2018 Rhode Island Shelf Stocking Study

REVISED

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Rhode Island Shelf Stocking Study

NMR analyzed light bulb stocking and pricing data collected by Lockheed Martin in the autumns of 2016–2018 to investigate the impact of National Grid's residential lighting program on the retail market.

Sample Summary

2016–2018

53–55 stores

49–64k packages

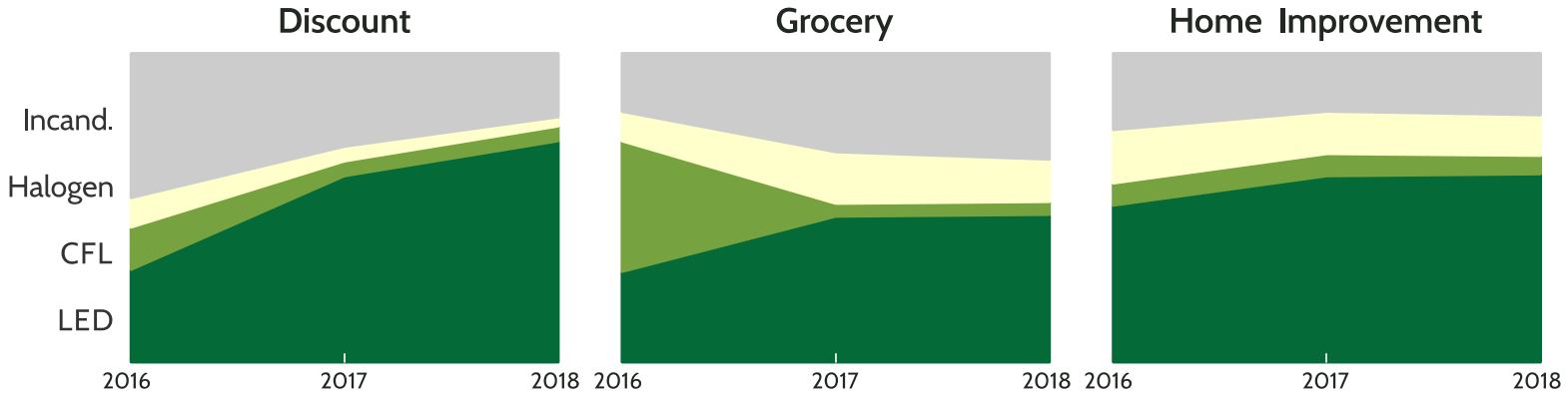
112–172k bulbs

2.2–3.1k models

Key Conclusions

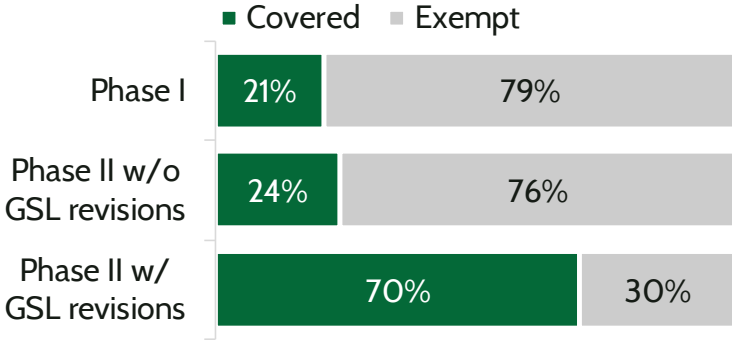
- The current DOE proposal (Phase II w/o GSL revisions) would save consumers little energy, leaving open the possibility of continued program intervention.
- LED prices have decreased year over year, while other bulb prices have increased.
- Efficient bulbs (LEDs & CFLs) are increasingly available, except in some store types like groceries.
- As LEDs become more available and their prices fall, other program approaches may be required to help late-adopters switch to this more efficient technology.

Participant Stocking Practices



EISA: Energy Independence and Security Act of 2007

Congress established energy efficiency standards for general use lighting (GSL) with EISA, instructing the Department of Energy to periodically revise these standards. The first update (Phase II) is expected in 2020, but is currently contested. Two scenarios were analyzed, and their impacts shown at right.



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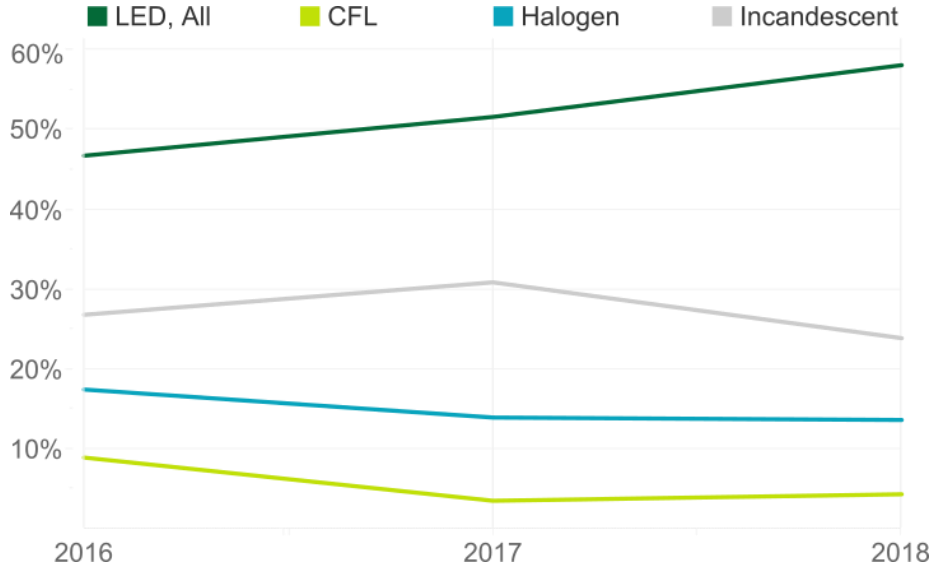
Executive Summary

On behalf of National Grid Rhode Island, Lockheed Martin conducted a shelf-stocking and price survey to evaluate the impact of the 2018 residential lighting program on the consumer retail light bulb market in Rhode Island. Lockheed Martin completed site visits at participating stores between October 2018 and January 2019, then delivered data to NMR Group Inc (NMR) in February 2019. The team inventoried 63,718 LED, CFL, incandescent, and halogen packages, or a total of 415,565 bulbs (Table 3). These represented 3,106 models of linear and non-linear lamps in 53 stores across the state (Table 1). NMR provided support for this study by reviewing data collection protocols; reviewing data collected in the 2016, 2017 and 2018 surveys; and preparing an analysis of selected data. It is important to note when examining results for shelf share, that we are observing products *available* for sale: Shelf share may not reflect actual lighting sales. In addition, while participant shelf stocking studies with participating retailers in Rhode Island are useful for understanding the availability of bulbs within participating stores, they do not provide context for the counterfactual of what types of bulbs would be available in the absence of the program.

Key Findings

- The amount of space dedicated to light bulbs in general (regardless of type) decreased between 2016 and 2018 across all channels except Discount (Table 4). This indicates that retailers are shifting shelf space to non-lighting products. If retailers are beginning to shift focus from light bulbs, programs may need to adapt. For example, if retailers begin to move lighting aisles, which have traditionally occupied prime real-estate, to other areas of the stores, the importance of off-shelf promotion may increase.
- LED shelf share has steadily increased since 2016, whereas CFL and Halogen shelf share did not change from 2017 to 2018 (Figure 1 below and Table 5).

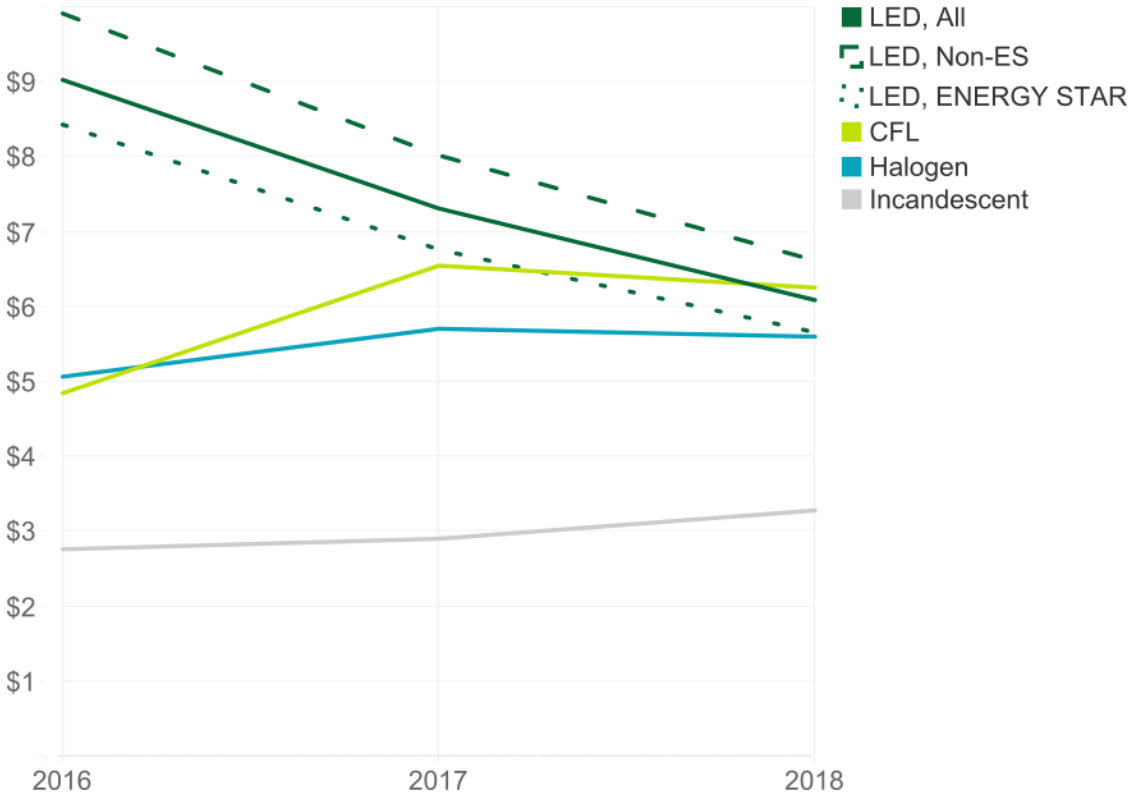
Figure 1: Shelf Share by Type



- Hardware & Home Improvement stores continue to devote a sizeable portion of shelf share to inefficient bulbs; 54% and 33% respectively (Table 7). Despite gains in LED saturation (see RI2311 Lighting Market Assessment Report), these retailers continue to offer a wide variety of inefficient bulbs to customers – meaning there are alternatives to LEDs readily available. As shown in Figure 8, in the main body of the report, most of the remaining halogens and incandescent bulbs represent categories currently subject to EISA Phase I (for halogens) or that would become subject to EISA Phase II (both bulb types) if the expanded general service lamp (GSL) definition is adopted (see additional information in the bullet below).
- Incandescent (+15%) and LED (+19%) bulbs have nearly replaced CFLs in Grocery stores (Figure 4). Shelf stocking data show that CFL shelf space in this channel is being divided among LEDs and incandescents.
- Most (79%) of the remaining inefficient bulbs on store shelves fall into categories which are currently exempt from the Energy Independence and Security Act (EISA) of 2007 (i.e., Phase I). Whether these bulbs will remain exempt will depend on the outcome of rulemakings and potential lawsuits regarding whether to expand the definition of a GSL to include additional bulb shapes, such as reflectors and globes, or maintain their exemption them from EISA efficiency standards. If the GSL definition is expanded, the majority (70%) of observed inefficient bulbs would be covered by EISA and would not be permissible for resale. Otherwise, the Department of Energy's most recent proposal for EISA Phase II would have negligible impact on the fraction of exempt bulbs under current stocking practices. Figure 8 and Figure 9 provide additional details by retail channel.
- Prices of all technologies except non-smart LEDs have increased since 2016 (Figure 2 below and Section 3), making non-smart LEDs an increasingly viable option for even price-sensitive consumers.

- Prices of globe and reflector LEDs haven fallen steeply, outpacing other styles (Figure12 and Figure 13, respectively).

Figure 2: Price per Bulb by Type[1]



[1] Non-smart bulbs only.

Considerations

Consideration 1: National Grid should carefully monitor updates and developments related to EISA efficiency standards. When and how the second phase of EISA is implemented will have a large impact on the feasibility of continuing program support.

Rationale: Based on the bulbs stocked during the latest round of shelf stocking visits, the revised definition of GSL put forth by the DOE in 2017, the fraction of bulbs considered exempt would decrease by more than one-half (down from 79% to 30 In contrast, if the revised GSL definition is rescinded (as proposed by the DOE in 2019), there would be little to no change in the proportion of exempt bulbs, essentially reverting exceptions to Phase I status.

Consideration 2: Depending on the outcome of the EISA backstop (see consideration 1), National Grid should continue program efforts to incentivize LEDs across channels, especially in Hardware, Home Improvement, and Grocery stores.

