2019 Rhode Island Shelf Stocking Study

FINAL

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Rhode Island Shelf Stocking Study

The report documents trends in the availability and shelf prices of multiple types of light bulb in National Grid's ENERGY STAR® Lighting Program partner stores. Stocking and pricing data were collected in the autumns of 2016–2019.

Sample Summary 2016–2019

53–55 stores

49–64k packages

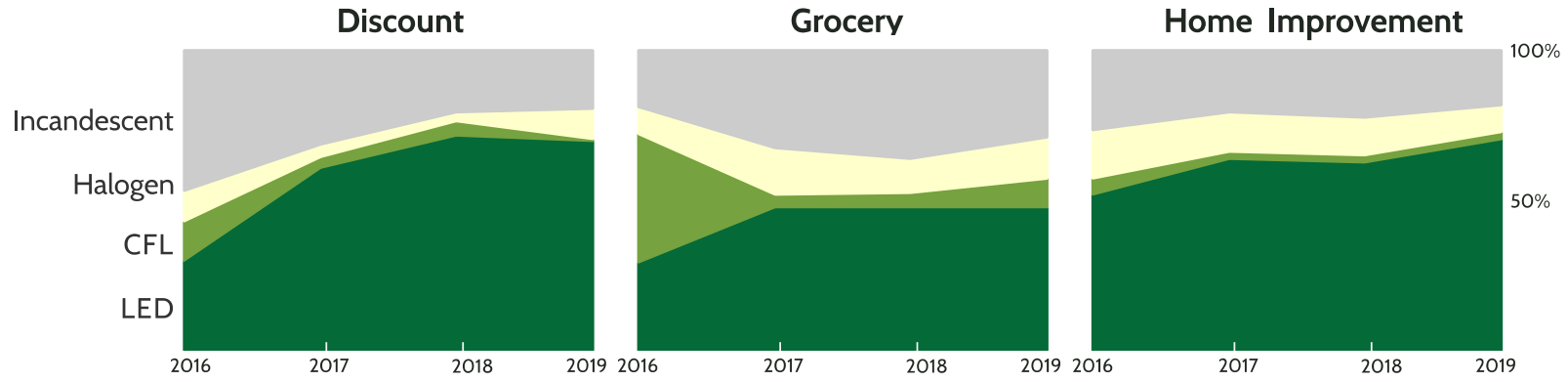
112–172k bulbs

2.2–3.6k models

Key Conclusions

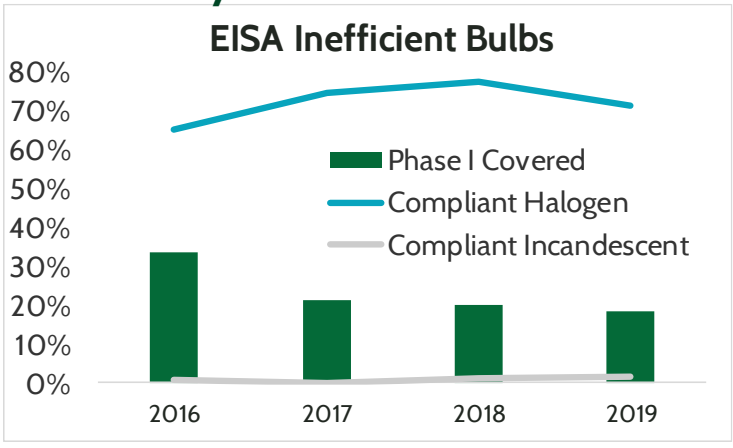
- The amount of space dedicated to light bulbs in general continues to decrease in most channels.
- Hardware, Drug and Grocery stores devote two-fifths of lighting space to inefficient bulbs.
- Program incentives and general market trends have reduced the LED prices consumers see on shelves by more than half at Hardware and Discount Stores since 2016.
- As LEDs displace older technologies, 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 set efficiency standards for general use lighting with EISA, which went into effect gradually between 2012 and 2014 (Phase I). The graph to the right shows that the availability of inefficient light bulbs subject to EISA standards (Phase I covered) have decreased over time. The majority of halogens on participating retailers' shelves since 2016 have been compliant with Phase I (Compliant Halogen).



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Executive Summary

On behalf of National Grid Rhode Island, TRC[1] conducted a shelf-stocking and price survey at participating retail stores to evaluate the impact of the 2019 residential lighting program on the consumer retail light bulb market in Rhode Island. Lockheed Martin completed site visits at participating stores between October 2019 and December 2019, then delivered data to NMR Group, Inc. (NMR) in February 2020. The team inventoried 62,074 LED, CFL, incandescent, and halogen packages, for a total of 150,668 bulbs (Table 2). These represented 3,607 models of linear and non-linear bulbs in 53 stores across the state (Table 1).[2] NMR supported this study by reviewing data collection protocols, reviewing data collected in the 2016-2019 surveys, and preparing an analysis of selected data. When examining results for shelf share, it is important to note 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 what types of bulbs would be available in the absence of the program.

