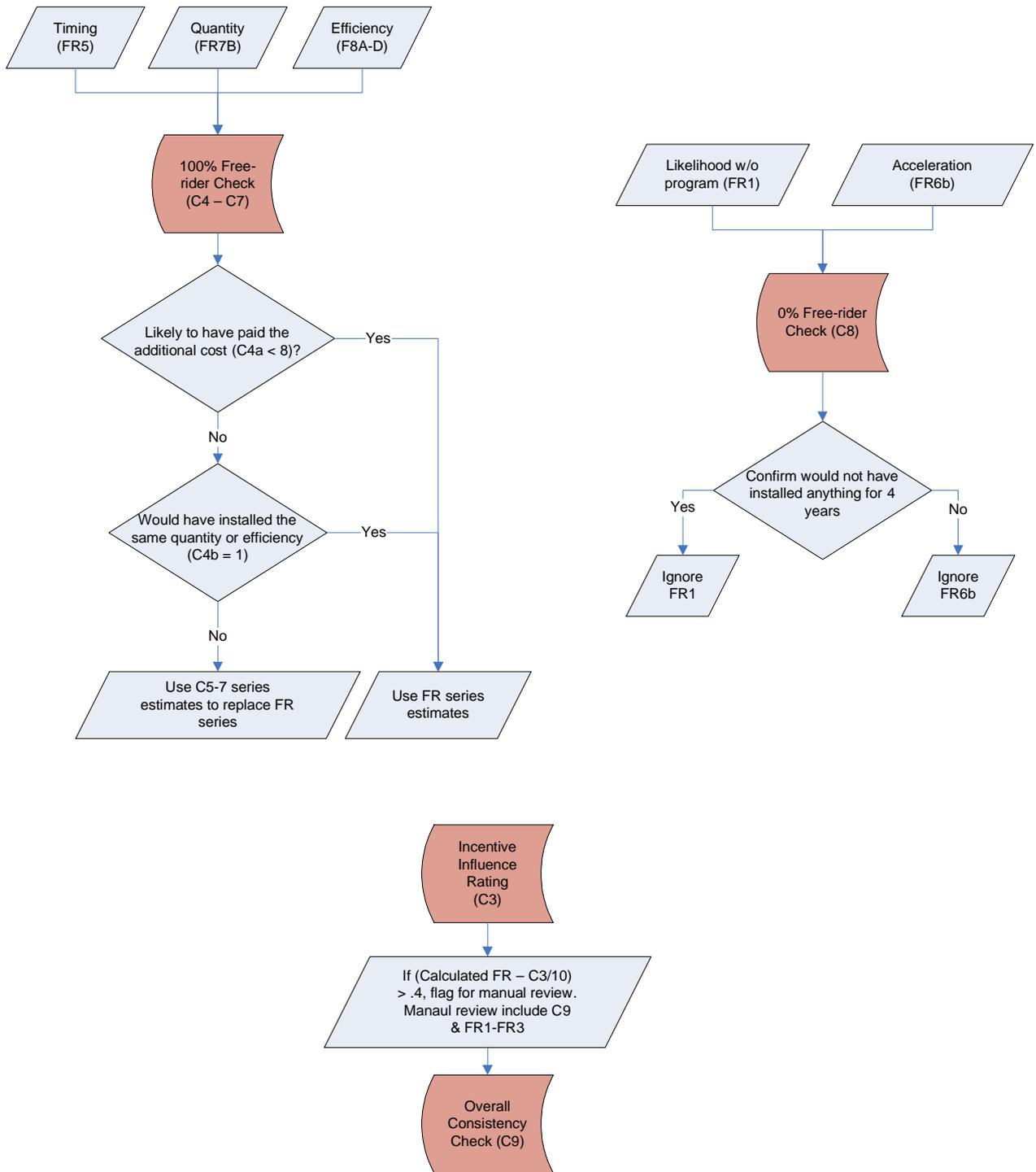




Figure F-3. Vendor Trigger for Free-Ridership Survey

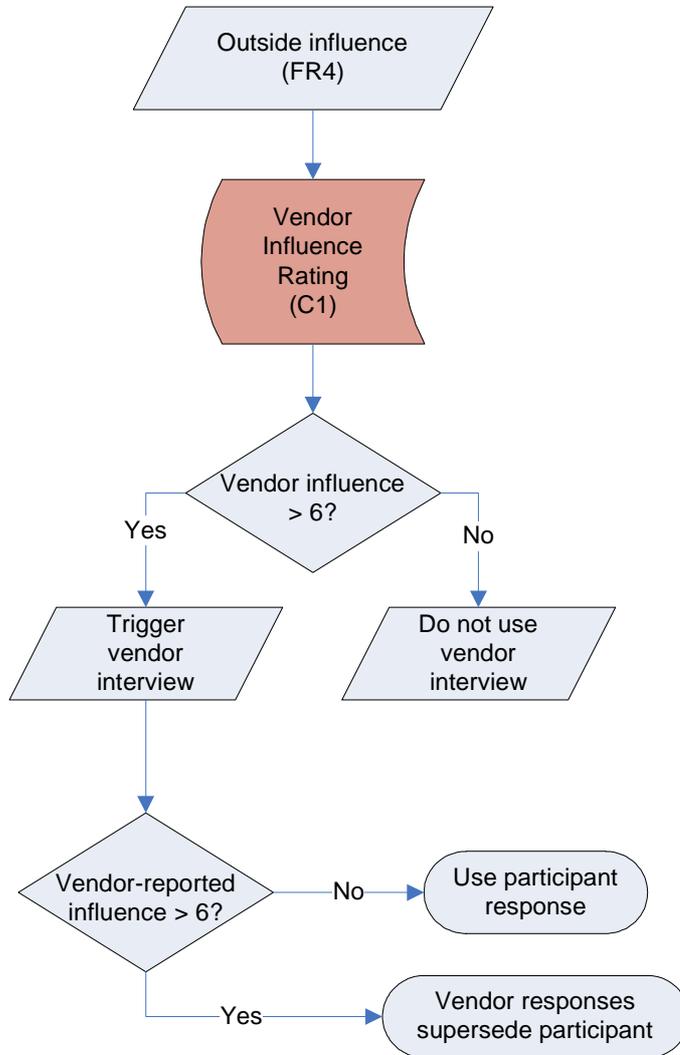




Figure F-4. Nonparticipant Spillover Scoring