Rationale: Based on shelf stocking data, these three channels demonstrate a high shelf share of EISA exempt bulbs currently in stock, relative to other channels. The program currently places great emphasis on Hardware and Home Improvement stores since they

represent the largest portion of market share, whereas Grocery stores are a lower priority due to relatively lower sales volume (but still addressed).

Consideration 3: National Grid should consider working with other stakeholders to fund non-program / non-participant shelf stocking visits in non-program areas or states (outside of Rhode Island).

Rationale: Participant shelf stocking studies within Rhode Island are useful in showing the prevalence of efficient and inefficient options available to Rhode Island consumers. However, they do not provide context for the counterfactual of what types of bulbs would be available in the absence of the program. A multi-sponsor study could provide useful context while minimizing costs. The Consortium for Retail Energy Efficiency Data (CREED) initiative is currently reaching out to program administrators who may be interested in such a study.

Section 1 Introduction

On behalf of National Grid Rhode Island, Lockheed Martin conducted a shelf-stocking and price survey to evaluate the impact of the residential lighting program on bulb-based consumer retail lighting in the Rhode Island. Lockheed Martin conducted all the shelf-stocking visits, and NMR Group, Inc. (NMR) provided support for the study by reviewing data collection protocols, reviewing data, and preparing an analysis of selected data.

1.1 Objectives

The objectives of this study were to assess the following indicators at Rhode Island retailers which participated in National Grid's residential lighting program in 2016–2018:

- Total shelf share dedicated to lighting over time by channel
- The amount of shelf share dedicated to screw-based LED, CFL, halogen, and incandescent lamps by channel
- The pricing (on a per bulb basis), number of bulb packages, and shelf locations of screw-based LED, CFL, halogen, and incandescent lamps by channel
- Differences in pricing and availability for screw-based LED ENERGY STAR® vs. Non-ENERGY STAR products by channel
- The amount of shelf share dedicated to linear lamps (LED vs. fluorescent) by channel

When examining results for shelf share, it is important to remember that we are observing products *available* for sale: Shelf share may not reflect actual lighting sales.

1.2 Methodology

Lockheed Martin completed site visits at participating stores between October 2018 and January 2019, then delivered data to NMR in February 2019. The team inventoried 63,718 LED, CFL, incandescent, and halogen packages; for a total of 171,849 bulbs; representing 3,106 models of linear and non-linear lamps (Table 3) in 53 stores across the state (Table 1).

1.2.1 Sample

The distribution of sampled stores in Table 1 varies over time, because the number of stores chosen for site visits was based on program sales activity within a channel. For example, a concerted effort was made to add stores of a local Drug store chain to the program, resulting in a six-fold increase of the number of sampled Drug stores. Special care should be taken when evaluating statistics for the Membership Club or Drug store channels prior to 2018, due to small sample sizes resulting from relatively low program sales. Similarly, the small Specialty store sample was heavily skewed toward electrical suppliers in 2017, as opposed to the equal mix of appliance, electrical and office supply stores in other years.

For additional context, Table 1 includes the proportion of program bulbs distributed by channel in 2018. Further Table 2 presents, results from a February 17, 2016 memo to Massachusetts Electric Program Administrators & EEAC Consultants. As the data from this study show, Home Improvement and Mass Merchandise stores accounted for more than 80% of sales in both Massachusetts and New York, whereas Drug, Hardware and Specialty stores combined represented less than 5% of purchases. While older, it does provide a point of context for sales volume by channel, regardless of bulb type.

Table 1: Sampled Channel Distribution with Light Bulbs†

Channel	Sample			Program	Example
	2016	2017	2018	2018	
Discount	33%	24%	8%	25%	Dollar store, surplus retailer
Drug	2%	2%	11%	<1%	
Grocery	22%	20%	19%	1%	Supermarket, convenience store
Hardware	15%	22%	30%	25%	Franchise, local chain
Home Improvement	7%	5%	19%	23%	National chain
Mass Merchandise	13%	13%	8%	23%	General goods retailer
Membership Club	2%	4%	–	<1%	
Specialty	6%	11%	6%	3%	Office/Electrical supply
Total	**54**	**55**	**53**	**n/a**	

† One Specialty electrical supply store visited all three years stocked only fixtures in 2016 and 2018 and is therefore excluded from the analysis for those years.

Sample sizes ►

Table 2: 2016 Massachusetts Lighting Decision-Making Consumer Survey

Channel	MA	NY
Discount	3%	6%
Drug	–	–
Grocery	4%	3%
Hardware	–	–
Home Improvement	47%	36%
Mass Merchandise	35%	48%
Membership Club	7%	4%
Specialty	–	–

Table 3 provides a summary of total products observed during the shelf survey, broken out by packages, bulbs, and unique models. It indicates that the average package size increased by 17% in 2018 to 2.7 bulbs from 2.3 bulbs in previous years.

Table 3: Sampled Product Totals

	2016	2017	2018	2016–2018
Models	2,245	3,110	3,106	8,461
Packages	48,770	57,888	63,718	170,376
Bulbs	111,567	132,149	171,849	415,565
Bulbs per package	2.3	2.3	2.7	2.4

1.2.2 Shelf Share

Historically, Lockheed has collected data on the total number of displayed units for a product.[1] From the standpoint of a customer's experience in a store, we believe that the more relevant measures of product prominence are the front-facing area in a display and the number of displays with a product. Customers cannot easily gauge the depth of a product on the shelf, so the front-facing area likely affects consumer perceptions of bulb selection more than product volume. Lockheed began to collect separate data on front-facing area in 2017 at NMR's request.[2] Furthermore, we counted each distinct location (shelf, end-cap, etc.) where a customer might encounter a particular product (make and model) as a unique contribution to shelf share since, like front-facing-units, location influences overall customer perceptions of bulb selection. For example, the four models in the list below would be counted as six items.

- FluoroBright PAR38, Lower Shelf
- GreinTek Q2718, End-Cap
- GreinTek Q2718, Middle Shelf
- Wolframite A19-60W, Shipper
- Wolframite A19-60W, Upper Shelf
- Zerp Corp E89B12D3, Wing Stack

Since front-facing unit data are not available prior to 2017, total displayed units serves as a substitute for shelf share for 2016. Similar studies in Massachusetts have shown the two measures to be correlated, as do the values in Table 4, which features average counts for both front-facing and total displayed units per channel; the average is used instead of total shelf space due to variations in sample size over time. Overall, both measures of bulb availability also indicate that, with the exception of Discount stores which are targeted by the program as a proxy for hard-to-reach customers,[3] the amount of space dedicated to lighting products has decreased across all channels since 2016. This decrease in bulb availability has occurred despite a 38% increase in the number of models sold during the same time frame (Table 3), particularly screw-base LEDs which have increased 62%. Although it is difficult to definitively say why light bulbs are receiving less shelf space, this may be due to a decreasing frequency in bulb purchases stemming from the longer life of LEDs compared to traditional technologies. Another likely factor is the increasing shift of consumer purchasing to online retail, which may lead brick-and-mortar retailers to offer a wider variety of all products (lighting or otherwise) on shelves.

[1] Note that this represents the products on display to customers which is not necessarily proportional to actual sales.
[2] The depth of products on a shelf will also vary by the rate of shelf re-stocking at a store and the configuration when the technician records the displayed stock, whereas the front-facing area of products should be less variable, primarily changing along with the actual product mix.
[3] Total displayed units for Hardware and Home Improvement have remained relatively flat during this period, with a spike in 2017.

Table 4: Average Lighting Shelf Space per Store by Channel

	Front Facing Units			Total Displayed Units			
Channel	2017	2018	Δ2018	2016	2017	2018	Δ2018
Discount	93	151	62%	436	519	725	40%
Drug	40	29	-28%	4	77	75	-3%
Grocery	119	48	-60%	358	442	193	-56%
Hardware	291	245	-16%	879	991	853	-14%
Home Improvement	813	559	-31%	3,317	5,991	3,780	-37%
Mass Merchandise	440	379	-14%	2,179	1,755	1,634	-7%
Membership Club	31	–	–	651	464	–	–
Specialty	179	40	-78%	141	522	150	-71%

1.3 KEY TERMS

Globe, reflector and many B/C/F shape bulbs are exempt under EISA Phase I , for details see Appendix B – EISA Exemption Flow Charts. The reclassification of these shapes as general service lamps (GSL) is a distinguishing feature between DOE's 2017 proposed regulations and revisions proposed in 2019 (2.2).

1.3.1 Bulb Feature – Smart Bulb

Smart bulbs include advanced electronics which may offer any of several features such as color adjustment, wireless control, and integration with home automation systems.

1.3.2 Bulb Shape – A-Line[4]

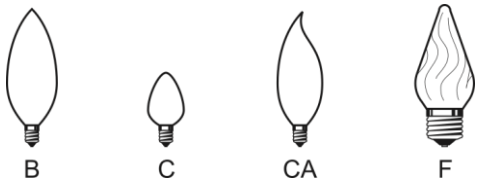
This category of bulb includes A-series (arbitrary) bulbs and other shapes of bulb intended as A-series equivalents such as bare CFL spirals or flat LEDs that resemble the profile of an A-series bulb.

1.3.3 Bulb Shape – Globe

G-series (globe) bulbs are spherical.

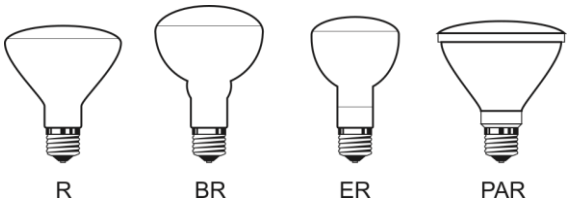
1.3.4 Bulb Shape – B/C/F

This category of bulb includes B-series (bullet), C-series (candle), CA-series (candle-angular or "flame-tip"), and F-series (flame) shaped bulbs since these are often confused with one another or used interchangeably.



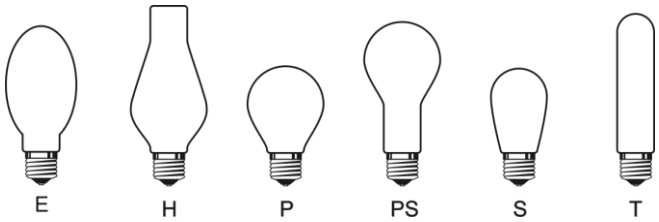
1.3.5 Bulb Shape – Reflector

This category of bulb includes those that are specially shaped for directional illumination, as in recessed lighting, namely: R-series (reflector), BR-series (bugle reflector), ER-series (elliptical reflector), PAR-series (parabolic reflector), and MR-series (multi-faceted reflector, not shown).



1.3.6 Bulb Shape – Other

This category includes all other bulb shapes, examples of which include P-series (pear), S-series (sign) and T-series (tube).



[4] Bulb diagrams used under Creative Commons Attribution, Share-alike license from Woodega@wikipedia.org.

1.3.7 Location – End Cap

End caps are shelves at the ends of an aisle, perpendicular to the aisle itself. Special displays and sales items are often featured in end caps.

1.3.8 Location – Shipper

Shippers are containers of product intended to be displayed to the customer as they are received from the manufacturer, unaltered. A common example are the large bin floor shippers found in the fronts of Home Improvement stores.

1.3.9 Location – Wing Stack

A wing stack is a display of products along the length of the aisle which sits in front of the shelves. Examples include a tower of bottled water cases, or a small cardboard stand displaying product. We could not locate a suitable, non-proprietary image of a wing stack.

1.3.10 Location –Other

A non-shelf location (pegboard hooks, glass cases) that does not fall into the other categories. In the Lockheed shelf stocking data, there were a few observations of bulbs at the register (4) or clearance (19) locations. We reclassified these as Other.

Section 2 Stocking and Display

This section explores stocking practices across channels, including the prevalence of bulbs that are exempt from the 2007 Energy Independence and Security Act (EISA). Except where otherwise noted, all analysis is for non-linear, non-smart bulbs.

Key Findings

- LED shelf share has steadily increased since 2016, whereas CFL and Halogen shelf share did not change from 2017 to 2018.
- Hardware & Home Improvement stores continued to stock large quantities of inefficient bulbs – 54% and 33% respectively – which is notable due to the dominance of these channels in the sales of light bulbs. While some of these inefficient bulbs are meant for very specific specialty applications (e.g., appliance bulbs), most of the halogens and incandescents remaining on shelves reflect types currently subject to EISA Phase I (halogens) or that would become subject to EISA Phase II if the GSL is expanded to include candelabras, gloves, and reflectors (Figure 8).
- A mix of incandescent bulbs (+15%) and LEDs (+19%) have nearly replaced CFLs in Grocery stores, resulting in a lower availability of efficient lighting products in this channel.
- The proportion of EISA Phase I (currently) exempt bulbs has remained largely unchanged for many channels, except for a marked decrease in Discount stores (which could reflect National Grid's efforts to promote LEDs in this hard-to-reach channel). However, the aggregate shelf share of exempt inefficient bulbs across all channels has increased by 14%, possible explanations for this change include a shift in the market to avoid regulation or dumping existing exempt stock before it becomes subject to possible EISA Phase II regulations.
- Under DOE's proposed 2017 GSL Revision the majority of observed inefficient bulbs would be covered by EISA and would not be permissible for resale, although some of the bulbs currently offered at Hardware, Home Improvement and Grocery stores would still be exempt, potentially allowing for limited program savings.
- If the expanded GSL definition proposed as part of EISA Phase II is rescinded, shelf share of exempt bulbs would remain relatively unchanged, providing little incentive for retailers to adjust stocking practices. However, regardless of the EISA Phase II resolution, retailers and manufacturers are likely to continue to adjust practices to match consumers' shift towards LEDs resulting from a combination of naturally occurring market adoption and program influence.