Since the finalization of the 2018 report, the Department of Energy (DOE) issued final rulings regarding lighting standards set forth in the Energy Independence and Security Act of 2017 (EISA)[3] and an expanded definition of general service lamps (GSLs) set forth by the Obama Administration.[4] In September 2019, the DOE rescinded the expanded GSL definition from January 2017,[5] and, in December 2019, the DOE maintained that the 45 lumens-per-watt (Lm/W) backstop has not been triggered,[6] effectively freezing standards to those in place since 2014 (Phase I). Section 2.3 provides more details on EISA, its phases, and the regulatory and legal decisions affecting it.

This executive summary focuses on non-linear bulbs, but the main body includes results for linear bulbs (See Section 2.2.2).

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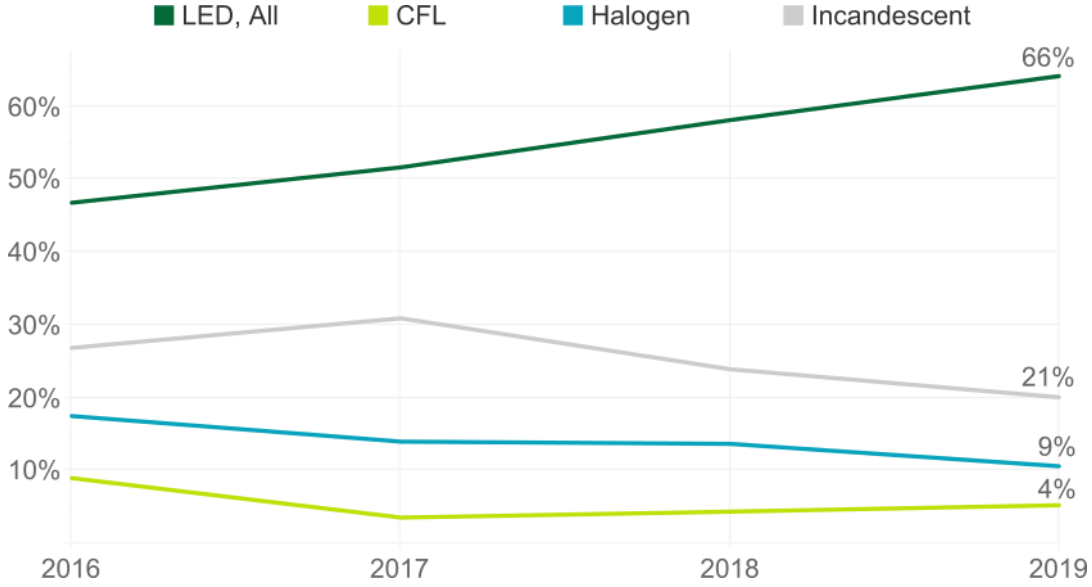
[1] In late 2019, TRC Companies acquired the division of Lockheed Martin that conducted the shelf-stocking studies.
[2] The Residential Lighting Program currently supports linear fixtures but not linear bulbs. The TRC shelf stocking data provided to NMR, however, listed primarily linear bulbs which are analyzed in this report for consistency with previous data sets and reports.
[3] United States Congress. 2007. Energy Independence and Security Act of 2007, Public Law 110-140. https://www.govinfo.gov/content/pkg/PLAW-110publ140/html/PLAW-110publ140.htm.
[4] Department of Energy, Final determination, "Energy Conservation Program: Definition for General Service Lamps." Federal Register 82, No. 12 (January 17, 2017) p7322 https://www.federalregister.gov/documents/2017/01/19/2016-32012/energy-conservation-program-energy-conservation-standards-for-general-service-lamps. The expanded definition of GSLs would have discontinued exemptions for several shapes and features, such as reflectors, globes, and candelabra-based lamps, as well as *vibration resistant, rough service*, and other similar categories.
[5] Department of Energy, Final determination, "Energy Conservation Program: Definition for General Service Lamps." Federal Register 84, No. 172 (September 5, 2019) p46661. https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps.
[6] Department of Energy, Final determination, "Energy Conservation Program: Energy Conservation Standards for General Service Incandescent Lamps." Federal Register 84, No. 248 (December 27, 2019) p71626. https://www.federalregister.gov/documents/2019/12/27/2019-27515/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps.

Key Findings

- LED shelf share has increased steadily since 2016, whereas CFL and Halogen shelf shares have decreased slowly (Figure 1 and Table 4). Although much lower than in 2017, incandescent shelf-share is second only to LEDs.

Figure 1: Shelf Share by Type[7]



