PA Consulting Group

The United Illuminating Company (UI)

2007 Commercial and Industrial Programs Free-ridership and Spillover Study

October 28, 2008

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1. EXECUTIVE SUMMARY

This Executive Summary summarizes the findings of the program year 2007 Commercial and Industrial Free-ridership and Spillover Study for The United Illuminating Company (UI) customers that participated in the Energy Conscious Blueprint, Energy Opportunities, and/or Small Business Programs. The purpose of this study was to assess program free-ridership, participant spillover, and nonparticipant spillover for these programs.

The 2007 Free-ridership and Spillover Studies ran concurrently for National Grid, Cape Light Compact, UI, and Unitil. Connecticut Light & Power and Western Massachusetts Electric also participated in the study several months after UI's study was completed.

1.1 STUDY OBJECTIVES

The primary objective of the program year 2007 Commercial and Industrial Free-ridership and Spillover Study was to assist UI in quantifying the net impacts of their Commercial and Industrial energy efficiency programs by estimating the extent of:

- Program free-ridership
- Participant "like" spillover

The study also includes a nonparticipant spillover analysis. UI vendors were not included in this particular portion of the study due to lack of information; however, the results, determined in aggregate across all participating sponsors, are presented at the end of this section.

1.2 STUDY METHODOLOGY

The methodology used for this year's study follows the standardized methods developed in 2003 for a group of Massachusetts energy efficiency program administrators[1].

To accomplish the above objective, telephone surveys were conducted with samples of 2007 program participants and design professionals and equipment vendors involved in these 2007 installations. The program participant sample consisted of unique electric utility *accounts*, not unique customer names. The same customer name, or business identity, can have multiple accounts in multiple locations, but program technical support and incentives are provided on behalf of an individual account. Thus, for the purposes of this study, a customer or participant is defined as a unique account.

The majority of these telephone interviews were completed with program participants between March 28 and May 9, 2008. All sampled participating customers were mailed a letter on UI letterhead in advance of the telephone call. This letter explained the purpose of the call, informed customers that someone would be calling them in the next couple of weeks to ask them some questions about their experience with the program, and thanked them for their cooperation in advance. This advance letter and repeated call attempts resulted in a high

[1] Pamela Rathbun, Carol Sabo, and Bryan Zent, *Standardization Methods for Free-ridership and Spillover Evaluation—Task 5 Final Report (Revised),* prepared for National Grid, NSTAR Electric, Northeast Utilities, Unitil, and Cape Light Compact, June 16, 2003.

response rate of 76 percent, which increases the level of confidence in the survey results. The duration of interviews with program participants averaged ten minutes.

In addition to the customer surveys, surveys were conducted with design professionals and vendors identified by customers as being the most knowledgeable about the decisions to install the equipment through UI's program. These surveys were used for estimating free-ridership for those installations where the design professional/equipment vendor was more influential in the decision than the customer.

The number of survey completions for some measure categories is low because the number of installations within these measure categories for program year 2007 was small. Thus, although a high percentage of the 2007 program participants completed surveys, some caution should be used when interpreting the results.

1.3 TOTAL PARTICIPANT FREE-RIDERSHIP ESTIMATES

A program's ***free-ridership rate*** is the percentage of program participants deemed to be free riders. A ***free rider*** refers to a customer who received an incentive through an energy efficiency program who would have installed the same or a smaller quantity of the same high efficiency measure on their own within one year 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 equipment purchase decision. Consequently, none or only some of the energy savings of equipment purchased by this group of customers should be credited to the energy efficiency program. Free riders account for program costs, but not benefits, to the program, driving benefit-cost ratios down.

For programs that offer monetary incentives for multiple measure categories (e.g. motors, lighting, HVAC), it is important to estimate free-ridership by specific measure category. Category-specific estimates produce feedback on the program at the level at which it actually operates and allow for cost-effectiveness testing by measure category. [2]

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 category-specific estimates. The ability to provide reliable estimates by measure category is dependent on the number of installations within that measure category—the fewer installations, the less reliable the estimation.

It is also important to measure the *extent* of free-ridership for each customer. Pure free riders (100 percent) would have installed exactly the same quantity and type of equipment within one year without the program. Partial free riders (1–99 percent) are those customers who would have installed some equipment within one year on their own, but a smaller quantity and/or a lesser efficiency. Thus, the program had some impact on their decision. Non-free riders (0 percent) are those who would not have installed any equipment within one year in the absence of the program services. The total free-ridership estimates in this report consist of pure, partial, and non free-riders.

[2] The number of survey completions for most measure categories is low because very few customers installed the measure. Thus, although a high percentage of the 2007 program participants sampled completed a survey, caution should be used when interpreting the results.

This year's approach to estimating free riders follows the approach outlined in the *Standardization Methodology* report, which consists 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 had not been offered. This approach is considered an accurate method of estimating the actual level of free-ridership among program participants because it addresses the program's impact upon 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 utility-sponsored energy efficiency programs. This method is also recommended because it 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.

One issue with the method is how to handle responses of "don't know." The "don't know" responses to the initial free-ridership question are assigned a free-ridership value of zero percent. For these cases, we then check their responses to the consistency questions and the open-ended question and adjust the free-ridership rate appropriately. Note that program total free-ridership (pure and partial) rates illustrated in the following tables are weighted by measure category kWh savings as well as the disproportionate probability of being sampled. When reviewing the measure category free-ridership rates it is important to consider the number of survey completions that the estimate is based upon.

Energy Conscious Blueprint Free-ridership Rates. Table 1-1 summarizes the total free-ridership results by measure category for 2007 Energy Conscious Blueprint installations. The total free-ridership for the 2007 program year was 13.5 percent, which is significantly lower than in 2005 and 2004, respectively. The decrease is primarily driven by custom applications, which resulted in a lower free-ridership rate in 2007.

Table 1-1
United Illuminating Energy Blueprint Program Total Participant Free-ridership Rates
All 2007 Installations

Measure Description	Total Participant Free-ridership Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	47/70	3.9%	±2.7%	34.1%	14.1%
Motors	7/11	41.0%	±18.4%	45.3%	50.5%
Cooling—Unitary	12/18	45.2%	±13.7%	48.6%	0.0%
Cooling—Other	6/7	46.7%	±12.7%	66.9%	10.7%
Variable Speed Drives	9/13	24.7%	±13.1%	7.7%	32.7%
Lighting	27/36	36.8%	±7.6%	31.9%	82.6%
Overall	**84/107**	**13.5%**	**±2.8%**	**32.5%**	**36.8%**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts: the same account may be represented in multiple measure categories.

Energy Opportunities Free-ridership Rates. Table 1-2 summarizes the total free-ridership results by measure category for 2007 Energy Opportunities installations. The total free-ridership for the 2007 program year was 13.6 percent.

Table 1-2
United Illuminating Energy Opportunities Program Total Participant Free-ridership Rates
All 2007 Installations

Measure Description	Total Participant Free-ridership Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	19/24	3.2%	±3.0%	NA	NA
Lighting	63/133	17.5%	±5.7%	NA	NA
Overall	**79/152**	**13.6%**	**±4.4%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts: the same account may be represented in multiple measure categories.

Small Business Program Free-ridership Rates. Table 1-3 summarizes the total free-ridership results by measure category for 2007 Small Business installations. The total free-ridership for the 2007 program year was 5.6 percent.

Table 1-3
United Illuminating Small Business Program Total Participant Free-ridership Rates
All 2007 Installations

Measure Description	Total Participant Free-ridership Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	63/310	5.5%	±4.2%	NA	NA
Lighting	43/155	6.3%	±5.2%	NA	NA
Overall	**81/322**	**5.6%**	**±3.7%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts: the same account may be represented in multiple measure categories.

1.4 PARTICIPANT "LIKE" SPILLOVER ESTIMATES

Spillover refers to additional energy-efficient equipment installed 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 equipment through the program in the past year and then installed additional equipment of the same type due to program influences. In contrast to free-ridership, spillover adds benefits to the program at no additional cost, increasing the program benefits and benefit-cost ratio.

Survey free-ridership questions were followed by questions designed to measure "like" spillover. These questions asked about recent purchases (since program participation in 2007) of any additional energy-efficient equipment of the same type as installed through the program that were made *without* any technical or financial assistance from the utility. A "like" spillover estimate was computed based on how much more of the same energy-efficient equipment the participant installed outside the program 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 outside the program since we are relying on customer self-reports of the quantity and efficiency of any measures installed. We used a conservative approach and reported only those measures installed outside the program that were of exactly the same type and efficiency as the ones installed through the program. Our conservative approach allowed 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, made it possible for us to use the estimated program savings for that measure to calculate the customer's "like" spillover savings.

Energy Conscious Blueprint Participant "Like" Spillover Rates. Table 1-4 presents the like spillover rate for year 2007 Energy Conscious Blueprint participants. The total spillover rate for the 2007 program year is 24.7 percent. Custom applications saw a significantly higher spillover rate than in 2005 or 2004.

Table 1-4
United Illuminating Energy Blueprint Program Participant "Like" Spillover Rates
All Year 2007 Installations

Measure Description	Total Participant "Like" Spillover Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	47/70	34.8%	±6.6%	3.1%	2.3%
Motors	7/11	0.0%	—	0.8%	17.1%
Cooling—Unitary	12/18	0.0%	—	0.9%	0.0%
Cooling—Other	6/7	7.4%	±6.6%	0.0%	0.0%
Variable Speed Drives	9/13	0.0%	—	0.0%	5.4%
Lighting	27/36	0.7%	±1.3%	0.3%	0.0%
Overall	**84/107**	**24.7%**	**±3.6%**	**1.6%**	**2.0%**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts: the same account may be represented in multiple measure categories.

Energy Opportunities Participant "Like" Spillover Rates. Table 1-5 presents the like spillover rate for year 2007 Energy Conscious Blueprint participants. The total spillover rate for the 2007 program year is 4.7 percent.

Table 1-5
United Illuminating Energy Opportunities Program Total "Like" Spillover Rates
All 2007 Installations

Measure Description	Total Participant "Like" Spillover Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	19/24	0.5%	±1.2%	NA	NA
Lighting	63/133	6.2%	±3.6%	NA	NA
Overall	**79/152**	**4.7%**	**±2.7%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts: the same account may be represented in multiple measure categories.

Small Business Participant "Like" Spillover Rates. Table 1-6 presents the like spillover rate for year 2007 Small Business participants. The total spillover rate for the 2007 program year is 7.8 percent.

Table 1-6
United Illuminating Small Business Program Total Participant "Like" Spillover Rates
All 2007 Installations

Measure Description	Total Participant "Like" Spillover Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	63/310	9.4%	±5.4%	NA	NA
Lighting	43/155	0.1%	±0.5%	NA	NA
Overall	**81/322**	**7.8%**	**±4.2%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts: the same account may be represented in multiple measure categories.

1.5 NONPARTICIPANT SPILLOVER ESTIMATES

Nonparticipant spillover refers to energy efficient measures 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. Total nonparticipant spillover would also include responses from nonparticipating designers and vendors.

The methodology for the 2007 study estimated only a portion of nonparticipant like-measure spillover based on responses from design professionals and vendors participating in National Grid, UI, and Unitil's Medium and Large Commercial programs[3]. Cape Light Compact vendors were not included in this study due to insufficient data; however, two of the three vendors that *were* indicated within Cape Light Compacts' vendor data overlapped with National Grid's vendor sample and were surveyed.

The data for the analysis could have been collected from nonparticipants directly or from the design professionals and vendors who recommended, sold, and/or installed qualifying high efficiency equipment. We chose to survey 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 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

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

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 kWh savings estimates to nonparticipant spillover. In the program tracking system database, measure-specific program kWh savings are associated with each design professional and vendor who participated in the program in 2007.

To determine nonparticipant spillover, design professionals and equipment vendors were asked (by measure category they installed in the program) 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 savings data from the program tracking system, the participating vendor nonparticipant like spillover savings could be estimated for each design professional/vendor and the results extrapolated to the total 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 specified and/or installed equipment through the program in 2007. 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 2007).

Second, this method only allows us to extrapolate nonparticipant spillover for those same measure categories that a particular design professional/vendor was associated with for the 2007 programs. Thus, if a vendor installed program-eligible equipment in other measure categories in the year 2007 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 measures like those installed through the program in 2007.

The nonparticipant spillover results for the Medium and Large Commercial and Industrial programs are based on surveys with 106 design professionals and vendors out of a population of 237 National Grid, UI, and Unitil vendors. Because of the significant overlap in sponsors' territories, as well as vendors across sponsors, we report the results in aggregate rather than by sponsor. The analysis indicates that the combined nonparticipant spillover from the medium and large commercial and industrial programs amounted to 2,603,307 kWh in the 2007 program year, which is approximately 2.6 percent of the total savings produced by these programs combined (Table 1-7).

Table 1-7
Nonparticipant "Like" Spillover Results for Program Year 2007
National Grid, Unitil, and United Illuminating Vendors

A	B	C	D	E	F	G	H	I
Survey Categories	**Vendor Population kWh Savings[4]**	**Number of Firms Surveyed with kWh Savings/ Number of Firms in Program with kWh Savings**	**Surveyed kWh Savings[5]**	**Surveyed Savings Coverage Rate (D/B)**	**Nonparticipant Spillover from Surveyed Firms (kWh)[6]**	**Estimated Spillover Percent (F/D)**	**90% CI**	**Nonparticipant Spillover Extrapolated to Population (kWh) (B*G)**
Motors	102,873	6/16	38,077	37.0%	0	0.0%	0.0%	0
HVAC	10,877,314	27/60	2,175,565	20.0%	79,149	3.6%	0.7% to 3.5%	395,726
VSD[7]	2,393,842	11/28	802,202	33.5%	115,569	14.4%	4.8% to 25.3%	344,868
Lighting	56,560,136	60/151	20,074,391	35.3%	603,572	3.0%	1.0% to 4.6%	1,700,580
Compressed Air	4,671,464	10/22	1,743,112	37.3%	60,498	3.5%	1.3% to 6.3%	162,132
Refrigeration	4,758,046	2/6	1,197,312	25.2%	0	0.0%	0.0%	0
Other[8]	19,474,884	10/33	4,998,940	25.7%	0	0.0%	0.0%	0
Total	**98,838,559**	**106/254**	**31,029,599**	**31.4%**	**858,788**	**2.6%**	**1.0% to 3.7%**	**2,603,307**

[4] The vendor population kWh savings represents the total savings for all measures for Medium and Large Commercial and Industrial programs for actual vendors. Spillover is measured for each vendor associated with the program.

[5] The total surveyed kWh savings represents the total savings for all surveyed design professionals and surveyed vendors in the program tracking system database whose names suggested they were actual vendors, not participants.

[6] Net of "like" spillover for the customers associated with the surveyed design professionals/vendors, as identified from the participating customer survey.

[7] One VSD response suggested spillover but could not respond to the percentage question (VNP3). We imputed the percentage with the values from other VSD vendors that could respond to this question. Only one case was considered in the imputation, with a value of 50 percent.

[8] "Other" is a residual category consisting of measures remaining from "Custom" after equipment was reassigned to existing categories such as "Motors," "HVAC," or "Lighting," as well as process equipment, process cooling equipment, and comprehensive chillers.

2. INTRODUCTION

This report summarizes the findings of the year 2007 Commercial and Industrial Free-ridership and Spillover Study. The emphasis of this study was to assess program free-ridership, and participant and nonparticipant "like" spillover for the following programs offered by UI (hereafter referred to as "UI Programs"):

- Energy Conscious Blueprint
- Energy Opportunities
- Small Business Programs

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 year 2007 program participants, and the design professionals and equipment vendors who were active in the year 2007 program. 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 2007 programs using survey research methods to estimate the free-ridership and spillover rates. To predict the actions of future participants or program vendors, true experimental conditions would need to be established where random assignment to groups is carried out, assumptions about measurement biases are supported or refuted, and a sufficient number of cases are available for all measure-specific estimates.