2.1 SHELF SHARE

Shelf share is a measure of the availability of products to consumers, as determined by the fraction of visible packages on the shelf; front-facing units when available (2017 and 2018) or total displayed units (2016), which includes additional packages further back on the shelf.

2.1.1 Overall Shelf Share

Of the four bulb types, only LEDs have seen a consistent increase in shelf share since 2016, whereas CFLs have fallen out of favor (Table 5). Incandescent bulbs still represented a quarter (24%) of non-linear bulbs in participating stores in 2018, down slightly from 2016; the difference is statistically significant.

Table 5: Statewide Shelf Share

Type	2016	2017	2018
LED	47%	52%	58%
CFL	9%	4%	4%
Halogen	17%	14%	14%
Incandescent	27%	31%	24%

2.1.2 Linear Lamps

Fluorescent bulbs remain the dominant linear lamp technology, although T-LEDs have begun to make inroads in Home Improvement and Mass Merchandise stores (Table 6).

Table 6: Fluorescent Shelf Share of Linear Lamps

Channel	2016	2017	2018
Discount	100%	100%	–
Hardware	100%	93%	92%
Home Improvement	100%	74%	80%
Mass Merchandise	100%	96%	71%

Sample sizes ►

2.1.3 Lamp Efficiency

Table 7 shows the shelf share of efficient (CFL & LED) lighting by channel; Specialty, Drug and Membership Club values were influenced by small store sample sizes (Table 1). The shelf share of efficient bulbs has steadily increased in the Discount and Mass Merchandise channels since data collection began, although the 2018 samples in these two channels were much smaller than previous years.[5] This highlights the program's potential to impact the market, particularly since Discount stores are frequently targeted as a proxy for hard-to-reach customers. In contrast, other high-priority channels such as Hardware and Home Improvement remained relatively unchanged.

[5] Four Mass Merchandise stores in 2018 versus seven in 2016 and 2017.
Four Discount stores in 2018 versus 13 in 2017 and 18 in 2017.

Table 7: Efficient Lamp Shelf Share by Channel

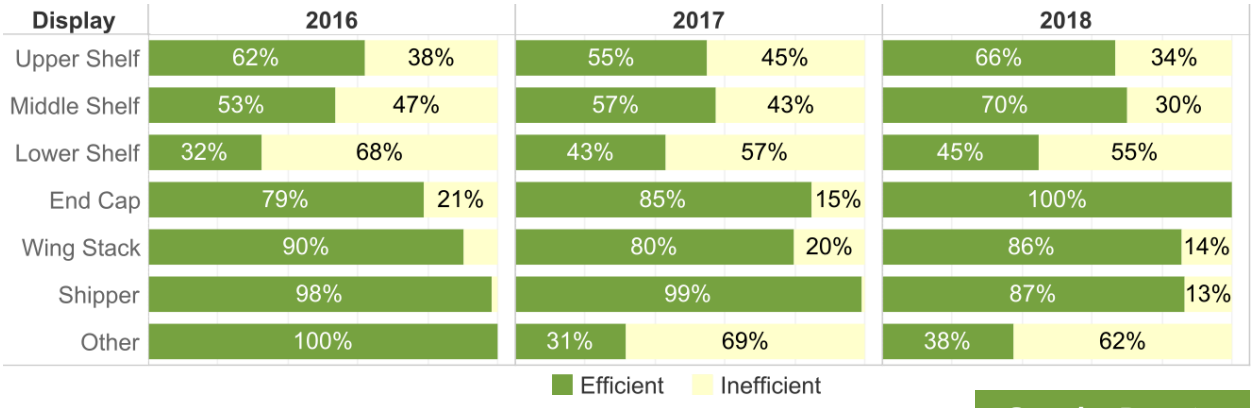
Channel	2016	2017	2018
Discount	44%	65%	76%
Drug	100%	70%	45%
Grocery	72%	51%	52%
Hardware	48%	46%	46%
Home Improvement	58%	67%	67%
Mass Merchandise	57%	65%	87%
Membership Club	96%	87%	–
Specialty	78%	23%	97%

Sample sizes ►

2.1.4 Efficient Lamp Locations

The placement of products can have a powerful influence on consumer behavior. For example, the middle shelf is near eye-level and easy to see, and shipper or register displays near check-out may spur impulse purchases. Product placement is therefore worth considering when assessing the state of the market. The shelf share of efficient lamps has steadily increased on lower and middle shelves, as well as in end caps (Figure 3). Inefficient lamp shelf share has increased in the catch-all location of "other" (see Section 1.3 for definitions of these locations).

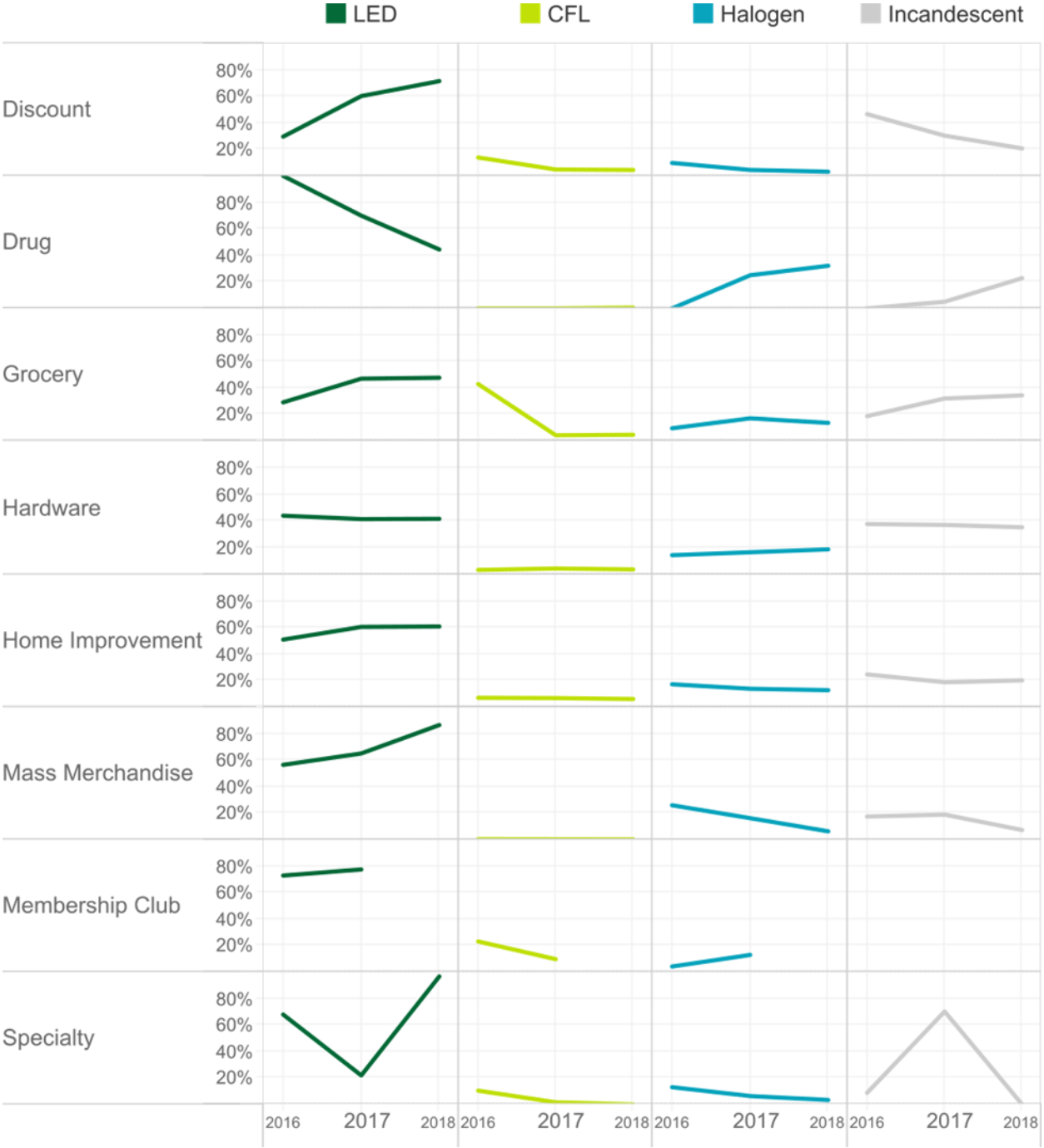
Figure 3: Efficient Lamp Shelf Share by Display Location



See the Data ►

The increased presence of LEDs in Discount and Mass Merchandise alluded to previously (in discussion of Table 7) can be clearly seen in Figure 4; the stagnant shares in Hardware and Home Improvement can be seen as well. Interestingly, the decline in CFLs on Grocery shelves has been accompanied by nearly equal increases in both LED and incandescent bulb shelf share.

Figure 4: Shelf Share by Type and Channel, 2016–2018

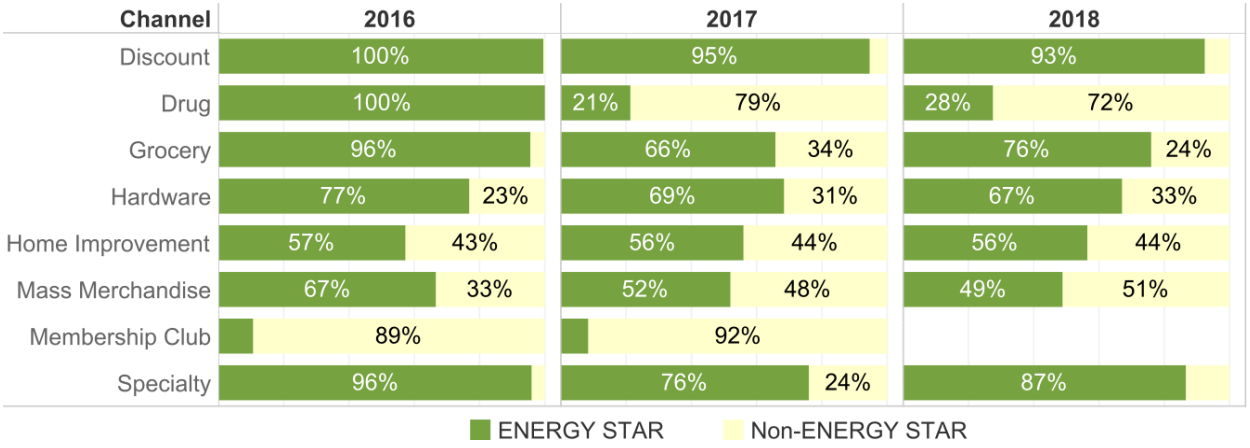


See the Data ►

2.1.5 ENERGY STAR LEDs

Figure 5 suggests that the proportion of ENERGY STAR certified bulbs among LEDs has remained fairly constant, perhaps slightly decreasing as LEDs continued to saturate the market, becoming more of a commodity rather than a premium good. Some channels have a much higher proportion of non-qualified bulbs, however, particularly Drug stores and Membership clubs.[6] This may be attributed in part to the prevalence of private label products, although the majority of these are ENERGY STAR certified. Private label lamps constituted 7% of LED shelf share in Hardware stores (0% certified), 37% in Home Improvement (67% certified), and 49% Mass Merchandise (58% certified).

