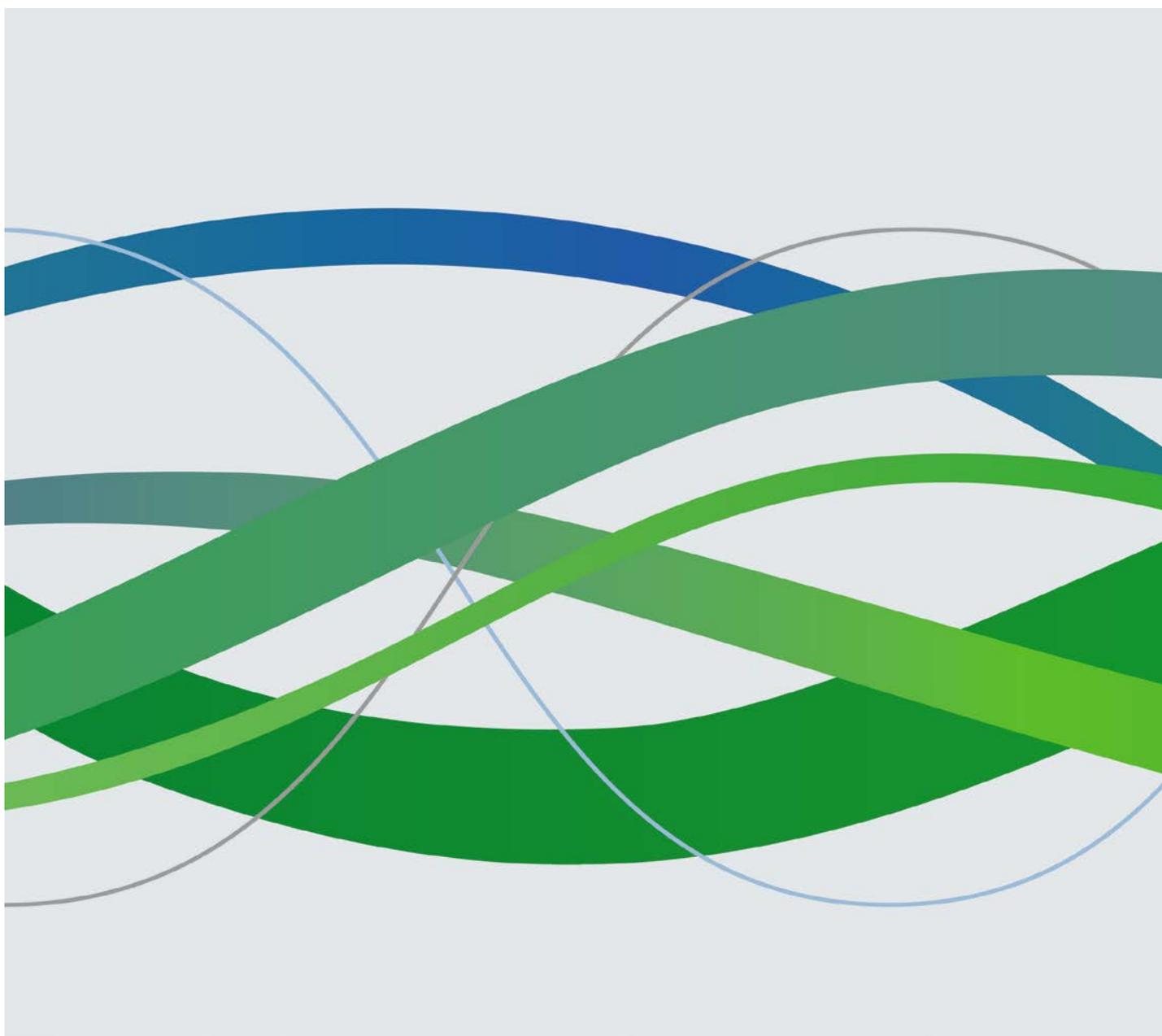


# Process Evaluation of the 2012 Bright Opportunities Program Final Report

Massachusetts LCIEC Project 17

Prepared by KEMA, Inc.

June 14, 2013





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## 1. Executive Summary

This report documents DNV KEMA's process evaluation of the Bright Opportunities Program. This evaluation was conducted by DNV KEMA under the Massachusetts Large C&I Evaluation Contract (MA-LCIEC). It is one part of a broader MA-LCIEC Project 17 evaluation that includes an impact evaluation of this program. The Bright Opportunities Program is jointly marketed under the Mass Save brand and individually administered by the Massachusetts Program Administrators (PAs). This study was conducted on behalf of the PAs and the Energy Efficiency Advisory Council (EEAC).

Bright Opportunities is a relatively new program that provides incentives directly to distributors of specific lighting technologies (LED bulbs and linear fluorescent tubes). While these "upstream" incentives go directly to the distributors, the program design assumes that the discounts will be passed down the supply chain so that lighting contractors and end users will be able to purchase the participating technologies at a substantially discounted price.

The research objectives of the process evaluation for the Bright Opportunities Program included:

- Determine whether the program is appropriately designed;
- Determine whether the program is being delivered in an efficient and effective manner;
- Determine barriers to adoption of these energy-efficient lighting technologies that the current program design has been unable to eliminate or sufficiently mitigate;
- Determine advantages (or disadvantages) of the upstream program design compared to the earlier downstream program designs;
- Provide estimates of net-to-gross ratios for the program net of free-ridership; and
- Provide preliminary estimates of spillover from the program focusing on participant spillover.

To achieve these objectives, DNV KEMA conducted end user surveys (n=200), interviews with participating and nonparticipating distributors (n=33), and interviews with participating contractors (n=25) to gather data for use in this process evaluation. We also conducted a few interviews with program staff and Ecova, the subcontractor responsible for collecting and managing the program tracking data.

### 1.1 Program Design

The program is designed as an "upstream" program that provides incentives to distributors and manufacturers rather than end users. In theory, these cost savings should be passed down through the supply chain and seamlessly reduce the costs of these technologies for end users. DNV KEMA found evidence supporting the effectiveness of this program design:

- As discussed in the program attribution section below, there was evidence from both end users and participating lighting distributors and contractors that the program was having significant impacts on their sales of LED bulbs. The reduction in program incentives that occurred in March



2012 also did not appear to have any impacts on the level of program attribution reported by end users.

- Only a small percentage of participating end users reported any barriers/challenges with their lighting purchase.
- Both end users and trade allies were generally satisfied with the program, as discussed in the program delivery section below.

Upstream programs, by their very design, have certain risks including consumer unawareness that they are receiving program discounts, stockpiling, “double-dipping,” and “leakage.” The following is a summary of these risks and what evidence our evaluation found that they are actually occurring.

- *Consumer unawareness that they are receiving program discounts:* A potential disadvantage of an upstream rebate program is lack of end user awareness of the discounts provided by the program. Our evaluation found that this does not appear to be a major issue with Bright Opportunities, considering the high end user awareness of the discounts and attribution scores. However, we did find some evidence to suggest that end users and possibly contractors were not aware of program details. This evidence is discussed in our conclusions and recommendations section.
- *Stockpiling:* One risk of the Bright Opportunities Program design is that some participants may purchase more lamps than they actually need (e.g., stockpile lamps) just because the buydown discounts are so large. This could negatively impact the program’s gross energy savings estimates because lamps are in storage rather than in fixtures or sockets. The program managers have tried to discourage this practice by requiring that customers make a minimum payment (e.g., \$5 for LED bulbs) for each bulb purchase. While we think stockpiling is a valid concern, we did not explore this issue in this process evaluation report because a key piece of evidence for such stockpiling would be lamp installation rates, and this will be explored in the impact evaluation for this program which is scheduled to be completed in the third quarter of 2013.
- *Double-dipping:* While C&I customers can only receive discounted LED bulbs through this upstream program, they can receive discounted linear fluorescent lamps either through this Bright Opportunities Program or through so-called “downstream” lighting rebate programs where the incentives go to the end users rather than the lighting distributors. This raises the possibility of “double-dipping” where customers could receive rebates for the same linear fluorescent lamp from both the upstream and downstream C&I lighting programs. However, our evaluation did not find much evidence for this double-dipping. Rather than lack of awareness of the downstream program, the primary reason appears to be a belief that dual participation was not allowed.



- *Leakage*: Another potential risk for upstream programs is “leakage,” e.g., lighting distributors selling lamps discounted by Massachusetts rate payers in other states. We did not find much evidence to establish whether or not this was occurring.

## 1.2 Barriers to Participation

Few end users (about 12%) reported any barriers to using the participating lighting technologies. Linear fluorescent end users did not report any barriers. Most of the LED participants who said they had encountered barriers/challenges reported performance or lighting quality issues with the LED bulbs. Nearly half (46%) of those reporting problems said they had trouble operating the bulbs with dimmer switches and one third (33%) said that they had difficulty fitting the bulbs in fixtures.

Participating distributors were unaware of any reasons for why companies would not participate, even voicing confusion and surprise that any would not. The few who did provide specific barriers said program paperwork, program awareness, payment issues, and other issues.

## 1.3 Motivations to Participation

The most common reasons that participants provided for participating in the Bright Opportunities were to save energy and to reduce their utility bills. A hypothesis proposed by the evaluation team was that LED end users were more likely to have energy efficient practices and policies than linear fluorescent end users. The survey results produced mixed evidence for this hypothesis. On one hand, LED and linear fluorescent end users had similar frequencies of having energy-using equipment purchase guidelines and energy managers on staff. On the other hand, LED end users were more likely than linear fluorescent end users to say that they made the purchase to reduce their energy bills.<sup>1</sup>

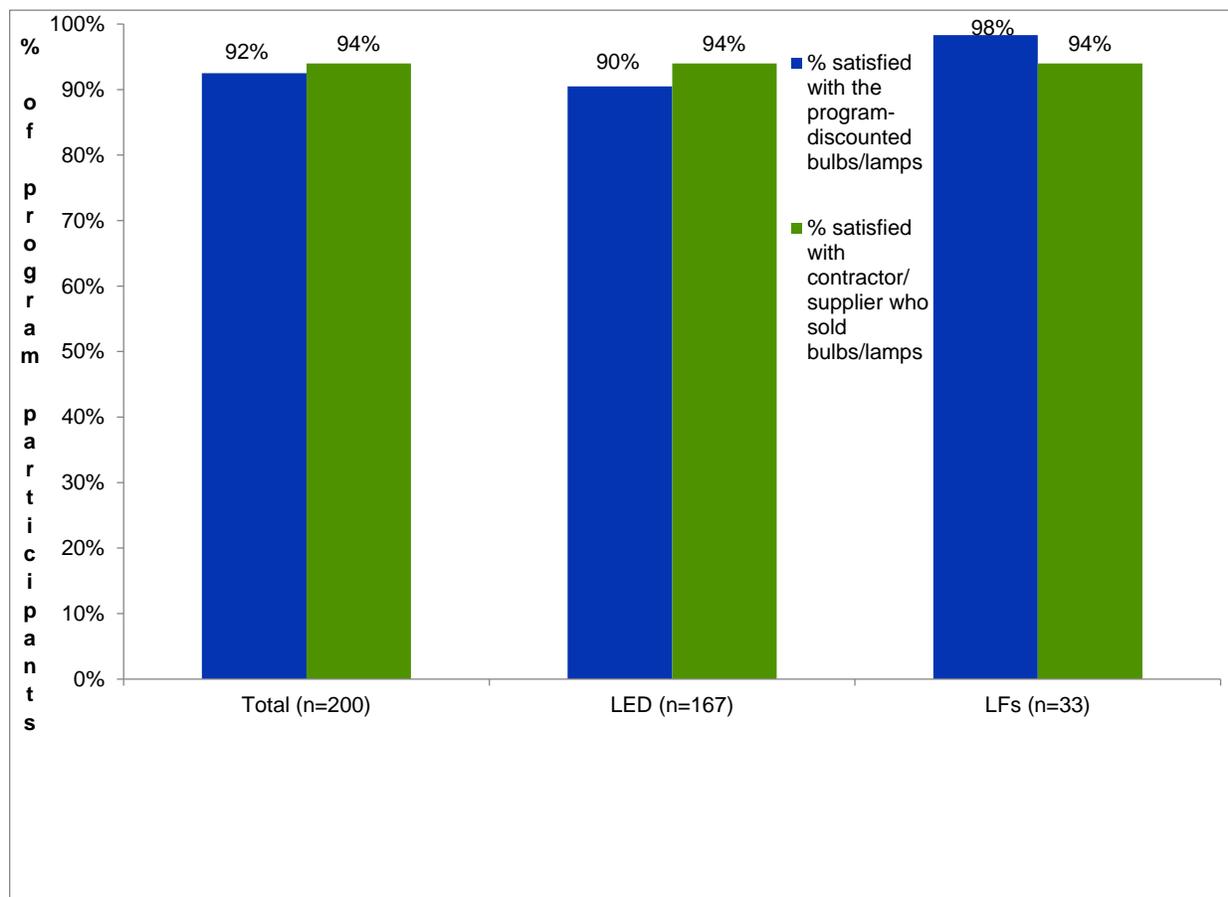
## 1.4 Program Delivery

We asked both participating end users and participating lighting distributors and contractors about their satisfaction with the bulbs/lamps that the program discounted as well as with various aspects of program delivery. Figure 1-1 shows that over 90 percent of both the LED participants and the linear fluorescent participants were satisfied (4 or 5 on a 5-point satisfaction scale) with the program-discounted bulbs/lamps and with the contractors or suppliers who sold them. The 90 percent figure is for all bulbs, including those in dimmer switches. However, as discussed in the main body of the report, the participating end users were less satisfied (72% of respondents) with the performance of the bulbs/lamps in dimmer switches.

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<sup>1</sup> About five percent of the program participants received both LED and linear fluorescent buydown discounts.

**Figure 1-1: Participating End User Satisfaction**



We also asked the participating distributors and contractors about their level of satisfaction with various aspects of the program:

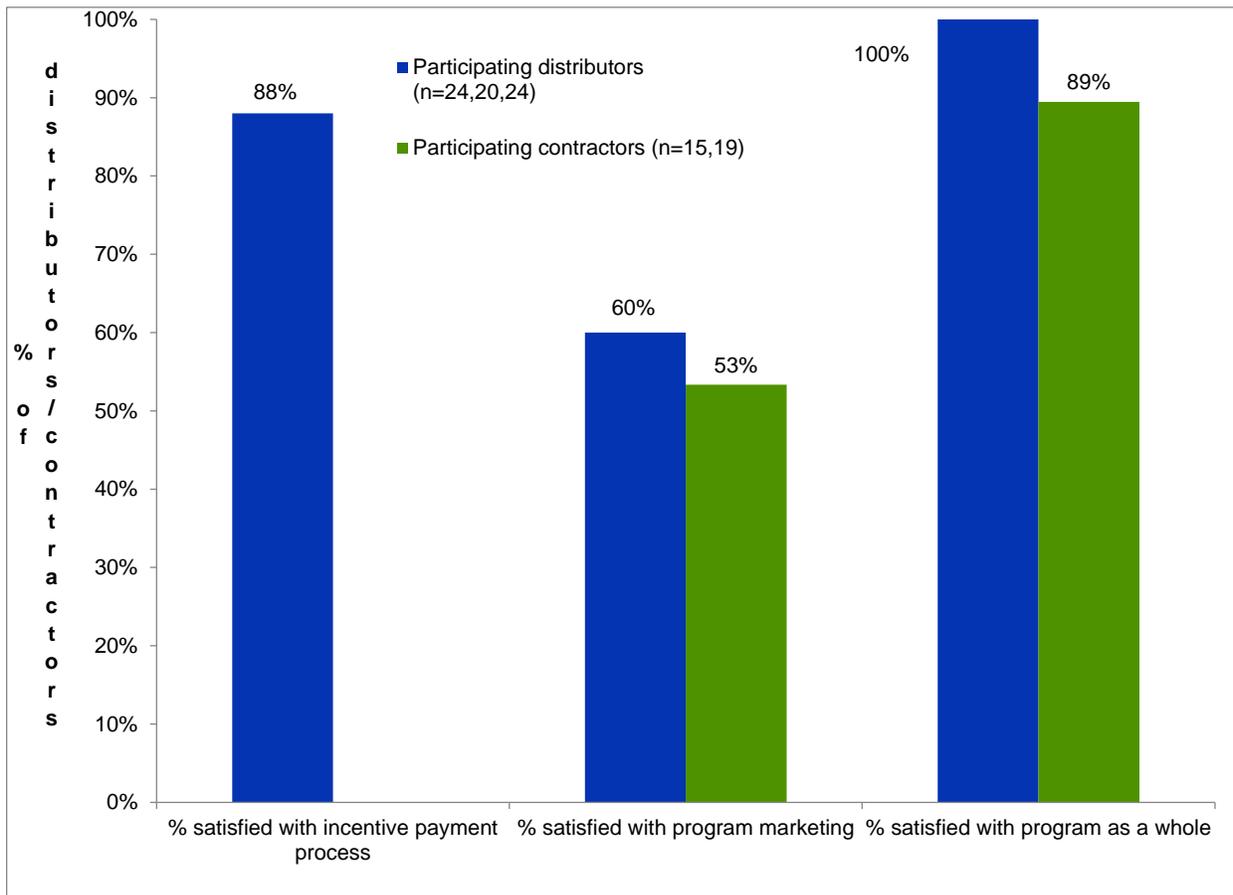
- *Distributor/contractor satisfaction with the program-discounted bulbs/lamps:* We asked the participating lighting distributors and contractors whether they had received any customer complaints about the LED bulbs that the program discounted. Nearly half (46%) of the distributors and nearly two-thirds (64%) of the contractors said that they had received no complaints. Of those distributors/contractors reporting customer complaints, the most frequently-cited complaint concerned the performance of the LED bulbs controlled by dimmer switches. However, the distributors/contractors reporting these customer complaints also commented that they were relatively infrequent.
- *Distributor/contractor satisfaction with the program reporting requirements:* We asked the participating lighting distributors whether they thought the program’s reporting requirements were reasonable. Seventy-seven percent of the participating distributors and 74 percent of the participating contractors gave an unqualified “yes” to this question. Eighteen percent of the



distributors and 17 percent of the contractor gave a “qualified yes” to this question – e.g. first indicating that the requirements were reasonable but then qualifying their response with some complaint or condition. “Qualified yes” responses included comments stating that they would always prefer it to be easier and that it does take time, but that the requirements were reasonable. Only five percent of the distributors and nine percent of the contractors said that the reporting conditions were not reasonable.

- Distributor/contractor satisfaction with the incentives, marketing and the program as a whole:*  
 We also asked the participating trade allies about their level of satisfaction with the incentive payment process, the program’s marketing efforts, and the program as a whole. Figure 1-2 shows that satisfaction levels for the incentive payment process and the program as a whole were very high. However, only a small majority of the participating distributors and contractors were satisfied with the program’s marketing efforts. The most common reasons for dissatisfaction were unawareness of any marketing efforts and low customer awareness of the program.

**Figure 1-2: Participating Trade Ally Satisfaction w/ Incentive Payment Process, Marketing, and Program as a Whole**





- *Interviews with program managers and implementation contractors:* In addition to the survey of participating end users and the in-depth interviews with participating distributors and contractors, we also conducted phone interviews with program staff and with staff from Ecova, the subcontractor responsible for collecting and maintaining the program tracking data. These interviews revealed that while some of the participating distributors were resistant to program requirements for providing detailed sales and custom information, these were a small (albeit vocal) minority, and the program was able to use its leverage (e.g., the threat of program removal) to insure their compliance with program requirements.

## 1.5 Net-to-Gross Estimates

To calculate net-to-gross estimates for the Bright Opportunities Program we used a “preponderance of the evidence” approach where we used information from both the end user survey and the lighting trade ally interviews.

### 1.5.1 Program Attribution from the End User Perspective

For end users, DNV KEMA calculated free ridership using a methodology adapted from a previous evaluation of Massachusetts gas programs completed by TetraTech.<sup>2</sup> We modified this methodology slightly in order to streamline the surveys and for use with these specific lighting measures. The methodology attempts to quantify how the timing and quantity of the lighting participants’ purchases were affected by the discounts. It also compares LED or linear fluorescent lighting to several alternative lamp types to estimate efficiency effects. In all cases, the free-ridership battery attempts to establish what each respondent would have done in absence of the discounts. There are also several questions designed to check the consistency of the answers. The output of the methodology is the proportion of the discounted lamp installations that are attributable to the discounts.

Bright Opportunities reduced the incentive levels for LED lamps by about \$5 each on March 1, 2012. The Energy Efficiency Advisory Council (EEAC) and the evaluation team were interested in the effect of this incentive change on attribution, so we calculated attribution for three time periods: overall, before the incentive change, and after (Figure 1-3). Attribution was higher for LEDs than for linear fluorescents. This is probably because LEDs are a newer technology and have a much higher incremental cost than linear fluorescents.

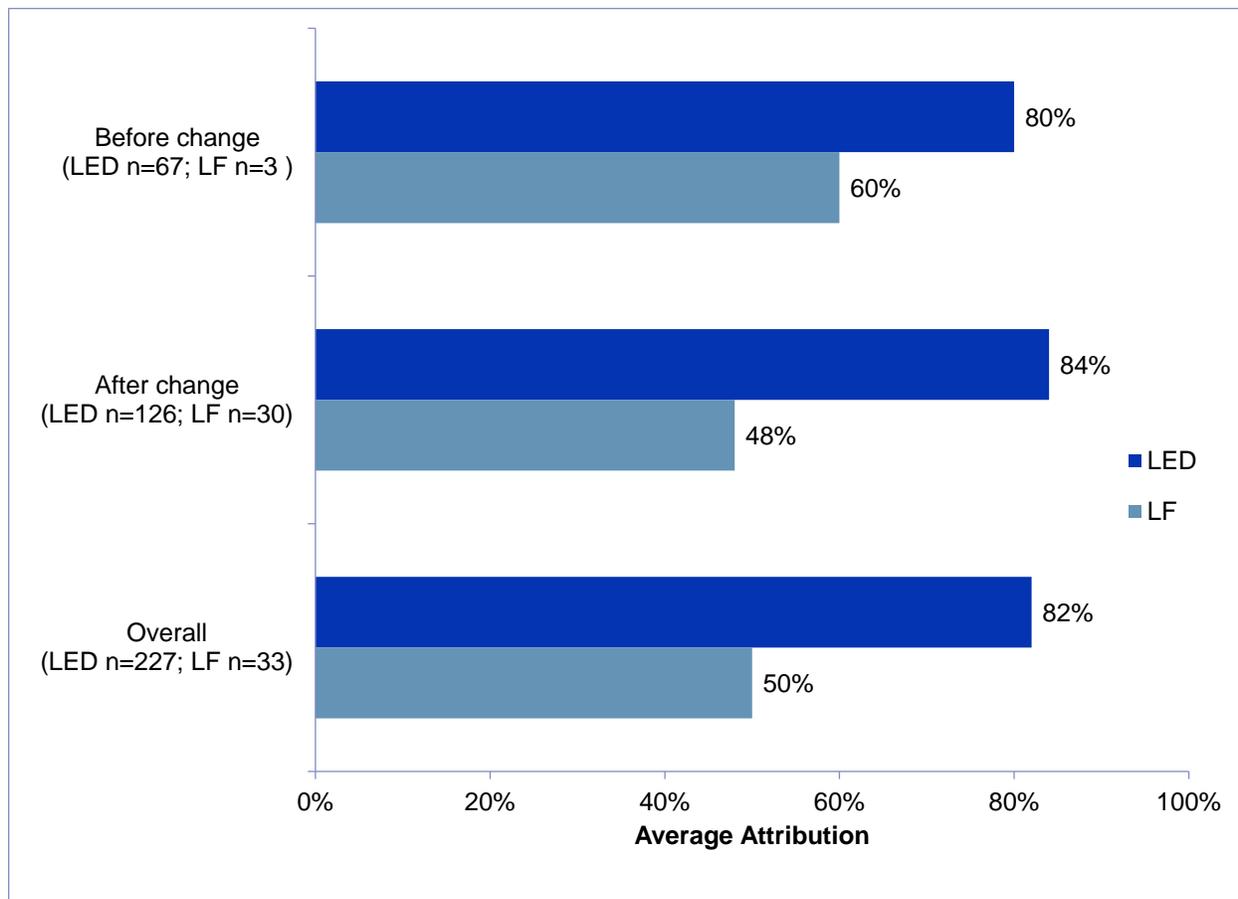
This chart includes responses from the 200 respondents to the end user telephone survey as well as 27 respondents to the surveys administered during the impact evaluation site visits.

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<sup>2</sup> National Grid, NSTAR, Unitil, Berkshire Gas, Columbia Gas, and New England Gas 2010 Commercial and Industrial Natural Gas Programs Free-ridership and Spillover Study Final Report; September 20, 2011; TetraTech.



**Figure 1-3: Program Attribution (Net-to-Gross) Ratios  
Calculated from End User Survey Responses**



Note: 90% confidence intervals for LED bulbs were  $\pm 3\%$  and for linear fluorescent bulbs  $\pm 4\%$ .

Note: DNV KEMA could not find a purchase date for one of the LED records. Thus it appears in the overall bars, but not in the before or after change bars.

Attribution was not significantly affected by the incentive change.<sup>3</sup> This is probably due to the reason why Bright Opportunities reported changing incentives in the first place – e.g., they observed that the regular (undiscounted) wholesale price of the discounted bulbs had decreased since the program began, and they tried to lower the incentives to keep them at a constant proportion of the undiscounted wholesale price. Depending on how much of the discount distributors passed on, the net effect of this incentive change should have had very little impact on the retail price end users paid for the discounted lamps.

<sup>3</sup> The change for linear fluorescents from 71% to 55% appears large, but the before estimate was based on only three survey responses, so it is not very reliable and therefore should be interpreted with caution.



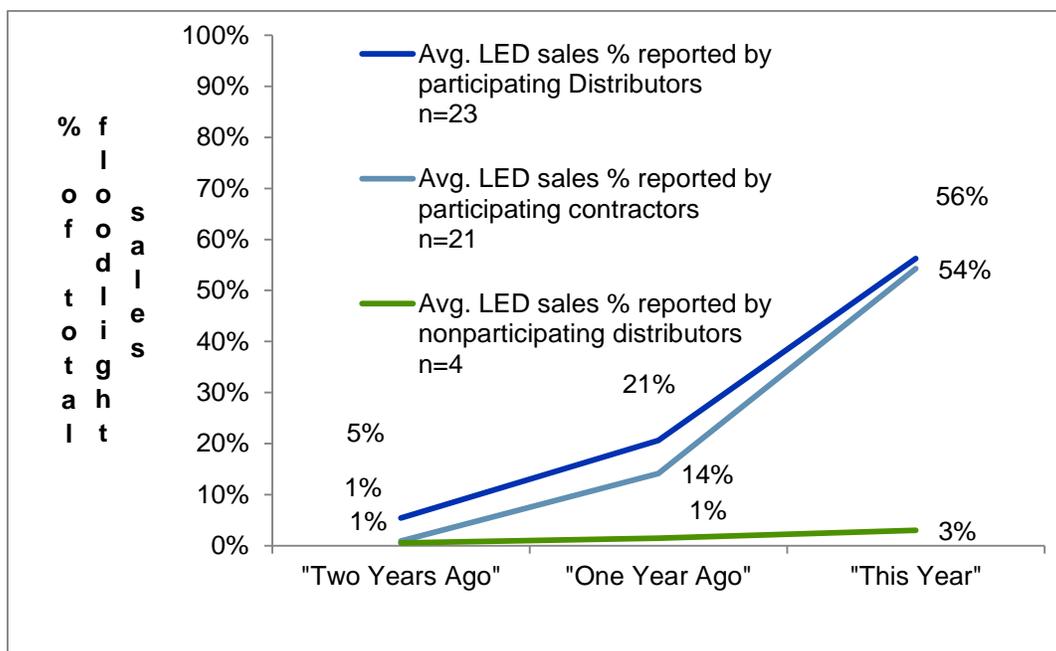
### 1.5.2 Program Attribution from the Distributor/Contractor Perspective

Another way to examine possible program impacts on the Massachusetts LED market is to do a number of comparisons including:

- Comparing the LED sales penetration of participating distributors/contractors over time;
- Comparing the LED sales penetration of participating distributors/contractors with nonparticipating distributors; and
- Comparing the Massachusetts sales of participating distributors with their sales in other states.

We asked participating distributors, nonparticipating distributors and participating contractors about LEDs as a percentage of floodlight sales this year (2012), one year ago (2011) and two years ago (2010).<sup>4</sup> Figure 1-4 shows that the LED share of the floodlight sales rose significantly for the participating distributors and contractors but sales for the nonparticipating distributors remained relatively flat. The sample size for the nonparticipating distributors was obviously very small, but the difference between the participating and nonparticipating distributors was still statistically-significant at the 95percent confidence level. On average, nonparticipating distributors were smaller than participating distributors with a median of seven employees compared to 42 for the participating distributors.

**Figure 1-4: LED Floodlight Market Penetration Over Time**

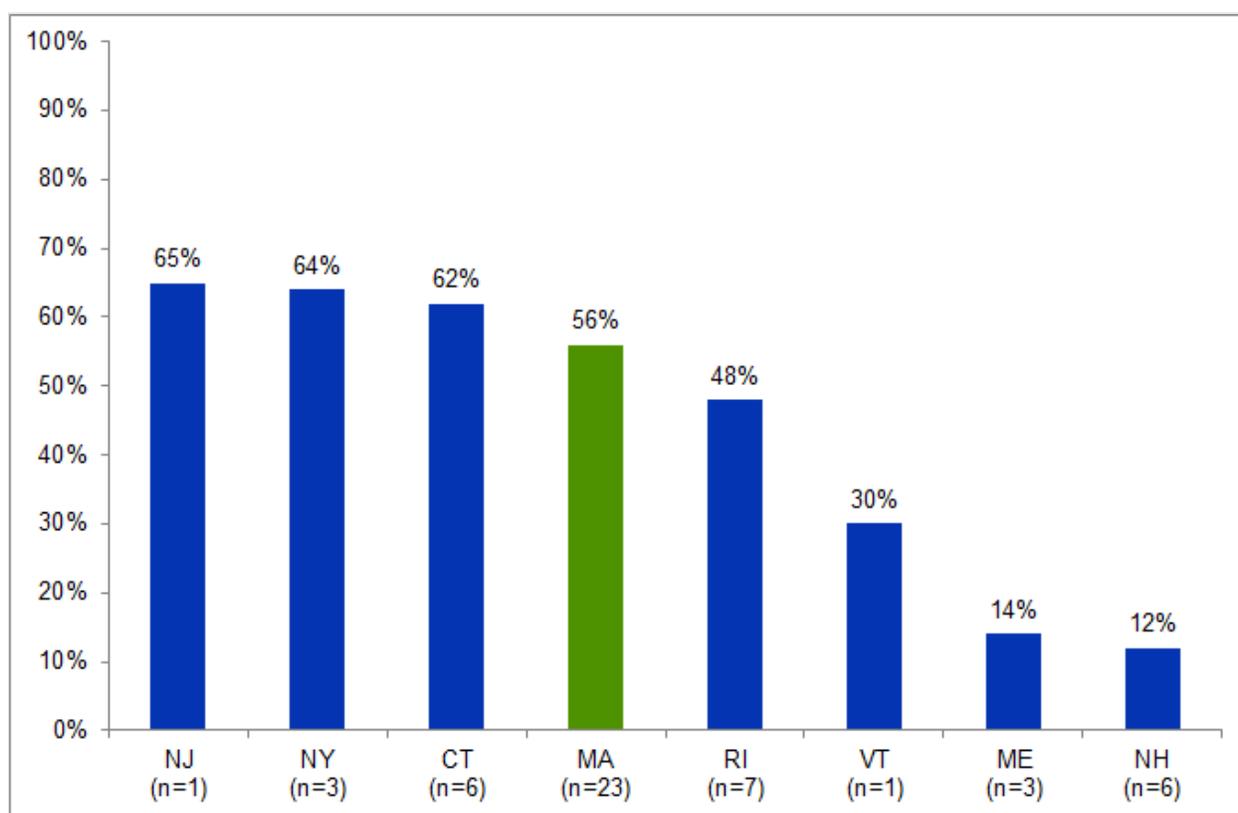


<sup>4</sup> We choose floodlight/spotlight lighting category as our basis for comparison because LED floodlights/spotlights accounted for the bulk of program sales.



Participating distributors were asked if they sold LEDs in states other than Massachusetts. Nine distributors said that they did not or did not know. The remaining distributors were then asked what states and what percentage of floodlight sales were LEDs in those states, to measure a difference and shown in Figure 1-5. The Massachusetts program, with 56 percent was in the higher end of the range. Two other states with high levels of LED spotlight, Connecticut and Rhode Island were cited as having high LED percentages due to similar programs in those states. Due to the division of the sample and small number of responses for each state, only New Hampshire showed statistically-significant differences at the 90% confidence level.

**Figure 1-5: LEDs as Percent of Floodlight Sales by State**



We also provided the participating distributors with specific information (e.g. customer name, bulb quantity, promotional price, buydown amount, discount percentage) about a particular lighting project that they had done with program –discounted bulbs and then asked them to estimate: 1) whether that customers would have purchased any of those bulbs absent the rebates; and, if yes, 2) what would be the impact of the removal of the discount on the quantity of bulbs sold for that particular project. We asked the participating contractors a similar series of questions with the exception that rather than asking them about a specific project, we asked them about their total purchases through the program.

We then used the distributor and contractor responses to these questions to calculate a net-to-gross ratio. Table 1-1 shows the average net-to-gross estimates we derived from lighting distributor responses to the



net-to-gross questions we asked about specific projects. In addition to the straight average (where each project had equal weight), we also calculated a unit-weighted average where projects got a larger weight based on their number of bulbs, and a revised version of this average where one outlier project was removed.

**Table 1-1: Net-to-Gross Estimates from Participating Lighting Distributors Based on Specific Projects**

| Averaging Method                         | Total Program Net-to-Gross Ratio | Linear Fluorescent Net-to-Gross Ratio | LED Net-to-Gross Ratio |
|--|----------------------------------|---------------------------------------|------------------------|
| Straight Average                         | 77%                              | 71%                                   | 79%                    |
| Unit Weighted Average                    | 88%                              | 93%                                   | 68%                    |
| Unit Weighted Average - Outliers Removed | 83%                              | 81%                                   | 88%                    |

Table 1-2 shows the average net-to-gross estimates we derived from lighting contractor responses. In this case there was not an outlier and so we only calculated the straight average and the unit-weighted average. These results are somewhat surprising since both the end users and the lighting distributors on average estimated higher net-to-gross ratios for the LED bulbs than they did for the linear fluorescent lamps. We reexamined the contractors’ explanations for their net-to-gross estimates to see if there might be clues there, but their explanations for their linear fluorescent net-to-gross estimates were indistinguishable from those for their LED net-to-gross estimates (e.g., knowing what their customers are willing to pay, etc.).

**Table 1-2: Net-to-Gross Estimates from Participating Lighting Contractors Based on Their Total Program Sales**

| Averaging Method      | Total Program Net-to-Gross Ratio | Linear Fluorescent Net-to-Gross Ratio | LED Net-to-Gross Ratio |
|-----------------------|----------------------------------|---------------------------------------|------------------------|
| Straight Average      | 88% ±10%                         | 100%                                  | 86% ±11%               |
| Unit Weighted Average | 97% ±5%                          | 100%                                  | 96% ±6%                |

Note: The 90% confidence intervals are shown. Linear Fluorescents had no variance, so a confidence interval could not be computed.

### 1.5.3 Combining the Net-to-Gross Estimates

To come up with a recommended net-to-gross estimate for the program, we selected some of the estimates from the end user survey responses, the participating distributor responses, and the participating contractor estimates. Our reasoning for selecting these estimates is explained below. We then averaged these three ratios for each lighting type to produce the recommended net-to-gross ratio. Table 1-3 shows the recommended ratios and their component pieces.



**Table 1-3: Recommended Net-to-Gross Ratios by Lighting Type**

| Lighting Category  | Overall End User Net-to-Gross Ratio | Lighting Distributor Straight Average Net-to-Gross Ratio | Lighting Contractor Straight Average Net-to-Gross Ratio | Recommended Net-to-Gross Ratio |
|--------------------|-------------------------------------|--|---|--------------------------------|
| LEDs               | 82% ±3%                             | 79%  | 86% ±11%  | 82%                            |
| Linear Fluorescent | 50% ±4%                             | 71%  | 100%  | 74%                            |

Note: The 90% confidence intervals are shown. For the lighting contractor net-to-gross estimate for the linear fluorescents there was no variance in the estimate and so we could not calculate confidence intervals for this estimate. In the case of the participating lighting distributor estimates, we attempted to survey a census of the participating distributors and therefore confidence intervals, which are a measure of sampling error, would not be relevant.

Our reasoning for using these averages was as follows:

- *End user estimate:* For the end-user net-to-gross ratio we considered using the net-gross-ratio for the post-March 2012 period instead since one might argue that this would be the best predictor of future program activity. However, as discussed above, for the key LED technology there was little difference between the estimate for the pre-March 2012 period (80%) and the post-March 2012 period (84%) and so we chose to use the overall program estimate (82%) since this had a more robust sample size.
- *Distributor estimate:* We chose to use the straight average net-to-gross ratio for LEDs because it was in between the unit-weighted average net-to-gross ratio with the outlier project included and the unit-weighted average with this outlier project excluded. We chose to use the straight average net-to-gross ratio for linear fluorescents to be consistent with the type of average we were using for LEDs and because this 71 percent net-to-gross ratio is the distributor estimate that is closest to being equidistant from the end user (50%) and contractor estimates (100%).
- *Contractor estimate:* We chose to use the straight average net-to-gross ratio to be consistent with what we did with the distributor estimates and because the straight average net-to-gross ratio for the LEDs was identical to the estimate from the end user surveys.

Table 1-3 shows that there was a lot more variability around the linear fluorescent net-to-gross ratio estimates than there was about the LED net-to-gross ratio estimates. We suspect this is likely due to the much smaller sample sizes for the linear fluorescent estimates and the possibility that some estimators may be conflating their estimates for the low-wattage T5 and T8 lamps rebated by the program with conventional T5 and T8 lamps. In any case, the linear fluorescents represent such a small percentage of the total program sales volume that this variability is not very consequential.



While the comparisons of LED floodlight market shares for participating distributors/contractors and nonparticipating distributors certainly are additional pieces of evidence for program influence, we did not attempt to estimate net-to-gross ratios from this methodology because the nonparticipating distributor sample size was too small. As discussed in the methodology section, available nonparticipating distributor sample was exhausted and additional sample was not available.

We used similar reasoning for not trying to calculate a net-to-gross ratio from the comparison of Massachusetts LED floodlight market shares to other nearby states. The sample sizes for the comparison states were all very small and because of this the only statistically-significant difference was between Massachusetts and New Hampshire. Finally although we know that some of these comparison states such as Vermont have upstream lighting programs that are similar to the Massachusetts program, we do not know enough about LED programs in other states to know which of these states should be included in a “non-program comparison group.”

DNV KEMA also computed participant spillover for other LED or linear fluorescent projects. Participant spillover refers to other projects of the same measures that end users completed without the aid of a rebate program, and that were influenced by their experiences with the Bright Opportunities program (or the lamps discounted through it). DNV KEMA computed like spillover by asking:

- Whether the end user had completed any other LED or linear fluorescent projects since their purchase of the lamps discounted through Bright Opportunities;
- Whether those lamps received rebates or discounts;
- How many lamps they purchased; and
- How much influence their experiences with the bulbs discounted through Bright Opportunities and the dealers from which they purchased those bulbs affected their decisions.

DNV KEMA scaled the spillover calculation to the number of bulbs discounted through Bright Opportunities to arrive at a ratio of the same unit as the attribution ratios in the preceding section. The detailed calculation methodology is described in Appendix AA.

All of the like spillover ratios approach zero. The following table shows the like spillover ratios for LED and linear fluorescent bulbs before and after the discount changes in 2012, and overall. Except for the LED after change and overall ratios, these are not statistically significant from zero.<sup>5</sup>

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<sup>5</sup> While these ratios could be added directly to the attribution ratios presented in the previous section, they would not change those values, so DNV KEMA has not done so.



**Table 1-4: Like Spillover**

| Time of Purchase                     | LED  | Linear Fluorescent |
|--------------------------------------|------|--------------------|
| Before change<br>(LED n=67; LF n=3 ) | <1%  | 3%                 |
| After change<br>(LED n=126; LF n=30) | <1%* | 0%                 |
| Overall<br>(LED n=227; LF n=33)      | <1%* | <1%                |

\* Statistically greater than zero at 90% confidence level.

## 1.6 Conclusions and Recommendations for Program Improvements

The preponderance of the evidence indicates that the Bright Opportunities Program is a well-designed and well-run program. This evidence includes:

- Generally high program satisfaction levels from end users and participating trade allies
- The lack of barriers to program participation (beyond unawareness of the program discussed below);
- The generally high program net-to-gross ratios; and
- The lack of significant complaints from program implementers.

For these reasons we only have a couple of recommendations for program improvements. These include:

- *Do more marketing of the program, especially to end users:* As shown above, only a small majority of the participating distributors and contractors were satisfied with the program’s marketing efforts. As discussed in the body of this report, participating distributors who were less-than-satisfied cited a lack of marketing support, saying that while distributors are receiving information and marketing, it is not reaching end users who ultimately drive sales. Some distributors also felt that they are largely on their own in communicating the program to end users. Participating contractors who were less-than-satisfied with the program marketing efforts cited similar reasons, saying that they had not heard of the program and in a few case were not even aware they had received discounted prices, thinking it was the regular price.
- *Encourage participating trade allies to do more to educate their customers about the source and size of the buydown discounts:* We make this recommendation based on the following evidence:
  - Although 76 percent of the participating end users we surveyed said they were aware that they had received program-discounted bulbs, when we asked them an open-ended question as to the source for this information, only 34 percent mentioned their contractor or equipment supplier.