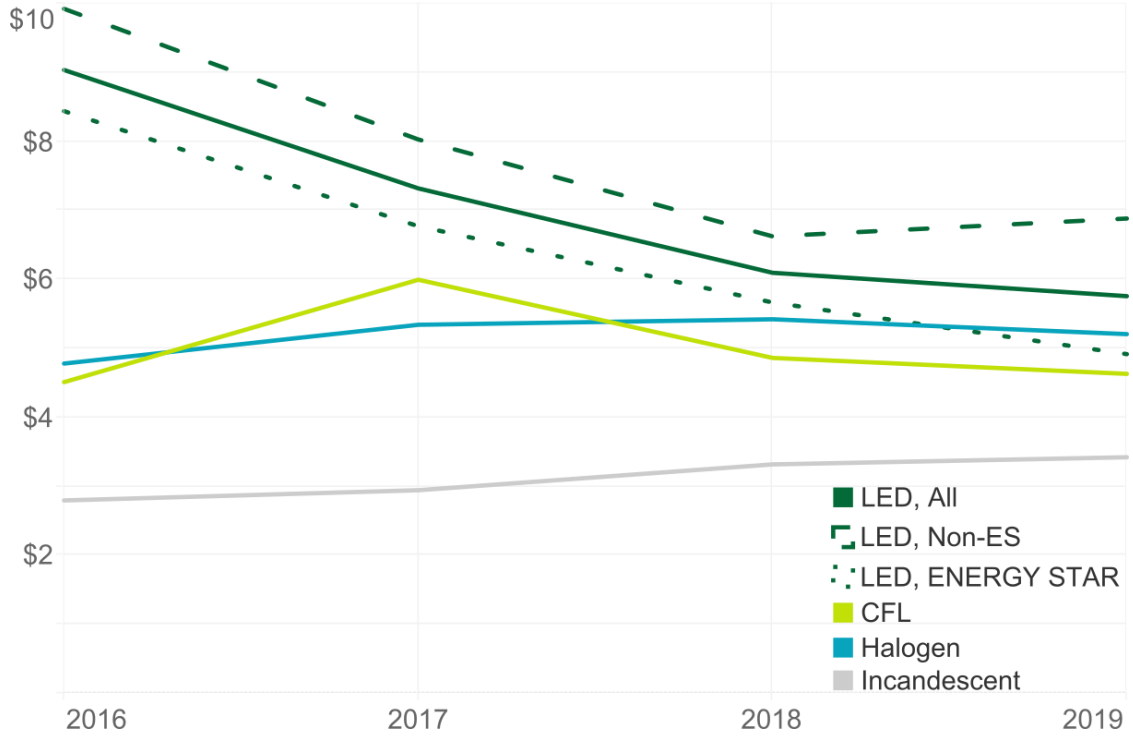
See the Data ►

- In the past year, Hardware and Home Improvement shelf share for LEDs increased 16% (from 44% to 60%) and 9% (from 63% to 72%), respectively (Figure 3).
- The amount of space dedicated to light bulbs in general continues to decrease in most channels (Table 3). This indicates that retailers are shifting shelf space to non-lighting products, perhaps due to the longevity of LEDs vs. incandescent and halogen bulbs.
- Hardware, Drug, and Grocery stores continue to devote approximately two-fifths of shelf share to inefficient bulbs: 40%, 47%, and 43%, respectively (Table 6). In contrast, Discount, Home Improvement, and Mass Merchandise stores devote 30% or less of their lighting shelf space to inefficient bulbs.
- As shown in Figure 5, in general, most of the incandescent and halogen bulbs represent categories currently subject to the
-

[7] Values in this figure are derived from data for all channels. While this data is not explicitly weighted, TRC uses a channel sampling approach based on program sales so that combining the data in this manner yields an implicit weighting (Section 1.2.1).

- EISA of 2007 (i.e., Phase I). In addition, while most (71%) of these halogen bulbs meet Phase I efficacy requirements, a very small portion (2%) of the incandescent bulbs do (Table 7).
- No incandescent or halogen bulbs on store shelves would meet the 45 Lm/W backstop (Phase II).
- The average prices of all technologies, except LEDs, have increased since 2016 (Figure 2 and Section 3). This makes LEDs an increasingly viable option. Note that LED prices in all years include the application of incentives, so removal of incentives will boost the LED shelf prices, but sales data research indicates that LED prices have trended downward regardless of incentives.[8]

Figure 2: Price per Bulb by Type[1]



[1] Non-smart bulbs only.

See the Data ▶

- LED prices decreased by more than half at Hardware (54%) and Discount stores (73%) (Figure 6).
- Smart LED prices decreased for the first time in three years (Table 10).

[8] For example, LED prices in non-program areas averaged $4.93 in 2016 and $2.59 in 2018 (47% reduction). At the same time, halogen prices in non-program areas averaged $1.75 in 2016 and $1.43 in 2018 (18% reduction). See NMR Group. 2017. *RLPNC 16-5 and 17-10 Sales Data Analysis and Modeling*. Available at http://ma-eeac.org/wordpress/wp-content/uploads/RLPNC_165_1710_SalesDataReport_16NOV2017_FINAL.docx and NMR Group. 2019. *Rhode Island 2018 Lighting Sales Data Analysis.* Available at http://rieermc.ri.gov/wp-content/uploads/2019/12/ri_ltgsalesdatareport_18sep2019_final.pdf.

- After falling steeply for the past three years, prices of globe and reflector LEDs stabilized or increased in 2019 (Figure 10 and Figure 11, respectively). A-line prices also appear to have stabilized, but candelabra prices continue to fall (Figure 8 and Figure 9).

Considerations

Consideration 1: National Grid should continue to monitor the lighting market through analysis of sales data – such as the LightTracker dataset available from the Consortium for Retail Energy Efficiency Data – and additional shelf-stocking efforts.

Consideration 2: National Grid should continue to keep a close eye on the outcome of current litigation surrounding the DOE decisions to rescind the expanded definition of GSLs and to assert that the 45 Lm/W backstop was not triggered, thereby setting efficiency standards back to those of EISA Phase 1.