Figure 5: LED Shelf-Share by ENERGY STAR Status



See the Data ►

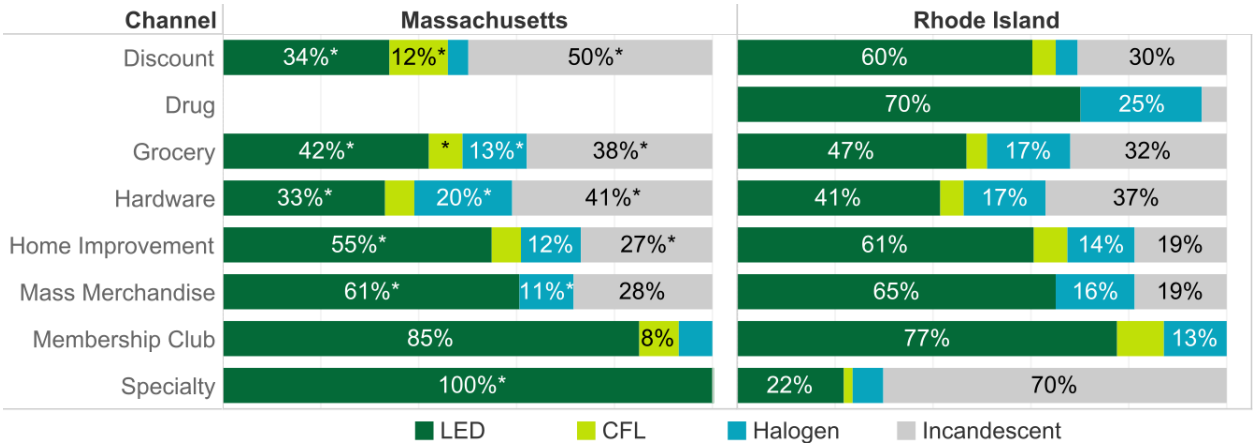
2.1.6 Comparison to Massachusetts for 2017

NMR provided a similar analysis to this report for the Massachusetts electric Program Administrators (PAs) and Massachusetts Energy Efficiency Advisory Council (EEAC) in 2017.[7] A comparison of those results with this analysis revealed that LEDs enjoyed a significantly higher shelf share across most channels in Rhode Island, with the exception of Specialty stores in 2017 (Figure 6).

[6] Interestingly, while one might expect stores that stock more efficient lighting to subsequently stock more higher-performing efficient lighting as well, the shelf share of ENERGY STAR LEDs in a channel is not correlated with the shelf share of efficient lighting (-0.13); note that this correlation was determined with a separate test, and is not shown elsewhere in any figure or table.

[7] NMR Group, Inc. "RLPNC 1715 Shelf Stocking Study." July 6, 2018. http://ma-eeac.org/wordpress/wp-content/uploads/RLPNC_1715_ShelfStocking_6July2018_Final.pdf

Figure 6: Shelf Share by Type, Channel and State, 2017



* Significantly different from Rhode Island with a 95% confidence interval.
In Massachusetts, Grocery was labeled "Grocery & Supermarket," and Specialty was labeled "Lighting & Electronics."
No Drug stores were sampled.

See the Data ►

While ENERGY STAR LEDs were more prevalent in Rhode Island than Massachusetts across many channels in 2017, the latter state had a significantly higher proportion of ENERGY STAR products in the high-volume Home Improvement channel (Table 8). This difference, along with disparities in the mix of bulb type at Home Improvement stores in Figure 6, provided some evidence that stocking decisions were not fully determined at the regional level.

Table 8: ENERGY STAR LED Shelf Share by Channel and State, 2017

Channel	Massachusetts	Rhode Island
Discount	78%*	95%
Drug	–	21%
Grocery	51%*	66%
Hardware	57%*	69%
Home Improvement	64%*	56%
Mass Merchandise	47%	52%
Membership Club	41%*	8%
Specialty	52%	76%

* Significantly different from Rhode Island with a 95% confidence interval.

2.2 EISA

The Energy Independence and Security Act (EISA) of 2007 has and will continue to have a profound impact on the residential lighting market. EISA encompassed a wide variety of energy-related standards. For the purposes of this report, we concentrate on the General Service Lighting (GSL) standards. EISA laid out initial standards to be implemented between 2012 and 2014 (Phase I) and a schedule of events that would lead to increased standards in 2020 (Phase II) and 2025 (Phase III). The act envisioned the DOE issuing rulemakings that would take effect in 2020 and 2025. However, it also included a provision (backstop) that would go into effect in 2020 should the DOE fail to complete a rulemaking in accordance with the act or if the final DOE rulemaking did not produce savings greater than or equal to the savings of the backstop provision. Appendix B includes flow charts of the Phase I and Phase II (including the 2017 GSL revision, see below) exemption status algorithm used to classify bulbs in this section.

The status of EISA Phase II remains uncertain. In January 2017, the Department of Energy (DOE) issued a notice of proposed rulemaking (NOPR) that expanded the definition of a GSL to include seven previously exempt categories and expanded the covered lumen range. In March 2017, the National Electrical Manufacturers Association (NEMA) field a petition to review the DOE rulemakings. On July 7, 2017, DOE and NEMA reached a settlement, with NEMA agreeing to withdraw its petition and the DOE agreeing to complete the GSL rulemaking and other associated regulatory activities. In February 2019, the DOE issued another NOPR that if implemented would rescind the revised definitions for GSLs. This second NOPR received thousands of comments, and the outcome remains unclear at the time of writing. For additional details on EISA coverage and history we recommend readers review two recent reports published in Massachusetts:

- RLPNC 18-8 Residential Lighting Market Scan Report
- RLPNC 18-10 2018-19 Residential Lighting Market Assessment Study

2.2.1 Phase I

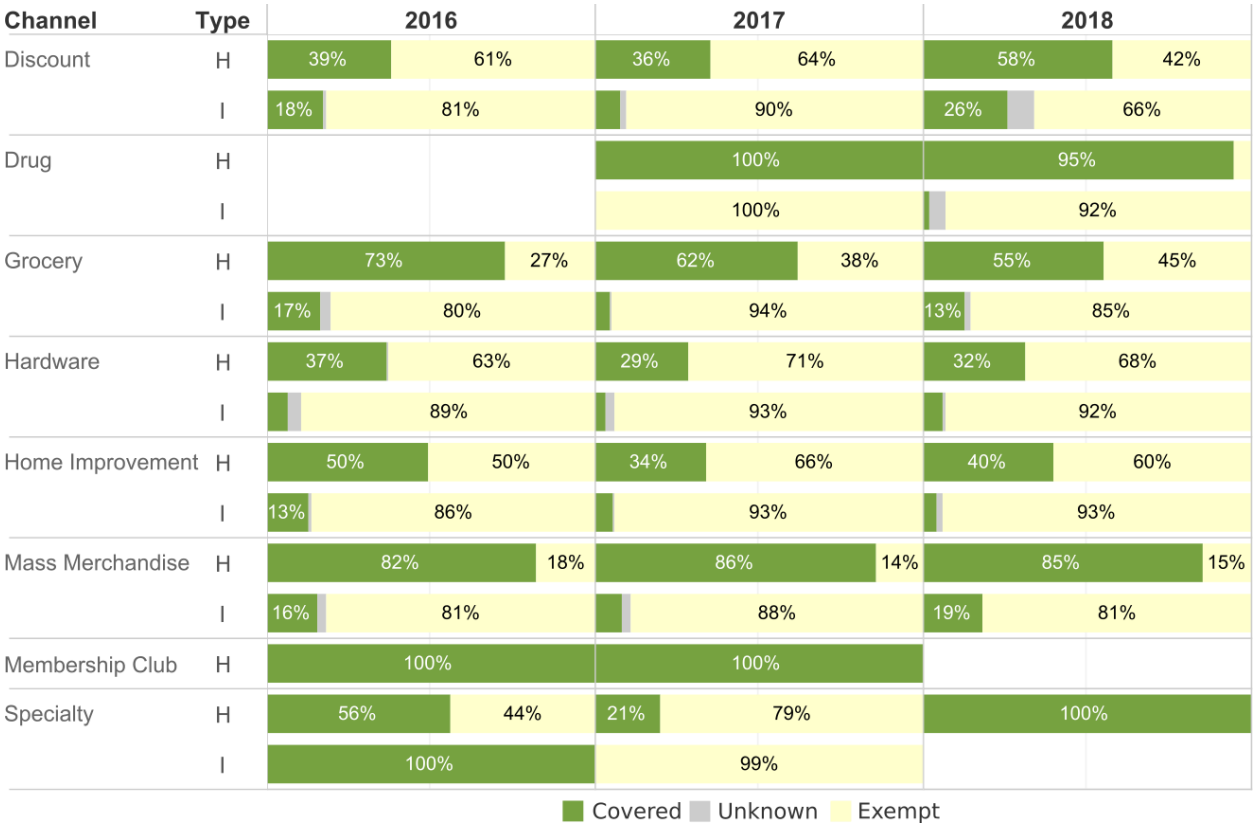
Figure 7 shows the shelf share of inefficient bulbs (non-linear halogen and incandescent) by EISA Phase I coverage (exempt or covered).[8] The shelf share of exempt halogen (H) and incandescent (I) bulbs has steadily decreased in the Discount channel since 2016, although the 2018 sample size is one-third that of previous years. This highlights the program's potential to impact the market, particularly since Discount stores are frequently targeted as a proxy for hard-to-reach customers.

[8] Some bulbs are marked as unknown exemption status, generally due to missing brightness information (lumens); a broad classification of "torpedo" for B-series, C-series, and F-series bulbs in the source data;[8] or in some cases bulb base. The fraction of unknown status bulbs varies across channels and years. Overall, unknown bulbs range from 1.3% in 2016 to 1.0% in 2018 however the percentage is as high as 8% for Drug store incandescents in 2018.

Specialty stores showed a similar doubly-beneficial trend to Discounts stores, with a decrease in both the shelf share of inefficient bulbs and portion of these bulbs that are exempt under EISA Phase I. In contrast, the shelf share of inefficient bulbs and exempt fraction of the same increased in Grocery stores. Together with the information from Table 7 that shows that these two channels have also seen a reduction in their *efficient* lamp share, a possible implication of these shifts is that a consumer who seeks to quickly replace a burned out bulb or pick-up a bulb whilst conducting other errands will have greater opportunity to purchase an inefficient option at Grocery and Hardware stores.

Figure 7: EISA Phase I Exempt Inefficient Bulb Shelf Share

Non-linear Halogen and Incandescent bulbs



Membership Clubs did not stock incandescent bulbs. Drug stores stocked only LEDs in 2016.

See the Data ►

Table 9 summarizes the change in inefficient lamp shelf share (the complement of values in Table 7) side-by-side with the change in exempt shelf share (from Figure 7) during the study period. In short, the results do not display any strong consistent patterns. Some channels, notably the discount channel, have seen the percentage of exempt bulbs and inefficient bulbs fall (the most desirable outcome from an efficiency standpoint), while other channels (e.g., grocery stores) have seen the direct opposite – an undesirable increase in both exempt and inefficient bulbs. Some show mixed patterns (e.g., home improvement and mass merchandise stores), which is not necessarily undesirable, as they may be carrying more specialty application bulbs, but this is overwhelmed by the general shift towards efficient bulb models. Notably, the decrease of both exempt and inefficient bulbs in Discount stores provides further evidence of the earlier Figure 7 discussion about a positive program impact on efficient bulb availability.

Table 9: Change in Exempt and Inefficient Bulb Share by Channel, 2016–2018

Channel	ΔExempt	ΔInefficient
Discount	-15%	-32%
Drug	–	25%
Grocery	11%	20%
Hardware	2%	2%
Home Improvement	9%	-9%
Mass Merchandise	7%	-30%
Membership Club†	0%	-9%
Specialty	-26%	-19%

† Membership Clubs were not sampled in 2018; changes are calculated between 2016 and 2017.

2.2.2 Phase II

Although its status remains uncertain, under the 2017 DOE rules,[9] the fraction of bulbs on shelves in 2018 considered exempt – and therefore still permissible for retail after 2020 – would be reduced by more than one-half, from 79% to 30%. As shown in Figure 8, the impact in some channels would be considerably greater. Exempt incandescents in Discount and Drug stores would fall below 20% and no halogens currently stocked in Discount, Drug or Mass Merchandise stores would be exempt.