- When we asked the participating end users a direct question as to whether their contractor or equipment supplier mentioned the program discounts, 62 percent said that they had. However, only about half (51%) of the respondents who said their equipment suppliers mentioned the discounts also reported that their suppliers identified a source for the discount.
- The survey asked respondents who said they were aware of the discounts to estimate the dollar amount of the discounts, per lamp. Most respondents (77% of LED end users; 91% of linear fluorescent end users) who were aware of the discounts did not know a dollar value.
- The survey asked those who said they did not know a dollar amount to estimate a percentage discount. The estimates of percentage discounts were not as accurate as the dollar estimates. Most respondents said they could not estimate the size of the discounts for both LEDs and linear fluorescents. Those who did make an estimate were inaccurate by a wide margin.
- While our end user surveys produced fairly high net-to-gross ratios, we also took the trouble of reminding the participating end users of the exact size of the discounts they received. Future evaluators may be less careful and this would increase the risk that the program may not get full credit for its influence over lamp/bulb sales because end users are simply unaware of the source and extent of these buydown discounts.
- *Do more consumer education about the use of LED bulbs in dimmer switches.* We recommend that the program provide more education/resources on the performance of LEDs on dimmer switches and encourage distributors/manufacturers/contractors to do the same. Such information might include recommended dimmer lists and general information on the technical challenges of LEDs on dimmers, including minimum load ratings. We make this recommendation based on the following evidence:
  - While overall 90 percent of the participants who used LED bulbs through the program were satisfied with the performance of these bulbs, only 72 percent of participants who had used LED bulbs in dimmer switches were satisfied with their performance.
  - Of the few end users (about 16%) who reported any barriers to using the LED bulbs, nearly half (46%) of those reporting problems said they had trouble operating the bulbs with dimmer switches.
  - Of those distributors/contractors reporting customer complaints, the most frequently-cited complaint concerned the performance of the LED bulbs controlled by dimmer switches.



## 2. Introduction

### 2.1 Program Description

The Massachusetts Bright Opportunities Program is a program which attempts to increase the market penetration of energy-efficient lighting technologies through the use of upstream incentives that are used to buy down the cost of these lighting technologies at the lighting distributor level. All five electric PAs in the state are participating in the program. The program began offering upstream incentives on linear fluorescent lighting technologies in September 2011 and incentives for LED lighting technologies in November 2011. In the case of the LED lighting technologies the upstream incentives take the place of the downstream incentives that the Massachusetts C&I programs previously offered for these technologies.

The lighting distributors who participate in the program are obligated to collect sales data on the type and quantity of lamps they sold, as well as the name, location, and contact information of the customers to whom they sold the discounted lighting products. Every month the distributors submit their sales data to the Massachusetts electric PAs and to ECOVA, a third-party program manager. ECOVA combines the sales data from the various participating distributors and then allocates the energy savings and incentives to each participating PA. ECOVA then issues invoices to each PA for that particular month. The program also plans to do quality control inspections for about 10 percent of the sites to make sure that they can verify onsite the lighting quantities and types claimed in the distributor sales reports.

The initial discussions about the scope for this evaluation of the Bright Opportunities Program began in late February 2012 with a summit of PA, EEAC, and program evaluator representatives at DNV KEMA's offices in Burlington, Massachusetts. This summit included a brief, high-level discussion of the Bright Opportunities Program evaluation scope among many other evaluations that were discussed that day. Soon afterwards, on February 29, a smaller group of PA, EEAC, and program evaluator representatives; along with a PA representative who manages the Bright Opportunities Program, had a conference call to better understand the program and to further refine the evaluation scope.

In April 2012 the DNV KEMA evaluation team submitted a memorandum to the PAs with a list of questions seeking additional information about the Bright Opportunities Program. The PAs provided responses to these questions in late April. In early May the PAs provided the evaluation team with a copy of the program tracking data so they could have some understanding of the size and mix of the program participants. In May the PAs and EEAC also told DNV KEMA that they would like a net-to-gross and spillover analysis to be part of the analysis. On June 18, 2012 DNV KEMA issued the initial draft of the work plan.



## 2.2 Evaluation Objectives

This section describes the evaluation objectives for this process evaluation. We also include the impact evaluation objectives to help explain why certain topics are not included in the process evaluation scope of work.

### 2.2.1 Process Evaluation Objectives

The research objectives of the process evaluation for the Bright Opportunities Program include:

- Determining whether this program, which is brand-new, is appropriately designed;
- Determining whether the program is being delivered in an efficient and effective manner;
- Determining what barriers to adoption of these energy-efficient lighting technologies remain that the current program design has been unable to eliminate or sufficiently mitigate;
- Determining what advantages (or disadvantages) the upstream design of this lighting program has compared to the earlier downstream program designs;
- Providing estimates of net-to-gross ratios for the program net of free-ridership; and
- Providing preliminary estimates of spillover from the program focusing on participant spillover.

### 2.2.2 Impact Evaluation Objectives

The research objectives of the impact evaluation for the Bright Opportunities Program include updating the following assumptions with Massachusetts-specific research:

- Application of purchased lamps by facility and space type;
- Hours of use of purchased lamps;
- Baseline replaced lamps for estimating delta watts;
- Gross savings realization rates to be applied to 2012 results; and
- Estimates of delta watts and hours of use to be applied prospectively.



## 3. Methodology

DNV KEMA completed telephone surveys/interviews with participating end users, participating distributors, nonparticipating distributors, and participating contractors.. We also conducted a few interviews with program staff and Ecova, the subcontractor responsible for collecting and managing the program tracking data. This section provides an overview of DNV KEMA's evaluation methodology. For details, refer to Appendix A.

### 3.1 Sampling

This section describes the sampling procedures we used for this evaluation.

#### 3.1.1 End User Sample

In November 2012, DNV KEMA received program tracking data which covered the November 2011 to November 2012 period. The Program data included information about the types and quantities of products installed, customer names and addresses, distributor names and addresses, and equipment manufacturers. The product types identified in the data were LEDs (MR16, PAR20, PAR30 and PAR38) and Fluorescents (T5 and T8). Since no estimates of savings were provided, standard formulas were applied to calculate annual kWh savings by product type and wattage.

DNV KEMA sampled for the process and impact evaluations concurrently to ensure unique samples for each effort. The sample frame for the impact evaluation was defined as unique rows for each customer location and product type. For purposes of designing and selecting the sample, the level of detail for product types was the two major groups: LEDs and Fluorescents. The tracking data were aggregated by customer name, address and group. The initial 6,343 records produced 3,365 unique combinations. However, we noticed that there were many instances where names and addresses were spelled, abbreviated, or punctuated differently, creating multiple records. Software tools and manual review reduced the number of unique combinations of name, address and product group to 3,077. After eliminating a few records where the sales quantity was less than or equal to zero, the number of records is 3,070. The distribution of savings and quantities installed across the product groups follows in Table 3-1.



**Table 3-1: Distribution of Upstream Lighting Projects by Product Group**

| Product Group | Savings (kWh) | % of Savings | Quantity Installed | % of Quantity Installed | Number of Customer Locations | % of Customer Locations |
|---------------|---------------|--------------|--------------------|-------------------------|------------------------------|-------------------------|
| LED           | 37,478,740    | 93.21%       | 219,691            | 49.04%                  | 2,513                        | 81.86%                  |
| Fluorescent   | 2,728,501     | 6.79%        | 228,295            | 50.96%                  | 557                          | 18.14%                  |
| Total         | 40,207,241    | 100.00%      | 447,986            | 100.00%                 | 3,070                        | 100.00%                 |

For the process evaluation, the sampling units were defined as unique customer names, regardless of address or product group. The 3,070 unique customer locations and product groups represented 2,599 customer names. The frame for the process evaluation was the names remaining after the impact evaluation sample was selected and removed from the population.

The sample design for the participating customer telephone survey was based on a frame that excluded customers selected for the site visit sample and aggregated by customer name. DNV KEMA created six strata based on estimated savings. The phone numbers were randomly ordered, then called in order. DNV KEMA monitored the incidence of bulb type, but did not sample for it nor have separate quotas according to bulb type. Respondents who purchased both LED and linear fluorescent bulbs were only asked the linear fluorescent sequence. . The number of customer names in the population for the process survey sample was 4,439, which account for a total savings of 55,421,570 kWh. For planning purposes, we estimated the sample size of 200 completes to achieve results as proportions with  $\pm 10\%$  relative precision at a 90% confidence interval.

### 3.1.2 Participating Lighting Distributors/Manufacturers

Based on the first set of program tracking data we received (through April 2012), we originally identified 33 participating distributors. However, in fall 2012 we requested additional program data which expanded the number of participating distributors to 50. All 50 distributors were included in DNV KEMA’s sample frame.

We also examined the program tracking data to identify participating manufacturers. There were 12 manufacturers identified in the data with products that were purchased through Bright Opportunities. However, two of these manufacturers accounted for nearly 90 percent of the program shipments. In addition, while the manufacturers supply the lighting products for the Bright Opportunities Program, the



program fact sheets clearly indicated that lighting distributors and not lighting manufacturers were the focus of the program.<sup>6</sup>

### 3.1.3 Nonparticipating Lighting Distributors

We planned to interview nonparticipating lighting distributors for both process evaluation reasons (e.g. barriers to participation) and to collect energy-efficient measure penetration data that would be useful for the net-to-gross analysis. Our sample frame for the nonparticipating lighting distributors was extracted from a large sample frame of lighting vendors (including both contractors and distributors) that we created for the LCIEC 2012 Large C&I Process Evaluation Report.<sup>7</sup> This lighting vendor sample frame was pulled relatively recently (late 2011) and combined data from both the Dun and Bradstreet (D&B) and Dodge databases. Based on SIC codes we estimated that there were 623 lighting distributors in this database. DNV KEMA removed the companies identified as participating distributors, duplicates, and similar NAICS categories<sup>8</sup>, reducing potential lighting distributors to 350. DNV KEMA also used a second data set, purchased from Sales Genie, to identify additional potential nonparticipating lighting distributors. Our final combined sample frame included 387 nonparticipating lighting distributors.

### 3.1.4 Participating Lighting Contractors

The customer names in the tracking data were reviewed to identify those that were likely to be contractors who installed lighting products at other end user sites. This group was comprised of 255 unique names, and accounted for 1,874,381 kWh savings. Based on this sample of 25 contractors, the anticipated precision for results was  $\pm 22.36\%$ . While this was significantly higher than the typical 90%/10% target, we expect to be able to combine these responses with those from the participating distributors to achieve statistically reliable results.

## 3.2 Surveys and Interviews

This section summarizes the topics covered by our end user survey instrument and the guide we used for our in-depth interviews with lighting distributor and contractors.

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<sup>6</sup> DNV KEMA attempted to interview these two manufacturers as part of our evaluation of the Massachusetts ENERGY STAR® lighting program, which is a residential upstream lighting program that focuses on lighting retailers. However, we were unsuccessful.

<sup>7</sup> *Massachusetts Large Commercial & Industrial Process Evaluation (LCIEC Project 10)*, Prepared by KEMA Inc. Final Report, July 20, 2012.

<sup>8</sup> NAICS codes used to extract firms from D&B data included not only lighting distributors, but also firms classified in the same 5-digit NAICS category. This included security system alarm installers and distributors, communication distributors and installers office cleaning firms.



### 3.2.1 End user Survey

DNV KEMA used computer-aided telephone interviews (CATI) to survey participating end users. These surveys covered the following topics:

- Firmographics;
- Company energy-related policies;
- Installation verification;
- Hours of operation of rebated lamps;
- Equipment replaced by rebated lamps;
- Barriers/challenges encountered in the lighting purchases/projects;
- Satisfaction with the lighting products;
- Satisfaction with the lighting distributors/contractors;
- Influences on purchase decision(s);
- Net-to-gross; and
- Like and unlike spillover.

The surveys asked about either LED or linear fluorescent lamps. This decision was made to reduce survey length and improve response rates. Because linear fluorescent lamps represented such a small portion of the sample, the survey asked about linear fluorescent lamps for any respondents that purchased both types of lamps.

### 3.2.2 Lighting Distributor and Contractor Interviews

DNV KEMA performed In-Depth Interviews (IDIs) with participating lighting distributors, participating lighting installation contractors, and nonparticipating lighting distributors. Interviews covered the following topics:

- Firmographics;
- Company energy-efficiency related sales goals;
- Sales strategies;
- Reasons for involvement (participants only);
- Program sales verification (total and selected projects, participants only);
- Net-to-gross;
- Program barriers;
- Quality control and “leakage”; and
- Satisfaction.

Interviews concentrated on LED lamps to minimize length and increase completion rates. For sales verifications, interviewers attempted to ask about all bulb types for distributor and/or select specific projects.



### 3.3 Dispositions

This section discusses the disposition of our end user survey and in-depth interview efforts.

#### 3.3.1 End User Survey

DNV KEMA attempted to contact over 3,200 upstream rebate program participants (end users) between November 11 and 24, 2012. DNV KEMA attempted up to eight contacts per end user. The final dispositions are shown in Table 3-2. We completed a total of 200 surveys, for a final response rate of seventeen percent.

**Table 3-2: End user Survey Dispositions**

| Disposition                           | Total |
|---------------------------------------|-------|
| Ineligible <sup>9</sup>               | 326   |
| Eligible - Not Complete <sup>10</sup> | 427   |
| Unknown Eligibility <sup>11</sup>     | 1,833 |
| Refused                               | 500   |
| Complete                              | 200   |
| Total                                 | 3,286 |

Some of the survey questions applied only to linear fluorescent (LF) tubes and some only to LED bulbs. The survey asked only the linear fluorescent questions to the end users who received both types of lamps. DNV KEMA made this decision because the majority of the incentivized lamps were LEDs. Favoring the linear fluorescent questions helped to ensure we collected enough data on linear fluorescent tubes that we could make robust statistically-significant inferences from the results.

#### 3.3.2 Lighting Distributor and Contractor Interviews

DNV KEMA attempted to contact participating distributors in November- December 2012 and nonparticipating distributors in December 2012 through February 2013, and participating installation contractors were called in February-March 2013. Numbers were called until the respondent completed the interview, refused to be interviewed, was determined to be ineligible, was not available for interview after eight attempts, or it appeared that the business was no longer in operation/there was no usable number.

<sup>9</sup> Ineligible dispositions included: computer/fax tone, disconnected numbers, duplicated numbers, and organizations that said they were a lighting or electrical contractor.

<sup>10</sup> Eligible – not complete dispositions included: callbacks that were never called back, cell phone, language barrier, over quota, and respondent never available.

<sup>11</sup> Unknown eligibility included: answering machines, no answers, and never dialed.



Dispositions for participating distributors, nonparticipating distributors and installation contractors are shown in Table 3-3.

The large number of nonparticipating distributors who were either not qualified or had disconnected numbers revealed a weakness in the data frame available and for that reason DNV KEMA worked to secure a secondary data set. These additional data provided only a slight addition to completions, indicating an issue with tracking distributors not actively working with programs in general.

**Table 3-3: Interview Dispositions**

| Disposition                      | Participating Distributors | Non-Participating Distributors | Installation Contractors |
|----------------------------------|----------------------------|--------------------------------|--------------------------|
| Not Called                       | 0                          | 0                              | 71                       |
| Called, not contacted            | 0                          | 0                              | 114                      |
| Exhausted                        | 13                         | 32                             | 0                        |
| Not Qualified                    | 1                          | 231                            | 0                        |
| Refused                          | 11                         | 33                             | 10                       |
| Wrong number/number disconnected | 1                          | 83                             | 20                       |
| Partial Completion               | 0                          | 3                              | 0                        |
| Full Completion                  | 24                         | 5                              | 25                       |



## 4. Findings

This section presents the major findings from the end user surveys and the interviews with lighting distributors and contractors. The section is organized by topic, with relevant information from each type of respondent integrated into each section.

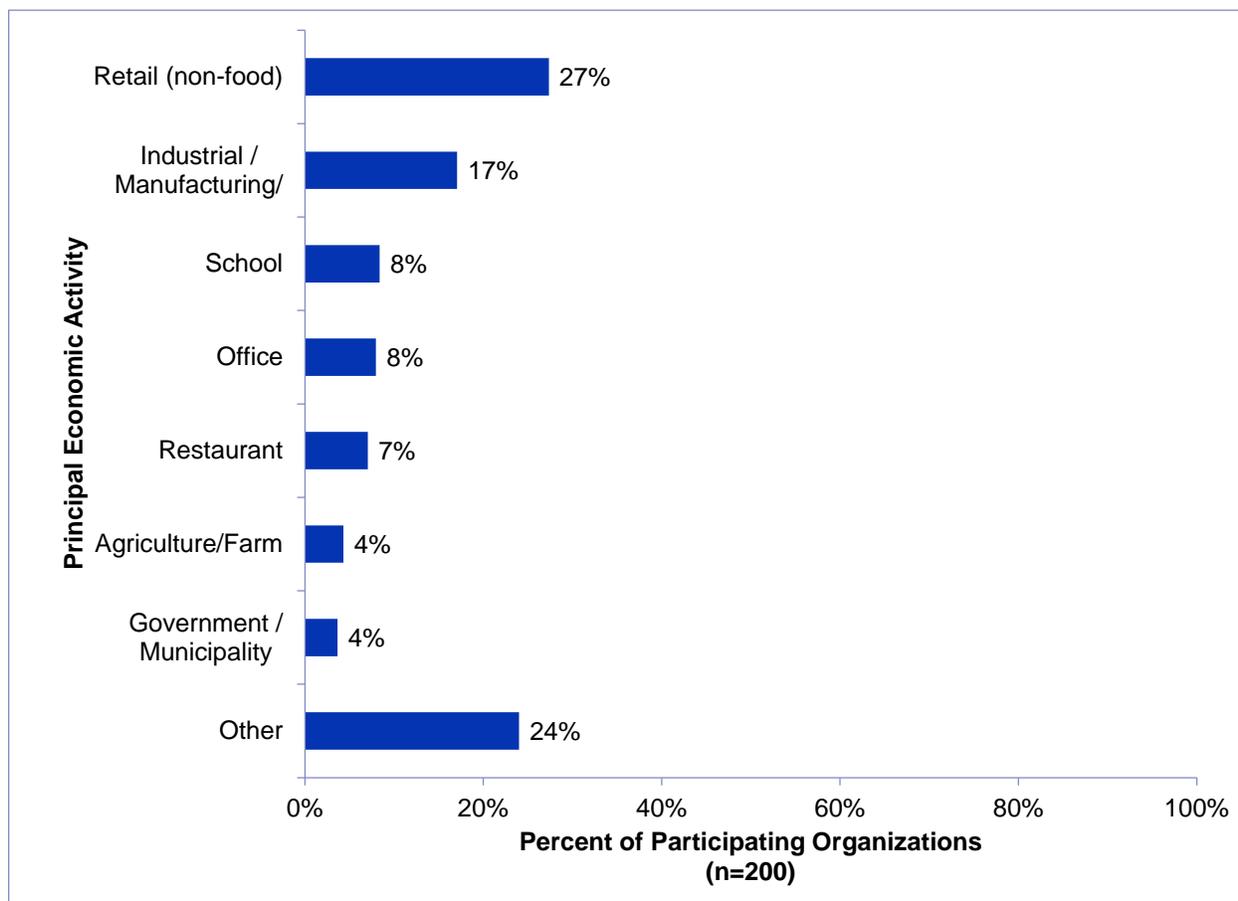
### 4.1 Firmographics

The survey asked end users several questions to categorize the organizations they work for and the buildings they occupy. We also asked the lighting distributors and contractors to characterize the kind of customers who purchase the LED lighting products.

#### 4.1.1 Economic Activity

The survey asked end users to identify the primary economic activity at the location where they installed the discounted lights. Figure 4-1 shows the distribution of responses. The two most common categories were non-food retail (27%) and industrial or manufacturing (17%). Compared to the 2012 Large Commercial and Industrial Process Evaluation Report, Bright Opportunities participants were more likely to be non-food retail (8% in the process report) and less likely to be office (20% in the process report).

**Figure 4-1: Primary Economic Activity - End users**



Other included the following principal economic activities: College/University (3%); Health Care/Hospital (3%); Warehouse (3%); Hotel/Motel (3%); Community Service (3%); Church/Temple (2%); Convenience store (<1%); and unspecified other (7%).

There were two statistically-significant differences depending on the type of lamp.<sup>12</sup> LEDs were more likely to be installed in non-food retail organizations than linear fluorescents (35% vs. 6%). In contrast, linear fluorescents were more likely to be installed in schools than LEDs (25% vs. 3%).

#### 4.1.2 Other Firmographics

Overall about two-thirds (66%) of the participants reported owning all of the space occupied by their organization. One-fourth of them reported leasing all of their space, and the remainder said they owned some and leased some space (4%) or could not answer the question (5%; Table 4-1).

There were significant differences between LED and linear fluorescent end users in their space ownership status. Linear fluorescent end users were more likely to own all of their space and less likely to lease all

<sup>12</sup> Differences that exceed a 90% confidence interval were considered statistically significant.



of their space than LED end users. These space ownership differences are likely related to the differences in economic activity reported in the previous section. Linear fluorescents were more likely to be purchased by schools, which are likely to own their space. In contrast, LEDs were more likely to be purchased by non-food retail stores. Many of these stores will rent their space.

**Table 4-1: Other Demographics**

| Demographic                              | LED<br>(n=167) | Linear<br>Fluorescent<br>(n=33) | Overall<br>(n=200) |
|--|----------------|---------------------------------|--------------------|
| Own all space                            | 62%*           | 78%*                            | 66%                |
| Lease all space                          | 29%*           | 12%*                            | 25%                |
| Own some, lease some                     | 6%*            | 0%*                             | 4%                 |
| Don't know                               | 3%             | 11%                             | 5%                 |
| Square feet occupied (mean) <sup>1</sup> | 11,928*        | 18,123*                         | 13,468             |
| # FTE (mean) <sup>2</sup>                | 102*           | 88*                             | 147                |

\* Difference statistically significant at 90% confidence level.

<sup>1</sup> 26% of respondents said don't know or refused to answer.

<sup>2</sup> 7% of respondents said don't know or refused to answer.

For any respondent who said they leased some of their space, the survey asked if their energy costs were included in their normal lease payment. Affirmative answers were rare – only six percent of the renters said that their normal lease payment included energy costs.

The survey asked end users to estimate the enclosed square footage that they occupy. The overall average size was 13,468 square feet (median = 6,000 square feet). End users who purchased LEDs had smaller footprints (mean=11,928 square feet) than those who purchased linear fluorescents (mean = 18,123 square feet). This size difference is probably also due to the differences in economic activity. Schools, which were more likely to use the linear fluorescents, tended to be larger, on average, than non-food retail stores, which were more likely to use the LEDs. This finding should be interpreted with caution because about one-fourth (26%) of the respondents did not know or refused to answer the question.

The survey also asked end users how many full-time equivalent employees worked at the location where the incentivized lamps were installed. The overall mean number of employees was 102, with a median of 10. Similar to the footprint results, LED end users had fewer employees (mean = 88) than linear fluorescent end users (mean = 147). These differences are probably also related to the economic activity differences between each type of end user. Response coverage was better for this question than the footprint question. Only seven percent of the respondents did not know or refused to answer the question.



### 4.1.3 Lighting Distributor/Contractor Characterization of Their Customers

We asked the participating lighting distributors if participation had any impact on the types of customers they were selling to. Respondents were split with 47 percent of them stating that there had been a difference in the types of customers they served and 53 percent stating that there had not been. Of those responding ‘Yes’, differences cited included more lighting sales with individual businesses such as retail outlets or small commercial businesses instead of large contracts.

We asked participating lighting distributors if participation in the program had any impacts on the mix of lighting products that they sold. Seventy-three percent of respondents stated that they had changed what they carry, 27 percent said that it had not. Those who responded ‘Yes’ cited stocking more LEDs.

We also asked the participating lighting distributors if they could characterize or make generalizations about the types of customers they were selling to. A majority of distributors refused to identify specific customers or customer categories, making comparison to customer profiles largely meaningless. Of those that did respond, responses included:

- Retail;
- Institutional: hospitals, colleges, property management companies;
- Hotels/hospitality;
- School districts; and
- Commercial.

Participating lighting contractors were asked questions about customers similar to those we posed to distributors. We asked the lighting contractors if the program had any impact on the types of customers they were working with or selling to. All contractors responded that the program had not had any impact on that. Contractors were then asked if they could make any generalizations about their customers who have them install LEDs. Their responses included:

- Commercial customers (specifically those who were not able to afford LEDs before);
- Younger business owners;
- Middle-income businesses;<sup>13</sup>
- Businesses with dedicated maintenance staff; and
- Interest in energy savings, very energy conscious or “green.”

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<sup>13</sup> One contractor explained: “Middle class is more likely to spend [on LED lighting]. Poor can’t afford it and rich people [businesses] don’t care.”



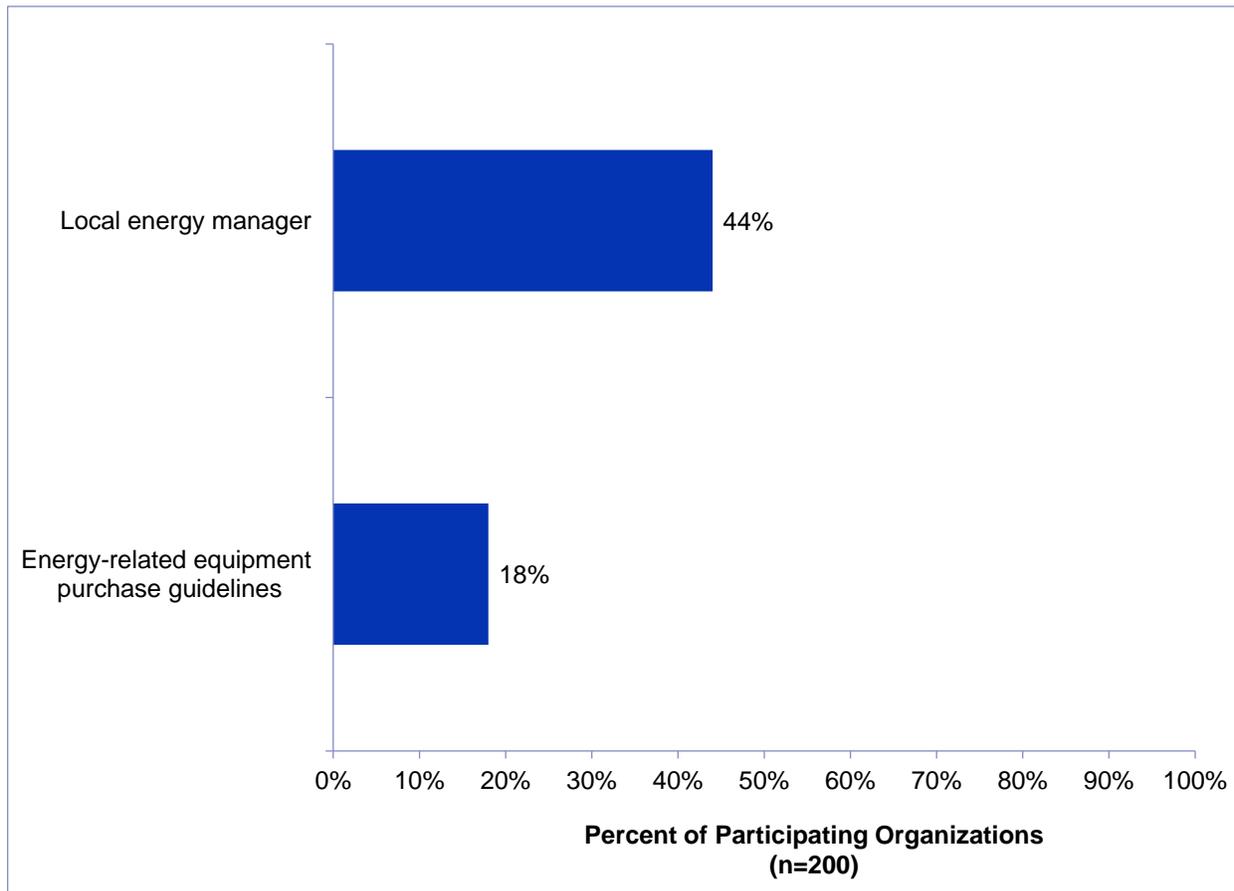
## 4.2 Energy-Related Policies

The end user surveys asked whether there was a person at the respondent’s location whose job responsibilities included energy management for their location. The minority (44%) of respondents said there was such a position.

Additionally, the survey asked whether respondents’ organizations had official policies or informal guidelines related to the purchase of energy-using equipment. Less than one-fifth (18%) of respondents answered this question affirmatively (Figure 4-2).

A hypothesis proposed by the evaluation team was that organizations that purchased LED bulbs were more energy-conscious than those who purchased linear fluorescents. In terms of the frequency with which they reported having a local energy manager or an energy-related equipment purchase, there were no statistically -significant differences in either question between LED and linear fluorescent end users. However, as discussed later in the report, there were some differences between these two groups in terms of the frequency with which they cited energy savings as a motivation for joining the program.

**Figure 4-2: Energy-Related Policies**



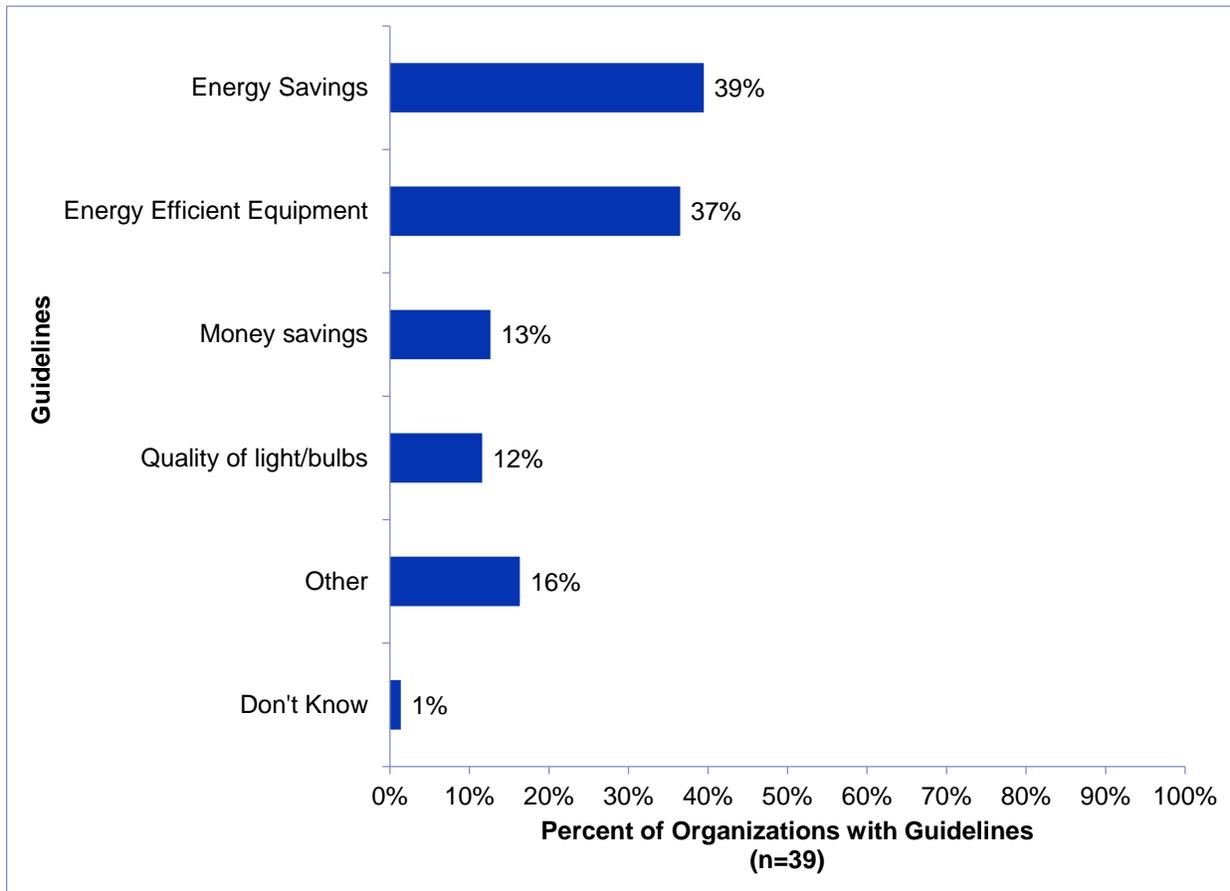


There were several other interesting patterns in the data:

- *Having an energy manager and purchase guidelines were correlated.* About three-fourths (73%) of LED end users with energy purchase policies also reported having an energy manager. In contrast, only one-third of organizations without energy purchase policies said they had an energy manager. Linear fluorescent end users had a similar pattern, though it was not as pronounced and not statistically significant due to the small sample size.
- *LED end users with large footprints (>10,000 square feet) more likely (80%) than those with small footprints (30%) to report having an energy manager.* This pattern was not apparent for linear fluorescent end users, mostly because there were only a few with a small footprint. Organizations with larger footprints likely also have larger energy profiles, making it more worthwhile to assign someone to manage the site's energy. Organizations with larger footprints also likely have more employees, giving them a greater ability to assign energy management duties to someone.
- *Having an energy manager may improve the chances that an organization will be satisfied with LEDs and contractors who install them.* LED end users that reported being very satisfied with the lamps and contractors (46%) were more likely to have an energy manager than those who were less than very satisfied (24%). This pattern did not hold for linear fluorescent purchasers. A possible reason for this finding is that employees with energy management duties may have had more realistic expectations about the discounted lamps, due to greater attention and experience with energy-related topics.

If the respondent indicated that their organization has formal policies or informal guidelines for the purchase of energy-using equipment, the survey asked them to elaborate on those guidelines. As shown in Figure 4-3, of the organizations that have energy purchase guidelines, the majority of those guidelines involve energy savings or energy efficiency. LED and linear fluorescent end users had similar distributions of responses to this question.

**Figure 4-3: Energy Purchase Guidelines**



\* Note, total exceeds 100% because multiple answers were permitted.

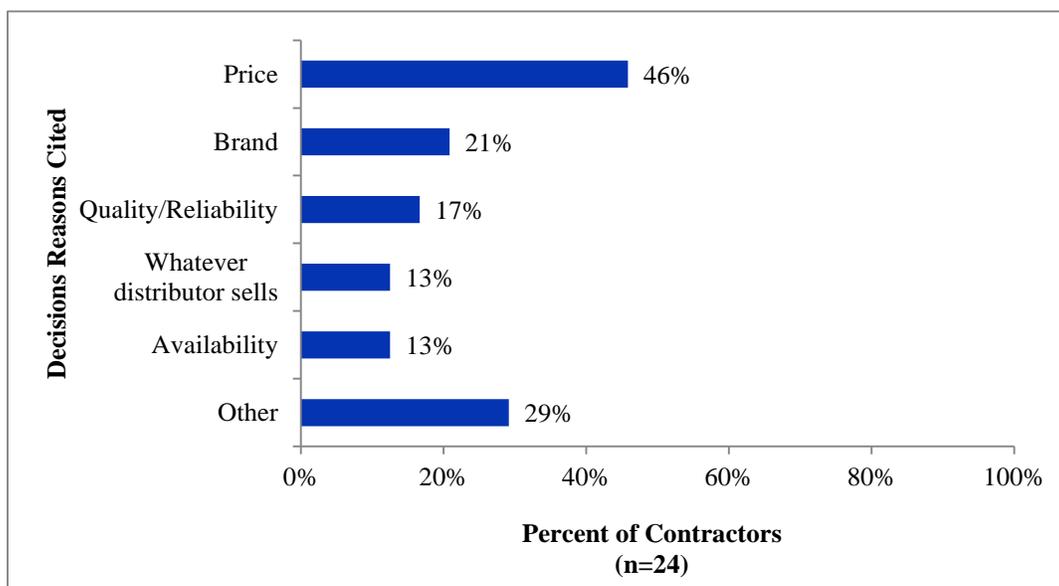
There were several additional interesting differences within LED end users:

- *LED end users who owned all of their space were more likely than those who leased some space to say that their guidelines involved energy savings (67% who owned; 8% who leased). Owners typically have more incentive and ability to make energy-saving improvements to their space than lessees.*
- *LED end users in the retail or office sectors were more likely than those in any other sectors to say their guidelines involved the quality of the light. Light quality may be more directly relevant to these economic activities, and thus be more important to these organizations.*
- *Neither of these findings applied to linear fluorescent end users, in part because the small sample sizes limited the power of statistical tests.*

We asked the lighting contractors how they decided what products to purchase from distributors. Nearly half (46%) of the contractors cited price as a factor in deciding what products to buy. A number of

contractors elaborated on this, stating that they would specifically look for rebates in order to get a better price. Other considerations they cited less frequently included bulb brand, their perceptions of the quality or reliability of the bulbs, choosing from whatever the distributor sells, and availability of stock and quantity. Figure 4-4 shows the frequency with which they cited these various factors.

**Figure 4-4: Decision factors of contractor purchases**



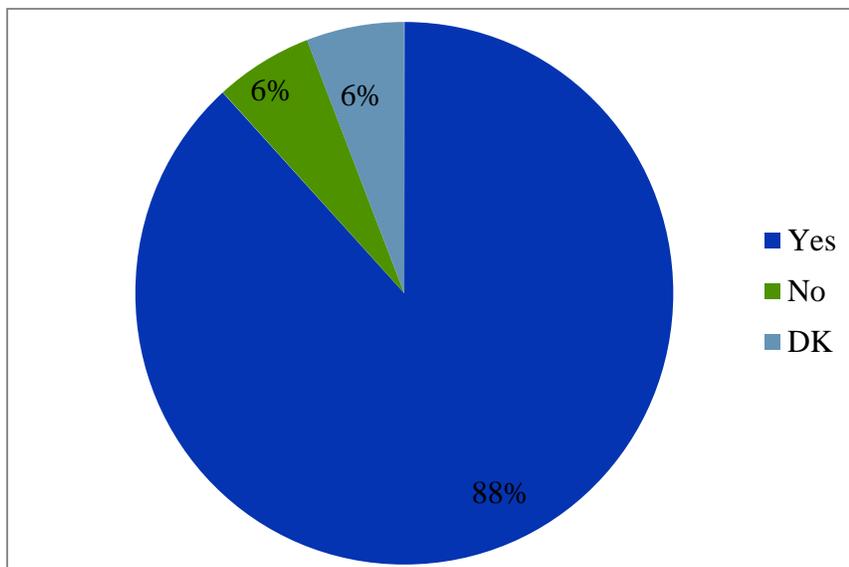
Design-bid-build projects are new construction or major renovation projects where design engineers usually specify, in a contract, a limited number of lighting options that contractors can bid on. Such projects are commonly known as “build to specification” projects. In such projects it is up to the design engineer to find energy-efficient options and the contractors are limited to the choices given them.

We asked the participating contractors if they “built to spec.” The large majority (82%) said that they did.

We then asked the contractors who said they build to specification, whether the price they get for lighting equipment affects their bidding process. Because the program offers the LED bulbs in particular at a heavily-discounted rate, we were interested in knowing how these lower prices might impact the bidding process. Figure 4-5 shows that most answered that the price of lighting affects their bidding process, with 15 of 17 respondents answering affirmatively with a “yes” or “absolutely.”

Of course, in many situations, the lighting contractors are not asked to purchase the lighting, only to install it. One respondent responded that price would make a difference in their bidding but “people don’t want us to get involved with buying lights because they know they can get them cheaper themselves.”

**Figure 4-5: Whether Lighting Distributors Said that Lighting Prices Affects Their Bid Process (n=17)**



### 4.3 Sources of Information about Bright Opportunities

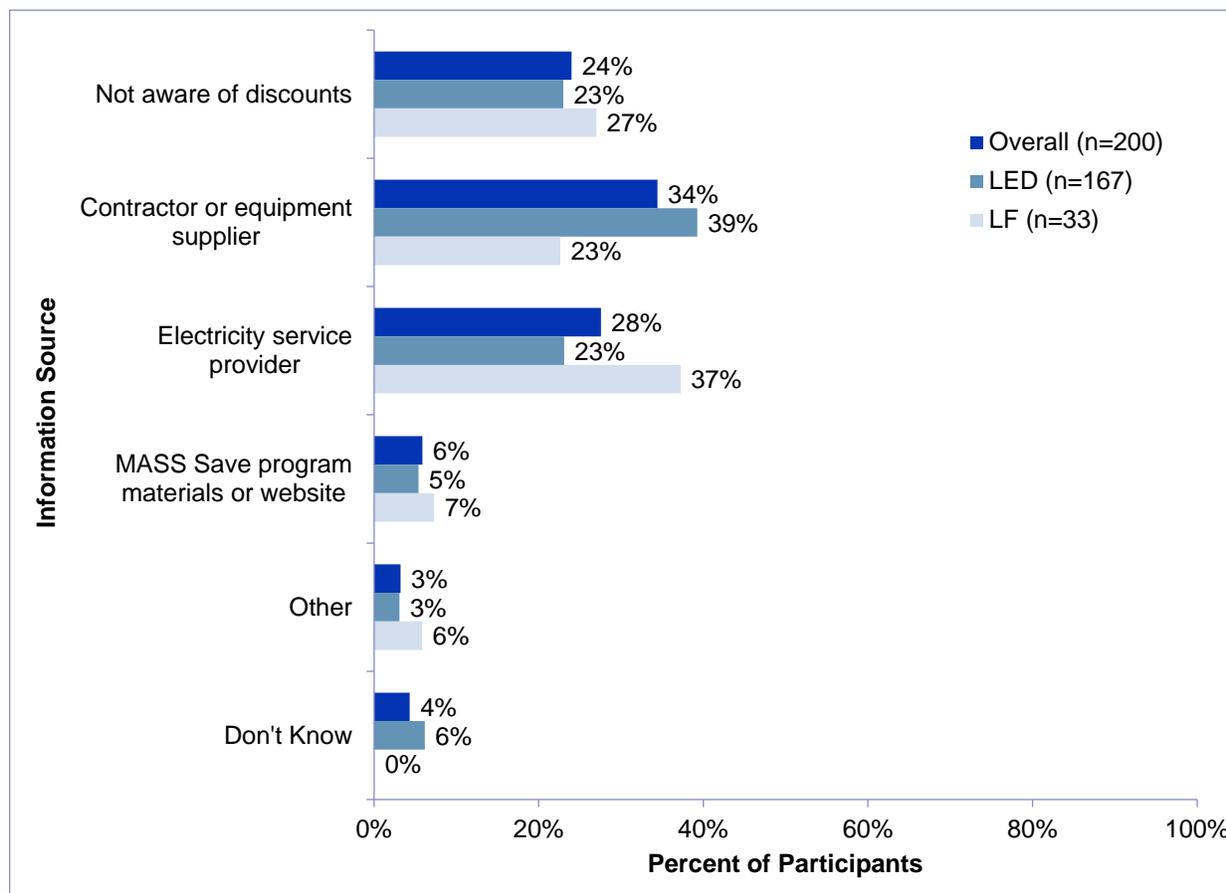
This section summarizes our findings concerning how both the participating end users and the participating trade allies heard about the program.

