

Supplier and Retailer Perspectives on the Massachusetts Residential Lighting Market Final Report

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Prepared for:

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Executive Summary

This report summarizes findings from retailer and supplier interviews conducted in 2014. The interviews supported the comprehensive assessment and monitoring of the Massachusetts lighting market and the Massachusetts ENERGY STAR® Lighting Program. DNV GL presents these findings to help develop a better understanding of the recent trends, new opportunities, and lingering barriers in the Massachusetts residential lighting market. The findings also serve to gauge lighting market actors' satisfaction with this program and to identify opportunities for program improvements.

The evaluation's primary data collection efforts included the following:

1. In-depth interviews with 17 lighting manufacturers and five high-level buyers of lighting products for large retail chains that participated in the Massachusetts program in 2013.
2. Computer-aided telephone interview surveys with 224 managers of stores in Massachusetts that sold lighting products through the program in 2013.

DNV GL developed this report under subcontract with Cadmus, on behalf of the Massachusetts Energy Efficiency Advisory Council (EEAC) and the Massachusetts electric program administrators. Tetra Tech, another member of the Cadmus Residential Evaluation Team, fielded the telephone survey with retail store managers. Note that findings from the suppliers and retailers will be integrated with findings from other research efforts that make up the larger Massachusetts Residential Lighting Market Assessment research effort. NMR Group, also under subcontract to Cadmus, leads this larger Lighting Market Assessment.

This executive summary highlights key findings from the report, which addresses these and other findings in greater detail. Findings from the supplier interviews regarding net-to-gross ratios have been delivered under separate cover.¹

In a few cases, market actors' perspectives on the Massachusetts lighting market may appear contradictory, logically inconsistent, misinformed, or unsubstantiated. In such cases, we present evidence or informed speculation to explain or assess the validity of these perspectives. Even where it is difficult to know why these market actors made certain statements about the Massachusetts program or the Massachusetts lighting market, these perspectives remain valuable as they may suggest opportunities to better educate trade allies about program design, rules, and objectives.

EISA Legislation Impacts

The December 2007 Energy Independence and Security Act (EISA) called for a gradual phase-out of less-efficient lamps over time, starting in 2012. The following key findings from the Massachusetts retailer survey and supplier interviews concern the EISA legislation's impacts.

¹ DNV GL, NMR, and Cadmus. *Massachusetts Upstream Lighting Program Net-to-Gross Ratio Estimates*. Delivered to the PAs and EEAC consultants on October 17, 2014.

Awareness of the Legislation

- *A large majority of lighting market actors reported EISA legislation awareness. Over three-quarters (76%) of Massachusetts store managers and all lighting manufacturers and high-level retail buyers reported being aware of EISA.*
- *Store manager awareness of the EISA legislation increased since 2012. Over three-quarters (76%) of store managers surveyed in 2014 claimed awareness of the legislation, compared to two-thirds (67%) of those surveyed in 2012.*

Sales Impact on LED, Halogen, and CFL Bulbs

- *Lighting manufacturers reported EISA has contributed to increased sales of LED and halogen bulbs and, to a lesser extent, CFL lighting products. All lighting manufacturers we interviewed reported the EISA legislation impacted sales of LED bulbs, and a large majority (82%) reported increased halogen sales due to EISA, compared with only 36% reporting that EISA led to greater CFL sales.*
- *Market actors disagreed about EISA impacts on sales of halogen bulbs. Some market actors claimed the Massachusetts program's support of discounts for standard CFLs helped to keep consumers from switching to less expensive and less energy-efficient, EISA-compliant halogen bulbs. Some recent point-of-sale data from California gives support to these claims although other possible supporting data remain unavailable or inconclusive.*
 - *Some interesting differences occurred among lighting market actors regarding how they viewed EISA's impacts on halogen bulbs. Eighty-two percent of the manufacturers and 50% of the retail buyers said halogen bulb sales increased due to EISA. In contrast, only 15% of store managers said their halogen bulbs sales increased since 2012.*
 - *The responses may differ due to manufacturers and retail buyers commenting on halogen sales trends nationally and regionally, while store managers offer a Massachusetts-specific perspective. In the 2014 interviews and those conducted for the 2013 Massachusetts lighting market assessment, a few lighting manufacturer and retail buyers claimed that by continuing to offer discounts for standard CFLs, the Massachusetts program kept many consumers from purchasing less expensive and less energy-efficient EISA-compliant halogens.² They claimed that when the California upstream lighting program significantly reduced discounts for standard CFLs, EISA-compliant halogens gained market share on standard CFLs due to their lower price points. If true, this would indicate halogen bulbs have not made the same market penetration in Massachusetts as in other parts of the country.*
 - *There is some recent point-of-sale data supporting these claims (i.e., reduced upstream discounts for standard CFLs led to an increased halogen market share in California and a lower*

² KEMA, Inc. (under subcontract to NMR Group, Inc.) *Lighting Retailer, Supplier Perspectives on the Massachusetts ENERGY STAR® Lighting Program*, Final Report. Prepared for Cape Light Compact, National Grid, NSTAR, Unitil, Western Massachusetts Electric, Energy Efficiency Advisory Council Consultants. June 2013.

halogen market share in Massachusetts than other parts of the country). However, other possible supporting data remain unavailable or inconclusive.

Impact on Stocking Practices

- *Most Massachusetts store managers and high-level retail buyers reported not altering their stocking practices due to the EISA phase-out.* Less than one-half (45%) of store managers and only one-fifth of retail buyers reported changing their stocking practices due to EISA.

Impacts on Consumer Purchase Behavior

- *Across all retail channels, 61% of store managers said they observed changes in consumers' purchasing behaviors in response to new EISA regulations.* Hardware and home improvement store managers most commonly reported these changes in behaviors.

Future Impacts

- *The lighting market actors expected LED prices to drop, partly due to the future impact of EISA legislation.* A greater percentage of lighting manufacturers and high-level retail buyers thought LED prices would decrease (100% and 75%, respectively) compared to CFLs (29% and 50%) and EISA-compliant halogens (43% and 33%).

LED Market Assessment

This section presents key findings from the lighting retailer and supplier interviews concerning the Massachusetts market for LED bulbs.

Historical Sales

- *The Massachusetts ENERGY STAR program impacted LED sales in Massachusetts.* While most lighting manufacturers reported selling LEDs before participating in the Massachusetts ENERGY STAR program, only one-half of high-level retail buyers reported selling LEDs before the program. About one-half (53%) of Massachusetts store managers reported selling LED bulbs before 2013.

Rationale for Businesses not Selling LED Bulbs

- *Lighting market actors most commonly cited high costs as a reason for not selling LED bulbs.* This was also the most-cited barrier when we surveyed these market actors in 2012.

LED Sales in the Past Year

- *Respondents deemed LED lighting sales in Massachusetts to be healthy.* Most store managers (61%) reported sales to be “excellent” or “good” over the past year, with very few managers (6%) indicating poor LED sales during this time. This was an improvement from the 2013 survey of store managers (n= 137) when 53 percent reported LED sales to be “excellent” or “good” over and 11 percent characterized their sales as “poor.”

Factors Limiting LED Sales

- *Respondents selling LED bulbs mostly commonly cited high costs as the factor preventing greater LED lighting sales.* This was the only barrier reported by all three lighting market actor groups surveyed (e.g., store managers, lighting manufacturers, and high-level retail buyers).

LED Pricing in 2015

- *Respondents expected LED bulb prices to decrease over the next year, but not LED fixtures.* The majority of market actors surveyed anticipated LED bulb prices would decrease in 2015. In contrast, only 31% of store managers thought LED fixture prices would decrease at the same time.

Effectiveness of the Program Promoting LED Bulbs

- *The store managers offered a mixed assessment of the program, in terms of promoting LED sales.* Over one-half (51%) of store managers provided a rating of 7 or higher, on a scale from 0 to 10, indicating the program effectively promoted LED bulbs. However, almost one-third (32%) of managers rated the Massachusetts ENERGY STAR program's effectiveness as a 4, 5, or 6, indicating they did not strongly believe in the program's effectiveness in promoting LED bulb sales. Only a few store managers (11%) provided a rating below 4. This mixed assessment of the program is likely an effect of their more positive view of the program LED incentive levels combined with their more negative assessment of the program's promotional and customer education efforts, as discussed elsewhere in the report.

Impact of Program on LED Sales

- *Lighting market actors provided mixed feedback on the program's impact on promoting LED lighting.* While nearly three-fourths (71%) of lighting manufacturers reported the program affected their decisions to sell LED lighting products, only 37% of Massachusetts store managers and one-half of high-level retail buyers said the program affected their promotion of LED products. This difference could result from participating manufacturers' greater awareness of the full influence of substantial LED program discounts on manufacturers' decisions whether or not to offer these bulbs through certain retail channels. In addition, as noted above, only about half of the store managers were satisfied with the program's promotional efforts. An analysis of their verbatim responses indicated that they believed that the program should provide more education to help consumers better understand the benefits of LEDs.

Perception of Program Incentive Levels for LED Bulbs

- *A large majority of the store managers considered program discounts for LED bulbs sufficient.* A large majority (79%) of store managers found an average incentive of about \$12 per bulb adequate for selling at least *some* types of LED bulbs, with 63% reporting the incentive adequate for selling *all* types of LED bulbs. Very few store managers (8%) found the average \$12 per bulb incentive level insufficient to sell *any* types of LED bulbs.

Recommendations to Increase LED Bulb Sales

- *Respondents most frequently cited providing larger rebates and customer education for increasing LED bulb sales.* Increased incentives and better customer education were the only suggestions all three lighting market actor groups provided. When surveyed in 2012, retail managers also cited better rebates and customer education.

Hard-to-Reach Customers

The Massachusetts ENERGY STAR lighting program has long sought to increase the penetration of energy-efficient lighting products in the state's hard-to-reach (HTR) lighting markets. Key findings regarding this customer group follow.

Defining HTR Customers

- *The large majority of lighting market actors agreed with the program's definition of HTR lighting markets.* A large majority of manufacturers and retail buyers (78% and 80%, respectively) agreed with the definition of "hard-to-reach" markets for energy-efficient lighting as those serving low-income, ethnic, non-English-speaking, and less-educated customers. Seventy-eight percent of store managers agreed with this definition of HTR markets.

Retail Channels for Promoting Energy-Efficient Lighting to HTR Customers

- *Most lighting market actors thought discount stores and small grocery stores served as effective retail channels to reach HTR customers.* The large majority (80%) of lighting manufacturers and a majority (60%) of high-level retail buyers thought discount stores and small grocery stores offered the best ways to reach HTR customers. None of the manufacturers and only 20% of retail buyers considered discount stores and small grocery stores ineffective channels to reach HTR customers.

Program Effects on CFL and LED Sales

We asked lighting market actors about the Massachusetts ENERGY STAR Lighting Program's impacts on sales of energy-efficient lighting. Key findings follow concerning these program effects. It should be noted that these are very high-level findings and that we analyze and discuss the lighting market actor assessments of program influence in much more detail in a separate report: "Massachusetts Upstream Lighting Program Net-to-Gross Ratio Estimates Using Supplier Self-Report Methodology."

Program Influence on Sales of CFL and LED Lighting

- *Lighting market actors agreed that some retailers would not be selling CFLs and LEDs without the program, although lighting manufacturers were more likely than store managers to report this happening.* As discussed in the main report, these differing accounts as to the level of program influence are likely due to differences in market knowledge among the market actors, variations in the types of retailers selling certain bulb types, differences in potential bias among market actors, and variations in the wording of the interview or survey questions.

Ways the Program Promotes Energy-Efficient Lighting Other Than Discounts

- *Lighting market actors cited other ways the program promoted sales of energy-efficient lighting products, besides financial incentives.* Respondents cited in-store signage, co-op advertising support, marketing support, and customer education as additional ways the program promoted energy-efficient lighting.

Lighting Sales Not Discounted by the Program

- *A majority of lighting market actors reported selling standard CFLs in Massachusetts that did not receive program discounts.* About 60% of all market actor groups reported selling non-specialty CFLs not receiving discounts from the Massachusetts ENERGY STAR Lighting Program.
- *About one-half of lighting market actors reported selling CFL specialty bulbs in Massachusetts that did not receive program discounts.* Sixty percent of manufacturers and high-level retail buyers and almost one-half (44%) of store managers reported selling CFL specialty bulbs that did not receive discounts from the program.
- *About one-half of lighting market actors reported selling LED bulbs in Massachusetts that did not receive program discounts.* At least 50% of all market actor groups surveyed reported selling LED bulbs that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program.

Program Satisfaction

We asked participating store managers about their satisfaction levels with a number of different aspects of the Massachusetts ENERGY STAR program and with the program as a whole. The store managers were asked for ratings using a five-point satisfaction scale, where 5 equaled “very satisfied” and 1 equaled “very dissatisfied.” Some findings concerning program satisfaction included the following.

Satisfaction with Availability of Program-Discounted Bulbs

- *Massachusetts store managers mostly expressed satisfaction with the availability of program-discounted bulbs.* Seventy-nine percent of store managers provided rated satisfaction with the availability of program-discounted bulbs as 4 or 5.

Satisfaction with Program as a Whole

- *Lighting market actors generally expressed satisfaction with the program as a whole.* At least 80% of lighting manufacturers, retail buyers, and store managers gave a 4 or 5 rating for satisfaction with the program as a whole.
- *Store manager satisfaction with the program increased since 2012.* Eighty percent of store managers surveyed in 2014 provided ratings of 4 or 5, indicating satisfaction with the program, compared to 71% in 2012. This was a statistically significant increase.³

³ At the 95% confidence level using a two-tailed t test.

Satisfaction with Program Managers, Contractors, and Other Staff

- *All lighting manufacturers and high-level buyers expressed satisfaction with program managers, contractors, and other staff involved in delivering the program.*

Future Program Participation

- *A large majority of lighting market actors planned to participate in the Massachusetts ENERGY STAR program in the future. The large majority (85%) of store managers and all lighting manufacturers and high-level retail buyers reported they anticipated taking part in the program moving forward.*

Suggestions for Improving the Program

Lighting market actors provided a number of suggestions for program improvements. These recommendations included:

- Providing a single point of contact for the program;
- Offering higher incentive levels;
- Developing a formal bid process for retailers;
- Providing more communication from the program; and
- Doing more customer education concerning LEDs.

Introduction

This report summarizes findings from retailer and supplier interviews conducted in 2014 to support the comprehensive assessment and monitoring of the Massachusetts lighting market and the Massachusetts ENERGY STAR® Lighting Program. DNV GL presents these findings to present a better understanding of recent trends, new opportunities, and lingering barriers in the Massachusetts residential lighting market. These findings also serve to gauge lighting market actors' satisfaction levels with the program and identify opportunities for program improvements.

The evaluation included the following primary data collection efforts:

- In-depth interviews with 17 lighting manufacturers and five high-level lighting product buyers for large retail chains participating in the 2013 Massachusetts program.
- Computer-assisted telephone interview (CATI) surveys with 224 Massachusetts store managers that sold lighting products through the program in 2013.

DNV GL developed this report under subcontract with Cadmus, on behalf of the Massachusetts Energy Efficiency Advisory Council and the Massachusetts electric program administrators (PAs). Tetra Tech, another member of the Cadmus Residential Evaluation Team, fielded the telephone survey with retail store managers. These findings from suppliers and retailers will be integrated with findings from other research efforts making up the larger Massachusetts Residential Lighting Market Assessment research effort. NMR Group, also under subcontract to Cadmus, leads this larger Lighting Market Assessment.

The report included the following research scope:

- Summarizing lighting market actors' perceptions of the Energy Independence and Security Act's (EISA) past, present, and future effects on sales and stocking of different light bulb types;
- Assessing the LED market, including sales, stocking, and pricing trends;
- Summarizing supplier and retailer perceptions of the hard-to-reach (HTR) lighting market;
- Assessing respondents' perceptions of the program's effects on CFL and LED sales; and
- Summarizing changes over time.

Methodology

This report summarizes results from the two following, primary research efforts, conducted from May to July 2014:

1. *In-depth interviews conducted with 17 participating manufacturers and five high-level retail buyers.* Respondents' companies supplied or purchased lighting products that received upstream incentives from the Massachusetts ENERGY STAR Lighting Program in 2013. DNV GL staff conducted the interviews.

2. A CATI survey completed with 224 store managers participating in the Massachusetts program. Tetra Tech fielded these surveys, with DNV GL analyzing the survey data. Retail channels within the store manager sample frame included the following:
- *Discount stores* typically selling products at prices lower than traditional retail outlets.
 - *Drug stores* selling over-the-counter medications (and possibly selling paper products, beverages, and a selection of grocery items).
 - *Grocery stores* typically selling perishable and non-perishable food items and stocking a small selection of household goods.
 - *Large Home Improvement stores*—a class of hardware stores typically occupying warehouse-style spaces; many have dedicated outdoor garden centers.
 - *The Lighting and Electronics* channel groups lighting retailers with electronics retailers. The former typically stock light fixtures, ceiling fans, and replacement lamps, while the latter sell home electronics and appliances.
 - *Mass Merchandise stores* typical stock a large assortment of goods (including clothing and housewares and sometimes food products and medications) at competitive prices.
 - *Membership Clubs* - typically warehouse-style stores stocking a wide variety of grocery and household items in bulk resulting in lower per unit prices. Consumers usually pay an annual membership fee to access these lower prices.
 - *Small Hardware* stores selling a variety of home repair, maintenance, and improvement products.

For the 2014 store manager survey, we used a sample design similar to that used in past years; this allowed comparability across years. We stratified the sample frame by retail channel. Three criteria determined the targeted number of completed surveys for each channel:

1. The percentage of total bulb sales that channel represents;
2. The number of unique store locations in the sample frame for that channel; and
3. Whether that retail channel served HTR customers (we oversampled these stores due to their particular interest to the Energy Efficiency Advisory Council [EEAC] and PAs).⁴

Table 1 presents the original sample frame of 763 stores. For various reasons included in the table, we adjusted this down to 623. Despite the reduction in the sample frame, we hit our targets and completed more surveys (224) than originally planned (221). The table shows an overall response rate of 29%, ranging from a 20% response rate for the mass merchandise channel to a 42% response rate for the hardware channel.

⁴ Identified through the fulfillment contractor's program tracking database as a store selling HTR-designated bulbs. The implementer's method for pursuing HTR customers differed somewhat from previous years, in which some bulbs targeted at HTR customers also were sold in certain locations of home improvement and mass merchandise stores.