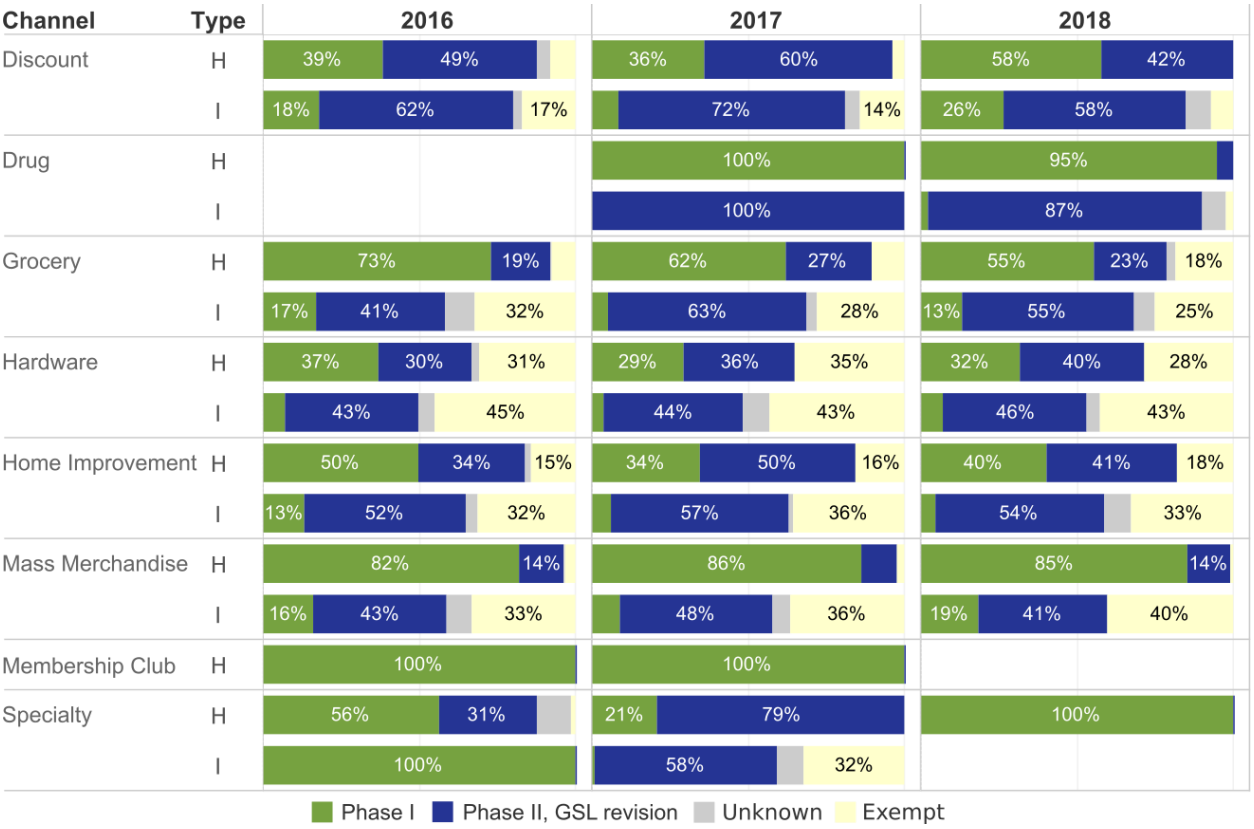
The larger portion of bulbs with unknown status under these rules is due to the complex segmentation of reflector and globe shapes.[10] All such bulbs are exempt under Phase I rules but have size-dependent exemptions in the 2017 regulations for which we were unable to make definitive determinations with the available data.

[9] Note: as discussed, the DOE's more recent proposed rulemaking which would rescind definition changes included in the 2017 rules is still out for public comment.

[10] Four percent overall for each observation year, although some channels are as high as 11% in 2016 (Specialty halogen), 8% in 2017 (Hardware and Specialty incandescent), and 9% in 2018 (Home Improvement incandescent).

Figure 8: Phase II (2017, GSL revision) Exempt Inefficient Bulb Shelf Share

Non-linear Halogen and Incandescent bulbs



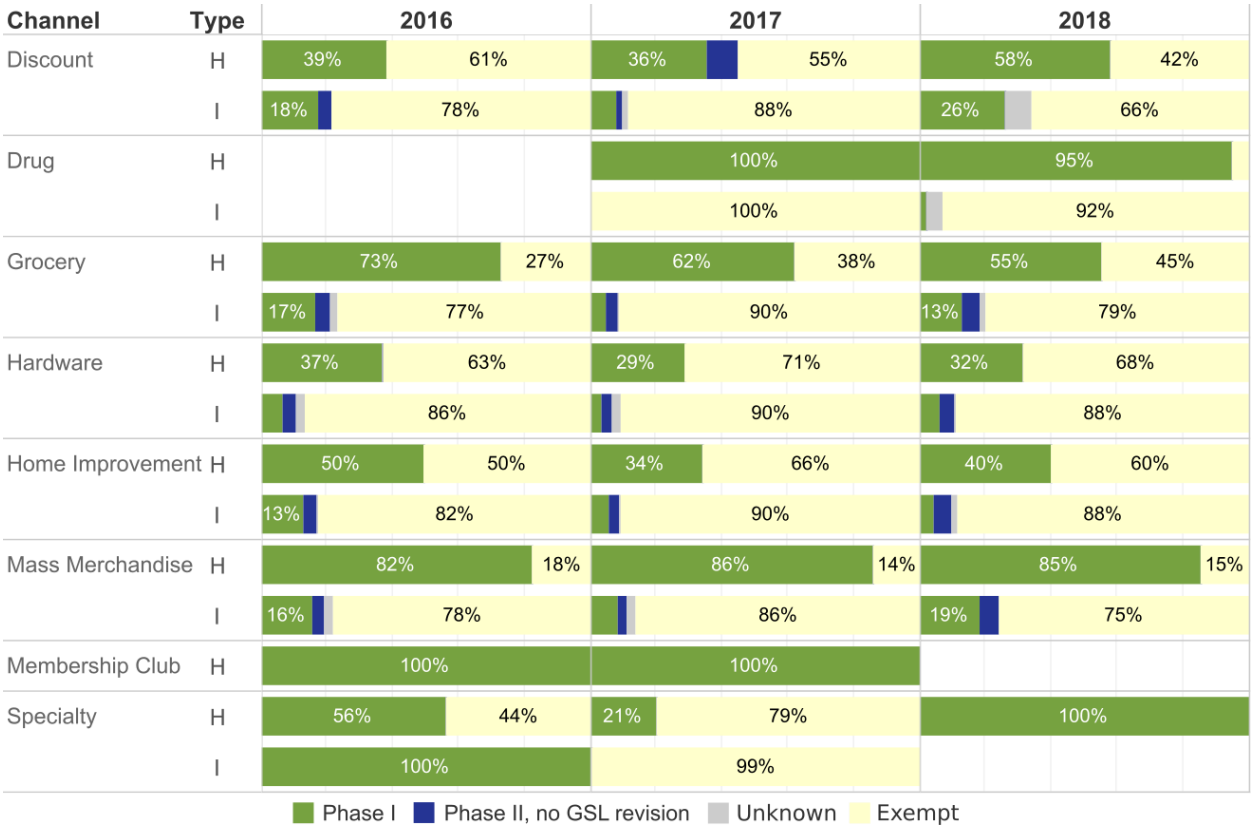
Membership Clubs did not stock incandescent bulbs. Drug stores stocked only LEDs in 2016.

See the Data ►

In contrast, as Figure 9 shows, there would be relatively little to no change in the proportion of exempt halogens under DOE's 2018 proposed regulations under current stocking practices, because the NOPR would rescind the definition changes, essentially reverting exceptions to Phase I status. Changes are limited to Discount stores (9%), and small decreases (6% or less) in the fraction of exempt incandescent bulbs due to the increased lumen range. In fact, with very few exceptions, Figure 7 and Figure 9 look extremely similar.

Figure 9 :Phase II (GSL definition rescinded) Exempt Inefficient Bulb Shelf Share

Non-linear Halogen and Incandescent bulbs



Membership Clubs did not stock incandescent bulbs. Drug stores stocked only LEDs in 2016.

See the Data ►

Section 3 Pricing

This section includes analysis of the price per bulb across various strata. It should be noted that these prices are as listed on the package and recorded by Lockheed, including any applicable program incentives or store discounts, divided by the number of bulbs per package. Furthermore, prices have not been adjusted for inflation. Except where otherwise noted, all analysis is for non-linear, non-smart bulbs.

Key Findings

- Of all technologies, only LED prices (excluding Smart LEDs) have decreased since 2016. This may lead to greater adoption of efficient lighting by consumers due to a reduction in price differential between LEDs and other technologies.
- High cost incandescent bulbs were often displayed in the same locations as lower-cost bulbs of other technologies, and vice versa.
- LEDs are making major advances in non-A-line shape categories:
  - Prices of globe and reflector LEDs haven fallen steeply, outpacing other styles.
  - LEDs were cheaper than halogen bulbs in 2018 for both the Reflector and Bullet/Candle/Flame (B/C/F) series shape categories.

Table 10 shows that the price per bulb has increased since 2016 for all technologies except LEDs, although the trend varied by shape as detailed in Section 3.3.

Table 10: Price per Bulb by Type

$ per bulb	Median			Mean		
Type	2016	2017	2018	2016	2017	2018
LED	$7.98	$5.84	$4.83	$9.04	$7.32	$6.10
CFL	$4.00	$5.99	$6.76	$4.85	$6.56	$6.26
Halogen	$3.99	$4.94	$4.94	$5.07	$5.71	$5.61
Incandescent	$2.00	$2.24	$2.33	$2.77	$2.91	$3.29

Sample sizes ►

In Table 3, it was revealed that the average package size has increased by 0.4 bulbs. Since the price per bulb in multi-bulb packages is lower than the price of single bulbs, this shift will depress the average price per bulb observed in this survey. However due inconsistencies in data collection and manufacturer designation of model numbers, it is difficult to say whether the lower price per bulb in multi-packs is dominated by differences in the kinds of bulbs found in single versus multi-bulb packages, or volume discounts.

3.1 SMART BULBS

Contrary to general expectations for consumer electronics, as well the trend for conventional replacement LEDs in Table 10, smart LED prices in Table 11 have increased considerably over time. It is not entirely clear why this should be the case since manufacturers have indicated in ENERGY STAR Partners meetings that they have been reducing prices. Possible explanations include the positioning of these models as premium products, or retailers relying upon them as profit centers. Manufacturers may also have included more value-added features to these products over time in order to boost sales.

Table 11: Price per Smart LED

$ per bulb	Median			Mean		
Type	2016	2017	2018	2016	2017	2018
Smart LED	$15.97	$28.99	$24.99	$23.13	$30.17	$30.74

Sample sizes ►

3.2 ENERGY STAR & PROGRAM INCENTIVE

The price of both ENERGY STAR and non-ENERGY STAR LEDs has decreased over time, as has the differential between them (Table 12). For context, National Grid's lighting program, which only incentivizes ENERGY STAR LEDs, paid an average incentive of $5.10 per bulb in 2016 and $3.55 per bulb in 2017; and $5.44 per bulb in 2018.[11] These incentives constitute the majority of/exceed the difference in price between ENERGY STAR and non-ENERGY STAR bulbs.

Table 12: Price per LED by ENERGY STAR Status

$ per bulb	Median			Mean		
Status	2016	2017	2018	2016	2017	2018
No	$8.97	$6.49	$5.33	$9.92	$8.02	$6.62
Yes	$6.49	$4.99	$4.22	$8.44	$6.76	$5.67
Difference	$2.48	$1.50	$1.11	$1.48	$1.26	$0.96

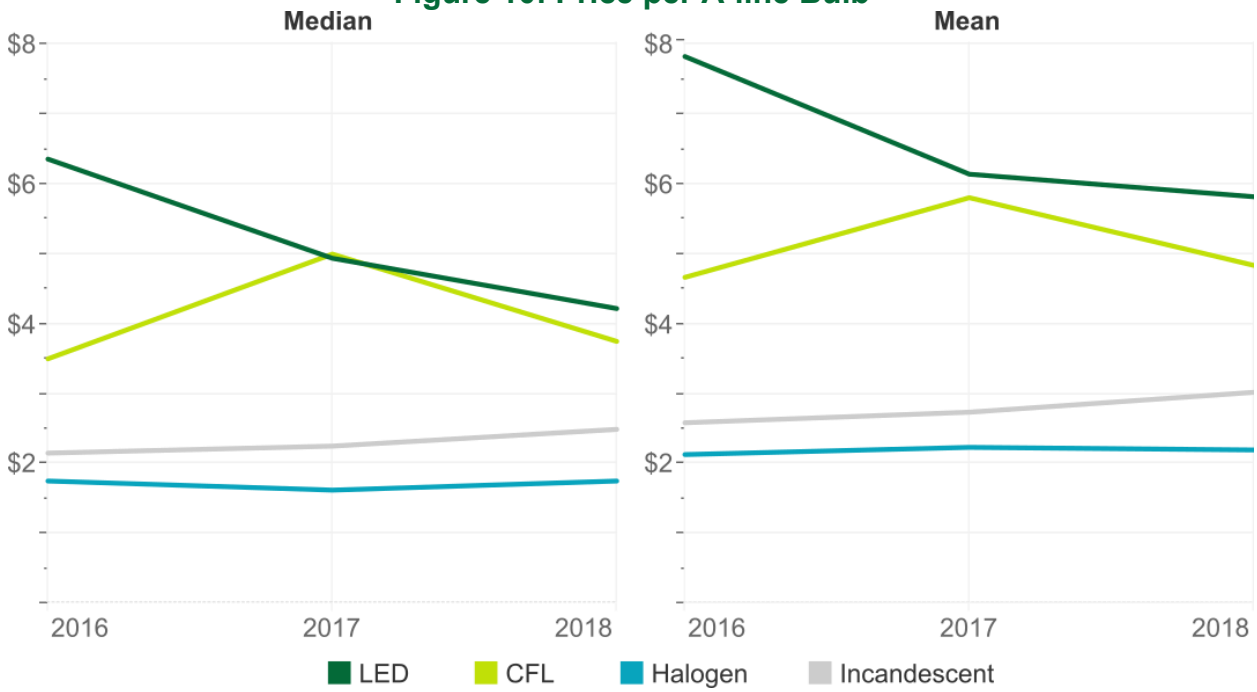
Sample sizes ►

[11] Based on program sales counts and rebate amounts for Rhode Island as listed in the program tracking database provided by EFI to NMR as part on-going evaluations of the Massachusetts upstream programs. These databases included both Massachusetts and Rhode Island program sales.