#### 4.3.1 Participating End Users

All respondents to the end user survey received discounts according to Bright Opportunities Program records. However, due to the “upstream” nature of these discounts – they went directly to the manufacturers or distributors rather than the end users, one of the key evaluation questions was whether end users were aware they received a discount. Overall, about three-fourths (76%) of participants said they were aware that their lamp purchases were discounted. This did not vary significantly for LED (77%) or linear fluorescent (73%) lamps. Note, this level of awareness is likely an upper threshold because of the possibility that some respondents were answering this question affirmatively because they did not want to appear ignorant or because that is what they thought the interviewer wanted to hear (this is often called “the social desirability bias”).

The most frequently-cited information sources included contractors or equipment suppliers (34% of respondents) and electricity service providers (28%). A few respondents mentioned the MASS Save program (Figure 4-6).

**Figure 4-6: Discount Information Source**



There were a few statistically significant differences in sources of information about the discounts:

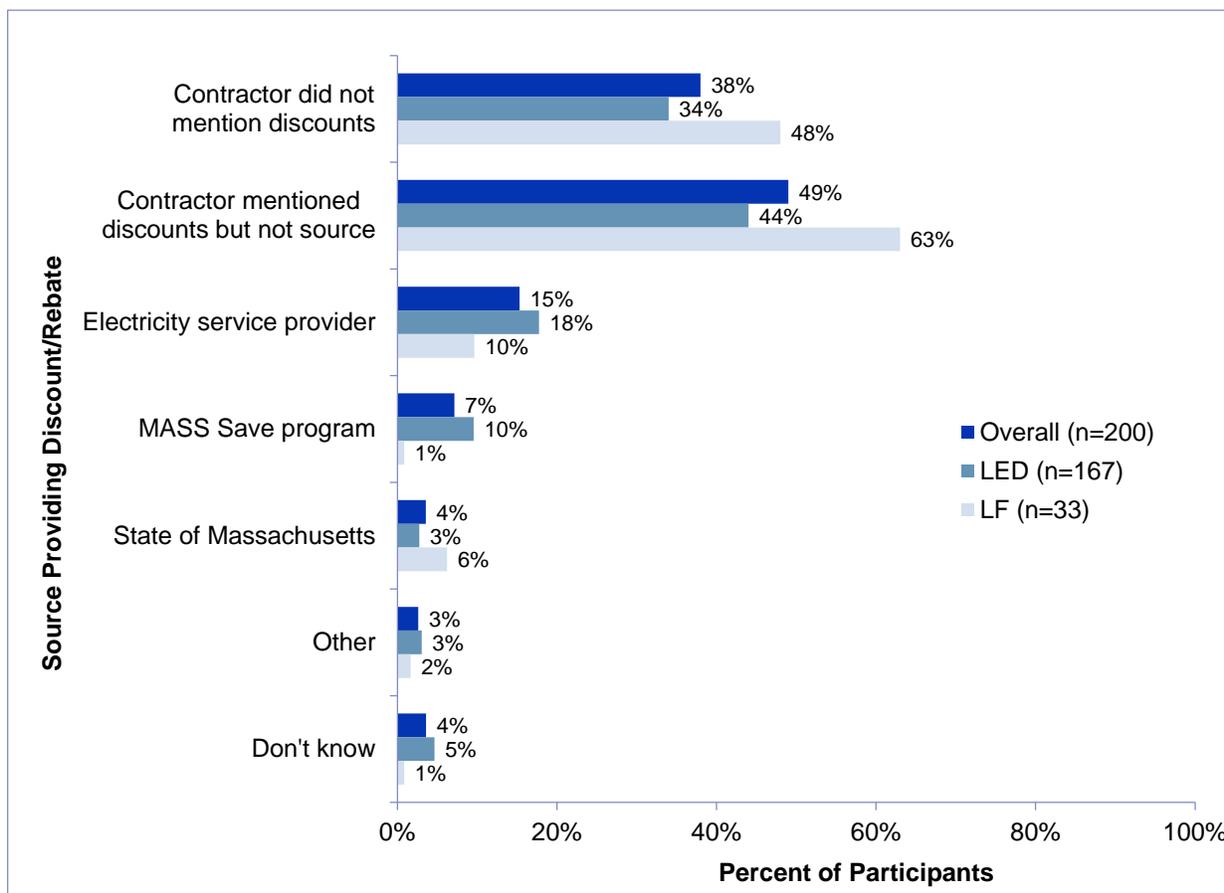
- *Lighting type:* LED end users were more likely than linear fluorescent end users to hear about the discounts from their contractor or equipment supplier (39% LED; 23% linear fluorescent). In contrast, linear fluorescent end users were more likely than LED end users to hear about the discounts through their electricity service providers (37% linear fluorescent; 23% LED). Several factors may have contributed to this pattern:
  - Linear fluorescent end users tended to be larger organizations which are more likely to have dedicated account representatives with electricity service providers.
  - The LED discounts are relatively new, and only available as an upstream incentive. Therefore the electricity service providers have had less opportunity to market these incentives.
  - “Downstream” linear fluorescent rebates have also been available for several years in Massachusetts, and these organizations may have taken advantage of those programs in the past.



- *Building size:* LED end users with large footprints (>10,000 square feet) were more likely (53% of respondents) than those with small footprints (13%) to report hearing about the discounts from their electricity service provider. In contrast, LED end users with small footprints (64%) were more likely than those with large footprints (32%) to report hearing about the discounts from contractors. This pattern is likely due to the activity of electricity provider account managers with the larger organizations but not with the smaller ones.
- *Market sector:* LED end users in the non-food retail sector (37%) were more like than those in the not-for-profit sector (which included schools and governments; 7%) to say they heard about the discounts from their electricity service provider.

The survey also asked participating end users if their contractor or equipment supplier mentioned any discounts were available on the purchased lamps. Most of them (62%) said that their equipment suppliers did mention that the lamps were discounted. However, only about half (51%) of the respondents who said their equipment suppliers mentioned the discounts also reported that their suppliers identified a source for the discount. Of the cited sources, electricity service providers were the most common, followed by the MASS Save program and the State of Massachusetts (Figure 4-7).

**Figure 4-7: Discount Source According to Contractor**



Note: Total exceeds 100% because multiple answers were accepted. Other included: manufacturers, contractors/distributors, and unspecified other sources.

The frequency with which end users reported that their contractors/suppliers mentioned the discounts varied to a statistically-significant degree depending on the lamp type. These differences suggest that equipment suppliers discussed the discounts on LED lamps more so than on linear fluorescent lamps.

- Equipment suppliers were more likely to mention that LED lamps were discounted than linear fluorescent lamps (66% of LED respondents; 52% of linear fluorescent respondents). The larger size of the LED discounts may explain why these suppliers mentioned them more often.
- Equipment suppliers were more likely to mention a specific source of discounts for LED lamps than linear fluorescent lamps (56% LED; 27% linear fluorescent).



- LED end users in the non-food retail sector (55%) or the miscellaneous sector<sup>14</sup> (58%) were more likely than those from the not-for-profit sector (including schools and government; 18%) to hear that the discounts came from the electricity service provider. In contrast, not-for-profit organizations (51%) were more likely than participants in the non-food retail sector (13%) or the miscellaneous sector (12%) to hear that the discounts came from the MASS Save program.

The survey asked respondents who said they were aware of the discounts to estimate the dollar amount of the discounts, per lamp. As shown in Table 4-2, most respondents (77% of LED end users; 91% of linear fluorescent end users) who were aware of the discounts did not know a dollar value. However, those that did make an estimate were fairly accurate for both LEDs and linear fluorescents. LED end users tended to underestimate the discount, and linear fluorescent end users tended to overestimate the discounts.

The survey asked those who said they did not know a dollar amount to estimate a percentage discount. The estimates of percentage discounts were not as accurate as the dollar estimates. Again, most respondents said they could not estimate the size of the discounts for both LEDs and linear fluorescents. Those who did make an estimate were inaccurate by a wide margin. As occurred with the dollar estimate, LED end users underestimated the discount while linear fluorescent end users overestimated the discount.

These results suggest that distributors are not communicating specific details of the discounts to many of their customers.

**Table 4-2: Estimated per Lamp Discounts**

| Lamp Type                 | Dollars                           |                         |            | Percent                           |                         |            |
|---------------------------|-----------------------------------|-------------------------|------------|-----------------------------------|-------------------------|------------|
|                           | Mean Actual Discount <sup>1</sup> | Mean Estimated Discount | Don't know | Mean Actual Discount <sup>1</sup> | Mean Estimated Discount | Don't know |
| LED (n=167)               | \$29.48                           | \$21.00                 | 77%        | 75%                               | 50%                     | 77%        |
| linear fluorescent (n=33) | \$1.30                            | \$1.82                  | 91%        | 32%                               | 65%                     | 73%        |

<sup>1</sup> Calculated by taking the average across the entire CATI sample.

### 4.3.2 Participating Lighting Distributors/Contractors

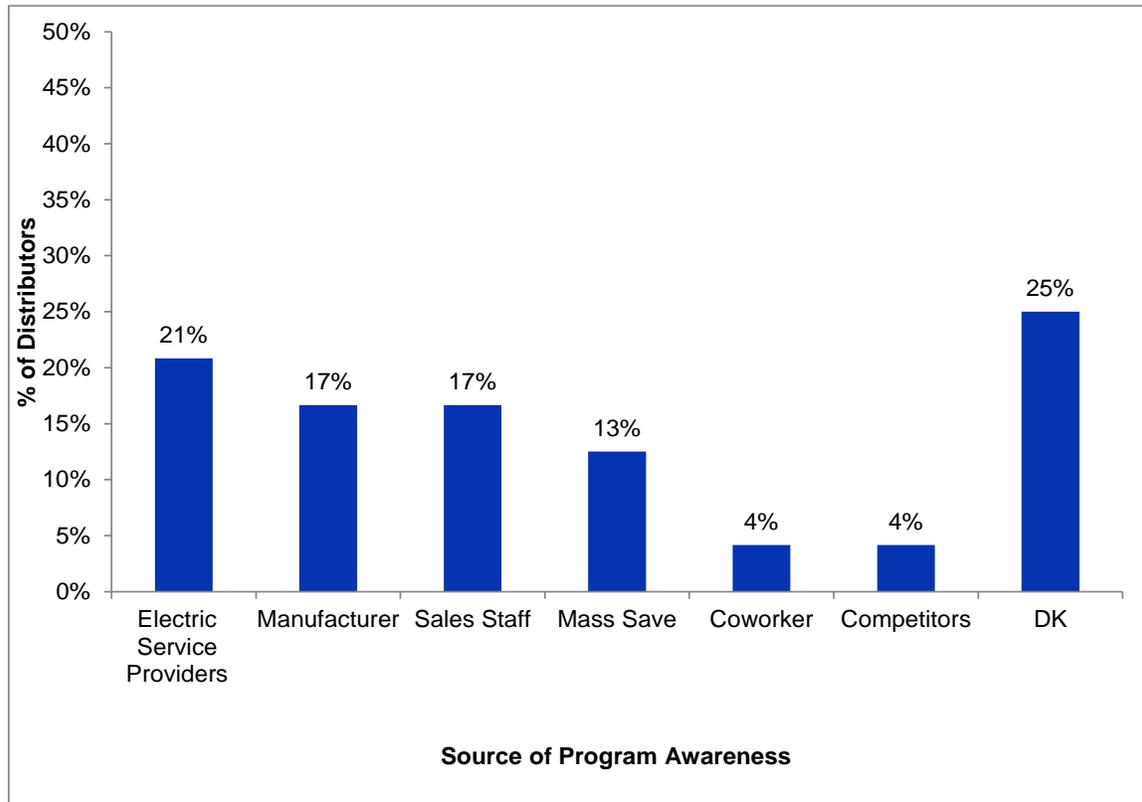
We asked the participating lighting distributors how they heard about the Bright Opportunities Program. The most frequently-cited sources included utilities (21% of respondents) followed by lighting

<sup>14</sup> The miscellaneous sector included: grocery store, convenience store, restaurant, health care/hospital, hotel/motel, agriculture/farm, and unspecified other economic activities.



manufacturers (17%), and their own sales staff (17%). A quarter of them did not recall how they became aware of the Bright Opportunities Program. Figure 4-8 shows the full range of responses.

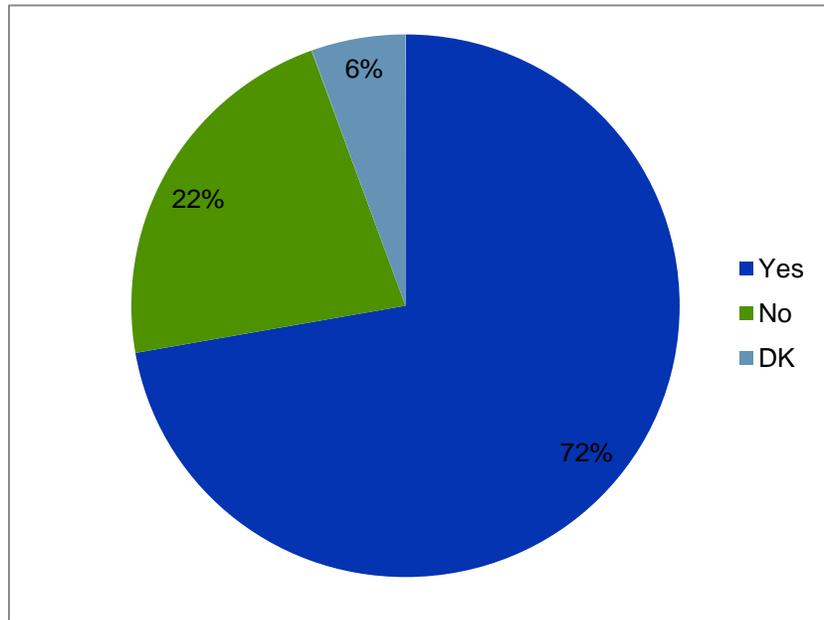
**Figure 4-8: Participating distributor source of program awareness (n=24)**



The lighting distributors were asked if they referenced the buydown price discounts from Bright Opportunities initiative in any marketing materials or sales pitches. The majority of respondents did, as shown in Figure 4-9. Respondents also mentioned a number of other marketing activities where they mentioned the program including:

- Mailings;
- Flyers, brochures at counters;
- Sales staff training;
- Line items (invoices); and
- Direct customer contact.

**Figure 4-9: Participating Distributors Citing Bright Opportunities in Marketing Materials (n=18)**



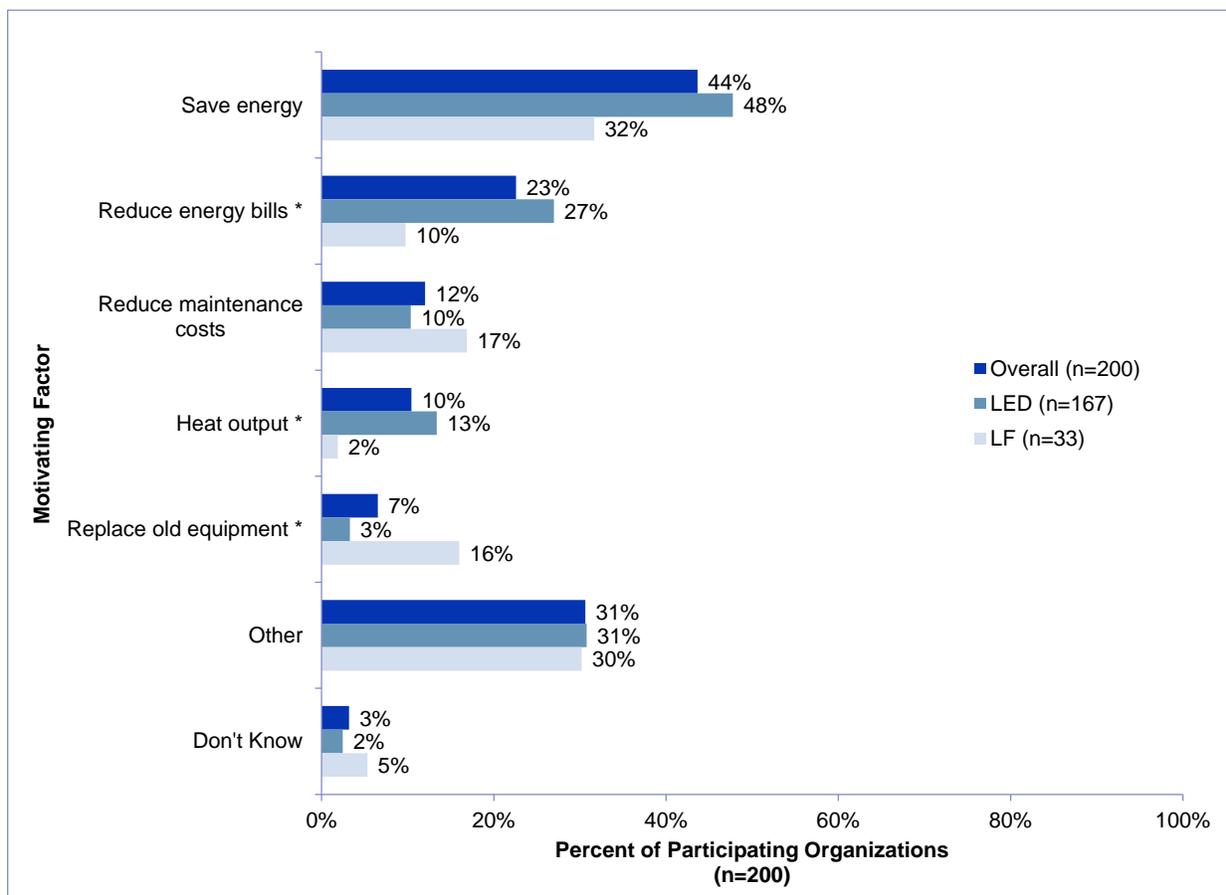
## 4.4 Motivation to Participate

We asked both the participating end users and the participating distributors/contractors why they chose to participate in the program. This section summarizes their responses.

### 4.4.1 Participating End Users

The survey asked participating end users what motivated them to participate. The most common answer (44% of respondents) was to save energy followed by reducing energy bills (23%). However, the respondents mentioned many other motivations, as Figure 4-10 shows. LED end users were more likely to mention reducing energy bills and heat output than linear fluorescent end users. In contrast, linear fluorescent end users were more likely to say they were replacing old equipment. This pattern supports the hypothesis that the LED end users may have been more energy conscious than the linear fluorescent end users.

**Figure 4-10: Motivations to Participate**



\* Difference between LED and linear fluorescent is statistically significant at 90% confidence level.

Note: Totals exceed 100% because multiple answers were accepted.

Other included the following, each mentioned by less than 5% of the respondents: get incentives, pro-environmental corporate policies, longevity, old equipment failed, quality of light, installer/contractor recommendation, old equipment working poorly, distributor/salesperson recommendation, recommendation of pa staff, the technical assistance offered through the program, recommendation of internal staff, past experience with program, and unspecified other reasons.

There were several other statistically-significant differences for respondents who purchased the lamps to reduce energy bills:

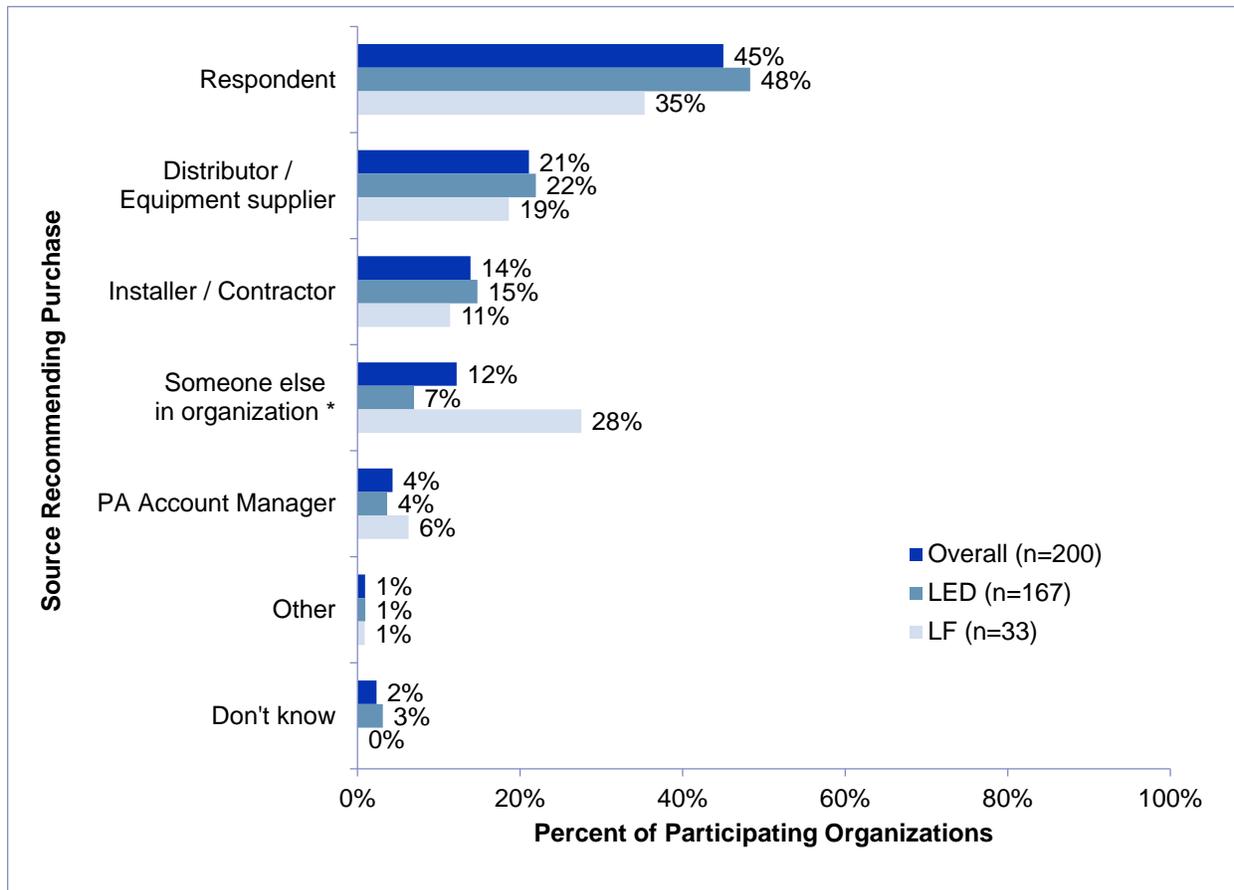
- *Lamp satisfaction:* Respondents who were less than satisfied with the lamps and their contractors (66%) were more likely than those who were satisfied (44%) to say they purchased LEDs to save energy. Linear fluorescent end users had a similar pattern. This suggests that the lamps may not be saving as much energy as these end users expected.
- *Account representative:* Organizations with an account representative at their electricity service provider (40%) were more likely than those without one (17%) to say they purchased LEDs to



reduce their energy bills. This may reflect that organizations with account managers may be a little more conscious about their energy bills than those without an account manager.

The surveys also asked the end users who was most responsible for recommending the purchase of the LEDs or linear fluorescent lamps that received the incentives. The most common answer was the respondent him or herself. Distributors/equipment suppliers and contractors/installers were also common answers (Figure 4-11). The only answer on which LED and linear fluorescent end users differed to a statistically-significant degree was that linear fluorescent end users were more likely to cite an internal colleague as the lighting product recommender than the LED end users were. This is probably due to the size and economic activity differences between the two types of purchasers. Linear fluorescent end users worked in larger organizations that would have a greater chance of having the type of interpersonal networks where recommendations like this would flow.

**Figure 4-11: Recommended Purchase**



\* Difference between LED and linear fluorescent is statistically significant at 90% confidence level.

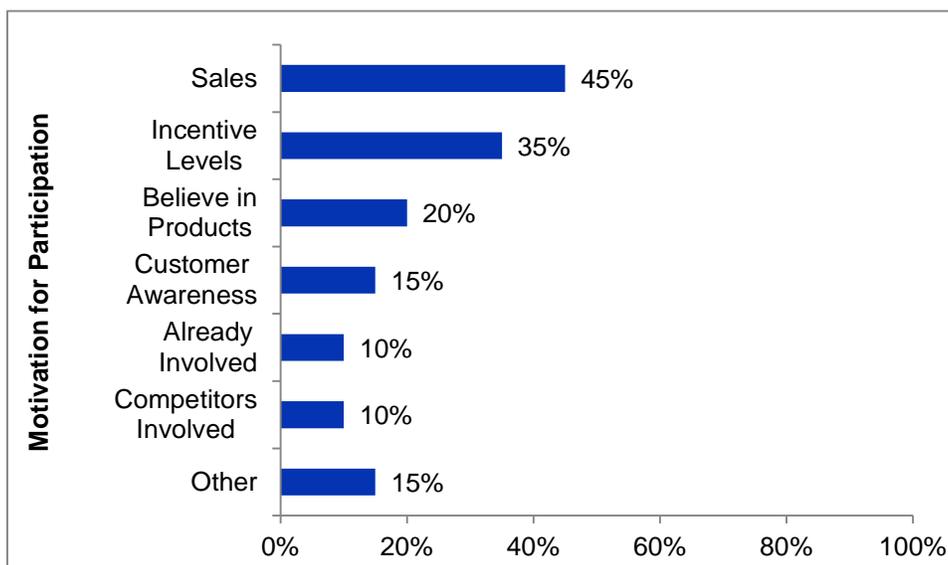
Other included: third-party design professional, third-party engineer, manufacturer's representative, and someone else.



#### 4.4.2 Participating Distributors/Contractors

We also asked the participating lighting distributors why they decided to participate in the Bright Opportunities Program. They provided a variety of reasons, with some citing multiple reasons. The most common reasons were to increase or make sales (45%) or due to the incentive levels (35%). Other responses, as shown in Figure 4-12, include a belief in quality or efficient products, customer awareness of the program, already being involved with similar programs and competitors being involved.

**Figure 4-12: Distributor Reason for Participation (n=20)**



Note: Totals exceed 100% because multiple answers were accepted.

#### 4.5 Project Information

The surveys asked several questions about the project that the discounted lamps were a part of. These included whether the lamps were part of a larger project, the type of lamp replaced by the discounted ones, downstream rebate program participation, and whether the discounted lamps were installed with any lighting controls such as dimmer switches.

Overall, about one-fourth (26%) of respondents said their lamp purchase was part of a larger project and when they were, the respondents often lacked detailed information about those projects. LED participants (24% of respondents) and linear fluorescent participants (32%) had similar rates of inclusion in larger projects (Table 4-3). On average, the projects that LEDs were a part of were larger than the ones that linear fluorescents were a part of. However, the majority (59%) of respondents who said that the linear fluorescents were part of a larger project did not know the cost of the larger project. About one-third (31%) of the respondents who said the LEDs were part of a larger purchase did not know if they were invoiced separately. This was significantly greater than for linear fluorescents (3%). There were no other



statistically significant differences between LED participants and linear fluorescents participants on the invoicing question.

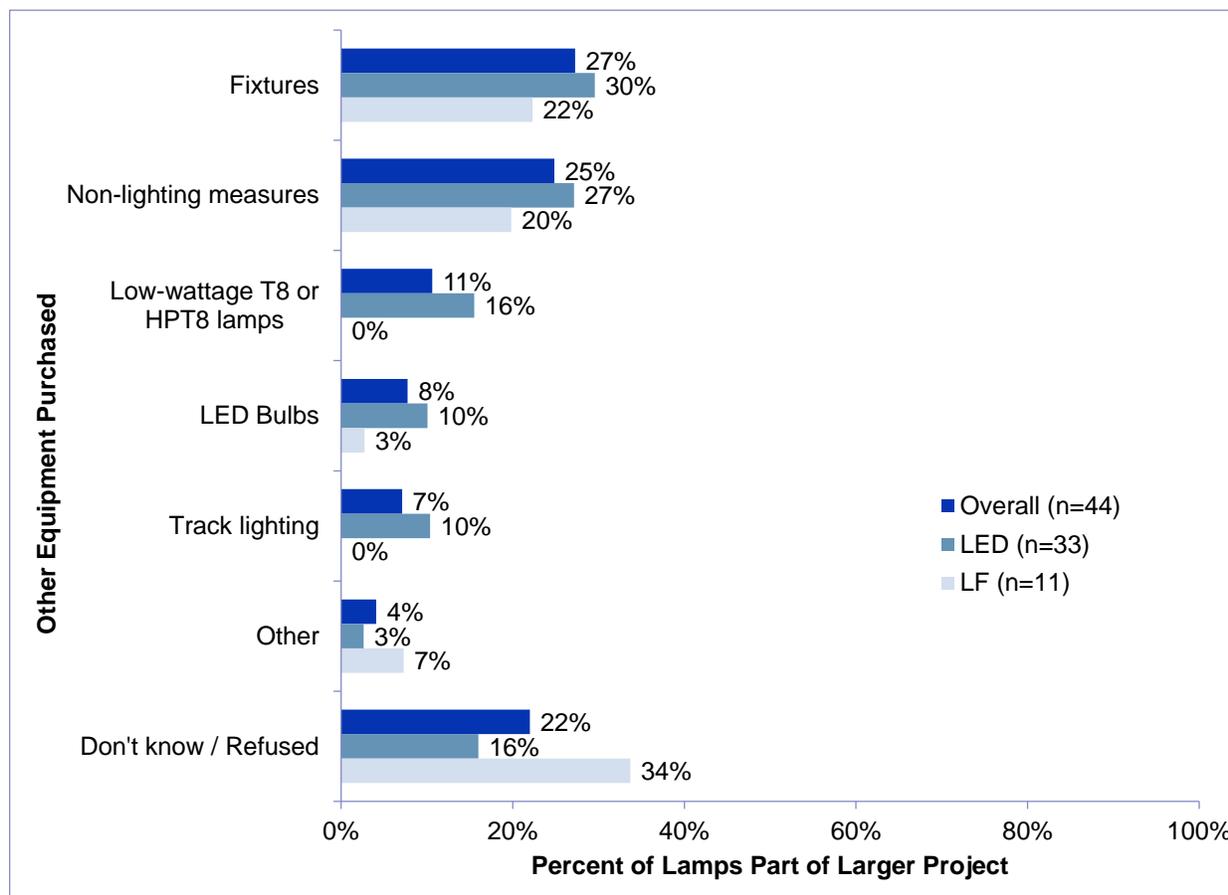
**Table 4-3: Larger Project Information**

|                                | LED<br>(n=167) | Linear<br>Fluorescent<br>(n=33) | Overall<br>(n=200) |
|--------------------------------|----------------|---------------------------------|--------------------|
| Part of a larger project       | 24%            | 32%                             | 26%                |
| Larger project cost (mean)     | \$16,872*      | \$11,203*                       | \$15,828           |
| Don't know larger proj. cost   | 16%*           | 59%*                            | 30%                |
| Invoiced separately            | 18%            | 28%                             | 21%                |
| Don't know invoiced separately | 31%*           | 3%*                             | 22%                |

\* Difference statistically significant at 90% confidence level.

The most common other types of equipment included in larger projects with the discounted lamps were fixtures (overall 27% of respondents) and non-lighting measures (overall 25%). However, roughly one-fourth (22%) of the respondents who said the discounted lamps were part of a larger project did not know what else was included in that projects (Figure 4-13). None of the differences between the responses of LED participants and linear fluorescent participants were statistically significant.

**Figure 4-13: Other Equipment in Project**



Other included: lighting controls and incandescent lamps.

Respondents who said they would have purchased the LEDs without the discount (31%) were more likely than those who would not have purchased without the discount (15%) to say that the LEDs were part of a larger project. There are several ways that inclusion in a larger project could reduce the reported necessity of the discounts to affect buyers’ decisions:

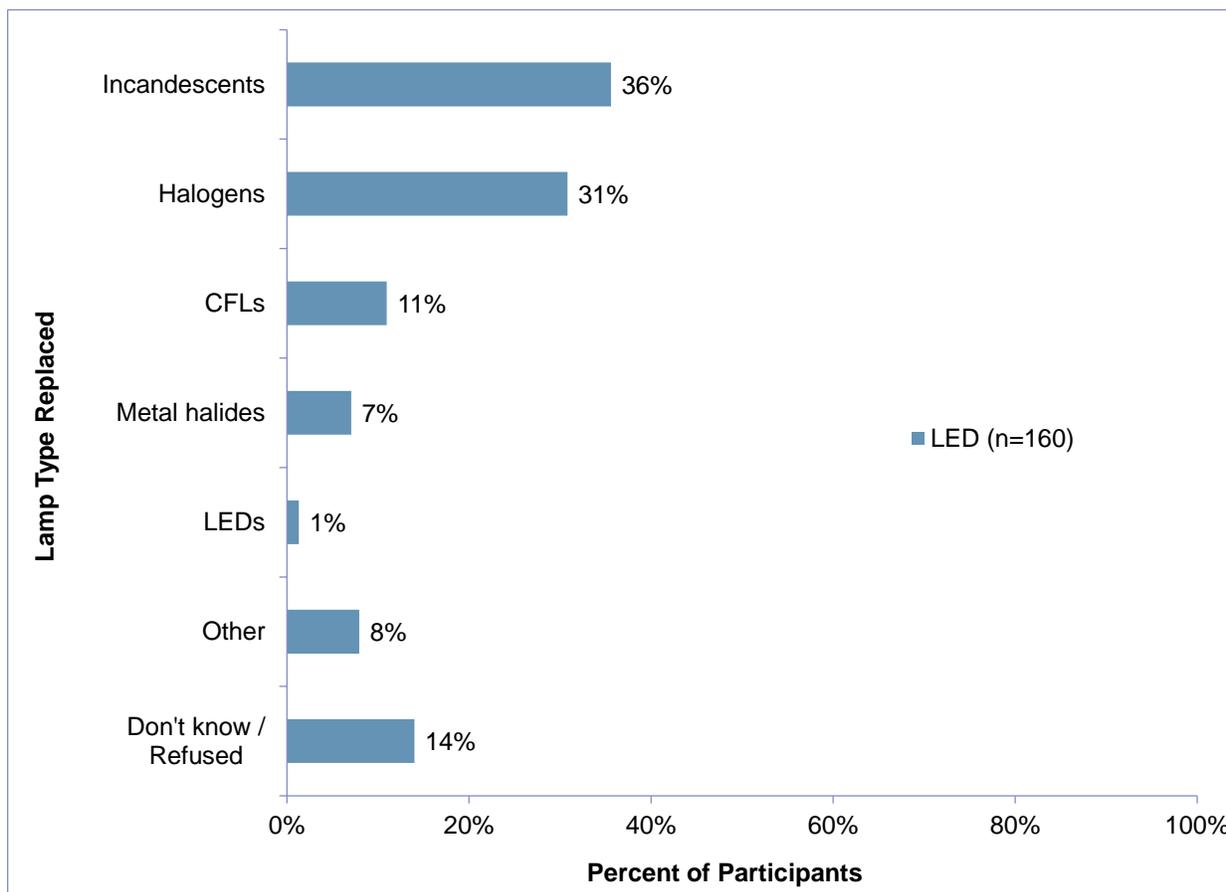
- *The unit cost of the LEDs could be obscured in the total project cost.* Not knowing how much the lamps really cost could obscure the value of the discounts.
- *When LEDs were part of a larger project, the organization may have had a set amount of money they could spend on the project and would do whatever they could with that pool of funds.* Without the discounts they would just buy fewer LEDs, or possibly another technology.

### 4.5.1 Type of Bulb Replaced

For LED end users, the survey asked what type of lamp the discounted LEDs replaced. The most common types of lamps replaced were incandescents (36%) and halogens (31%; Figure 4-14). This is unsurprising

because most of the discounted LEDs were a type that would replace flood lamps. The survey did not ask this question for linear fluorescent end users – DNV KEMA assumed almost all linear fluorescent lamps would replace other linear fluorescent lamps.

**Figure 4-14: Type of Lamp Replaced by LED**



Note: Totals exceeds 100% because multiple answers were accepted.

There was some evidence to suggest that the LEDs did not perform well relative to replaced halogen lamps. Respondents who were less than very satisfied with the lamps or contractors (50%) were more likely to have replaced halogens than those who were very satisfied (25%). Respondents who replaced halogens were also less likely to say they would have purchased the LEDs without the discounts. Nineteen percent of those who said they would purchase without a discount and 46 percent who said they would not purchase without the discount replaced halogens.

#### 4.5.2 Downstream Rebate Participation

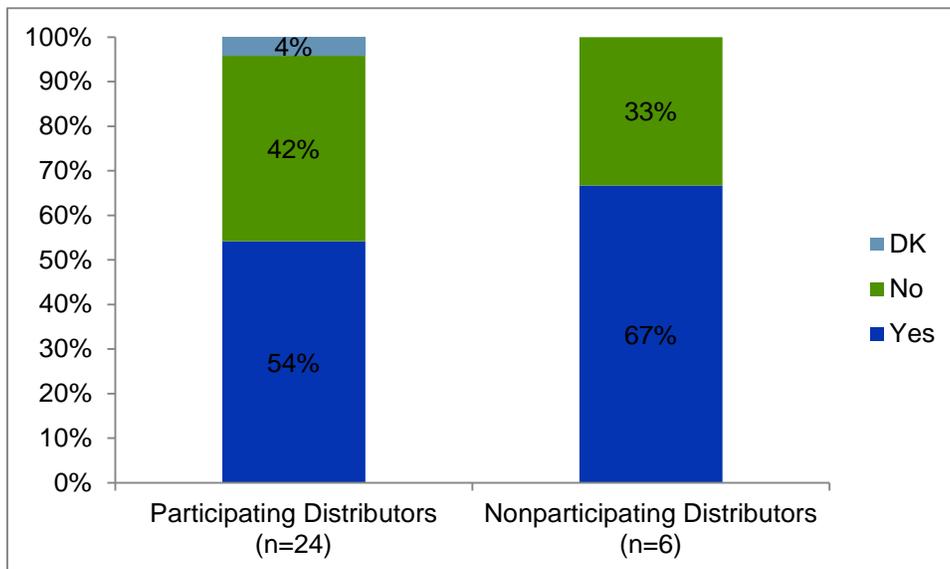
Of the linear fluorescent end users who were aware that their lamps received an upstream discount, 11 percent said that they also received a downstream rebate. About three-fourths (72%) of those who did not report receiving an additional downstream rebate said they *were* aware of those rebates. The most



common reason for not participating in both was that they didn't think they could (37%). The survey did not ask this question to LED end users because there were not downstream rebates available for LED lamps.

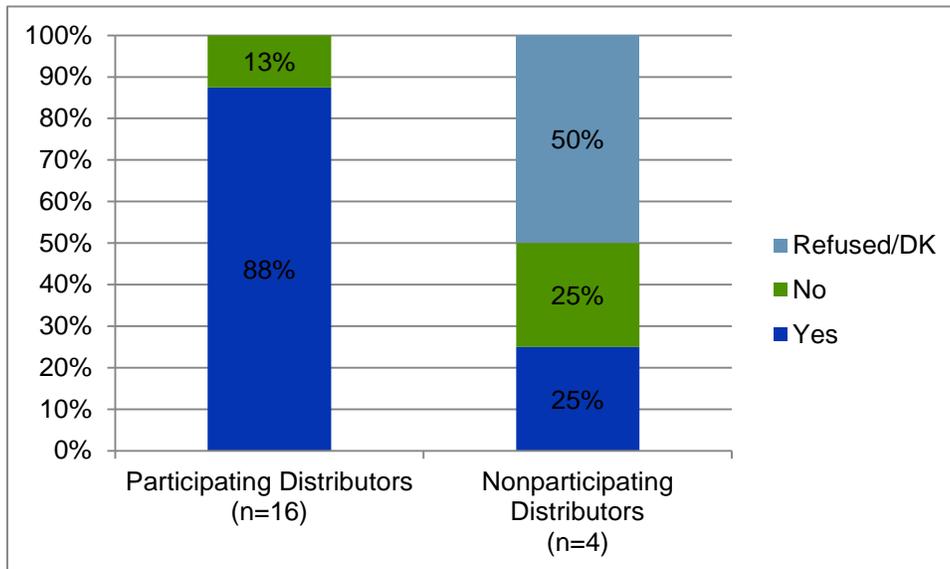
We also examined the frequency with which lighting distributors, whether they were participating in the Bright Opportunities Program or not, were also participating in the Massachusetts downstream C&I lighting program. We asked the distributors if they were aware of an existing downstream program which pays commercial and industrial customers directly for having energy efficient lighting installed at their facilities. Responses for the two groups, in Figure 4-15, show little difference between the two groups.