Table 1. Sampling Disposition for Store Manager CATI Surveys

Channel	Discount	Drug	Grocery	Hardware	Home Imprvmt.	Lighting and Electronics	Mass Merch.	Membership Club	Total
Sample Size	292	30	192	72	60	25	60	32	763
Fax/data line	3	1	1	0	0	0	0	0	5
Bad number	10	0	7	1	0	0	1	0	19
Does not recall participation	9	3	7	0	0	0	2	0	21
Ineligible, no respondent	41	10	33	1	2	0	8	0	95
Adjusted Sample Size	229	16	144	70	58	25	49	32	623
Hard Refusal ¹	1	0	1	1	0	0	0	0	3
Soft Refusal ¹	14	1	8	14	7	2	1	3	50
Incompletes (partial interview)	9	0	9	5	6	0	7	2	38
Immediate hang-up	0	0	0	0	0	0	0	0	0
Language barrier/non-English	0	0	3	0	0	0	0	0	3
Referred to corporate	92	3	35	3	5	0	17	8	163
Active ²	36	4	40	17	16	13	12	4	142
Completed Surveys	77	8	48	30	24	10	12	15	224
Target Completes	77	6	48	29	24	10	12	15	221
Completes Needed	0	-2	0	-1	0	0	0	0	0
Percent to Target	100%	133%	100%	103%	100%	100%	100%	100%	101%
Cooperation Rate³	33.6%	50.0%	33.3%	42.9%	41.4%	40.0%	24.5%	46.9%	36.0%
Response Rate⁴	26.4%	26.7%	25.0%	41.7%	40.0%	40.0%	20.0%	46.9%	29.4%

¹ Attempts made to convert all soft refusals.

² An average of 4.35 contacts made per active case.

³ Number of completed surveys, divided by the Adjusted Sample Size.

⁴ Number of completed surveys, divided by the Sample Size.

Source: Tetra Tech

Organization of this Report

This report divides into two sections. The first provides an introduction and overview of data sources used to complete this report and the resulting high-level findings, conclusions, and recommendations. The second section summarizes findings from interviews conducted with lighting manufacturers, store managers, and high-level retail buyers. The latter section separates into the following subsections, which provide greater detail:

- Impacts of EISA Legislation
- LED Market Assessment
- HTR Customers
- Program Effects on CFL and LED Sales
- Program Satisfaction

Findings from the Lighting Manufacturer and Retailer Interviews

Impacts of EISA Legislation

DNV GL staff asked lighting market suppliers (manufacturers and retailers) about their experiences with EISA. The U.S. Congress passed EISA in 2007. It requires general-purpose lamps to meet minimum efficacy standards.⁵ This section discusses findings from lighting supplier interviews concerning the following:

- EISA's impact on sales of CFLs, halogens, LEDs and incandescent bulbs
- EISA's influence on lighting stocking practices
- Future impacts of EISA legislation

Lighting Suppliers' Awareness of EISA

DNV GL staff asked lighting suppliers if they were aware of the EISA legislation.⁶ Figure 1 shows all lighting manufacturers and retail buyers; a large majority of store managers knew of this legislation.

⁵ EISA defines a general-purpose lamp as: a standard incandescent or halogen-type lamp intended for general service applications; using a medium screw base; falling within a lumen range of 310 to 2,600 lumens; and capable of operating at a voltage at least partially within 110 and 130 volts.

⁶ The actual survey question read: "In December 2007 Congress passed an energy bill called the Energy Independence and Security Act. One component of the bill calls for a gradual phase-out of inefficient lamps over time starting in 2012. Were you aware of this phase out?"

Figure 1. Lighting Suppliers' Awareness of EISA Legislation

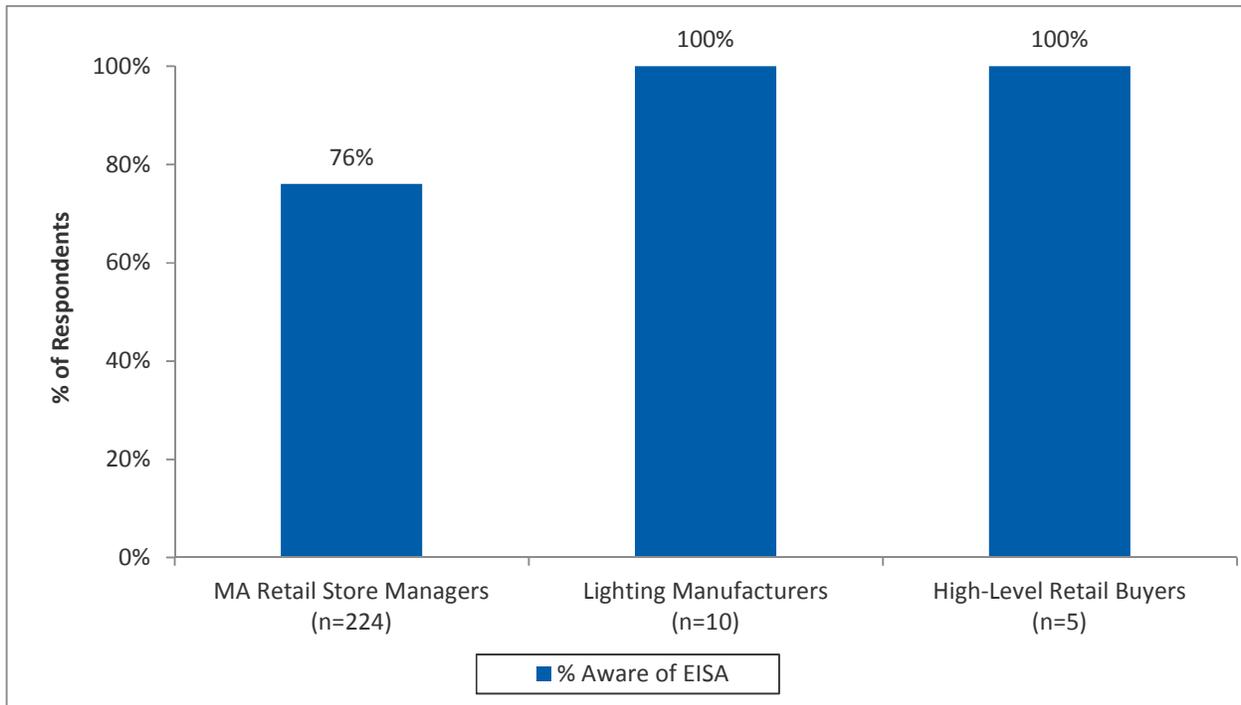


Figure 2 shows Massachusetts store managers' awareness of the EISA legislation increased since 2012. Over three-quarters (76%) of store managers surveyed in 2014 claimed awareness of the legislation compared to two-thirds (67%) of those interviewed in 2012.

Figure 2. Massachusetts Store Manager Awareness of EISA Legislation, 2012 vs. 2014

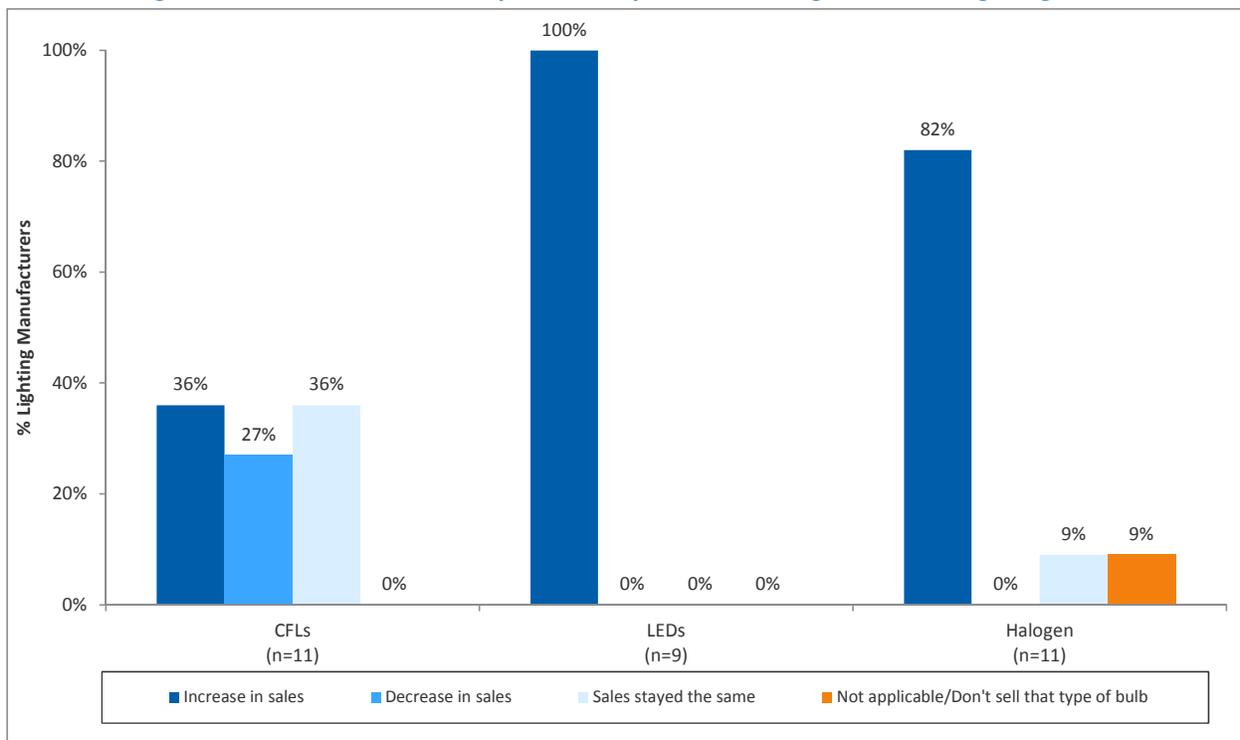


Some variability occurred in reported EISA awareness levels among different retail channels, with the highest awareness levels among managers of lighting “destination stores” (e.g., lighting/electronics [100% of respondents], home improvement [96%], and hardware [86%]) and lowest among managers of drug stores (62%) and mass merchandise stores (58%). Notably, respondents expressing at least some dissatisfaction with the Massachusetts program were more likely (32%), to a statistically-significant degree, to be unaware of the legislation than those totally satisfied with the program (20%). This raises a possibility that some EISA-unaware respondents might blame the program for EISA-influenced lighting market impacts.

EISA Impacts on Lighting Sales

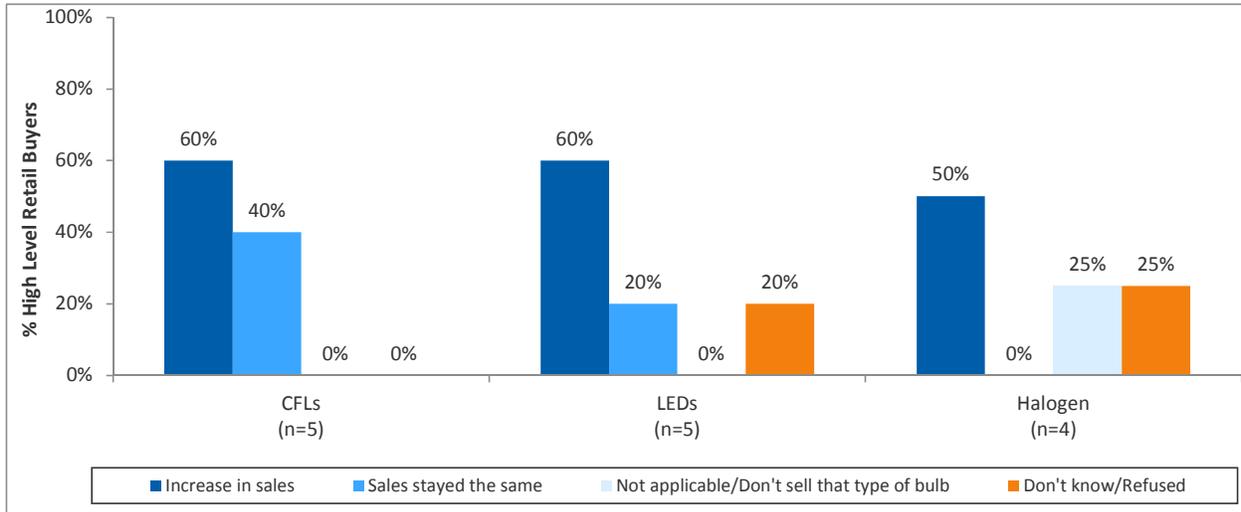
We asked lighting manufacturers and high-level retail buyers if EISA impacted sales of CFLs, halogens, and LEDs. Figure 3 shows all manufacturer respondents said EISA led to increased sales of LEDs, and the large majority said it led to increased sales of halogens. “We’ve seen our energy-saving halogen sales spike dramatically,” said one manufacturer. Yet only 36% said the legislation led to an increase in CFL sales. As discussed elsewhere in this report, some manufacturers claimed EISA-compliant halogens have consumed some of the market share lost by phased-out incandescents and which otherwise might have gone to CFLs.

Figure 3. Manufacturers Perception of Impact of EISA Legislation on Lighting Sales



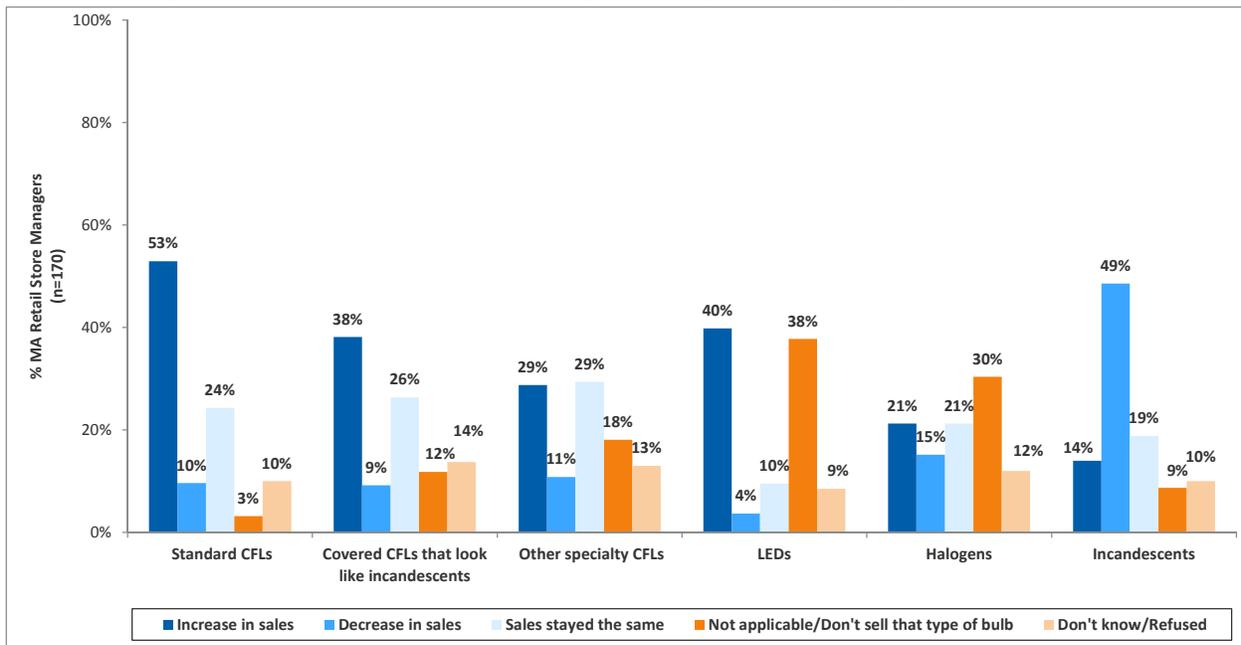
Retail buyers’ expressed fairly consistent assessments of EISA’s impact on lighting sales (as shown in Figure 4), with 50% to 60% of them saying the legislation increased sales of CFLs, halogens, and LEDs.

Figure 4. High-Level Retail Buyers Perception of Impact of EISA Legislation on Lighting Sales



We asked Massachusetts store managers who reported awareness of the EISA legislation if they thought their sales of CFLs (standard, covered, and other specialty), LEDs, halogens, and incandescent bulbs changed since 2012. Figure 5 shows they were most likely (58% of respondents) to find standard CFL sales increased over this two-year period and most likely (49%) to say incandescent sales decreased over this period.

Figure 5. Massachusetts Store Managers Perception of Lighting Sales Since 2012



Some variability occurred in these responses among different retail channels. For example, discount store managers were much less likely (21% of respondents) to say incandescent bulb sales decreased

over the last two years than managers within other retail channels (43% to 83% of respondents, depending on the retail channel).

Much of this likely resulted from differences in consumer demand, as incandescent bulbs are the least-expensive bulb category and therefore should appeal to price-sensitive customers shopping at discount stores. The mass merchandise channel, which includes stores such as Walmart that also target price-sensitive shoppers, had the second-lowest frequency (43% of respondents) saying their incandescent sales declined over the last two years.

Besides these consumer-demand factors, supply factors may explain why so few discount store managers reported declining incandescent sales. For discount stores with \$0.99 or \$1.00 price limits, incandescent bulbs offer one of the few bulbs that can be sold for under a dollar without receiving program subsidies.

Recent surveys of lighting products on retail shelves in Massachusetts largely confirmed this self-report from discount store managers, regarding their sales of incandescent bulbs not declining that quickly. For example, the most recent shelf survey study found 19% of lighting packages in the discount stores were incandescent in 2013, compared to 18% in 2012.

Bulb stocking and bulb sales do not necessarily correlate, but the discount channel presents one outlet where this correlation proves more likely. Our interviews with lighting market actors revealed that, since retail channels such as discount, grocery, and drug stores, have more limited shelf space for lighting, they tend to dedicate this limited shelf space to the best-selling lighting products. If discount stores stock incandescent bulbs, this provides a reasonable indicator that they sell well.

This contrasts, for example, with large home improvement stores, which are considered “destination stores” for lighting products. They usually offer a full range of lighting products because they seek to insure customers making trips to their stores find the light bulbs they seek, even if these are less popular bulb types. This would explain why the shelf survey study found large home improvement channels had the highest proportion of stores (100%) selling incandescent bulbs in Massachusetts, compared to 61% of stores in the discount channel.⁷

Yet this poses an additional question: “If the incandescent bulbs were such good sellers, why did not all the discount stores sell the incandescent bulbs?” This may be explained by only a small number of large lighting manufacturers producing incandescent bulbs and offering access to stockpiles of incandescent bulbs produced before the EISA phase-out (in contrast to the CFL market, which has a much broader range of suppliers). Whether from choice or necessity (*e.g.*, difficult price competition), most of these large lighting manufacturers selling incandescent bulbs have, when participating in upstream lighting programs, made supply arrangements with big box retailers rather than retailers in HTR retail channels,

⁷ Cadmus, NMR, DNV GL. *Residential Lighting Shelf Survey and Pricing Analysis*. Delivered to the PAs and EEAC consultants on June 2, 2014.

such as discount stores. Therefore, discount stores addressed in the shelf survey sample and not stocking incandescent bulbs may have been working with suppliers that did not have ready access to these incandescent bulbs.

Another possible reason why large home improvement stores were more likely to have incandescent bulbs than the discount stores is their superior warehousing capacity. Reports from lighting market actors in previous evaluations have indicated that the large home improvement stores have greater warehousing capacity than discount stores. This would allow them to keep greater stores of incandescent bulbs (e.g., purchased before the EISA phase-out) which they could draw upon later. The 2013 Massachusetts supplier report did record a few lighting manufacturer claims of retailer hoarding of incandescent bulbs in anticipation of EISA as well as mixed evidence for consumer hoarding.⁸

Some notable differences emerged between lighting market actors regarding how they viewed EISA's impacts on halogen bulbs. Eighty-two percent of manufacturers and 50% of the retail buyers said halogen bulb sales increased due to EISA. In contrast, only 15% of store managers said their sales of halogen bulbs increased since 2012.

