

Buy All the Shiny Things: Understanding Consumers' Lighting Decision-Making in a Transforming Market

Kiersten von Trapp, NMR Group Inc.

Matt Woundy, NMR Group Inc.

Jayne Piepenburg, NMR Group Inc.

Melissa Meek, NMR Group Inc.

David Barclay, NMR Group Inc.

ABSTRACT

The residential lighting market is undergoing dramatic changes brought on by new technologies and increases in efficiency standards, prompting Program Administrators nationwide to ask what factors influence consumers' decisions to purchase efficient lighting. This paper explores factors that influence consumers to purchase energy-efficient lighting, and the barriers that prevent some from switching to efficient alternatives.

The findings presented in this paper are from two recent evaluations, both relying on separate groups of residential panelists. One study relied on detailed lighting inventory data over multiple years through on-site visits with residential panelists (on-site panel), and one relied on data purchased from a nationwide panel of mobile app users who upload their receipts from retail and restaurant shopping trips and respond to triggered surveys (online panel). These evaluations both took place in two Northeastern states, one still running an active upstream lighting incentive program, and one that formerly offered upstream incentives but no longer does.

The on-site panelists provide insights into what bulb types people are choosing to install in their homes while the online panelists offer an opportunity to ask customers how and why they are deciding to purchase those bulbs.

Introduction

The residential lighting market is undergoing dramatic changes brought on by new technologies and increases in efficiency standards, prompting Program Administrators nationwide to ask what factors influence consumers' decisions to purchase efficient lighting (Amann 2018). This paper explores factors that influence consumers to purchase energy-efficient lighting, and the barriers that prevent some from switching to efficient alternatives. Evidence presented in this paper shows that consumers are increasingly choosing to purchase and install LEDs. Still, the program area studied continues to outpace non-program area in terms of LED adoption (NMR RLPNC 17-9 2018; NMR RLPNC 16-5 2017). This research seeks to understand what factors are driving customer choice - are incentives alone influencing customers, or are other program factors such as marketing and shelf-stocking also playing a role?

Methodology

This paper is based on findings from two evaluations. The first evaluation is based on data from on-site lighting inventories of homes in Massachusetts and New York conducted by NMR Group and completed between October and December of 2017. NMR Group sent trained

technicians to 598 homes – 381 in Massachusetts and 217 in New York – to collect data on lighting use, storage, and purchase behavior. These visits represented the most recent efforts in a long-term series of on-site data collection. All of the households in both states were panelists who had taken part in prior on-site visits as part of this ongoing study. (NMR RLPNC 17-9 2018)

The second evaluation is based on data purchased from InfoScout, a research company that has a nationwide panel of mobile app users who upload their receipts from shopping trips in exchange for various rewards and respond to triggered surveys. We targeted recent light bulb purchasers in Massachusetts, which is still running an active statewide lighting incentive program, and portions of New York, which formerly offered incentives. In September 2017, we fielded a survey to a sample frame of 2,361 unique InfoScout panelists in the two states. The survey obtained responses from 100 InfoScout panelists in Massachusetts and 160 in New York. (RLPNC 17-12 2018)

In this paper we provide a high-level overview of the methods and results from each of these two studies. The data sources are considered separately.

Evidence of Program Effect

The authors chose to study residential lighting trends between Massachusetts and portions of New York (comprising Westchester County and 40-mile radiuses around the cities of Albany, Buffalo, Rochester, and Syracuse) because of a unique natural experiment offered by different choices made in the two areas. Prior to 2014 both areas offered customers discounted energy efficiency lighting choices through retailers – through separate upstream residential lighting buy down programs. Through these programs, customers could purchase discounted CFLs and LEDs. However, in 2012 New York ceased offering incentives for standard spiral CFLs and the New York Department of Public Service ended nearly all upstream incentives in 2014. At the same time, Massachusetts chose to continue offering CFL and LED incentives.¹

Figure 1 provides a summary of efficient and inefficient saturation trends between 2009 and 2018 in both Massachusetts and the New York comparison area.² In this figure, we exclude linear fluorescent lamps and focus on LEDs and CFLs.