**Figure 4-15: Distributor Downstream Program Awareness**



Respondents that indicated they were aware of the downstream program were then asked if they had sold any lighting products through this program, shown in Figure 4-16. The chart shows that the lighting distributors participating in the Bright Opportunities Program were also much more likely to be participating in the downstream program. Even though the sample size for the nonparticipating distributors was very small, this difference was statistically significant.

**Figure 4-16: Downstream Program Participation**

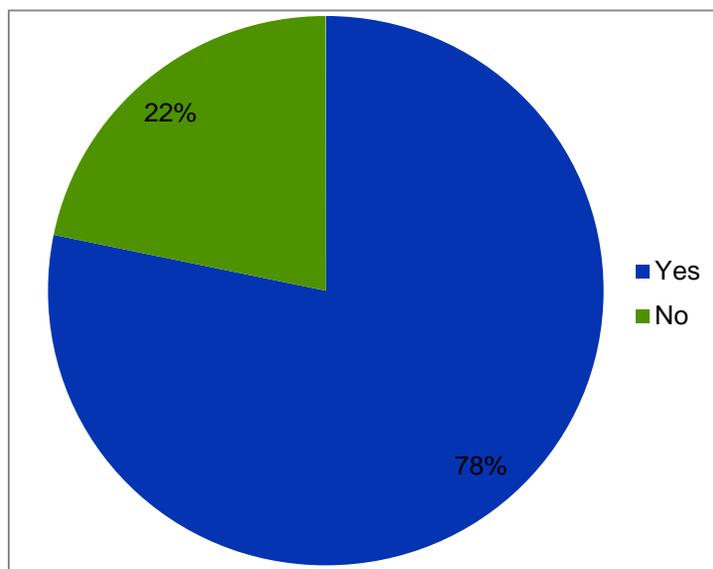


### 4.5.3 Lighting controls

Participating distributors were asked if they sold lighting controls for installation in retrofit applications.<sup>15</sup> As shown in Figure 4-17, approximately three-fourths (78%) of distributors do sell lighting controls for retrofit applications.

<sup>15</sup> We asked these questions in support of another Massachusetts evaluation – LCIEC Project 22 – which is analyzing the Massachusetts lighting control market.

**Figure 4-17: Distributors Selling Retrofit Lighting Controls**



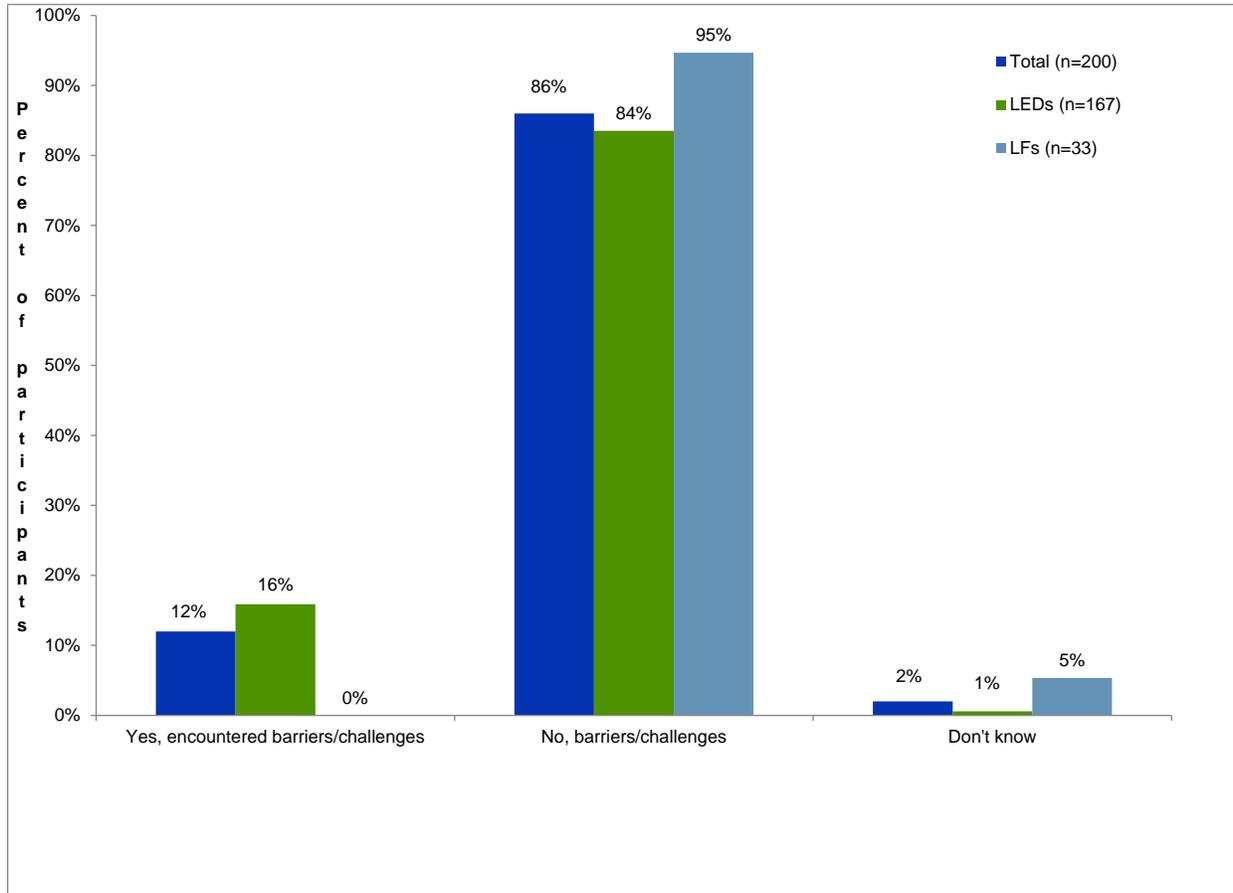
Respondents who did carry retrofit lighting controls were then asked if they could estimate the portion of their lighting control sales which go to retrofit versus new construction applications. Of the 17 who were asked, seven stated that they were unable to say. Of the remainder, distributors gave responses ranging from 15 percent to 100 percent, with a weighted average of 69 percent.

We also asked lighting distributors for their observations on trends regarding retrofit lighting controls and to speculate on any reasons for those changes. Overall, distributors commented that lighting control sales are generally increasing, although one did mention a decrease in sales. Increased sales were attributed to increased awareness, incentives and code changes. Respondents also mentioned that the types of sensors have changed – there are now more wireless sensors and vacancy (as opposed to occupancy) sensors available on the market.

## 4.6 Barriers to Participation

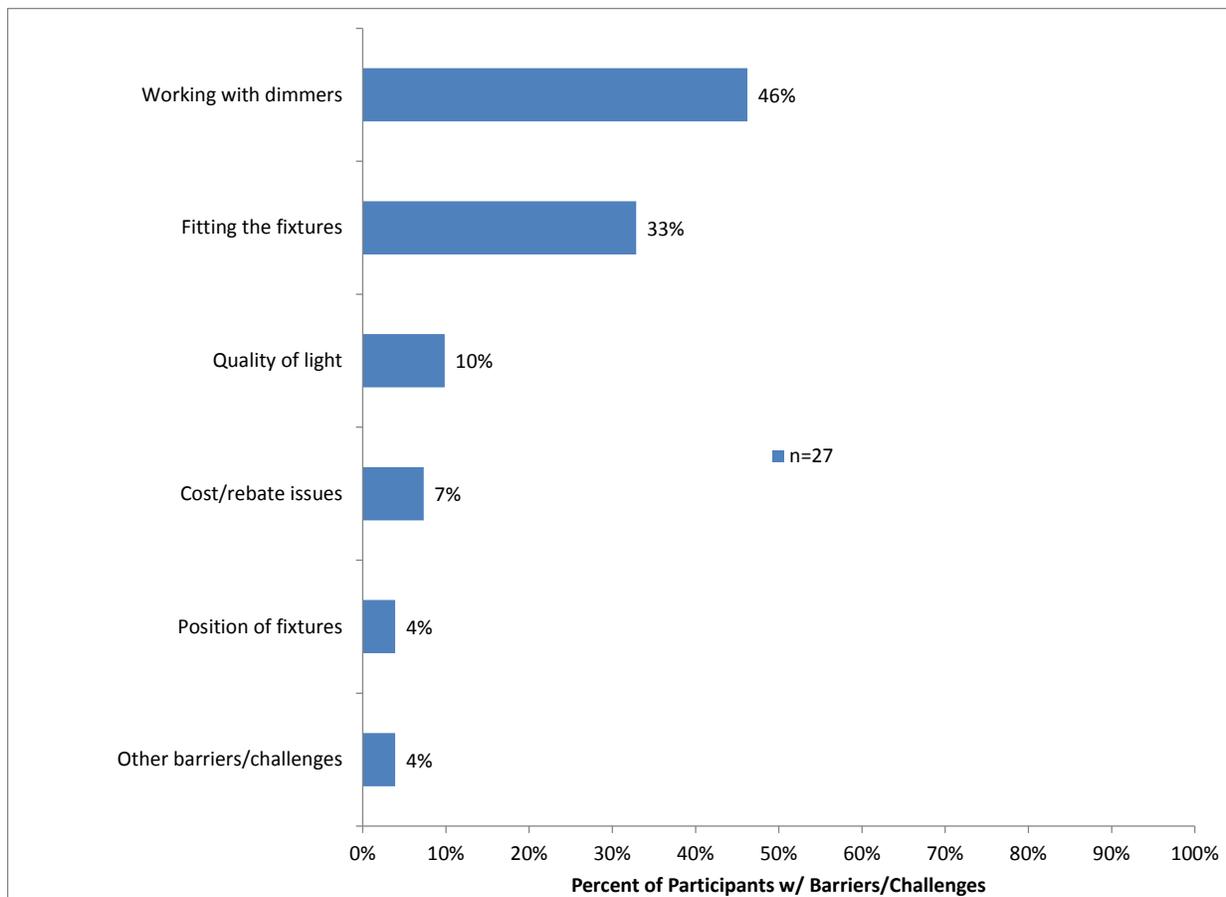
We asked the program participants if they had encountered any barriers or challenges when making these lighting purchases. Only a small minority (12% of all respondents) said they encountered barriers/challenges, as Figure 4-18 shows. None of the linear fluorescent participants reported any difficulties.

**Figure 4-18: Whether Participants Encountered Barriers/Challenges When Making These Lighting Purchases**



We asked these LED participants who said they had encountered barriers/challenges what challenges they faced. Most of what they reported were performance or lighting quality issues with the LED bulbs. Nearly half (46%) of those reporting problems said they had trouble operating the bulbs with dimmer switches and one third (33%) said that they had difficulty fitting the bulbs in fixtures. Figure 4-19 shows the full range of responses.

**Figure 4-19: What Barriers/Challenges Participants Faced When Implementing Their Lighting Purchases/Projects**



We looked more closely at these responses, to determine whether there was any class of participants that were more likely to report these barriers/challenges. The participants who said they had an account representative with a Program Administrator were statistically more likely (29% of respondents) to report barriers/challenges than those who did not report having an account representative (6%). If the problems that participants were reporting were more related to the program, then this would be surprising since one would assume that the account representative could help mitigate program participation barriers.

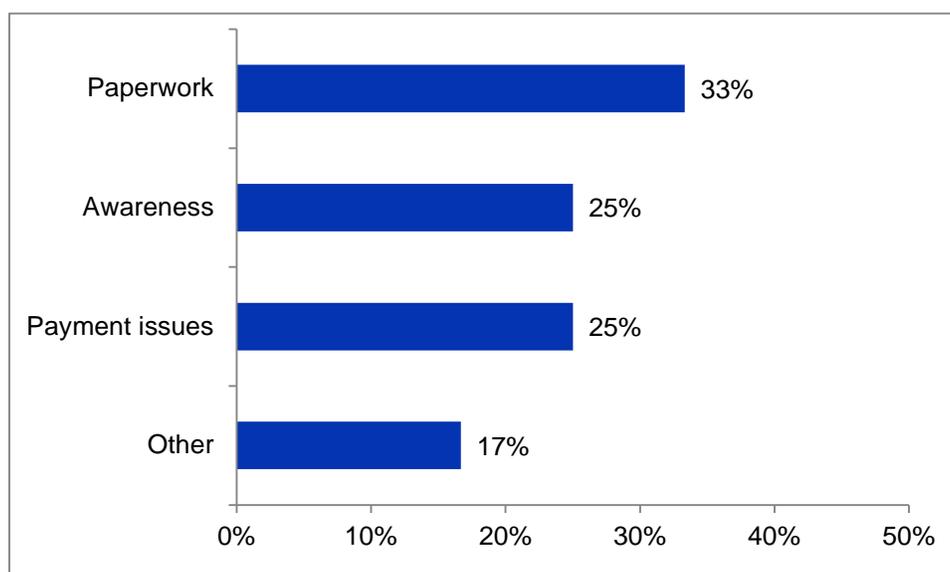
However, since the problems were more bulb-related, it is unclear how much these account representatives could have helped with these issues. One possible explanation for why companies or organizations with account representatives were more likely to report problems is that these companies or organizations are generally larger than the average C&I participant. Therefore one could hypothesize that their lighting projects were generally larger than average and a larger project would increase the chance that there might be problems with fixture or dimmer switch compatibility with the LED bulbs.



Certain types of companies or organizations were also more likely to report certain problems with the LED bulbs than others. For example, the non-profit organizations were more likely to report problems with dimmer switches, the non-food retailers were more likely to report problems with fixture fit, and the industrial/warehouse participants were more likely to report issues with light quality. These differences were all statistically significant at the 90 percent confidence level.

Participating distributors were also asked for thoughts or insights as to why some lighting distributors may not be participating in the initiative. Twelve respondents were unaware of any reasons for why companies would not participate, even voicing confusion and surprise that any would not. Responses of the remaining twelve are in Figure 4-20.

**Figure 4-20: Distributor Cited Reasons for Nonparticipation**



## 4.7 Satisfaction

We asked both participating end users and participating lighting distributors and contractors how satisfied they were with various aspects of the Bright Opportunities Program. The section summarizes their responses.

### 4.7.1 End User Satisfaction

We asked the participating customers about their satisfaction with the bulbs or lamps they received through the program as well as with the lighting distributors who provided them. For all these satisfaction questions we asked them to use a five-point satisfaction scale where five equaled “very satisfied and one equals “very dissatisfied.” Because of the upstream nature of the Bright Opportunities Program in which customers received the discounted bulbs/lamps without having to go through the procedures (e.g., filling out rebate application forms) that are required by downstream rebate programs, we assumed that many



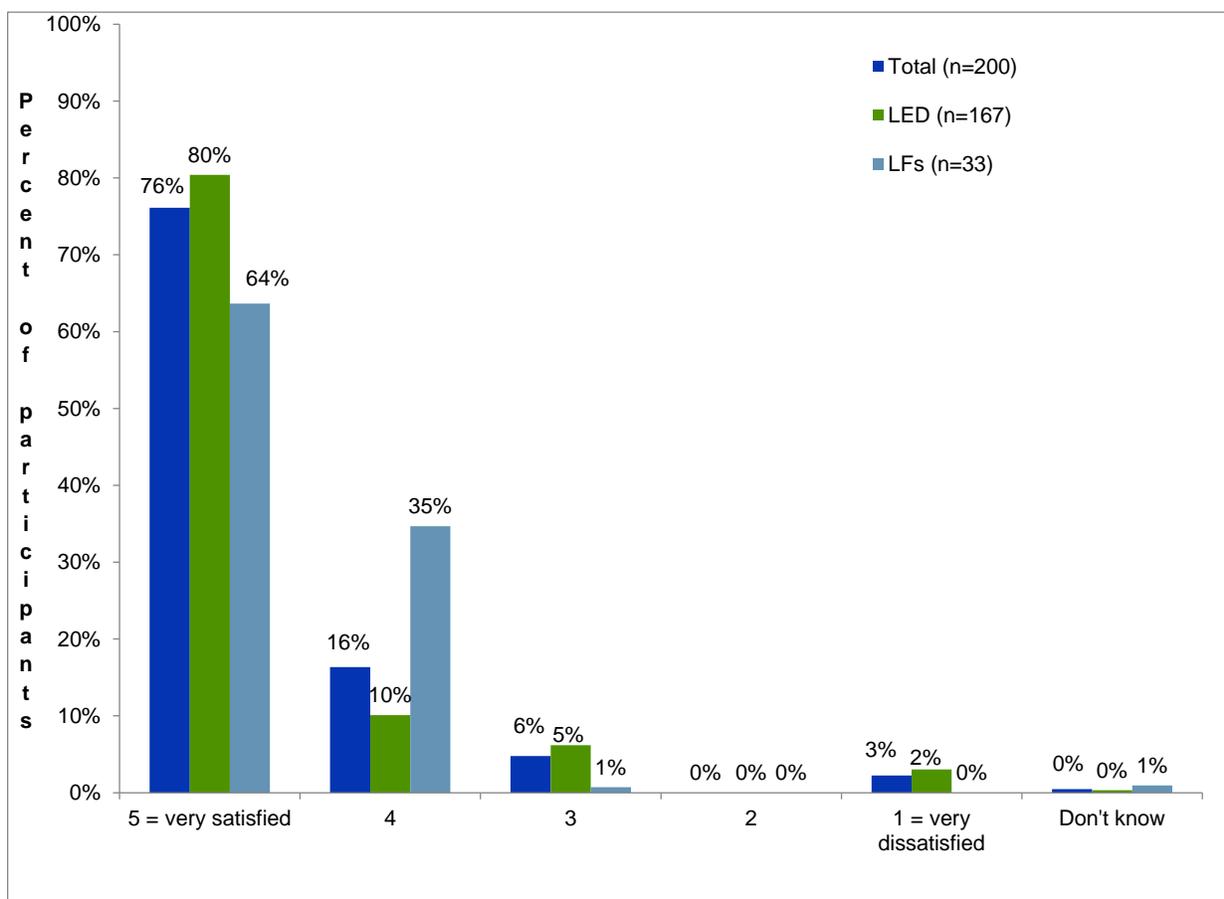
participants did not realize that they were participating in a program per se and therefore we did not ask them about their satisfaction with the program as a whole.

#### **4.7.1.1 End User Satisfaction with the Bulbs/Lamps**

Participant satisfaction with the LED bulbs and linear fluorescent lamps was very high with participant satisfaction (4 or 5 satisfaction ratings) above 90 percent for both lighting types. The average satisfaction rating was 4.7. As Figure 4-21 shows, the LED participants were more likely to be very satisfied with the bulbs/lamps than the linear fluorescent participants, but they were also more likely to be less than satisfied with the bulbs.

There were some statistically-significant differences among the participant subgroups. The participants with Program Administrator account representatives were more likely (89% of respondents) to be very satisfied with the bulbs than those who did not have such representatives. This was somewhat surprising since the previous subsection showed how the companies/organizations with account representatives were more likely to report barriers/challenges with their lighting purchases/projects. Participants who had installed all the bulbs/lamps they received through the program were also more likely (30%) to be less-than-satisfied with their bulbs/lamps than those who had not installed their bulbs/lamps. This is likely due to the fact that as participants installed more bulbs/lamps they increased the chance that there would be problems.

**Figure 4-21: Satisfaction with the Bulbs/Lamps**



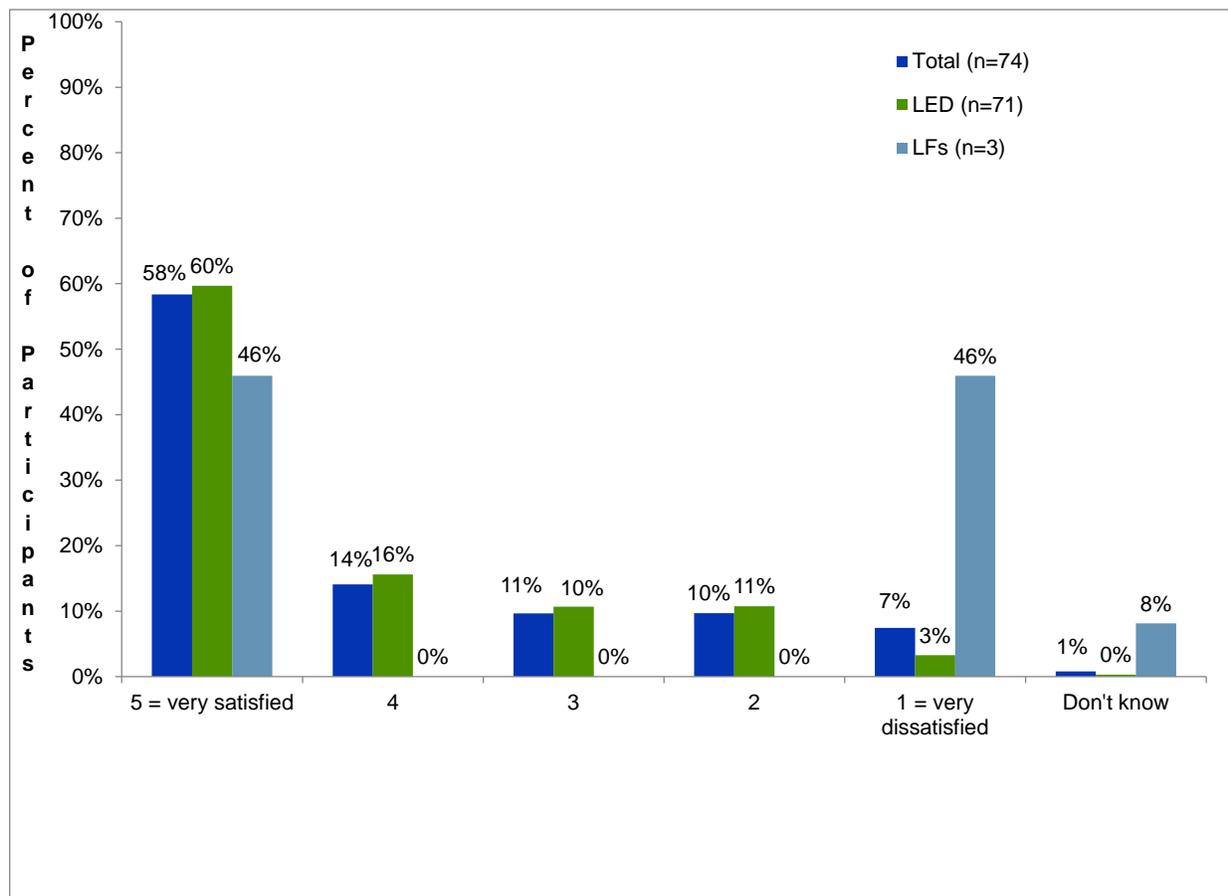
We asked the 15 LED participants and one linear fluorescent participant who were less than satisfied with their bulbs/lamps why they said that. Their most-cited reason was dissatisfaction with the quality of the light (cited by 54% of the less-than-satisfied participants) followed by dissatisfaction with the length of the life of the bulb/lamp (26%).

We asked the program participants whether they had used any of their bulbs on dimmers switches. The question was designed to be asked only of the LED participants, but three of the linear fluorescent participants were also unintentionally asked this question. Thirty-eight percent of the respondents said that they had used their program-discounted bulbs/lamps in dimmer switches. Those who had used the bulbs/lamps in dimmer switches were then asked how satisfied they were with how the bulbs performed in the dimmer switches. Figure 4-22 shows that 72 percent of the respondents were satisfied with the performance of the bulbs/lamps in these switches. The average satisfaction rating on the five-point scale was 4.2.

Those respondents who had installed all their purchased bulbs/lamps were much more likely to be “very satisfied” (67% of respondents) with the performance of these bulbs/lamps in the switches than those who

had not installed all of them (23%). A logical explanation for this is that many respondents who encountered problems with the dimmer switches simply stopped installing bulbs/lamps in these switches.

**Figure 4-22: Satisfaction with the Use of Bulbs/Lamps in Dimmer Switches**



Twenty-one of the respondents were less than satisfied (satisfaction ratings of 3 or lower) with the performance of their bulbs/lamps in the dimmer switches. When asked to explain why they were less-than-satisfied, the most common reasons included the bulbs/lamps not working properly (39% of the respondents) and the bulbs flickering (36%).

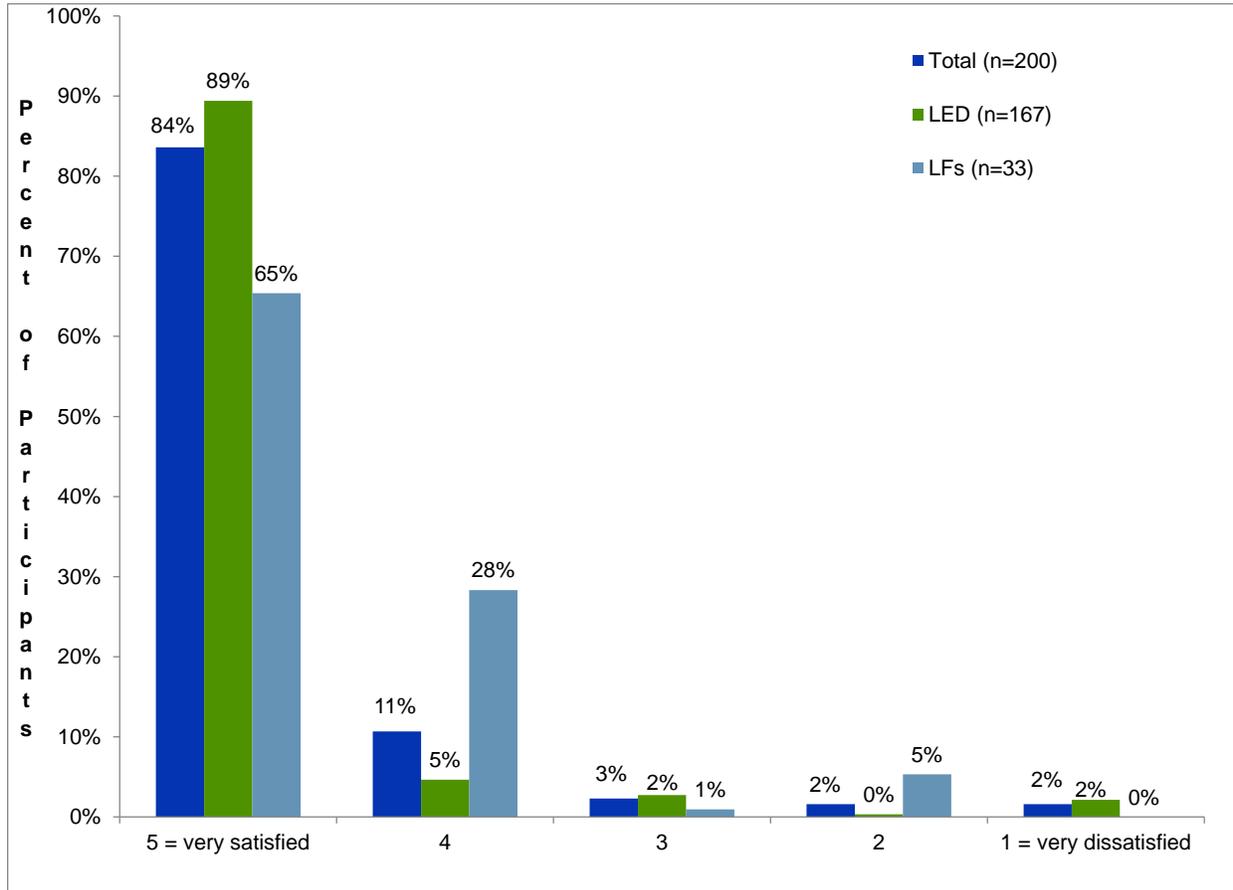
**4.7.1.2 Satisfaction with the Lighting Distributors/Contractors**

We asked all the participants how satisfied they were with the contractor or equipment supplier from whom they purchased the program-discounted bulbs. Figure 4-23 shows that levels of satisfaction were very high with 95 percent of the participants satisfied with their contractors or equipment suppliers. The LED participants were more likely than the linear fluorescent participants to be “very satisfied” with their contractors/suppliers. Since the size of the LED bulb buydown amounts were much larger than those for the Linear Fluorescent lamps, this may explain why the participants who participated in the program via the LED bulbs were so much more satisfied with their contractors and equipment suppliers.



The LED participants who were knowledgeable about the details of the buydown discounts they received were more likely to be satisfied (100% of respondents) than those who were not aware of these discount details (92%), a statistically-significant difference.

**Figure 4-23: Satisfaction with the Lighting Distributors/Contractors**



Respondents from the Office sector were more likely to be satisfied with their contractors/distributors (100% of respondents) than those from the Non-Food Retail (93%) or Industrial/Warehouse sectors (90%). This is likely due to the higher incidence with which these sectors reported product quality issues, as discussed in the previous section.

We asked the nine respondents who were less than satisfied with their lighting contractors/suppliers why they said this. The two most common explanations were that they were dissatisfied with the product quality (25% of those less-than-satisfied with their contractors/suppliers) and that they received poor customer service (13% of the less-than-satisfied).



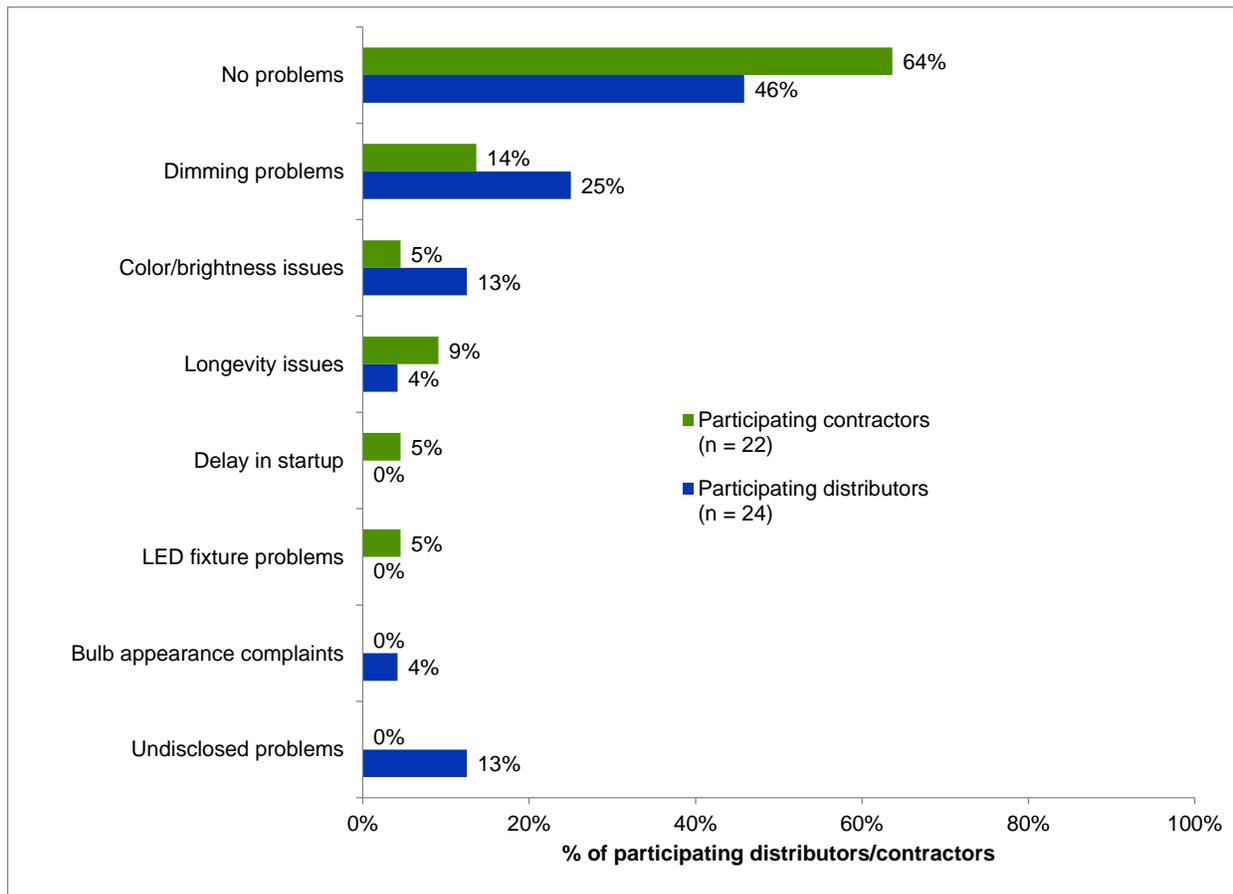
## 4.7.2 Distributor/Contractor Satisfaction with the Program

We asked the participating lighting distributors about their satisfaction with various aspects of the program.

### 4.7.2.1 Distributor/Contractor Satisfaction with LED Bulb Performance

We asked the participating lighting distributors and contractors if they had experienced any complaints from customers or had other problems with the performance of LED bulbs sold through Bright Opportunities Program. Almost half (46%) of the participating distributors and almost two-thirds (64%) of the participating contractors did not report any problems. A quarter of the distributors and 14 percent of the contractors reported dimming problems with the LED bulbs, but a number of them described these problems as infrequent. One distributor reported that restaurants will sometimes complain because they are used to having the color of the light change when they dim the lights, but this does not happen with LED bulbs. Figure 4-24 shows all the responses.

**Figure 4-24: Customer Complaints with Program LEDs as Reported by Participating Lighting Distributors/Contractors**





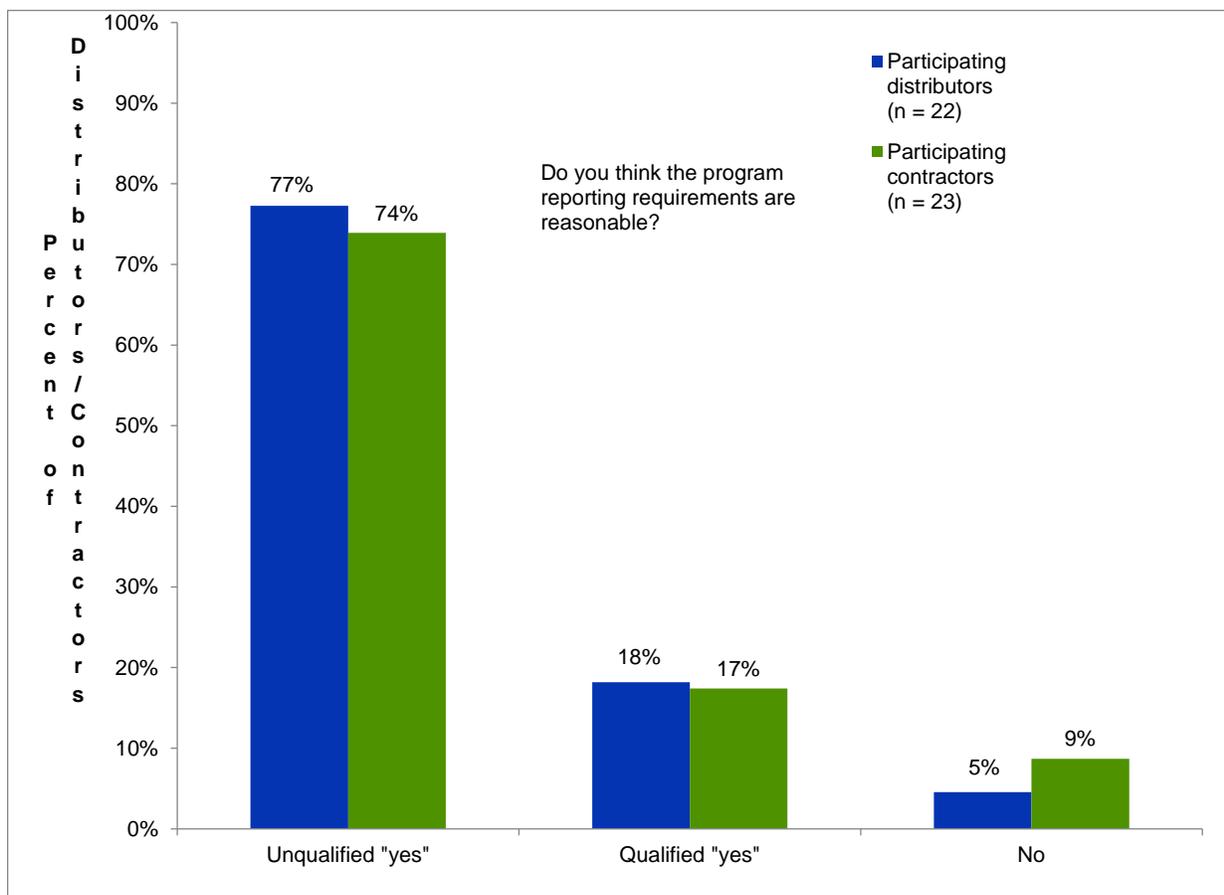
#### 4.7.2.2 Distributor/Contractor Satisfaction with Program Reporting Requirements and Inspection Process

We asked both participating distributors and participating contractors if the reporting requirements of the program were reasonable. The program requires reporting information such as product types, quantities, prices and customer information. A large majority (77% of the distributors, 74% of the contractors) gave an unqualified “yes” to this question (Figure 4-25). Only a tiny minority (5% of the distributors, 9% of the contractors) said that the requirements were not reasonable. The remainder of the respondents said “yes” to the question but added a comment or complaint which indicated that they were not totally satisfied with these requirements. Some of these “qualified yes” responses included:

- “A little excessive, but if it makes products more widely available, okay.”
- “I think they're fine but probably should involve the contractor less.”
- “Yes, until I have to answer questions. I don't think this is fair. The administrators should be approaching the electrician instead of the distributor.”
- “For the incentives, sure. But it should fall under who gets compensated the most.”
- “Yes - but it's cumbersome.”
- “Yeah it takes a lot of time and it's a pain but it is reasonable.”
- “If you want to make it easier I'll go for it. It's a task and involves man hours.”
- “Yes but not always easy but it's not asking too much.”

Distributors were also asked if they were aware of any of their clients having verification inspections done by the program – only two distributors were able to cite specific cases. Both of those distributors rated the experience as a ‘5 – Very Satisfied’. Four contractors also reported being aware of installation inspections, giving satisfaction ratings of 5, 5, 4, and 1 respectively. The contractor citing a satisfaction of 1 stated it was because the contractor should not be contacted or required to participate – as they do not make any money from the program.

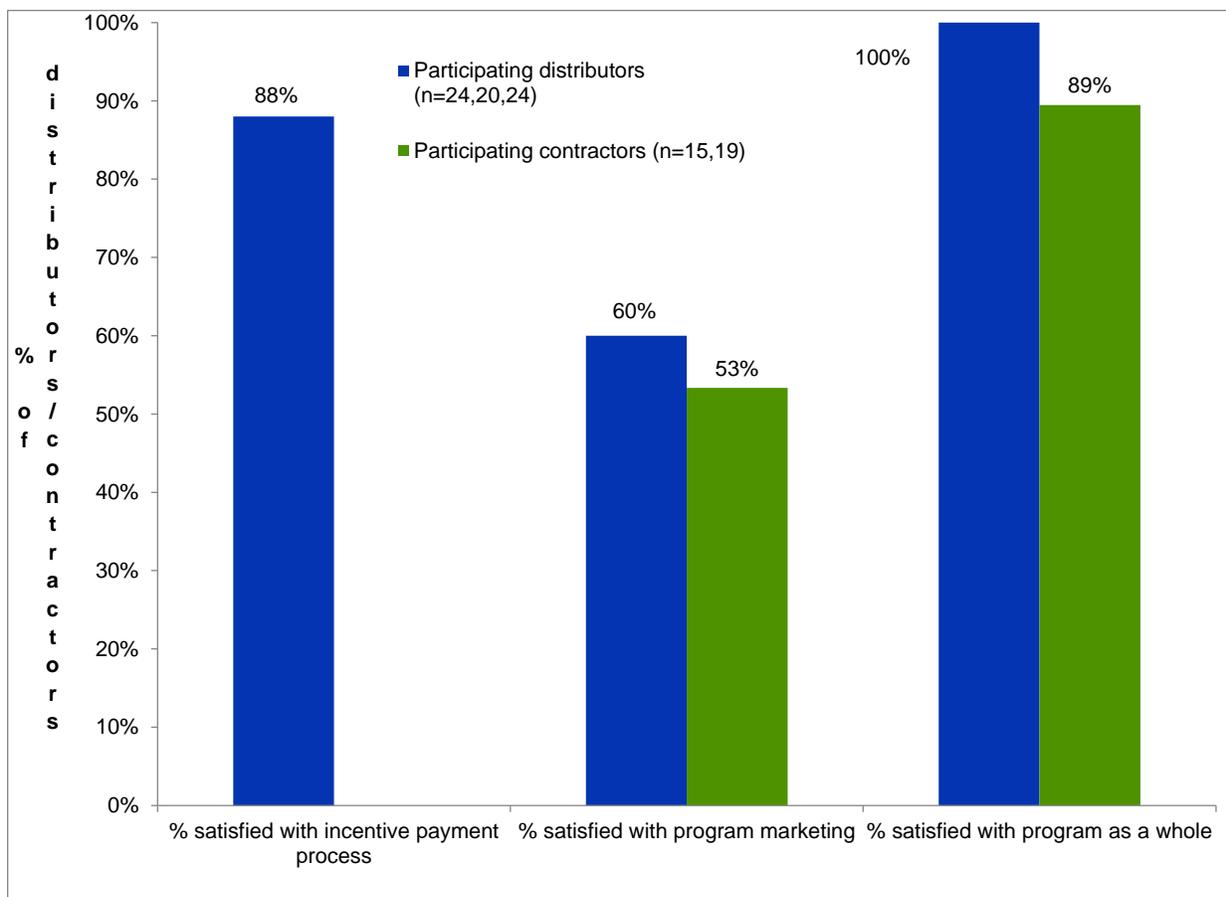
**Figure 4-25: Whether Participating Distributors/Contractors Thought Program Reporting Requirements were Reasonable**



**4.7.2.3 Distributor/Contractor Satisfaction with Incentive Payment Process, Program Marketing, and the Program as a Whole**

We also asked the participating trade allies about their level of satisfaction with the incentive payment process, the program’s marketing efforts, and the program as a whole. Figure 4-26 shows that satisfaction levels for the incentive payment process and the program as a whole were very high. However, only a small majority of the participating distributors and contractors were satisfied with the program’s marketing efforts. The most common reasons for dissatisfaction were unawareness of any marketing efforts and low customer awareness of the program.