This difference may result from the surveys asking manufacturers and retail buyers a different question ("What has been the impact of this energy legislation on sales of EISA-compliant halogen bulbs?") than the store managers ("Have sales for [these bulbs] increased, decreased, or stayed the same since 2012?").⁹

Manufacturers and retail buyers also may have commented on halogen sales trends nationally and regionally, while store managers offered a Massachusetts-specific perspective. If true, this indicates

⁸ One finding of the 2013 report was: "Some lighting market actors reported hoarding of incandescent bulbs. Twenty-two percent of the store managers who had noticed a change in their customers' purchasing behavior in response to EISA (about 10% of all the retailers in our sample) reported some hoarding of incandescent bulbs. In addition, one buyer for a major retailer, which also has a major presence in the Massachusetts program, indicated that his company had experienced a spike in sales of incandescent bulbs soon after the legislation went into effect. This sales spike encompassed all incandescent wattages, not just the higher wattage bulbs subject to the initial stages of the phase-out. A couple of incandescent bulb manufacturers also reported a spike in demand for these products, which they attributed to hoarding by retailers. However, it is important to note that the onsite surveys that were conducted in the spring of 2013 by another member of the evaluation team did not find much evidence of EISA-driven hoarding." (KEMA, Inc. (under subcontract to NMR Group, Inc.) *Lighting Retailer, Supplier Perspectives on the Massachusetts ENERGY STAR® Lighting Program*, Final Report. Prepared for Cape Light Compact, National Grid, NSTAR, Unital, Western Massachusetts Electric, Energy Efficiency Advisory Council Consultants. June 2013, p. 1-3).

⁹ We asked the question differently for the store managers because our surveys of these market actors in years past revealed that while lighting manufacturers and retail buyers were nearly universally aware of the EISA legislation, a significant percentage of store managers were not. Therefore, by making the question more generic (e.g., "since 2012"), we hoped to capture more sales trend information from non-EISA-aware store managers who might be filtered out (e.g., by giving "don't know" responses) by a more directly EISA-focused question.

halogen bulbs have not achieved the same market penetration in Massachusetts as in other parts of the country.

If so, why would Massachusetts experience a smaller market penetration of EISA-compliant halogen bulbs? A couple of lighting manufacturers from our 2013 survey offered a possible explanation: by continuing to offer discounts for standard CFLs, the Massachusetts program keeps many consumers from purchasing less expensive and less energy-efficient, EISA-compliant halogens. The following excerpt from the 2013 report illustrates this point:

Two manufacturers pointed to differences between the Massachusetts and California lighting markets that allowed the CFLs in Massachusetts to be more price competitive with the EISA-compliant [halogens] than was the case in California. One lighting manufacturer representative whose company sold into both the Massachusetts and California lighting markets indicated that, because the Massachusetts upstream lighting program was relatively consistent in providing buydown discounts for CFLs, the CFLs and the EISA-compliant halogens were usually equivalent in price, both selling for about \$1.00 per bulb. Therefore, in the Massachusetts market, there was limited risk of customers “regressing” to the less energy-efficient halogens or incandescents for price reasons. However, he maintained that this was not the case in California, where the upstream lighting program price discounts for the CFLs were often not available. He claimed that, during periods when the California CFL buydown discounts were not available, the typical retail price for a basic CFL was \$3.99 and this was causing many consumers to buy the cheaper incandescent bulbs and EISA-compliant halogen bulbs instead. Another lighting manufacturer representative who also sold into both the Massachusetts and California lighting markets made a similar observation. “In California, most of the utilities are not rebating anything but [CFL equivalents for] the 60-Watt bare spiral now, where you can see in Massachusetts, from February until now [September 2012] they’re still rebating [CFL equivalents] for 75 and 100 Watts,” she said. “So I’m not sure regulatory-wise why they’re allowed to do it and California is not.”¹⁰

Our 2014 in-depth interviews with lighting manufacturers and retail buyers found that some of these lighting market actors continued to make this claim: that if the Massachusetts program reduced or eliminated discounts for standard CFLs, many customers would “regress” to less energy-efficient halogen bulbs due to lower prices.

Some manufacturers selling CFLs in the Massachusetts and California residential lighting markets have cited California as a “cautionary tale” for what would happen in the Massachusetts lighting market if the

¹⁰ KEMA, Inc. (under subcontract to NMR Group, Inc.) *Lighting Retailer, Supplier Perspectives on the Massachusetts ENERGY STAR® Lighting Program*, Final Report. Prepared for Cape Light Compact, National Grid, NSTAR, Unitil, Western Massachusetts Electric, Energy Efficiency Advisory Council Consultants, pages 45-46. June 2013.

Massachusetts program eliminated or significantly reduced CFL discounts. They reported that after California mostly eliminated discounts for standard CFLs, EISA-compliant halogens gained significant market shares at the expense of CFLs, which rose to a higher price point in the absence of program discounts.

A major lighting manufacturer interviewed in 2014 described the challenges CFLs faced in California due to competition with EISA-compliant halogens:

Well, in [the] absence of a program, a CFL would be \$4.00.... So [a typical bulb shopper in a hardware store] goes over, he looks at the light bulb section. He sees some souped-up halogen bulb, 18 lumens a watt that meets EISA on the shelf. And those are \$0.80 a piece...they may be \$9.99 for a 12-pack or something like that, a six-pack; it depends, but cheap.... Here in California...we do a lot of business with [a major California grocery chain]. And we have data from them that the CFL category has dropped off in California by about 50%, and all this market share has been taken by the halogen. So CFLs have eroded because there's an absence of utility funding in California [for CFL discounts].... But those [EISA-compliant halogens] just developed since EISA. Those were not around. EISA created those halogen SKUs [stock keeping units], and that was a bad product that nobody saw coming except the majors [the largest lighting manufacturers who used to produce incandescents] were able to get that workaround. And in my opinion, it makes the EISA law very counterproductive, because it's really forcing more people back to less efficient light bulb sources than the other way.

There were some data to support these claims, although other data remains unavailable or inconclusive, as described below:

- The 2013–2014 tracking data from the California Upstream Lighting Program confirm the reduction in program support for standard CFLs. However, evaluators have yet to conduct the shelf surveys and other data collection in California that would indicate increases in halogen market shares during 2013–2014.
- Point-of-sale data obtained through the Consortium for Retail Energy Efficiency Data (CREED) indicated a rising proportion of halogen sales from 2009 to 2013. However, the increase in market share did not differ between Massachusetts and the national market (represented by 44 states). Notably, point-of-sale (POS) data reflect sales information from participating and nonparticipating Massachusetts retailers, while the CATI surveys only reflect the perspectives of participating retailers. Therefore, if the claims of some lighting manufacturers/buyers are correct (e.g., program discounts can keep standard CFLs more cost competitive with halogens), one would expect the Massachusetts participating retailers to report a lower halogen market share than the general population of Massachusetts retailers, which cannot be determined through the POS data.
- Residential socket saturation data show Massachusetts with a slightly lower percentage of sockets with halogens (6%) than California (9%). Yet California saturation data derive from 2012,

pre-dating the 2013–2014 period which is when some lighting manufacturers and retail buyers claimed fewer standard CFL discounts led to increased sales of halogen bulbs.

One retail buyer interviewed in 2014 also claimed that if CFL and LED discounts discontinue, many consumers would switch to halogen bulbs. For this reason, he urged Massachusetts regulators to make the 72-watt halogen bulb and not the 23-watt CFL the baseline for estimating LED energy savings. The buyer noted:

The regulators are basing the savings of CFLs off of EISA, which they never should have done in the first place.... That should be the baseline, the new incandescent [the EISA-compliant halogen], because that's what people are going to buy if there's no incentives on CFLs or LEDs. But that's not the case now. So you've got program administrators clambering for ways to...claim savings on LEDs, which they should be able to...when all these incentives go away, and Bob and Jill and Billy go buy light bulbs, they're going to go buy the incandescent bulbs that are on the shelf. They're not going to buy the LEDs that are \$5.00 plus or certainly not the CFLs,... The regulators have screwed it up. The evaluators have supported them, and they screwed it up even worse. And the program administrators are going to be the ones left holding the bag, because they can't claim savings on lighting. And then the consumers are going to go back to the hybrids.... So simple math should be on a 100-watt, in the 100-watt bulb category, the old wattage was 100, and you replace it with a 23-watt CFL. Now it's 72 watts, but you still replace with a 23-watt CFL. So there's still significant savings, and even more so for a LED at say 20 watts to replace that 72-watt bulb. The problem is that the equations being used by the regulators don't take into consideration that 72 watts. They just wipe it totally off the face of the earth, like it doesn't exist, and they use the 23 watt CFL as the baseline.

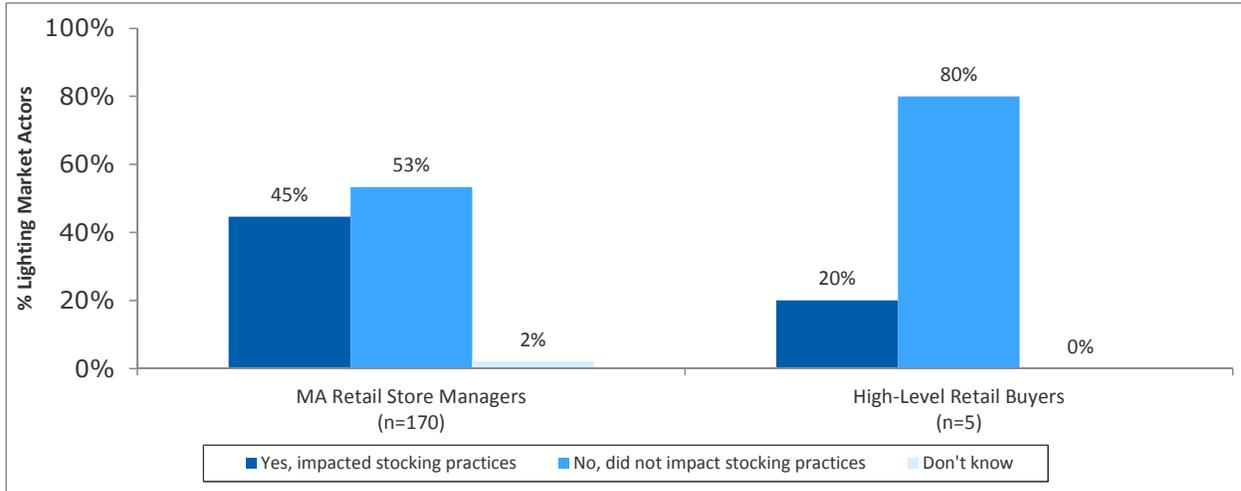
This retail buyer's claims -- that Massachusetts currently uses the CFL as its baseline assumption for estimating LED energy savings and evaluators supported this assumption -- are factually incorrect. Massachusetts currently determines its baseline assumptions from a Market Adoption Model, which relies on very current product sales and socket saturation data, collected and analyzed by program evaluators. This model currently uses baseline assumptions that comprise a mix of incandescents, halogens, and CFLs.

EISA Impact on Stocking Practices

The evaluators asked high-level retail buyers and Massachusetts store managers if their companies changed stocking practices due to the EISA phase-out. Figure 6 shows that the majority of these market actors said that they did not alter their stocking practices because of EISA legislation. When we looked for further explanation in the verbatim responses, two themes emerged. First some retailers said that they had migrated to the higher efficiency bulbs not because of EISA but because their company sold "the best products" in general and they viewed these higher efficiency bulbs as higher quality products.

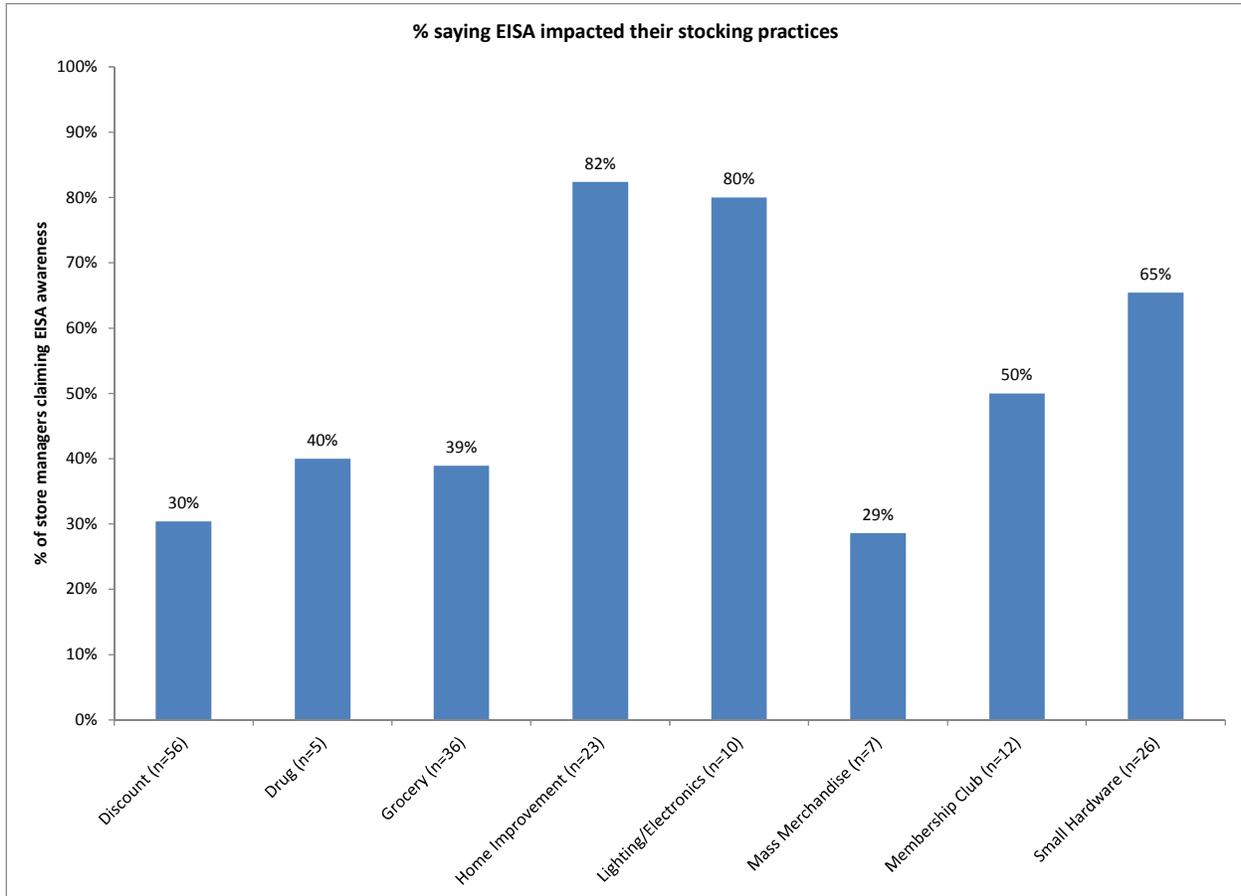
A second theme was that it was not EISA which had caused them to change their stocking practices but rather the discounts offered by the Massachusetts lighting program.

Figure 6. MA Store Managers and High-Level Retail Buyers Perception on Changes in Stocking Practices Due to EISA Legislation



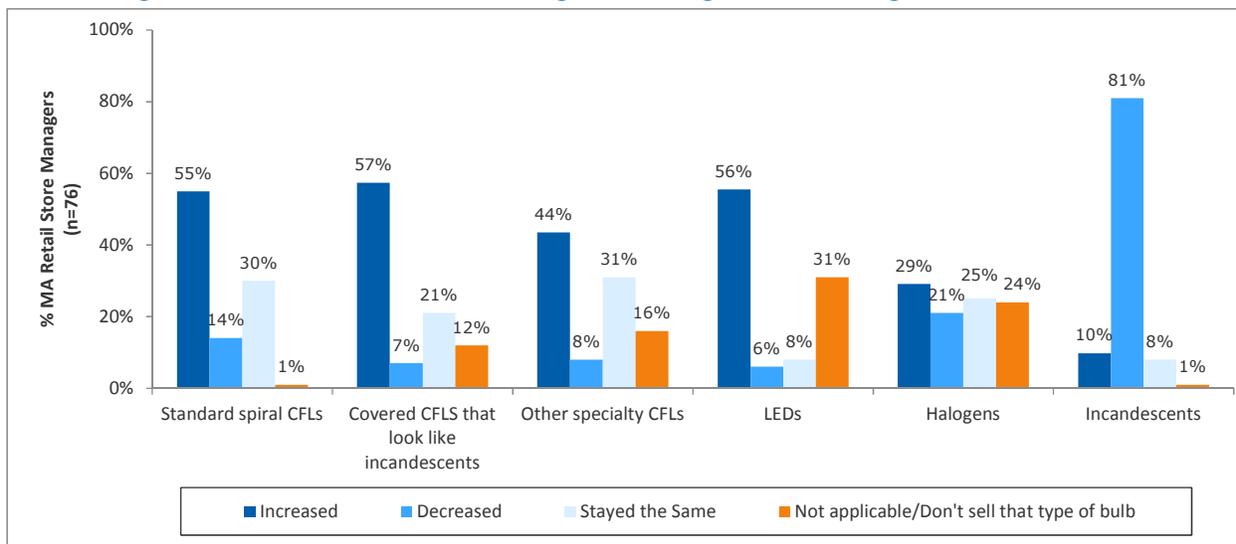
The store managers displayed a great deal more variability in their responses. Figure 7 shows managers of lighting “destination stores” (e.g., lighting/electronics, home improvement, and hardware) were much more likely than store managers from other retail channels to say EISA impacted their stocking practices.

Figure 7. Whether MA Store Managers Reported EISA Impacts on Bulb Stocking



Evaluators asked store managers who reported changing their stocking practices due to the EISA bulb phase-out if their stocking of CFLs (*e.g.*, standard, covered, and other specialty CFL products), LEDs, halogens, and incandescent bulbs increased, decreased or stayed the same since 2012. Figure 8 shows about one-half of these store managers said they increased their inventory of all CFL bulb types and LEDs. In contrast, less than one-third (29%) of these respondents stocked more halogens, and the large majority (81%) said they had stocked fewer incandescents since 2012.

Figure 8. Massachusetts Store Managers Stocking Practices of Light Bulbs Since 2012



Future Impacts of EISA on Lighting Sales, Stocking, and Pricing

We asked lighting manufacturers and high-level retail buyers about their expectations for future effects of EISA legislation on CFLs, EISA-compliant halogens, and LED bulb sales. Most responses focused on changes in sales and pricing for energy-efficient lighting.

Figure 9 shows noticeably more manufacturers indicated prices will decrease for LEDs compared to CFLs and EISA-compliant halogens. About the same percentages of manufacturers indicated sales will increase for CFLs, EISA-compliant halogens, and LEDs in the future. Similarly to manufacturers, more retail buyers said prices will decrease for LEDs compared to CFLs and EISA-compliant halogens (see Figure 10). A higher percentage of retail buyers also reported that LED sales will increase relative to CFLs and EISA-compliant halogens.