Rationale for Considerations 1 and 2: The retail lighting market is at a critical stage. The DOE decisions allow for the continued sale of inefficient bulbs for all lumen bins and shapes, yet consumers seem to be embracing LEDs as a preferred technology. National Grid, Rhode Island state regulators, and program administrators and regulators across the nation must decide if continued intervention into the lighting market is justified. Continued tracking of lighting sales and shelf stocking, as well as the outcome of legal action regarding EISA, will help National Grid and regulators determine the right course of action for the ratepayers of Rhode Island

Section 1 Introduction

This section provides additional details on the study objectives and methods. It also provides a list of the key terms used in the report. The remaining report sections and appendices provide additional details on key study findings, the data, and federal regulations.

1.1 Objectives

The objectives of this study were to assess the following indicators at Rhode Island retailers that participated in National Grid's residential lighting program in 2016-2019:

- Total shelf share[9] dedicated to lighting over time by channel
- The amount of shelf share dedicated to screw-based LED, CFL, halogen, and incandescent bulbs by channel
- The pricing (on a per bulb basis), number of bulb packages, and shelf locations of screw-based LED, CFL, halogen, and incandescent bulbs 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 bulbs (LED vs. fluorescent) by channel[10]

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

TRC[11] completed site visits at 53 participating stores between October 2019 and December 2019, then delivered data to NMR in February 2020. The team inventoried 62,074 LED, CFL, incandescent, and halogen packages, for a total of 150,668 bulbs. These bulbs comprised 3,607 models of linear and non-linear bulbs (Table 2) found in 53 stores across the state (Table 1).

1.2.1 Sample

The distribution of sampled participating stores in Table 1 varies over time because the number of stores the team chooses for site visits is based on program sales activity within a channel and the desire for dual-purpose visits. For example, the Home Improvement channel sample grew in 2018 when sampling became stratified based on whether the stores also sold thermostats. Also

[9] 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 later), or total displayed units (2016), which includes additional packages further back on the shelf.
[10] The Residential Lighting Program currently supports linear fixtures but not linear bulbs. The TRC shelf stocking data provided to NMR, however, listed primarily linear bulbs which are analyzed in this report for consistency with previous data sets and reports
[11] TRC Companies acquired the division of Lockheed Martin that conducted the shelf-stocking studies in late 2019.

in 2018, TRC made a concerted effort to add locations 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. TRC did not include membership Clubs in the 2018 and 2019 samples. Similarly, the small Specialty store sample was heavily skewed toward electrical suppliers in 2017, as opposed to the more equal mix of appliance, electrical, and office supply stores in other years. Because TRC designed the sample based on program participation and sales, NMR does not explicitly weight any findings that combine the data from all channels as the sampling scheme implicitly weights them.[12]

Table 1: Sampled Channel Distribution with Light Bulbs†

Channel	Sample				Example
	2016	2017	2018	2019	
Discount	33%	24%	8%	15%	Dollar/surplus store
Drug	2%	2%	11%	9%	
Grocery	22%	20%	19%	17%	Supermarket, convenience store
Hardware	15%	22%	30%	25%	Franchise, local chain
Home Improvement	7%	5%	19%	17%	National chain
Mass Merchandise	13%	13%	8%	11%	General goods retailer
Membership Club	2%	4%	–	–	
Specialty	6%	11%	6%	6%	Office/electrical supply
Total	**54**	**55**	**53**	**53**	

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

Sample sizes ►

Table 2 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 in 2019 is similar to those observed in 2016 and 2017, despite a 17% increase between 2017 and 2018.

Table 2: Sampled Product Totals

	2016	2017	2018	2019
Number of Unique Models	2,245	3,110	3,106	3,607
Number of Packages	48,770	57,888	63,718	62,074
Number of Bulbs	111,567	132,149	171,849	150,668
Bulbs per Package	2.3	2.3	2.7	2.4

1.2.2 Errata

NMR reconciled light bulb attributes from the 2019 data with earlier data – particularly from 2018 – which allowed us to correct some values and fill in gaps. Consequently, the values for previous

[12] TRC does not require permission to conduct shelf-stocking surveys. They conduct these surveys as part of their regular business interactions with retail partners. Therefore, the shelf-stocking data do not suffer from the non-response bias in sampling that potentially impact surveys that only include voluntary respondents.

years in this report may differ from the 2018 report in some places, although the changes are usually small (less than 10%). Some notable exceptions are as follows:

- The price per bulb for CFL and halogen bulbs (all shapes) shown here are lower than in the 2018 report due to recategorization (Figure 2 or Table 8). For CFLs, the main change involved the identification of numerous GU-base CFLs. Halogen reflector prices have increased by about $1-2 per bulb compared to prior reports.
- Average price per A-line LEDs in 2018 are lower ($0.86–$1.16) for most incandescent equivalent bins (Table 11), but $0.19 more for the 50–65W category.