**Figure 4-26: Participating Trade Ally Satisfaction w/ Incentive Payment Process, Marketing, and Program as a Whole**

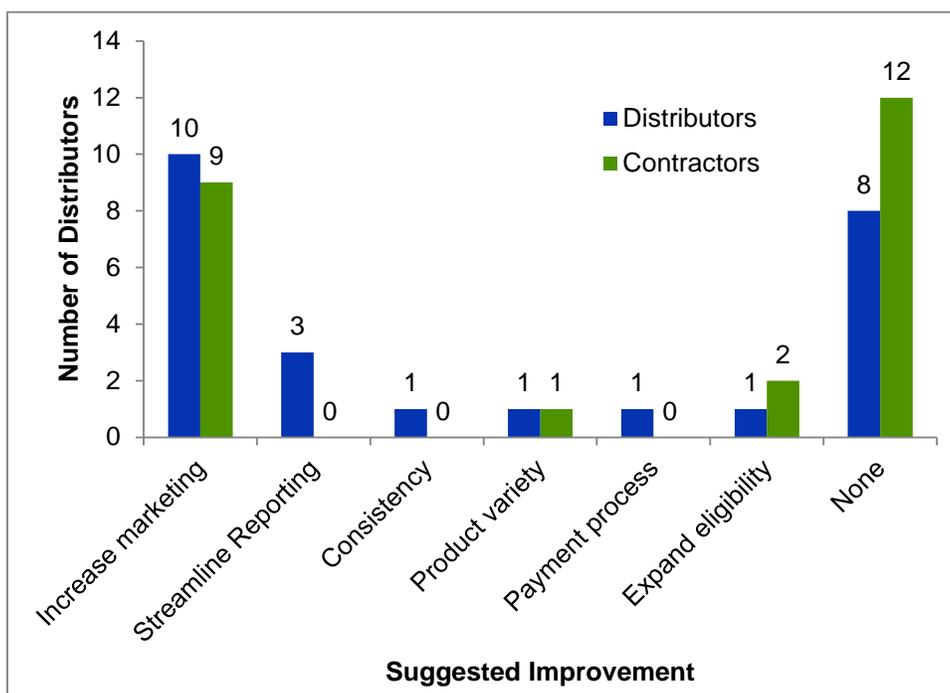


Reasons that participating lighting distributors or contractors cited for dissatisfaction included:

- *Incentive payment process:* A few respondents said that the amount of time it takes to receive the rebate (up to six weeks) was too long.
- *Marketing and outreach:* Distributors who gave satisfaction ratings below four cited a lack of marketing support, saying that while distributors are receiving information and marketing, it is not reaching end users who ultimately drive sales. Some distributors also felt that they are largely on their own in communicating the program to end users. Contractors who rated the program less than four cited similar reasons, saying that they had not heard of the program and in a few case were not even aware they had received discounted prices, thinking it was the regular price.
- *The program as a whole:* Two contractors gave satisfaction ratings of less than four for the program as a whole. One wanted to see the program expanded to residences and another reiterated his confusion, not even being aware that he had participated in the program. No distributors gave a score lower than four.

Finally, distributors and contractors were asked what recommendations they had to improve the way the program was delivered. The most common responses were ‘none’ and ‘improving marketing.’ Program participants wanted to see additional marketing information go to contractors and end users to increase awareness as well as program knowledge. A few distributors wanted streamlined reporting. Other suggestions included more program consistency (not changing incentive levels), increased lamp variety, streamlined payment processing and expanding program eligibility (specifically to the residential sector). Figure 4-27 shows the full range of responses.

**Figure 4-27: Suggested Program Improvements from Distributors/Contractors**



## 4.8 Net-to-Gross

This section describes DNV KEMA’s findings relevant to net-to-gross calculations. The full calculations will be presented in the impact report. Here, we report end user attribution findings, and several attribution-related findings for the participating distributors and contractors.

### 4.8.1 Program Attribution from the End User Perspective

For end users, DNV KEMA calculated free ridership using a methodology adapted from a previous evaluation of Massachusetts gas programs completed by TetraTech.<sup>16</sup> We modified this methodology

<sup>16</sup> National Grid, NSTAR, Unitil, Berkshire Gas, Columbia Gas, and New England Gas 2010 Commercial and Industrial Natural Gas Programs Free-ridership and Spillover Study Final Report; September 20, 2011; TetraTech.



slightly in order to streamline the surveys and for use with these specific lighting measures. The methodology attempts to quantify how the timing and quantity of the lighting participants' purchases were affected by the discounts. It also compares LED or linear fluorescent lighting to several alternative lamp types to estimate efficiency effects. In all cases, the free-ridership battery attempts to establish what each respondent would have done in absence of the discounts. There are also several questions designed to check the consistency of the answers. The output of the methodology is the proportion of the discounted lamp installations that are attributable to the discounts. The detailed methodology is described in Appendix AA.

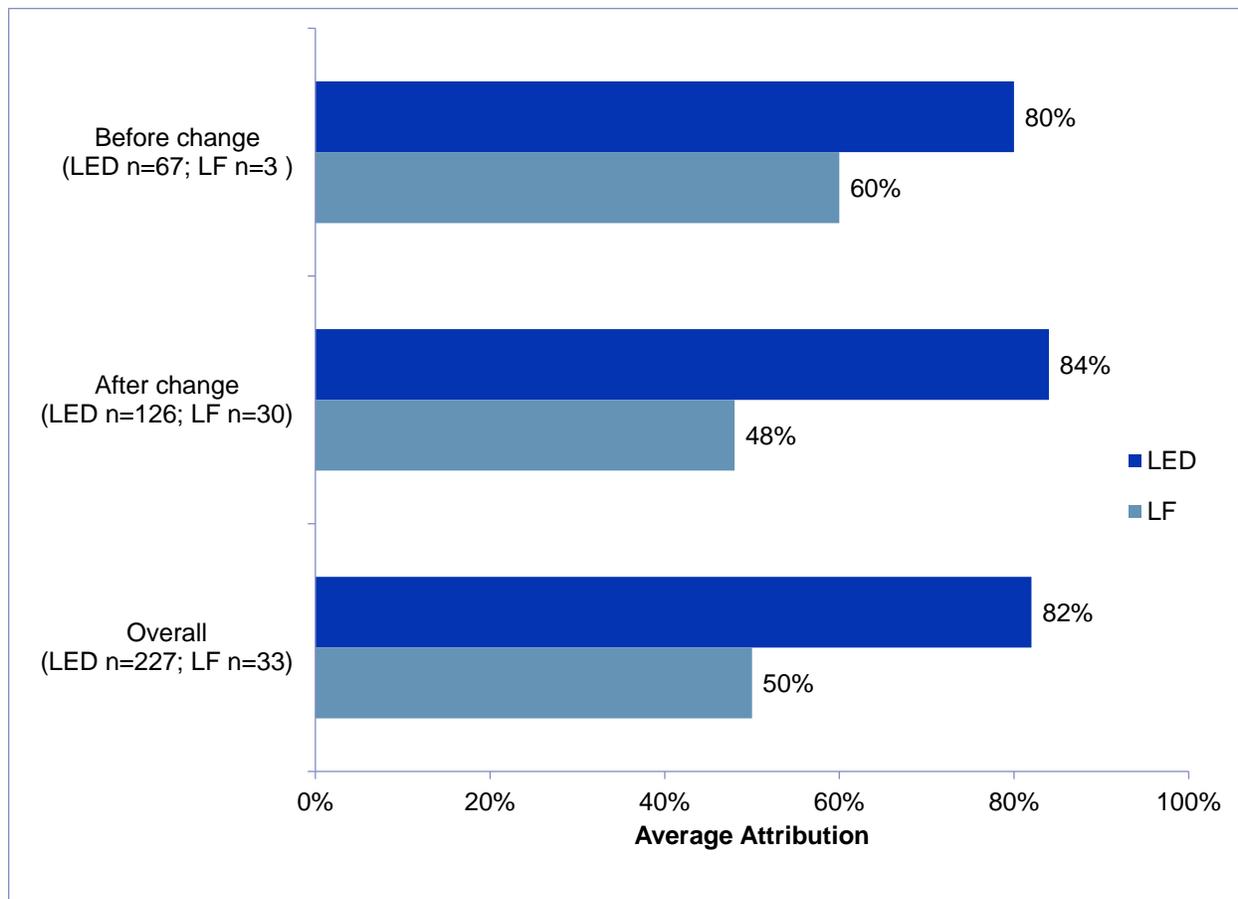
Bright Opportunities reduced the incentive levels for LED lamps by about \$5 each on March 1, 2012. The Energy Efficiency Advisory Council (EEAC) consultants and the evaluation team were interested in the effect of this incentive change on attribution, so we calculated attribution for three time periods: overall, before the incentive change, and after (Figure 1-3). Attribution was higher for LEDs than for linear fluorescents. This is probably because LEDs are a newer technology and have a much higher incremental cost than linear fluorescents. It should be noted that this chart includes the responses from the 200 respondents to the end user survey, and 27 out of 40 planned site visits.<sup>17</sup> DNV KEMA applied case weights to the results by dividing the number of accounts in the population by the number of survey completes in each stratum.<sup>18</sup>

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<sup>17</sup> The average attribution for the 27 additional site visits was slightly lower than for the CATIs (76% vs. 82%). However, the difference was not statistically significant at the 90% confidence level.

<sup>18</sup> Weighting the results produced minimal changes to the attribution ratios. In all cases, the unweighted ratios are within one standard error of the weighted ratios.

**Figure 4-28: Average Program Attribution (Net-to-Gross) Ratios  
Calculated from End User Survey Responses**



Note: 90% confidence intervals for LED bulbs were  $\pm 3\%$  and for linear fluorescent bulbs  $\pm 4\%$ .

Note: DNV KEMA could not find a purchase date for one of the LED records. Thus it appears in the overall bars, but not in the before or after change bars.

The chart shows that attribution was not significantly affected by the incentive change.<sup>19</sup> This is probably due to the reason Bright Opportunities reported changing incentives in the first place – they observed that the regular (undiscounted) wholesale price of the discounted bulbs had decreased since the program began, and they tried to lower the incentives to keep them at a constant proportion of the undiscounted wholesale price. Depending on how much of the discount distributors passed on, the net effect of this incentive change should have had very little impact on the retail price end users paid for the discounted lamps.

<sup>19</sup> The change for linear fluorescents from 71% to 55% appears large, but the before estimate was based on only 3 survey responses, so it is not very reliable and therefore should be interpreted with caution.



#### 4.8.1.1 Like Spillover

DNV KEMA also computed “spillover” for other LED or linear fluorescent projects. Spillover refers to other projects of the same measures that end users completed without the aid of a rebate program, and that were influenced by their experiences with the Bright Opportunities program (or the lamps discounted through it). DNV KEMA computed like spillover by asking:

- Whether the end user had completed any other LED or linear fluorescent projects since their purchase of the lamps discounted through Bright Opportunities;
- Whether those lamps received rebates or discounts;
- How many lamps they purchased; and
- How much influence their experiences with the bulbs discounted through Bright Opportunities and the dealers from which they purchased those bulbs affected their decisions.

DNV KEMA scaled the spillover calculation to the number of bulbs discounted through Bright Opportunities to arrive at a ratio of the same unit as the attribution ratios in the preceding section. The detailed calculation methodology is described in Appendix AA.

All of the like spillover ratios approach zero. Table 4-4 shows the like spillover ratios for LED and linear fluorescent bulbs before and after the discount changes in 2012, and overall. Except for the LED after change and overall ratios, these are not statistically significant from zero.<sup>20</sup>

**Table 4-4: Like Spillover**

| Time of Purchase                     | LED  | Linear Fluorescent |
|--------------------------------------|------|--------------------|
| Before change<br>(LED n=67; LF n=3 ) | <1%  | 3%                 |
| After change<br>(LED n=126; LF n=30) | <1%* | 0%                 |
| Overall<br>(LED n=227; LF n=33)      | <1%* | <1%                |

Statistically significantly different from zero, at a 90% confidence level.

#### 4.8.2 Program Attribution from the Distributor/Contractor Perspective

Another way to examine possible program impacts on the Massachusetts LED market is to do a number of comparisons including:

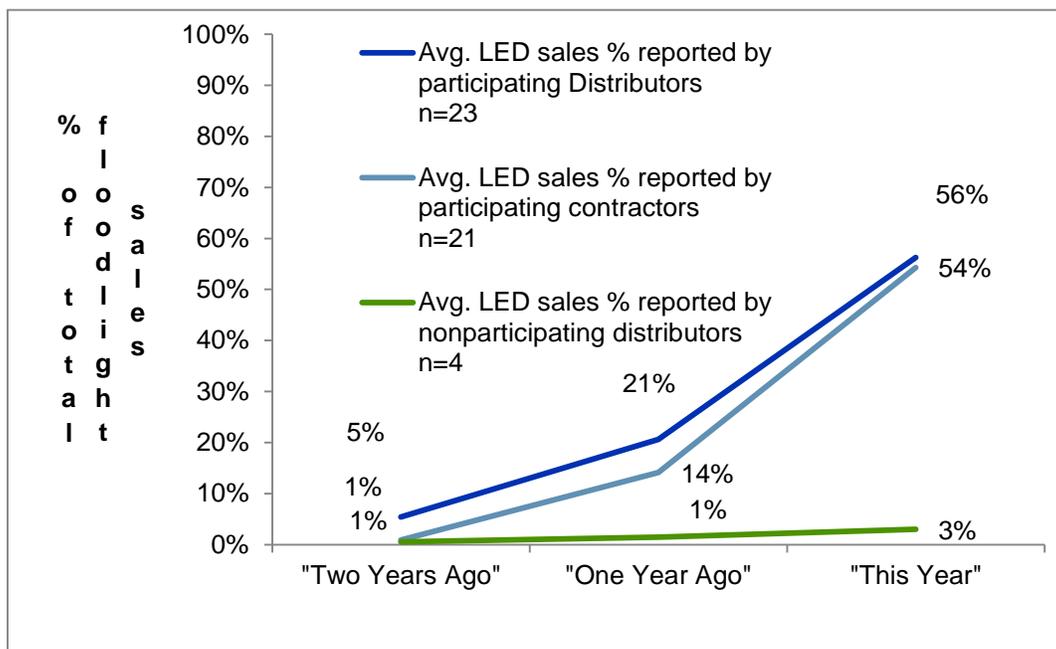
<sup>20</sup> While these ratios could be added directly to the attribution ratios presented in the previous section, they would not change those values, so DNV KEMA has not done so.



- Comparing the LED sales penetration of participating distributors/contractors over time;
- Comparing the LED sales penetration of participating distributors/contractors with nonparticipating distributors; and
- Comparing the Massachusetts sales of participating distributors with their sales in other states.

We asked participating distributors, nonparticipating distributors and participating contractors about LEDs as a percentage of floodlight sales this year (2012), one year ago (2011) and two years ago (2010).<sup>21</sup> Figure 4-29 shows that the LED share of the floodlight sales rose significantly for the participating distributors and contractors but sales for the nonparticipating distributors remained relatively flat. The sample size for the nonparticipating distributors was obviously very small, but the difference between the participating and nonparticipating distributors was still statistically-significant at the 95 percent confidence level.

**Figure 4-29: LED Floodlight Market Penetration Over Time**



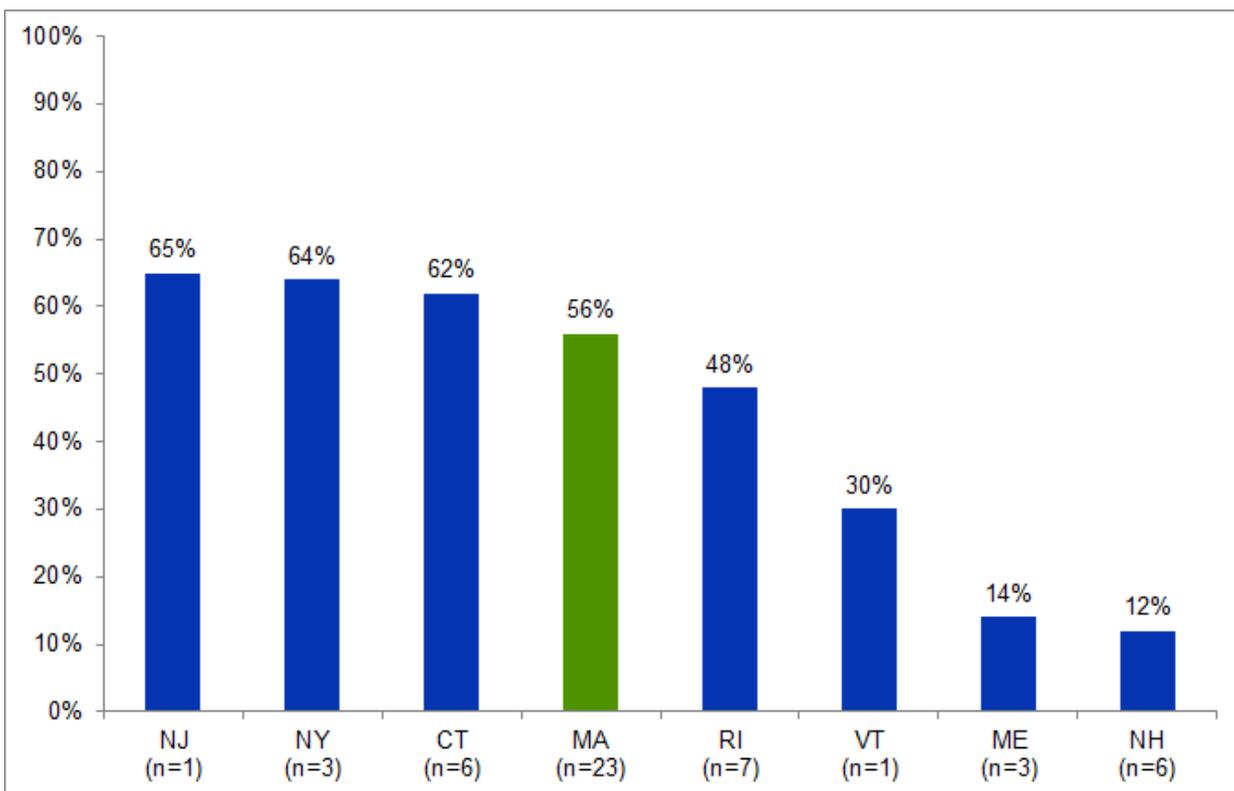
Participating distributors were asked if they sold LEDs in states other than Massachusetts. Nine distributors said that they did not or did not know. The remaining distributors were then asked what states and what percentage of floodlight sales were LEDs in those states, to measure a difference and shown in Figure 4-30. The Massachusetts program, with 56 percent was in the higher end of the range. Two other states with high levels of LED spotlight, Connecticut and Rhode Island were cited as having high LED percentages due to similar programs in those states. Due to the division of the sample and small number

<sup>21</sup> We choose floodlight/spotlight lighting category as our basis for comparison because LED floodlights/spotlights accounted for the bulk of program sales.



of responses for each state, only New Hampshire showed statistically-significant differences at the 90% confidence level.

**Figure 4-30: LEDs as Percent of Floodlight Sales by State**



We also provided the participating distributors with specific information about some of the lighting projects they were involved with through the program and asked them the following questions about these particular projects:

- PI2. Do these sales quantities sound about right to you?
- PI3. According to our records you sold the [A: TYPE] bulbs/lamps at a [B: PROMOTIONAL PRICE] which was [C: BUYDOWN AMOUNT] less than your normal retail price for a discount of [D: DISCOUNT] percent. If this discount had not been available, do you think you would have sold any of these types of bulbs/lamps to this customer?
- PI4. [IF RESPONSE TO PI3 ≠ “NO”] If this discount of [DISCOUNT] percent had not been available, would your sales of these [TYPE] bulbs/lamps to [CUSTOMER] been the same, lower, or higher?
  - PI4A. [IF SAME OR HIGHER] Why do you say this?



- PI4B. [IF LOWER] By what percentage do you estimate your sales of these [TYPE] bulbs/lamps to [CUSTOMER] to be lower in the absence of the discount?

We asked the participating contractors a similar series of questions with the exception that rather than asking them about a specific project, we asked them about their total purchases through the program. So, for example, instead of asking them: “If this discount had not been available, do you think you would have sold any of these types of bulbs/lamps to this customer?,” we asked them instead: “If this discount had not been available, do you think you would have purchased any of these types of bulbs/lamps?”

We then used the distributor and contractor responses to these questions to calculate a net-to-gross ratio. If respondents said “No” to question P13, we gave the lighting products associated with this response to have a net-to-gross ratio of 100%. If they indicated they would have sold some but their sales would have been lower in the absence of the program, we estimated the program-attributable share of their sales – e.g. the net-to-gross ratio – to be their response to P14B.

Table 4-5 shows the average net-to-gross estimates we derived from lighting distributor responses to the net-to-gross questions we asked about specific projects. In addition to the straight average (where each project had equal weight), we also calculated a unit-weighted average where projects got a larger weight based on their number of bulbs, and a revised version of this average where one outlier project was removed.

**Table 4-5: Net-to-Gross Estimates from Participating Lighting Distributors Based on Specific Projects**

| Averaging Method                         | Total Program Net-to-Gross Ratio | Linear Fluorescent Net-to-Gross Ratio | LED Net-to-Gross Ratio |
|--|----------------------------------|---------------------------------------|------------------------|
| Straight Average                         | 77%                              | 71%                                   | 79%                    |
| Unit Weighted Average                    | 88%                              | 93%                                   | 68%                    |
| Unit Weighted Average - Outliers Removed | 83%                              | 81%                                   | 88%                    |

Table 4-6 shows the average net-to-gross estimates we derived from lighting distributor responses. In this case there was not an outlier and so we only calculated the straight average and the unit-weighted average.

**Table 4-6: Net-to-Gross Estimates from Participating Lighting Contractors Based on Their Total Program Sales**

| Averaging Method      | Total Program Net-to-Gross Ratio | Linear Fluorescent Net-to-Gross Ratio | LED Net-to-Gross Ratio |
|-----------------------|----------------------------------|---------------------------------------|------------------------|
| Straight Average      | 88% ±10%                         | 100%                                  | 86% ±11%               |
| Unit Weighted Average | 97% ±5%                          | 100%                                  | 96% ±6%                |



Note: The 90% confidence intervals are shown. Linear Fluorescents had no variance, so a confidence interval could not be computed.

### 4.8.3 Combining the Net-to-Gross Estimates

To come up with a recommended net-to-gross estimate for the program, we selected some of the estimates from the end user survey responses, the participating distributor responses, and the participating contractor estimates. Our reasoning for selecting these estimates is explained below. We then averaged these three ratios for each lighting type to produce the recommended net-to-gross ratio. Table 4-7 shows the recommended ratios and their component pieces.

**Table 4-7: Recommended Net-to-Gross Ratios by Lighting Type**

| Lighting Category  | Overall End User Net-to-Gross Ratio | Lighting Distributor Straight Average Net-to-Gross Ratio | Lighting Contractor Straight Average Net-to-Gross Ratio | Recommended Net-to-Gross Ratio |
|--------------------|-------------------------------------|--|---|--------------------------------|
| LEDs               | 82% ±3%                             | 79%  | 86% ±11%  | 82%                            |
| Linear Fluorescent | 50% ±4%                             | 71%  | 100%  | 74%                            |

Note: The 90% confidence intervals are shown. For the lighting contractor net-to-gross estimate for the linear fluorescents there was no variance in the estimate and so we could not calculate confidence intervals for this estimate. In the case of the participating lighting distributor estimates, we attempted to survey a census of the participating distributors and therefore confidence intervals, which are a measure of sampling error, would not be relevant.

Our reasoning for using these averages was as follows:

- *End user estimate:* For the end-user net-to-gross ratio we considered using the net-gross-ratio for the post-March 2012 period instead since one might argue that this would be the best predictor of future program activity. However, as discussed above, for the key LED technology there was little difference between the estimate for the pre-March 2012 period (80%) and the post-March 2012 period (84%) and so we chose to use the overall program estimate (82%) since this had a more robust sample size.
- *Distributor estimate:* We chose to use the straight average net-to-gross ratio for LEDs because it was in between the unit-weighted average net-to-gross ratio with the outlier project included and the unit-weighted average with this outlier project excluded. We chose to use the straight average net-to-gross ratio for linear fluorescents to be consistent with the type of average we were using for LEDs and because this 71 percent net-to-gross ratio is the distributor estimate that is closest to being equidistant from the end user (50%) and contractor estimates (100%).

- *Contractor estimate:* We chose to use the straight average net-to-gross ratio to be consistent with what we did with the distributor estimates and because the straight average net-to-gross ratio for the LEDs was identical to the estimate from the end user surveys.

Table 4-7 shows that there was a lot more variability around the linear fluorescent net-to-gross ratio estimates than there was about the LED net-to-gross ratio estimates. We suspect this is likely due to the much smaller sample sizes for the linear fluorescent estimates and the possibility that some estimators may be conflating their estimates for the low-wattage T5 and T8 lamps rebated by the program with conventional T5 and T8 lamps. In any case, the linear fluorescents represent such a small percentage of the total program sales volume that this variability is not very consequential.

While the comparisons of LED floodlight market shares for participating distributors/contractors and nonparticipating distributors certainly are additional pieces of evidence for program influence, we did not attempt to estimate net-to-gross ratios from this methodology because the nonparticipating distributor sample size was too small. As discussed in the methodology section, available nonparticipating distributor sample was exhausted and additional sample was not available.

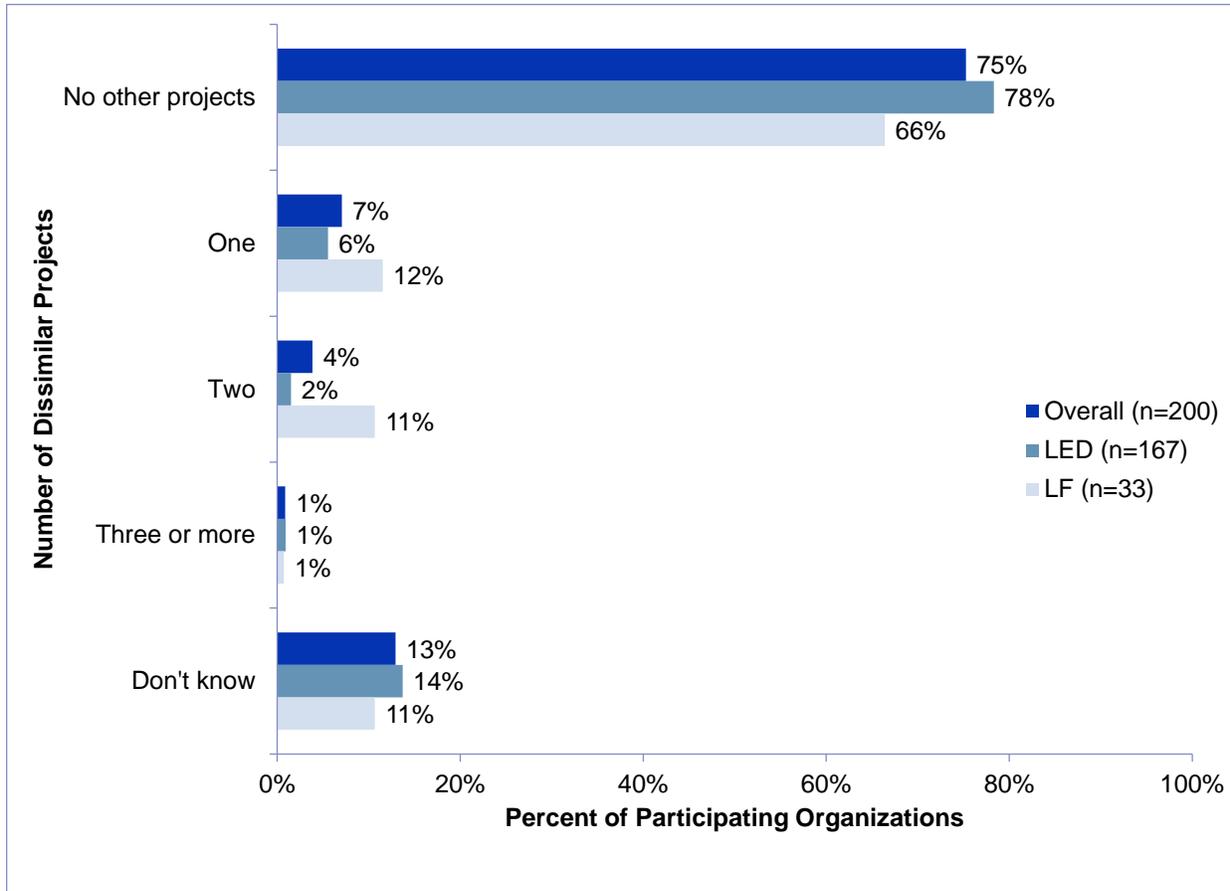
We used similar reasoning for not trying to calculate a net-to-gross ratio from the comparison of Massachusetts LED floodlight market shares to other nearby states. The sample sizes for the comparison states were all very small and because of this the only statistically-significant difference was between Massachusetts and New Hampshire. Finally although we know that some of these comparison states such as Vermont have upstream lighting programs that are similar to the Massachusetts program, we do not know enough about LED programs in other states to know which of these states should be included in a “non-program comparison group.”

## 4.9 Unlike Spillover

Unlike spillover is the extent to which a participant’s experiences with the discounted lamps affected their decisions to implement other energy efficiency projects that did not involve the same type of lamp, and were not incentivized in some other way. The estimation of unlike spillover had to take a different approach than like spillover, because the surveys only gathered project-level information.

The survey asked respondents how many unlike projects they had completed *without incentives* from MASS Save or their electricity or gas service providers. Most respondents indicated that they had not completed any additional projects (Figure 4-31).

**Figure 4-31: Other Similar Projects  
Not Receiving Discounts**



For any respondent that did complete other projects, the survey asked what type of measures were included. The most common answer was LED bulbs (for linear fluorescent end users) or solar panels (for LED end users; Table 4-8).



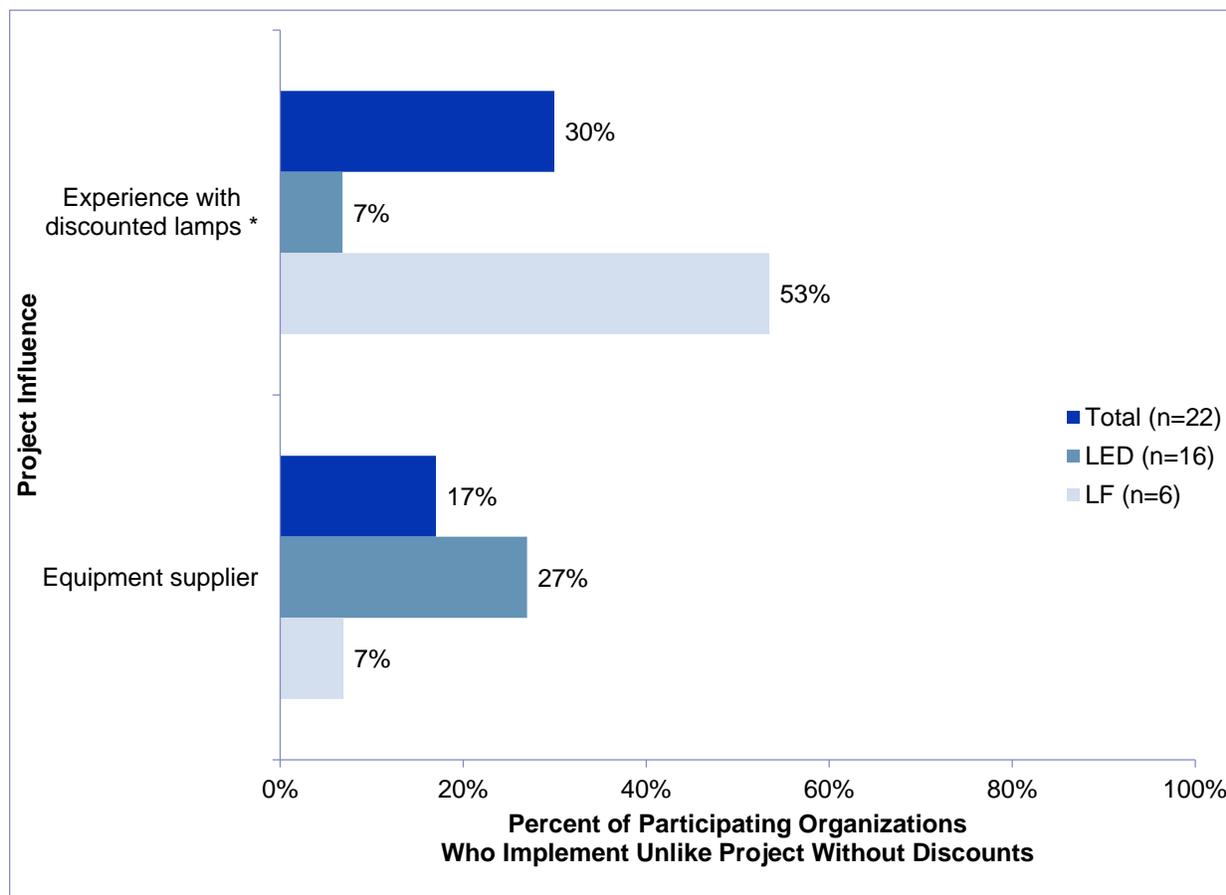
**Table 4-8: Unlike Project Types**

| Project Type                | Total (n=18) | LED (n=12) | Linear Fluorescent (n=6) |
|-----------------------------|--------------|------------|--------------------------|
| LED bulbs                   | 32%          | 6%         | 50%                      |
| Solar Panels                | 16%          | 40%        | 0%                       |
| Non-lighting measures       | 12%          | 29%        | 0%                       |
| Lighting (unspecified)      | 7%           | 18%        | 0%                       |
| Boilers                     | 7%           | 11%        | 4%                       |
| Energy-efficient appliances | 7%           | 17%        | 0%                       |
| Other                       | 58%          | 36%        | 73%                      |
| Don't Know                  | 14%          | 0%         | 23%                      |

Note: Totals exceed 100% because multiple answers were accepted.

The final step was to determine how much influence, if any, the participants' experience with the discounted lamps or equipment suppliers had on their decision to undertake similar, undiscounted projects. Influence of the discounted lighting projects on these unlike projects was less than for the like projects (Figure 4-32). This is expected because one's experience with lighting projects does not necessarily provide any basis for forming expectations about any other type of projects or even different lighting products.

**Figure 4-32: Influence on Undiscounted, Like Projects**



Taken together, these results suggest that unlike spillover (at the project level) from the Bright Opportunities Program was minimal. Multiplying the percent of organizations with each of two factors (additional + undiscounted and influenced) produces a rough estimate of the maximum unlike spillover one could expect. In all cases, that maximum is around 10% (

Table 4-9).

Note, this figure refers to less than ten percent of additional projects as being influenced by the Bright Opportunities program. To convert this figure to a value that could be added to Net-to-Gross ratios would require engineering estimates of the energy savings from those projects. It is possible that when converted to a unit comparable to the NTG ratios, unlike spillover will approach zero. When DNV KEMA computed like spillover in the same fashion as described here, we obtained similar project-level ratios. However, once we computed those ratios at the individual end user level and took the relative size of the later projects into account, like spillover approached zero. The same could happen with unlike spillover.



**Table 4-9: Maximum Unlike Spillover**

|                                   | LED<br>(n=167) | linear<br>fluorescent<br>(n=33) | Overall<br>(n=200) |
|-----------------------------------|----------------|---------------------------------|--------------------|
| Additional, undiscounted projects | 22%            | 34%                             | 25%                |
| Influenced projects*              | 53%            | 27%                             | 30%                |
| Product of both factors           | 12%            | 9%                              | 8%                 |

\* The maximum percent for each lamp type from Figure 4-32

DNV KEMA asked participating distributors if they were aware of any instances of the lighting products discounted by Bright Opportunities being sold for use outside of Massachusetts. All respondents but one responded that they had not heard of any instances. The one that did not say ‘no’ directly only stated that there had been rumors, but was not able to cite any specific instances. The only method that any distributors were able to recommend for ensuring that the program was used within Massachusetts as intended was to continue sampling installation sites.

## A. Detailed Methodology

This appendix provides details on DNV KEMA's evaluation methodology, including sampling and attribution calculations.

### A.1 Sampling

In May 2012 DNV KEMA received program tracking data which covered the November 2011 to April 2012 period. We used these data to determine the sample frames discussed in this subsection. Although some of these customers were contacted by an audit team as part of a separate quality control effort during the initial few months of the evaluation, they were not excluded from this frame. The Program data included information about the types and quantities of products installed, customer names and addresses, distributor names and addresses, and equipment manufacturers. The product types identified in the data are LEDs (MR16, PAR20, PAR30 and PAR38) and linear fluorescents (T5 and T8). Since no estimates of savings were provided, standard formulas were applied to calculate annual kWh savings by product type and wattage. The per lamp savings estimates for each product type are presented in Appendix Table A-1. The goal of the impact evaluation will be to produce new estimates of delta watts and hours of use.

**Appendix Table A-1: Per Lamp Savings Assumptions by Product Type**

| Product Type | Baseline Fixture Wattage | Baseline Ballast Factor | Baseline Wattage | Installed Fixture Wattage | Installed Ballast Factor | Installed Wattage | Delta Watts | Annual Hours | kWh Savings |
|--------------|--------------------------|-------------------------|------------------|---------------------------|--------------------------|-------------------|-------------|--------------|-------------|
| T8           | 32                       | 0.88                    | 28               | 28                        | 0.88                     | 25                | 3.5         | 3,380        | 12          |
| T5           | 54                       | 1.00                    | 54               | 50                        | 1.00                     | 50                | 4.0         | 3,380        | 14          |
| PAR20        | 38                       | 1.00                    | 38               | 8                         | 1.00                     | 8                 | 29.8        | 4,500        | 134         |
| PAR30        | 55                       | 1.00                    | 55               | 15                        | 1.00                     | 15                | 40.4        | 4,500        | 182         |
| PAR38        | 61                       | 1.00                    | 61               | 14                        | 1.00                     | 14                | 46.8        | 4,500        | 211         |
| MR16         | 31                       | 1.00                    | 31               | 8                         | 1.00                     | 8                 | 23.4        | 4,500        | 105         |

The sample frame for the impact evaluation was defined as unique rows for each customer location and product type. For purposes of designing and selecting the sample, the level of detail for product types was the two major groups: LEDs and linear fluorescents. The tracking data were aggregated by customer name, address and group. The initial 6,343 records produced 3,365 unique combinations. However, we noticed that there were many instances where names and addresses were spelled, abbreviated, or punctuated differently, creating multiple records. Software tools and manual review reduced the number of unique combinations of name, address and product group to 3,077. After eliminating a few records where the sales quantity was less than or equal to zero, the number of records is 3,070. The distribution of savings and quantities installed across the product groups follows in Appendix Table A-2.



**Appendix Table A-2: Distribution of Upstream Lighting Projects by Product Group**

| Product Group | Savings (kWh) | % of Savings | Quantity Installed | % of Quantity Installed | Number of Customer Locations | % of Customer Locations |
|---------------|---------------|--------------|--------------------|-------------------------|------------------------------|-------------------------|
| LED           | 37,478,740    | 93.21%       | 219,691            | 49.04%                  | 2,513                        | 81.86%                  |
| Fluorescent   | 2,728,501     | 6.79%        | 228,295            | 50.96%                  | 557                          | 18.14%                  |
| Total         | 40,207,241    | 100.00%      | 447,986            | 100.00%                 | 3,070                        | 100.00%                 |

For the process evaluation, the sampling units were defined as unique customer names, regardless of address or product group. The 3,070 unique customer locations and product groups represent 2,599 customer names. The frame for the process evaluation was the names remaining after the impact evaluation sample was selected and removed from the population. \*

### A.1.1 Sample Design for Impact Evaluation

The goal of the impact evaluation is to estimate realization rates and other factors with  $\pm 10\%$  relative precision at a 90% confidence interval. In light of the fact that LEDs make up such a large percentage of the program savings, it is most important that these results achieve the precision targets. Since fluorescents make up less than 7% of the total program savings, the 90/10 criteria will be relaxed somewhat for that sample.

The population for the impact evaluation includes only the sites that have been identified as end use customers. Summary statistics about the population frame for the impact evaluation are provided in Appendix Table A-3.

**Appendix Table A-3: Population for Impact Evaluation**

| Customer Group | Product Group | Sites | Total kWh Savings | Average Savings | Minimum | Maximum | StdDev | CV   |
|----------------|---------------|-------|-------------------|-----------------|---------|---------|--------|------|
| End User       | LED           | 2,407 | 36,430,888        | 15,135          | 105     | 631,688 | 35,681 | 2.36 |
| End User       | Fluorescent   | 522   | 2,591,251         | 4,964           | 12      | 362,924 | 18,904 | 3.81 |
| Total          |               | 2,929 | 39,022,139        |                 |         |         |        |      |

In order to estimate the sample sizes required to produce estimates that meet the precision targets described above, we must make an assumption about the level of variability in the results (error ratio). Other studies of lighting impact evaluations have found an error ratio of 0.4 to be realistic. The sample design is stratified by size, based on the total savings at each location, using Model-Based Statistical Sampling techniques. The process assigns a higher selection probability to larger installations to maximize the efficiency of the sample. After reviewing alternatives, we propose the sample design described in Appendix Table A-4.