Notably, given the much greater prices for LEDs than for CFLs or halogen bulbs, and because LED bulbs are newer technologies, they inherently offer the potential for larger decreases in prices. Similarly, current LED sales levels are so low compared to CFLs and halogen bulbs that they inherently have greater room to grow.

Figure 9. Lighting Manufacturers Perception of Future Impact of EISA

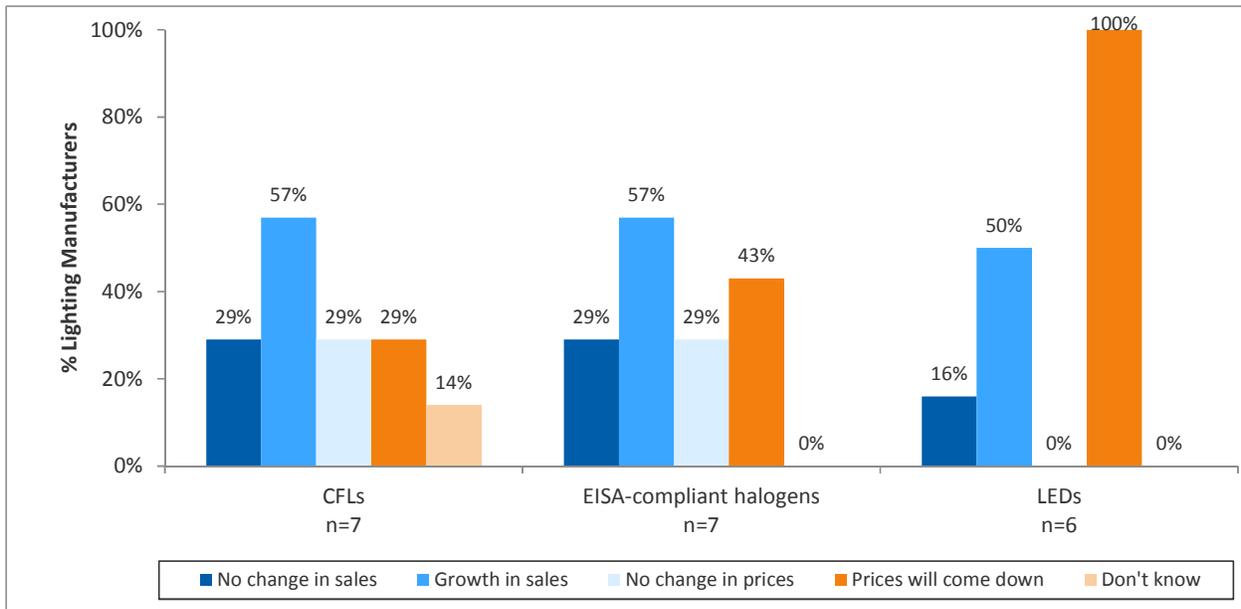
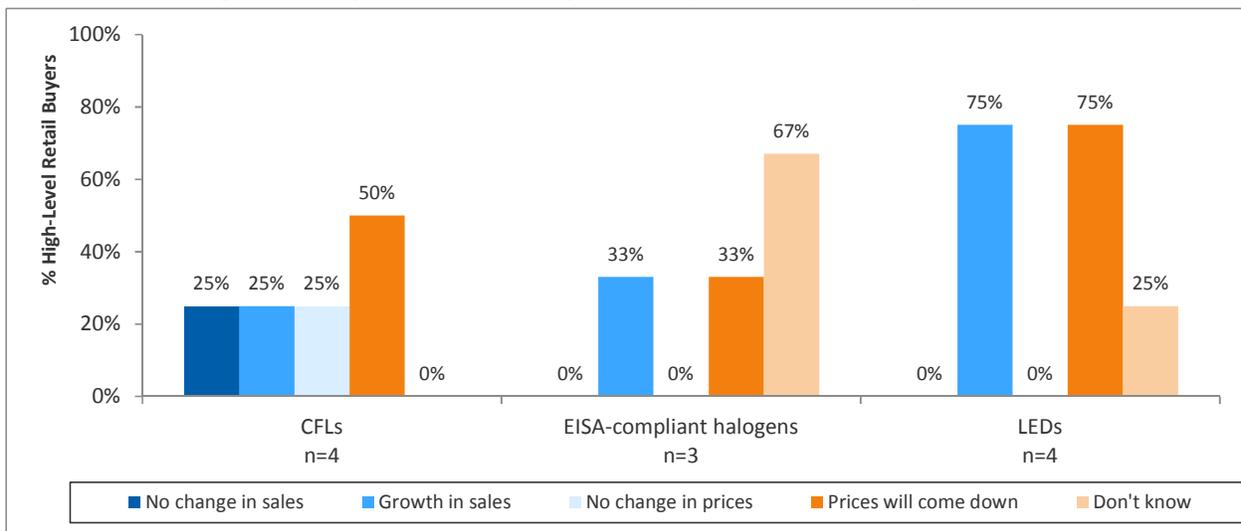


Figure 10. High-Level Retail Buyers Perception of Future Impact of EISA

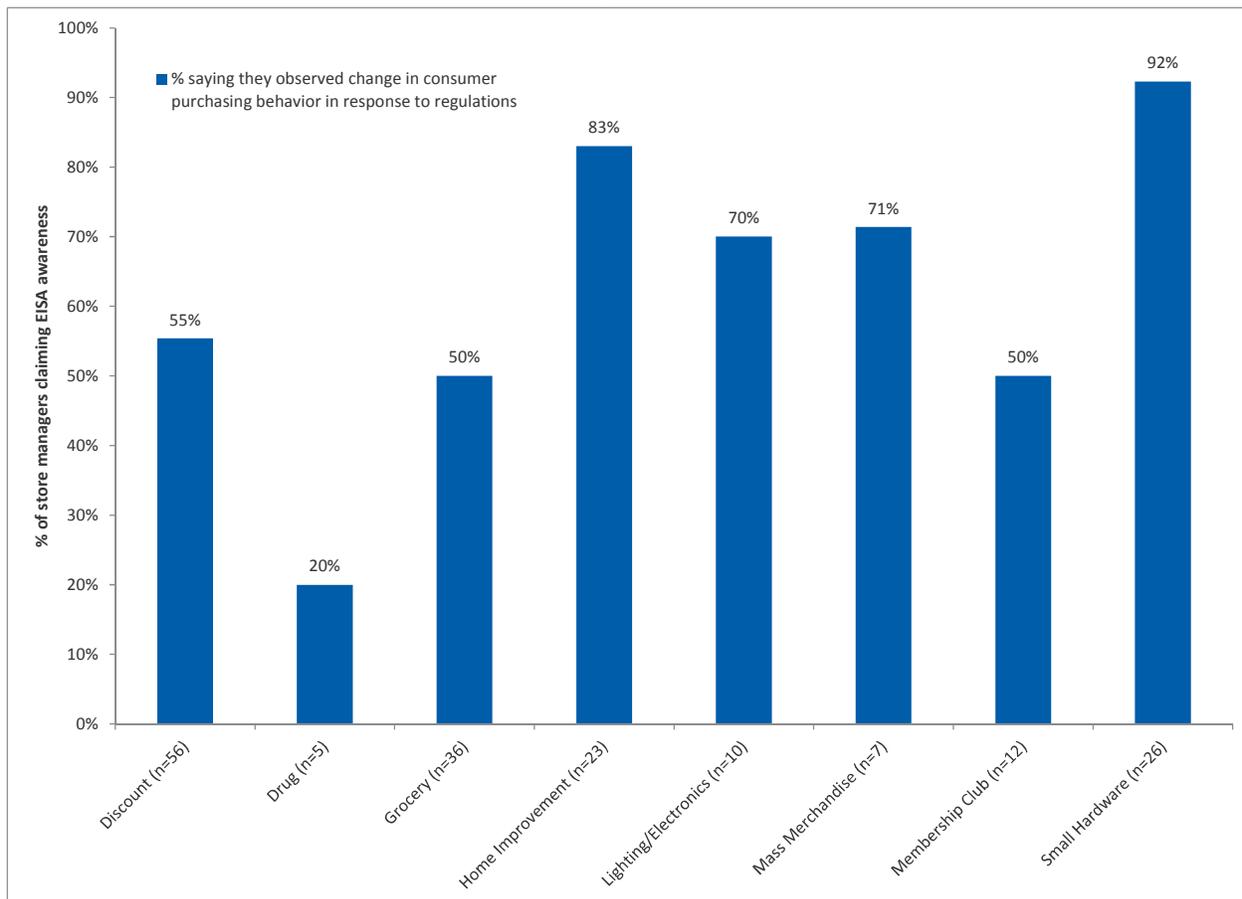


Impacts of EISA on Consumer Purchasing Behaviors

We asked store managers reporting awareness of EISA if they observed changes in their consumers' purchasing behaviors in response to the new regulations. Across all retail channels, 61% said they had observed such changes in consumer behaviors. However, responses varied a great deal, depending on the retail chain. Figure 11 shows store managers in the hardware and home improvement retail channels were much more likely than store managers in other retail channels to report changes in

consumer purchasing behaviors due to EISA. One possible explanation for this is that hardware and home improvement stores (along with lighting stores) generally offer the widest range of bulb choices because they view themselves as lighting “destination stores” where shoppers can expect to find any bulb type they seek, including incandescent bulbs. Therefore managers of stores of this type would be more likely to witness traditional incandescent bulbs shoppers having to change their purchasing habits due to the EISA phase-out.

Figure 11. Whether Store Managers Observed Changes in Consumers Purchasing in Response Due to EISA



LED Market Assessment

This section discusses findings from the lighting market actor interviews concerning LED bulbs, including the following issues:

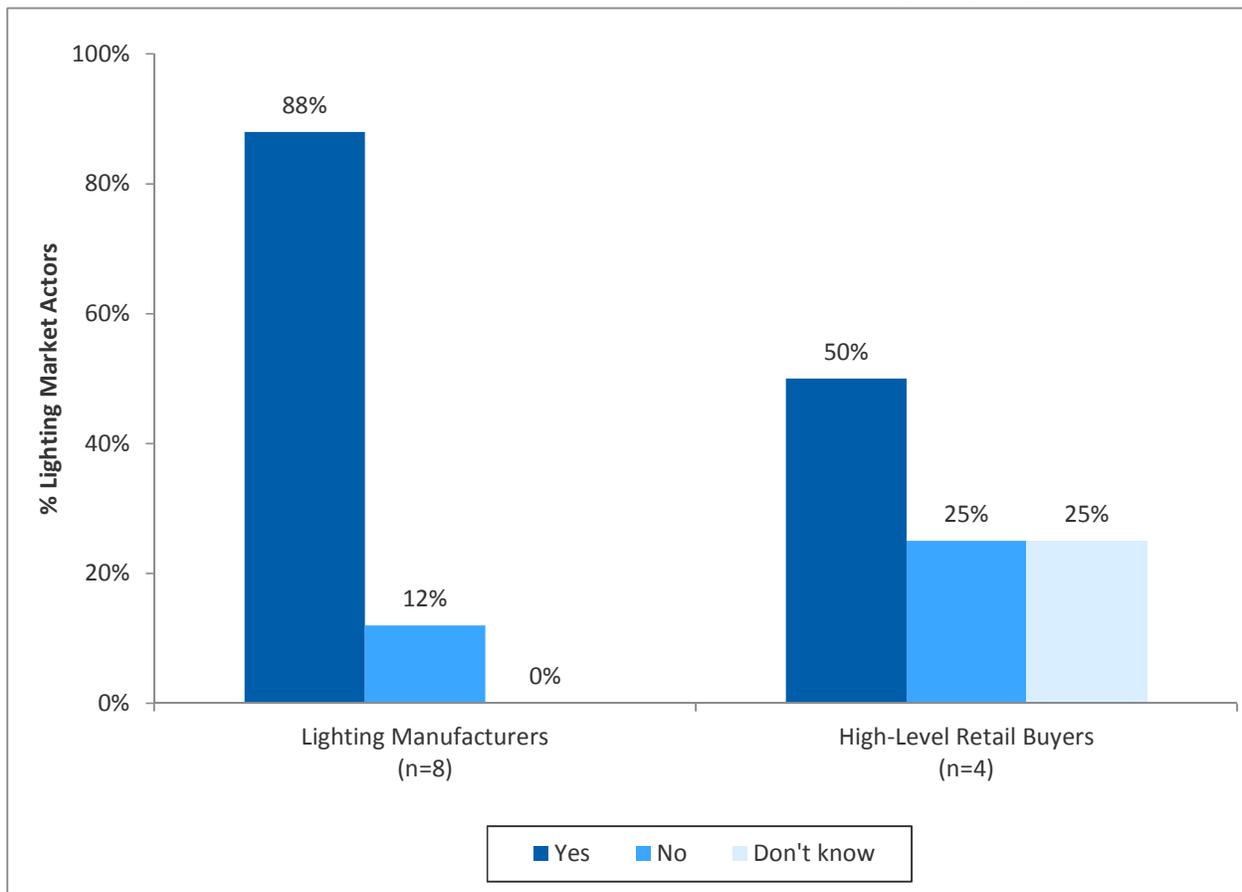
- Prior sales of LEDs in Massachusetts;
- Reasons why some businesses are not selling LEDs;
- LED bulb sales over the previous year;

- Factors and/or barriers preventing LED bulb and fixture sales;
- The future pricing of LED bulbs and fixtures;
- The effectiveness of the Massachusetts ENERGY STAR Program in promoting LED bulbs;
- The impact of program LED rebates;
- The perceived adequacy of incentive levels offered by the program; and
- Suggestions for increasing LED bulb sales

Historical LED Sales in Massachusetts

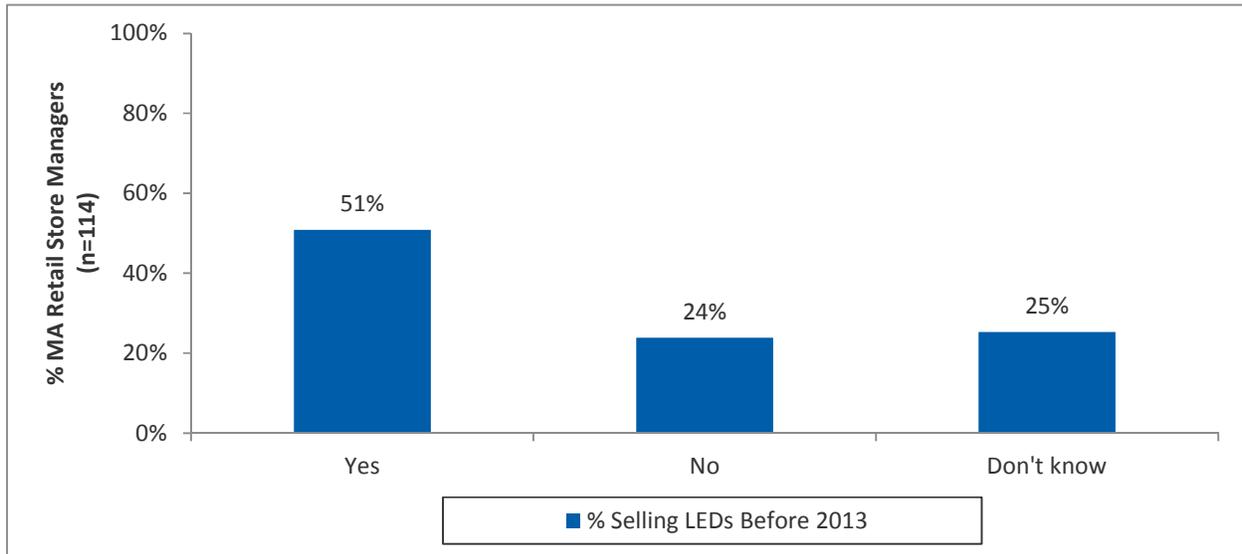
We asked manufacturers and high-level retail buyers if their businesses sold LEDs before becoming involved with the Massachusetts ENERGY STAR Lighting Program. Figure 12 shows the large majority of lighting manufacturers and one-half of the high-level retail buyers reported selling LEDs before becoming involved with the Massachusetts program.

Figure 12. Lighting Manufacturers and High-Level Retail Buyers Selling LEDs Before Involvement with the Massachusetts ENERGY STAR Lighting Program



We also asked store managers if their businesses sold LEDs prior to 2013. Figure 13 shows about one-half (51%) of store managers reported selling LEDs before 2013. However, one-quarter did not know if their businesses sold LEDs prior to 2013.

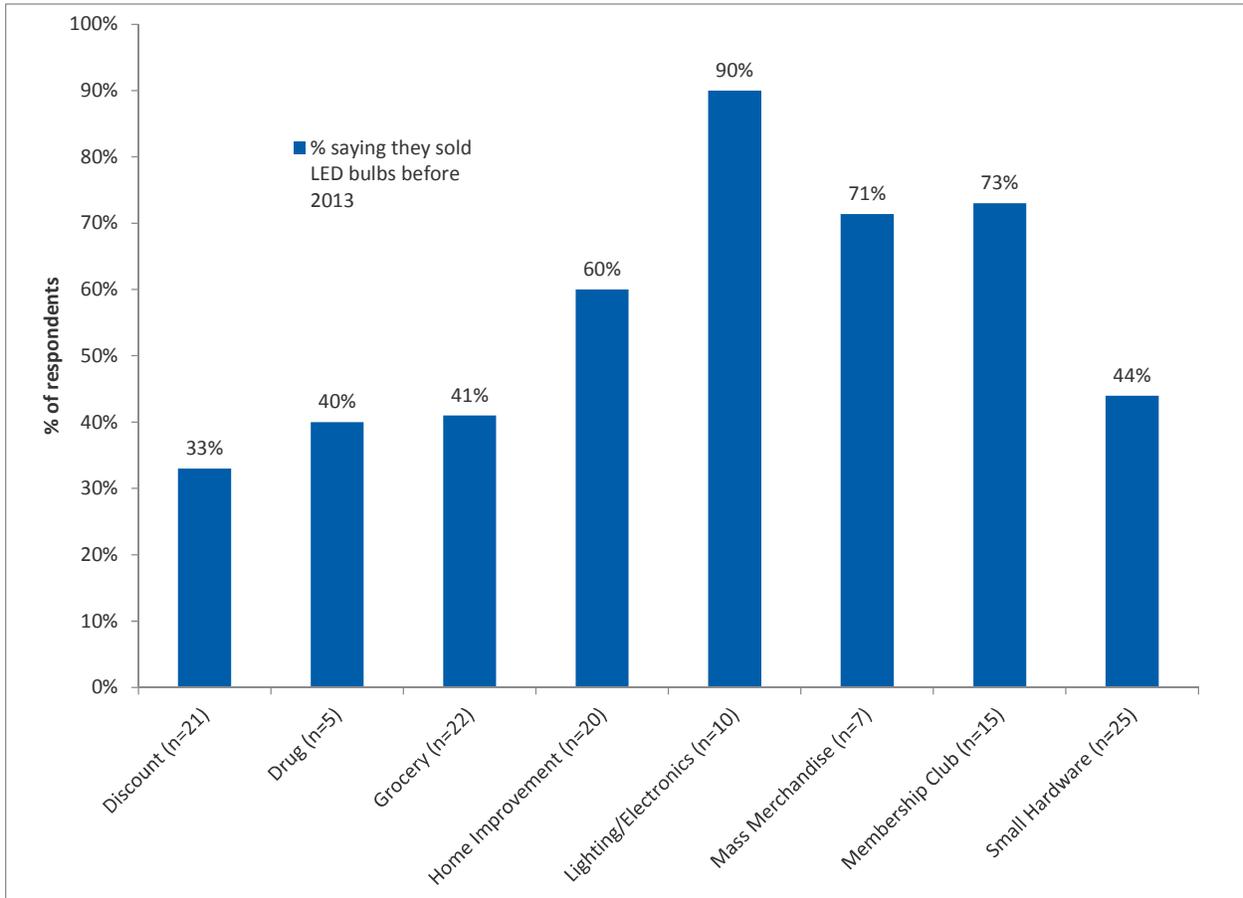
Figure 13. MA Store Managers Reporting Sales of LEDs Prior to 2013



These responses varied a great deal, depending on the store manager’s retail channel, as shown in Figure 14. Given customers’ price sensitivity; it is unsurprising that few discount stores reported selling LED bulbs before 2013 (when these bulbs were much more expensive). Similarly, we expected most drug and grocery stores—which have limited shelf space for lighting products and prefer to focus on fast-selling lighting products—would not sell LEDs prior to 2013. We did not expect, however, that less than one-half of the hardware stores would report LED sales before 2013.