1.2.3 Shelf Share

Shelf share is a measure of the availability of products to consumers, determined by the fraction of packages on the shelf. For this study, the shelf-share is limited to program participating stores. Historically, TRC collected data on the total number of displayed units for a product.[13] 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 the total volume of displayed packages on a shelf. TRC began to collect separate data on front-facing units (packages) in 2017 at NMR's request.[14] Since front-facing unit data are not available prior to 2017, and similar studies in Massachusetts have shown the two measures to be well correlated, total displayed units serves as a substitute for shelf share for 2016.

[13] Note that this represents the products on display to customers, which is not necessarily proportional to actual sales.
[14] 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.

The decline in Mass Merchandise lighting shelf space continued in 2019, and the Discount channel returned to its 2017 shelf-share level. Lighting shelf space appears to have increased nearly two-fold at Grocery stores in 2019, approaching 2017 levels, suggesting that the 2018 data may have been an outlier or incompletely collected. Likewise, the erratic changes in Specialty stores reflects the small sample size and the variability of the product mix. Other channels, such as Home Improvement centers, showed negligible change or a small amount of growth (Table 3).

Table 3: Average Lighting Shelf Space per Store by Channel

Channel	All Displayed Packages 2016	Front Facing Units (Packages) 2017	2018	2019	Δ2018-2019
Discount	**436**	93	151	97	-35%
Drug	**4**	40	29	27	-5%
Grocery	**358**	119	48	129	168%
Hardware	**879**	291	245	271	11%
Home Improvement	**3,317**	813	559	598	7%
Mass Merchandise	**2,179**	440	379	284	-25%
Membership Club	**651**	31	–	–	–
Specialty	**141**	179	40	76	91%

1.3 Key Terms

Most 310 to 2,600 lumen A-line bulbs are **covered** by the Energy Independence and Security Act (EISA)(Section 2.3) Phase I (i.e., they are not exempt). Other A-line bulbs, as well as globe, reflector, and many B/C/F shape bulbs, are **exempt** under Phase I (they are *not covered*) and *need not meet* the efficacy standards phased in from 2012 to 2014. Reclassification of these latter shapes as general service lamps (GSL) is a distinguishing feature between the Department of Energy's (DOE's) 2017 proposed regulations and subsequent revisions in 2019 (Section 0). For details on EISA bulb coverage, see Appendix B.

1.3.1 Bulb Feature – Smart Bulb

Smart bulbs include advanced electronics that 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[15]

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.

A

1.3.3 Bulb Shape – Globe

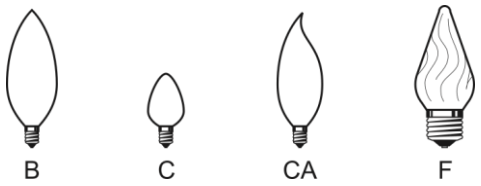
G-series (globe) bulbs are spherical.

G

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

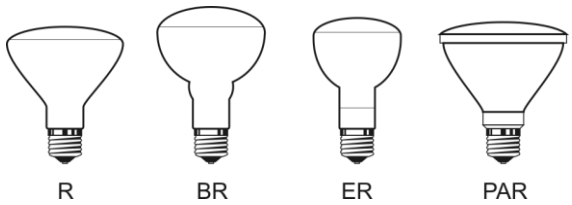
1.3.4 Bulb Shape – B/C/F

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.



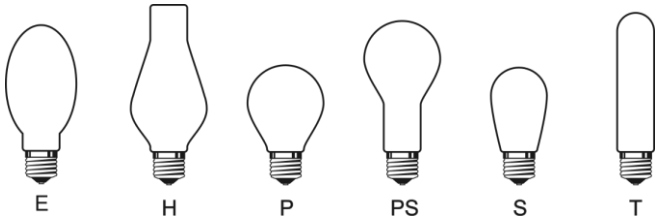
1.3.5 Bulb Shape – Reflector

This category of bulb includes those that are specially shaped for directional illumination, such as used 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).



Section 2 Stocking and Display

This section explores stocking practices across channels, including the prevalence of bulbs that are exempt from EISA. Except where otherwise noted, all analysis is for non-linear, screw-based, non-smart bulbs. Also note that, as discussed in Methodology (Section 1.2), the sample only includes program participating stores and therefore does not contain data for non-program stores. This means that the results only reflect program stores, not the market. Consequently, the report emphasizes channel-level results to avoid creating the false impression of describing the entire market. Where presented, overall results across channels rely on the implicit sample weighting described above and reflect the sum of the data points across all channels.

2.1 Key Findings

- LED shelf share has steadily increased since 2016.
- Keeping in mind that all the stores represented in the inventory partner with the program, the proportion of ENERGY STAR bulbs by channel has remained relatively stable since 2017. However, 2019 saw contraction in share at Discount stores, but expansion in the Grocery stores, which may reflect the stores included in the sample as much as any market change.
- CFL shelf share increased slightly since 2018 due to a change in the sampled Specialty stores, but still remains lower than in 2016.
- Hardware, Drug, and Grocery stores continue to devote approximately two-fifths of shelf share to inefficient bulbs (40%, 47%, and 43%, respectively). In contrast, Discount, Home Improvement, and Mass Merchandise stores devote 30% or less of their lighting shelf space to inefficient bulbs. The majority of inefficient bulbs are exempt under EISA Phase I.
- The proportion of EISA Phase I 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 inefficient bulbs covered by Phase I across all channels has decreased by 15%.
- No EISA covered inefficient bulbs would meet the 45 lumens-per-Watt (Lm/W) backstop, should the courts decide it was triggered.
- Many inefficient GSLs (EISA-covered) that remain on shelves do not meet EISA Phase I efficiency requirements (29% of 589 halogen and 98% of 174 incandescent bulbs in 2019). This suggests that they are being legally sold from stockpile, or are being manufactured domestically or being imported, despite EISA Phase I prohibitions.