2.1 ORGANIZATION OF THE REPORT

In this introductory chapter of the report, we review the study's objectives and methodology and briefly describe each of the programs included in the year 2007 study. 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. This is followed by an overview of the participant free-ridership approach (Chapter 4), participant "like" spillover approach (Chapter 5), and nonparticipant "like" spillover approach (Chapter 6). In Chapter 7, we present the free-ridership and "like" spillover results.

Appendices A–B detail the sampling plan for the Participant and the Design Professional and Vendor spillover surveys. Appendix C documents the weighting methodology used to produce the participant free-ridership and "like" spillover estimates. Appendix D contains the survey instruments. Appendix E details customer account and program savings coverage. Appendix F contains an example of the Design Professional and Vendor spillover calculation.

2.2 STUDY OBJECTIVES

The primary objective of the year 2007 Commercial and Industrial Free-ridership and Spillover Study was to assist UI in quantifying the net impacts of their energy efficiency programs in terms of:

- Program free-ridership
- Participant "like" spillover
- Nonparticipant "like" spillover

Consistent with past studies, secondary objectives of this study were to assess programs' influence on design professionals and equipment vendors.

At this point, it is helpful to define free-ridership and spillover. A program's ***free-ridership rate*** is the percentage of program participants deemed to be free riders. A ***free rider*** refers to a customer who received an incentive through an energy efficiency program who would have installed the same or a smaller quantity of the same high efficiency measure on their own within one year 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 equipment purchase decision. Consequently, none or only some of the energy savings of equipment purchased by this group of customers should be credited to the energy efficiency program. Free riders account for costs but not benefits to the program, driving benefit–cost ratios down.

In contrast, spillover adds benefits to the program, increasing the program benefits and benefit–cost ratio. ***Spillover*** refers to additional energy-efficient equipment installed 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 equipment through the program in the past year and then installed additional equipment of the same type due to program influences.

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. The methodology for the 2007 study also estimated ***nonparticipant like-measure spillover*** based on responses from design professionals and vendors participating in National Grid, Unitil, and UI's Medium and Large Commercial and Industrial programs (it does not survey nonparticipating designers and vendors).

2.3 STUDY METHODOLOGY

To accomplish the study objectives, telephone surveys were conducted with samples of program participants in each of the programs, design professionals, and equipment vendors. The participant free-ridership and "like" spillover survey was conducted with program participants, as well as design professionals and equipment vendors who were involved in projects under the UI's Energy Blueprint and Energy Opportunities Programs. The nonparticipant spillover survey was conducted with design professionals and equipment vendors listed in National Grid, Unitil, and UI's program tracking system databases.

2.3.1 Participant Free-ridership and "Like" Spillover Surveys

The program participant survey, designed to estimate program free-ridership and participant "like" spillover, targeted participants in the UI Programs. The survey also targeted design professionals and equipment vendors identified by customers as being the most knowledgeable about the decision to install the equipment. This survey was used for estimating free-ridership for those installations where the design professional or equipment vendor was more influential in the decision than the customer.

Table 2-1 presents the number of participant accounts sampled for the year 2007 study, as well as the number of telephone surveys completed for UI programs. The telephone interviews with program participants were completed between March 28 and May 9, 2008.

The sample consisted of accounts participating in the program, rather than customers. Organizations may have multiple locations and accounts, yet may be considered one customer. Each account number associated with each organization is a unique sample point. Please refer to Appendix A for a full account of the sampling methods and plans for UI.

The methodology used for this year's study follows the Standardization Methods developed in 2003 for a group of Massachusetts energy efficiency program administrators. All sampled customers were mailed a letter on utility letterhead in advance of the telephone call. This letter explained the purpose of the call, informed customers that someone would be calling them in the next couple of weeks to ask them some questions, and thanked them for their cooperation in advance. This advance letter and repeated call attempts resulted in increased response rates, which increases the level of confidence in the survey results.

Appendix E contains a summary of the number of customer accounts in the population, the number of customer accounts, and the kWh savings covered (by measure category) by the free-ridership and spillover survey.

Table 2-1
2007 Participant Free-ridership and Spillover Survey Response Rates

	Energy Blueprint	Energy Opportunities	Small Business	Sample Total
Starting Sample	**107**	**99**	**134**	**340**
Ineligible[1]	8	2	9	19
Non-working telephone number	0	1	1	2
Adjusted Sample	**99**	**96**	**124**	**340**
Refused	2	2	9	13
Language barrier	0	0	1	1
Completed Surveys	**84**	**79**	**81**	**244**
Response Rate[2]	**85%**	**82%**	**65%**	**76%**

[1] Ineligibles include cases where measure was not installed, the contact is no longer employed, respondent said that no one there is responsible, or situations where the business is closed or the company no longer owns that building.

[2] Calculated by dividing completed surveys by adjusted sample.

2.3.2 Nonparticipant Spillover Surveys

In addition to the customer surveys, surveys were conducted with design professionals and equipment vendors who had installed equipment through National Grid, Unitil, and UI's Medium and Large Commercial and Industrial programs in 2007. This survey was used for estimating the extent of nonparticipant spillover for the programs.

The program tracking system databases contained the names of design professionals and vendors. After removing names that did not appear to be actual vendors (for example, some "vendors" were actually customers such as schools) and duplicate names, 237 design professionals and vendors remained. We attempted to complete a survey with as many of these as possible.

Table 2-2 presents the number of designers/vendors in the population, the number 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 May 2008.

Table 2-2
2007 Response Rate to the Nonparticipant Spillover Survey

	Design Professionals and Equipment Vendors Named in Participant Survey	Tracking System Design Professionals and Equipment Vendors
Starting sample	**152**	**253**
No working telephone number	0	3
Refusals	1	2
Adjusted sample	**151**	**248**
Completed surveys	**100**	**105**
Response rate	**65.8%**	**42.0%**

Interviews were completed with 100 of the 152 design professionals and equipment vendors mentioned by customers during the participant surveys (a 66 percent response rate), and 105 of the 253 design professionals and vendors from the program tracking system database who had a usable telephone number and were familiar with the program (a 42 percent response rate).

2.4 PROGRAM DESCRIPTIONS

Following is a brief description of the year 2007 programs.

Energy Conscious Blueprint. The Energy Conscious Blueprint program is offered to commercial and industrial customers involved in new construction and renovations. The program offers incentives based on the efficiency level of the equipment installed through the program. The program reviews the new building plans and recommends energy-efficient equipment and materials, which can include:

- Lighting
- Refrigeration
- Motors
- Variable Speed Drives
- Custom Projects

Energy Opportunities. The Energy Opportunities program is targeted to medium and large commercial and industrial customers. The program pays cash incentives of up to 50 percent off the installed costs to commercial and industrial customers who build energy-efficient technology into their facilities as part of a retrofit. The types of equipment eligible in 2007 under Energy Opportunities included:

- Lighting
- Custom Projects

Small Business Energy Advantage. This program pays cash incentives to small businesses lowering energy costs through the implementation of direct installs through independent contractors. These program incentives include a cash incentive of between 25 percent and 50 percent off installation costs and/or the option of interest free financing on bills for up to 36 months. The types of equipment eligible in program year 2007 under the Small Business Programs included:

- Lighting
- Custom Projects

3. INTRODUCTORY SURVEY QUESTIONS

This chapter summarizes the introductory survey questions used to identify the primary decision maker and put the decision making in context by reviewing the project. Please see Appendix D for the exact question wording used for UI. Questions used to identify the key decision-maker are discussed first. This is followed by questions designed to serve as project review for the respondent. In cases where the key decision-maker is not the customer, but is a designer/vendor, a very similar set of questions are asked of these decision makers.

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 D of this document contains the detailed free-ridership survey questions for participants. Appendix D also contains the participant "like" spillover survey, a parallel version of the free-ridership survey suitable for designers/vendors who are the decision makers, and the nonparticipant designer and 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 (i.e., measures installed, incentive amount) into the appropriate questions.

The surveys appear to be very long (on paper), but in practice, administration time averages 9–11 minutes depending on customer surveyed and number of measures installed. Many customers, especially the smaller ones, skipped right 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.

3.2 IDENTIFICATION OF KEY DECISION-MAKER(S)

UI and its evaluators recognize that identifying and surveying the key decision-maker(s) is critical for collecting accurate information on free-ridership and spillover. These questions were designed to ensure that the person(s) interviewed is the person who was most involved in the initial design and specification approval.

If the listed contact person was not the primary decision-maker, information was collected on the person at the company who was the primary decision-maker and the survey was conducted with that individual. In cases where the customer told the interviewer that a designer/vendor was the key decision-maker, the customer survey 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 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 the survey firm and UI.

Table 3-1
Identification of DecisionMaker

Intro Are you the person at your company/facility who was most involved in making the decision to install equipment through the [program] in 2007 at [address]?
I2 Do you work directly for [company] or are you a contractor who provides design and/or installation services for [company]?
Intro2 I'd like to review the [measure 1 category description, measure 2 category description] equipment you installed through [program]. **R1** Do you recall installing this [measure 1 category description] equipment through the [program] in 2007? **R2** Do you recall installing this [measure 2 category description] equipment through the [program] in 2007?
A1a,d *(IF RECALLS MEASURES)* Were you involved in the decision-making process at the when the [measure # category description] equipment was selected and specified for this facility? **A1b,e** *(IF NO)* At what point in the process did you become involved? **A1c,f** What was your role?
A2 *(ONCE DECISION MAKER IS IDENTIFIED)* Some companies/facilities work with a design professional, project architect, engineer, equipment contractor, or a utility account manager as part of the project design phase. Which individual was MOST responsible for recommending or specifying the exact type of high efficiency [measure # category description] equipment to install through the [program]? PROBE: Someone in my company, design professional, contractor, manufacturer's representative, utility account manager, or someone else?
A3 *(IF A2 IS SOMEONE OTHER THAN A PERSON AT THE COMPANY)* On a scale of 1 to 5, with 1 being no influence and 5 being a great deal of influence, how much influence did this person have on your company's/facility's decision to install high efficiency equipment so that it would qualify for the program? *(NOTE: THOSE WHO ANSWER 4 or 5 TO THIS QUESTION WILL BE ASKED THE NEXT QUESTION)*
A4 We would like to talk to the person who was most influential in recommending or specifying the efficient equipment to install through the program. This individual may be the project architect, engineer, equipment contractor, or the utility account manager. Could you give me the name and telephone number of this person?

3.3 PROJECT AND DECISION-MAKING REVIEW

The series of questions in Table 3-2 was used to help customers recall the decision-making process as well as the services received through the program. The questions also provided insight into whether the project was already planned and whether modifications to the plans were needed to participate. Questions P3 and P4 regarding plans do not in themselves

indicate any level of free-ridership. An affirmative response, however, does suggest a tendency to some level of free-ridership and the response is used later on along with the responses to the other consistency questions. Starting with this set of questions, all the free-ridership and spillover questions were asked of the first measure category prior to repeating the questions for the second measure category (if applicable).

P1 was only asked of those participants who received a technical assessment study for one or more measures. Unlike an audit, a technical assessment is defined as a significant study that examines the cost-effectiveness of installing a measure. UI provided information related to technical assistance services and cost for participants.

Table 3-2
Project and Decision-Making Review Questions

P0	*(IF TECHNICAL ASSISTANCE FLAG NOT AVAILABLE IN DATABASE)* Did your company receive a technical assessment through the [Program] program to determine the energy savings and cost-effectiveness of installing the equipment?
P1	*(IF RECEIVED TA FOR MEASURE #)* [Sponsor] paid [X%/a portion] of the [measure # technical assessment cost] to conduct a Technical Assessment Study at your company/facility to determine the cost-effectiveness of installing [measure # category description] equipment. If [Sponsor] had not paid a portion of the cost, would your company/facility have paid to have a similar Technical Assessment Study done within one year of when the study took place?[9]
P2	What factors motivated your company/facility to install this [measure # category description] equipment through the [program] in 2007?
P3	Did your company/facility have specific plans set aside to install any of this equipment ***before*** you talked with anyone about the program?[10]
P3b	*(IF YES)* What plans existed? *(Probe for timing, quantity, and efficiency)*
P4	*(IF P3=YES)* Was it necessary to change the timing of the installation, the quantity of equipment, or the efficiency level of the [measure # category description] equipment in order to qualify for the [program]?
P4a	*(IF YES)* What changes were necessary? *(Probe for timing, quantity, and efficiency)*

[9] This question is used later as part of the TA Impact to adjust free-ridership rates.

[10] Questions P3-P4b are used in the consistency analysis.

4. FREE-RIDERSHIP ESTIMATION

This chapter summarizes how participant free-ridership rates were estimated.

Before discussing actual free-ridership estimates by program and measure category, it is important to note that these *estimates were based upon customer self-reports*, and should be reviewed with some degree of caution. Over the past twenty years, a great deal of discussion has taken place regarding the estimation of free riders. Much of this discussion has centered on the limitations of using customer self-reported behavior to estimate free-ridership.

Self-reported data have five major limitations:

1. Participants may not be able to accurately recall the dynamics of their actual purchase decision. A number of individuals are often involved in the participation/purchase decision, and the ability of one individual to recall all of the issues involved may prove to be difficult.
2. Participants may not be able to accurately judge their likely purchasing choices in the absence of a program. There may be various reasons why this happens, but one explanation is they are responding after what has usually been a positive experience with the program and measure.
3. Judgment could also be influenced by program spillover. For example, the program may be impacting the stocking practices and range of equipment available through contractors and distributors, thus changing the efficiency levels of equipment available to participants and nonparticipants. Judgment could also be affected by the general nature of individuals to be optimistic when predicting what they would do and when (or what they would have done).
4. Customers may simply report what they think the interviewer wants to hear (social desirability bias). Customers may not want to admit they would purchase standard-efficiency equipment in the absence of a utility-sponsored program. This limitation is especially true for the customer who does not value energy efficiency, but would not confess to opposing something seen as a “social good.”
5. Customers may not understand the efficiency standards of the program and the costs associated with program equipment in the absence of utility incentives.

Even with these limitations, it is clear that self-reported data are, and will continue to be, an important source of free-ridership information. This is because practical alternative methods of measuring free riders, especially in the Commercial and Industrial sectors, are lacking. To the extent that customers are good at introspecting about their likely behaviors, this is a useful method for identifying the possible magnitude of free-ridership.

4.1 OVERVIEW OF PARTICIPANT FREE-RIDERSHIP APPROACH

4.1.1 Initial Free-ridership Questions

For energy efficiency programs that offer monetary incentives for multiple measure categories (e.g., motors, lighting, HVAC), it is important to estimate free-ridership by specific measure category. Category-specific estimates produce feedback on the program at the level at which it actually operates and allow 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 category-specific estimates.

It is also important to measure the *extent* of free-ridership for each customer. Pure free riders (100 percent) would have installed exactly the same quantity and type of equipment within one year in the absence of the program. Partial free riders (1–99 percent) are those customers who would have installed some equipment within one year on their own, but a smaller quantity and/or a lesser efficiency. Thus, the program had some impact on their decision. Non –free-riders (0 percent) are those who would not have installed any equipment within one year in the absence of the program services. The total free-ridership estimates in this report consist of pure, partial, and non free-riders.

This year's approach to estimating free-riders follows the methods proposed in the Standardized Methods for Free-ridership and Spillover Evaluation, which 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 had not been offered, and addresses the program's impact upon 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 utility-sponsored 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.

This series of questions first starts out by reminding the customer of the financial assistance they received for the measure category being asked about. Customers are then asked about the impact of UI's contribution/incentive and technical assistance/education on the timing, quantity, and efficiency level of the specific measure category installed, as well as the amount of money they would have spent on their own in the absence of the program. All questions are asked about each measure category installed. In cases where respondents say they would have done something differently, they are prompted to provide some estimate of the change in quantity, efficiency, or cost of the measure category (which then impacts quantity and efficiency).