Among retail channels where a majority of store managers reported selling LED bulbs before 2013, few surprises emerged. Home improvement and lighting stores traditionally stock a wide range of lighting products. In addition, large membership club chains such as Costco historically have tried to feature the most energy-efficient bulbs available (*i.e.*, they phased out incandescent bulbs before EISA requirements).

Figure 14. MA Store Managers Reporting Sales of LEDs Prior to 2013, by Retail Channel



Reasons Why Businesses Do Not Sell LEDs

We asked market actors who reported not selling LED bulbs why their company/store declined to carry this bulb type. Table 2 summarizes respondents' reasons for not offering LEDs. All three market actor groups among those that do not sell LEDs indicated that they thought their consumers would not pay the higher LED prices.

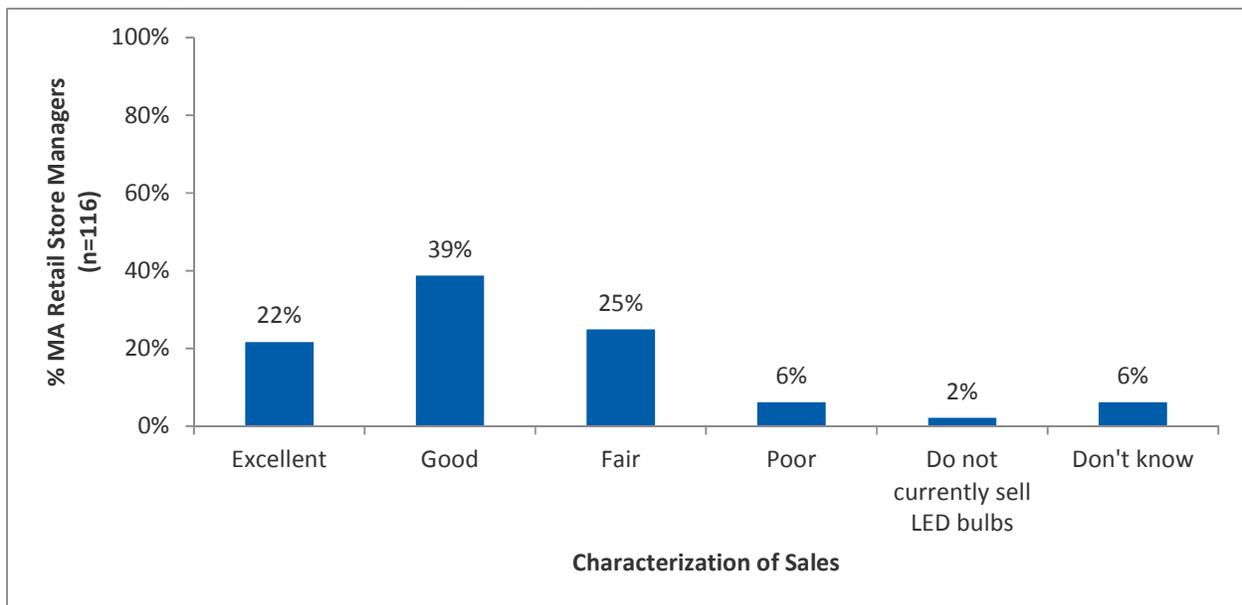
Table 2. Reasons Businesses Not Selling LED Bulbs

Reason for Business Not Selling LEDs	Market Actor(s) Indicating Reason		
	Store Manager	Manufacturer	Buyer
Too expensive (for customers)	X	X	X
Need for higher rebate levels		X	X
Does not fit well with rest of product line	X	X	
Customers not interested	X	X	
Limited availability	X		
Consumers not sufficiently familiar with these products	X		
Hassle to obtain ENERGY STAR certified LED bulbs (e.g., time and cost)	X	X	

Characterization of LED Sales in the Prior Year

We asked Massachusetts store managers to characterize their LED bulbs sales over the past year as “excellent,” “good,” “fair,” or “poor.” Figure 15 shows most store managers (61%) reported sales to be “excellent” or “good,” while very few (6%) indicated “poor” LED bulb sales. This was an improvement from the 2013 survey of store managers (n= 137) when 53 percent reported LED sales to be “excellent” or “good” over and 11 percent characterized their sales as “poor.”

Figure 15. MA Store Manager Perceptions of LED Bulb Sales Over the Past Year



Factors/Barriers Preventing Sales of LEDs

We asked lighting market actors to identify factors preventing more LED products from being sold. Table 3 summarizes market actors’ challenges in selling LED products. All market actor groups cited price as the biggest reason for experiencing difficulties in selling LEDs.

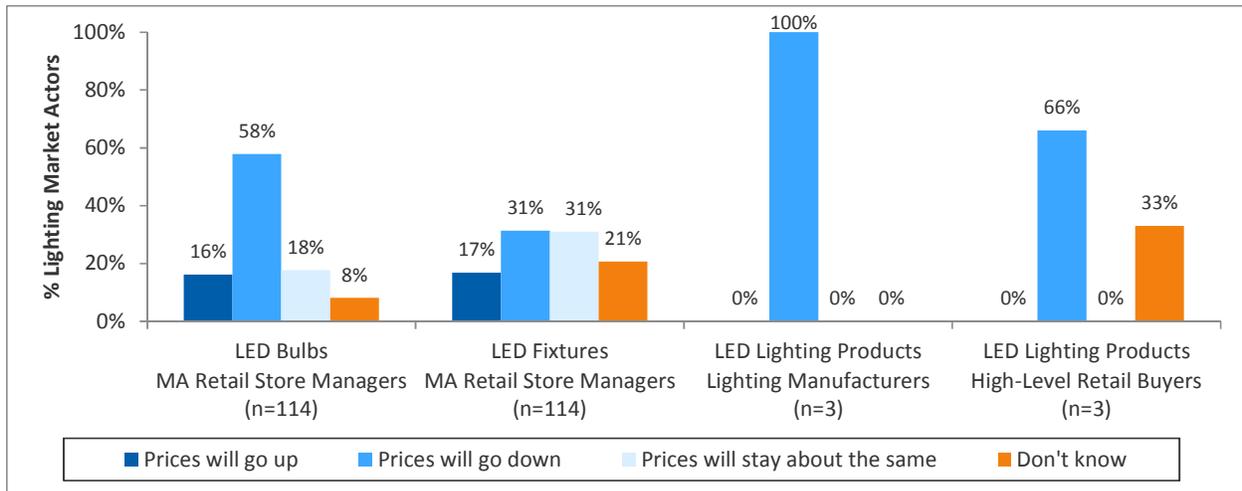
Table 3. Factors Preventing Sales of LED Products

Barrier to Selling LEDs	Market Actor(s) Indicating Barrier		
	Store Manager	Manufacturer	Buyer
Too expensive for customers	X	X	X
Application (LEDs do not match what needs to be replaced)		X	X
Performance issues		X	X
Past quality problems	X		
Does not fit well with rest of product line	X		
Customers not interested in them	X		
Limited availability of them	X		
Lack of consumer familiarity/need for more consumer education	X	X	
Do not sell well	X		
Program discounts/rebates not always available	X		
Confusing language on LED packaging (e.g., customers confused about how to differentiate “warm white”, “cool white” and “family room” color)			X

Future LED pricing levels

We asked store managers if they thought prices for LED bulbs and fixtures would increase, decrease, or stay the same in 2015. Along the same lines, we asked lighting manufacturers and high-level retail buyers if LED lighting product pricing generally would go up, down, or stay the same over next few years. Figure 16 shows all lighting manufacturers and most high-level retail buyers (66%) said prices would fall for LED products in general during the next few years. While the majority of Massachusetts store managers (58%) reported prices for LED bulbs would decrease in 2015, only about one-third (31%) indicated prices for LED fixtures would decrease.

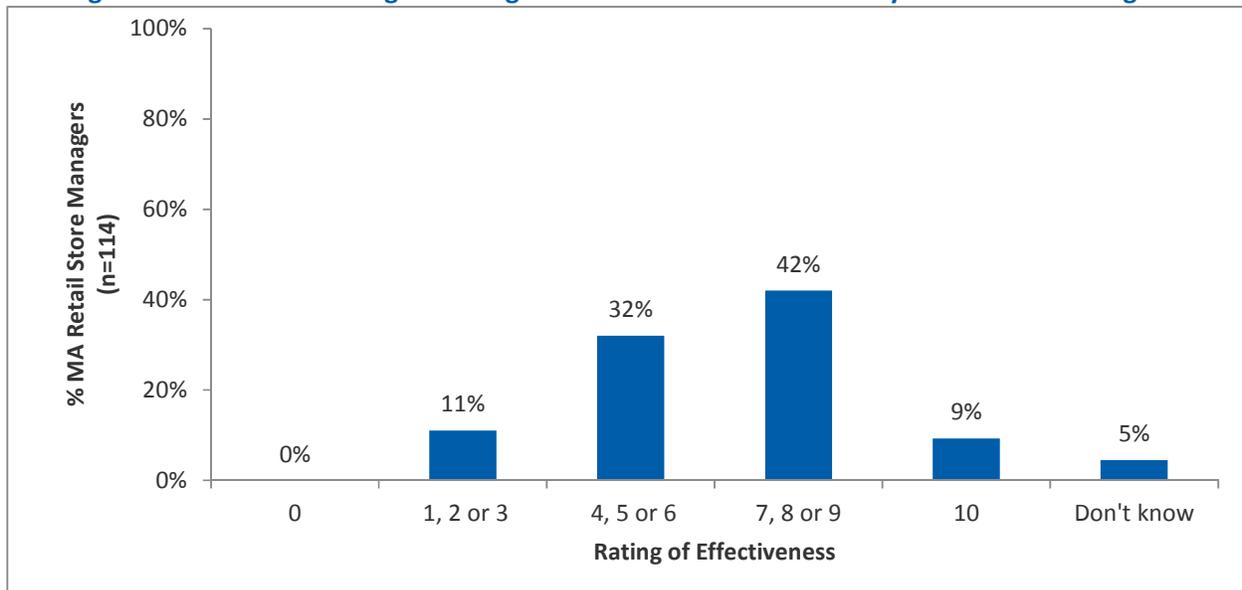
Figure 16. Lighting Market Actor Perceptions of LED Prices in the Future



Effectiveness Rating for Promotion of LED bulbs by MA ENERGY STAR Lighting Program

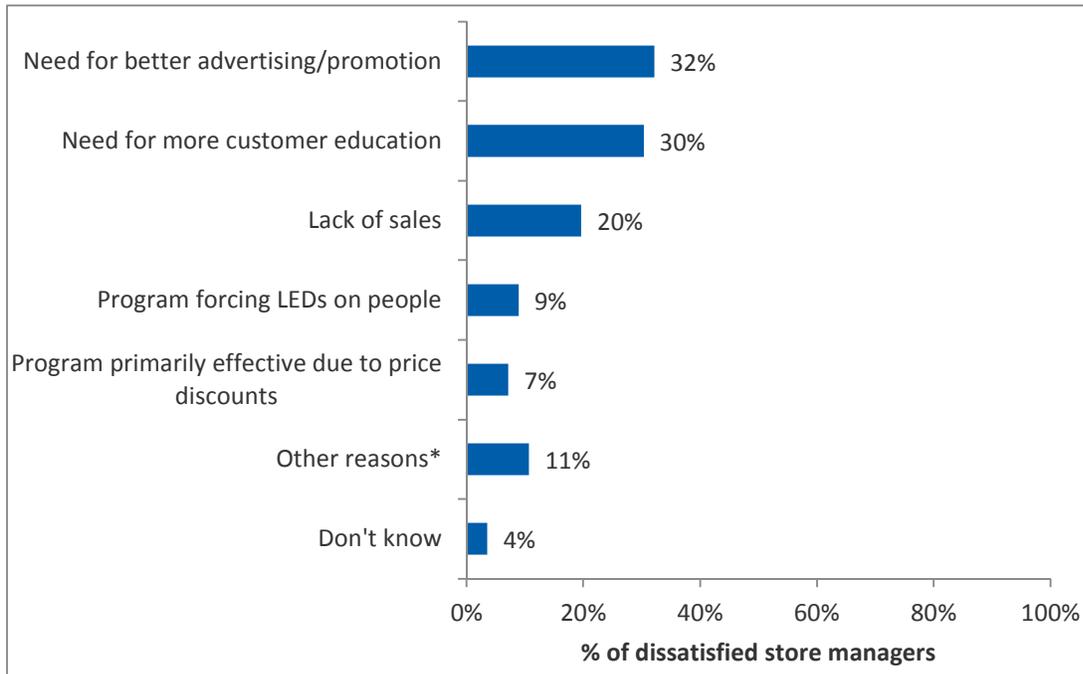
We asked store managers to rate the ENERGY STAR program’s effectiveness in promoting LED bulbs over the past year, using a scale of 0 to 10, where 0 means “not very effective at all” and 10 means “very effective.” Figure 17 shows about half (51%) of store managers provided a rating of 7 or higher, indicating the ENERGY STAR program effectively promoted LED bulbs. However, almost one-third (32%) of managers rated the Massachusetts ENERGY STAR program’s effectiveness as a 4, 5, or 6, indicating they did not strongly believe in the program’s effectiveness in promoting LED bulb sales. In addition another 11%) provided a rating below 4.

Figure 17. MA Store Managers Ratings for Promotion of LED Bulbs by ENERGY STAR Program



We looked more closely at the responses of those who gave satisfaction ratings of less than seven. Figure 18 shows that these store managers were most likely to cite the need for better advertising/promotion or more customer education as reasons for their dissatisfaction.

Figure 18. Reasons Why Store Managers Were Less Than Satisfied with Program LED Promotion Efforts



Note: Total responses exceed 100% because respondents were allowed to give multiple responses. The total sample of dissatisfied store managers was 56. *Other reasons included that customers are just buying what is available, a desire to see the old bulbs return, and the program not being well run.

Some of the verbatim responses of the dissatisfied store managers included:

- **Need for better advertising/promotion:**
 - "There is not enough word out on the street. Maybe if they put some information in the electric bill like 'you can save X amount of money over time using the LED lights'. Same thing with LED fixtures."
 - "I do not see it on TV, the news or on the Internet."
 - "They help in-store but do not do any promotions or advertising - they leave it up to the stores."
 - "A lot of people still are not aware of them."
 - "I do not see a lot of push or ads for it."

- "I have not seen or heard of the program at all, until today."
- "It helps to sway people who are already in the aisle, but it does not help people to come and want to replace their bulbs who were not already planning to do so."
- "I think they could get the word out a little bit more."
- "Because we still have people that do not know about LEDs, so they are not reaching everyone."
- "Working in the store, I have not seen many advertisements."
- **Need for better education**
 - "It is a new emerging technology that has a long road to bear fruit. Customers need to know more about it."
 - "The only things I have seen for commercials to push LED bulbs doesn't say much about why they are special other than they are energy efficient. People want to know more about them."
 - "People are not informed."
 - "Just what I am seeing - the vast majority do not know anything."
 - "There is not a lot of information readily available."
 - "The majority of people do not know about LED lights until they come in."
 - "I do not know if the state of Massachusetts communicates their intent to the general public."

Figure 19 shows Massachusetts store managers provided a higher average effectiveness rating for promotion of LED bulbs by the ENERGY STAR program in 2014 (average rating = 6.4) compared to 2012 (average rating = 5.6).

Figure 19. MA Store Manager Ratings for Promotion of LED Bulbs by ENERGY STAR Program, 2012 vs. 2014



Impact of the Program on the Promotion of LED Bulbs

We asked lighting market actors if the ENERGY STAR program affected their promotion of LED lighting products. Figure 20 shows around one-half of Massachusetts store managers and high-level retail buyers said the program did not greatly impact their promotion of LED products. In contrast, almost three-quarters (71%) of manufacturers reported the program impacted their decisions to start selling LED lighting products. This difference could be explained by the greater awareness of participating manufacturers than retail market actors regarding the full influence of substantial program discounts for LED bulbs on manufacturers’ decisions whether or not to sell these bulbs through certain retail channels. In addition, as noted above, only about half of the store managers were satisfied with the program’s promotional efforts. An analysis of their verbatim responses indicated that they believed that the program should provide more education to help consumers better understand the benefits of LEDs.