**Appendix Table A-4: Proposed Sample Design for Impact Evaluation**

| Product Group | Stratum | Maximum KWh Savings | Sites | Total KWh Savings | Sample | Inclusion Probability |
|---------------|---------|---------------------|-------|-------------------|--------|-----------------------|
| LED           | 1       | 7,994               | 1,459 | 4,756,134         | 10     | 0.00685               |
|               | 2       | 18,450              | 493   | 5,950,855         | 10     | 0.02028               |
|               | 3       | 39,133              | 259   | 6,954,547         | 10     | 0.03861               |
|               | 4       | 92,052              | 141   | 8,120,784         | 10     | 0.07092               |
|               | 5       | 631,688             | 55    | 10,648,569        | 10     | 0.18182               |
| Fluorescent   | 1       | 5,996               | 432   | 505,501           | 5      | 0.01157               |
|               | 2       | 22,130              | 65    | 747,486           | 5      | 0.07692               |
|               | 3       | 127,209             | 24    | 975,339           | 4      | 0.16667               |
|               | 4       | 362,924             | 1     | 362,924           | 1      | 1.00000               |

Based on the information available at the current time regarding the distribution of customer locations by size (total savings) and assumed error ratio, this design is anticipated to produce estimates of realization rates and other factors with the precisions indicated in Appendix Table A-5.

**Appendix Table A-5: Anticipated Precisions for Impact Evaluation**

| Product Group | Sites | Total Savings | Assumed Error Ratio | Confidence Level | Planned Sample Size | Anticipated Relative Precision |
|---------------|-------|---------------|---------------------|------------------|---------------------|--------------------------------|
| LED           | 2,407 | 36,430,888    | 0.4                 | 90%              | 50                  | ±9.57%                         |
| Fluorescent   | 522   | 2,591,251     | 0.4                 | 90%              | 15                  | ±18.13%                        |
| Total         | 2,929 | 39,022,139    | 0.4                 | 90%              | 65                  | ±9.01%                         |

### **A.1.2 Sample Design for Participating Customer Telephone Surveys for Process Evaluation**

We collected information for the process evaluation and the net-to-gross/spillover analysis from participating customers through two types of surveys. One participating customer survey was administered by DNV KEMA field staff during their site visits in conjunction with their data collection efforts for the impact evaluation. The sample design for that on-site survey was described in the previous subsection. The second participating customer survey will be a telephone survey. This subsection describes the sample design for this telephone survey.



The sample design for the participating customer telephone survey will be based on a frame that has been reduced to exclude customers selected for the site visit sample and aggregated by customer name. It will also be stratified by size for efficiency. The number of customer names in the population for the process survey sample is 4,439, which account for a total savings of 55,421,570 kWh.

For planning purposes, we estimated the sample size required to produce results as proportions with  $\pm 10\%$  relative precision at a 90% confidence interval. The recommended sample design is shown below.

**Appendix Table A-6: Proposed Sample Design for Process Evaluation Telephone Survey of Participating Customers**

| Customer Group | Stratum | Maximum KWh Savings | Sites | Total KWh Savings | Sample | Inclusion Probability |
|----------------|---------|---------------------|-------|-------------------|--------|-----------------------|
| End User       | 1       | 6,722               | 2,827 | 6,668,098         | 38     | 0.01344               |
| End User       | 2       | 15,419              | 826   | 8,503,804         | 38     | 0.04600               |
| End User       | 3       | 33,339              | 442   | 9,909,687         | 38     | 0.08597               |
| End User       | 4       | 75,902              | 243   | 11,580,151        | 38     | 0.15638               |
| End User       | 5       | 430,086             | 96    | 14,930,185        | 38     | 0.39583               |
| End User       | 6       | 1,124,799           | 5     | 3,829,643         | 5      | 1.00000               |
| <b>Total</b>   |         |                     | 4,439 | 55,421,570        | 195    |                       |

Based on this design with a target of 195 completed surveys, the anticipated relative precision for process evaluation results is  $\pm 10.7\%$ . To the extent that survey questions can also be delivered during on-site visits, the sample size would increase to produce results with better precisions than  $\pm 10\%$ . This sample size will allow for the estimation of overall results with good precision, as well as results for segments of the population, such as business types.

### A.1.3 Additional Sample

DNV KEMA’s initial sample covered the November 2011 to April 2012 period. However, surveys did not enter the field until the fourth quarter of 2012, so additional sample, covering the period between April and November 2012, became available before fielding. We added these records to our initial sample and restratified. The previous tables have been updated with all changes caused by the additional sample.



### **A.1.4 Sample Design for Lighting Distributor/Contractor Interviews for Process Evaluation**

As noted in the Process Evaluation section, we interviewed both participating and nonparticipating lighting distributors as well as participating lighting contractors to collect information useful for the process evaluation and also the net-to-gross and spillover calculations.

#### **Participating Lighting Distributors/Manufacturers**

Based on the first set of program tracking data we received (through April 2012), we originally identified 33 participating distributors. However, in fall 2012 we requested additional program data which expanded the number of participating distributors to 50.

We also examined what the program tracking data showed in terms of participating manufacturers. There were 12 manufacturers identified in the data with products that were purchased through the Program. However, only two of these manufacturers accounted for nearly 90 percent of the program shipments. In addition, while the manufacturers supply the lighting products for the Program, the Bright Opportunities Program fact sheets clearly indicate that lighting distributors and not lighting manufacturers are the focus of the program. We did attempt to interview these two manufacturers as part of our evaluation of the Massachusetts ENERGY STAR® lighting program, which is a residential upstream program that focuses on lighting retailers. However, we were unsuccessful.

#### **Nonparticipating Lighting Distributors**

We planned to interview nonparticipating lighting distributors for both process evaluation reasons (e.g. barriers to participation) and to collect energy-efficient measure penetration data that would be useful for the net-to-gross analysis. Our sample frame for the nonparticipating lighting distributors was extracted from a large sample frame of lighting vendors (including both contractors and distributors) that we created for Large C&I Process Evaluation Report. This lighting vendor sample frame was pulled relatively recently (late 2011) and combined data from both the Dun and Bradstreet (D&B) and Dodge databases. Based on SIC codes we estimated that there were 623 lighting distributors in this database. DNV KEMA then used the full, raw data set and removed those companies that were participants, duplicates, and similar NAICS categories<sup>22</sup>, reducing potential lighting distributors to 350. DNV KEMA also used a second data set, purchased from Sales Genie, to identify additional potential nonparticipating lighting distributors. Our final combined sample frame included 387 nonparticipating lighting distributors.

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<sup>22</sup> NAICS codes used to extract firms from D&B data included not only lighting distributors, but also firms classified in the same 5-digit NAICS category. This included security system alarm installers and distributors, communication distributors and installers office cleaning firms.



### Participating Lighting Contractors

The customer names in the tracking data were reviewed to identify those that are likely to be contractors who installed lighting products at other end user sites. This group was comprised of 255 unique names, and accounted for 1,874,381 kWh savings. In order to design an efficient sample of these contractors, the population was stratified by kWh savings, as indicated in Appendix Table A-7.

**Appendix Table A-7: Stratification for Participating Lighting Contractor Sample**

| Group      | Stratum | Maximum KWh Savings | Sites | Total KWh Savings | Sample | Inclusion Probability |
|------------|---------|---------------------|-------|-------------------|--------|-----------------------|
| Contractor | 1       | 5,286               | 182   | 286,314           | 6      | 0.03297               |
| Contractor | 2       | 17,197              | 41    | 382,435           | 6      | 0.14634               |
| Contractor | 3       | 31,790              | 19    | 463,913           | 6      | 0.31579               |
| Contractor | 4       | 88,976              | 12    | 561,725           | 6      | 0.50000               |
| Contractor | 5       | 179,994             | 1     | 179,994           | 1      | 1.00000               |
| Total      |         |                     | 255   | 1,874,381         | 25     |                       |

Based on this sample of 25 contractors, the anticipated precision for results was ±22.36%. While this was significantly higher than the typical 90%/10% target, we expect to be able to combine these responses with those from the Participating Distributors to achieve statistically reliable results.

## A.2 Attribution Methodology

This section contains a detailed description of the method DNV KEMA used to compute end user attribution.

Attribution is defined as the complement of free ridership.

$$Attribution (ATTR) = 1 - Free Ridership (FR)$$

Free ridership was calculated as a function of free ridership in quantity, efficiency, and time.

$$Free Ridership (FR) = 1 * FR\_QTY * FR\_EFF * FR\_TIMING$$

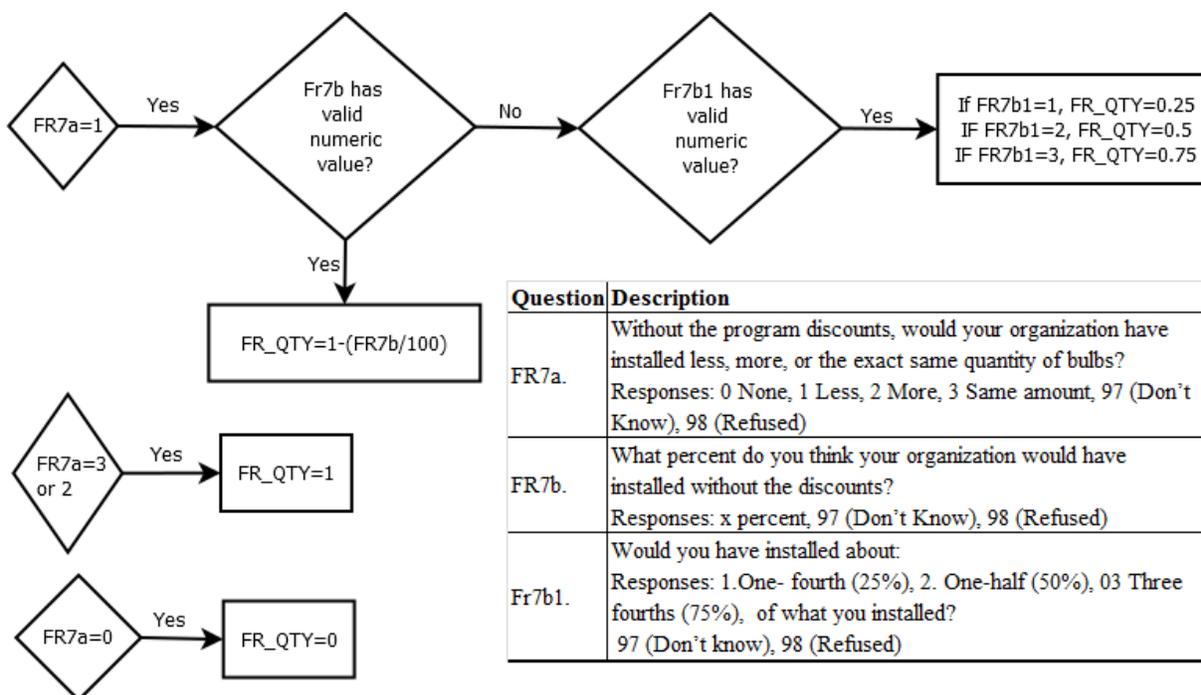
### A.2.1 Quantity Free Ridership

Free ridership of quantity (FR\_QTY) was elicited from questions regarding the quantity of equipment installed. End users were asked if they would have installed the same number of LED or linear fluorescent lamps without a program. If they said they would have installed the same quantity or more, quantity free



ridership was set to 1. If they said they would have never installed any lighting, then quantity free ridership was set to 0. If they said they would have installed some lighting without the program, but a lesser quantity, then quantity free ridership was set to the ratio of quantity they would have installed and the actual quantity they installed. Appendix Figure A-1 illustrates the quantity free ridership calculation as a flowchart.

**Appendix Figure A-1: Quantity Free Ridership Scoring**



### A.2.2 Efficiency Free Ridership

Free ridership of efficiency score (FR\_EFF) was calculated by asking the participant what type of lamps they would have installed if the discount had not been available. Their efficiency free ridership score was based on a comparison of the lumens/watt<sup>23</sup> for the alternative lamp type and the one they purchased, as shown in Appendix Table A-8. DNV KEMA assigned a free ridership score of 0 to the least efficient alternative lamp type. DNV KEMA assigned a score of 1 if the alternative lamp type had equal or greater efficiency than the program. These endpoints set the range of available efficiencies and any lamp type that fell between the endpoints received an efficiency free ridership value roughly equal to the ratio between its efficiency and the most efficient alternate technology.

<sup>23</sup> According to US DOE, 2010 U.S. Lighting Market Characterization, Page 79, Table C.2: <http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/2010-lmc-final-jan-2012.pdf>



**Appendix Table A-8: Efficiency Free Ridership**

| Type of lamp that participants would have installed without the presence of the program | Discounted Lamp Type |                    |
|---|----------------------|--------------------|
|   | LED                  | Linear Fluorescent |
| Incandescent  | 0                    | 0                  |
| Halogen   | 0.1                  | 0.1                |
| Metal halide  | 1                    | 0.75               |
| T12   | 1                    | 0.75               |
| T8  | 1                    | 0.75               |
| T5  | 1                    | 1                  |
| CFL   | 1                    | 0.5                |
| LED   | 1                    | 0.5                |

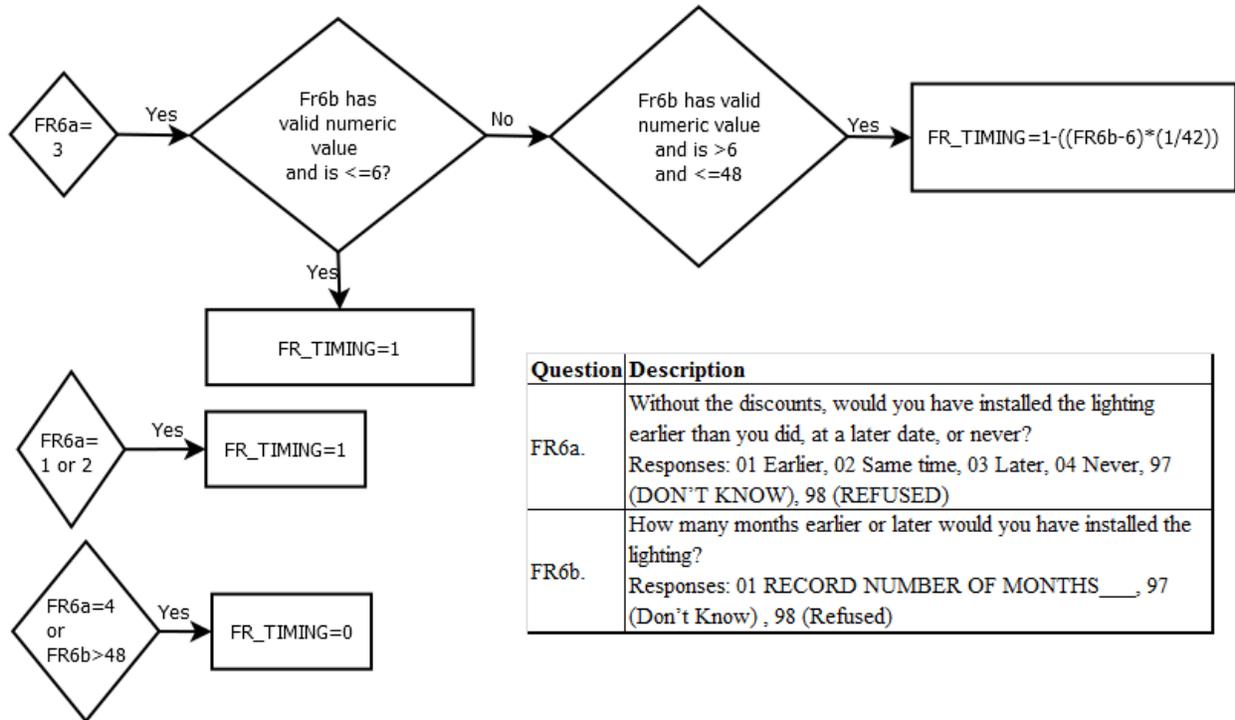
### A.2.3 Timing Free Ridership

Timing free ridership (FR\_TIMING) was obtained by asking if the participant would have installed lighting equipment earlier, later, or at the same time without the program. If the participant would have installed at the same time or within the six months they received a timing free ridership score of 1 because the program had little influence. If they would have installed more than 48 months later, they received a timing free ridership score of 0. If they would have installed sometime between seven months and forty-eight months later, their timing free ridership score was calculated by using the formula:

$$1 - \left( \frac{\# \text{ months above six months}}{42} \right)$$

For example, if participants responded that they would have installed the equipment eighteen months later, the FR\_TIMING would be 1-(12/42), equaling 0.71 Appendix Figure A-2 illustrates the timing free ridership calculation in the form of a flowchart.

**Appendix Figure A-2: Timing Free Ridership Scoring**



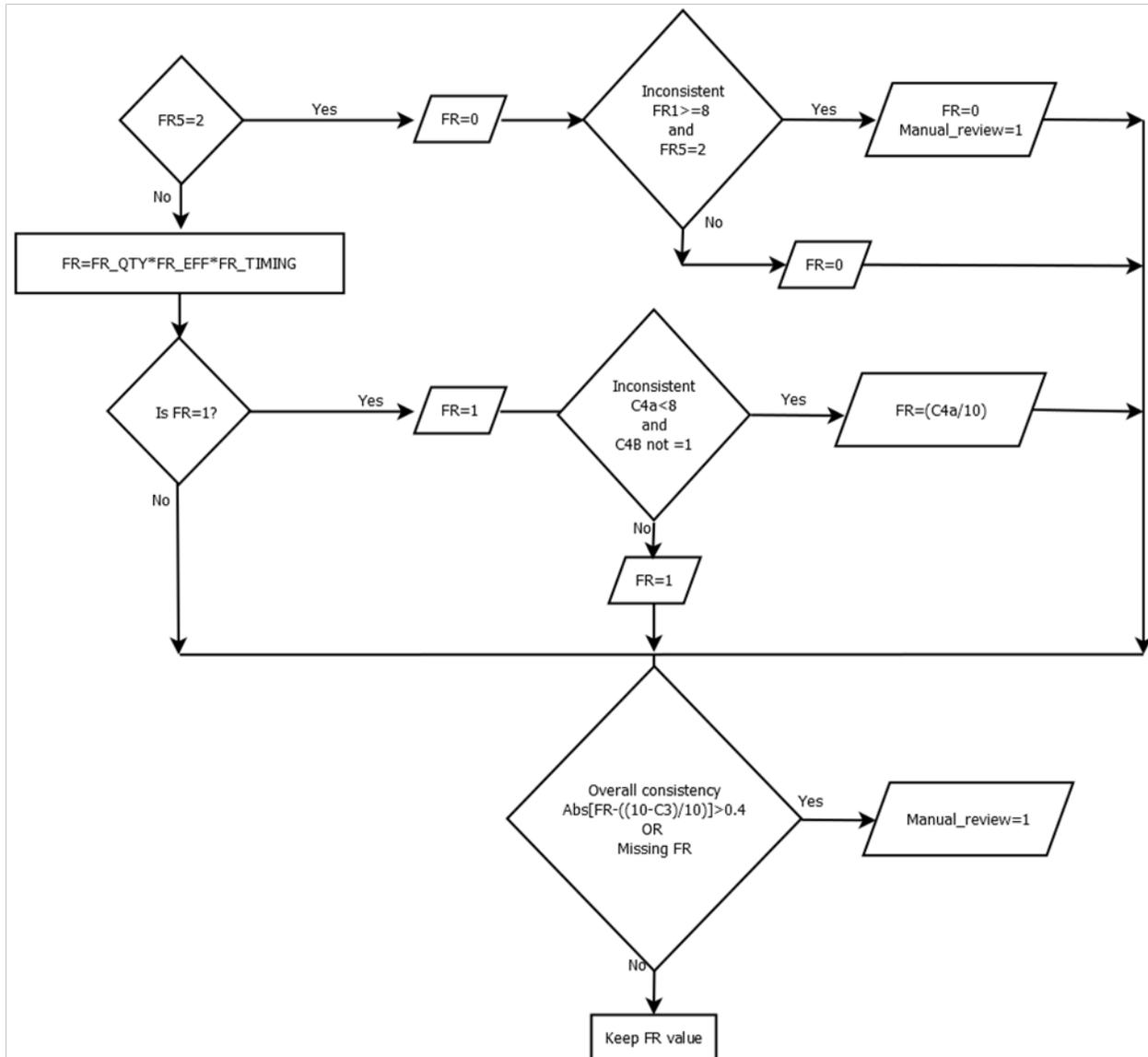
### A.2.4 Consistency Checks

After a free ridership score was calculated, DNV KEMA checked it for consistency against several consistency check questions in the survey. The consistency check was used when overall free ridership scores were zero or hundred percent and in cases where the survey responses did not contain enough data to calculate a free ridership score based on the previously described algorithms. All respondents whose free ridership calculations failed the consistency check received a manual review. Appendix Figure A-3 illustrates the consistency check algorithm in the form of a flowchart.

### A.2.5 Weighting

The final step in the attribution calculation was to weight the results back up to the population level. For this weighting DNV KEMA used simple case weights, which were equivalent to the number of accounts in the population divided by the number of survey completes, by strata.

**Appendix Figure A-3: Free Ridership Consistency Check**



The table below describes the questions that appear in the above figure:



| Question | Description   |
|----------|---|
| FR1.     | On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your organization would have installed the same quantity and efficiency of bulbs at that same time without the discounts?<br>Responses: ___ (0 TO 10), 97 (Don't Know), 98 (Refused)  |
| FR5.     | Without the discounts, would your organization have installed any type of lighting at all?<br>Responses: 01 Yes , 02 No, 97 (Don't Know), 98 (Refused)  |
| C4a.     | Now I want to focus on what it would have cost your organization to install the bulbs on its own without the discounts. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your organization would have paid the additional cost on top of the amount you already paid, to purchase the same quantity and efficiency of lighting equipment at that same time?<br>Responses: ___ (0 TO 10), 97 (Don't Know), 98 (Refused)   |
| C4b.     | [ASK IF C4a < 8] You said that you would have installed the same quantity and efficiency of bulbs at that same time, but you also just said that there was a <<C4a SCORE>> in 10 likelihood of you paying the additional incentive provided by the program. Which of these is more accurate?<br>Responses: 01 Installed same quantity & efficiency at same time, 02 Likelihood of installing this without the program, assistance was <<C4a SCORE>> out of 10, 03 Something else Specify, 97 (Don't Know), 98 (Refused) |

### A.2.6 Manual Review

During the manual review, inconsistencies and missing values were inspected and compared to several open ended responses. When a calculated value was flagged as inconsistent, DNV KEMA kept the calculated value unless the other responses could clearly override it. In cases where missing data prevented a calculation, DNV KEMA assigned a specific free ridership value based on the available, non-missing data, including open-ends and consistency check questions. In cases where a clear free ridership number could not be assigned from these information sources, DNV KEMA assigned a free ridership score equal to the average free ridership score of the respondents who provided enough information to allow the calculation, by lamp type (LED or linear fluorescent).

### A.2.7 Participant “Like” Spillover Calculation

The “like” spillover estimates are based on the amount of LED or linear fluorescent bulbs that the participants installed outside of rebate programs and as a result of program influence. The first requirement to get any spillover credit is for the participants to purchase similar measures after they purchased the bulbs discounted by Bright Opportunities. Responses other than ‘Yes’ to the following question resulted in a spillover score of zero:

- **S1.** Has your organization purchased any [LED / linear fluorescent] bulbs for this or other facilities in Massachusetts?



The next step was for anyone who purchased similar bulbs to have done so outside of a rebate program. DNV KEMA used the following two questions to determine this. The first question (S1B) addresses typical "downstream" programs that we assume respondents would have direct knowledge of. The second question (S1C) covers other purchases made through Bright Opportunities or other upstream programs, which we could not assume respondents would have direct awareness of. If respondents did not answer "yes" to S1B they received a spillover score of zero. If they said "don't know" to S1B, they were asked S1C. If they provided a cost per bulb of at least \$40 for LED and \$5 for linear fluorescent bulbs in response to S1C, then we set their attribution to zero.

- **S1B.** Did you make these purchases on your own, that is, without a discount or rebate the program?
- **S1C.** How much did you pay per bulb?

For any one making it through those three questions without a spillover of zero, we calculated spillover from quantities of measures that the participants purchased by dividing the total number of bulbs purchased outside a program (self-reported during the surveys) by the total number of bulbs purchased within the program (from the program tracking database used during sampling). DNV KEMA asked about up to three additional purchases with the following questions:

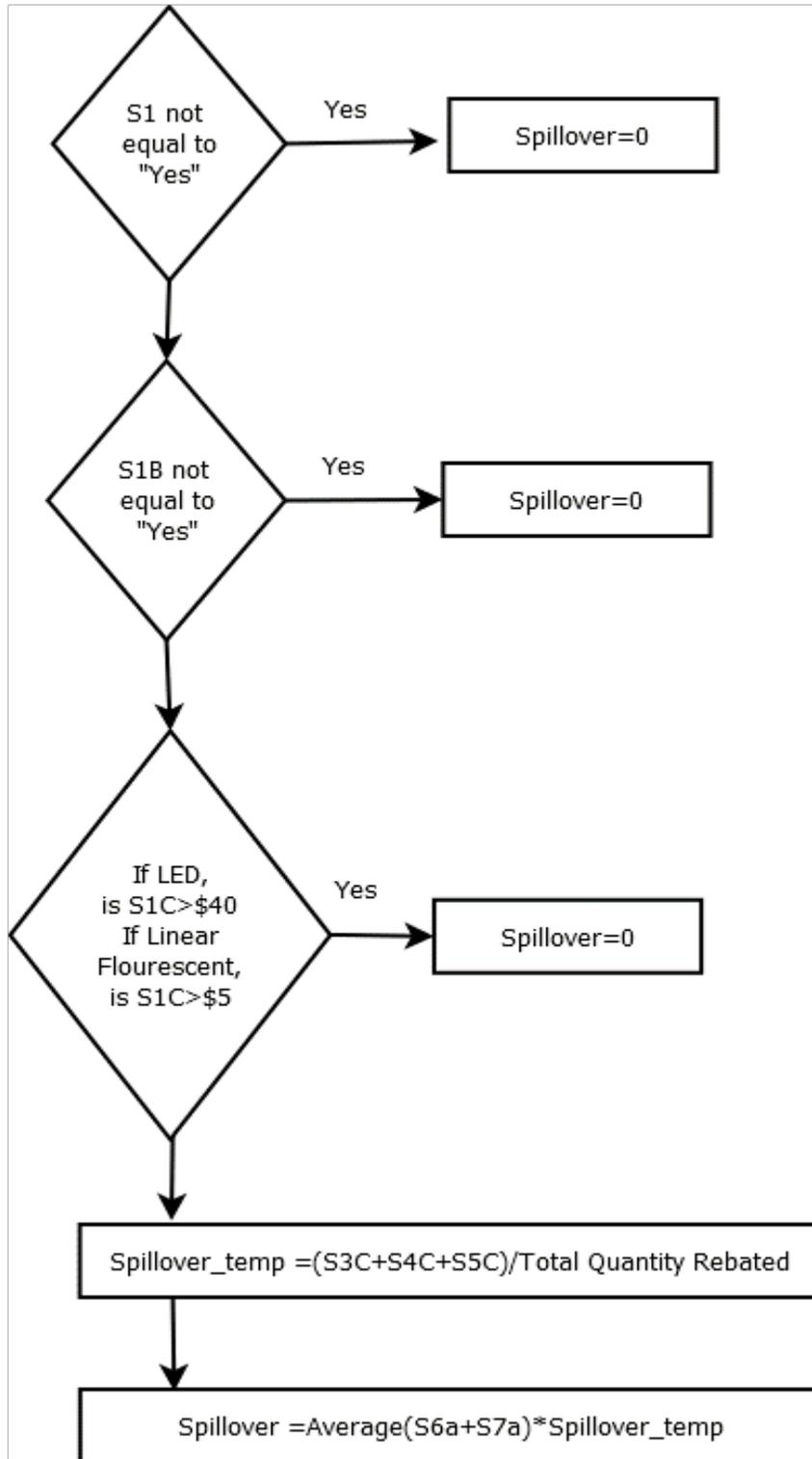
- **S3C.** About how many [LED / linear fluorescent] bulbs did you purchase during the first purchase?
- **S4C.** About how many [LED / linear fluorescent] bulbs did you purchase during the second purchase?
- **S5C.** About how many [LED / linear fluorescent] bulbs did you purchase during the third purchase?

The ratio obtained above was then multiplied by a 0 to 1 program influence factor, computed by taking the average of the following two questions and dividing by 10.

- **S6A.** On a scale of 0 to 10, where 0 is —no influence at all and 10 is —a great deal of influence, how much influence did your experience with the measure you purchased have on your later purchase decisions?
- **S7A.** On a scale of 0 to 10, where 0 is —no influence at all and 10 is —a great deal of influence, how much influence did the contractor or equipment supplier you purchased have on your later purchase decisions?

The following flowchart shows the steps for spillover scoring.

**Appendix Figure A-4: Spillover Calculation**





The number obtained from multiplication is a proportion of additional bulbs purchased outside of rebate programs, and influenced by the respondent's participation in Bright Opportunities. This ratio is of the same unit as the attribution estimate described previously. Therefore, it can be directly added to attribution (or subtracted from free ridership) to get the attribution including the spillover.

There were three cases where end users indicated they had completed like projects but did not provide enough data to compute a spillover value. For these cases, DNV KEMA substituted the average spillover ratio computed over everyone else who had completed like projects (approximately 0.06).



## B. End user Survey

This appendix contains the survey completed by the end users.

### MA Project 17 End user Survey

#### Database Variables

| Variable                | Definition   |
|-------------------------|--|
| TYPE                    | type of bulb purchased “linear fluorescent” or “LED”.<br>We will only ask about 1 type of bulb.<br>IF customer did LFs, we will ask them about LFs, even if they also did LEDs.<br>If they only did LEDs, we will ask them about LEDs. |
| TOTAL_QUANTITY          | number of <TYPE> purchased   |
| PURCHASE_DATE_FIRST     | approximate date of first <TYPE> purchase  |
| PURCHASE_DATE_LAST      | approximate date of last <TYPE> purchase   |
| TOTAL_INCENTIVE         | total amount of incentive for the <TYPE> purchased   |
| AVG_INCENTIVE_HIGH      | high threshold for average incentive for the <TYPE>s purchased to trigger freeridership questions  |
| AVG_INCENTIVE_LOW       | low threshold for average incentive for the <TYPE>s purchased to trigger freeridership questions   |
| AVG_INC_PERC_HIGH       | high threshold for average incentive for <TYPE> purchased, in terms of percent, to trigger free ridership questions  |
| AVG_INC_PERC_LOW        | low threshold for average incentive for <TYPE> purchased, in terms of percent, to trigger free ridership questions   |
| ADDRESSES               | address(es) where <TYPE>s installed. Up to 5 addresses listed, separated by semi-colon.  |
| PA                      | Program administrator – usually an electricity provider  |
| PHONE                   | main phone number to use.<br>If cont1_phone not missing, phone = cont1_phone<br>else if cont2_phone not missing, phone = cont2_phone<br>else phone = looked up phone number (PhoneT)   |
| CONT1_NAME              | name of contact person – mostly blank  |
| CONT1_PHONE             | phone number for cont1_name, if available  |
| CONT2_NAME              | names of 2ndary contact person – even more blank   |
| CONT2_PHONE             | phone number for cont2_name, if available  |
| LAST_PURCHASE_DATE_BOTH | latest date respondent purchased LEDs or LFs   |

#### Introduction and Screening

10. [IF <CONT1\_NAME> BLANK]

Hello, my name is \_\_ from Discovery Research Group. We are performing an evaluation of an energy efficiency program funded by the Massachusetts electricity service providers, including <PA>.



Our records indicate that your organization purchased some <TYPE> bulbs in the past 12 months which received a discounted price from this program.

[IF <CONT1\_NAME> BLANK, READ] Could I please speak with the person there who would be most familiar with this purchase?

- 01 [Yes] [RECORD CONTACT NAME, GOTO I1]
- 02 [No] [ARRANGE CALLBACK]
- 97 [Don't know] ..... [ARRANGE CALLBACK]
- 98 [Refused] [TERMINATE REFUSED I0]

I1. May I please speak to <CONT1\_NAME>?

**INTERVIEWER** IF LISTED RESPONDENT NO LONGER WITH ORGANIZATION ASK TO SPEAK TO PERSON MOST INVOLVED IN THE PURCHASE OF LIGHTING FOR THE ORGANIZATION

[READ AFTER YOU GET CONTACT ON THE PHONE] Hello, my name is \_\_ from \_\_. We are performing an evaluation of an energy efficiency program funded by the Massachusetts electricity service providers, including <PA>.

Our records indicate that your organization purchased some <TYPE> bulbs in the past 12 months which received a discounted price from this program.

Are you the person who is most familiar with this purchase?

[IF NECESSARY: We are aware another company name CRI is also conducting similar surveys right now. This is a different survey. We understand your time is valuable and we would appreciate if you could complete it today, even if you have already completed the CRI survey. ]

[DO NOT READ]

- 01 [Yes] [GOTO SCR1]
- 02 [No] [GOTO I2]
- 97 [Don't know] ..... [GOTO I2]
- 98 [Refused] [GOTO I2]

I2. Is there someone else there who might be better to speak to?

[DO NOT READ]

- 01 [Yes] [RECORD NAME, GET TRANSFERRED AND READ I1 WITH NEW PERSON, OR ARRANGE CALLBACK]
- 02 [No] [GOTO SCR1]
- 97 [Don't know] ..... [CALLBACK LATER]
- 98 [Refused] [TERMINATE REFUSED I2]



SCR1. Would you describe your organization as a lighting or electrical contracting company?

[DO NOT READ]

- 01 [Yes] [TERM1]
- 02 [No] [AR0]
- 97 [Don't know] ..... [AR0]
- 98 [Refused] [AR0]

TERM1. I'm sorry, but this survey is for end users of lighting products rather than contractors. Thank you for your time today.

**About the Organization**

AR0. Let's start with a little information about your organization.

F1. What is the principal economic activity of your organization at your location?

[DO NOT READ. CHOOSE ONE. IF RESPONDENT TELLS YOU MULTIPLE, ASK THEM WHICH ONE BEST DESCRIBES THE MAIN ACTIVITY AT THE LOCATION.]

|    |   |  |
|----|---|--|
| 01 | Office                                    |  |
| 02 | Retail (non-food)                         |  |
| 03 | College/university                        |  |
| 04 | School                                    |  |
| 05 | Grocery store                             |  |
| 06 | Convenience store                         |  |
| 07 | Restaurant                                |  |
| 08 | Health care/hospital                      |  |
| 09 | Hotel or motel                            |  |
| 10 | Warehouse                                 |  |
| 11 | Church/Temple                             |  |
| 12 | Industrial Process/Manufacturing/Assembly |  |
| 13 | Agriculture/Farm                          |  |
| 14 | Government/Municipality                   |  |
| 15 | Community Service                         |  |
| 77 | Other Specify                             |  |
| 97 | [Don't know]                              |  |
| 98 | [Refused]                                 |  |

F2. Does your organization have any formal requirements or informal guidelines for the purchase, replacement, or maintenance of energy-using equipment?

[DO NOT READ]

|   |       |    |
|---|-------|----|
| 1 | [Yes] | F3 |
| 2 | [No]  | F4 |



|    |              |    |
|----|--------------|----|
| 97 | [Don't Know] | F4 |
| 98 | [Refused]    | F4 |

F3. What are these guidelines?

[DO NOT READ]

|           |                        |    |
|-----------|------------------------|----|
| <b>01</b> | <b>RECORD VERBATIM</b> | F4 |
| 97        | [Don't know]           | F4 |
| 98        | [Refused]              | F4 |

F4. Does your organization have a person whose job responsibilities include managing the energy use of your location?

[DO NOT READ]

|    |              |    |
|----|--------------|----|
| 01 | [Yes]        | F5 |
| 02 | [No]         | F5 |
| 97 | [Don't Know] | F5 |
| 98 | [Refused]    | F5 |

F5. Does your organization have a dedicated account representative with <PA>?

[DO NOT READ]

|    |              |              |
|----|--------------|--------------|
| 01 | [Yes]        | next section |
| 02 | [No]         | next section |
| 97 | [Don't Know] | next section |
| 98 | [Refused]    | next section |

**Equipment Installation Verification**

B0. According to my records, you purchased <TYPE> bulbs that received a discount through the program. I'm going to ask you a series of questions about the <TYPE> bulb purchase.

B1. My records indicate your organization purchased <TOTAL\_QUANTITY><><TYPE> bulbs between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>. Does that quantity sound correct?



[DO NOT READ]

- 01 [Yes] [GOTO B4; <<NUM\_PUR>>=<TOTAL\_QUANTITY>]
- 02 [No] [GOTO B3]
- 97 [Don't Know]..... [GOTO B2]
- 98 [Refused] [GOTO B2]

B2. Is there someone else there who I could talk to who might know?

[DO NOT READ]

- 01 [Yes] [RECORD CONTACT INFORMATION FOR CALLBACK]
- 02 [No] [GOTO B3]
- 97 [Don't Know]..... [GOTO B3]
- 98 [Refused] [GOTO B3]

B3. How many <TYPE> bulbs did your organization purchase? [IF NECESSARY, REPEAT: between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>]

[DO NOT READ]

- 01 RECORD EXACT NUMBER PROGRAMMING NOTE: MAKE THIS NUMBER THE NEW NUMBER PULLED IN FOR THE REMAINDER OF THE SURVEY INTO <<NUM\_PUR>>]
- 97 [Don't Know]
- 98 [Refused]

B4. Were all of the <TYPE> bulbs installed at <ADDRESSES>? [IF NECESSARY, REPEAT: between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>]

[DO NOT READ]

- 01 [Yes] [GOTO B9]
- 02 [No] [GOTO B5]
- 97 Don't Know]..... [GOTO B9]
- 98 [Refused] [GOTO B9]

B5. How many <TYPE> bulbs were installed at <ADDRESSES>?

[DO NOT READ]

01 RECORD EXACT NUMBER – PROGRAMMING NOTE: DO NOT ACCEPT NUMBER GREATER THAN <<NUM\_PUR>>] I WOULD LIKE TO ADD IN A DATA CHECKER THAT IN THE EVENT THE RESPONDENT GIVES A NUMBER GREATER THAN NUM\_PUR WE HAVE RECORDED IN B3 PLEASE BRING UP B5A LISTED BELOW

- 97 [Don't Know]..... [GOTO B5B]
- 98 [Refused] [GOTO B5B]



B5A. Previously you mentioned you had purchased [num\_pur] <TYPE> bulbs But, also reported that you installed [b5 response]. To ensure we have an accurate account of how many your organization purchased at a discount through <pa> can you please verify the total number of <type> bulbs you installed through this discount program?

01 [RECORD EXACT NUMBER] ..... [USE THIS NUMBER FOR THE NUMBER INSTALLED FOR THE REST OF THE SURVEY; GOTO B9]

97 [Don't Know]

98 [Refused]

B5B. About what percent of the <<NUM\_PUR>><>><TYPE> bulbs were installed at <ADDRESSES>? Your best guess is fine.

01 RECORD PERCENT ..... [IF 100%, USE <<NUM\_PUR>> AS NUMBER INSTALLED FOR REST OF SURVEY]

97 [Don't know] ..... [GOTO B23]

98 [Refused] [GOTO B23]

[ASK B6 IF RESPONSE IN B5 LESS THAN NUM\_PUR OR B5B < 100%]

B6. Did you put the remainder of the <TYPE> bulbs in storage for later installation at <ADDRESSES>?

[DO NOT READ]

01 [Yes] [GOTO B9]

02 [No] [GOTO B7]

97 [Don't Know]..... [GOTO B9]

98 [Refused] [GOTO B9]

[IF B5 = 97 or 98, GOTO B8]

B7. How many of <TYPE> bulbs did you put in storage?

[DO NOT READ]

01RECORD EXACT NUMBER – PROGRAMMING NOTE: DO NOT ACCEPT NUMBER GREATER THAN <<NUM\_PUR>>]

97 [Don't Know]

98 [Refused]

[IF B4 = 02 AND B6 =02 ASK B8]



B8. What did you do with the <TYPE> bulbs that you did not install at <ADDRESS> or put into storage?

[DO NOT READ. SELECT ALL THAT APPLY]

- 01 [Installed at a different location]
- 02 [Gave them away]
- 03 [Sold them]
- 04 [Threw them away]
- 05 [Lost them]
- 06 [They burned out]
- 77 Other Specify
- 97 [Don't Know]
- 98 [Refused]

[IF B5 = 0GOTO B23]

B9. Are all of the <TYPE> bulbs that were installed at <ADDRESS> still installed?

[DO NOT READ]

- 01 [Yes] [GOTO B12]
- 02 [No] [GOTO B10]
- 97 [Don't Know]..... [GOTO B12]
- 98 [Refused] [GOTO B12]

B10. How many are still installed?

[DO NOT READ]

- 01RECORD EXACT NUMBER – PROGRAMMING NOTE: DO NOT ACCEPT NUMBER GREATER THAN <<B5>>]
- 97 [Don't Know]..... [GOTO B11]
- 98 [Refused] [GOTO B11]

[PROGRAMMING LOGIC FOR GETTING INTO B10A AND B11. THIS SHOULD COVER ALL POSSIBILITIES.

IF B5a\_OS EXISTS:

- IF B10\_OS > B5a\_OS GOTO B10A;
- IF B10\_OS < B5a\_OS GOTO B11;
- IF B10\_OS = B5a\_OS GOTO B12;

IF B5a\_OS DOES NOT EXIST:



IF B5\_OS EXISTS:

IF B10\_OS > B5\_OS GOTO B10A;

IF B10\_OS < B5\_OS GOTO B11;

IF B10\_OS = B5\_OS GOTO B12;

IF B5\_OS DOES NOT EXIST:

IF B10\_OS > NUM\_PUR GOTO B10A;

IF B10\_OS < NUM\_PUR GOTO B11;

IF B10\_OS = NUM\_PUR GOTO B12;

[ PROGRAMMER NOTE: DO NOT ALLOW NUMBER GREATER THAN B5 OR <<NUM\_PUR>><<TOTALQUANTITY>> LIKE WE DO ON B5 IF THEY GIVE A NUMBER GREATER ]

B10a. You said earlier that you installed <<num\_pur>> but now you have reported that you installed <<B10 response>>. To ensure our accuracy, can you please verify the total number that are still installed.