As the figure shows, it was not until New York began to exit the upstream lighting market that differences in saturation between the two areas began to emerge. Over a relatively short time period, the differences in choices in the two states have led to a substantial gap in saturation between the two areas. Additional evidence of a historical program effect can be found in a companion paper being presented at ACEEE (Barclay, et. al., 2018).

¹ Massachusetts discontinued upstream incentives for CFLs on January 1, 2017 but continues to offer incentives for LEDs.

² Prior to 2013, the New York data was collected in a broader area in New York – representing the full state. Starting in 2013, the data shown are limited to visits conducted in a 40-mile radius around Buffalo, Rochester, Syracuse, and Albany, and all of Westchester County.

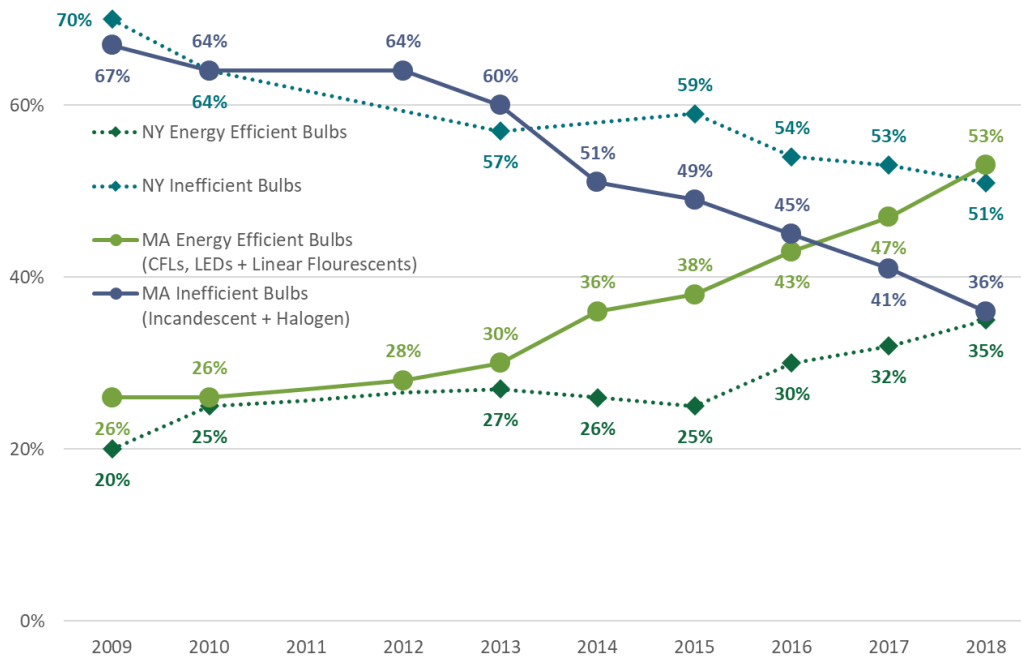
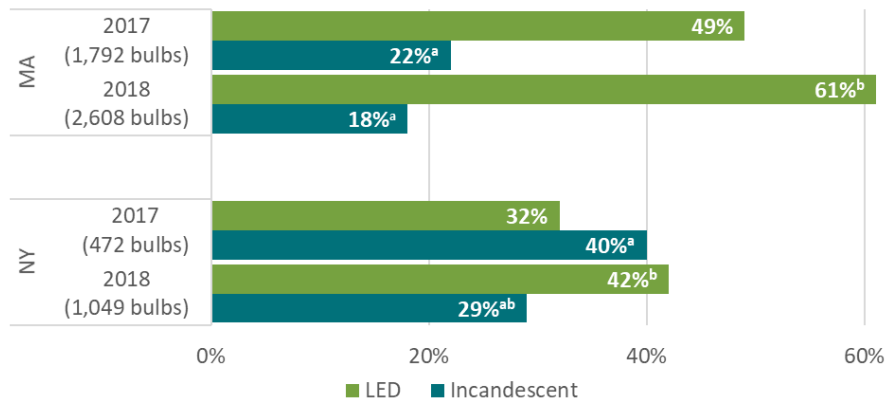


Figure 1. Efficient and Inefficient Saturation Comparison (MA and NY On-sites)

Observed Lighting Technology Choices

The 2018 on-site visits gave us an initial insight into participants’ lighting decision making process. During these visits, trained on-site technicians visited homes and compared the bulb in each socket to what was in the socket in the prior visit, thus directly observing bulb replacement behavior. As Figure 2 shows, in 2017, LEDs were the most common replacement bulb type (49%) in Massachusetts and the second most common replacement bulb type in New York (32%) (incandescents were the most common in 2017 in New York). In 2018, 61% of replacement bulbs installed in Massachusetts were LEDs, and for the first time, LEDs (42%) made up a larger share of replacement bulbs in New York than incandescent bulbs (29%).