Figure 20. Did the Massachusetts ENERGY STAR Lighting Program Affect Promotion of LED Products

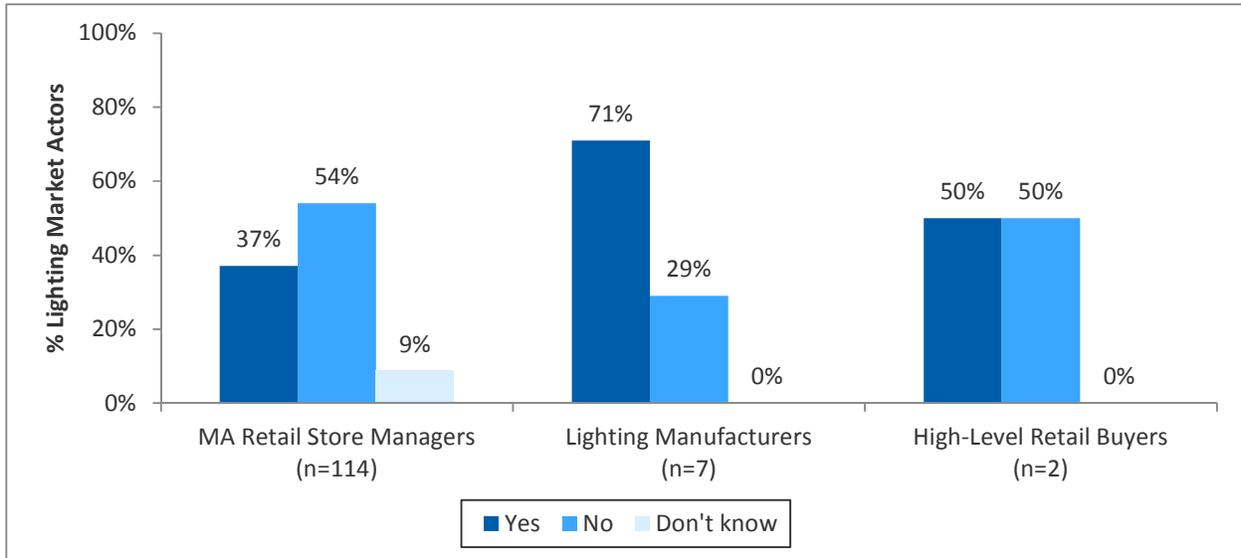
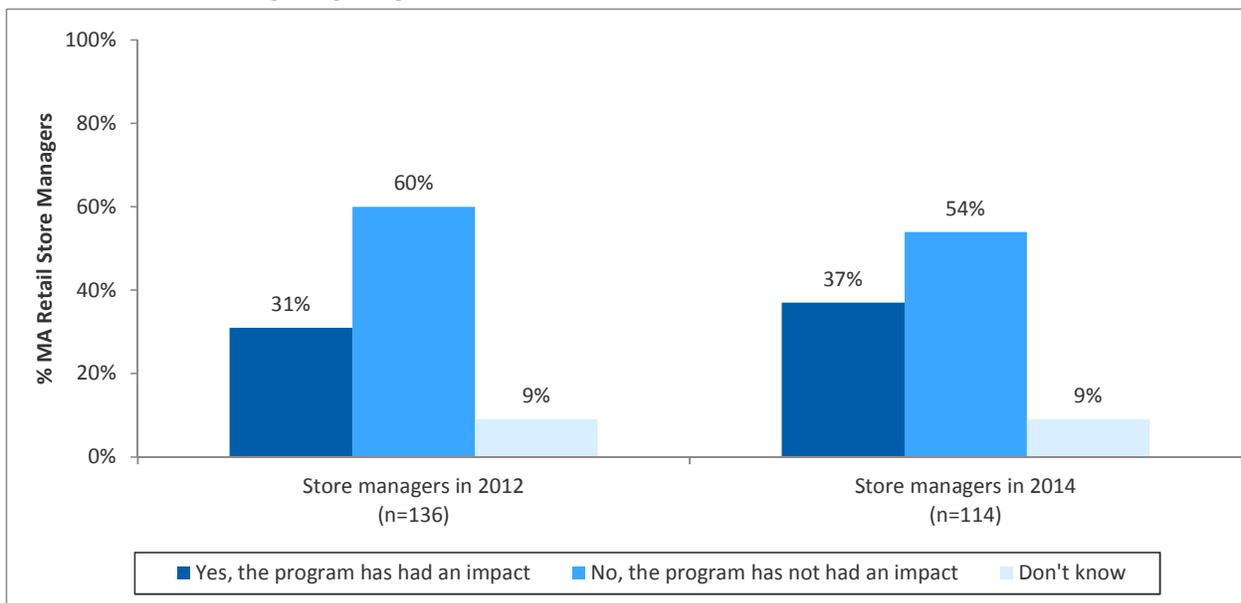


Figure 21 shows a small increase from 2012 to 2014 in the percentage of store managers saying the program affected their promotion of LED products.

Figure 21. MA Store Manager Perceptions on Impact of Massachusetts ENERGY STAR Lighting Program on Promotion of LED Products, 2012 vs. 2014

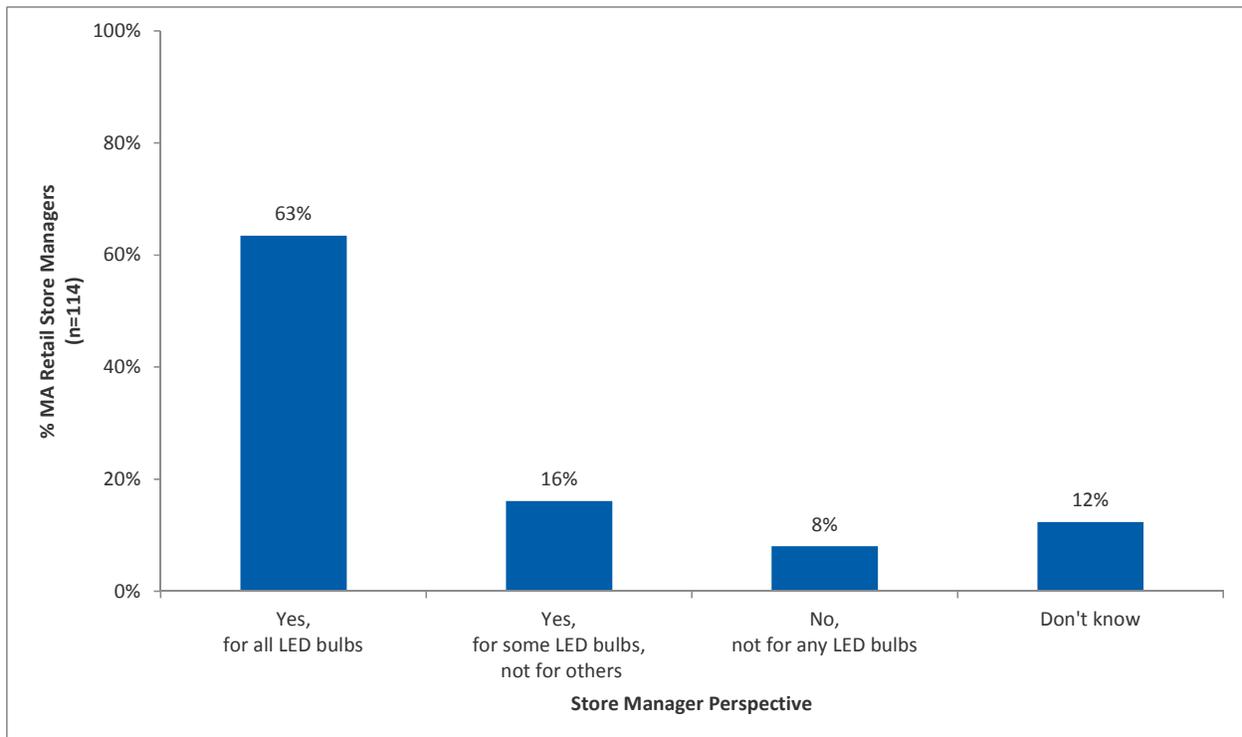


Adequacy of Incentive Levels

The Massachusetts ENERGY STAR lighting program currently offers average buydown discounts for LED bulbs of about \$12 per bulb. We asked participating store managers if they considered these incentive levels adequate to move consumer demand for these products. Figure 22 shows the large majority of

respondents (79%) said the incentives proved sufficient for selling at least some types of LED bulbs, with 63% finding the incentive adequate for selling all kinds of LED bulbs. Very few store managers (8%) considered the incentive level insufficient to sell any types of LED bulbs.

Figure 22. MA Store Managers Perspectives on Adequacy of MA Program LED Incentive Levels to Increase Consumer Purchases



Some variability occurred in the responses, depending on the store manager’s retail channel. For example, while 100% of store managers in the home improvement and mass merchandise channels found LED incentive levels adequate, only 57% of those in the discount channel considered them adequate.

A number of plausible explanations exist for this variability. First, discount stores cater to more price-sensitive, lower-income customers, and such customers more likely find even LED bulbs with significant program discounts too expensive. Second, some shopper intercept research we have conducted in California has found lighting purchasers in home improvement stores prove less price sensitive than purchasers in other retail channels.

This partially may be explained by home improvement stores traditionally serving as “destination stores” for lighting purchases. For example, if a customer makes a special trip to a home improvement store with the intention of buying LED bulbs, they are unlikely to walk away from these bulbs simply due to prices higher than they would prefer. However, higher prices would more likely to deter them in

other shopping environments (*e.g.*, discount or grocery stores), where lighting purchase decisions tend to be more of an “impulse buy.”

Third, the lighting manufacturer interviews revealed large home improvement retail chains and other large big-box retail chains can obtain bulk purchase discounts from lighting manufacturers. These bulk discounts, in combination with program discounts, make it easier for them to reach a price point to move LED sales, while retailers such as discount stores would have greater difficulty in arranging the same bulk discounts.

We also asked lighting market actors to identify LEDs that required increased promotion. Even though high-level retail buyers did not identify LEDs in need of added promotion, store managers and lighting manufacturers cited the following LED products as having the greatest need for increased discounts:

- A-line/A-lamp/A19 LED bulbs
- Reflector/Floods/Par 30/Par 38 LED bulbs
- LED nightlights
- LED linear tubes

Besides LEDs, lighting manufacturers also recommended heavier promotion of cold cathode fluorescent lamps and Phillip Lamps (PL) lamp replacements.¹¹

Suggestions for Increasing Retail Sales of LED bulbs

We asked lighting market actors for suggestions on ways to increase LED bulbs sales. Table 4 shows their suggestions with lowering LED prices and providing more effective customer education being the most commonly-cited.

Table 4. Suggestions to Increase LED Sales

Recommendation	Market Actor(s) Indicating Reason		
	Store Manager	Manufacturer	Buyer
Offer larger rebates/incentives (<i>i.e.</i> , need for price reduction)	X	X	X
Provide customer education	X	X	X
Provide retailer education	X		
Make LEDs more available	X		
Need to continue incentive program		X	

¹¹ PL lamps are older versions of CFL lamps. They use external ballasts and are more difficult to install and maintain than current CFLs, which have built in ballasts. However, current versions, according to Philips product claims, have built-in ballasts and click lamp bases that allow the lamps to last much longer than regular energy saving lamps.

As shown, the perceived need to reduce LED product prices emerged as a common theme in the responses of store managers, lighting manufacturers, and high-level retail buyers, despite that most consider current incentives sufficient to increase sales of at least some LEDs. Sample market actor comments follow regarding lowering LED prices:¹²

- “There is a need to get pricing down closer to what customers are seeing for incandescents.”
- “I suggest increasing LED incentives and decreasing/eliminating CFL incentives. You get more savings from incentivizing LEDs compared to CFLs.”
- “Manufacturers need to continue driving prices down.”
- “Price is the driver—we need the trend of lower cost to continue with more economies of scale and more factories in China ramping up.”

Another theme often cited by interviewed lighting market actors addressed the need for better consumer education about LED products. Market actor comments regarding more effective education included the following:

- “Make sure people know LEDs don’t have mercury—a selling point compared to CFLs.”
- “Have the program mail out or give out via door-to-door an LED so people are likely to try them out in their homes.”
- “Customers need to see that the product that lasts for a long time without replacement; that it's worth spending a little bit more up front.”
- “We need more assistance from utility programs to entice customers outside of the early adopters to buy LEDs.”
- “We need to simplify messages about LEDs. People in [the] industry are passionate about lighting, and they think people want education about color rendering which is the equivalent of the metric system.”

HTR Customers

This section discusses findings from the lighting manufacturer and high-level retail buyer interviews concerning the following:

- The definition of HTR customers;
- ENERGY STAR lighting program strategies to increase CFL sales among HTR customers and perceptions of lighting suppliers; and
- Whether program efforts to encourage more CFLs sales in the discount and HTR grocery retail sectors shift CFLS sales away from national retailers or create new sales.

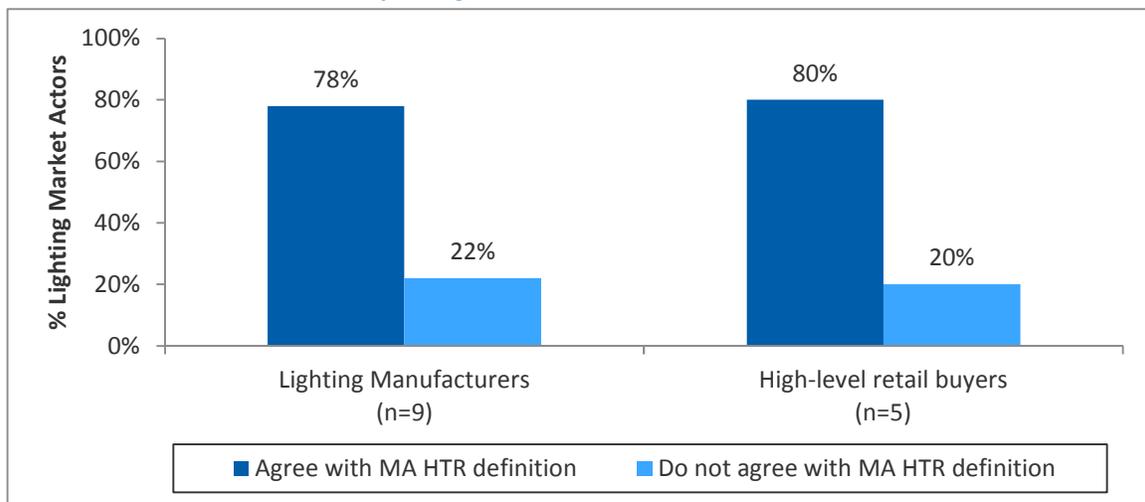
¹² These individual opinions may conflict with comments from other interviewed market actors.

Defining HTR Lighting Customers

The Massachusetts ENERGY STAR Lighting Program strives to increase the penetration of energy-efficient lighting technologies in HTR lighting markets. In the past, the program has defined HTR lighting markets as those serving low-income, ethnic, non-English-speaking, and less-educated customers. The program tried to reach these customers through discount stores and small or ethnic grocery stores.

We asked lighting manufacturers and high-level retail buyers if they agreed with the given definition of HTR lighting markets. Figure 23 shows the large majority of lighting manufacturers and retail buyers agreed with this definition.

Figure 23. Whether Lighting Manufacturers and High-Level Retail Buyers Agreed with the HTR Definition



For lighting manufacturers and high-level retail buyers that disagreed with the definition, we asked for their reasons. Most thought the definition should be expanded to include other factors, such as customer age, geographic location, or income. Those disagreeing with the definition offered the following comments:

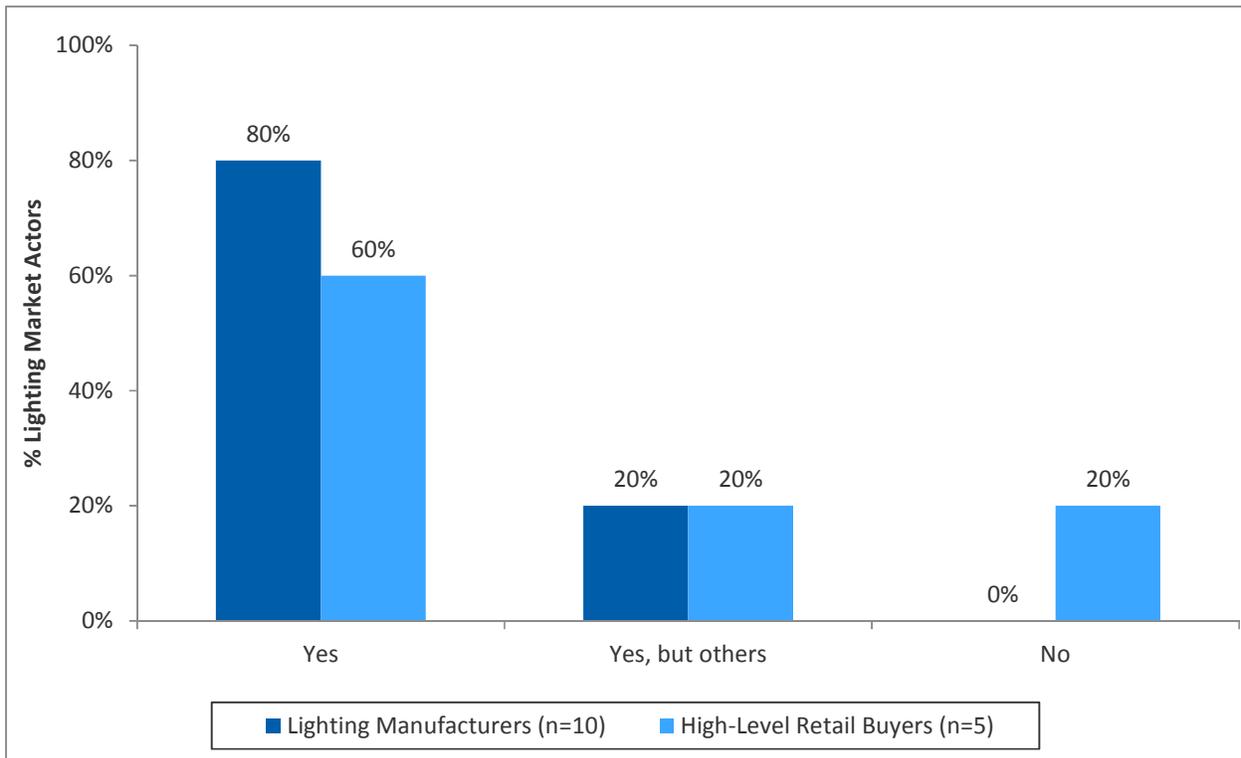
- Age considerations:
 - “People that do not have access to the Internet or are not able to drive themselves, such as senior citizens.”
 - “Hard to reach folks are going to be the people who are stuck in their ways from the 1950s that are used to the 100-watt bulb.”
 - “At the retirement community—most of the facility is managed by someone else.”
- Geographic considerations:
 - “Anywhere where there is not a population there is not going to be a retailer.”
 - “Hard to reach could also be rural and remote.”

- Income considerations:
 - “The wealthy—the people who really do not care about their bill.”

Retail Channels for HTR Lighting Customers

The Massachusetts program primarily promotes energy-efficient lighting technologies to HTR sectors by encouraging sales through discount stores and through small and ethnic grocery stores. We asked lighting manufacturers and retail buyers whether they thought discount stores and small/ethnic grocery stores offered the best ways to reach these HTR customers. Figure 24 shows the large majority (80%) of lighting manufacturers and a majority (60%) of high-level retail buyers considered discount stores and small grocery stores as the best avenues for reaching HTR customers. In addition, two manufacturers and one high-level retail buyer agreed with the current program’s focus on discount and small/ethnic grocery stores, but suggested additional retail channels to reach HTR lighting customers, such as major chain stores serving low-income demographics. Examples cited included Wal-Mart, Home Depot, Walgreens, and Rite-Aid, most of which already serve as program partners.