3.3 SHAPE[12]

The prices of inefficient A-line bulbs in Rhode Island have remained flat the past three years while those of LEDs have steadily decreased as shown in Figure 10; there is some variation in trends for LEDs by wattage (Table 13).The mean and median prices of CFL A-line bulbs spiked in 2017 (the year in which most CFLs lost ENERGY STAR qualification due to new specifications), but the price per CFL decreased in 2018, ending up slightly above the price for 2016.

Figure 10: Price per A-line Bulb



See the Data ►

Table 13: Price per A-line LED Bulb by Incandescent Equivalent Wattage

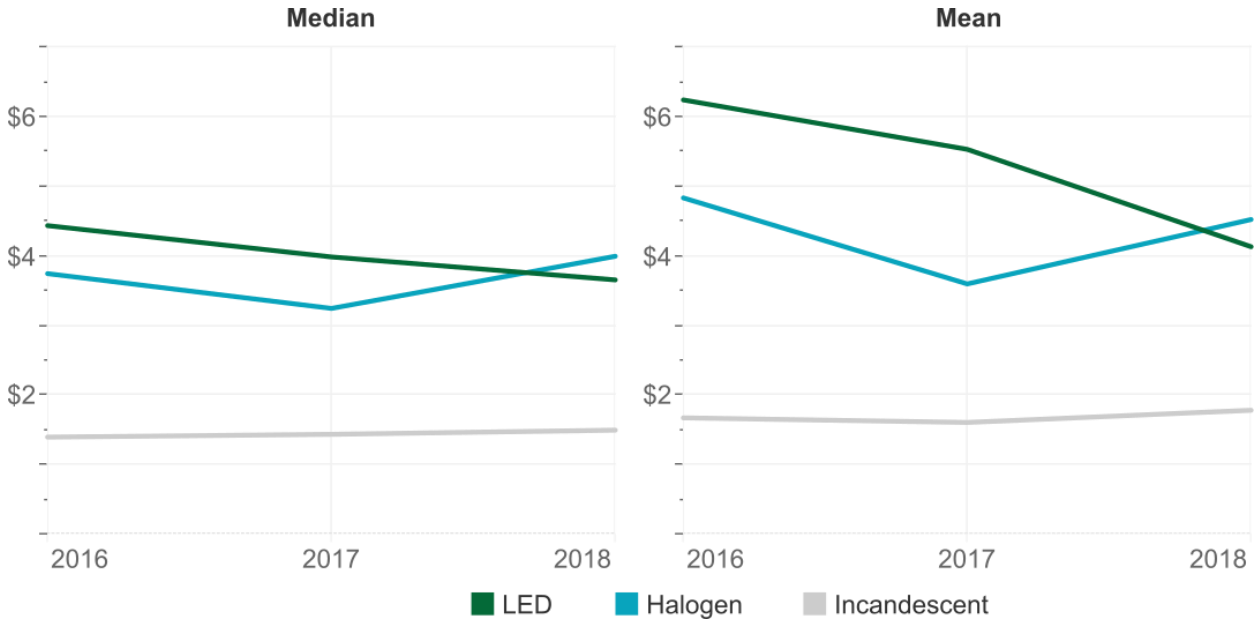
Equivalent Wattage	2016	2017	2018
25–45	$3.09	$4.90	$3.54
50–65	$2.98	$4.41	$5.70
75	$8.88	$7.13	$5.38
≥100	$13.26	$10.50	$8.16

Sample sizes ►

[12] Definitions and diagrams of various bulb shape categories are available in Section 1.3.

Figure 11 includes prices for variations of Bullet, Candle, and Flame shaped bulbs (Bulb Shape – B/C/F), which serve similar functions and are sometimes confused with one another.[13] CFLs in these typically smaller form factors are rare, resulting in a sample size which was too small to include. Inefficient B/C/F bulb prices have remained relatively consistent since data collection began, although halogen bulb prices were slightly cheaper in 2017. While median LED prices have decreased slightly over the past three years, the average price has fallen more than twice as fast, and the sticker prices of LED bulbs in these shape series are now cheaper than halogens.

Figure 11: Price per B/C/F Bulb

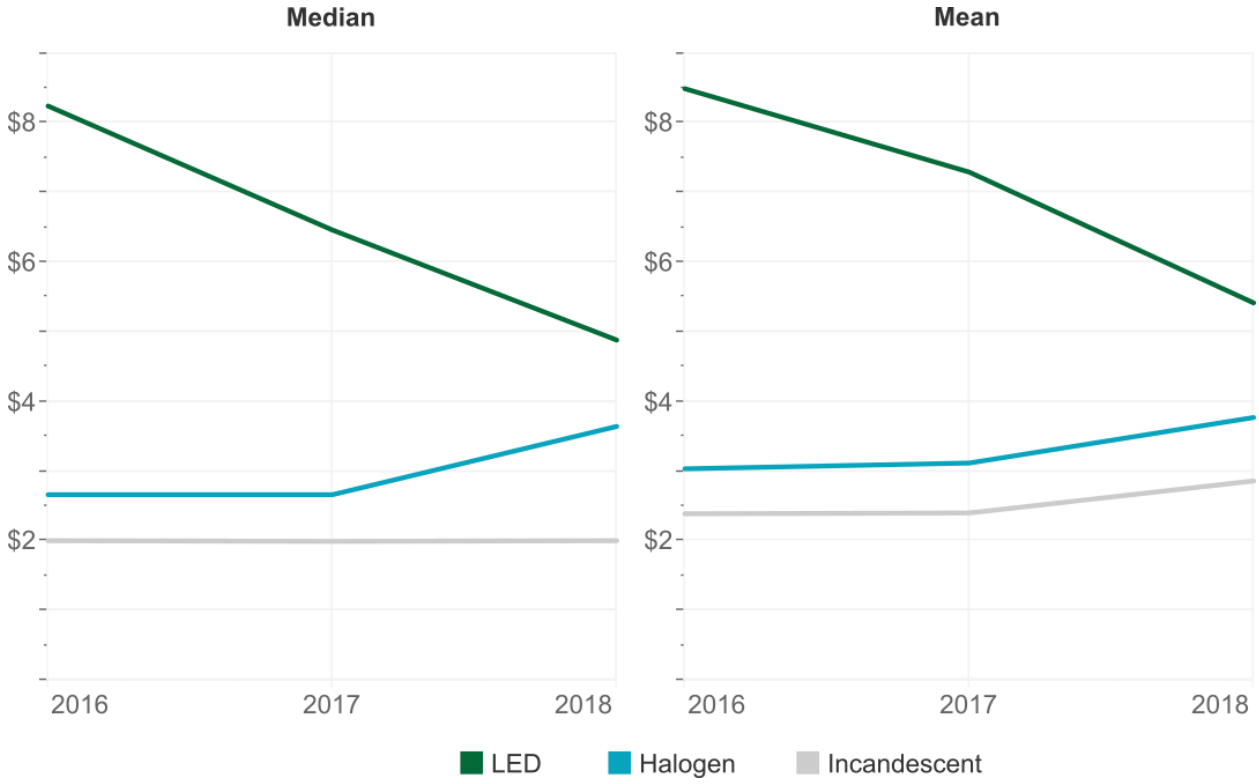


See the Data ►

[13] Based on the raw data furnished by Lockheed and retailer descriptions encountered when data cleaning of B and C series bulbs, approximately 6% of B/C/F bulb shapes were miscategorized.

LED globe prices have decreased steeply since 2016, while inefficient globe prices have increased slightly in Figure12; CFLs are again omitted due to small sample size.

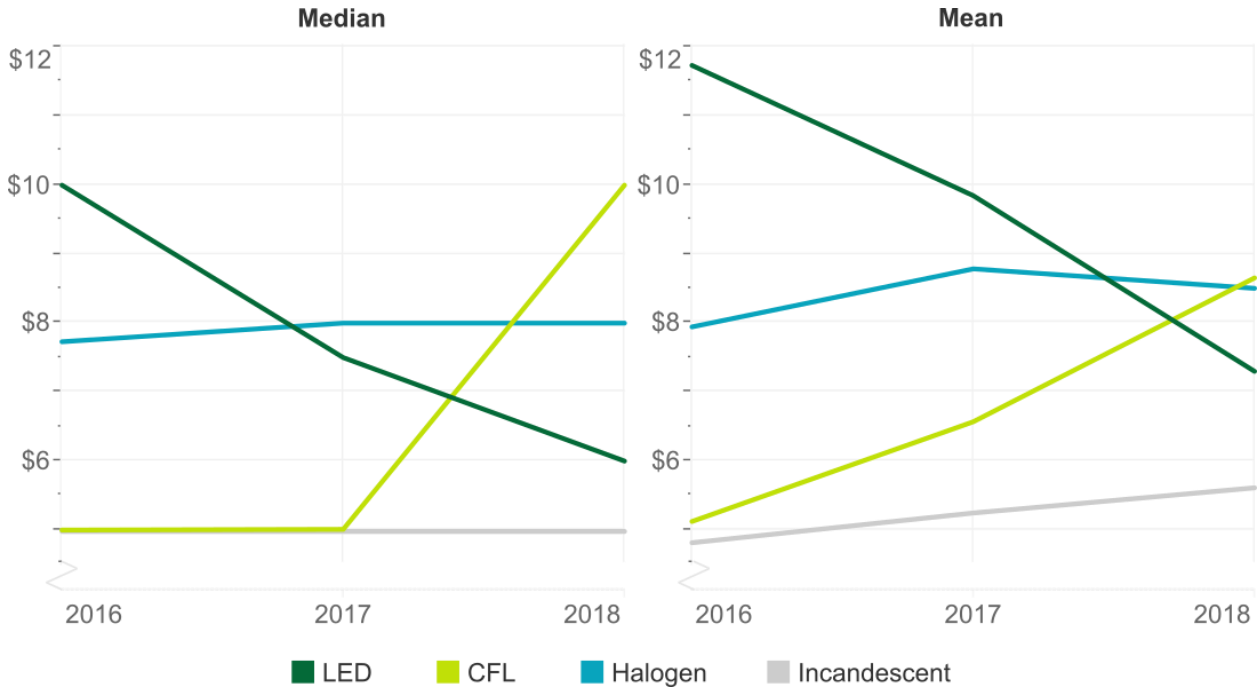
Figure12: Price per Globe Bulb, 2016–2018



See the Data ►

LED prices have fallen dramatically for reflector bulbs, and both the median and mean reflector LED prices are now lower than halogen prices (Figure 13). CFL reflector prices have risen sharply, nearly mirroring the reduction in price for LED reflectors. The figure also shows more modest increases in the average price of incandescent and halogen reflectors despite little change in median bulb prices.

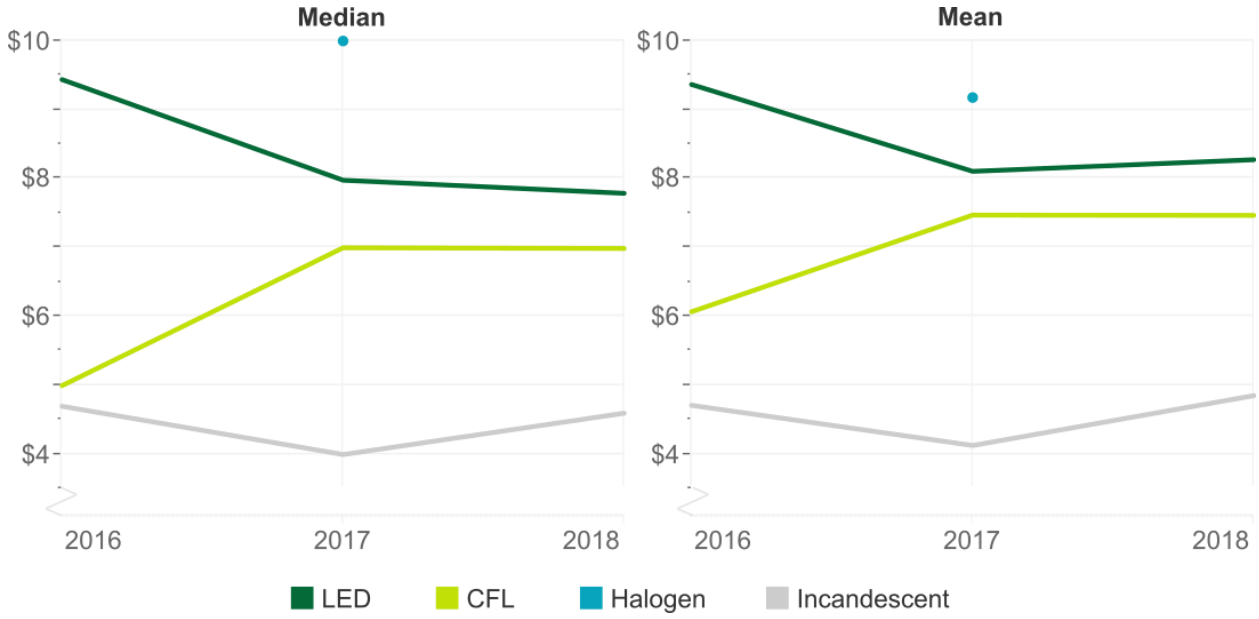
Figure 13: Price per Reflector Bulb



See the Data ►

Other-shaped LEDs remained the most expensive bulb type for this category, excluding halogen bulbs, for which there is little data (Figure 14). In addition, unlike other categories, CFLs have remained consistently cheaper than LEDs despite an increase in price in 2017.