2.2 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. TRC examined total displayed units (2016), which includes additional packages further back on the shelf, but switched to front-facing units in 2017 and later.

2.2.1 Overall Shelf Share

Of the four bulb types, only LEDs have seen a consistent increase in shelf share since 2016 (47% to 66%), whereas CFLs have become less available (8% to 4%) (Table 4).[16] Incandescent bulbs still represented one fifth (21%) of non-linear bulbs in participating stores in 2018, down from 2016 (28%).

Table 4: Statewide Shelf Share

Type	2016	2017	2018	2019
LED	47%	53%	60%	66%
CFL	8%	2%	2%	4%
Halogen	17%	13%	12%	9%
Incandescent	28%	32%	25%	21%

See the Chart ►

The overall trend for LEDs is similar to the National Electrical Manufacturers Association's (NEMA) reported shipments for A-line bulbs;[17] however, the continued presence of incandescents as the second most common A-line (Table 29) technology contradicts NEMA's statement that "By the end of 2015, traditional incandescent bulbs were virtually gone from store shelves and manufacturers were no longer shipping those bulbs as a result of EISA-2007."[18]

[16] The increase from 2018 to 2019 is due to the replacement of a previous Specialty store with another that only carried CFLs.
[17] National Electrical Manufacturers Association. "LED A-line Lamp Shipments Increase in Third Quarter 2019 Compared to Second Quarter 2019" https://www.nema.org/Intelligence/Indices/Pages/LED-A-line-Lamp-Shipments-Increase-in-Third-Quarter-2019-Compared-to-Second-Quarter-2019.aspx
[18] National Electrical Manufacturers Association. "NEMA A-line Lamp Index". (December 2018). https://www.nema.org/Intelligence/Documents/A-line-index-Announcement.pdf

2.2.2 Linear Bulbs

Recalling that the Residential Lighting Program currently does not support linear LED bulbs (but does support LED fixtures), fluorescent bulbs remain the dominant linear bulb technology; although, T-LEDs (the only other technology available) have begun to make notable inroads in Home Improvement centers (Table 5 and Table 13).

Table 5: Fluorescent Shelf Share of Linear Bulbs

Channel	2016	2017	2018	2019
Discount	100%	100%	–	100%
Hardware	100%	93%	92%	78%
Home Improvement	100%	74%	80%	82%
Mass Merchandise	100%	96%	71%	88%

Sample sizes ►

2.2.3 Channel

Table 6 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). A decrease in efficient bulb shelf share at Discount stores in 2019 suggests that the 2018 increase in Discount store shelf share of efficient bulbs may also be due to a small sample size of stores visited; however,[19] the fluctuations may also stem from the volatile nature of shelf-stocking in this channel. In contrast, efficient shelf share at other high-priority channels, such as Hardware, Home Improvement, and Mass Merchandise stores, remained stable or increased in 2019. Hardware store efficient bulb shelf share increased for the first time since records began in 2016, and Home Improvement efficient shelf share growth recommenced after a pause in 2018. The shelf share of efficient bulbs remains stagnant at Grocery stores.