Figure 24. Whether Lighting Manufacturers and High-Level Retail Buyers Thought Discount and Small Grocery Stores were the Best Ways to Reach HTR Lighting Customers



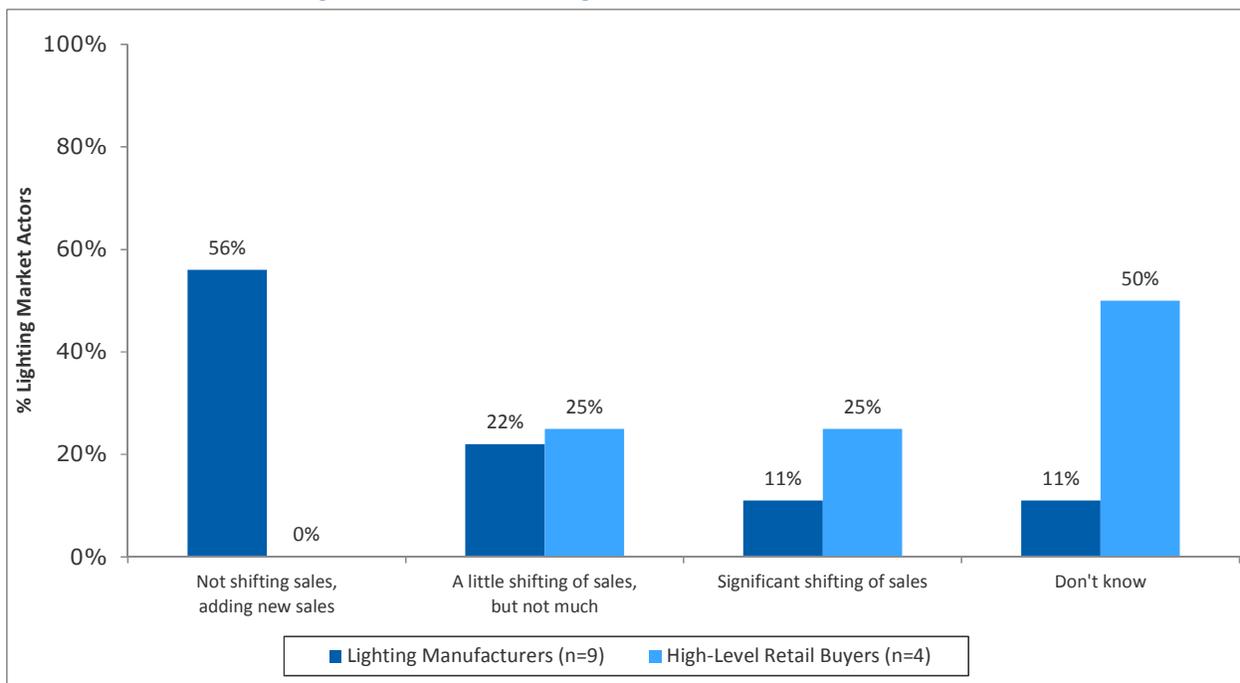
Retail Channel Shifting

A concern raised about program strategies that promote greater CFL sales in retail channels, such as discount stores to reach HTR customers: such strategies may simply shift sales from national chain

retailers such as Wal-Mart or Home Depot to these discount stores rather than create new sales—a phenomenon sometimes called “retail channel shifting” or even “retail cannibalization.”

We asked lighting manufacturers and high-level retail buyers whether they thought these discount and small grocery stores created new ENERGY STAR CFL product sales or took ENERGY STAR CFL sales otherwise achieved by national chain retailers. Figure 25 shows a slight majority of lighting manufacturers said shifting of sales did not occur. About one-quarter of lighting manufacturers and high-level buyers said a little shifting of sales occurred, but not much. Only one lighting manufacturer and one high-level buyer cited a significant shifting of sales.

Figure 25. Whether Lighting Manufacturers and High-Level Retail Buyers Thought the Program was Creating New Sales or Shifting Sales from National Chain Retailers



Program Effects on CFL and LED Sales

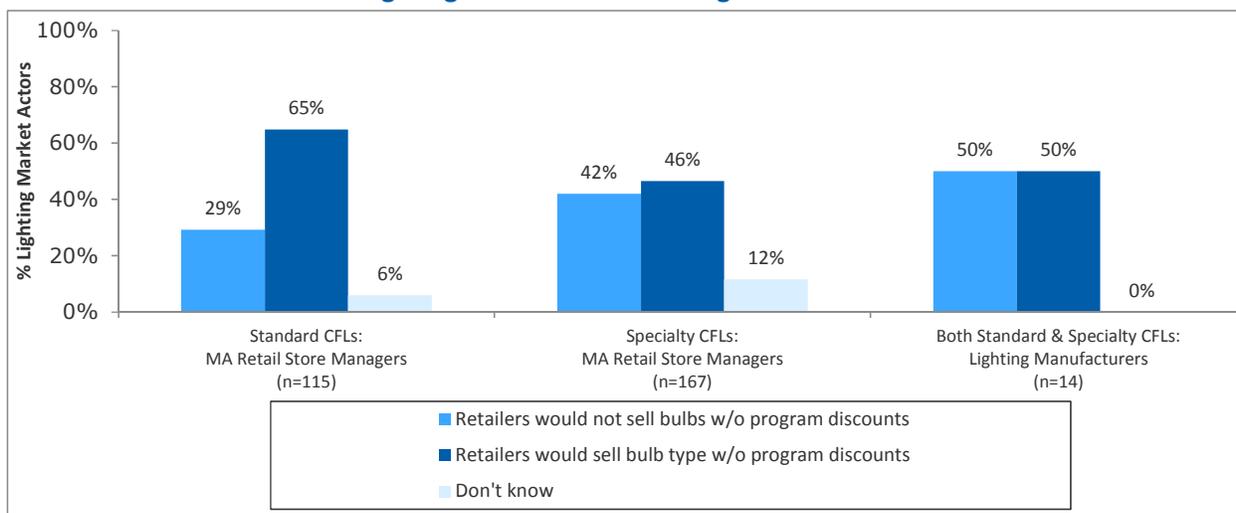
This section discusses the lighting market actor interview findings concerning the following issues:

- The Massachusetts ENERGY STAR Lighting Program impact on sales of energy-efficient lighting;
- How the Massachusetts ENERGY STAR Lighting Program helped promote energy-efficient lighting products (besides discounts); and
- The amount of lighting product sales not discounted by the Massachusetts ENERGY STAR Lighting Program.

Program Influence on Sales of CFLs and LEDs

We asked lighting manufacturers if there were retailers they worked with that would not have sold any CFL products had program discounts not been available. Similarly, we asked Massachusetts store managers if their store would not have sold standard CFLs and specialty CFLs without program discounts. To allow easier comparison, we combined their responses in a single chart (Figure 26).

Figure 26. Impact of Program on MA Store Managers and Lighting Manufacturers Selling CFL Products



However, it should be noted that while these questions were similar, they were not the same. The manufacturers could say “yes” if any of the retailers they supplied would not have sold the bulbs without the program while the store managers could only say “yes” if their own store would not have sold the bulbs without the program. In addition, we asked the manufacturers about standard CFLs and specialty CFLs in the same question, while for the store managers these were separate questions. Both these differences increased the chances of manufacturers saying “yes” to this question.

Yet there are other explanations, besides the differences in the question wording, for why the manufacturers were more likely to say that retailers would not be selling the bulb types without the program discounts. First in some cases the manufacturers likely had greater market knowledge than the store managers as to the influence of the program discounts on store deliveries. For example, manufacturers have consistently reported to us that they would not be able to supply ENERGY STAR CFLs to dollar stores without program discounts because the manufacturing cost of an ENERGY STAR CFL is more than a dollar. Yet some store managers may be unaware of this constraint.

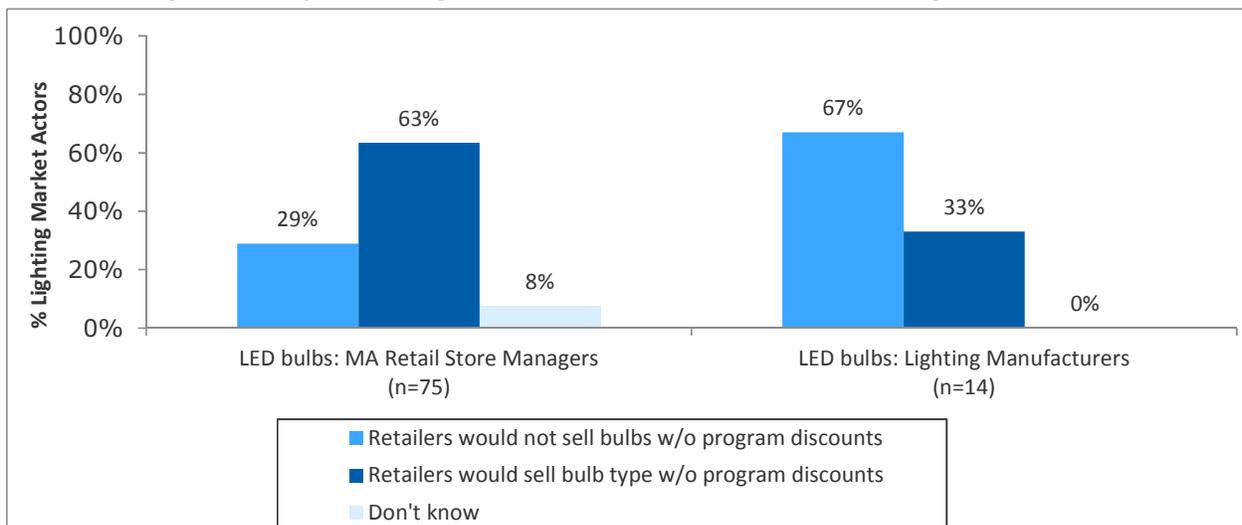
In addition, because manufacturers are more frequently than retailers the direct beneficiaries of upstream lighting discounts, they have an inherent bias to exaggerate the program influence so that the program discounts will continue. The separate report: “Massachusetts Upstream Lighting Program Net-to-Gross Ratio Estimates Using Supplier Self-Report Methodology” provides much more detailed analysis

on how program attribution can vary with the retail channel and how differences in market knowledge and potential bias can lead to differences in program attribution estimates among lighting market actors.

We asked the manufacturers and store managers similar questions about retailer sales of LED bulbs without program discounts. Figure 27 shows their responses. Once again the manufacturers were more likely than the store managers to say that retailers would not be selling these bulb types without the program discounts. This difference is likely due to similar factors as was discussed for the CFLs above. One possible reason why the difference between the manufacturer and store managers estimates was larger for LEDs than it was for CFLs was because the program LED discounts were much larger than the CFL discounts in absolute terms. Therefore if these larger discounts had a greater influence on whether or not a manufacturer could supply LEDs to a given store type, the manufacturers would likely know more about this than the retailers.

Another difference has to do with the types of retailers who sell LED bulbs. Large home improvement stores served as the retail channel selling the most LEDs through the program. As the report discusses in greater detail, large home improvement stores are considered “destination stores” for lighting products and they offer a full range of lighting products to insure customers find the bulbs they seek, even if these are less popular types. Following this business model, it would be highly unlikely for a large improvement store to stop stocking LED bulbs just because the program stopped discounting them.

Figure 27. Impact of Program on Stores and Manufacturers Selling LED Products



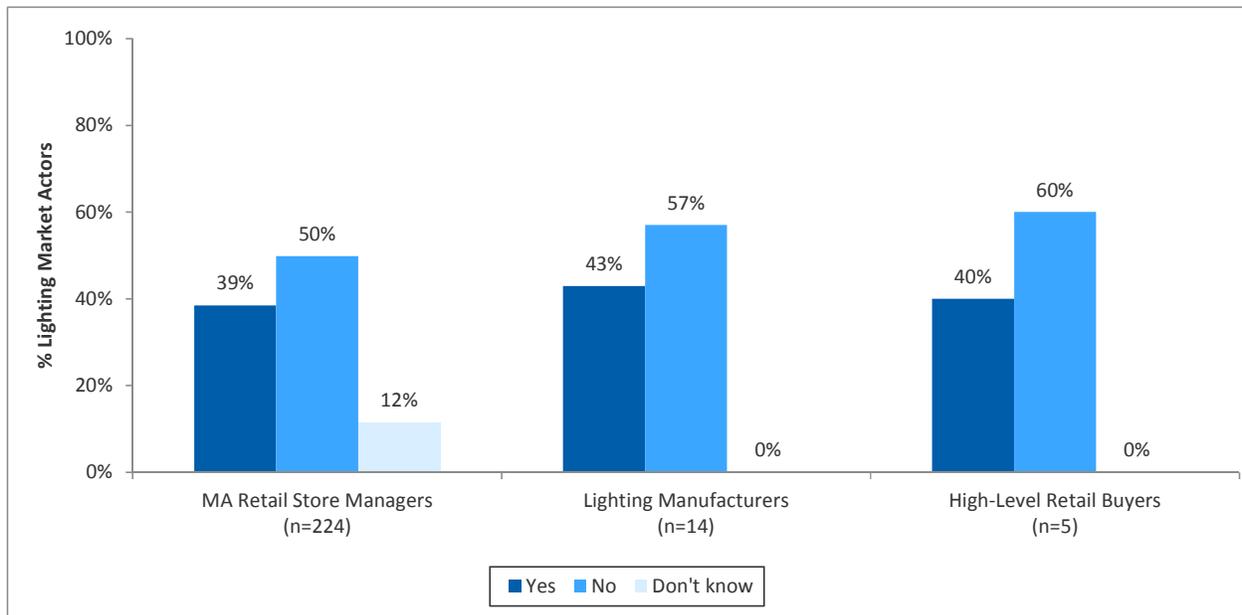
Besides Discounts, Whether the Program Helps Sell Energy-Efficient Lighting

We asked lighting suppliers if they thought the Massachusetts ENERGY STAR program provided anything other than financial incentives to help sell energy-efficient lighting products. Figure 28 shows about 40% of all market actor groups responded positively to this question and offered the following, additional ways the program promotes sales of energy-efficient lighting:

- Providing in-store signage;
- Providing co-op advertising support;
- Providing marketing support; and
- Providing customer education.

In each group surveyed, however, at least one-half of respondents said they thought the program did not offer anything besides incentives.

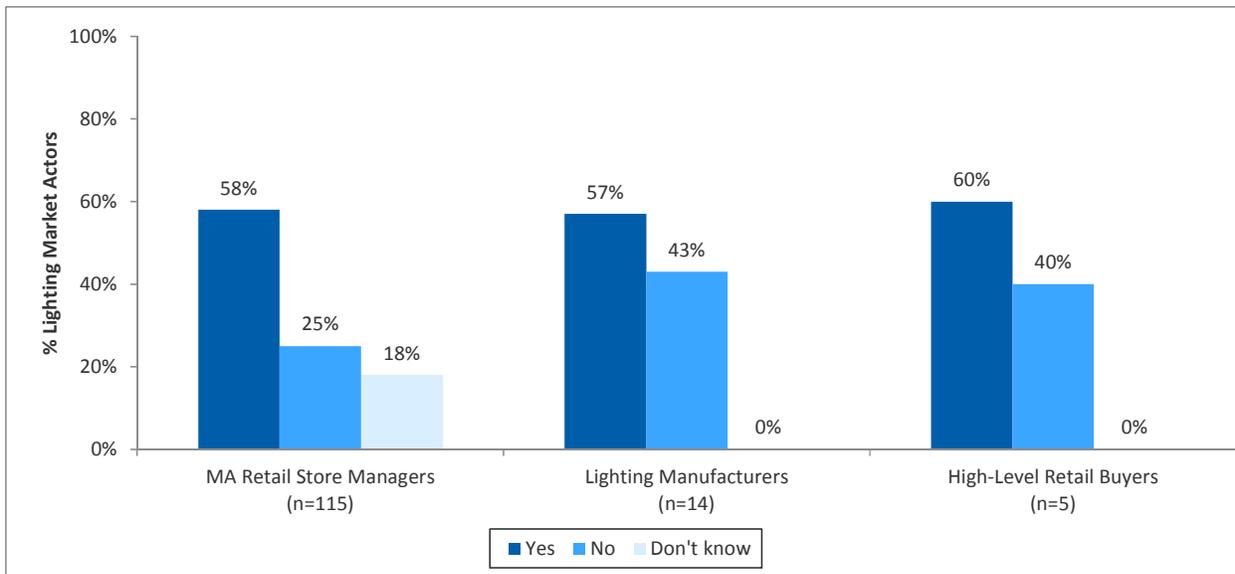
Figure 28. Whether the Massachusetts ENERGY STAR Program Helps Sell Energy Efficient Lighting Products with Anything Other Than Financial Incentives



Sales of Lighting Not Discounted by MA ENERGY STAR Lighting Program

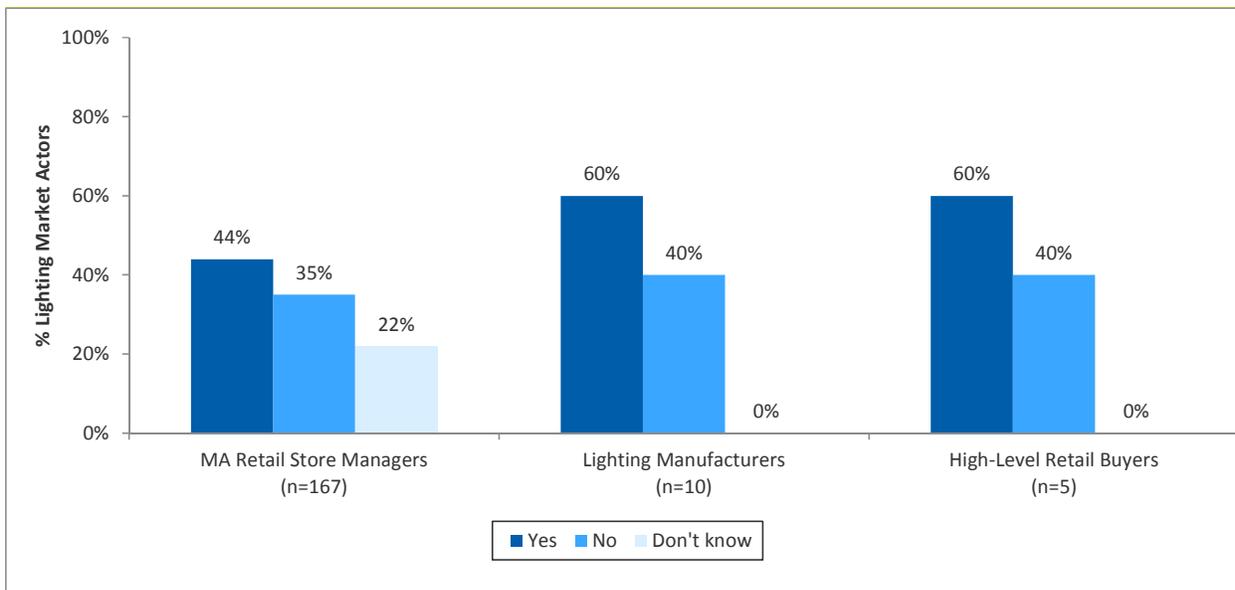
We asked lighting market actors if, in 2013, their businesses sold standard CFLs in Massachusetts that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program. Figure 29 shows about 60% of all market actor groups reported selling CFL non-specialty bulbs that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program.

Figure 29. Whether Businesses Sold Standard CFLs in 2013 that did not Receive Discounts from MA ENERGY STAR Lighting Program



Similarly, we asked lighting market actors if, in 2013, their businesses sold CFL specialty bulbs in Massachusetts that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program. Figure 30 shows manufacturers and high-level retail buyers were more likely than Massachusetts store managers to sell CFL specialty bulbs that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program.