^a Significantly different from MA at the 90% confidence level.

^b Significantly different from 2017 at the 90% confidence level.

Figure 2. Replacement Bulbs, 2017-2018 (MA and NY On-site Panelists)

While LEDs were a popular replacement choice, we observed some panelists replacing LEDs with inefficient alternatives (backsliding). While this behavior was observed in both areas, it was less common in Massachusetts than in New York. In Massachusetts, 13% of LEDs were replaced with halogens or incandescent bulbs, compared to 23% in New York. Despite some level of backsliding, LED saturation continues to rise in both areas.

Figure 3 shows overall bulb replacement behavior by state. Replaced bulbs are bulbs that were recorded in the 2017 visit but were removed from the sockets when technicians returned for the 2018 visit. Replacement bulbs are those bulbs installed in sockets in 2018 from which the “replaced bulbs” were removed.

For each bulb a panelist replaced, we asked them why they replaced that bulb. Overall, the most common reason panelists gave for replacing bulbs in both areas was that the bulb had failed (i.e. burned out or broken). After excluding self-reported energy-efficiency program participation, we observed that unlike in 2017, a similar proportion of bulbs were removed in both areas because the householder wanted to replace it with a more efficient bulb (16% in Massachusetts, 14% in New York).



Figure 3. Replacement Bulb Types from the 2018 On-Site Study (MA and NY On-site Panelists)

Bulb Replacement Behavior by Demographic Variables

During the 2018 panel on-site visits, we explored replacement behavior by education, income, home type, and tenure to determine if replacement behavior varied by demographic characteristics. Non-low-income householders, householders in single-family dwellings, and homeowners were more likely than others to install replacement LEDs. This pattern held true in both states. Massachusetts householders in these groups installed more replacement LEDs than their New York counterparts, indicating that Massachusetts is outpacing New York in efficient bulb replacement no matter how you parse the data.