Table 6: Efficient Bulb Shelf Share by Channel

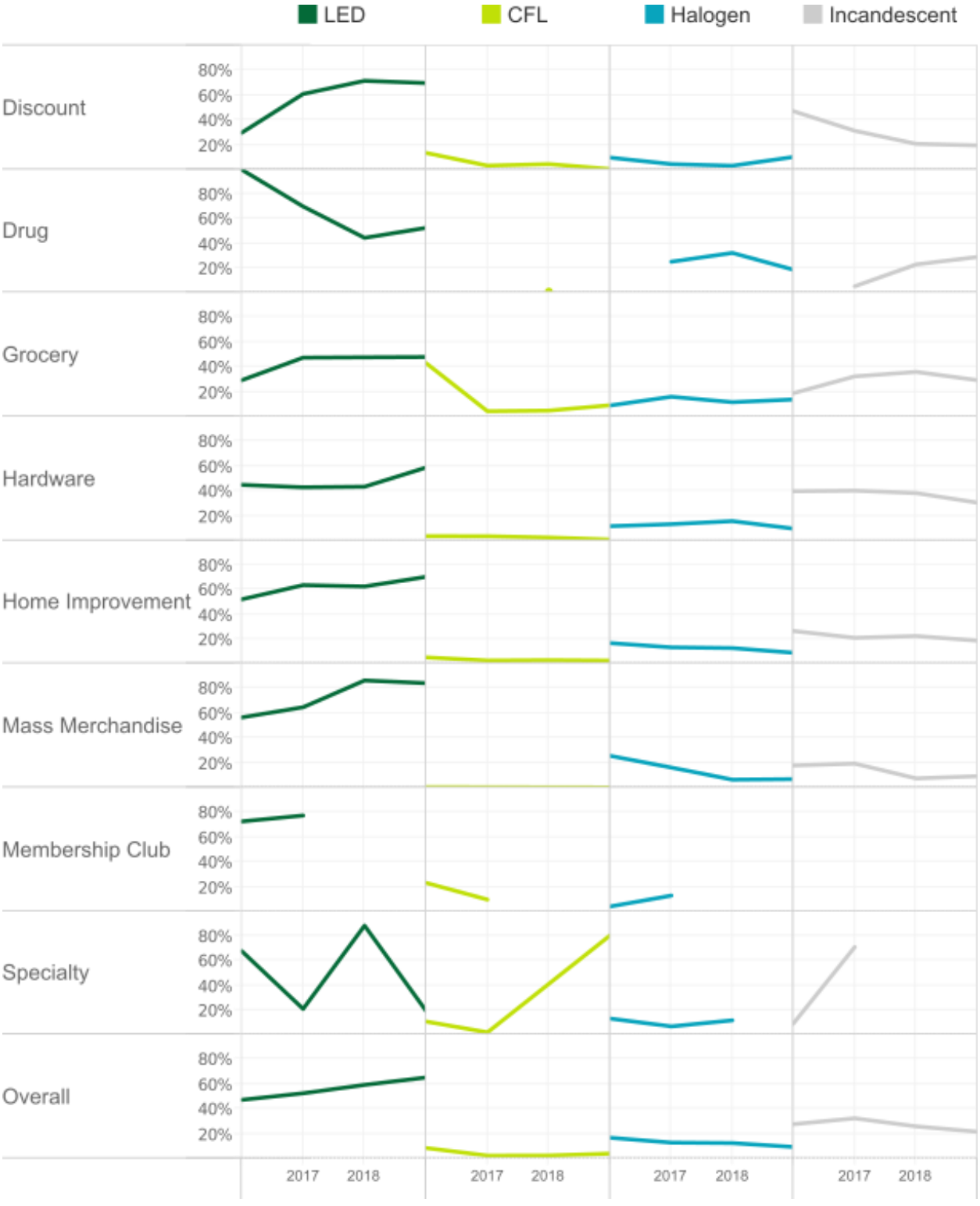
Channel	2016	2017	2018	2019
Discount	43%	64%	76%	70%
Drug	100%	70%	45%	53%
Grocery	72%	52%	53%	57%
Hardware	49%	47%	46%	60%
Home Improvement	58%	67%	66%	74%
Mass Merchandise	57%	65%	86%	84%
Membership Club	96%	87%	–	–
Specialty	78%	23%	97%	100%

Sample sizes ►

Additional detail regarding bulb technology stocking by channel is available in Figure 3. For example, this chart shows that the decrease in CFL shelf share at groceries in 2017 was taken up by a roughly equal mix of LED and inefficient bulbs (recall concerns about small sample sizes for drug stores and membership stores before 2018 and exclusion of membership stores from the sample in 2018 and 2019).

[19] Four Discount stores in 2018 vs. eight in 2019, 13 in 2017, and 18 in 2016.

Figure 3: Shelf Share by Type and Channel, 2016-2019

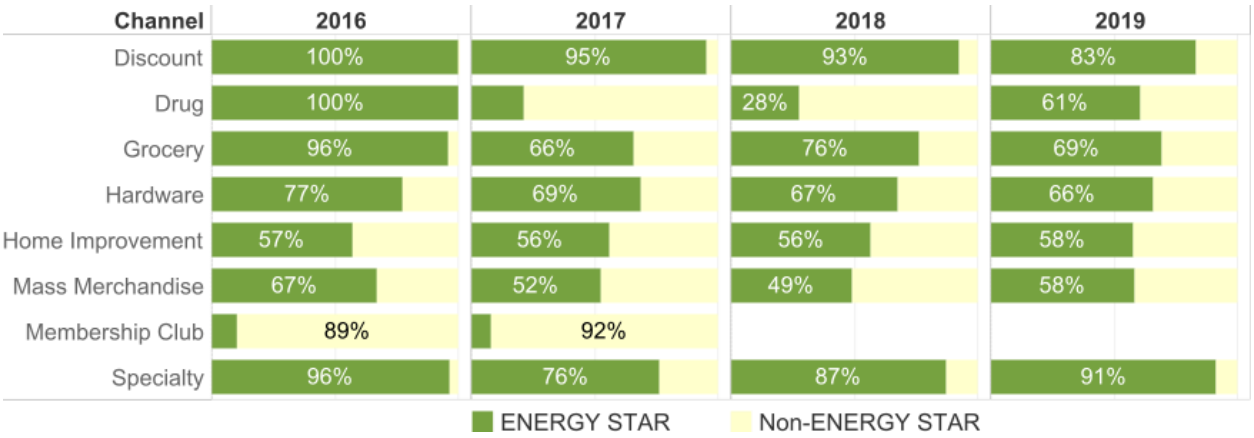


See the Data ►

2.2.4 ENERGY STAR LEDs

Figure 4 suggests that the proportion of ENERGY STAR qualified bulbs among LEDs has remained rather consistent overall, with a notable decrease in some channels, such as Discount stores. This may be a side effect of market progress, with LEDs becoming more of a commodity rather than a premium good.