Figure 14: Price per Other Shape Bulb



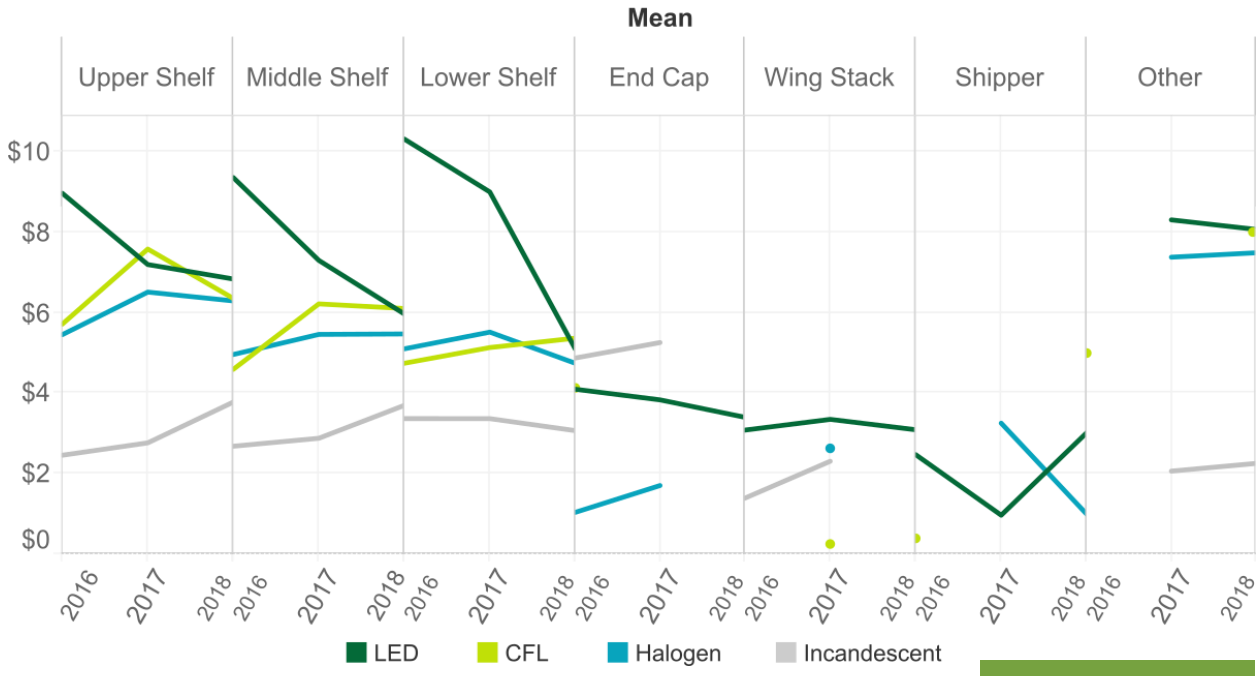
See the Data ►

3.4 Type & Display Location

As previously discussed in Efficient Lamp Location (Section 2.1.4), product placement can affect consumers' experiences and purchases. Figure 15 portrays the pricing and stocking trends for different bulb technologies across recent shelf stocking studies.

Low-cost LEDs, CFLs and halogens are featured in shippers, wing stacks and end caps whereas some of the most expensive incandescent bulbs are placed in wing stacks and end caps; see Section 1.3 for definitions. In contrast, the catch-all "other" location designation is often stocked with the most expensive LED, CFL and halogen bulbs, but the cheapest incandescents. Consequently, in some stores the selection of displayed bulbs in one location may exaggerate the price disparity between efficient and inefficient bulbs, driving price-conscious consumers to select the bulb with the lowest initial cost, whereas in other displays the price disparity may be downplayed.

Figure 15: Price per Bulb by Location



See the Data ►

Appendix A Data Tables

A.1 METHODOLOGY

Table 14: Counts of Sampled Stores by Channel†

Channel	2016	2017	2018
Discount	18	13	4
Drug	1	1	6
Grocery	12	11	10
Hardware	8	12	16
Home Improvement	4	3	10
Mass Merchandise	7	7	4
Membership Club	1	2	–
Specialty	3	6	3
TOTAL	**54**	**55**	**53**

† One Specialty electrical supply store visited all three years stocked only LED fixtures in 2016 and 2018 and is therefore excluded from the analysis for those years.

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A.2 STOCKING

A.2.2 Linear Lamp Shelf Share

Table 15: Counts of Fluorescent Linear Lamps

Type	Channel	2016	2017	2018	Channel	2016	2017	2018
LED	Discount	–	–	–	Mass Merchandise	0	4	28
Fluorescent	Discount	35	36	0	Mass Merchandise	32	97	68
LED	Hardware	0	26	27	Home Improvement	0	126	186
Fluorescent	Hardware	26	338	330	Home Improvement	13	363	728

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A.2.3 Non-Linear Lamp Shelf Share

Table 16: Shelf Share by Type and Channel

Type	Channel	2016	2017	2018	Channel	2016	2017	2018
LED	Discount	30%	60%	72%	Membership Club	73%	77%	–
CFL	Discount	14%	5%	4%	Membership Club	23%	10%	–
Halogen	Discount	10%	5%	3%	Membership Club	4%	13%	–
Incandescent	Discount	47%	30%	21%	Membership Club	–	–	–
LED	Drug	100%	70%	44%	Grocery	29%	47%	48%
CFL	Drug	0%	0%	1%	Grocery	43%	4%	5%
Halogen	Drug	0%	25%	32%	Grocery	9%	17%	14%
Incandescent	Drug	0%	5%	23%	Grocery	19%	32%	34%
LED	Hardware	44%	41%	42%	Home Improvement	51%	61%	61%
CFL	Hardware	4%	5%	4%	Home Improvement	7%	7%	6%
Halogen	Hardware	15%	17%	19%	Home Improvement	17%	14%	13%
Incandescent	Hardware	38%	37%	35%	Home Improvement	25%	19%	20%
LED	Specialty	68%	22%	97%	Mass Merchandise	56%	65%	86%
CFL	Specialty	10%	2%	0%	Mass Merchandise	0%	0%	0%
Halogen	Specialty	13%	6%	3%	Mass Merchandise	26%	16%	6%
Incandescent	Specialty	9%	70%	0%	Mass Merchandise	17%	19%	7%

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Table 17: Counts of Non-Linear Lamp Sample Size by Channel

Channel	2016	2017	2018
Discount	7,849	1,211	602
Drug	4	40	171
Grocery	4,290	1,309	481
Hardware	7,035	3,487	3,921
Home Improvement	13,268	2,438	5,586
Mass Merchandise	15,250	3,083	1,516
Membership Club	651	62	–
Specialty	423	1,073	120
TOTAL	**48,770**	**12,703**	**12,397**

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Table 18: ENERGY STAR LED Shelf Share

Channel	2016	2017	2018
Discount	100%	95%	93%
Drug	100%	21%	28%
Grocery	96%	66%	76%
Hardware	77%	69%	67%
Home Improvement	57%	56%	56%
Mass Merchandise	67%	52%	49%
Membership Club	11%	8%	–
Specialty	96%	76%	87%

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Table 19: Efficient Lamp Shelf Share by Location

Location	2016	2017	2018
Upper Shelf	62%	55%	66%
Middle Shelf	53%	57%	70%
Lower Shelf	32%	43%	45%
Endcap	79%	85%	100%
Wing Stack	90%	80%	86%
Shipper	98%	99%	87%
Other	100%	31%	38%

Sample sizes ▶

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Table 20: Shelf Share by Type and Channel Comparison between States, 2017

Type	Channel	MA	RI	Channel	MA	RI
LED	Discount	34%	60%	Membership Club	85%	77%
CFL	Discount	12%	5%	Membership Club	8%	10%
Halogen	Discount	4%	5%	Membership Club	7%	13%
Incandescent	Discount	50%	30%	Membership Club	0%	0%
LED	Drug	–	70%	Grocery	42%	47%
CFL	Drug	–	0%	Grocery	7%	4%
Halogen	Drug	–	25%	Grocery	13%	17%
Incandescent	Drug	–	5%	Grocery	38%	32%
LED	Hardware	33%	41%	Home Improvement	55%	61%
CFL	Hardware	6%	5%	Home Improvement	6%	7%
Halogen	Hardware	20%	17%	Home Improvement	12%	14%
Incandescent	Hardware	41%	37%	Home Improvement	27%	19%
LED	Specialty	100%	22%	Mass Merchandise	61%	65%
CFL	Specialty	0%	2%	Mass Merchandise	0%	0%
Halogen	Specialty	0%	6%	Mass Merchandise	11%	16%
Incandescent	Specialty	0%	70%	Mass Merchandise	28%	19%

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Table 21: Comparison between States Sample Sizes, 2017

Channel	MA Type *n* (Figure 6/Table 20)	ENERGY STAR LEDs *n*	
		MA	RI
Discount	273	74	660
Drug Store	–	–	6
Grocery (& Supermarket)	1,595	526	401
Hardware	4,301	1,456	851
Home Improvement	1,466	793	645
Mass Merchandise	95	1,272	988
Membership Club	2,005	77	4
Specialty (Lighting & Electronics)	92	47	173
TOTAL	**9,827**	**4,245**	**3,728**

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A.2.4 EISA

Table 22: EISA Phase I Halogen Shelf Share

	Exempt			Unknown			*n*		
Channel	2016	2017	2018	2016	2017	2018	2016	2017	2018
Discount	61%	64%	42%	0%	0%	0%	766	53	19
Drug	–	0%	5%	–	0%	0%	0	10	55
Grocery	27%	38%	45%	0%	0%	0%	406	222	65
Hardware	63%	71%	68%	0%	0%	0%	1,021	522	675
Home Improvement	50%	66%	60%	0%	0%	0%	2,285	270	599
Mass Merchandise	18%	14%	15%	0%	0%	0%	3,938	481	88
Membership Club	0%	0%	–	0%	0%	–	27	8	0
Specialty	44%	79%	0%	0%	0%	0%	55	68	4

Drug stores stocked only LEDs in 2016.

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Table 23: EISA Phase I Incandescent Shelf Share

	Exempt			Unknown			*n*		
Channel	2016	2017	2018	2016	2017	2018	2016	2017	2018
Discount	81%	90%	66%	1%	2%	8%	3,644	357	125
Drug	–	100%	92%	–	0%	5%	0	2	39
Grocery	80%	94%	85%	4%	0%	2%	800	418	165
Hardware	89%	93%	92%	4%	3%	1%	2,650	1,161	1,262
Home Improvement	86%	93%	93%	1%	1%	2%	3,279	366	943
Mass Merchandise	81%	88%	81%	3%	2%	0%	2,648	562	102
Specialty	0%	99%	–	0%	0%	–	37	753	0

There were no incandescent bulbs stocked in Membership Clubs.

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Table 24: EISA Phase II – 2017 (GSL revision) Halogen Shelf Share

	Exempt			Unknown			*n*		
Channel	2016	2017	2018	2016	2017	2018	2016	2017	2018
Discount	8%	4%	0%	4%	0%	0%	766	53	19
Drug	–	0%	0%	–	0%	0%	0	10	55
Grocery	8%	11%	18%	0%	0%	3%	406	222	65
Hardware	31%	35%	28%	2%	0%	0%	1,021	522	675
Home Improvement	15%	16%	18%	2%	0%	0%	2,285	270	599
Mass Merchandise	4%	2%	1%	0%	0%	0%	3,938	481	88
Membership Club	0%	0%	–	0%	0%	–	27	8	0
Specialty	2%	0%	0%	11%	0%	0%	55	68	4

Drug stores stocked only LEDs in 2016.

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Table 25: EISA Phase II – 2017 (GSL revision) Incandescent Shelf Share

	Exempt			Unknown			*n*		
Channel	2016	2017	2018	2016	2017	2018	2016	2017	2018
Discount	17%	14%	7%	3%	5%	8%	3,644	357	125
Drug	–	0%	3%	–	0%	8%	0	2	39
Grocery	32%	28%	25%	10%	4%	7%	800	418	165
Hardware	45%	43%	43%	5%	8%	4%	2,650	1,161	1,262
Home Improvement	32%	36%	33%	4%	1%	9%	3,279	366	943
Mass Merchandise	33%	36%	40%	8%	6%	0%	2,648	562	102
Specialty	0%	32%	–	0%	8%	–	37	753	0

There were no incandescent bulbs stocked in Membership Clubs.