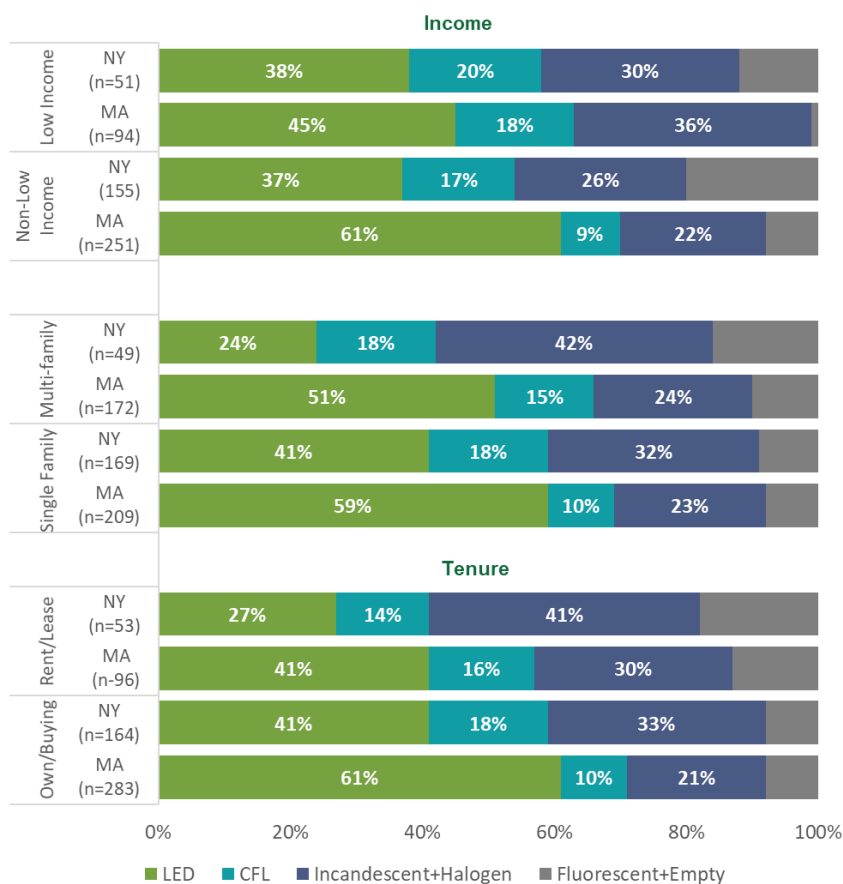


Figure 4. Replacement Bulbs by Demographic, 2018 (Massachusetts and New York On-site Panelists)

Impact of Upstream Program

The evidence above makes clear that saturation of LEDs is increasing more rapidly in Massachusetts. The Massachusetts upstream program includes a variety of approaches to encourage customers to adopt energy efficient lighting. At the core, the program provides incentives that buy down the price of LEDs at retailers but the program also includes: in-store signage, social media campaigns, in-store employee training, promotional events, advertisements (print, radio, and television), and other outreach efforts. Working under the theory that the

upstream program in Massachusetts is responsible for most of the difference, the authors sought to increase understanding of how the program was impacting lighting purchase behavior.

At first the authors considered returning to on-site panelists and conducting in-depth interviews with them to gain this understanding, but there was a desire to avoid tainting the sample of on-site panelists by asking them too many questions and introducing unnecessary study bias into future waves of the panel. Therefore, the authors turned to a separate panel of purchasers who routinely respond to web-based surveys (InfoScout panelists).

Pre-Purchase Planning

This section examines how people decide what bulbs to purchase using the data from InfoScout panelists who responded to the September 2017 survey. According to these panelists, the majority of lighting purchases were planned in advance (84% of respondents in Massachusetts and 93% in New York). Slightly more than three-fifths of Massachusetts purchasers and three-quarters of New York purchasers also determined which type of bulb to purchase in advance. Figure 5 provides an overview of the 2017 InfoScout panelists' decision-making process.

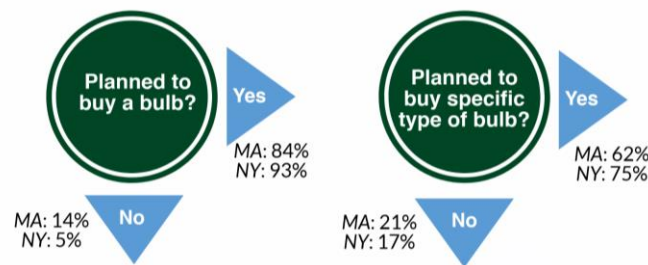


Figure 5. Overview of Purchase Planning³

Sources of Influence

InfoScout panelists who had determined what type of bulb to purchase in advance elaborated on what had influenced their purchasing decision. The most common factor influencing bulb selection in both states was in-store signage at the time of the purchase or on a previous trip. Coupons were the second most often cited factor in Massachusetts, and third in New York. The subset of InfoScout panelists who were asked this question said they had determined in advance what type of bulb to purchase; thus, NMR speculates that respondents were referring to in-store information from a previous trip, or a coupon discovered before heading to the store, in their responses to this question.⁴

³ Respondents who answered, “don’t know” to questions about purchase planning are not displayed.

⁴ A study conducted by KRC Research on behalf of Sylvania in March of 2016 found that 42% of Americans obtained information about light bulb purchases from in-store displays/employees and 39% from product packaging. Our findings differ from this report in several ways. First, our findings only reflect individuals in Massachusetts and New York. Second, we only surveyed those who said they had decided what type of bulb to purchase in advance of going to the store about what information influenced their decision. Future studies should consider surveying all respondents about what sources of information that influenced their decision-making.

About one-quarter of these same purchasers in both states who had decided in advance what type of bulb to purchase said they had researched lighting before making their purchase (25% in Massachusetts and 24% in New York). Purchasers in both states most commonly performed online research followed by relying on family or friends' recommendation, and conversations with store employees.