We have summarized the free-ridership questions below. These questions have complex skip patterns depending on the responses to the questions. Also, please note that as these questions are drawn from the *Standardized Methodology* report, the survey wording may differ slightly, depending on the Sponsor for whom the study is conducted. The full questions are shown in Appendix D.

Table 4-1
Initial *Measure-Specific* Free-Rider Questions

According to our records, the total cost for all equipment installed at your facility in [time period] through the [program] was about [total project cost]. [Sponsor] paid about [measure # sponsor contribution] of the total cost of the [measure # category description] equipment installed through the [program]. [*NON-TECHNICAL ASSESSMENT*: You may have also received some technical assistance from a [sponsor] rep, engineer, or equipment vendor.] [*TECHNICAL ASSESSMENT*: The program also contributed toward the cost of a Technical Assessment Study.]
F1 If [sponsor] had not paid a portion of the equipment cost ***or*** provided any technical assistance or education through the [program], would your company/facility have purchased any [measure # category description] equipment ***within one year of when it was installed***? ***(TIMING)*** *(IF NO, SKIP TO CONSISTENCY QUESTIONS)*
F2 Without the program incentive, technical assistance, or education, would your company/facility have purchased the ***exact same quantity*** of [measure # category description] equipment within one year? ***(QUANTITY)*** **F2a** (IF NO) What percent of this [measure # category description] equipment do you think your company/facility would have purchased on its own within one year?
F3 What percent of this equipment would have been of the same efficiency or higher efficiency as what was installed through the program? ***(PROGRAM EFFICIENCY)***[11]
F4 Now I want to focus on what it would have cost your company/facility to install this equipment on its own without the program. Do you think your company/facility would have paid the additional [measure # sponsor contribution], on top of the amount you already paid, to install the same quantity and efficiency of [measure # category description] within one year? ***(COST)*** **F5** *(IF NO)* How would you have adjusted your purchase to accommodate the fact that you wouldn't have paid all of the costs? Would you have purchased less equipment, lower efficiency equipment, or done something else?
F6 *(If would have purchased less equipment)* What percent of the [measure # category description] equipment do you think your company/facility would have purchased on its own at the same time? **F7** *(If would have purchased lower efficiency equipment)* What percent of the [measure # category description] that your company/facility would have purchased on its own would have been of a lower efficiency than what was installed through the program?

The total free-ridership rate includes both pure and partial free-ridership. After these questions, a measure category is initially classified as a pure free rider measure (100 percent free rider) for 2007 if the customer indicated:

[11] There are measures where it may be inappropriate to ask customers the percentage of same or higher efficiency equipment that would have been installed outside of the program. These installations are "all or nothing," not between baseline and high efficiency. However, the survey asks respondents about their decisions regarding more broad measure categories. To address the concern, the survey would need to be modified to identify decisions made regarding specific technologies. For example, instead of asking only about "lighting", the survey would ask about T-5, occupancy sensors, and so on. Doing this would lengthen the survey considerably. Therefore, all customers were asked what the percentage of same or higher efficiency equipment that would have been installed outside of the program, regardless of measure category.

- They would have purchased the measure within 1 year (TIMING); AND
- They would have purchased the exact same amount (QUANTITY); AND
- All of the equipment they would have purchased would have been of similar efficiency level to what they installed through the program (PROGRAM EFFICIENCY); AND
- They would have paid for the entire measure cost (COST)[12].

If one or more of the above four conditions are not met, the measure is assigned a partial free rider (1-99 percent) or non free-rider (0 percent) rate. For measures where the customer indicated they would *not* have purchased the equipment within one year (TIMING), the free-ridership rate is 0 percent. For measures where the customer would have purchased it within one year. but the quantity, efficiency, or cost would have been different, the partial free-ridership is calculated by applying the following formula to the customer's quantity and efficiency*:*

*Initial FR =% QUANTITY * {% PROGRAM EFFICIENCY}*

where: % QUANTITY = the percent of the equipment the customer would have purchased on their own without the program; and

% PROGRAM EFFICIENCY = the percent of the equipment the customer would have purchased that would have been of an efficiency level similar to (or higher than) the program equipment.

The above calculation explicitly addresses the full range of total free-ridership (0 percent to 100 percent), based on the quantity and efficiency of any equipment that would have been installed outside of the program. The amount a customer would have paid (COST) does not factor directly into this equation. However, if a customer who otherwise is a 100 percent free rider based on responses to the TIMING, QUANTITY, and PROGRAM EFFICIENCY questions then indicates that the full cost of the measure would not have been paid, the above formula is applied to the quantity and/or efficiency percentages that the customer reports they would have made to lower the cost.

Customers that could not respond to select free-ridership questions (responding "don't know") are assigned a response of zero, assuming 0 percent free-ridership for those particular questions. Questions where don't know responses are translated to zero are:

- F2a (Percent of equipment would have purchased on own without the program)
- F3 (Percent of equipment customer would have installed without the program would have been of the same efficiency or higher efficiency as what was installed through the program)

[12] Customers who would not have paid the entire cost were then asked how they would have changed the cost—either by changing the quantity and/or the efficiency of the purchase. Changes in quantity or efficiency indicate these customers are partial free riders.

4.1.2 Consistency Questions

To improve the reliability of the total free-ridership estimates, the next set of questions serve as consistency checks for those measure categories that were assigned an initial free-ridership rate of either 0 percent *or* 100 percent. All respondents are asked consistency check questions. These consistency questions are closely reviewed for measures with an initial free-ridership rate of 0 percent or 100 percent.

The response to the last question was then qualitatively analyzed against the initial free-ridership rate. For a given measure category, if the initial free-ridership rate was ***clearly contradicted*** by the customer's response to the last open-ended consistency question, the initial free-ridership was adjusted to 50 percent (from either 0 percent or 100 percent).

Table 4-2
Consistency Checks

Consistency Checks	Initial Free-ridership Rate		
	0%	**100%**	
P3 Did your company/facility have specific plans set aside to install any of this equipment before you talked with anyone about the program? *(IF YES)* What plans existed? *(Probe for timing, quantity, and efficiency)*	Yes	No	Yes
P4 *(IF P3=YES)* Was it necessary to change the timing of the installation, the quantity of the equipment, or the efficiency level of the [measure # category description] in order to qualify for the [program]? **P4a** *(IF YES)* What changes were made? *(Probe for timing, quantity, and efficiency)*[13]	No	Not Asked	Yes
F8 Was the information or advice you received from a contractor, design team, utility rep, or an engineer a crucial factor in your decision to install this high efficiency equipment through the program at the time you did?	No	Yes	
F9 *(OPEN ENDED)* Please describe what impact, if any, the program had on your decision to install the energy efficient [measure # category description] equipment at the time you did? [14]	ASKED	ASKED	

[13] Questions P3 and P4 were asked earlier in the Project and Decision Making Review section of the survey to get the respondent thinking back to the planning process.

[14] If (FR_{int}=0% and ((P3='Yes' and P4='No') or F8='No')) or (FR_{int}=100% and (P3='No' or (P3='Yes' and P4='Yes') or F8='Yes')) then ask and evaluate F9. Interviewers were trained to probe for adequate information to allow for proper evaluation of responses to F9.

4.1.3 Technical Assessment

The next step in calculating total free-ridership is designed to recognize the impact of the utility Technical Assessment Study the programs offered to some participants. This question was asked up-front in the survey as part of the project and decision-making review. As noted earlier, a Technical Assessment Study is defined as a significant study that examines the cost-effectiveness of installing a measure. This question was only asked of those participants who received a Technical Assessment Study.

Table 4-3
Technical Assessment Study Impact Question

P1	*(IF RECEIVED TA FOR MEASURE #)* [Sponsor] paid [X%] of the [measure # technical assessment cost] to conduct a Technical Assessment Study at your facility to determine the cost-effectiveness of installing [measure # category description]. If [Sponsor] had not paid a portion of the cost, would your company have paid to have a similar Technical Assessment Study done within one year of when the study took place?

For those customers who said they would ***not*** have paid the costs to have a similar Technical Assessment Study done on their own, the total free-ridership rate of this customer's measure was reduced by an adjustment factor of 50 percent.

UI did not provide information related to Technical Assessment studies. The information received via the survey was not a reliable indicator of the Technical Assessment influence; therefore, this analysis was not included for UI.

4.1.4 Influence of Past Program Participation

The final step in calculating total free-ridership is designed to recognize that past program participation in one of UI's energy efficiency programs may have had a positive impact on a customer's behaviors as well as their decision to install equipment through the program again. The following table shows the questions regarding past program participation as well as how much a participant's free-ridership is reduced for each response (spillover is not adjusted based on responses to these questions). The first question (F10) determines if the customer participated in UI's program(s) in previous years. This question was only asked once for customers with multiple measures. The next questions (F11a–F11c) determine if the customer had positive experiences with energy efficiency due to past program participation and whether this experience(s) changed their perspectives and behaviors regarding the performance and value of energy efficiency. Questions F11a–F11c were asked of each measure category. These questions were only asked of customers who had participated in UI's programs ***prior*** to the evaluated program year.

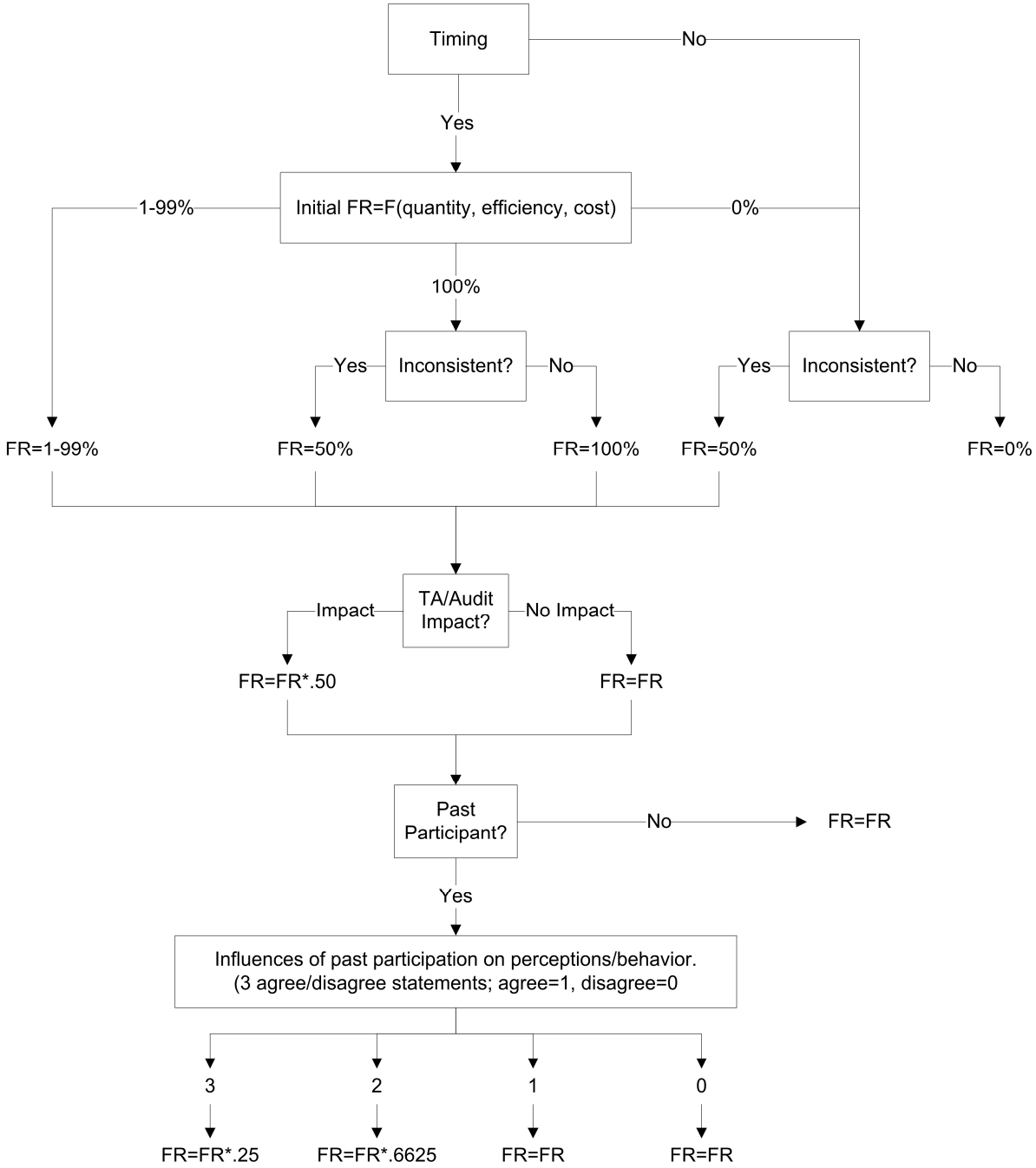
Table 4-4
Past Program Participation Impact Questions

F10 Did your company/facility participate in [sponsor's] energy efficiency [program] before you installed energy efficient equipment in 2007?
(IF YES TO F10) I'm going to read you three statements. For each statement, please tell me whether you agree or disagree that this statement applies to your company/facility. There are no right or wrong answers; we just want your honest opinion.
F11a The energy savings performance of equipment installed through the [program] in earlier years was a primary reason why we decided to install energy efficient [measure # category description] through the program in 2007. Do you agree or disagree with this statement?
F11b We asked our contractor to look into energy efficient options for [measure # category description] when developing project plans in 2007 because of our previous experience with the performance of energy efficient equipment installed through the [program], and what we learned by participating in the program. Do you agree or disagree with this statement?
F11c We took into account the cost-effectiveness of installing energy efficient [measure # category description] when evaluating different options in 2007 because of our previous experience with the performance of energy efficient equipment installed through the [program], and what we learned by previously participating in the program. Do you agree or disagree with this statement?

# of Agreements to F11a–F11c	Reduction to FR
3	**-75%**
2	**-37.5%**
1 or 0	**-0%**

4.1.5 Total Free-ridership Calculation Flowchart

The following flowchart summaries the steps described above in quantifying total free-ridership rate for each measure category installed by a customer. The free-ridership rate is then weighted for disproportionate sampling, non-response, and kWh savings. This weight is calculated taking into account the unique kWh savings associated the respondent and measure category included in the survey. See Appendix C for a discussion on weighting methodology.



4.1.6 Free-ridership Results When Key Decision-Maker was a Design Professional/Vendor

As mentioned earlier, we attempted to contact vendors and design professionals identified by program participants as being most influential in their decision to install the energy saving measures through the program. (See Section 3 of this report to see the wording of these questions: A1, A2, and A3). A separate survey tailored to these designers/vendors was administered for the purposes of estimating free-ridership. (See Appendix D).

Design professionals'/vendors' responses to the free-ridership questions superseded 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.

Participant-identified design professionals/vendors were first asked a series of introductory questions designed to verify they were most influential in the decision to install the equipment. The questions are shown in the following table.

Table 4-5
Design Professional/Vendor's Identification of Decision-Maker

Va1a, Va1d Were you involved in the decision-making process at the design stage when the [measure category] equipment was specified and agreed upon for this facility?
Va1b, Va1e *(IF NO)* At what point in the process did you become involved?
Va1c, Va1f What was your role?
VA3 On a scale of 1 to 5, with 1 being no influence and 5 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? *(NOTE: THOSE WHO ANSWER 4 OR 5 TO THIS QUESTION WILL BE ASKED THE FREE-RIDERSHIP QUESTIONS, WHICH WILL REPLACE PARTICIPANTS' RESPONSES)*

The design/vendor free-ridership survey questions are a parallel version of the customer survey questions and are not discussed here. To aid the reader when comparing the surveys and when following the algorithm logic, the parallel questions from both versions are numbered the same. Questions from the customer version of the survey that are inappropriate for designers/vendors have been omitted.

5. PARTICIPANT "LIKE" SPILLOVER APPROACH

This chapter summarizes the key participant "like" spillover questions, the rationale for asking these questions, and the flowchart and algorithm for estimating spillover for participants.