01 Record Response ---whatever is recorded here will become the B5/B10 response needed for the rest of the questions so blow errors do not occur...

97 Don't know (Goto B23)

98 Refused (Goto B23)

B11. What happened to the ones that are no longer installed?

[DO NOT READ. ACCEPT MULTIPLE ANSWERS]

01 [Burnouts – thrown away]

02 [Put in storage]

03 [Reinstalled somewhere else]

04 [Lost/Stolen]

77 [Other Specify]

97 [Don't know]

98 [Refused]

B12. On average, how many hours per week are the <TYPE> bulbs turned on?

[DO NOT READ]



[NOTE: MAXIMUM HOURS/WEEK=168;  
24 HOURS \* 5 DAYS=120;  
12 HOURS \* 7 DAYS=84;  
8 HOURS \* 7 DAYS=56;  
4 HOURS \* 7 DAY=28]

[01 RECORD EXACT NUMBER PROGRAMMING NOTE: ACCEPT NUMBER 1 TO 168]  
97 [Don't Know]  
98 [Refused]

[IF <TYPE> = "LINEAR FLUORESCENT",  
OR B5 = 97 OR 98, GOTO B23]

B13. What types of lighting did the <TYPE> bulbs replace? Were they incandescent lighting, halogens, metal halides, CFLs, LEDs or something else?

[ALLOW MULTIPLE RESPONSES. DO NOT READ]

- 01 [Incandescent]
- 02 [Halogens]
- 03 [CFLs]
- 04 [LEDs]
- 05 [Metal halides]
- 77 [Other]
- 97 [Don't know]
- 98 [Refused]

[IN B13 IF 01 INCLUDED, ASK B14 SEQUENCE]

B14a. Of the <<B10>> or <<B05>><>><TYPE> bulbs that are still installed, about what percent replaced incandescent lamps?

[DO NOT READ]

- 01RECORD PERCENT ..... [IF = 0 GOTO B15a]
- 97 [Don't Know] ..... [GOTO B14b]
- 98 [Refused] ..... [GOTO B14b]

B14b. What was the most common wattage of the incandescent lamps that you replaced?

[READ LIST IF NECESSARY]

- 01 20 watts or less
- 02 21 to 35 Watts
- 03 36 to 40 Watts
- 04 41 to 50 Watts
- 05 51 to 80 Watts
- 06 81 to 100 Watts



- 07 Over 100 Watts
- 77 Other Specify
- 97 [Don't Know]
- 98 [Refused]

[IN B13 IF B13 IF 02 INCLUDED, ASK B15 SEQUENCE]

B15a. Of the <<B10>> or <<B05>>>> <TYPE> bulbs that are still installed, about what percent replaced halogen lamps?

[DO NOT READ]

- 01 RECORD PERCENT ..... [IF = 0 GOTO B15a]
- 97 [Don't Know] ..... [GOTO B15b]
- 98 [Refused] ..... [GOTO B16b]

B15b. What was the most common wattage of the halogen lamps that you replaced?

[READ LIST IF NECESSARY]

- 01 20 watts or less
- 02 21 to 35 Watts
- 03 36 to 40 Watts
- 04 41 to 50 Watts
- 05 51 to 80 Watts
- 06 81 to 100 Watts
- 07 Over 100 Watts
- 77 [Other] ..... [RECORD VERBATIM]
- 97 [don't know]
- 98 [refused]

[IN B13 IF 03INCLUDED, ASK B16 SEQUENCE]

B16a. Of the <<B10>> or <<B05>><>><TYPE> bulbs that are still installed, about what percent replaced compact fluorescent lamps?

[DO NOT READ]

- 01 RECORD PERCENT ..... [IF = 0 GOTO B17a]
- 97 [Don't Know] ..... [GOTO B16b]
- 98 [Refused] ..... [GOTO B16b]

B16b. What was the most common wattage of the compact fluorescent lamps that you replaced?

[READ LIST IF NECESSARY]

- 01 9 Watts or less



- 02 10 to 13 Watts
- 03 14 to 19 Watts
- 04 20 to 25 Watts
- 05 Over 25 Watts
- 77 [Other Specify]
- 97 [Don't Know]
- 98 [Refused]

[IN B13 IF 04 IN B13 IF 04 INCLUDED, ASK B17 SEQUENCE]

B17a. Of the <<B10>> or <<B05>><>><TYPE> bulbs that are still installed, about what percent replaced LED lamps?

[DO NOT READ]

- 01[RECORD PERCENT]..... [IF = 0 GOTO B18a]
- 97 [Don't Know] ..... [GOTO B17b]
- 98 [Refused] ..... [GOTO B17b]

B17b. What was the most common wattage of the LED lamps that you replaced?

[READ LIST IF NECESSARY]

- 01 7 Watts or less
- 02 8 Watts
- 03 9 Watts
- 04 10 to 13 Watts
- 05 14 to 17 Watts
- 06 Over 17 watts
- 77 [Other] ..... [RECORD VERBATIM]
- 97 [Don't Know]
- 98 [Refused]

[IN B13 IF 05 INCLUDED, ASK B18 SEQUENCE]

B18a. Of the <<B10>> or <<B05>><>><TYPE> bulbs that are still installed, about what percent replaced metal halide lamps?

[DO NOT READ]

- 01[RECORD PERCENT] ..... [IF = 0 GOTO B19a]
- 97 [Don't Know] ..... [GOTO B18b]
- 98 [Refused] ..... [GOTO B18b]

B18b. What was the most common wattage of the metal halide lamps that you replaced?

[READ LIST IF NECESSARY]



- 01 20 Watts or less
- 02 21 to 35 watts
- 03 36 to 40 Watts
- 04 41 to 50 Watts
- 05 51 to 80 Watts
- 06 81 to 100 Watts
- 07 101 to 150 Watts
- 08 151 to 175 Watts
- 09 176 to 200 Watts
- 10 201 to 250 watts
- 11 251 to 399 watts
- 12 400 to 599 watts
- 13 600 to 800 watts
- 14 over 800 watts
- 77 [Other] ..... [RECORD VERBATIM]
- 97 [don't know]
- 98 [refused]

[IN B13 IF 77 INCLUDED , ASK B19 SEQUENCE]

B19a. What other types of lamps did the remaining <TYPE> bulbs replace?

[DO NOT READ]

- 01 [RECORD RESPONSE] ..... [RECORD TYPE AND NUMBER]
- 97 [don't know] ..... [GOTO B23]
- 98 [refused]..... [GOTO B23]

B19A1 . What type? [PROGRAMMING NOTE: TEXT BOX]

B19A2. How many? [PROGRAMMING NOTE: NUMERICAL OPEN END]

B19b. What was the most common wattage of these remaining lamps that you replaced?

[DO NOT READ]

- 01 [RECORD RESPONSE] ..... [RECORD VERBATIM]
- 97 [Don't Know]
- 98 [Refused]

B19B1. [RECORD WATTAGE. PROGRAMMING NOTE: NUMERICAL OPEN END]

[IF B20 –B22 INTENTIONALLY MISSING TO REDUCE SKIP LOGIC REVISIONS]

B23. Were the <TYPE> bulbs you purchased part of a larger project or projects?

[DO NOT READ]

- 01 [Yes] [GOTO B24]
- 02 [No] [GOTO B27]
- 97 [Don't Know]..... [GOTO B27]



98 [Refused] [GOTO B27]

B24. What other equipment was included in the project(s)?

[DO NOT READ, ACCEPT MULTIPLE ANSWERS]

- 01 [LED Fixtures]
- 02 [Low-wattage T8 or HPT8 lamps]
- 03 [T5 lamps]
- 04 [T8 Fixtures]
- 05 [T5 Fixtures]
- 06 [LED Bulbs]
- 07 [Occupancy sensors / Motion detectors / Daylighting controls]
- 08 [Exit signage]
- 09 [Incandescent lamps]
- 10 [Non-lighting measures]
- 77 [Other] [RECORD VERBATIM]
- 97 [Don't know]
- 98 [Refused]

B25. What was the overall cost of the project(s)? Your best guess is fine.

[DO NOT READ]

- 01 RECORD COST ESTIMATE IN DOLLARS]
- 97 [Don't Know]
- 98 [Refused]

B26. Did your contractor or equipment supplier invoice the <TYPE> bulbs separately from other equipment included in the project(s)?

[DO NOT READ]

- 01 [Yes]
- 02 [No]
- 97 [Don't know]
- 98 [Refused]

B27. For the <TYPE> bulbs we are discussing, did your contractor or equipment supplier mention any discounts or rebates?

DO NOT READ

- 01 [Yes] [GOTO B28]
- 02 [No] [GOTO B30]
- 97 [Don't Know]..... [GOTO B30]
- 98 [Refused] [GOTO B30]



B28. Did they say where the discount or rebate came from?

DO NOT READ

- 01 [Yes] [GOTO B29]
- 02 [No] [GOTO B30]
- 97 [Don't Know]..... [GOTO B30]
- 98 [Refused] [GOTO B30]

B29. Which of the following sources did they say provided the discount or rebate?

[READ ALL, ACCEPT MULTIPLE ANSWERS]

- 01 Themselves
- 02 Manufacturer
- 03 Your electricity service provider (<PA>) ..... [GOTO B32; HARDCODE B30 = 1]
- 04 State of Massachusetts
- 05 MASS Save program ..... [GOTO B32; HARDCODE B30 = 1]
- 77 Someone else Specify
- 97 [Don't know]
- 98 [Refused]

B30. Were you aware the equipment you purchased received a price discount sponsored by your electricity service provider, <PA> and/or the MASS Save program?

DO NOT READ

- 01 Yes] [GOTO B31]
- 02 [No] [GOTO FR0]
- 97 [Don't Know]..... [GOTO FR0]
- 98 [Refused] [GOTO FR0]

B31. Where did you learn about the price discount?

[DO NOT READ. ACCEPT ONE ANSWER]

- 01 [Contractor or equipment supplier]
- 02 [Electricity service provider, <PA>]
- 03 [MASS Save program materials or website]
- 04 [Internet other than electricity provider or MASS Save]
- 05 [Colleagues within organization]
- 06 [Colleagues outside of organization]
- 77 [Other Specify]
- 97 [Don't know]
- 98 [Refused]

B32. If you know, how much were the <TYPE> bulbs discounted?

- 01[RECORD DOLLAR AMOUNT PER BULB] ... [GOTO FR0]



97 [Don't know] ..... [GOTO B33]  
98 [Refused] [GOTO FR0]

B33. About what *percent* were they discounted?

DO NOT READ

01[RECORD PERCENT]  
97 [Don't know]  
98 [Refused]

**Net to Gross**

[NOTE TO PROGRAMMER – PLEASE LEAVE THE QUESTION NUMBERS IN THIS SECTION AS IS, DESPITE THE FACT IT IS OUT OF ORDER.]

FR0. What factors motivated your organization to consider installing <TYPE> bulbs?  
PROBE: What other factors did you consider?

[DO NOT READ LIST. PLEASE CHOOSE ALL THAT APPLY. ]

- 01 (Distributor/salesperson recommendation)
- 02 (Installer/Contractor recommendation)
- 03 (Old equipment failed / Replace burnouts)
- 04 (Old equipment working poorly)
- 05 (Old equipment scheduled for replacement)
- 06 (Wanted to reduce maintenance costs)
- 07 (The incentive being offered through the program)
- 08 (The technical assistance offered through the program)
- 09 (Wanted to reduce energy bills)
- 10 (Wanted to save energy)
- 11 (Recommendation of <PA> staff)
- 12 (Recommendation of internal staff)
- 13 (Past experience with the program)
- 14 (Pro-environmental corporate policies)
- 15 (Low price)
- 16 (Stock up / Have a bunch of bulbs on hand)
- 77 (Other Specify)
- 97 (Don't Know)
- 98 (Refused)

FR4. Who was MOST responsible for recommending or specifying the purchase(s) that included the <TYPE> bulbs we are talking about?

[DO NOT READ LIST, RECORD ONLY ONE]

- 01 Respondent
- 02 Someone else in organization ..... [SPECIFY NAME: \_\_\_\_]
- 03 Distributor, equipment supplier, salesperson
- 04 Installer/Contractor



- 05 Third-party design professional
- 06 Third-party engineer
- 07 Manufacturer's representative
- 08 <PA> account manager
- 09 Someone else [Specify ]
- 97 [don't know]
- 98 [refused]

C1. [IF FR4= DISTRIBUTOR, CONTRACTOR, THIRD-PARTY DESIGN PROFESSIONAL, THIRD-PARTY ENGINEER, MANUFACTURER'S REPRESENTATIVE, OR <PA> ACCOUNT MANAGER (IF FR4=03, 04, 05, 06, 07, OR 08)]

On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the <<FR4 response>> have on your organization's decision to install the <TYPE> bulbs? [PROGRAMMING NOTE: PLEASE LIST OUT THE 0-10 SCALE INSTEAD OF HAVING A NUMERIC TEXT BOX]

\_\_\_\_\_ (ENTER INFLUENCE RANKING)  
 97 (Don't Know)  
 98 (Refused)

[IF NOT AWARE OF PA DISCOUNTS (IF B30 ≠ 01) GOTO FR41  
 ELSE IF (B32 < AVG\_INCENTIVE\_LOW OR B32 > AVG\_INCENTIVE\_HIGH) GO TO FR41  
 ELSE IF (B33 < AVG\_INC\_PERC\_LOW OR B33 > AVG\_INC\_PERC\_HIGH) GO TO FR41]

FR1. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your organization would have installed the same quantity and efficiency of <TYPE> bulbs at that same time if <PA> and Mass Save had not provided a discount?

\_\_\_ (0 TO 10) ..... [IF 10, GOTO C4a]  
 97 (Don't Know)  
 98 (Refused)

[FR3A, FR3B DELETED BECAUSE THEY DO NOT MAKE SENSE FOR BUYDOWN PROGRAM.]

FR5. If <PA> and Mass Save had not discounted the <TYPE> bulbs, would your organization have installed any type of lighting at all?

[IF NECESSARY: By any lighting, I mean <TYPE> or any other kind of bulbs.]

01 Yes  
 02 No [GOTO C3]  
 97 [Don't Know]  
 98 (Refused) ..... [GOTO C3]

FR8. You said your organization would have installed some lighting equipment on its own if the discounts had not been available. What kind of lighting would this have been?

[ALLOW MULTIPLE RESPONSES]



- 01 [Incandescent]
- 02 [Halogens]
- 03 [Metal halides, HID, High-intensity discharge]
- 04 [T12s]
- 05 [T8s]
- 06 [T5s]
- 07 [CFLs]
- 08 [LEDs]
- 77 [Other]
- 97 [Don't Know]
- 98 [Refused]

FR6a. Would you have installed the lighting earlier than you did, at a later date, or never?

[IF NECESSARY: Without the discounts from <PA> and Mass Save]

- 01 Earlier
- 02 Same time ..... [GOTO FR7a]
- 03 Later
- 04 Never [GOTO FR7a]
- 97 [DON'T KNOW] ..... [GOTO FR7a]
- 98 [REFUSED] ..... [GOTO FR7a]

FR6b. How many months [if FR6a=1 earlier/ if FR6a=3 later] would you have installed the lighting?

- 01 RECORD NUMBER OF MONTHS\_\_ MONTHS
- 97 (Don't Know)
- 98 (Refused)

FR6B\_OSRecord number of months

[IF RESPONDENT GIVES ANSWER IN NUMBER OF YEARS, CONVERT TO MONTHS AND ASK RESPONDENT TO VERIFY]

FR7a. Without the discounts from <PA> and Mass Save, would your organization have installed less, more, or the exact same quantity of <TYPE> bulbs?

- 00 None [GOTO C3]
- 01 Less [GOTO FR7b]
- 02 More [GOTO FR7c]
- 03 Same amount ..... [GOTO C3]
- 97 (Don't Know) ..... [GOTO C3]
- 98 (Refused ) ..... [GOTO C3]

FR7b. You installed <<B5>> discounted <TYPE> bulbs during the timeframe between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>. What percent of



the <<B5>> do you think your organization would have installed without these discounts during that timeframe?

\_\_\_\_\_ (ENTER PERCENTAGE: 0-100%) [GOTO C3]

97 (Don't Know) ..... [GOTO FR7b1]

98 (Refused) ..... [GOTO C3]

IF FR7B=97 ASK Fr7b1. Would you have installed about

READ LIST

01. One- fourth (25%) [GOTO C3]

02. One-half (50%), [GOTO C3]

03 Three fourths (75%) of what you installed? ..... [GOTO C3]

97 [Don't know] [GOTO C3]

98 [Refused] [GOTO C3]

FR7c. You installed <<B5>> discounted <TYPE> bulbs during the timeframe between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>. What percent *more* than <<B5>> do you think your organization would have installed without these discounts during that timeframe?

\_\_\_\_\_ (ENTER any number over 100) [GOTO C3]

97 (Don't Know) ..... [GOTO FR7c1]

98 (Refused) ..... [GOTO C3]

IF FR7C=97 ASK FR7C1. For example, would you have installed about

READ LIST

01. One- fourth more (125%)

02. One-half more (150%),

03. Twice as much (200%) of what you installed?

97 (Don't know)

98 (Refused)

C3. On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the <PA> and Mass Save discounts have on your decision to install <TYPE> bulbs? [PROGRAMMING NOTE: PLEASE INCLUDE THE FULL 0-10 SCALE NOT JUST NUMERICAL OPEN END]

\_\_\_\_\_ (ENTER INFLUENCE RANKING)

97 (Don't Know)

98 (Refused)

**100% FREE RIDERSHIP CONSISTENCY CHECK**



[IF WOULD HAVE PURCHASED AT THE SAME TIME, IN THE SAME QUANTITY & TYPE;  
 IF FR1=10 OR (FR6A = 2 AND FR7A=3) ASK C4A-C4B,  
 ELSE GOTO C9]

C4a. Now I want to focus on what it would have cost your organization to install the <TYPE> bulbs on its own without the discounts. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your organization would have paid the additional <TOTAL\_INCENTIVE> on top of the amount you already paid, to purchase the same quantity and efficiency of lighting equipment at that same time?  
 [PROGRAMMING NOTE: PLEASE INCLUDE FULL 0-10 SCALE NOT JUST NUMERICAL OPEN END]

- \_\_\_ (0 TO 10)
- 97 (Don't Know)
- 98 (Refused)

C4b. [ASK IF C4a < 8] You said that you would have installed the same quantity and efficiency of <TYPE> bulbs at that same time, but you also just said that there was a <<FILL WITH C4a SCORE>> in 10 likelihood of you paying the additional incentive provided by the <PA> program. Which of these is more accurate?

- 01 Installed same quantity & efficiency at same time .....[GOTO C9]
- 02 Likelihood of installing this without the program assistance was <<C4a SCORE>> out of 10
- 03 Something else Specify
- 97 (Don't Know)
- 98 (Refused)

**FREERIDERSHIP IF UNAWARE OF BUYDOWNS**

[ASK FR41 TO C4B IF NOT AWARE OF BUYDOWN OR IF INCENTIVE ESTIMATE OUT OF RANGE.  
 IF B30= 01  
 AND

((B32 > AVG\_INCENTIVE\_LOW AND B32 < AVG\_INCENTIVE\_HIGH) OR ((B33 > AVG\_INC\_PERC\_LOW AND B33 < AVG\_INC\_PERC\_HIGH)) GO TO C9]

FR41. According to our information, you received a discount on the <TYPE> bulbs from <PA> and Mass Save of about <TOTAL\_INCENTIVE>. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your organization would have installed the same quantity and efficiency of <TYPE> bulbs at the same time if they had cost <TOTAL\_INCENTIVE> more?

[PROGRAMMER NOTE: PLEASE INCLUDE FULL 0-10 SCALE NOT JUST NUMERICAL OPEN END]



\_\_\_ (0 TO 10) ..... [IF 10, GOTO C44a]

97 (Don't Know)

98 (Refused)

FR45. If the <TYPE> bulbs had cost <TOTAL\_INCENTIVE> more, would your organization have installed any lighting at all?

[IF NECESSARY: By any lighting, I mean <TYPE> or any other kind of bulbs.]

01 Yes

02 No [GOTO C43]

97 (Don't Know)

98 (Refused) [GOTO C43]

FR48. You said your organization would have installed some lighting equipment if the <TYPE> bulbs had cost <TOTAL\_INCENTIVE> more. What kind of lighting would this have been?

[ALLOW MULTIPLE RESPONSES]

01 [Incandescent]

02 [Halogens]

03 [Metal halides, HID, High-intensity discharge]

04 [T12s]

05 [T8s]

06 [T5s]

07 [CFLs]

08 [LEDs]

77 [Other]

97 [Don't know]

98 [Refused]

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

[IF NECESSARY: Without the discounts from <PA> and Mass Save]

01 Earlier

02 Same time ..... [GOTO FR47a]

03 Later

04 Never [GOTO FR47a]

97 (DK) [GOTO FR47a]

98 (REFUSED) ..... [GOTO FR47a]

FR46b. How many months [if fr46a=1 earlier/ if fr46a=3 later] would you have installed the lighting?

01 RECORD NUMBER OF MONTHS\_\_\_ MONTHS

97 (Don't Know)

98 (Refused)



FR47a. If the <TYPE> bulbs had cost <TOTAL\_INCENTIVE> more, would your organization have installed less, more, or the exact same quantity of <<types>>?

- 01 Less [GOTO FR47b]
- 02 More [GOTO FR47c]
- 03 Same amount ..... [GOTO C43]
- 97 (Don't Know) ..... [GOTO C43]
- 98 (Refused) [GOTO C43]

FR47b. Compared to the number of <TYPE> bulbs that you purchased, what percent do you think your organization would have installed if they had cost <TOTAL\_INCENTIVE> more?

\_\_\_\_\_ (ENTER PERCENTAGE: 0-100%) [GOTO C43]

- 97 (Don't Know) ..... [GOTO FR47b1]
- 98 (REFUSED) ..... [GOTO C43]

If FR47b=97 ask FR47b1. Would you have installed about

READ LIST

- 01. One- fourth (25%) ..... [GOTO C43]
- 02. One-half (50%)..... [GOTO C43]
- 03. Three fourths (75%) of what you installed? ..... [GOTO C43]
- 97 [Don't know] ..... [GOTO C43]
- 98 [Refused] [GOTO C43]

FR47c. Compared to the number of <TYPE> bulbs that you installed, what percent *more* do you think your organization would have installed if they had cost <TOTAL\_INCENTIVE> more?

01 RECORD PERCENTAGE(ONLY ACCEPT number over 100) [GOTO FR48]

- 97 (Don't Know) ..... [GOTO FR47c1]
- 98 (REFUSED) ..... [GOTO C43]

IF FR47C=97 ASKFr47C1 For example, would you have installed about

READ LIST

- 01. One- fourth more (125%)
- 02. One-half more (150%)
- 03. Twice as much (200%) of what you installed?
- 97 (Don't know)
- 98 (Refused)



C43. On a scale of 0 to 10, with 0 being no influence and 10 being a great deal of influence, how much influence did the price have on your decision to install <TYPE> bulbs? [Programming note: please include full 0-10 scale instead of just numerical open end.]

REPEAT SCALE AS NEEDED

\_\_\_\_ (ENTER INFLUENCE RANKING)  
97 (DK)  
98 (REFUSED)

**Unaware 100% FREE RIDERSHIP CONSISTENCY CHECK**

[IF WOULD HAVE PURCHASED AT THE SAME TIME, IN THE SAME QUANTITY, AND OF THE SAME EFFICIENCY LEVEL; IF FR41=10 OR (FR46A=2 AND FR47A=2 OR 3 AND FR48A=100%), ASK C44A-C47C, ELSE GOTO C9]

C44a. Now I want to focus on what it would have cost your organization to install this equipment if it had been more expensive. On a scale of 0 to 10, with 0 being not at all likely and 10 being very likely, how likely is it that your organization would have paid the additional <TOTAL\_INCENTIVE> on top of the amount you already paid, to purchase the same quantity and efficiency of <TYPE> bulbs at that same time? [Programmer note: please include full 0-10 scale not just numerical open end]

REPEAT SCALE AS NEEDED

\_\_\_\_ (0 TO 10)  
97 (DK)  
98 (REFUSED)

C44b. [ASK IF C44a < 8] You said that you would have installed the same quantity and efficiency of equipment at that same time, but you also just said that there was a <<FILL WITH C4a SCORE>> in 10 likelihood you would have paid more for the lighting equipment. Which of these is more accurate?

READ LIST

- 01 Installed same quantity & efficiency at same time .....[GOTO C9]
- 02 Likelihood of paying greater cost <<C44a SCORE>> out of 10
- 03 Something else Specify
- 97 (Don't Know)
- 98 (Refused)

**ADDITIONAL CONSISTENCY CHECK**



C9. In your own words, please describe what impact, if any, the price had on the quantity, timing, and efficiency level of the <TYPE> bulbs you decided to install.

DO NOT READ

- 01[RECORD VERBATIM RESPONSE]
- 97 [Don't Know]
- 98 [Refused]

C10. The <TYPE> bulbs you purchased were discounted by < TOTAL\_INCENTIVE >. If the discount had been half as much, would you have purchased any <TYPE> bulbs?

DO NOT READ

- 01 [Yes] [GOTO C11]
- 02 [No] [GOTO SAT0]
- 97 [Don't Know]..... [GOTO C11]
- 98 [Refused] [GOTO SAT0]

C11. If the discount had been half as much, how would that have affected the timing, amount, and efficiency level of the bulbs you decided to purchase?

DO NOT READ

- 01[RECORD VERBATIM RESPONSE]
- 97 [don't know]
- 98 [Refused]

C11\_os text open end. Directional: PROBE AND CLARIFY FULLY – Try to get comment about (1) timing, (2) amount, and (3) efficiency

**Satisfaction with Project/Program**

SAT0. Next, I have some questions about your experiences with the <TYPE> bulbs we've been discussing.

E1. While implementing these lighting purchases, did you encounter any barriers or challenges?

DO NOT READ

- 01 [Yes] [GOTO E2]
- 02 [No] [GOTO E3]
- 97 (Don't Know) ..... [GOTO E3]
- 98 (Refused) [GOTO E3]



E2. What challenges did you face and how did you overcome them?

DO NOT READ

- 01 [RECORD VERBATIM]
- 97 [Don't know]
- 98 [Refused]

[IF <TYPE> = "LED" GOTO SAT1]  
 [IF B30 ≠ 01 THEN GOTO SAT1]

E3. For the purchases involving the bulbs we've been discussing today, did you also receive a rebate check from <PA> or Mass Save?

DO NOT READ

- 01 [Yes] [GOTO SAT1]
- 02 [No] [GOTO E4]
- 97 (Don't Know) ..... [GOTO SAT1]
- 98 (Refused) [GOTO SAT1]

E4. Were you aware that <PA> and Mass Save had a program that would pay rebates directly to you for other types of efficient lighting projects?

DO NOT READ

- 01 [Yes] [GOTO E5]
- 02 [No] [GOTO SAT1]
- 97 (Don't Know) ..... [GOTO SAT1]
- 98 (Refused) [GOTO SAT1]

E5. Why didn't you also participate in the direct rebate program?

[DO NOT READ. ALLOW MULTIPLE RESPONSES]

- 01 [Upstream program met all lighting needs]
- 02 [Didn't think you could participate in both programs]
- 03 [Too much hassle to participate in both programs]
- 04 [Our lighting contractor/distributor recommendation]
- 05 [The direct rebate program is no longer available]
- 06 [Not aware of other programs]
- 77[Other Specify
- 97 (Don't Know)
- 98 (Refused)

SAT1. On a five point scale where five means very satisfied and one means very dissatisfied, how satisfied or dissatisfied were you with the <TYPE> bulbs you purchased?

REPEAT SCALE AS NEEDED



- 01 Very dissatisfied ..... [GOTO SAT2]
- 02 [GOTO SAT2]
- 03 [GOTO SAT2]
- 04 [GOTO SAT3]
- 05 Very satisfied ..... [GOTO SAT3]
- 97 (Don't know) ..... [GOTO SAT3]
- 98 (Refused) [GOTO SAT3]

SAT2. Why do you say that?

DO NOT READ

- 01 [RECORD VERBATIM]
- 97 [Don't know]
- 98 [Refused]

SAT2\_os RECORD RESPONSE DIRECTIONAL: PROBE AND CLARIFY FULLY

[IF <TYPE> = "LINEAR FLUORESCENT" GOTO SAT6]

SAT3. Do you have any of the <TYPE> bulbs on dimmer switches?

DO NOT READ

- 01 [Yes] [GOTO SAT4]
- 02 [No] [GOTO SAT6]
- 97 (Don't Know) ..... [GOTO SAT6]
- 98 (Refused ) ..... [GOTO SAT6]

SAT4. On a five point scale where five means very satisfied and one means very dissatisfied, how satisfied or dissatisfied were you with how the <TYPE> bulbs perform in the dimmers?

REPEAT SCALE AS NEEDED

- 01 Very dissatisfied ..... [GOTO SAT5]
- 02 [GOTO SAT5]
- 03 [GOTO SAT5]
- 04 [GOTO SAT6]
- 05 Very satisfied ..... [GOTO SAT6]
- 97 (Don't know) ..... [GOTO SAT6]
- 98 (Refused) [GOTO SAT6]

SAT5. Why do you say that?

DO NOT READ

- 01 [RECORD VERBATIM]
- 97 [Don't know]



98 [Refused]

SAT5\_os RECORD RESPONSE directional PROBE AND CLARIFY FULLY

SAT6. On the same five point scale, how satisfied were you with the contractor or equipment supplier from whom you purchased the <TYPE> bulbs?

REPEAT SCALE AS NEEDED

- 01 Very dissatisfied ..... [GOTO SAT7]
02 [GOTO SAT7]
03 [GOTO SAT7]
04 [GOTO NEXT SECTION]
05 Very satisfied ..... [GOTO NEXT SECTION]
97 (Don't know) ..... [GOTO NEXT SECTION]
98 (Refused) [GOTO NEXT SECTION]

SAT7. Why do you say that?

DO NOT READ

- 01 [RECORD VERBATIM]
97 [Don't know]
98 [Refused]

SAT7\_os RECORD RESPONSE directional PROBE AND CLARIFY FULLY

Like spillover

S1. Now I'd like you to think of the time since <LAST\_PURCHASE\_DATE\_BOTH>...

Has your organization purchased any <TYPE> bulbs for this or other facilities in Massachusetts?

DO NOT READ

- 01 Yes
02 No [GOTO UNLIKE SPILLOVER SECTION]
97 [Don't Know] ..... [GOTO UNLIKE SPILLOVER SECTION]
98 [Refused] [GOTO UNLIKE SPILLOVER SECTION]

S1b. Did you make these purchases on your own, that is without a discount or rebate from <PA> or Mass Save?

DO NOT READ

- 01 Yes /did it on own..... [GOTO S2]
02 No /got discount or rebate..... [GOTO UNLIKE SPILLOVER SECTION]
97 [Don't Know] ..... [GOTO S1c]



98 [Refused] [GOTO UNLIKE SPILLOVER SECTION]

**S1c. About how much did you pay per bulb?**

- 01 [RECORD VERBATIM EXACT NUMBER]
- 97 [DON'T KNOW] [GOTO S1D]
- 98 [REFUSED] [GOTO S2]

[PROBE: BRACKET TO GET RANGE]

- S1d. [RECORD VERBATIM LOWEST NUMBER IN RANGE] [GOTO S2]
- S1e. [RECORD VERBATIM HIGHEST NUMBER IN RANGE] [GOTO S2]
- 97 [Don't know] ..... [GOTO S2]
- 98 [Refused] ..... [GOTO UNLIKE SPILLOVER SECTION]

[IF S1C =01

IF <TYPE> = "LED" AND S1C VERBATIM<\$40 GOTO UNLIKE SPILLOVER SECTION  
 ELSE IF <TYPE> = "LINEAR FLUORESCENT AND S1C VERBATIM<\$5 GOTO UNLIKE  
 SPILLOVER SECTION

IF S1C=97

IF <TYPE> = "LED" AND S1D<\$40 GOTO UNLIKE SPILLOVER SECTION  
 ELSE IF <TYPE> = "LINEAR FLUORESCENT" AND S1D<\$5 GOTO UNLIKE SPILLOVER  
 SECTION]]

**S2. How many times have you purchased <TYPE> bulbs since  
 <LAST\_PURCHASE\_DATE\_BOTH>? Your best guess is fine.**

**DO NOT READ**

- 01 One purchase
- 02 Two purchases
- 03 Three or more purchases
- 97 [Don't know] ..... [GOTO U1]
- 98 [Refused] [GOTO U1]

**S3a. Let's focus on<<if S2 =1 your >>> if S2=2 or3 the first> purchase... What was the  
 approximate date of this purchase?**

[TRY TO GET YEAR AND MONTH AT LEAST.]

S3a\_01 In what year was the first purchase? [RECORD YEAR] 97 Don't Know 98 Refused

S3a\_02 What month? [RECORD MONTH]

- 01. January
- 02. February
- 03. March
- 04. April
- 05. May
- 06. June



- 07. July
- 08. August
- 09. September
- 10. October
- 11. November
- 12. December

S3a\_03 What day? [RECORD DAY]

- 01. RECORD NUMBER PROGRAMMER NOTE: ONLY ALLOW 1-31
- 97 Don't Know
- 98 Refused

S3b. What is the name and address of where you made<<if S2 =1 your >>< if S2=2 or3 the first>purchase?

[PROBE: TRY TO GET NAME AND ADDRESS OF THE SELLER]

- 01 [RECORD VERBATIM] – bring up open ends for S3b\_01- S3b\_03
- 97 [Don't know]
- 98 [Refused]

- S3b\_01. [RECORD NAME OF SELLER]
- S3b\_02. [RECORD ADDRESS OF SELLER]
- S3b\_03. [RECORD CITY OF SELLER]

S3c. About how many <TYPE> bulbs did you purchase at that time?

[PROBE: BRACKET TO GET RANGE]

- 01 [RECORD VERBATIM]..... [GOTO S4a]
- 97 [Don't know] ..... [GOTO S3d]
- 98 [Refused] [GOTO S4a]

S3d. How did the quantity compare to the total quantity you purchased between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>?

[PROBE: TRY TO GET A %. OVER 100% IS OK IF THEY PURCHASED MORE]

- 01 [RECORD VERBATIM]
- 97 [Don't know]
- 98 [Refused]

[IF S2 = 02 OR 03 ASK S4 SECTION, IF S2=1 GOTO S6]

S4a. Now let's focus on the second purchase...

[IF S3A = DON'T KNOW, GOTO S4B]

- S4a\_01 In what year was the second purchase? [RECORD YEAR]
- 97 Don't Know
- 98 Refused

S4a\_02 What month? [RECORD MONTH]

- 01. January
- 02. February



- 03. March
- 04. April
- 05. May
- 06. June
- 07. July
- 08. August
- 09. September
- 10. October
- 11. November
- 12. December

S4a\_03 What day? [RECORD DAY]  
02. RECORD NUMBER PROGRAMMER NOTE: ONLY ALLOW 1-31  
97 Don't Know  
98 Refused

[IF S3B = 97 OR 98, GOTO S4C]

S4b. What is name and address of where you made the second purchase?

[PROBE: TRY TO GET NAME AND ADDRESS OF THE SELLER]  
01 [RECORD VERBATIM] this should bring up open ends for S4b\_01 - S4b\_03  
97 [Don't know]  
98 [Refused]

S4b\_01. [RECORD NAME OF SELLER]  
S4b\_02. [RECORD ADDRESS OF SELLER]  
S4b\_03. [RECORD CITY OF SELLER]

[IF S3C = DON'T KNOW, GOTO S4D]

S4c. About how many <TYPE> bulbs did you purchase at that time?

[PROBE: BRACKET TO GET RANGE]  
01 [RECORD VERBATIM]..... [GOTO S5a]  
97 [Don't know] ..... [GOTO S4d]  
98 [Refused] [GOTO S5a]

[IF S3D = DON'T KNOW, GOTO S5A]

S4d. How did the quantity compare to the total quantity you purchased between  
<PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>?

[PROBE: TRY TO GET A %. OVER 100% IS OK IF THEY PURCHASED MORE]  
01 [RECORD VERBATIM]  
97 [Don't know]  
98 [Refused]

[ASK S5 SECTION IF S2 = 03, IF S2 = 1,2, 97 OR 98 GOTO S6]

S5a. Now let's focus on the third purchase...?

[IF S3a = Don't know, GOTO S5b]



S5a\_01 In what year was the third purchase? [RECORD YEAR] 97 Don't Know 98 Refused

S5a\_02 What month? [RECORD MONTH]

- 01. January
- 02. February
- 03. March
- 04. April
- 05. May
- 06. June
- 07. July
- 08. August
- 09. September
- 10. October
- 11. November
- 12. December

S5a\_03 What day? [RECORD DAY]

- 03. RECORD NUMBER PROGRAMMER NOTE: ONLY ALLOW 1-31
- 97 Don't Know
- 98 Refused

[IF S3B = 97 OR 98, GOTO S5C]

S5b. What is the name and address where you made the third purchase?

[PROBE: TRY TO GET NAME AND ADDRESS OF THE SELLER]

- 01 [RECORD VERBATIM] this should bring up the open ends for S5b\_01 – S5b\_03
- 97 [Don't know]
- 98 [Refused]

S5b\_01. [RECORD NAME OF SELLER]

S5b\_02. [RECORD ADDRESS OF SELLER]

S5b\_03. [RECORD CITY OF SELLER]

[IF S3C = DON'T KNOW, GOTO S5D]

S5c. About how many <TYPE> bulbs did you purchase at that time?

[PROBE: BRACKET TO GET RANGE]

- 01 [RECORD VERBATIM]..... [GOTO S6]
- 97 [Don't know] ..... [GOTO S5d]
- 98 [Refused] [GOTO S6]

[IF S3C = 97 OR 98, GOTO S6]

S5d. How did the quantity compare to the total quantity you purchased between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST>?

[PROBE: TRY TO GET A %. OVER 100% IS OK IF THEY PURCHASED MORE]

- 01 [RECORD VERBATIM]
- 97 [Don't know]
- 98 [Refused]



S6. Did your experience with the <TYPE> bulbs you purchased between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST> influence your decision to make these later purchases?

- 01 Yes
- 02 No [GOTO S7]
- 97 [Don't Know] ..... [GOTO S7]
- 98 [Refused] ..... [GOTO S7]

S6a. On a scale of 0 to 10, where 0 is —no influence at all and 10 is —a great deal of influence, how much influence did your experience with the <TYPE> bulbs you purchased between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST> have on your later purchase decisions?

[PROGRAMING NOTE: PLEASE INCLUDE FULL 0-10 SCALE NOT JUST NUMERIC OPEN END.]

- \_\_ 0-10 rating .....
- 97 [Don't Know].....

S7. Did a recommendation by the contractor or equipment supplier you purchased the <TYPE> bulbs you purchased between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST> influence your decision to make these later purchases?

- 01 Yes
- 02 No [GOTO UNLIKE SPILLOVER SECTION]
- 97 [Don't Know] ..... [GOTO UNLIKE SPILLOVER SECTION]
- 98 [Refused] [GOTO UNLIKE SPILLOVER SECTION]

S7a. On a scale of 0 to 10, where 0 is —no influence at all and 10 is —a great deal of influence, how much influence did the contractor or equipment supplier you purchased the <TYPE> bulbs you purchased between <PURCHASE\_DATE\_FIRST> and <PURCHASE\_DATE\_LAST> have on your later purchase decisions? [Programming note: please include full 0-10 scale not just numeric open end.]

- \_\_ 0-10 rating ..... [GOTO UNLIKE SPILLOVER SECTION]
- 97 [DON'T KNOW]..... [GOTO UNLIKE SPILLOVER SECTION]

**“Unlike” spillover**



U1. Since <LAST\_PURCHASE\_DATE\_BOTH>, has your organization purchased, installed, or implemented any other type of energy efficiency equipment **on your own**, that is without a rebate from <PA> or Mass Save?

- 01 Yes
- 02 No [GOTO NEXT SECTION]
- 97 [Don't Know] ..... [GOTO NEXT SECTION]
- 98 [Refused] [GOTO NEXT SECTION]

U2. How many projects involving non-rebated energy efficient equipment has your organization done since <LAST\_PURCHASE\_DATE\_BOTH>? Your best guess is fine.

- 01 One project
- 02 Two projects
- 03 Three or more projects
- 97 [Don't know] ..... [GOTO NEXT SECTION]
- 98 [Refused] [GOTO NEXT SECTION]

U3a. Let's focus on the first project... What did you install?

U3a\_01. Record type: \_\_\_\_\_  
 U3a\_02. Record quantity: \_\_\_\_\_  
 U3a\_03. Record size or capacity: \_\_\_\_\_

U3b. Would this project have qualified for an incentive through <PA> or Mass Save?

- 01 Yes
- 02 Yes, implemented through a program ..... [GOTO U4a]
- 03 No [GOTO U3d]
- 97 [Don't Know] ..... [GOTO U4a]
- 98 [Refused] [GOTO U4a]

U3c. Why didn't you implement this project through a <PA> or Mass Save program?

DO NOT READ - SELECT ALL THAT APPLY

- 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 <PA>'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



97 [Don't Know]

U3d. [IF U3c = 04 EQUIPMENT WOULD NOT QUALIFY] Why wouldn't the project qualify?

01 (RECORD VERBATIM RESPONSE)

97 [Don't Know]

98 [Refused]

[IF U2 = 01, 97, 98, GOTO U6]

U4a. Let's focus on the second project... What did you install?

U4a\_01. Record type: \_\_\_\_\_

U4a\_02. Record quantity: \_\_\_\_\_

U4a\_03. Record size or capacity: \_\_\_\_\_

U4b. Would this project have qualified for an incentive through <PA> or Mass Save?