In-Store Purchase Decisions

Figure 6 compares a subset of the surveyed purchasers who decided which bulb type to purchase while in a store, for year 2016 and 2017. 2017 InfoScout panelists who had decided what type of bulb to purchase while at the store were more likely to ultimately purchase an LED bulb than their 2016 counterparts.

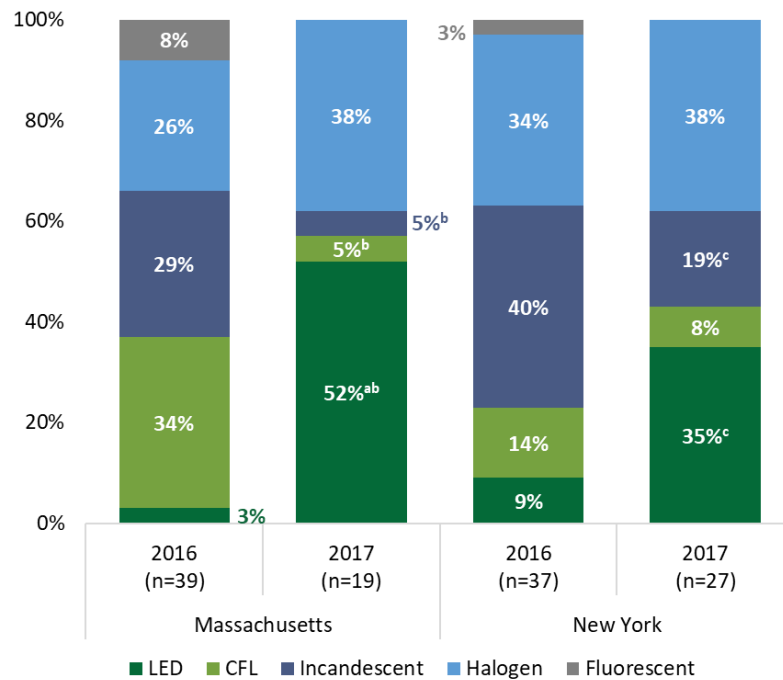


Figure 6. In-Store Decisions

a Significantly different from New York 2017 purchasers at the 90% confidence level.

b Significantly different from Massachusetts 2016 purchasers at the 90% confidence level.

c Significantly different from New York 2016 purchasers at the 90% confidence level.

One out of five (20%) LED purchasers in Massachusetts reported they had considered another bulb type before making a purchase, a larger proportion than those who had selected other bulb types. The fact that many shoppers considered another bulb type but ultimately selected an LED could suggest that the information available in the store was persuasive or informative enough to lead these shoppers to select an efficient bulb, or that the price of efficient lighting was lower than shoppers' expectations.

If their desired bulb type had not been available, the most common responses were that they would not have purchased a bulb on that trip (41% in Massachusetts and 34% in New York) or would have selected whatever was cheapest (21% in Massachusetts and 26% in New York).

One-half of all LED bulb purchasers were committed to buying an LED bulb and would not have purchased a bulb if an LED had not been available. Many incandescent purchasers would have selected an LED bulb if an incandescent bulb had not been available (21% in Massachusetts and 36% in New York).

Awareness of Efficient Choices

Among InfoScout panelists, more than three-quarters (76%) of Massachusetts incandescent purchasers said they had been aware that more efficient choices had been available, compared to only one-third (33%) of New York incandescent purchasers. Greater knowledge of energy efficiency may indicate that educational campaigns have had some success, but given that some incandescent purchasers selected an incandescent bulb despite their awareness of more efficient choices, education alone may not be enough to influence decision-making. When asked why they had purchased a less efficient bulb, the most common responses in both states were “wanted this specific bulb type,” “it’s the same bulb type that burned out,” and “it’s my preferred bulb type.” Again, this suggests that there exists a subset of bulb purchasers that are less flexible in their purchasing behavior. Just under one in ten respondents in Massachusetts and 16% in New York said that price was the reason they had selected a less efficient bulb.

Conclusions

The residential lighting market is in a period of rapid change. Data from the on-site panelists provides compelling evidence that the Massachusetts upstream program is influencing customer behavior and accelerating LED adoption in Massachusetts, compared to the New York comparison area.