5.1 OVERVIEW OF PARTICIPANT "LIKE" SPILLOVER APPROACH

One of the issues with quantification of spillover savings is how to value the savings of energy-efficient measures installed outside the program as a result of the program. Because this is a telephone survey, we relied on customer self-reports of the quantity and efficiency of any measures installed. Experience has shown that while customers can usually 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 was program-eligible and what the savings should be. Our approach below discusses this in more detail.

5.1.1 Participant "Like" Spillover

Two methods can be used to address this problem. The first method involves follow-up inspections and measurements at facilities where customers report spillover and/or a review of the feasibility studies and project files. While costly, this allows UI to determine whether the equipment is indeed program-eligible and to estimate the potential savings that should be attributed to participant spillover.

The second method, which is much less costly and can be completed over the telephone, is to use a conservative approach and only ask participants about measures installed outside the program that ***are of exactly the same type and efficiency as the ones installed through the program*** (i.e., "like" or identical-measure spillover). This conservative approach allows us to be more certain about whether the equipment customers installed outside of the program was the same type as the program-eligible equipment. This in turn makes it possible to use the estimated program savings for that measure to calculate the customer's spillover savings.

A combined telephone survey/site visit approach could be used when the utility sponsor includes an estimate of free-ridership and spillover with an impact evaluation that requires site visits to develop an adjusted gross energy savings. In that case, we would recommend completing the telephone survey first and providing the results to the site visit engineer to identify spillover measures and help estimate spillover savings while on site.

The telephone survey questions below use the more conservative approach to estimate "like" spillover. These telephone survey questions ask about recent purchases (since program participation) of any additional energy-efficient equipment *of the same type* as installed through the program due to program influences. A spillover estimate is computed based on how much more of the same energy-efficient equipment the participant installed outside the program. The "like" spillover estimate consists of one measurement step: customer self-reports of similar equipment purchased outside the program (that was program-influenced). This step involves asking the following questions:

Table 5-1
"Like" Participant Spillover Questions

S1	Now I'd like you to think of the time since you participated in the [program] in 2007. Has your company/facility purchased and installed any [measure description category #] equipment on its own for this or other facilities served by [Sponsor]?
S1a	*(IF YES)* Was this equipment of ***the same level or a higher level of efficiency*** as the equipment you installed through the program?
S2	*(IF S1a YES)* About how much energy efficient [measure description category #] equipment did your company/facility purchase on its own since participating in this program in 2007? (*As a percent of program installation*)?
S3	*(IF S1a=YES)* Did … influence your decision to install some or all this efficient [measure description category #] equipment on your own? (a) …a recommendation by the contractor or designer who worked with you under the [program]… (b) …your experience with the energy-efficient equipment installed through the [program]… (c) …your participation in any past program offered by [Sponsor]…
S4	*(IF S1a=YES)* Why didn't you purchase this [measure category] through a [Sponsor] program?

SPILLOVER Algorithm:

If (S3a=yes AND (S3b = no AND S3c = no)) spillover = 50%.

If (S3b=yes OR S3c = yes) spillover = 100%.

If (S3a=no or don't know) AND (S3b=no or don't know) AND (S3c=no or don't know) spillover=0%

For measures identified as "like" spillover, the spillover savings are calculated using quantity installed and the initial spillover percentage classification, as determined by the above spillover algorithm. In cases where the respondent cannot answer the spillover questions, the spillover rate is assumed to be 0 percent.

For program-influenced installations, the total "like" spillover rate is calculated taking into account quantity installed through the program and program influence. For example, assume the following situation for Customer A whose new motor installations:

- Customer A reports installing an additional 50 percent of new motors outside of the program
- This decision was influenced only by a recommendation by the program contractor.

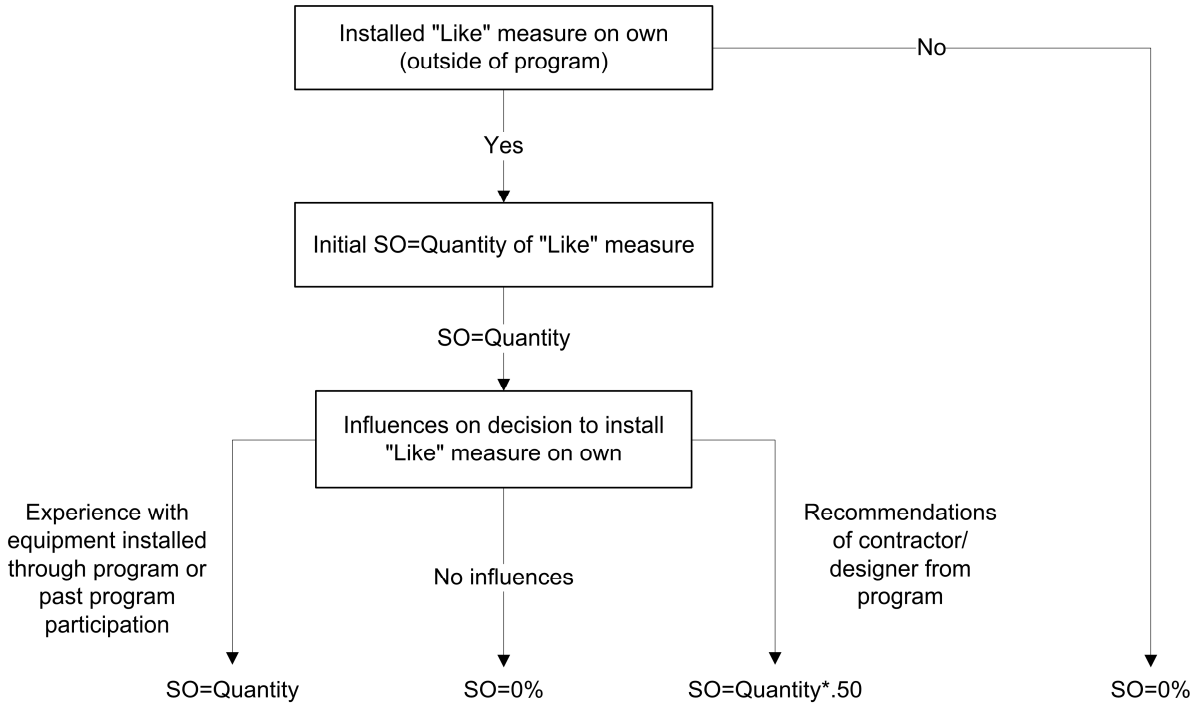
Total "like" spillover rate for Customer A is:

50% * 50% = 25%

Customer A has "like" spillover rate of 25%.

5.1.2 Participant "Like" Spillover Calculation Flowchart

The following flowchart summarizes the steps described above in quantifying "like" spillover for each measure category installed by participants. The spillover rate is then weighted for disproportionate sampling, nonresponse, and kWh savings. This weight is calculated taking into account the unique kWh savings associated with the respondent and measure category included in the survey. See Appendix C for a discussion on weighting methodology.



6. NONPARTICIPANT "LIKE" SPILLOVER APPROACH

6.1 OVERVIEW OF NONPARTICIPANT "LIKE" SPILLOVER APPROACH

Nonparticipant ***spillover*** refers to energy efficient measures 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 measures 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. 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 kWh savings associated with design professionals or vendors (by measure category) in the program tracking system database for sponsors 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 customers of utilities 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 measure 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:

1. For each design professional/vendor, the survey determined the percentage of all program-eligible equipment sold/installed outside the program in utilities' territories.
2. 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).
3. For each design professional/vendor, savings associated with this "nonparticipant spillover" equipment were determined by examining the participant database and quantities installed.
4. 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.

Step 1. Determine the Percentage of All Program-Eligible Equipment Installed Outside the Program

Using the program database, we identified which measures design professionals/vendors installed, and how those measures 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.

Table 6-1
Initial Nonparticipant Spillover Questions

VNP1	Our records show that your firm specified, sold, and/or installed [measure description category #] to Commercial and Industrial customers in [time period] through [program]. This includes equipment such as [detailed description]. Is that correct? *(Read for each measure category identified; use detailed measure descriptions to further identify the measures installed in the broad measure category)*
VNP2	*(FOR EACH MEASURE CATEGORY RESPONDED YES)* Did you specify, sell, and/or install any of this program-eligible [measure description category #] equipment to customers of [Sponsor] ***without*** an incentive?
VNP3	*(IF VNP2 = YES)* What percent of all of this [detail description] you specified, sold, and or installed for [Sponsor] customers in 2007 did ***not*** receive an incentive?

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 kWh 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.

Table 6-2
Preliminary Nonparticipant "Like" Spillover

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.

VNP5 Our past experience specifying or installing [measure description category #] through energy efficiency programs has convinced us that this equipment is cost effective or beneficial even without a program incentive.

VNP6 Because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with [Sponsor], we are better able to identify opportunities to improve energy efficiency by using high efficiency [measure description category #].

VNP7 Because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with [Sponsor], we are more likely to discuss energy efficient options with all of our customers when developing project plans for [measure description category #],

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

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

Table 6-3
Nonparticipant Spillover Consistency Checks

VNP4	In 2007, you mentioned that about [___ percent] of the [measure description category #] you specified and/or installed would have been eligible for an incentive through a [Sponsor] program, but did not receive an incentive. What are the main reasons why your firm did not request a customer incentive from a utility for this energy saving equipment you specified/installed?
VNP8	Maybe you could just describe in your own words what impact, if any, the [program] had on your decision to specify or install energy efficient [measure description 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 VVP4. 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.

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 kWh savings with each nonparticipant spillover measure for each respondent.[15]

For example, assume a vendor had 200,000 kWh savings in the program tracking system database attributable to motor 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 (200,000 kWh * 0.25/(1-0.25) = 66,667 kWh). If this vendor was assigned (in Step 2) a nonparticipant spillover rate of 100 percent for motors, the nonparticipant spillover kWh savings for that vendor remains at 66,667 kWh. 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 kWh savings for that vendor was 66,667 * 0.5 = 33,334

[15] The formula for calculating kWh savings for each measure was derived as follows:

Definitions:

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

Solve for x:

Total kWh for all program-eligible equipment= kWh savings for efficient equipment sold through program +kWh savings for efficient equipment sold outside the program = a+x
b = nonparticipant spillover/total kWh = x/(a+x)

Therefore:

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

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

kWh. 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 assumption that the same design professional or vendor was involved in the participant's "like" spillover project.

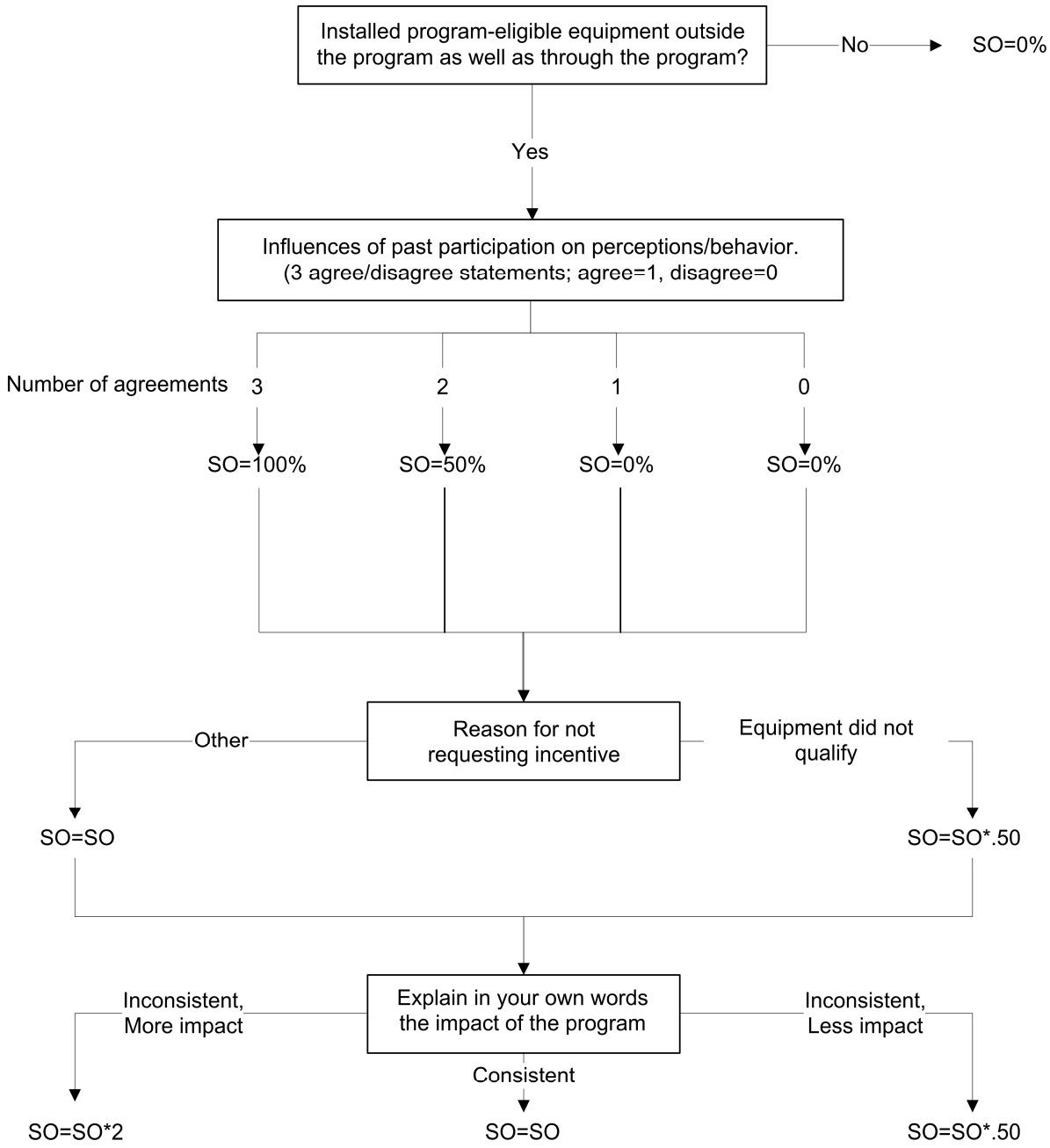
Step 4. Extrapolate the Survey Nonparticipant Spillover Savings to the Total Vendor Population Savings During the Study Period

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 kWh savings represented by vendors in the program tracking system database.

For example, if the survey covered a total of 75,857,814 kWh in measure category savings and the surveyed nonparticipant spillover totals 6,962,221 kWh for that measure category, surveyed nonparticipant spillover divided by the surveyed total kWh savings is 9.2 percent. This nonparticipant spillover was extrapolated to all vendors related to the programs by multiplying total program measure category savings represented by all vendors by 0.092.

6.2 NONPARTICIPANT SPILLOVER CALCULATION FLOWCHART

The following flowchart summarizes the steps described above in quantifying nonparticipant spillover for each measure category specified/installed by the design professionals and vendors.


Installed program-eligible equipment outside the program as well as through the program?
No
SO=0%
Yes
Influences of past participation on perceptions/behavior. (3 agree/disagree statements; agree=1, disagree=0
Number of agreements
3
2
1
0
SO=100%
SO=50%
SO=0%
SO=0%
Reason for not requesting incentive
Other
Equipment did not qualify
SO=SO
SO=SO*.50
Explain in your own words the impact of the program
Inconsistent, More impact
Inconsistent, Less impact
Consistent
SO=SO*2
SO=SO
SO=SO*.50

7. FREE-RIDERSHIP AND "LIKE" SPILLOVER RESULTS

This chapter presents the total free-ridership results, "like" spillover results, nonparticipant "like" spillover results, and trends for UI's Energy Blueprint, Energy Opportunities, and Small Business Programs.

7.1 TOTAL PARTICIPANT FREE-RIDERSHIP RESULTS

Tables 7-1 to 7-3 below present UI's total participant free-ridership estimates (pure and partial) and the corresponding 90 percent error margin for each measure category for the 2007 program year. Note that total free-ridership (pure and partial) rates illustrated in the following tables are weighted by measure category kWh savings and the disproportionate probability of being sampled (See Appendix C for further discussion on how the measure category sampling weights are derived).