01 Yes

02 Yes, implemented through a program ..... [GOTO U5a]

03 No [GOTO U4d]

97 [Don't Know] ..... [GOTO U5a]

98 [Refused] [GOTO U5a]

U4c. Why didn't you implement this project through a <PA> or Mass Save program?

DO NOT READ - SELECT ALL THAT APPLY

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 <PA>'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

97 [Don't Know]

98 [Refused]

U4d. [IF U4c = 04 EQUIPMENT WOULD NOT QUALIFY] Why wouldn't the project qualify?

(RECORD VERBATIM RESPONSE)

97 [Don't Know]

98 [Refused]

[IF U2 ≠ 03, GOTO U6]

U5a. Let's focus on the third project... What did you install?



U5a\_01. Record type: \_\_\_\_\_  
U5a\_02. Record quantity: \_\_\_\_\_  
U5a\_03. Record size or capacity: \_\_\_\_\_

U5b. Would this project have qualified for an incentive through <PA> or Mass Save?

- 01 Yes
- 02 Yes, implemented through a program ..... [GOTO U6]
- 03 No [GOTO U5d]
- 97 [Don't Know] ..... [GOTO U6]
- 98 [Refused] [GOTO U6]

U5c. Why didn't you implement this project through a <PA> or Mass Save program?

- DO NOT READ - SELECT ALL THAT APPLY
- 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 <PA>'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
  - 97 [Don't Know]
  - 98 [Refused]

U5d. [IF U5c = 04 EQUIPMENT WOULD NOT QUALIFY] Why wouldn't the project qualify?

- (RECORD VERBATIM RESPONSE)
- 97 [Don't Know]
  - 98 [Refused]

U6. Did your experience with the <TYPE> bulbs we discussed earlier influence your decision to implement some or this equipment on your own?

- 01 Yes
- 02 No
- 97 [Don't Know]
- 98 [Refused]

U7. Did a recommendation by the contractor or equipment supplier you purchased the <TYPE> bulbs from influence your decision to implement some or this equipment on your own?

- 01 Yes



- 02 No
- 97 [Don't Know]
- 98 [Refused]

U8. Did your participation in any other program offered by <PA> influence your decision to implement some or all of this equipment on your own?

- 01 Yes
- 02 No
- 97 [Don't Know]
- 98 [Refused]

[IF U6 = 1 <<INFLUENCE>> = “experience with <TYPE> bulbs”  
 ELSE IF U7 = 1 <<INFLUENCE>> = “experience with the contractor or supplier you purchased the <TYPE> bulbs from”  
 ELSE IF U8 = 1 <<INFLUENCE>> = “experiences with other <PA> or mass save programs”  
 ELSE GOTO NEXT SECTION]

U9. On a scale of 0 to 10, where 0 is —no influence at all and 10 is —a great deal of influence, how much influence did <<INFLUENCE>> have on your decision to install this equipment without an incentive? [Programmer note: please include full 0-10 scale not just the numerical open end.]

- \_\_ 0-10 rating
- 97 [Don't Know]
- 98 [Refused]

## Firmographics

I just have a few more questions about the facility where your organization made the energy efficiency improvements we discussed earlier. Just to remind you, all of your responses will remain confidential.

**F9. At this location, does your organization [READ UNBRACKETED LIST]**

|           |  |     |
|-----------|--|-----|
| <b>01</b> | Own all of the space it occupies?                    | F11 |
| <b>02</b> | Lease all of the space it occupies?                  | F10 |
| <b>03</b> | Or own some and lease some of the space it occupies? | F10 |
| <b>97</b> | <b>[Don't know]</b>                                  | F11 |
| <b>98</b> | <b>[Refused]</b>                                     | F11 |



F10. Are any of your energy costs included in your normal lease payment?

|           |              |     |
|-----------|--------------|-----|
| <b>01</b> | [Yes]        | F11 |
| <b>02</b> | [No]         | F11 |
| 97        | [Don't know] | F11 |
| 98        | [Refused]    | F11 |

F11. What is the total enclosed square footage of the space your organization occupies at this location? Your best estimate is fine.

|           |                      |     |
|-----------|----------------------|-----|
| <b>01</b> | [RECORD VERBATIM]___ | F12 |
| 97        | [Don't know]         | F12 |
| 98        | [Refused]            | F12 |

F12. How many full-time employees work for your organization at this location?

|           |                 |               |
|-----------|-----------------|---------------|
| <b>01</b> | RECORD VERBATIM | Thank and end |
| 97        | [Don't know]    |               |
| 98        | [Refused]       |               |

Thank you very much for your time and participation in this important study. Have a great day!





## Introduction

[NOTE: THE QUESTIONS IN THIS INTERVIEW GUIDE WILL NOT NECESSARILY BE READ VERBATIM BUT MAY BE MODIFIED TO SUIT THE INTERVIEW. IN ADDITION, THE INTERVIEWERS MAY SKIP QUESTIONS THAT ARE LESS RELEVANT TO A PARTICULAR INTERVIEW]

I1. Hi, my name is \_\_\_\_\_ calling from DNV KEMA on behalf of <SPONSORING PAS AND MASS SAVE> regarding the Massachusetts Upstream Lighting initiative, also known as Bright Opportunities. Bright Opportunities provides buydowns for LEDs and reduced wattage linear fluorescent, lamps.

According to our records, your company has been selling lighting products as part of Bright Opportunities . [IF NECESSARY, NAME SOME RECENT PROJECTS THAT USED THE PROGRAM DISCOUNTS]. We would like to ask you some questions about your participation and about trends in the lighting market in general. Who would be most familiar with your participation?

[IF RESPONDENT IS NOT PROGRAM-FAMILIAR CONTACT, GET IN TOUCH WITH PROGRAM-FAMILIAR CONTACT AND REPEAT I1 EXCEPT LAST SENTENCE.]

[IF NECESSARY] The objective of this interview is to help estimate market penetration, gauge the level of Bright Opportunities' influence on the market penetration of energy efficient technologies, as well as collect other information about the programs offered by the Massachusetts Energy Efficiency Program Administrators.

[IF ASKED] We anticipate this interview will last about 30 minutes. Any information you provide will be treated as confidential.

[IF ASKED] DNV KEMA is an independent contractor hired to do this research. You can verify the legitimacy of this research by calling Wendy Todd of National Grid at 781-907-2232.

## About the Firm

F1. Let's start by getting a little information about your company. Can I confirm your main location? My records show your office is located at [Address].

F2. Approximately how many employees does your business have?  
[If necessary: We use this information to compare your responses to other companies.]

F2A. What would you estimate are your company's annual sales?



[If necessary: We use this information to compare your responses to other companies.]

- F2B. What percentage of your sales are lighting?
- F3. Bright Opportunities listed your company as a lighting distributor. Is this a reasonable characterization of your business?
- F3A. [IF NO] How would you describe or characterize your business?
- F3B. [IF YES] What is your distribution area within Massachusetts?
- F3C. [IF YES] Roughly what percentage of your company's Massachusetts lighting product sales in the past year went to end users and builders vs. other lighting contractors/installers?
- \_\_\_% of total sales going to end users/builders  
    \_\_\_% of total sales going to other lighting contractors/installers
- F3D. [IF YES] Do you sell lighting products outside of Massachusetts?
- F3Di. [IF YES] In which states?
- F4. Does your company also install lighting?
- F4A. [IF YES] Does at least half of your revenue come from installations?
- F5. Is energy-efficient lighting a particular focus of your company's marketing efforts or product offerings?
- F5A. [IF YES] In what ways does your company focus on energy efficient lighting?
- F6. Do you think that your company is generally more effective than your competitors at promoting and selling energy-efficient lighting?
- F6A. [IF YES] Why do you say that?
- F7. How did you first hear about Bright Opportunities?
- F8. What motivated you to get involved with Bright Opportunities?



F9. According to our records, your company sold the following quantities of energy-efficient lighting products through Bright Opportunities between <EARLIEST DATE OF DISTRIBUTOR’S PARTICIPATION> AND <LATEST DATE OF DISTRIBUTOR’S PARTICIPATION>? [READ LIST FROM TABLE BELOW]

**Distributor Quantity Table**

|    | TYPE             | Quantity from Tracking Data A. | Revisions to quantities? B. |
|----|------------------|--------------------------------|-----------------------------|
| 1  | T5-HO            |                                |                             |
| 2  | T5 Linear        |                                |                             |
| 3  | T8 (low watt)    |                                |                             |
| 4  | T8 Linear        |                                |                             |
| 5  | LED-MR16 (4w-6w) |                                |                             |
| 6  | LED-PAR20        |                                |                             |
| 7  | LED-PAR30        |                                |                             |
| 8  | LED-PAR38        |                                |                             |
| 9  | Decorative Lamps |                                |                             |
| 10 | LED A-Lamps      |                                |                             |
| 11 | Other: Specify   |                                |                             |

F10. Do these sales quantities sound about right to you?

[IF NO, MAKE NOTE OF ANY DISCREPANCIES THE RESPONDENT REPORTS IN THE TABLE ABOVE]

F11. Please provide your best estimate of what % of LED bulbs that you sold in Massachusetts during the past year fit into the following categories:

|   |             |
|---|-------------|
| F11A. First consider the LED bulbs that were discounted by this Massachusetts Bright Opportunities initiative. About what % of the total LED bulbs that you sold in Massachusetts during the past year did these account for? | ___%        |
| F11B. Next consider the LED bulbs that were <b>not</b> discounted by this initiative. About what % of the total bulbs that you sold in Massachusetts during the past year did these account for?                              | ___%        |
| F11C. Total LED bulbs sold in Massachusetts during the past year  | <b>100%</b> |



- F12. [IF PERCENTAGE IN F10B > 0] You indicated that in the past year [% from F10B] of your LED bulb sales in Massachusetts were not through the Bright Opportunities initiative. Why didn't you sell these bulbs through Bright Opportunities?
- F13. Of the flood lights/spotlights that you currently sell in Massachusetts, about what percentage are LEDs?
- F13A. What was this percentage a year ago?
- F13B. What was this percentage two years ago?
- F13C. [IF THE PERCENTAGE CHANGED OVER TIME] What factors do you think are influencing these changes in LED market share for these lighting technologies?
- F14. Do you also sell flood lights/spotlights outside of Massachusetts?
- F14A. [IF YES] In which states?
- F14B. [IF YES] Of the flood lights/spotlights that you currently sell in [STATE X], about what percentage are LEDs? [IF DISTRIBUTOR HAS LONG LIST OF STATES, REPEAT QUESTION F13B FOR ONLY 3 OF THEM]
- F14Bi. [IF THE PERCENTAGES IN F13B ARE DIFFERENT THAN THOSE REPORTED FOR F12 (MASSACHUSETTS)] You indicated that you are selling a [HIGHER/LOWER] percentage of your flood light/spotlights in Massachusetts compared to these other states. What factors do you think might explain these differences?



**Program Influences on Lighting Sales**

[IF DISTRIBUTOR MADE SALES TO MULTIPLE CUSTOMERS, RANDOMLY SORT CUSTOMERS AND ASK DISTRIBUTOR ABOUT CUSTOMERS IN RANDOM ORDER. IF DISTRIBUTOR HAD MORE THAN THREE CUSTOMERS, ONLY ASK THEM ABOUT THE FIRST THREE CUSTOMERS]

[BEFORE THE INTERVIEW, ENTER INTO THE TABLES IN THIS SECTION THE RELEVANT TRACKING DATA SPECIFIC TO THE CUSTOMERS BEING DISCUSSED]

PI0. According to our records you sold some [LED/T8/T5] lighting products that were discounted by the Bright Opportunities initiative to [CUSTOMER] in [DATE]. Do you recall this sale? [IF THEY DO NOT RECALL SALE, SKIP TO THE NEXT CUSTOMER. IF THEY DO NOT RECALL ANY SALES, SKIP TO PI6]

PI1. According to our records you sold the following lighting products to [CUSTOMER] in [DATE]. [READ LIST FROM TABLE BELOW]

**Customer-Specific Quantity Table**

|    | TYPE             | Quantity from Tracking Data A. | Revisions to quantities? B. |
|----|------------------|--------------------------------|-----------------------------|
| 1  | T5-HO            |                                |                             |
| 2  | T5 Linear        |                                |                             |
| 3  | T8 (low watt)    |                                |                             |
| 4  | T8 Linear        |                                |                             |
| 5  | LED-MR16 (4w-6w) |                                |                             |
| 6  | LED-PAR20        |                                |                             |
| 7  | LED-PAR30        |                                |                             |
| 8  | LED-PAR38        |                                |                             |
| 9  | Decorative Lamps |                                |                             |
| 10 | LED A-Lamps      |                                |                             |
| 11 | Other: Specify   |                                |                             |

PI2. Do these sales quantities sound about right to you?

[IF NO, MAKE NOTE OF ANY DISCREPANCIES THE RESPONDENT REPORTS IN THE TABLE ABOVE]



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

PI4. [IF RESPONSE TO PI3 ≠ “NO”] If this discount of [DISCOUNT] percent had not been available, would your sales of these [TYPE] bulbs/lamps to [CUSTOMER] been the same, lower, or higher?

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

PI4B. [IF LOWER] By what percentage do you estimate your sales of these [TYPE] bulbs/lamps to [CUSTOMER] to be lower in the absence of the discount?

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

**Customer-Specific Discount Table**

|    | TYPE             | Retail Price per Bulb/Lamp (\$) A. | Promotional Price per Bulb/Lamp (\$) B | Buydown Amount (\$) C. | Discount (%) D. | Sold Any? (Y/N/D K) PI3 | Sold Any? % Change in Sales in Absence of Discounts (%) PI4 |
|----|------------------|------------------------------------|--|------------------------|-----------------|-------------------------|---|
| 1  | T5-HO            |                                    |  |                        |                 |                         |   |
| 2  | T5 Linear        |                                    |  |                        |                 |                         |   |
| 3  | T8 (low watt)    |                                    |  |                        |                 |                         |   |
| 4  | T8 Linear        |                                    |  |                        |                 |                         |   |
| 5  | LED-MR16 (4w-6w) |                                    |  |                        |                 |                         |   |
| 6  | LED-PAR20        |                                    |  |                        |                 |                         |   |
| 7  | LED-PAR30        |                                    |  |                        |                 |                         |   |
| 8  | LED-PAR38        |                                    |  |                        |                 |                         |   |
| 9  | Decorative Lamps |                                    |  |                        |                 |                         |   |
| 10 | LED A-Lamps      |                                    |  |                        |                 |                         |   |
| 11 | Other: Specify   |                                    |  |                        |                 |                         |   |



[IF DISTRIBUTOR HAD MULTIPLE CUSTOMERS THROUGH INITIATIVE, REPEAT BATTERY FOR THE NEXT RANDOMLY-SELECTED CUSTOMER BUT STOPPING AFTER THE THIRD CUSTOMER]

PI5. In estimating what the impacts of these discounts on your lighting product sales would be, what knowledge or information are these estimates based on?

PI6. Do you reference these buydown price discounts from the Bright Opportunities initiative in any of your marketing materials or standard sales pitches?

PI6A. [IF YES] Can you cite some examples of how do you do this?

PI6B. [IF YES] When you mention these price discounts, do you mention who is sponsoring these discounts (e.g., the Massachusetts Electric Program Administrators, Mass Save )?

PI6Bi. [IF YES] How do you typically do this?

PI7. Has your participation in Bright Opportunities had any impacts on the mix of lighting products that you sell?

PI7A. [IF YES] What impacts has your participation had?

PI8. Has your participation in Bright Opportunities had any impacts on the types of customers you are selling to?

PI8A. [IF YES] What impacts has your participation had?

PI9. Can you make any generalizations about the types of customers who are buying your LED bulbs?

PI9A. [IF YES] What types of customers are these?

PI10. In general, what factors or barriers are preventing your company from selling more LED bulbs?

## Baseline Information

B1. [IF THEY INDICATED PREVIOUSLY (QUESTION F3) THAT THEY INSTALL LIGHTING] Has your company installed any of the LED bulbs that you sold through Bright Opportunities?

B1A. [IF YES] What types of lighting products are these LED bulbs typically replacing? [IF THEY MENTION MULTIPLE LIGHTING PRODUCT TYPES, PROBE TO TRY TO GET THEM TO ROUGHLY ESTIMATE WHAT % EACH OF THESE LIGHTING



PRODUCT TYPES REPRESENT OF THE TOTAL LIGHTING REPLACED BY THE LED BULBS]

B2. [IF THEY INDICATED PREVIOUSLY (QUESTION F3) THAT THEY *DO NOT* INSTALL LIGHTING] Do you have any sense as to what types of lighting products the LED bulbs you are selling through this initiative are replacing?

B2A. [IF YES] What types of lighting products are these LED bulbs typically replacing? [IF THEY MENTION MULTIPLE LIGHTING PRODUCT TYPES, PROBE TO TRY TO GET THEM TO ROUGHLY ESTIMATE WHAT % EACH OF THESE LIGHTING PRODUCT TYPES REPRESENT OF THE TOTAL LIGHTING REPLACED BY THE LED BULBS]



**Program Satisfaction and Quality Control**

S1. [IF THE TRACKING DATA INDICATES THAT THEY SOLD BULBS/LAMPS TO LIGHTING/ELECTRICAL CONTRACTORS] Our records indicate that some of your lighting sales through Bright Opportunities went to lighting or electrical contractors rather than to end use customers. In such cases, do you try to find out from the lighting or electrical contractors where these discounted bulbs were eventually installed?

S1A. [IF YES] How do you do this?

S2. Have you received any complaints from customers or encountered any problems with the performance of any of the LED bulbs you sold through Bright Opportunities?

S3. This initiative requires lighting distributors to report back information on the lighting products they sold through Bright Opportunities. This information includes product types, quantities, prices, and information about the customers who purchased the lighting products. Do you think these reporting requirements are reasonable?

S3A. [IF NO] Why do you say that?

S4. This initiative also has a quality control component involving inspections of a certain percentage of sites where the discounted lighting products were installed. Have any of your customers received an inspection?

S4A. [IF YES] Using a five-point satisfaction scale where five equals very satisfied and one equals very dissatisfied, how satisfied were you with this inspection process?

- 5 = very satisfied
- 4
- 3
- 2
- 1 = very dissatisfied

S4B. [IF SATISFACTION < 4] Why were you less than satisfied with this inspection process?



S5. The initiative pays incentives to lighting distributors and manufacturers to buydown the cost of their lighting products. Using this same five-point satisfaction scale, how satisfied have you been with the initiative's incentive-payment process?

5 = very satisfied

4

3

2

1 = very dissatisfied

S5A. [IF SATISFACTION < 4] Why were you less than satisfied with this incentive-payment process?

S6. Do you think the size of the buydown discounts offered by this program [RE-READ DISCOUNT AMOUNTS FROM TABLE ABOVE, IF NECESSARY] are adequate to encourage consumer demand for these energy-efficient lighting products?

S6A. [IF NO] For which lighting products do you think the discounts are not adequate to encourage consumer demand?

S7. How satisfied have you been with the program's marketing and outreach efforts?

5 = very satisfied

4

3

2

1 = very dissatisfied

S7A. [IF SATISFACTION < 4] Why were you less than satisfied with the program's marketing and outreach efforts?

S8. How satisfied have you been with Bright Opportunities as a whole?

5 = very satisfied

4

3

2

1 = very dissatisfied

S8A. [IF SATISFACTION < 4] Why were you less than satisfied with Bright Opportunities as a whole?



- S9. What recommendations, if any, do you have for improving the way Bright Opportunities is delivered or marketed?
- S10. Do you have any thoughts as to why some lighting distributors are not participating in this initiative?
- S11. Are you aware of any instances of the lighting products that were discounted by this initiative being sold for use outside of Massachusetts?
- S11A. [IF YES] What instances are you aware of?
- S11B. Do you think that the initiative has appropriate safeguards in place to insure that lighting discounted products are not sold outside of Massachusetts?

### Downstream Program Participation

- D1. In addition to Bright Opportunities, which buys down energy-efficient lighting costs at the wholesale level, there is also has a “downstream” program offered by the Program Administrators that pays commercial and industrial customers directly for having energy-efficient lighting installed at their facilities. Have you heard of this downstream lighting program?
- D2. Have you sold lighting products through this downstream program?
- D2A. [IF YES] What do you see as the advantages or disadvantages of Bright Opportunities vs. the downstream lighting program?
- D2B. [IF YES] Do you reference the downstream lighting program or its incentives in your marketing materials or sales pitches?
- D2Bi. [IF YES] Do you promote the incentives available from the downstream lighting program differently than you do for Bright Opportunities?
1. [IF YES] How so?
- D2C. [IF YES] Do you know whether any of your customers who purchased this lighting ALSO received lighting incentives through this downstream program?
- D2Ci. [IF YES] Can you give me any details about those projects?
- [PROBES: HOW DO YOU KNOW? HOW MANY/WHAT PERCENT OF YOUR T5/LWT8 SALES DO BOTH? ...]

### Lighting Controls



- LC1. Finally, I have some questions about lighting controls.
- LC2. Do you sell many lighting controls for installation in retrofit applications?  
[if NO, skip to end]
- LC3. Are you generally aware of the portion of your lighting controls sales which go to retrofit versus new construction applications? [if NO, skip to end]
- LC4. Have you noticed any trends in the retrofit portion of those lighting controls sales? Please explain. [if NO, skip to LC7]
- LC5. Can you provide any insight into what caused those changes?
- LC6. Do you have any suggestions for how the Massachusetts energy efficiency programs should respond to those changes? [skip to end]
- LC7. The Massachusetts energy efficiency programs have seen a decline in program participation across the past two years for lighting controls retrofit applications. My understanding is that you haven't seen any drop-off in sales. Do you have any idea why program participation might be down?
- END. Thank you for taking the time to talk with me today. After I review my notes, would it be ok to contact you again to follow up with any remaining questions?







F2. Do you also do lighting installations?

|            |     |                       |
|------------|-----|-----------------------|
| Yes        | 1   |                       |
| No         | 2   | [SKIP TO F4]          |
| Don't know | -97 | [SKIP TO F4]          |
| Refused    | -98 | [TERMINATE INTERVIEW] |

F3. Would you say you're more of an installer or more of a distributor?

|  |   |  |
|--|---|--|
| Installer<br>INSTALLERS]                     | 1 | [LIMIT THOSE WHO ARE MOSTLY<br>INSTALLERS] |
| Distributor                                  | 2 |  |
| About evenly divided between both activities | 3 |  |

F4. About what percentage of your projects in 2012 were commercial and/or industrial projects?  
[BEST GUESS IS OK.]

F5. The <SPONSORING PAs AND Mass Save> have a program called Bright Opportunities that significantly buys down the cost of LED lighting products and reduced wattage T5s and T8s at the lighting distributor level. Are you currently participating in this program?

|            |     |                       |
|------------|-----|-----------------------|
| Yes        | 1   | [TERMINATE INTERVIEW] |
| No         | 2   | [CONTINUE TO F6]      |
| Don't know | -97 | [CONTINUE TO F6]      |
| Refused    | -98 | [TERMINATE INTERVIEW] |



F6. Approximately how many employees does your business have?

[IF NECESSARY SAY: “We use this information to compare your responses to other companies.”]

F7. What would you estimate are your company’s annual sales?

[If necessary: We use this information to compare your responses to other companies.]

F7A. About what percentage of your sales are lighting?

F8. What is your distribution area within Massachusetts?

F9. Roughly what percentage of your company’s Massachusetts lighting product sales in the past year went to end users and builders vs. other lighting contractors/installers?

\_\_\_% of total sales going to end users/builders

\_\_\_% of total sales going to other lighting contractors/installers

F10. Do you sell lighting products outside of Massachusetts?

F10A. [IF YES] In which states?

F11. Is energy-efficient lighting a particular focus of your company’s marketing efforts or product offerings?

F11A. [IF YES] In what ways does your company focus on energy efficient lighting?

F12. Do you think that your company is generally more effective than your competitors at promoting and selling energy-efficient lighting?

F12A. [IF YES] Why do you say that?

F14. I’m going to name a number of lighting products and for each one I name, please estimate what percentage this lighting product accounted for of your total lighting sales over the past year



**Distributor Program-Wide Quantity Table**

|   | TYPE   | % of total 2012 lighting sales |
|---|--|--------------------------------|
| 1 | T5-HO  |                                |
| 2 | T8 (low watt)                                  |                                |
| 3 | LED-MR16<br>(4w-6w)                            |                                |
| 4 | LED-PAR20                                      |                                |
| 5 | LED-PAR30                                      |                                |
| 6 | LED-PAR38                                      |                                |
| 7 | LED A-Lamps                                    |                                |
| 8 | Decorative Lamps<br>(including G and B shapes) |                                |
| 9 | Other: Specify                                 |                                |

F15. Of the flood lights/spotlights that you currently sell in Massachusetts, about what percentage are LEDs?

F15A. What was this percentage a year ago?

F15B. What was this percentage two years ago?

F15C. [IF THE PERCENTAGE CHANGED OVER TIME] What factors do you think are influencing these changes in LED market share for these lighting technologies?

F16. Do you also sell flood lights/spotlights outside of Massachusetts?

F16A. [IF YES] In which states?

F16B. [IF YES] Of the flood lights/spotlights that you currently sell in [STATE X], about what percentage are LEDs? [IF DISTRIBUTOR HAS LONG LIST OF STATES, REPEAT QUESTION F16B FOR ONLY 3 OF THEM]

F16B1. [IF THE PERCENTAGES IN F16B ARE DIFFERENT THAN THOSE REPORTED FOR F15 (MASSACHUSETTS)] You indicated that you are selling a [HIGHER/LOWER] percentage of your flood light/spotlights in Massachusetts compared to these other states. What factors do you think might explain these differences?

F17. Of the T5 bulbs that currently sell in Massachusetts, about what percentage are High Efficiency (HE) and High Output (HO)?

HE:



HO:

F17A. What were these percentages a year ago?

HE:

HO:

F17B. Two years ago?

HE:

HO:

F17C. [IF change over years] What factors might me causing these changes?

F18. Of the T8 bulbs that currently sell in Massachusetts, about what percentage are low wattage?

F18A. What were these percentages a year ago?

F18B. Two years ago?

F18C. [IF change over years] What factors might me causing these changes?

## LED Market Characteristics

PI11. [IF THEY SELL LED BULBS] Can you make any generalizations about the types of customers who are buying your LED bulbs?

PI11A. [IF YES] What types of customers are these?

PI11B. [IF YES] What types of applications or functions?

PI12. In general, are there any factors or barriers preventing your company from selling more LED bulbs?"

PI12A. [IF YES] What factors?



## Baseline Information

- B3. [IF THEY INDICATED PREVIOUSLY (QUESTION F2) THAT THEY INSTALL LIGHTING] You indicated previously that you install lighting. Has your company installed any of the LED bulbs that you sell?
- B3A. [IF YES] What types of lighting products are these LED bulbs typically replacing? [IF THEY MENTION MULTIPLE LIGHTING PRODUCT TYPES, PROBE TO TRY TO GET THEM TO ROUGHLY ESTIMATE WHAT % EACH OF THESE LIGHTING PRODUCT TYPES REPRESENT OF THE TOTAL LIGHTING REPLACED BY THE LED BULBS]
- B4. [IF THEY INDICATED PREVIOUSLY (QUESTION F2) THAT THEY *DO NOT* INSTALL LIGHTING] Do you have any sense as to what types of lighting products the LED bulbs you are selling are replacing?
- B4A. [IF YES] What types of lighting products are these LED bulbs typically replacing? [IF THEY MENTION MULTIPLE LIGHTING PRODUCT TYPES, PROBE TO TRY TO GET THEM TO ROUGHLY ESTIMATE WHAT % EACH OF THESE LIGHTING PRODUCT TYPES REPRESENT OF THE TOTAL LIGHTING REPLACED BY THE LED BULBS]

## Downstream Program Participation

- D3. Before today, had you heard of Bright Opportunities?
- D3A. [IF YES] How did you first hear about Bright Opportunities?
- D3B. [IF YES] Why is your company not participating in the program?
- D3C. [IF YES] Do you have any thoughts as to why some lighting distributors are not participating in this program?
- D4. In addition to Bright Opportunities, which buys down energy-efficient lighting costs at the wholesale levels, Mass Save also has a “downstream” program that pays a rebate directly to commercial and industrial customers for installing energy-efficient lighting at their facilities. Have you heard of this downstream lighting program?
- D5. Have you sold lighting products through this downstream program?
- D5A. [IF YES] Do you reference the downstream lighting program or its incentives in your marketing materials or sales pitches?



1. [IF YES] How so?

After I review my notes, would it be ok to contact you again to follow up with any remaining questions?

Thank you.





## Introduction

[NOTE: THE QUESTIONS IN THIS INTERVIEW GUIDE WILL NOT NECESSARILY BE READ VERBATIM BUT MAY BE MODIFIED TO SUIT THE INTERVIEW. IN ADDITION, THE INTERVIEWERS MAY SKIP QUESTIONS THAT ARE LESS RELEVANT TO A PARTICULAR INTERVIEW]

I1. Hi, my name is \_\_\_\_\_ calling from DNV KEMA on behalf of <SPONSORING PAS AND MASS SAVE> regarding the Massachusetts Upstream Lighting initiative, also known as Bright Opportunities. Bright Opportunities provides buydowns for LEDs and reduced wattage linear fluorescent, lamps.

According to our records, your company has installed lighting products as part of Bright Opportunities . [IF NECESSARY, NAME SOME RECENT PROJECTS THAT USED THE PROGRAM DISCOUNTS]. We would like to ask you some questions about your participation and about trends in the lighting market in general. Who would be most familiar with your participation?

[IF RESPONDENT IS NOT PROGRAM-FAMILIAR CONTACT, GET IN TOUCH WITH PROGRAM-FAMILIAR CONTACT AND REPEAT I1 EXCEPT LAST SENTENCE.]

[IF NECESSARY] The objective of this interview is to help estimate market penetration, gauge the level of Bright Opportunities' influence on the market penetration of energy efficient technologies, as well as collect other information about the programs offered by the Massachusetts Energy Efficiency Program Administrators.

[IF ASKED] We anticipate this interview will last about 30 minutes. Any information you provide will be treated as confidential.

[IF ASKED] DNV KEMA is an independent contractor hired to do this research. You can verify the legitimacy of this research by calling Wendy Todd of National Grid at 781-907-2232.

## About the Firm

F12. Let's start by getting a little information about your company. Can I confirm your main location? My records show your office is located at [Address].

F13. Approximately how many employees does your business have?  
[If necessary: We use this information to compare your responses to other companies.]



F14. Bright Opportunities listed your company as a lighting installation contractor. Is this a reasonable characterization of your business?

F14A. [IF NO] How would you describe or characterize your business?

F14B. [IF YES] What is your territory do you work in within Massachusetts?

F14C. [IF YES] Do you install lighting outside of Massachusetts?

F14Ci. [IF YES] In which states?

F15. What types of lighting projects do you install?

[Residential, commercial, retail, industrial – project size, new construction, etc]

F16. Is energy-efficient lighting a particular focus of your company's marketing efforts or product offerings?

F16A. [IF YES] In what ways does your company focus on energy efficient lighting?

F16B. [IF YES] Do you think that your company is generally more effective than your competitors at promoting, selling, and installing energy-efficient lighting?

F16C. [IF YES] Why do you say that?

F17. Have you previously heard about Bright Opportunities?

F17A. [IF YES] How did you first hear about Bright Opportunities?



F18. Do you install LED's?

F18A. [IF YES] Please provide your best estimate of what % of LED bulbs that you installed in Massachusetts during the past year fit into the following categories:

|  |             |
|--|-------------|
| F10A. First consider the LED bulbs that were discounted by this Massachusetts Bright Opportunities initiative. About what % of the total LED bulbs that you installed in Massachusetts during the past year did these account for? | __%         |
| F10B. Next consider the LED bulbs that were <b>not</b> discounted by this initiative. About what % of the total bulbs that you installed in Massachusetts during the past year did these account for?                              | __%         |
| F10C. Total LED bulbs installed Massachusetts during the past year   | <b>100%</b> |

F15. [IF PERCENTAGE IN F10B > 0] You indicated that in the past year [% from F10B] of your LED bulb installations in Massachusetts were not through the Bright Opportunities initiative. Why didn't you install these bulbs through Bright Opportunities?

F16. Do you install flood lights or spotlights?

F16A. Of the flood lights/spotlights that you currently install in Massachusetts, about what percentage are LEDs?

F16B. What was this percentage a year ago?

F16C. What was this percentage two years ago?

F16D. [IF THE PERCENTAGE CHANGED OVER TIME] What factors do you think are influencing these changes in LED market share for these lighting technologies?

F17. Do you also install flood lights/spotlights outside of Massachusetts?

F17A. [IF YES] In which states?

F17B. [IF YES] Of the flood lights/spotlights that you currently install in [STATE X], about what percentage are LEDs? [IF DISTRIBUTOR HAS LONG LIST OF STATES, REPEAT QUESTION F13B FOR ONLY 3 OF THEM]



F17Bi. [IF THE PERCENTAGES IN F13B ARE DIFFERENT THAN THOSE REPORTED FOR F12 (MASSACHUSETTS)] You indicated that you are installing a [HIGHER/LOWER] percentage of your flood light/spotlights in Massachusetts compared to these other states. What factors do you think might explain these differences?

**Program Influences on Lighting Sales**

[BEFORE THE INTERVIEW, ENTER INTO THE TABLES IN THIS SECTION THE RELEVANT TRACKING DATA SPECIFIC TO THE CONTRACTORS BEING DISCUSSED]

PI0. According to our records you purchased some [LED/T8/T5] lighting products that were discounted by the Bright Opportunities initiative from [distributor] in [DATE]. Do you recall this purchase?

PI13. According to our records you purchased the following lighting products from [DISTRIBUTOR]. [READ LIST FROM TABLE BELOW]

**Contractor-Specific Quantity Table**

|    | TYPE             | Quantity from Tracking Data<br>A. | Revisions to quantities?<br>B. |
|----|------------------|-----------------------------------|--------------------------------|
| 1  | T5-HO            |                                   |                                |
| 2  | T5 Linear        |                                   |                                |
| 3  | T8 (low watt)    |                                   |                                |
| 4  | T8 Linear        |                                   |                                |
| 5  | LED-MR16 (4w-6w) |                                   |                                |
| 6  | LED-PAR20        |                                   |                                |
| 7  | LED-PAR30        |                                   |                                |
| 8  | LED-PAR38        |                                   |                                |
| 9  | Decorative Lamps |                                   |                                |
| 10 | LED A-Lamps      |                                   |                                |
| 11 | Other: Specify   |                                   |                                |

PI14. Do these sales quantities sound about right to you?

[IF NO, MAKE NOTE OF ANY DISCREPANCIES THE RESPONDENT REPORTS IN THE TABLE ABOVE]



PI15. According to our records you purchased the [TYPE] bulbs/lamps at a [PROMOTIONAL PRICE] which was [BUYDOWN AMOUNT] less than your normal retail price for a discount of [DISCOUNT] percent. If this discount had not been available, do you think you would have purchased any of these types of bulbs/lamps?

PI16. [IF RESPONSE TO PI3 ≠ “NO”] If this discount of [DISCOUNT] percent had not been available, would your purchases of these [TYPE] bulbs/lamps from [DISTRIBUTOR] been the same, lower, or higher?

PI16A. [IF SAME OR HIGHER] Why do you say this?

PI16B. [IF LOWER] By what percentage do you estimate your purchases of these [TYPE] bulbs/lamps from [DISTRIBUTOR] to be lower in the absence of the discount?

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

**Contractor-Specific Discount Table**

|    | TYPE             | Retail Price per Bulb/Lamp (\$) | Promotional Price per Bulb/Lamp (\$) | Buydown Amount (\$)<br>C. | Discount (%) | Purchase Any? (Y/N/DK) | Sold Any? % Change in Sales in Absence of Discounts (%) |
|----|------------------|---------------------------------|--------------------------------------|---------------------------|--------------|------------------------|---|
| 1  | T5-HO            |                                 |                                      |                           |              |                        |   |
| 2  | T5 Linear        |                                 |                                      |                           |              |                        |   |
| 3  | T8 (low watt)    |                                 |                                      |                           |              |                        |   |
| 4  | T8 Linear        |                                 |                                      |                           |              |                        |   |
| 5  | LED-MR16 (4w-6w) |                                 |                                      |                           |              |                        |   |
| 6  | LED-PAR20        |                                 |                                      |                           |              |                        |   |
| 7  | LED-PAR30        |                                 |                                      |                           |              |                        |   |
| 8  | LED-PAR38        |                                 |                                      |                           |              |                        |   |
| 9  | Decorative Lamps |                                 |                                      |                           |              |                        |   |
| 10 | LED A-Lamps      |                                 |                                      |                           |              |                        |   |
| 11 | Other: Specify   |                                 |                                      |                           |              |                        |   |

PI17. In estimating what the impacts of these discounts on your lighting product sales would be, what knowledge or information are these estimates based on?



PI18. Do you reference these buydown price discounts from the Bright Opportunities initiative in any of your marketing materials or standard sales pitches?

PI18A. [IF YES] Can you cite some examples of how do you do this?

PI18B. [IF YES] When you mention these price discounts, do you mention who is sponsoring these discounts (e.g., the Massachusetts Electric Program Administrators, Mass Save )?

PI18Bi. [IF YES] How do you typically do this?

PI19. How do you decide what products to buy from distributors?

PI20. Do you build to spec?

PI20A. [IF YES] Does the price you get for lighting equipment affect your bidding process?

PI21. Does the price of any particular lighting technology affect what lighting you stock?

PI21A. [IF YES] How?

PI22. Does the price of any particular lighting technology affect what lighting you spec or include in your bids?

PI22A. [IF YES] How?

PI23. Has your participation in Bright Opportunities had any impacts on the mix of lighting products that you sell or install?

PI23A. [IF YES] What impacts has your participation had?

PI24. Has purchasing Bright Opportunities discounted lighting had any impacts on the types of customers you are selling to?

PI24A. [IF YES] What impacts has your participation had?

PI25. Can you make any generalizations about the types of customers who are having you install LED bulbs?

PI25A. [IF YES] What types of customers are these?

PI26. In general, what factors or barriers are preventing your company from selling and installing more LED bulbs?



**Baseline Information**

- B5. Has your company installed any of the LED bulbs that you purchased through Bright Opportunities?
  - B5A. [IF YES] What types of lighting products are these LED bulbs typically replacing? [IF THEY MENTION MULTIPLE LIGHTING PRODUCT TYPES, PROBE TO TRY TO GET THEM TO ROUGHLY ESTIMATE WHAT % EACH OF THESE LIGHTING PRODUCT TYPES REPRESENT OF THE TOTAL LIGHTING REPLACED BY THE LED BULBS]

**Program Satisfaction and Quality Control**

- S12. Have you received any complaints from customers or encountered any problems with the performance of any of the LED bulbs you installed from the Bright Opportunities program?
- S13. This initiative requires lighting distributors to report back information on the lighting products they sold through Bright Opportunities. This information includes product types, quantities, prices, and information about the customers who purchased the lighting products. Do you think these reporting requirements are reasonable?
  - S13A. [IF NO] Why do you say that?
- S14. This initiative also has a quality control component involving inspections of a certain percentage of sites where the discounted lighting products were installed. Have any of your customers received an inspection?
  - S14A. [IF YES] Using a five-point satisfaction scale where five equals very satisfied and one equals very dissatisfied, how satisfied were you with this inspection process?
    - 5 = very satisfied
    - 4
    - 3
    - 2
    - 1 = very dissatisfied
  - S14B. [IF SATISFACTION < 4] Why were you less than satisfied with this inspection process?
- S15. Do you think the size of the buydown discounts offered by this program [RE-READ DISCOUNT AMOUNTS FROM TABLE ABOVE, IF NECESSARY] are adequate to encourage consumer demand for these energy-efficient lighting products?



S15A. [IF NO] For which lighting products do you think the discounts are not adequate to encourage consumer demand?

S16. How satisfied have you been with the program's marketing and outreach efforts?

5 = very satisfied

4

3

2

1 = very dissatisfied

S16A. [IF SATISFACTION < 4] Why were you less than satisfied with the program's marketing and outreach efforts?

S17. How satisfied have you been with Bright Opportunities as a whole?

5 = very satisfied

4

3

2

1 = very dissatisfied

S17A. [IF SATISFACTION < 4] Why were you less than satisfied with Bright Opportunities as a whole?

S18. What recommendations, if any, do you have for improving the way Bright Opportunities is delivered or marketed?

S19. Do you have any thoughts as to why some lighting distributors are not participating in this initiative?

S20. Are you aware of any instances of the lighting products that were discounted by this initiative being sold for use outside of Massachusetts?

S20A. [IF YES] What instances are you aware of?

S20B. Do you think that the initiative has appropriate safeguards in place to insure that lighting discounted products are not sold outside of Massachusetts?



## Downstream Program Participation

- D6. In addition to Bright Opportunities, which buys down energy-efficient lighting costs at the wholesale level, there is also has a “downstream” program offered by the Program Administrators that pays commercial and industrial customers directly for having energy-efficient lighting installed at their facilities. Have you heard of this downstream lighting program?
- D7. Have you installed lighting products through this downstream program?
- D7A. [IF YES] What do you see as the advantages or disadvantages of Bright Opportunities vs. the downstream lighting program?
- D7B. [IF YES] Do you reference the downstream lighting program or its incentives in your marketing materials or sales pitches?
- D7Bi. [IF YES] Do you promote the incentives available from the downstream lighting program differently than you do for Bright Opportunities?
1. [IF YES] How so?
- D7C. [IF YES] Have you been able to receive lighting incentives through this downstream program as well as purchase lighting products through the Bright opportunities program?
- D7Ci. [IF YES] Can you give me any details about those projects?

After I review my notes, would it be ok to contact you again to follow up with any remaining questions?

Thank you.