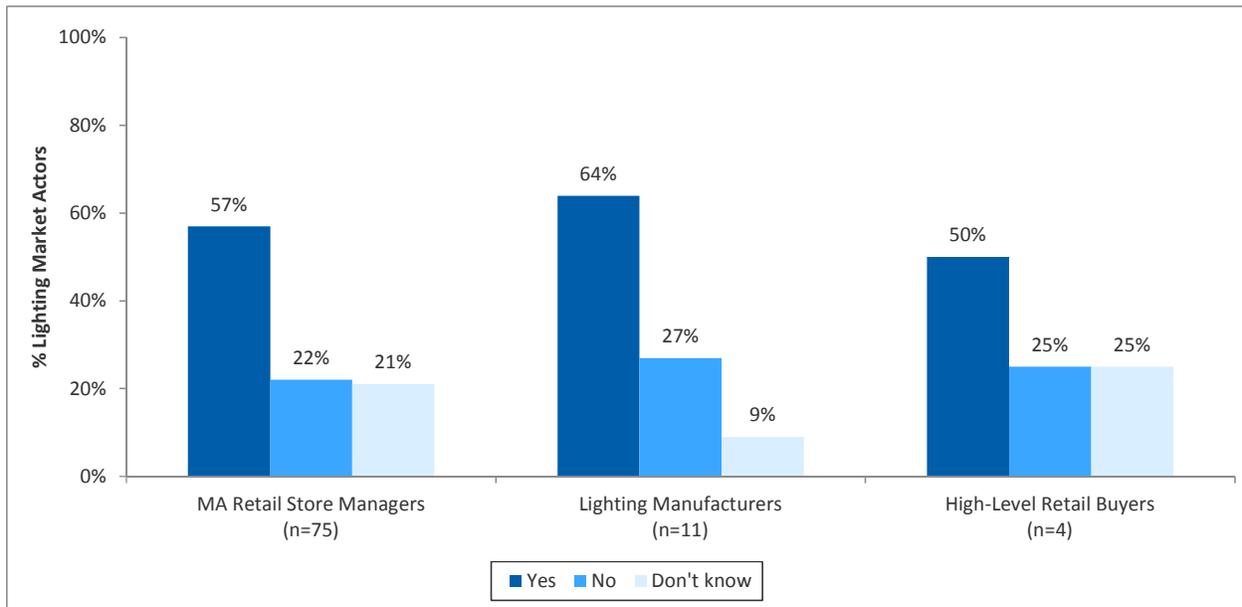
Figure 30. Did Business Sell Specialty CFLs in 2013 that did not Receive Discounts from the MA ENERGY STAR Lighting Program?



Finally, we asked lighting market actors if their businesses sold LED bulbs in Massachusetts that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program in 2013. Figure 31 shows at

least one-half of all market actor groups reported selling LED bulbs that did not receive discounts from the Massachusetts ENERGY STAR Lighting Program.

Figure 31. Did Business Sell LED Bulbs in 2013 that did not Receive Discounts from the MA ENERGY STAR Lighting Program?



Program Satisfaction

This section discusses the findings from lighting market actor interviews concerning satisfaction with the program. This includes the following:

- Satisfaction with program staff
- Satisfaction with the availability of program–discounted bulbs
- Satisfaction with the Massachusetts ENERGY STAR Lighting Program in general
- Interest in future program participation
- Suggestions to improve the Massachusetts ENERGY STAR Lighting Program

Satisfaction with Program Managers, Contractors, and Other Staff

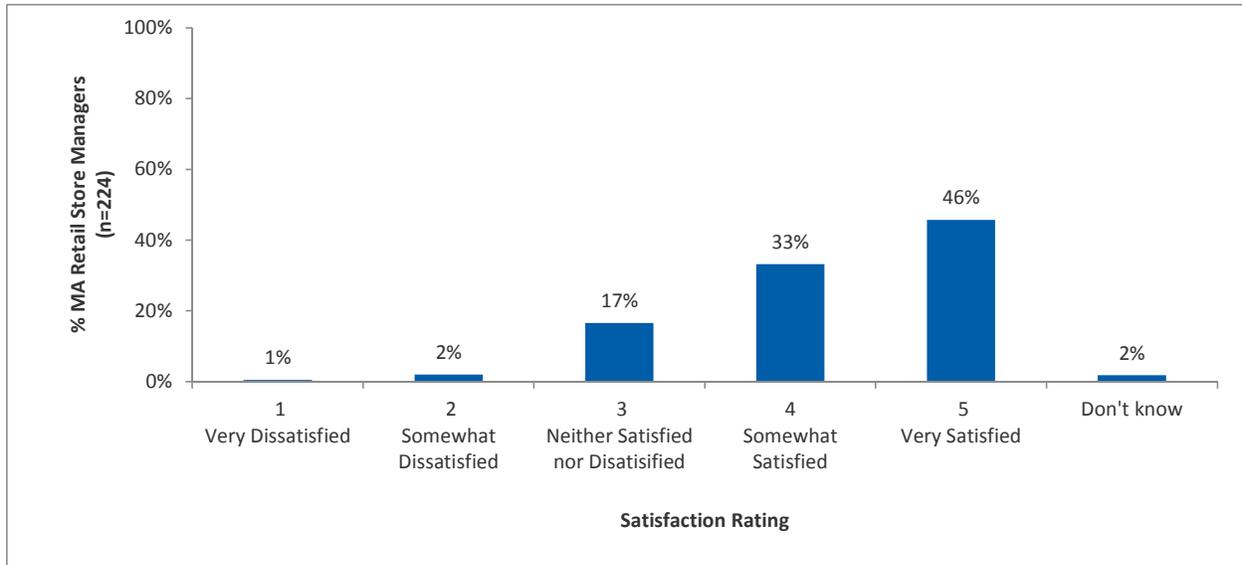
The evaluators asked lighting manufacturers (n=11) and high-level buyers (n=4) about their satisfaction with program managers, contractors, and other staff involved in delivering the Massachusetts ENERGY STAR Lighting Program, using a scale of 0 to 10, where 10 is very satisfied and 0 is very dissatisfied. Market actors expressed satisfaction with program staff, awarding ratings of 8 or higher by manufacturers and high-level buyers and ratings of 10 by the majority of manufacturers (64%) and high-level buyers (75%).

Satisfaction with Availability of Program-Discounted Bulbs

We asked store managers to rate their satisfaction with the availability of program-discounted bulbs, using a scale of 1 to 5, where 1 equals very dissatisfied and 5 equals very satisfied.

Figure 32 shows the large majority (79%) of store managers indicated being at least somewhat satisfied with the availability of program-discounted bulbs, with very few (3%) being dissatisfied.

Figure 32. Satisfaction with Availability of Program-Discounted Bulbs



Overall Program Satisfaction

We asked lighting market actors to rate their overall satisfaction with the Massachusetts ENERGY STAR program. Store managers provided ratings on a 5-point scale, and manufacturers and high-level retail buyers used a 10-point scale. Figure 33 shows all market actor groups expressed satisfaction with the program in general, with at least 80% of any market actor group surveyed being somewhat satisfied or very satisfied with the program. About one-fifth of store managers offered neutral responses (*e.g.*, neither satisfied nor dissatisfied), and only 1% of store managers expressed being very dissatisfied with the program.

Figure 33. Satisfaction with Massachusetts ENERGY STAR Program

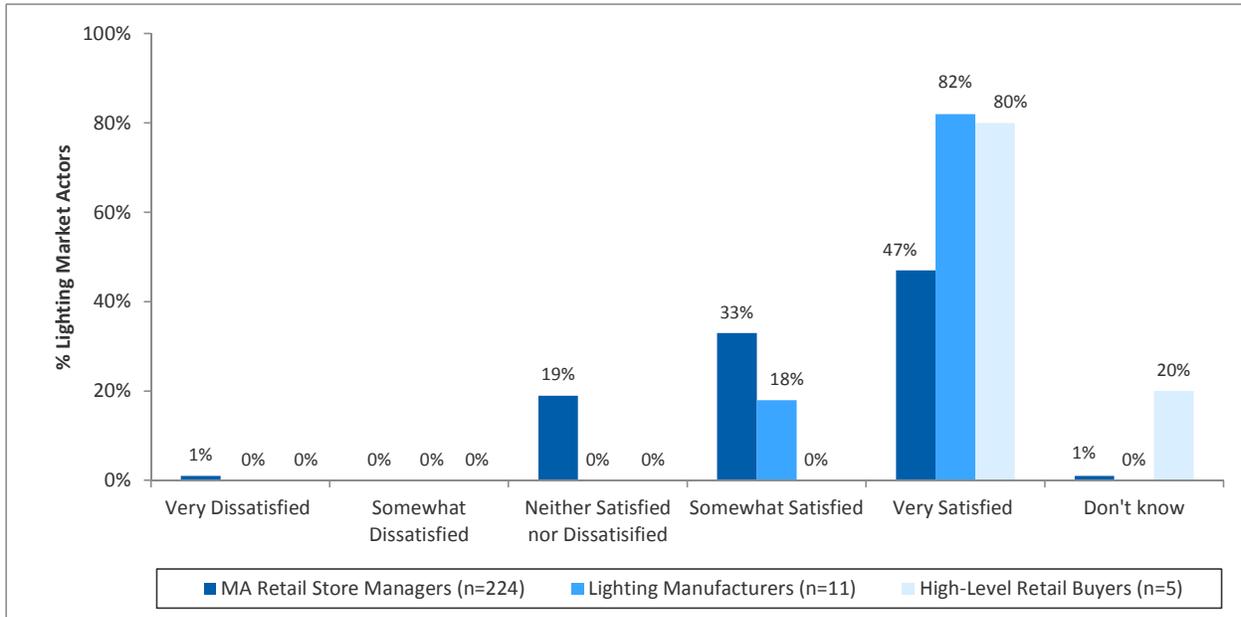
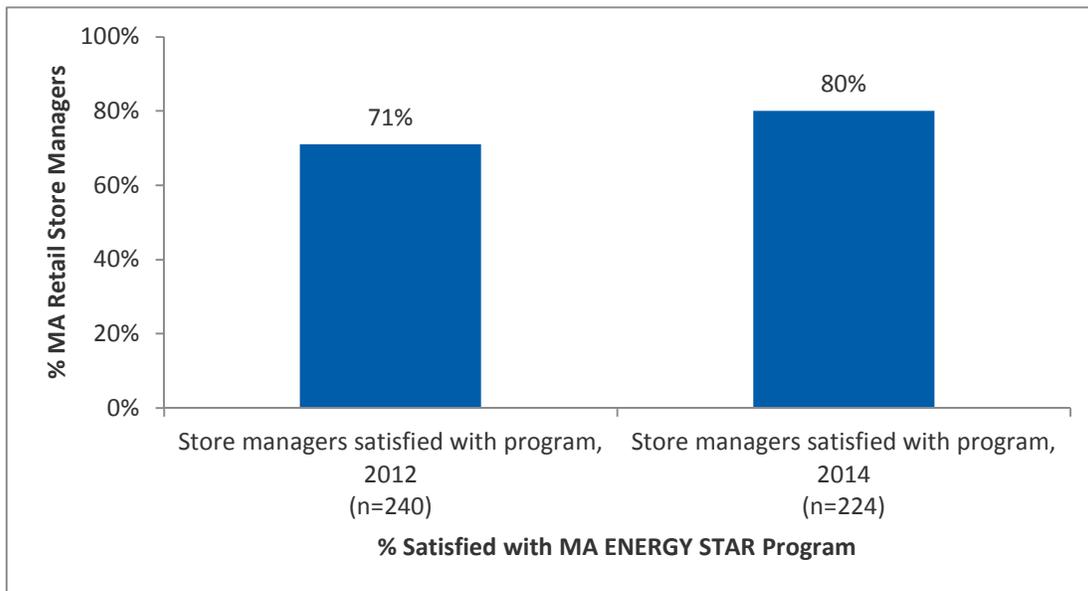


Figure 34 shows store managers' satisfaction with the program increased since 2012, with 80% of retailers surveyed in 2014 being at least somewhat satisfied with the program, compared with 71% surveyed in 2012.

Figure 34. MA Store Manager Satisfaction with Massachusetts ENERGY STAR Program 2012 vs. 2014



Future Participation in the Massachusetts ENERGY STAR Lighting Program

We asked lighting market actors if they planned to participate in the Massachusetts ENERGY STAR Program in the future. Figure 35 shows the large majority of store managers (85%) and all lighting manufacturers and high-level retail buyers planned to continue participating.

Figure 35. Market Actor Interest in Future Participation in MA ENERGY STAR Program

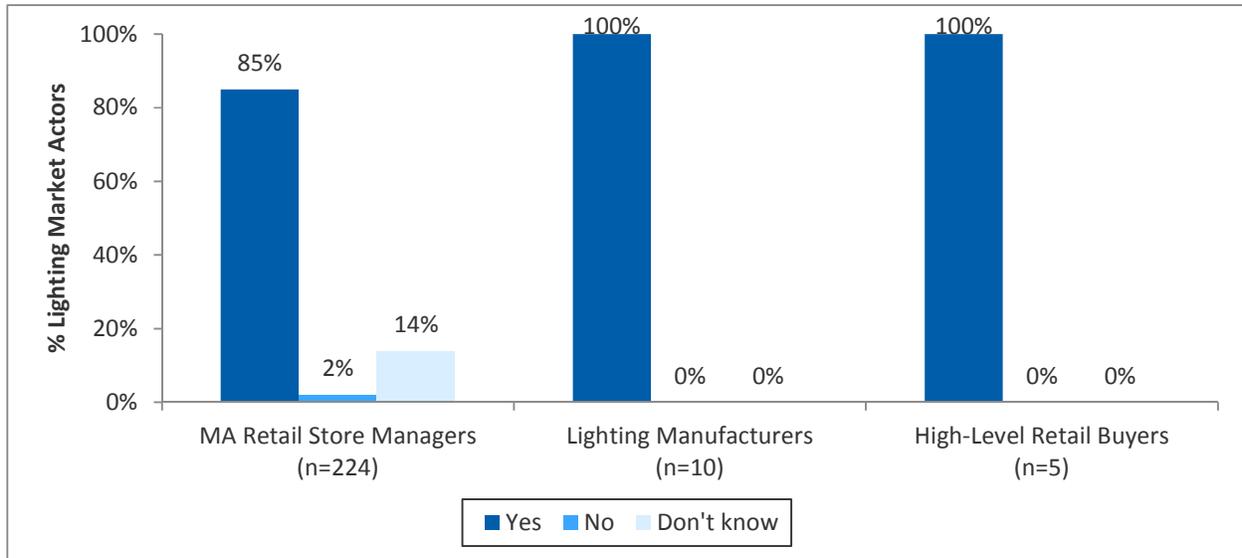
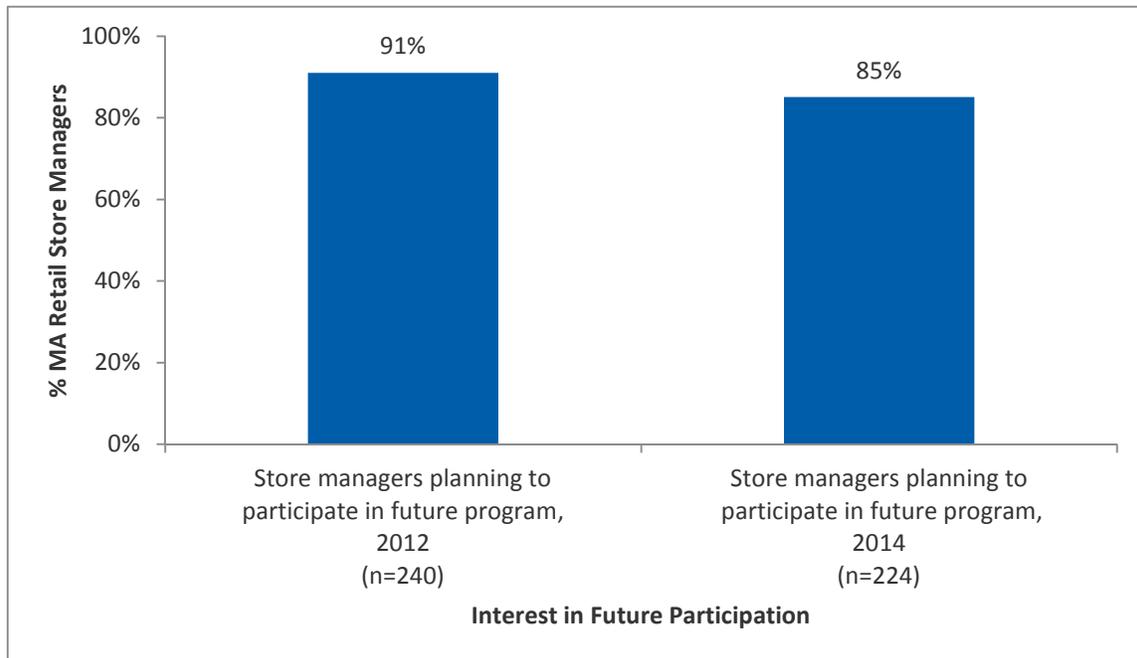


Figure 36, however, shows the 85% of 2014 store managers who said they planned to continue their program participation is a slight drop from 2012 levels of expected future participation.

Figure 36. MA Store Manager Interest in Future Participation of MA ENERGY STAR Program 2012 vs. 2014



Suggestions for Program Improvement

We asked lighting market actors to provide suggestions on ways to improve the Massachusetts ENERGY STAR Lighting Program. The following summarizes suggestions provided:

- *Offer a single point of program contact:* “In Massachusetts, there are five different utility companies and a third party, Parago, handle the invoicing,” said one market actor. “[We] deal with only one utility in California—the California utility handled the rebate by themselves, so everything is clear.¹³ But in Massachusetts, we have to collect store-level, and then we have to classify the different utility with different stores and then invoice Parago. This process is complicated.”
- *Raise incentive levels:* “With incentives in some states, the cost for four CFLs retail is \$1.00,” said one market actor. “Currently, the best I am able to do with Massachusetts is two CFLs for \$1.00 after the incentives have been applied. So there is room for growth to get that greater value.”
- *Use a formal bid process for participating retailers:* “Sometimes the manufacturer will get in with a retailer because they were first in line versus a bid process to see who would be the most cost-effective option for the program,” said one respondent.

¹³ In California, each of the three major investor-owned utilities administers and implements the Upstream Lighting Program in their service territories, unlike Massachusetts, where PAs run the program in a more collaborative, statewide fashion.

- *Provide more frequent communications about program changes:* “[There’s a need for] more transparency with the folks that are participating,” said one market actor. “I only receive an e-mail when there’s a big change in the program. Periodic/quarterly updates would be helpful.”
- *Additional suggestions:* Additional suggestions for program improvements included the following:
 - “Speed up the underwriting process.”
 - “Have a Web portal method for reporting point-of-sale data (other programs throughout the country do this).”