When reviewing the measure category free-ridership rates 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. Thus, although a high percentage of the 2007 program customers sampled completed a survey, some caution should be used when interpreting the results.

Table 7-1
United Illuminating Energy Blueprint Program Total Participant Free-ridership Rates
All 2007 Installations

Measure Description	Total Participant Free-ridership Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	47/70	3.9%	±2.7%	34.1%	14.1%
Motors	7/11	41.0%	±18.4%	45.3%	50.5%
Cooling—Unitary	12/18	45.2%	±13.7%	48.6%	0.0%
Cooling—Other	6/7	46.7%	±12.7%	66.9%	10.7%
Variable Speed Drives	9/13	24.7%	±13.1%	7.7%	32.7%
Lighting	27/36	36.8%	±7.6%	31.9%	82.6%
Overall	**84/107**	**13.5%**	**±2.8%**	**32.5%**	**36.8%**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts; the same participant may be represented in multiple measure categories.

Table 7-2
United Illuminating Energy Opportunities Program Total Participant Free-ridership Rates
All 2007 Installations

Measure Description	Total Participant Free-ridership Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	19/24	3.2%	±3.0%	NA	NA
Lighting	63/133	17.5%	±5.7%	NA	NA
Overall	**79/152**	**13.6%**	**±4.4%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts; the same participant may be represented in multiple measure categories.

Table 7-3
United Illuminating Small Business Program Total Participant Free-ridership Rates
All 2007 Installations

Measure Description	Total Participant Free-ridership Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	63/310	5.5%	±4.2%	NA	NA
Lighting	43/155	6.3%	±5.2%	NA	NA
Overall	**81/322**	**5.6%**	**±3.7%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts; the same participant may be represented in multiple measure categories.

7.2 "LIKE" SPILLOVER RESULTS

Tables 7-4 to 7-6 summarize the participant "like" spillover results from the year 2007 study implemented with Energy Conscious Blueprint, Energy Opportunities, and Small Business Energy Advantage customers. These rates indicate additional equipment installed outside the program that was similar to equipment installed through the program.

Note that the spillover rates illustrated in the following tables are weighted by measure category kWh savings and the disproportionate probability of being sampled (See Appendix C for further discussion on how the measure category sampling weights are derived). When reviewing the measure category 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.

Thus, although a high percentage of the 2007 program customers sampled completed a survey, some caution should be used when interpreting the results.

Table 7-4
United Illuminating Energy Blueprint Program Participant "Like" Spillover Rates
All Year 2007 Installations

Measure Description	Total Participant "Like" Spillover Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	47/70	34.8%	±6.6%	3.1%	2.3%
Motors	7/11	0.0%	—	0.8%	17.1%
Cooling—Unitary	12/18	0.0%	—	0.9%	0.0%
Cooling—Other	6/7	7.4%	±6.6%	0.0%	0.0%
Variable Speed Drives	9/13	0.0%	—	0.0%	5.4%
Lighting	27/36	0.7%	±1.3%	0.3%	0.0%
Overall	**84/107**	**24.7%**	**±3.6%**	**1.6%**	**2.0%**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts; the same participant may be represented in multiple measure categories.

Table 7-5
United Illuminating Energy Opportunities Program Total "Like" Spillover Rates
All 2007 Installations

Measure Description	Total Participant "Like" Spillover Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	19/24	0.5%	±1.2%	NA	NA
Lighting	63/133	6.2%	±3.6%	NA	NA
Overall	**79/152**	**4.7%**	**±2.7%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts; the same participant may be represented in multiple measure categories.

Table 7-6
United Illuminating Small Business Program Total Participant "Like" Spillover Rates
All 2007 Installations

Measure Description	Total Participant "Like" Spillover Rate				
	# Accounts (Survey/Pop)	2007	2007 90% Error Margin	2005	2004
Custom	63/310	9.4%	±5.4%	NA	NA
Lighting	43/155	0.1%	±0.5%	NA	NA
Overall	**81/322**	**7.8%**	**±4.2%**	**NA**	**NA**

Overall survey and population participant counts do not equal the sum of measure category survey and population participant counts; the same participant may be represented in multiple measure categories.

7.3 NONPARTICIPANT "LIKE" SPILLOVER RESULTS

Nonparticipant spillover refers to energy efficient measures 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. Total nonparticipant spillover would also include responses from nonparticipating designers and vendors.

The methodology for the 2007 study estimated only a portion of nonparticipant like-measure spillover based on responses from design professionals and vendors participating in National Grid's Energy Initiative and Design 2000*plus* programs, as well as UI and Unitil's Medium and Large Commercial and Industrial programs.

The results are based on surveys with 105 design professionals and vendors out of a population of 253 National Grid, UI, and Unitil vendors. The analysis indicates that the combined nonparticipant spillover programs amounted to 2,603,307 kWh in the 2007 program year, which is approximately 2.6 percent of the total savings produced in 2007 by the programs included in the study (Table 7-9).

Nonparticipant spillover for the Small Business Services program was not estimated because of the small number of vendors involved in delivering the program.

Table 7-9
Nonparticipant "Like" Spillover Results for Program Year 2007
National Grid, Unitil, and United Illuminating Vendors

A	B	C	D	E	F	G	H	I
Survey Categories	**Vendor Population kWh Savings[16]**	**Number of Firms Surveyed with kWh Savings/ Number of Firms in Program with kWh Savings**	**Surveyed kWh Savings[17]**	**Surveyed Savings Coverage Rate (D/B)**	**Nonparticipant Spillover from Surveyed Firms (kWh)[18]**	**Estimated Spillover Percent (F/D)**	**90% CI**	**Nonparticipant Spillover Extrapolated to Population (kWh) (B*G)**
Motors	102,873	6/16	38,077	37.0%	0	0.0%	0.0%	0
HVAC	10,877,314	27/60	2,175,565	20.0%	79,149	3.6%	0.7% to 3.5%	395,726
VSD[19]	2,393,842	11/28	802,202	33.5%	115,569	14.4%	4.8% to 25.3%	344,868
Lighting	56,560,136	60/151	20,074,391	35.3%	603,572	3.0%	1.0% to 4.6%	1,700,580
Compressed Air	4,671,464	10/22	1,743,112	37.3%	60,498	3.5%	1.3% to 6.3%	162,132
Refrigeration	4,758,046	2/6	1,197,312	25.2%	0	0.0%	0.0%	0
Other[20]	19,474,884	10/33	4,998,940	25.7%	0	0.0%	0.0%	0
Total	**98,838,559**	**106/254**	**31,029,599**	**31.4%**	**858,788**	**2.6%**	**1.0% to 3.7%**	**2,603,307**

[16] The vendor population kWh savings represents the total savings for all measures for Medium and Large Commercial and Industrial programs for actual vendors. Spillover is measured for each vendor associated with the program.

[17] The total surveyed kWh savings represents the total savings for all surveyed design professionals and surveyed vendors in the program tracking system database whose names suggested they were actual vendors, not participants.

[18] Net of "like" spillover for the customers associated with the surveyed design professionals/vendors, as identified from the participating customer survey.

[19] One VSD response suggested spillover but could not respond to the percentage question (VNP3). We imputed the percentage with the values from other VSD vendors that could respond to this question. Only one case was considered in the imputation, with a value of 50 percent.

[20] "Other" is a residual category consisting of measures remaining from "Custom" after equipment was reassigned to existing categories such as "Motors," "HVAC," or "Lighting," as well as process equipment, process cooling equipment, and comprehensive chillers.

APPENDIX A: UI PARTICIPANT SURVEY SAMPLING PLAN

The data file forwarded to us by United Illuminating provides information for participants in the Energy Blueprint (EB), Energy Opportunities (EO), and Small Business (SMB) programs. Each record in the data represents a measure installed through the programs for a particular location. One account may have multiple projects, and one project may include measures installed through multiple measure 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 account[21].

This appendix discusses the steps to be used in:

- Preparation of the data file and aggregation of the participant data
- Prioritization of accounts for sampling
- Selection of the sample
- Review of the sample to identify companies with multiple sampled accounts.

This is followed by characterization of the final sample plan.

[21] Uiacct is used as the unique location identifier.

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 file[22], we identify the following measure categories. Table 1 presents the measure categories, and measure descriptions that are associated with these categories.

Table 1. Measure Category and Associated Product Descriptions

Measure Category	Measure Description
Custom	CUSTOM MEASURE CUSTOM MEASURE–LIGHTING CUSTOM, ALL CUSTOM, COOLING CUSTOM, DEMAND REDUCTION CUSTOM, DOMESTIC HOT WATER CUSTOM, DRY TYPE TRANSFORMERS CUSTOM, ENVELOPE CUSTOM, HVAC CUSTOM, PROCESS AND SYSTEMS LIGHTING, CUSTOM
	REFRIGERATION, CUSTOM
Motors	MOTOR, STANDARD (<= 200 HP)
Cooling–Unitary	• Cooling, Unitary AC & Split Systems
Cooling–Others •	COOLING–CHILLERS, ASHRAE 90.1–20 COOLING, AIR TO AIR HP, SPLIT SYSTEM
• **Variable Speed Drives**	Variable Frequency Drives (VFD)
Lighting	LIGHTING MEASURE
	LIGHTING MEASURE–EXCEEDS CODE BY 1
	LIGHTING MEASURE–EXPRESS
	LIGHTING MEASURE (30/30)
	LIGHTING MEASURE(30/30)–EXCEEDS CO
	LIGHTING MEASURE(50/30)–EXCEEDS CO
	LIGHTING, ADDITIONAL, BI-LEVEL
	LIGHTING, STANDARD
	LIGHTING, STANDARD, LED COOLER
	LIGHTING, STANDARD, LED FREEZER

[22] The field "proddescr" was used to identify the measure categories within each program.

As directed by United Illuminating, measures with no savings or no incentive values were dropped from the data. Additionally, savings data recorded as negative values were recomputed into positive values.

2) **Aggregate the records by Account Number and Measure Category**. This aggregation sets the file up so that we have one record for each account for each measure category. As we do the aggregation, we sum the kWh savings, cost[23], and incentive so that the values are represented at an account level.

   The detailed descriptions of the measures included in that measure category are retained. These descriptions are used when describing to customers what equipment is included in a measure category. Note that a review of the program dataset showed that measure descriptions are fairly generic, particularly for custom measures. Interviewers will pay particular attention to directing respondents to the measures installed through the program.

3) **Create the flat file of participants**. The next step is to create a flat file where one record represents one account. To do this, and retain all measure category-specific details, we have to create variables specific to each measure category.

   First, measure category information is captured using dichotomous variables. We start by creating variables that serve as indicators that an account received a measure through that category (i.e., mea1 = Measure Category 1, mea2 = Measure Category 2, etc.), and assign the variable a value of 1 if an account received that measure. For example, if Measure Category = 1 (Custom), then we assign mea1 a value of one. If Measure Category = 2, then we create a mea2 and assign that variable a value of one. If the account did not receive any installments in that measure category, then the variable is assigned a value of zero.

   We also create variables associated with kWh, incentive values, and costs assigned for each measure category (i.e., kWh1, kWh2, inc1, inc2, inc3, etc.). The savings details remain blank if the account did not receive installments in the appropriate measure category.

   After these preparatory steps, the complete data file can then be aggregated a final time to an account level to create a flat file. The file now includes one record for each account participating in a program.

4) **Identify priority accounts**. When designing the sample plan, we identify which measure categories will be randomly sampled. We apply a prioritization scheme when selecting cases within these randomly sampled categories. All accounts flagged priority will be sampled, followed by a random sample of non-priority accounts. Accounts are flagged as priority if:
   a. they are considered a multi-measure account (their participation in a program includes installations across more than 1 measure category), or

[23] Per discussions with UI, used TotalProjectCost.

b. the kWh savings is within the top 10 percentile of kWh savings when it is reviewed by program and measure category.

The methodology for prioritizing accounts for the Small Business program varied from above. This is because a large portion of accounts were flagged as multi-measure accounts. Only two measures are included in the Small Business program – custom and lighting measures. All lighting recipients, with the exception of 12 cases, received custom measures. And nearly half of custom measure recipients also received lighting measures. If the above detailed method for identifying priority accounts were taken, all accounts would be multi-measure accounts, and no single-measure accounts would be sampled.

Therefore, for Small Business program participants, only accounts that had savings within the top 10 percentile of kWh savings were deemed priority. All other measures were randomly sampled. This method ensured that single-measure recipients were included in the sample.

5) **Develop sample plan and determine level of precision.** After determining the number of accounts associated with a measure category, we can develop the sample plan and determine the level of precision at a 90 percent Confidence Interval. The sample plan describes the population of accounts by measure category, the number of accounts to be surveyed by measure category, and potential number of survey completes if we apply a 65 percent response rate. Note that precision levels are only applicable when a sample is drawn; therefore, we indicate "NA" for measure categories where the sample is a census of participants.

A.2 SELECTION OF THE SAMPLE

The sample is selected using the Sample Plan and desired precision level for each measure category as a guide. In general, we always want to pull the accounts identified as priority, and a census of measure categories with less than or equal to 50 accounts associated with them within a program.

The interviews discuss no more than two measure categories for each account and program the account participated in. There are accounts that have measures installed in more than two measure categories. When this happens, we apply a set of rules to select which measure categories we want to include in the study.

1) First, select rare measure categories. Measure categories deemed rare (less than or equal to 50 accounts with installations in that measure category) are kept.

2) If we have not selected two measure categories in step 1, then we determine which measure category contributes the greatest ratio of energy savings in relation to the total program energy savings for that measure category[24]. The measure categories with the highest ratios are kept until two measures are selected.

[24] KWhx = kWh savings for the measure category for the account, where x is the measure category #
p_kWhx = total kWh savings for all installments in the program within the measure category x
ratiox = kWhx/p_kWh

3) If more than two measure categories are selected in step 1 above (an account has more than two measure categories deemed rare), then we select the two rare measure categories that have the highest ratio of energy savings.

The Energy Blueprint program included participants that received three or more measures deemed rare. As a result, Table 2 shows measure categories where a census should be taken, but the number of accounts actually sampled is fewer than the population.

The account-specific information, information associated with the selected measure categories, and detailed descriptions of the measure categories are retained for the sample.

A.3 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:

- Facility/Company 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. We tend to over-group cases and let the interviewers verify differences in contacts during their first run through the groupings, rather than find out later we didn't group enough and we have to call someone back about another case.

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.

We are currently in the process of reviewing how many multiples are in each program.

A.4 CHARACTERIZATION OF THE FINAL SAMPLE PLAN AND SAMPLE

The final sample plan includes:

1) All accounts in the following program/measure categories:

a. EB: Motors, HVAC Unitary, HVAC Others, VFD, and Lighting

b. EO: Custom

2) A sample of accounts in the following program/measure categories:

a. EB: Custom

b. EO: Lighting

c. SB: Custom and Lighting

Table A-1 outlines the sampling plan for UI's 2007 study. Table A-1 also presents the sample details in terms of kWh savings, coverage, number of accounts, and projected level of precision based on a 65 percent response rate.

Table A-1
UI 2007 Free-ridership and Spillover Study Sampling Plan[25]

Program	Measure Code	Label	Population of Accounts**	Sampled Number of Accounts*	Projected Completes at 65% RR	Population kWh	Sampled kWh	Percent kWh Coverage in Sample	+/- 90% Confidence Interval at Account Level
EB	1	Custom	70	62	40	10,550,592	6,521,388	61.8%	8.0%
	2	Motors	11	8	5	133,889	129,729	96.9%	NA
	3.1	Cooling - Unitary	18	16	10	280,004	275,653	98.4%	NA
	3.2	Cooling - Others	7	7	5	580,781	580,781	100.0%	NA
	4	VSD	13	9	6	1,158,525	818,117	70.6%	NA
	5	Lighting	36	33	21	2,393,898	2,275,853	95.1%	NA
	Number of Unique Accounts in Sample: 107								
EO	1	Custom	24	24	16	8,219,566	8,219,566	100%	NA
	5	Lighting	133	80	52	22,428,450	12,902,635	58%	8.9%
	Number of Unique Accounts in Sample: 99								
SB	1	Custom	310	134	87	5,105,836	3,275,128	64%	7.5%
	5	Lighting	155	90	59	1,082,500	811,163	75%	8.5%
	Number of Unique Accounts in Sample: 134								
TOTAL SURVEYS AND kWh DATA				*340*	*221*	*51,934,041*	*35,810,013*		

Although some measures were slated to be sampled at 100% (e.g., motors), sampling rules to sample no more than 2 measures removed accounts from some measure categories .