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Table 26: EISA Phase II – 2018 (GSL revision rescinded) Halogen Shelf Share

	Exempt			Unknown			*n*		
Channel	2016	2017	2018	2016	2017	2018	2016	2017	2018
Discount	61%	55%	42%	0%	0%	0%	766	53	19
Drug	–	0%	5%	–	0%	0%	0	10	55
Grocery	27%	38%	45%	0%	0%	0%	406	222	65
Hardware	63%	71%	68%	0%	0%	0%	1,021	522	675
Home Improvement	50%	66%	60%	0%	0%	0%	2,285	270	599
Mass Merchandise	18%	14%	15%	0%	0%	0%	3,938	481	88
Membership Club	0%	0%	–	0%	0%	–	27	8	0
Specialty	44%	79%	0%	0%	0%	0%	55	68	4

Drug stores stocked only LEDs in 2016.

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Table 27: EISA Phase II – 2018 (GSL revision rescinded) Incand. Shelf Share

	Exempt			Unknown			*n*		
Channel	2016	2017	2018	2016	2017	2018	2016	2017	2018
Discount	78%	88%	66%	1%	2%	8%	3,644	357	125
Drug	–	100%	92%	–	0%	5%	0	2	39
Grocery	77%	90%	79%	4%	0%	2%	800	418	165
Hardware	86%	90%	88%	4%	3%	1%	2,650	1,161	1,262
Home Improvement	82%	90%	88%	1%	1%	2%	3,279	366	943
Mass Merchandise	78%	86%	75%	3%	2%	0%	2,648	562	102
Specialty	0%	99%	–	0%	0%	–	37	753	0

There were no incandescent bulbs stocked in Membership Clubs.

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A.3 PRICING

Table 28: Counts of Price per Bulb by Type

Type	2016	2017	2018
LED	1,951	2,649	3,640
CFL	342	238	300
Halogen	847	849	876
Incandescent	1,705	1,956	1,814

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A.3.1 Smart Bulbs

Table 29: Counts of Price per Smart LED

Type	2016	2017	2018
Smart LED	19	53	79

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A.3.2 ENERGY STAR

Table 30: Counts of Price per Bulb by ENERGY STAR Status

Type	2016	2017	2018
No	777	1,132	1,598
Yes	1,155	1,464	1,963
TOTAL	1,951	2,649	3,640

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A.3.3 Shape

In Table 31 through

Table 34 bulb shape "B/C/F" includes variations of Bullet, Candle and Flame shaped bulbs which serve similar functions and are sometimes confused with one another.

Table 31: Price per LED Bulb by Shape

$ per bulb	Median			Mean		
Shape	2016	2017	2018	2016	2017	2018
A-line	$6.36	$4.94	$4.22	$7.83	$6.14	$5.82
B/C/F	$4.44	$3.99	$3.66	$6.25	$5.54	$4.14
Globe	$8.24	$6.46	$4.88	$8.49	$7.29	$5.41
Reflector	$9.99	$7.49	$5.99	$11.73	$9.82	$7.29
Other	$9.43	$7.97	$7.78	$9.36	$8.10	$8.27

Table 32: Price per CFL Bulb by Shape

$ per bulb	Median			Mean		
Shape	2016	2017	2018	2016	2017	2018
A-line	$3.50	$5.00	$3.75	$4.67	$5.81	$4.84
Reflector	$4.99	$5.00	$9.99	$5.11	$6.56	$8.65
Other	$5.99	$6.99	$6.98	$6.06	$7.46	$7.46

Table 33: Price per Halogen Bulb by Shape

$ per bulb	Median			Mean		
Shape	2016	2017	2018	2016	2017	2018
A-line	$1.75	$1.62	$1.75	$2.13	$2.23	$2.20
B/C/F	$3.75	$3.25	$4.00	$4.84	$3.60	$4.53
Globe	$2.66	$2.66	$3.64	$3.03	$3.11	$3.77
Reflector	$7.72	$7.99	$7.99	$7.94	$8.78	$8.49
Other	–	$9.99	–	–	$9.17	–

Table 34: Price per Incandescent Bulb by Shape

$ per bulb	Median			Mean		
Shape	2016	2017	2018	2016	2017	2018
A-line	$2.15	$2.25	$2.49	$2.58	$2.74	$3.02
B/C/F	$1.40	$1.44	$1.50	$1.68	$1.61	$1.79
Globe	$2.00	$1.99	$2.00	$2.39	$2.40	$2.86
Reflector	$4.97	$4.97	$4.97	$4.81	$5.24	$5.60
Other	$4.69	$3.99	$4.59	$4.70	$4.12	$4.84

Table 35: Counts of Price per Bulb by Type and Shape

Shape	2016	2017	2018	2016	2017	2018
	LED			CFL		
A-line	834	1,128	1,411	267	107	141
B/C/F	238	357	518	2	4	3
Globe	170	253	388	3	6	1
Reflector	650	747	1,062	35	97	140
Other	40	111	182	35	23	15
	Halogen			Incandescent		
A-line	382	354	371	544	565	513
B/C/F	27	19	16	471	536	453
Globe	28	35	26	322	322	375
Reflector	403	411	455	266	279	318
Other	7	30	8	102	254	155

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Table 36: Counts of A-line LED Bulb by Equivalent Wattage

Equivalent Wattage	2016	2017	2018
25–45	27	286	335
50–65	51	444	692
75	12	144	123
≥100	23	227	220

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A.3.4 Location

The sample sizes for table cells with no prices were too small to include.

Sample sizes ►

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Table 37: Price per LED by Location

$ per bulb	Median			Mean		
Location	2016	2017	2018	2016	2017	2018
Upper Shelf	$7.99	$5.98	$5.50	$8.96	$7.19	$6.83
Middle Shelf	$8.34	$5.54	$4.49	$9.35	$7.29	$5.96
Lower Shelf	$7.70	$6.86	$3.93	$10.30	$8.99	$5.09
Endcap	$2.99	$2.00	$2.99	$4.09	$3.83	$3.40
Wing Stack	$2.12	$2.50	$3.13	$3.08	$3.34	$3.09
Shipper	$2.00	$1.00	$2.89	$2.47	$0.97	$3.01
Other	–	$8.99	$7.00	–	$8.30	$8.06

Table 38: Price per CFL by Location

$ per bulb	Median			Mean		
Location	2016	2017	2018	2016	2017	2018
Upper Shelf	$5.00	$6.98	$6.75	$5.71	$7.57	$6.35
Middle Shelf	$3.50	$5.72	$6.86	$4.59	$6.21	$6.10
Lower Shelf	$4.50	$4.50	$4.00	$4.74	$5.13	$5.36
Endcap	$3.00	–	–	$4.13	–	–
Shipper	$0.33	–	–	$0.39	–	–
Other	$4.99	–	$6.99	$4.99	–	$8.00

Table 39: Price per Halogen by Location

$ per bulb	Median			Mean		
Location	2016	2017	2018	2016	2017	2018
Upper Shelf	$5.00	$6.58	$5.00	$5.45	$6.50	$6.28
Middle Shelf	$3.99	$4.50	$3.77	$4.95	$5.45	$5.46
Lower Shelf	$3.33	$3.00	$2.62	$5.10	$5.51	$4.74
Endcap	$0.99	$0.99	–	$1.04	$1.70	–
Wing Stack	–	$2.63	–	–	$2.63	–
Other	–	$6.99	$7.99	–	$7.37	$7.48

Table 40: Price per Incandescent by Location

$ per bulb	Median			Mean		
Location	2016	2017	2018	2016	2017	2018
Upper Shelf	$1.99	$2.00	$2.79	$2.45	$2.76	$3.77
Middle Shelf	$2.01	$2.35	$2.50	$2.68	$2.88	$3.69
Lower Shelf	$2.84	$2.66	$2.33	$3.36	$3.36	$3.06
Endcap	$5.74	$4.99	–	$4.87	$5.25	–
Wing Stack	$1.25	$1.83	–	$1.39	$2.30	$5.00
Other	–	$1.67	$2.00	–	$2.06	$2.25

Table 41: Counts of Price per Bulb by Type and Location

Shape	2016	2017	2018	2016	2017	2018
	LED			CFL		
Upper Shelf	800	940	1,112	96	121	141
Middle Shelf	744	952	1,633	129	56	110
Lower Shelf	286	465	621	95	55	30
Endcap	82	120	57	9	–	–
Wing Stack	8	42	8	–	2	–
Shipper	12	16	10	7	1	–
Other	–	61	120	6	2	19
	Halogen			Incandescent		
Upper Shelf	164	198	241	712	758	390
Middle Shelf	316	311	290	504	565	498
Lower Shelf	359	295	273	471	490	695
Endcap	8	12	–	4	8	–
Wing Stack	–	4	–	13	17	1
Shipper	–	1	3	1	–	–
Other	–	28	69	–	118	230

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Appendix B EISA Exemption Flow Charts

Figure 16: EISA Phase I

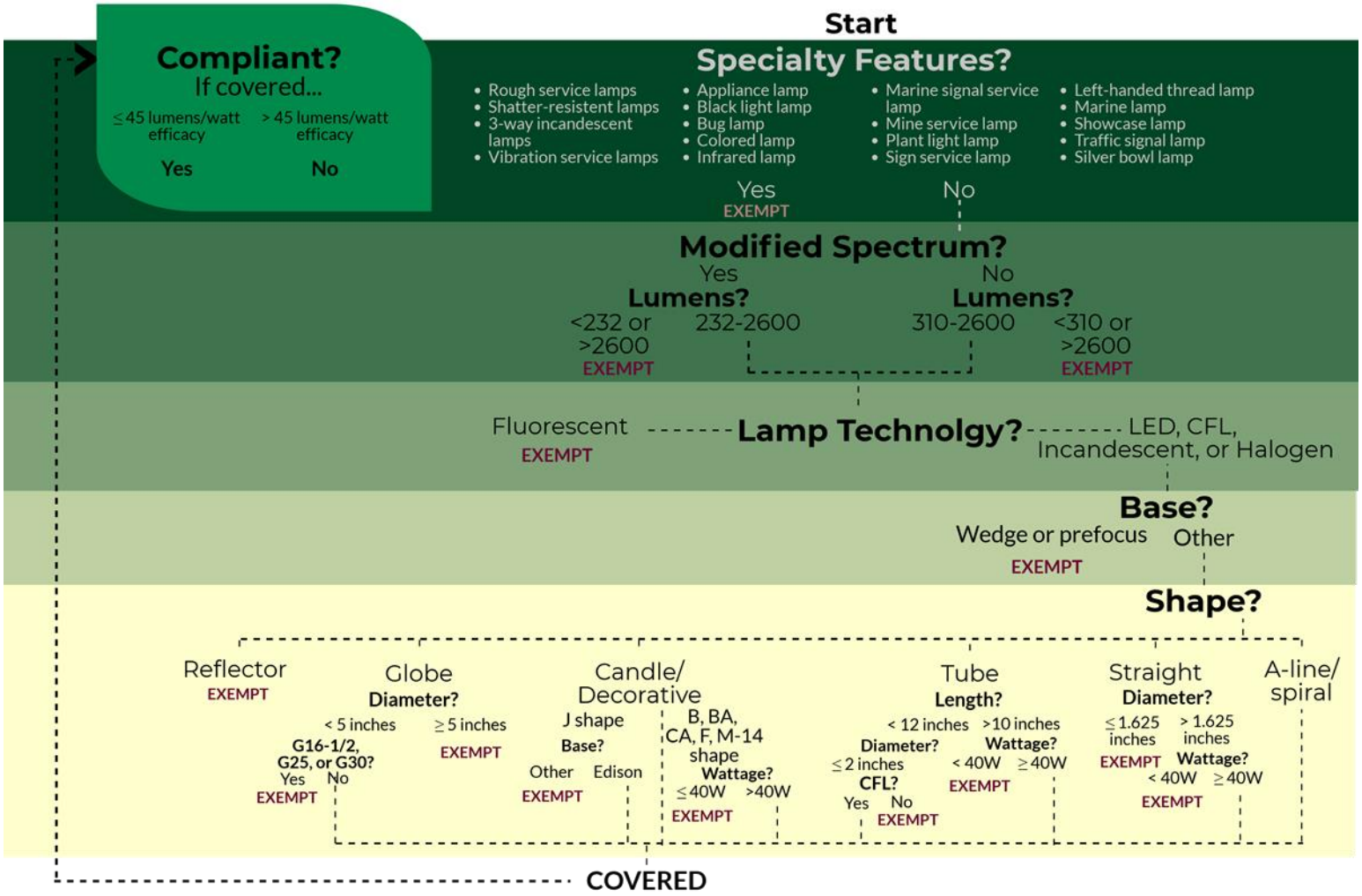

Figure 17: EISA Phase II