Between 2016 and 2017, we observed a distinct shift in shopping patterns, with consumers in both the program and non-program areas increasingly purchasing LEDs. Still, the proportion purchasing LEDs in the program area remained significantly higher. In addition, while most consumers in both the program and non-program areas reported making their purchasing decisions before visiting a store, incandescent purchasers in the non-program area were significantly less likely to have been aware of more efficient options (33% vs. 76%).

As further evidence of the impact of programs, while LEDs were the most commonly chosen replacement bulb in the program area, they were the second in the non-program area after incandescents. Non-low-income householders, householders in single-family dwellings, and homeowners were more likely than others to install replacement LEDs. This pattern held true in both states. Massachusetts householders in these groups installed more replacement LEDs than their New York counterparts, indicating that Massachusetts is outpacing New York in efficient bulb replacement no matter how you parse the data.

In addition, while LEDs were a popular replacement choice in both areas, we observed some panelists replacing LEDs with inefficient alternatives (backsliding). While this behavior was observed in both areas, it was less common in the program area than in the non-program area.

While the evidence supports the theory that the Massachusetts upstream program is having an effect, it does not distinguish which aspects of the upstream program are responsible

for the effects. It is important for program administrators to understand what factors influence consumers' decisions to purchase efficient lighting so that they can best design programs to influence customer behavior. This will be particularly important as naturally occurring market adoption continues to lead to decreases in net-to-gross ratios for upstream lighting programs. The shift market may require program administrators to change program delivery to decrease incentive values and overall program costs. The findings from these studies can help program administrators maximize program performance in a variety of market conditions.

Respondents of the InfoScout survey indicated that, aside from price, the most common factor influencing bulb selection was in both states was in-store signage at the time of the purchase or a previous trip. Coupons were the second most often cited factor in Massachusetts, and third in New York. Finally, purchasers in both states commonly performed online research followed by relying on family or friends, and conversations with store employees.

These findings indicate that program administrators should endeavor to leverage a wide variety of communication channels to extol the virtues of efficient lighting to customers, including, but not limited to: social media, email, in-store signage, in-store employee education, advertising (online, print, radio, and tv), and content on program administrator websites. Casting a wide net will help ensure that customers are educated about efficient lamps prior to making the decision to visit a retailer to purchase a bulb.

Highlighted Findings

- The majority of in store purchases were planned in advance and the most common factor influencing bulb selection, aside from price, in both states was in-store signage at the time of the survey or a previous trip.
- In both areas, InfoScout panelists who had decided what type of bulb to purchase while at the store were more likely to ultimately purchase an LED bulb than their 2016 counterparts.
- If their desired bulb type had not been available, most would InfoScout panelsits indicated they would not have purchased a bulb on that trip (41% in Massachusetts and 34% in New York) or would have selected whatever was cheapest (21% in Massachusetts and 26% in New York).
- One-half of all LED bulb purchasers were committed to buying an LED bulb and would not have purchased a bulb if an LED had not been available.
- Many incandescent purchasers would have selected an LED bulb if an incandescent bulb had not been available (21% in Massachusetts and 36% in New York).
- InfoScout panelists who purchased incandescent bulbs in Massachusetts were more likely to aware of efficient choices (76%) than their New York counterparts (33%).
- In 2018, 61% of replacement bulbs installed in Massachusetts were LEDs, and for the first time, LEDs (42%) made up a larger share of replacement bulbs in New York than incandescent bulbs (29%). While LEDs were a popular replacement choice, we observed some panelists replacing LEDs with inefficient alternatives. While this behavior was observed in both areas, it was less common in Massachusetts than in New York.
- In both states, highly educated householders, non-low-income householders, homeowners, and householders in single-family dwellings were more likely than others to install

replacement LEDs. Massachusetts householders in these groups installed more replacement LEDs than their New York counterparts, indicating that Massachusetts is outpacing New York in efficient bulb replacement no matter how you parse the data.

- In both states and across all demographic groups, home improvement stores such as Home Depot or Lowe's were the most common source of obtained LEDs, followed by mass merchandise retailers such as Walmart or Target. This may reflect the efforts by the PAs to diversify retailers where customers could find program-supported LEDs.

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