Shading indicates a sample of Accounts will be selected. All EB and accounts with multiple measures in the top 10 percentile in savings for that measure will be sampled at 100%. All SB accounts in the top 10 percentile will be sampled at 100%.

[25] Confidence intervals are calculated taking into account free-ridership estimates. EB estimates are taken from the 2005 study results. We do not have estimates for the other program; therefore, 50 percent free-ridership is assumed in calculating confidence intervals.

APPENDIX B: NONPARTICIPANT SPILLOVER SAMPLING PLAN

A census of vendors that participated in sponsors' Medium or Large Commercial and Industrial programs are eligible to be surveyed. Not all sponsors will have their vendors represented due to insufficient data.

B.1 VENDORS AND SPONSORS INCLUDED IN THE STUDY

For this survey a vendor is defined as a company that has been identified in the program tracking database as design professional, subcontractor, installation contractor, or project expeditor for the energy efficiency project. Vendors identified as a technical assistant were not included in the sample frame if an installation contractor existed. Contacting organizations that provided technical assistance for a customer for whom we are already contacting an installation contractor would double-count the savings associated with that measure for the participant.

Small business projects were eliminated from the sample. Few unique contractors work with small business projects, and those that do are heavily invested in the program (e.g., Rise). Therefore, the analysis only represents practices with Medium to Large Commercial and Industrial customers.

Vendors are asked a quick series of questions about their installation or specification activities with the same type of program-qualifying equipment they installed through the program. Because we are asking them about the same or similar type of program qualifying equipment, it is important the preparation process retain the type of equipment installed and savings related to those projects.

Three sponsors provided sufficient enough vendor data that could be linked to participants: National Grid, United Illuminating, and Unitil. Cape Light Compact, Western Massachusetts Electric, and UI vendors are not specifically included, although there may be overlap in their vendors with the three sponsors for which we do have sample.

- Cape Light Compact provided vendor data with their participant sample; however, only three unique vendors were provided and these vendors primarily served customers within the small business program, who were filtered out in the initial selection process. In 2005 there was overlap in Cape Light Compact's and National Grid's vendor list; six out of 17 vendors overlapped with National Grid, the final data represented only five unique Cape Light Compact vendors.
- The data provided from UI and Western Massachusetts Electric provided no vendor information tied to measures and relevant savings.

B.2 SAMPLE PREPARATION

The vendors were only to be contacted once regardless of the number of states in which they provided energy efficiency services or number of programs they participated in. Each vendor was only asked about the measure categories for which they provided services and for which we have savings information.

All sponsors' program data was cleaned so that vendors' names are recorded the same (there was variance even within each sponsors' databases). In addition to cleaning the

sample names, flags were added to the dataset to indicate through which sponsor(s) and program(s) vendors provided services through. This step ensures that vendors are only contacted once, regardless of the number of times they appear in the sample or number.

In addition to cleaning vendor names, we also cleaned vendor contact name and phone information so they were consistent within and between sponsors' databases as there were often multiple contacts for a single vendor. These contacts were organized giving priority to those vendors with the highest number of projects associated with their name. In effect, those individuals with the most projects associated with them are contacted first. Contacts with the same number of projects are randomly assigned first and second contact.

Last, flags are added to indicate what measures were installed via the program so that interviewers could direct respondents' attention to similar measures sold outside of the program. Because we want vendors to think about specific measures, we recode most of the custom measures to specific measure categories based on the detailed descriptions provided by sponsors. The measure categories, for the most part, are consistent with those detailed in the participant samples with the exception of refrigeration. Several refrigeration measures were identified in the custom sample; therefore, this separate category was added to this non-participant study.

B.3 SAMPLE CHARACTERIZATION

Table B-1 shows the resulting vendor sample sizes and savings values after aggregating the sponsors' vendor data. In total, 237 vendors are included in the sample representing over 83 Million kWh savings.

As vendors may provide more than one type of measure for customers, the total number of firms does not equal the sum of the column. Additionally, nine vendors service participants of more than one sponsor program. Therefore, the sum of firms associated with specific sponsors is greater than the value represented in the column "Number of Firms in Sample."

Table B-1
National Grid, UI, and Unitil Vendor Sample Characteristics

Survey Categories	Vendor Population kWh Savings Sampled	Number of Firms in Sample	Firms Associated with National Grid	Firms Associated with UI	Firms Associated with Unitil
Motors	102,873	16	16	0	0
HVAC	10,877,314	60	52	8	3
VSD	2,393,842	28	27	0	2
Lighting	56,560,136	151	125	24	8
Transformers	0	0	0	0	0
Compressed Air	4,671,464	22	22	2	1
Refrigeration	4,758,046	6	6	0	1
Other[26]	19,474,884	33	28	10	0
Total	98,838,560	**237**	**219**	**33**	**11**

[26] "Other" is a residual category consisting of measures remaining from "Custom" after equipment was reassigned to existing categories such as "Motors," "HVAC," and "Lighting".

APPENDIX C: WEIGHTING METHODOLOGY

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

C.1 CALCULATING THE SAMPLE WEIGHT (PHASE 1 WEIGHT)

Unless a census of all measures and customers is sampled ***and*** all customers respond to the survey, completed surveys must be weighted to represent population savings. This was not achieved for all measure categories.

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

Because our population of interest was technically the savings, we used *measure category savings* to determine the weight that should be applied to each case. The measure category savings were stratified by priority and non-priority cases[27]. Priority cases were sampled at 100 percent. Including this stratification in the weighting scheme ensured the accounts sampled at 100 percent were not overrepresented, and the sampled accounts (sampled at less than 100 percent) were represented appropriately.

Measure categories that were not sampled, but where a census was included in the study, were assigned a weight of one. In other words, the data is not adjusted when the weight is applied. Because these measure categories are not sampled, there is no need to correct for disproportional sampling.

The following table is an example of weights applied to a sample stratified by measure category. 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 "Complete" and "Measure Weight" columns, respectively. To calculate the "Measure Weight" for a given "Strata," we divided the "Percent of Measure Category Population" by the "Percent of Completed Surveys".

[27] As discussed in the sampling plan, priority cases are accounts that reside in New Hampshire, cases that are considered multi-measure accounts, and accounts that represent the top 10 percentile of kWh savings.

Table C-1
Examples of Weighting Calculations Using Five Measure Categories

Measure Category	Strata (priority/ non-priority)	Population of Savings	Percent of Measure Category Population	Surveyed Savings	Percent of Savings Surveyed	Measure Weight
1 Custom	Priority	10,654,345	69.5%	6,273,424	75.7%	0.9
	Non-priority	4,675,943	30.5%	2,019,136	24.3%	1.3
	Total	*15,330,288*	*100.0%*	*8,292,560*	*100.0%*	
2.1 Motor: New	Census	233,603	100.0%	191,420	81.9%	1.00
3.1 HVAC: Unitary	Priority	1,624,981	79.8%	1,259,891	91.6%	0.9
	Non-priority	412,100	20.2%	115,069	8.4%	2.4
	Total	*2,037,082*	*100.0%*	*1,374,960*	*100.0%*	
3.2 HVAC: Non-unitary	Census	1,047,818	100.0%	620,139	59.2%	1.00
5 Lighting	Priority	5,828,297	66.7%	5,174,365	81.3%	0.8
	Non-priority	2,915,645	33.3%	962,567	18.7%	1.8
	Total	*8,743,943*	*100%*	*5,136,933*	*100.0%*	

C.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 per account surveyed. The data is then analyzed taking into account the kWh savings.

Conducting this next step determines the net free-ridership rate, and ensures the overall free-ridership rates are computed taking into consideration the kWh savings for each individual account. The free-ridership rate 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 rates, particularly when the sample sizes are small.

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

Case A:	**Case B:**
Situation	
Received Custom measures	Received Custom 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: Determine measure weights (discussed in prior section)	
Measure weight = 0.9	Measure weight = 1.3
Step 2: Compute measure category-weighted kWh	
Adjusted kWh=10,000*0.9 = 9,000	Adjusted kWh = 1,000*1.3 = 1,300
Step 3: Calculate kWh associated with the free-ridership based on the measure category weighted kWh, calculated in Step 2	
FR savings = 9,000*.75 = 6,750	FR savings = 1,300*.25 = 325
Step 4: Sum the free-ridership attributed savings and population savings.	
Total FR attributed savings: 6,750 + 325 = 7,075 kWh Population savings: 9,000 + 1,300 = 10,300 kWh	
Step 5: Divide the Total FR attributed savings by population savings to determine free-ridership rate.	
Net free-ridership rate = 7,075/10,300 = 68.7%	

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

C.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 kWh associated with that measure and account.

Measure weight = sample weight * individual kWh savings

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

APPENDIX D: SURVEY INSTRUMENTS

D.1 2007 ADVANCE LETTERS

The United Illuminating Company
157 Church Street
P.O. Box 1564
New Haven, CT 06506-0901
203.499.2000

ID: <ID>

<DATE>

Dear <CUSTOMER>

United Illuminating is currently in the process of evaluating our Energy Conscious Blueprint and Energy Opportunities programs. This evaluation will allow us to improve the existing program and to design future program changes to ensure the highest level of program performance for our customers.

Within the next few weeks, you will be receiving a telephone call to ask about your experiences with our program in 2007, and the factors that were important to your company when deciding to install equipment through our program. We have hired PA Consulting Group, a professional research firm, to help design and conduct the study on our behalf. The survey should take less than 15 minutes of your time, and you can be assured that United Illuminating and PA Consulting Group will keep all of your answers strictly confidential. No information that could be used to identify your business will be published or provided to anyone outside of our company.

If you have any questions about the purpose of the study or its use, please feel free to contact me at (203) 499-3686. If you would like to call PA Consulting Group to complete the survey at your convenience, feel free to call their toll-free number (1-800-454-5070).

Thank you in advance for your help with this important study.

Sincerely,

Paul M. Gray C.E.M
Sr. Business Development Professional

D.2 2007 PARTICIPANT FREE-RIDERSHIP AND SPILLOVER SURVEYS

The following survey instruments are included in this section. Electronic MS Word versions are also included in the user's guide.

- UI Free-ridership and Spillover Survey
- 2007 Design Professional and Equipment Vendor Nonparticipant Spillover Survey

D.2.1 UI Free-ridership and Spillover Survey

Variable List
<CONTACT> = Customer Contact Name
<PROGRAM> = Small Business Program, Large C&I New Construction Program, Large C&I Retrofit Program will be filled from the sample.
<CUST> = Customer/Facility Name
<ADDR> = Service address where equipment was installed
<MEASCAT1, MEASCAT2> = End-use Category (i.e. Lighting)
<READ> = Measure description
(Read1a-Read1h), (Read2a-Read2h) = detailed measure descriptions
<TA> = 1 If a Design Grant was listed
<TACOST> = Total cost paid by utility for a Design Grant
<INC1, INC2> = Utility incentive for measure category

Intro. Hello, my name is __, and I'm calling on behalf of United Illuminating, your electric utility. May I speak with <NAME>?
Are you the person at your company/facility who was most involved in making the decision to install equipment through the <PROGRAM> in 2007 at <ADDR>?

1. Yes [SKIP TO I2]
2. No [SKIP TO I1A]
D (DK) [THANK AND TERMINATE]
R (REFUSED) [THANK AND TERMINATE]

I1a. Who at your company/facility made the decision to install this equipment through the program?

1. Transfers you
2. Can only give contact information [THANK AND TERMINATE]
D. (DK) [THANK AND TERMINATE]
R. (REFUSED) [THANK AND TERMINATE]

I2. Do you work directly for <CUST> or are you a contractor who provides design and/or installation services for <CUST>?

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

INTRO1:
I'm with PA Consulting, an independent research firm. On behalf of United Illuminating, we are following up with customers who participated in its <PROGRAM> to learn about their experiences. You or someone at your facility may have received a letter letting you know about this call. I'm not selling anything, I'd just like to ask about the equipment you installed at <ADDR>. Your responses will be confidential, and this should take about 15 minutes.

(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; I simply want to understand what factors were important to your company when deciding to purchase new equipment through this program. Your responses will be kept confidential by our firm and the utility. If you would like to talk with someone from United Illuminating, you can Paul Gray at (203) 499-3686.)

INTRO2:
I'd like to review the <MEASCAT1,MEASCAT2> equipment you installed through the <PROGRAM>. The <PROGRAM> is sponsored by United Illuminating and provides financial and technical assistance for the installation of energy efficient equipment.

R1. According to our records, the <MEASCAT1> you installed through the program included:
<READ1a-READ1h>

Do you recall installing <MEASCAT1> equipment through the <PROGRAM> in 2007?

1. Yes [SKIP TO A1a]
2. No
3. (This equipment was never installed)
   [SKIP TO MEASCAT2; ELSE THANK/TERMINATE]

D (DK)
R (REFUSED)

R1a. Is there someone else at your facility who would be more familiar with this equipment?

1. Yes - Continue (ENTER CONTACT INFO)
2. Yes – Not available (ENTER CONTACT INFO)
3. No
4. Contact no longer with the company

[IF # OF MEASURE CAEGORIES = 2, SKIP TO M2, ELSE THANK/TERMINATE]

Go through interview with other contact if available, otherwise set callback and update contact information.

A1a. Were you involved in the decision-making process at the design stage when the <MEASCAT1> equipment was specified and agreed upon for this facility?

1. Yes [IF NUMBER OF MEASURES = 2, SKIP TO M2, ELSE SKIP TO INTRO3a]
2. No

D (DK)

A1b. At what point in the process did you become involved?

(Open end)
(DK)
(REFUSED)

A1c. What was your role?

(Open end)
(DK)
(REFUSED)

M2. [IF NO SECOND MEASURE, SKIP TO INTRO3a]

R2. According to our records, the <MEASCAT2> you installed through the program included:
<READ2a-READ2h>

Do you recall installing <MEASCAT2> equipment through the <PROGRAM> in 2007?

1. Yes [SKIP TO A1d]
2. No
3. (This equipment was never installed) [SKIP TO S1 IF INSTALLED MEASURE CATEGORY 1, ELSE TERMINATE]

D (DK)
R (REFUSED)

R2a. Is there someone else at your facility who would be more familiar with this equipment?

1. Yes -CONTINUE (ENTER CONTACT INFO)
2. Yes- NOT AVAILABLE (ENTER CONTACT INFO)
3. No
4. Contact no longer with the company
   [IF DIDN'T RECALL MEASURE 1, MEASURE 1 WAS NOT INSTALLED, OR R WAS NOT THE CONTACT FOR MEASURE 1, TERMINATE, ELSE SKIP TO INTRO3A AND ONLY ASK QUESTIONS FOR MEASURE 1.]

A1d. Were you involved in the decision-making process at the design stage when the <MEASCAT2> equipment was specified and agreed upon for this facility?

1. Yes [SKIP TO INTRO3a]
2. No

D (DK)

A1e. At what point in the process did you become involved?

(Open end)
(DK)
(REFUSED)

A1f. What was your role?

(Open end)
(DK)
(REFUSED)

NOTE: For any cases where the interview terminates early (respondent doesn't recall measures, measures not installed, contact no longer with the company and we cannot locate a knowledgeable respondent) the cases will be pulled and sent to United Illuminating for review.

START OF MEASURE LOOP. A2 through S4A will be asked of each measure category recalled–up to TWO measures.

INTRO3a:
Now, I'd like to ask you some questions about your decision to install <MEASCAT1> equipment.
[IF THERE IS ALSO A SECOND MEASURE]
Then, I'll repeat these questions for <MEASCAT2> equipment.

INTRO3b: [IF SECOND MEASURE]
Now I'd like to review the <MEASCAT2> equipment you installed.

A2. Some companies/facilities work with a design professional, project architect, engineer, equipment contractor, or a utility account manager as part of the project design phase. Which individual was MOST responsible for recommending or specifying the exact type of high efficiency <MEASCAT1,MEASCAT2> equipment to install through the <PROGRAM>?

READ LIST, RECORD ALL THAT APPLY

1. Someone in my company (Meaning respondent or respondent is part of a committee) [SKIP to P0]
2. Design professional
3. Contractor
4. Manufacturer's representative
5. Utility account manager
6. Someone else

D (DK) [SKIP to P0]
R (REFUSED) [SKIP to P0]

(NOTE: if respondent answers DK or REF to A2 and cannot answer P series, the directives are as follows.

- *If number of Measure Categories = 1, thank and terminate interview.*

- *If number of Measure Categories = 2, and asking about MEASCAT1, exit this measure category loop and enter second measure category loop at Intro3a.*
- *If number of Measure Categories = 2 and asking about MEASCAT2, exit loop and skip to GS1.*

A3. On a scale of 1 to 5, with 1 being no influence and 5 being a great deal of influence, how much influence did this person have on your company's/facility's decision to install high efficiency equipment so that it would qualify for the program?

1. No influence at all
2. 2
3. 3
4. 4
5. A great deal of influence

D (DK)

PROJECT OVERVIEW

P0 Did your company receive a Technical Assessment study through United Illuminating's [PROGRAM] program to determine the cost-effectiveness of installing the <MEASCAT1> equipment?

[NOTE: A TECHNICAL ASSESSMENT IS A SIGNIFICANT STUDY OF SPECIFIC MEASURES. IT IS MORE INVOLVED THAN A FACILITY AUDIT]

1 Yes
2 No
D Don't know

[IF P0=No or DK, SKIP TO P2]

P1. United Illuminating paid a portion of the cost to conduct an Assessment Study at your facility to determine the cost-effectiveness of installing <MEASCAT1,MEASCAT2> equipment.
If United Illuminating had not paid a portion of the cost, would your company have paid to have a similar Assessment Study done within one year of when the study took place?

[NOTE: AN ASSESSMENT IS A SIGNIFICANT STUDY OF SPECIFIC MEASURE OR FACILITY BY AN ARCHITECT OR ENGINEER. IT IS MORE INVOLVED THAN A FACILITY AUDIT]

1. Yes
2. No

D DK

P2. What factors motivated your company/facility to install this <MEASCAT1,MEASCAT2> equipment through the <PROGRAM> in 2007?

DO NOT READ LIST. PLEASE CHOOSE ALL THAT APPLY.

1. (To reduce maintenance costs)
2. (To reduce initial purchase costs)
3. (The program incentive)
4. (The technical assistance offered)
5. (To reduce energy bills/save money)
6. (To improve efficiency/save energy)
7. (Took the advice of my installer/designer/contractor/utility rep)
8. (Because of my past program participation)
9. (Other - specify)
10. (DK)
11. (REFUSED)

P3. Did your company/facility have specific plans set aside to install any of this equipment before you talked with anyone about the program?

1. Yes
2. Yes, but don't remember specifics [SKIP TO P4]
3. No [SKIP TO ATXT3]

D (DK) [SKIP TO ATXT3]
R (REFUSED) [SKIP TO ATXT3]

P3b. (IF YES) What plans existed?

Open text window
(DK)
(REFUSED)

P4. Was it necessary to change the timing of the installation, the quantity of equipment or the efficiency level of the <MEASCAT1,MEASCAT2> equipment 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]

P4A. What changes were necessary?

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)
8. (DK)
9. (REFUSED)

FREE-RIDERSHIP

ATXT3
According to our records, United Illuminating paid about <INC1, INC2> of the total cost of the <MEASCAT1, MEASCAT2> equipment installed through the <PROGRAM> program.

[IF TA – The program also contributed toward the cost of an Assessment study.]
[IF NO TA – You might also have received some technical assistance from a United Illuminating rep, engineer or equipment vendor.]

F1. If United Illuminating had not paid a portion of the equipment cost OR provided any technical assistance or education through the <PROGRAM>, would your company/facility have purchased any <MEASCAT1,MEASCAT2> equipment within one year of when it was installed?

1. Yes
2. No [SKIP TO F8]
D (DK) [SKIP TO F8]

F2. Without the program incentive, technical assistance, or education, would your company/facility have purchased the exact same quantity of <MEASCAT1,MEASCAT2> equipment within one year?

1. Yes [SKIP TO F3]
2. No
D (DK)

F2a. What percent of this <MEASCAT1,MEASCAT2> equipment do you think your company/facility would have purchased on its own within one year?
(PROBE: Would you have purchased about one- fourth (25 percent), one-half (50 percent), three fourths (75 percent) of what you installed through the program?)

____ ENTER PERCENTAGE (0-100%, 998=DK/REF)
(IF=0, SKIP to F4)

F3. You said your company/facility would have installed [IF F2=1 SHOW: all the] [IF F2=2 OR F2=D SHOW: at least some] <MEASCAT1,MEASCAT2> equipment on its own if the program had not been available. What percent of this equipment would have been of the same efficiency or higher efficiency as what was installed through the program?
(PROBE: Would about one-fourth (25 percent), one-half (50 percent), three fourths (75 percent) been of equal efficiency?)

____ ENTER PERCENTAGE (0-100%, 998=DK/REF)

IF F1=1 AND F2=1 AND F3=100%, ASK F4 TO F7; ELSE SKIP TO F8

F4. Now I want to focus on what it would have cost your company/facility to install this equipment on its own without the program. Do you think your company/facility would have paid the additional <INC1,INC2> on top of the amount you already paid, to install the same quantity and efficiency of <MEASCAT1,MEASCAT2> equipment within one year?

1. Yes [SKIP TO F8]
2. No
D (DK)

F5. How would you have adjusted your purchase to accommodate the fact that you wouldn't have paid all of the costs? Would you have purchased less equipment, lower efficiency equipment, or done something else?
[INDICATE ALL THAT APPLY]

1. Purchased less equipment [ASK F6]
2. Purchased lower efficiency of equipment [ASK F7]
3. (Done something else, specify) [SKIP TO F10]
4. (DK) [SKIP TO F10]

[IF F5=1]

F6. What percent of the <MEASCAT1,MEASCAT2> equipment do you think your company/facility would have purchased on its own at that same time?
(PROBE: Would you have purchased about one- fourth (25 percent), one-half (50 percent), three fourths (75 percent) of what you installed through the program?)

____ ENTER PERCENTAGE (0-100%, 998=DK/REF)

[IF F5=2]

F7. What percent of the <MEASCAT1,MEASCAT2> that your company/facility would have purchased on its own would have been of a lower efficiency than what was installed through the program? (PROBE: Would about one-fourth (25 percent), one-half (50 percent), three fourths (75 percent) been of lower efficiency?)

____ ENTER PERCENTAGE (0-100%, 998=DK/REF)

ASK F8 IF F1=2 OR F1= D OR (F1=1 AND F2=1 AND F3=100 AND F4=1); ELSE SKIP TO F10.

F8. Was the information or advice you received from a contractor, design team, utility rep, or an engineer a crucial factor in your decision to install this high efficiency equipment through the program at the time you did?

1 Yes
2 No
3 No information received
D (DK)

ASK F9 IF ((F1=2 OR F1=D) AND (P4=3 OR F8=2)) OR
((F1=1 AND F2=1 AND F3=100% AND F4=1) AND (P3=3 OR (P4=1 or 2) OR F8=1));
ELSE SKIP TO F10.[28]

F9. I'd like to better understand your purchase decision. Please describe what impact, if any, the program had on your decision to install the energy efficient <MEASCAT1,MEASCAT2> equipment at the time you did?

Open text window
(DK)
(REFUSED)

(ASK F10 ONLY AFTER FIRST MEASURE, SKIP WHEN LOOPS THROUGH SECOND MEASURE, IF APPLICABLE)

F10. Did your company/facility participate in United Illuminating's energy efficiency <PROGRAM> before you installed energy efficient equipment in 2007?

1. Yes
2. No [SKIP TO N1]
D (DK) [SKIP TO N1]

(ASK F11 AFTER EACH MEASURE IF F10=1)

F11. 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/facility. There are no right or wrong answers; we just want your honest opinion.
(REPEAT IF NECESSARY)
0 Disagree
1 Agree
D (DK)

[28] This is a consistency check. Ask if 1) it was not necessary to change the timing of the installation (P4=3) but would not have or don't know if would have purchased the equipment without the help of utility (F1=2 or F1=3) – OR – 2) Company did not have specific plans to install equipment (P3=3) or (they did have plans and it was necessary to change their plans (P4-1 or P4=2)) or they were influenced by a contractor/utility (F8=1) BUT they say they were going to install 100 percent of the same equipment at that time.

A. The energy savings performance of equipment installed through the <PROGRAM> in earlier years was a primary reason why we decided to install energy efficient <MEASCAT1,MEASCAT2> through the program in 2007.
Do you agree or disagree with this statement?

B. We asked our contractor to look into energy efficient options for <MEASCAT1,MEASCAT2> when developing project plans in 2007 because of our previous experience with the performance of energy efficient equipment installed through the <PROGRAM>, and what we learned by participating in the program.
Do you agree or disagree with this statement?

C. We took into account the cost-effectiveness of installing energy efficient <MEASCAT1,MEASCAT2> when evaluating different options in 2007 because of our previous experience with the performance of energy efficient equipment installed through the <PROGRAM>, and what we learned by previously participating in the program.
Do you agree or disagree with this statement?

N1. Does your company or business have policies or formal specifications to follow when purchasing new <MEASCAT1, MEASCAT2> equipment in terms of size, brand, efficiency, payback, and so forth?

1 Yes
2 No

N2. (IF HAS SPECIFICATIONS) What is specified in these policies or specifications?
(IF NO SPECIFICATIONS) What are some of the main factors you consider when deciding what type of new equipment to purchase?

1 Payback criteria
2 Return on investment
3 Efficiency level of equipment
4 Size
5 Brand
6 Cost
7 Other (specify) _____

SPILLOVER

S1. Now I'd like you to think of the time since you participated in the <PROGRAM> in 2007. Has your company/facility purchased and installed any <MEASCAT1,MEASCAT2> equipment on its own for this or other facilities served by United Illuminating?

1. Yes
2. No [SKIP TO SKIP1]
D (DK) [SKIP TO SKIP1]

S1a. Was this equipment of THE SAME EFFICIENCY LEVEL OR A HIGHER LEVEL OF EFFICIENCY as the equipment you installed through the program?

1. Yes
2. No [SKIP TO SKIP1]
D (DK) [SKIP TO SKIP1]

S2. About how much energy efficient <MEASCAT1,MEASCAT2> equipment did your company/facility purchase on its own since participating in this program in 2007?

(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 amount as you installed through the program, twice as much as what you installed through the program or some other amount?)

____ ENTER PERCENTAGE (9998=DK/REF)

S3a. Did a recommendation by the contractor or designer who you worked with under the <PROGRAM> influence your decision to install some or all this efficient <MEASCAT1,MEASCAT2> equipment on your own?

1. Yes
2. No
D (DK)

S3b. Did your experience with the energy efficient equipment installed through the <PROGRAM> influence your decision to install some or all this efficient <MEASCAT1,MEASCAT2> equipment on your own?

1. Yes
2. No
D (DK)

S3c. Did your participation in any past program offered by United Illuminating influence your decision to install some or all this efficient <MEASCAT1,MEASCAT2> equipment on your own?

1. Yes
2. No
D (DK)

S4. Why didn't you purchase this <MEASCAT1,MEASCAT2> equipment through a United Illuminating program?

01 (Too much paperwork)
02 (Cost savings not worth the effort of applying)
03 (Takes too long for approval)
04 (The equipment would not qualify)
05 (Vendor does not participate in program)
06 (Outside United Illuminating's service territory)
07 (No time—needed equipment immediately)
08 (Thought the program ended)
09 (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)
13 (DK)

GO TO SKIP1 IF S4 NOT=04

S4a. Why wouldn't the equipment qualify?

Open text window
(DK)
(REFUSED)

SKIP1
[REPEATS QUESTIONS BEGINNING FROM **INTRO3b** FOR SECOND MEASURE – IF NO OTHER MEASURES, CONTINUE]

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

Open text window
(DK)
(REFUSED)

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

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
D (DK)

A4. (ASK IF A3=4 or 5)
We would like to talk to the person who was most influential in recommending or specifying the efficient equipment to install through the program. This individual may be the project architect, engineer, equipment contractor, or the utility account manager. 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
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.

D.2.2 Design Professional and Equipment Vendor Nonparticipant Spillover 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>, <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
<TOTCOST> = Total project cost (customer cost+utility cost) for an account (by program)
<UTILITY1>, <UTILITY2> = Utilities/Sponsors the vendor has worked with on energy efficiency projects
<PROGRAM1>- <PROGRAM4> = Utility/sponsor programs the vendor has been involved with
<COMP> = utility/sponsor name
<ME1-ME9> = types of equipment specified/sold as part of spillover questions

Procedure

The vendors identified in the sponsor databases are asked the nonparticipant spillover questions starting with Intro4. We will focus on reaching the contacts listed in the database. This section of the survey will be separate from the free rider questions asked of customer-identified vendors.

The customer-identified vendors are exported from each sponsor study and combined into a single sample file. This file is checked for missing contact information and we fill in phone numbers where we can. Cases will then be sorted by company, contact and phone number to identify “multiples”. Cases with the same contact names are called together and the contact is alerted that they have been referred by more than one customer. This set of sample cases receive the free-rider questions only.

SKIP TO INTRO4 IF VENDOR DOES NOT GET ASKED THE FREE-RIDERSHIP QUESTIONS

Intro. Hello, my name is __, and I am calling on behalf of <UTILITY1, UTILITY2>. We are talking with some of the design professionals and contactors who were involved with the <PROGRAM1, PROGRAM2> in 2007. 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 2007.

(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 <COMP>. 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

[VENDORS ARE ASKED THE FREE-RIDERSHIP QUESTION IF THE CUSTOMER IDENTIFIES THEM AS BEING MOST INFLUENTIAL IN THE DECISION TO INSTALL EFFICIENT EQUIPMENT. WHERE MULTIPLE CUSTOMERS HAVE IDENTIFIED THE SAME VENDOR, THE FREE-RIDERSHIP QUESTIONS WILL BE ASKED SEPARATELY FOR EACH ACCOUNT WHERE THEY INSTALLED EQUIPMENT]

INTRO2: I'd like to review the <MEASCAT1, MEASCAT2> you recommended or specified through the <PROGRAM> for <COMP>.

VR1. Do you recall recommending or specifying <MEASCAT1>, which included <DESC1> for <CUST> at <ADDR> through the <PROGRAM> in 2007?

1 Yes [SKIP TO V1a]
2 No
3 This equipment was never installed [IF NUMBER OF MEASURE CATEGORIES=2, SKIP TO M2; ELSE SKIP TO END]
D (DK)
R (Refused)

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

1 Yes - Continue (ENTER CONTACT INFO & TRANSFER)
2 Yes – Not available (ENTER CONTACT INFO & EXIT)
3 No – Continue
4 Contact no longer with the company

[IF # OF MEASURE CATEGORIES = 2, SKIP TO M2, ELSE SKIP TO END]

Go through interview with other contact if available, otherwise set callback and update contact information.

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

1 Yes [IF # OF MEASURE CATEGORIES=2, SKIP TO M2, ELSE SKIP TO INTRO3a]
2 No
D (DK)

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

(Open end)
(DK)
(REFUSED)

V1c. What was your role?

(Open end)
(DK)
(REFUSED)

M2. (IF NO SECOND MEASURE, SKIP TO INTRO3a)

VR2. Do you recall recommending or specifying <MEASCAT2> which included <DESC> for <CUST> at <ADDR> through the <PROGRAM> in 2007?

1 Yes [SKIP TO V2a]
2 No
3 This equipment was never installed [SKIP TO INTRO3a 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 equipment?

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 MEASURE 1, MEASURE 1 WAS NOT INSTALLED, OR R WAS NOT THE CONTACT FOR MEASURE 1, SKIP TO END; ELSE SKIP TO INTRO3a AND ONLY ASK QUESTIONS FOR MEASURE 1]

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

1 Yes
2 No
D (DK)

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

(Open end)
(DK)
(REFUSED)

V2c. What was your role?

(Open end)
(DK)
(REFUSED)

START OF MEASURE LOOP. VA3 through VF10 will be asked of each measure category recalled–up to TWO measures.

INTRO3a:
Now, I'd like to ask you some questions about your decision to recommend <MEASCAT1> equipment.
[IF THERE IS ALSO A SECOND MEASURE]
Then, I'll repeat these questions for <MEASCAT2> equipment.

INTRO3b: [IF SECOND MEASURE]
Now I'd like to review the <MEASCAT2> equipment you recommended.

VA3. On a scale of 1 to 5, with 1 being no influence and 5 being a great deal of influence, how much influence did your firm have on specifying the efficiency levels or features of <MEASCAT1> so that it would qualify for the program?
(NOTE: IF VA3 < 4 AND NO OTHER MEASURE, SKIP TO SPILLOVER; IF VA3<4 AND ANOTHER MEASURE CATEGORY, REASK VA3 OF SECOND MEASURE CATEGORY; ELSE SKIP TO VP1a)

1. No influence at all
2. 2
3. 3
4. 4
5. A great deal of influence

D (DK)

The next set of questions ask about <CUST>'s planning and installation decisions through <PROGRAM> in 2007.

[IF TA=0 SKIP TO VP3]

VP1a. <COMP> paid <TA%> of the <TACOST> to conduct a Technical Assessment Study for <CUST> to determine the cost-effectiveness of installing <MEASCAT1, MEASCAT2> equipment. If <COMP> had not paid a portion of the cost, do you think <CUST> would have paid <TACOST> to have a similar Technical Assessment Study done within one year of when the study took place?

1. Yes
2. No

D (DK)

VP3. As far as you know, did <CUST> have specific plans set aside to install any of this equipment before you talked with them about the program?

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

VP3b. (IF YES) What plans existed?

Open text window
(DK)
(REFUSED)

VP4. Was it necessary to change the timing of the installation, the quantity of equipment or the efficiency level of the <MEASCAT1, MEASCAT2> equipment 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]

VP4a. 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)

VATXT3
According to our records, [IF COMP=NATIONAL GRID OR CLC OR UNITIL: the total cost for all equipment installed at <CUST>'s facility was about <TOTCOST>.] <COMP> paid about <INC1, INC2> of the total cost of the <MEASCAT1, MEASCAT2>. <CUST> may have also received some technical assistance from <COMP> or a contribution toward the cost of a technical assessment study.

VF1 Would your company have recommended or specified any <MEASCAT1, MEASCAT2> to <CUST> within one year of when it was installed if they had not been able to receive a program incentive or any technical assistance or education through the [program]?

1 Yes
2 No *(SKIP TO VF8)*
D (DK) *(SKIP TO VF8)*

VF2 Without the program incentive, technical assistance, or education, would your company have recommended or specified the exact same quantity of <MEASCAT1, MEASCAT2> for <CUST> within one year?

1 Yes *(SKIP TO VF3)*
2 No
D (DK)

VF2a What percent of this <MEASCAT1, MEASCAT2> do you think your company would have recommended/specified?
(*PROBE:* Would you have recommended/specified about one-fourth (25 percent), one-half (50 percent), three fourths (75 percent) of what was installed through the program?)

____ ENTER PERCENTAGE (0-100%, 998=DK)
(IF=0, SKIP to F4)

VF3 You said you would have recommended/specified [IF VF2=1 SHOW:all the] [IF VF2=2 OR D SHOW: at least some] <MEASCAT1, MEASCAT2> for <CUST> if the program had not been available. What percent of this equipment that you would have recommended/specified would have been of the same efficiency or higher efficiency as what was installed through the program?
(*PROBE:* Would about one-fourth (25 percent), one-half (50 percent), three fourths (75 percent) been of equal efficiency?)

____ ENTER PERCENTAGE (0-100%, 998=DK)

(NOTE: IF VF1=1 AND VF2=1 AND VF3=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. Do you think <CUST> would have paid the additional <INC1, INC2>, on top of the amount they already paid, to install the same quantity and efficiency of <MEASCAT1, MEASCAT2> within one year?

1 Yes *(SKIP TO VF8)*
2 No
D (DK)

VF5 How do you think <CUST> would have adjusted their purchase to accommodate the fact that they wouldn't have paid all of the costs? Would they have purchased less equipment, lower efficiency equipment, or done something else? *(INDICATE ALL THAT APPLY—ASK BOTH VF6 AND VF7 IF APPROPRIATE)*

1	Purchased less equipment	*(ASK VF6)*
2	Purchased lower efficiency of equipment	*(ASK VF7)*
3	(Done something else, specify)	*(SKIP TO VF9)*
D	(DK)	*(SKIP TO VF9)*

[IF VF5=1]
VF6 What percent of the <MEASCAT1, MEASCAT2> do you think <CUST> would have purchased on its own at that same time? (*PROBE:* Would they have purchased about one-fourth (25 percent), one-half (50 percent), three fourths (75 percent) of what they installed through the program?)

____ ENTER PERCENTAGE (0-100%, 998=DK)

[IF VF5=2]
VF7 What percent of the <MEASCAT1, MEASCAT2> that <CUST> would have purchased on its own would have been of a lower efficiency than what was installed through the program? (*PROBE:* Would about one-fourth (25 percent), one-half (50 percent), three fourths (75 percent) been of lower efficiency?)

____ ENTER PERCENTAGE (0-100%, 998=DK)

(ASK VF8 IF (VF1=2 OR VF1=D) OR IF (VF1=1 AND VF2=1 AND VF3=100% AND VF4=1); ELSE SKIP TO VF9)

VF8 Was the technical assistance or advice you or another designer/vendor provided to <CUST> a crucial factor in their decision to install this high efficiency equipment through the program at the time they did?

1 Yes
2 No
3 No information received
D (DK)

VF9 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 THE CLARIFICATION—PROBE AS NEEDED TO UNDERSTAND REASON)*

Open text window
(DK)
(REFUSED)

VF10 On a scale of 1 to 5, with 1 being 'not at all important and 5 being 'very important', how important was your previous experience with a <COMP> program when making the decision to recommend or install <MEASCAT1, MEASCAT2>for this customer?

_____
D (DK)
0 NA – No previous program experience

SKIP TO END

NON-PARTICIPANT SPILLOVER

INTRO4:

Hello, my name is __, and I am calling on behalf of <UTILITY1, UTILITY2>. We are talking with some of the design professionals and contactors who were involved with the <PROGRAM1, PROGRAM2> in 2007. 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 2007.

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

VNP1 Our records show that your firm specified, sold, and/or installed <MEx> to Commercial and Industrial customers in 2007 through the <PROGRAM1 – PROGRAM4>. 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
D (DK)

ME1 = Custom equipment (skipped – measures split into specific categories below)
ME2 = Motors
ME2a = Motors: New
ME2b = Motors: Failed/Stock
ME3 = HVAC equipment
ME3a = HVAC: Unitary
ME3b = HVAC: Other
ME4 = Variable speed drives
ME5 = Lighting equipment
ME6 = Non-Lighting equipment
ME7 = Transformers
ME8 = Compressed air
ME9 = Refrigeration

ME10 = Process equipment and system
ME11 = Process cooling equipment
ME12 = VSDs on non-HVAC systems
ME13 = Comprehensive Chillers
ME14 = Equipment converting electric DHW to gas, Comprehensive design projects, O&M projects

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.

[VNP2-NP8 WILL BE ASKED FOR EACH MEASURE WHERE MEx=1 (where x=measure category number defined above).

VNP2 Please think about all the program-eligible <MEx> you specified, sold and/or installed for <UTILITY1, UTILITY2> customers in 2007.
Did you specify, sell and/or install any of this program-eligible <MEx> to customers of <UTILITY1, UTILITY2> without an incentive?

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

VNP3 (IF VNP2 = Yes)
What percent of all of this program-eligible <MEx> you specified, sold and/or installed for <UTILITY1, UTILITY2> customers in 2007 did not receive an incentive?

_____%
D (DK)

(ASK VNP4-VNP7 OF EACH MEASURE WHERE VNP3 > 0%)

VNP4 In 2007, you mentioned that about [___%] of the <MEx> you specified and/or installed would have been eligible for an incentive through a <UTILITY1, UTILITY2> 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?_____
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 (DK)

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

0 Disagree
1 Agree

VNP6 We are better able to identify opportunities to improve energy efficiency by using high efficiency <MEx> because of our previous experience with the performance of energy efficient equipment installed through energy efficiency programs, and what we learned through working with <UTILITY1, UTILITY2>.

0 Disagree
1 Agree

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 <UTILITY1, UTILITY2>.

0 Disagree
1 Agree

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

HVAC Questions – Ask of vendors associated with National Grid and flagged as installing HVAC measures (M3, M3a or M3b=1); else skip to END

I just have a couple more questions for you related to HVAC equipment.

HV1 [IF NOT COOL CHOICE, IDENTIFIED IF M3a=0 and M3b=0] These questions relate to the Cool Choice program offered by National Grid. Are you familiar with the Cool Choice program?

1 Yes
2 No --→ Describe Cool Choice Program and re-ask if familiar. If still no, skip to END.
D Don't know

(The Cool Choice program is sponsored by National Grid and provides financial and technical assistance for the installation of energy efficient HVAC equipment.)

HV2 Are you aware of the changes the CoolChoice program made in efficiency level requirements for HVAC equipment under 20 tons? These changes came into effect in 2007.

INTERVIEWER, IF NECESSARY, THE CHANGES ARE AS FOLLOWS:

TONNAGE	**SEER CHANGES**
<5.4 TONS	**(13.0 TO 14.0 SEER)**
>=5.4 AND < 11.25 TONS	**(11.0 TO 11.5 SEER)**
>=11.25 AND <20 TONS	**(10.8 TO 11.5 SEER)**

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

HV3 Did the 2007 program changes affect your sales of higher efficiency HVAC equipment?

1 Yes → How did it affect your sales? [RECORD RESPONSE]
2 No
D (DK)

HV4 Did the 2007 program changes affect the types of commercial customers who purchased program-eligible HVAC equipment?

1 Yes → How did it affect the types of customers purchasing eqiupment? [RECORD RESPONSE]
2 No
D (DK)

HV5 Did the 2007 program changes affect the types of HVAC equipment purchased by national accounts?

1 Yes → How did it affect the types of equipment purchased? [RECORD RESPONSE]
2 No
D (DK)

The 2007 changes included higher incentive levels to compensate for higher incremental costs of the more efficient HVAC equipment. For the following equipment types, please tell me if the higher incentive levels were sufficient and estimate the percent of the incremental cost the incentive covered.

HV6a Were the higher incentive levels sufficient for HVAC equipment less than 5.4 tons?

1 Yes
2 No
3 Not applicable, do not sell this tonnage [SKIP TO HV7a]
D (DK)

HV6b What percent of the incremental cost did the incentive cover?

____% [ENTER 999 FOR DK]

HV7a Were the higher incentive levels sufficient for HVAC equipment between 5.4 and 11.25 tons?

1 Yes
2 No
3 Not applicable, do not sell this tonnage [SKIP TO HV8a]
D (DK)

HV7b What percent of the incremental cost did the incentive cover?

____% [ENTER 999 FOR DK]

HV8a Were the higher incentive levels sufficient for HVAC equipment between 11.25 and 20 tons?

1 Yes
2 No
3 Not applicable, do not sell this tonnage [SKIP TO END]
D (DK)

HV8b What percent of the incremental cost did the incentive cover? _

___% [ENTER 999 FOR DK]

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

APPENDIX E: CUSTOMER ACCOUNT AND PROGRAM SAVINGS COVERAGE

UI CUSTOMER ACCOUNT AND PROGRAM SAVINGS COVERED BY PARTICIPANT FREE-RIDERSHIP AND SPILLOVER SURVEY

Table E-1
Energy Blueprint Program Accounts and Savings Covered by Survey

Measure Category	Year 2007 Accounts (N)			Year 2007 Savings (kWh)		
	Program	Survey	Survey Coverage	Program	Survey	Survey Coverage
Custom	70	47	67%	10,550,592	4,504,340	43%
Motors	11	7	64%	133,889	119,461	89%
Cooling—Unitary	18	12	67%	280,004	247,015	88%
Cooling—Other	7	6	86%	580,781	337,759	58%
Variable Speed Drives	13	9	69%	1,158,525	818,117	71%
Lighting	36	27	75%	2,393,898	1,758,277	73%
Total accounts	**107**	**84**	**79%**	**15,097,689**	**7,784,969**	**52%**

Note: Total survey and program counts do not equal the sum of measure category survey and program counts; the same participant may be represented in multiple measure categories.

Table E-2
Energy Opportunities Program Accounts and Savings Covered by Survey

Measure Category	Year 2007 Accounts (N)			Year 2007 Savings (kWh)		
	Program	Survey	Survey Coverage	Program	Survey	Survey Coverage
Custom	24	19	79%	8,219,566	7,140,210	87%
Lighting	133	63	47%	22,428,450	13,487,633	60%
Total accounts	**152**	**79**	**52%**	**30,648,016**	**20,627,843**	**67%**

Note: Total survey and program counts do not equal the sum of measure category survey and program counts; the same participant may be represented in multiple measure categories.

Table E-3
Small Business Programs Accounts and Savings Covered by Survey

Measure Category	Year 2007 Accounts (N)			Year 2007 Savings (kWh)		
	Program	Survey	Survey Coverage	Program	Survey	Survey Coverage
Custom	310	63	20%	5,105,836	1,604,788	31%
Lighting	155	43	28%	1,082,500	378,443	35%
Total accounts	**322**	**81**	**25%**	**6,188,336**	**1,983,231**	**32%**

Note: Total survey and program counts do not equal the sum of measure category survey and program counts; the same participant may be represented in multiple measure categories.

APPENDIX F: DESIGN PROFESSIONAL AND VENDOR SPILLOVER CALCULATION EXAMPLE

As an example, assume a vendor had 200,000 kWh savings in the program tracking system database attributable to premium efficiency motors. If that vendor said that 25 percent of all their premium efficiency motors were sold outside the program, the potential nonparticipant spillover savings would be (200,000 kWh * 0.25/(1-0.25) = 66,667 kWh). If this vendor was assigned a nonparticipant spillover rate of 100 percent for premium efficiency motors, the nonparticipant spillover kWh savings for that vendor was 66,667 kWh. If that same vendor was assigned a nonparticipant spillover rate of only 50 percent for premium efficiency motors, the nonparticipant spillover kWh savings for that vendor was 66,667 * 0.5 = 33,334 kWh. This type of calculation was made for each design professional and equipment vendor (by measure category) who had a nonparticipant spillover rate of more than 0 percent.

Table G-1. Nonparticipant Premium Efficiency Motor Spillover Rate Calculation

% Sold Outside Program (A)	Savings from program tracking system database (B)	Assigned Spillover Rate (C)
25%	200,000	50%

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

= 200,000 kWh *0.25/(1-0.25)

= 66,667 kWh

Nonparticipant spillover savings = potential savings * C

= 66,667 * 0.5

= 33,334 kWh