Figure 4: LED Shelf-share by ENERGY STAR Status



See the Data ►

2.3 EISA

The EISA 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 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 now rescinded 2017 GSL revision) exemption status algorithm used to classify bulbs in this section.

The status of EISA Phase II remains uncertain. In January 2017, the 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. However, after review prompted by a legal challenge to the January 2017 NOPR, the DOE issued final rulings in September 2019 that rescinded the expanded GSL definition from January 2017,[20] and, in December 2019, the DOE rejected the 45 Lm/W backstop of EISA has been triggered.[21] These decisions set lighting efficiency standards back to EISA Phase I, but the decisions are currently under litigation, and the outcome of those lawsuits could affirm the current DOE policy or put higher-efficiency standards in place.

2.3.1 Phase I

Figure 5 shows the shelf share of inefficient bulbs (non-linear halogen and incandescent) by EISA Phase I coverage (exempt or covered; see Section 1.3 for definitions).[22] There are small differences in the proportion of exempt bulbs from the 2018 report as a result of reconciling bulb attributes from the 2019 data with previous years. The changes are principally due to corrections in bulb shape or base.

The shelf share of exempt halogen (H in the graph below) bulbs has steadily decreased in the Discount channel since 2016, whereas the proportion of exempt incandescent (I in the graph below) bulbs is inconsistent. Hardware and Home Improvement stores exempt shelf shares in 2019 remain relatively unchanged, as they have since 2016. Exempt bulb shelf share of halogens in Drug stores and incandescent in Mass Merchandise stores increased in 2019 by more than 10%.

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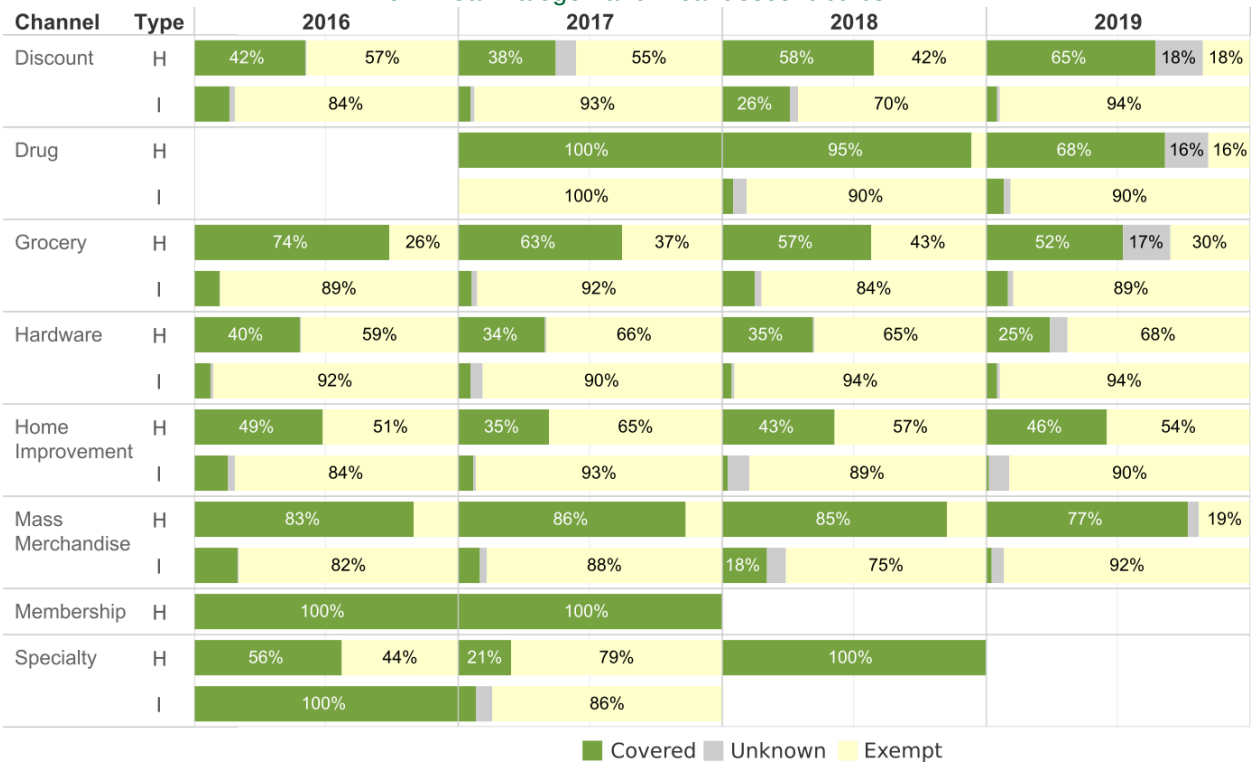
[20] Department of Energy, Final determination, "Energy Conservation Program: Definition for General Service Lamps." Federal Register 84, No. 172 (September 5, 2019) p46661. https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps.

[21] Department of Energy, Final determination, "Energy Conservation Program: Energy Conservation Standards for General Service Incandescent Lamps." Federal Register 84, No. 248 (December 27, 2019) p71626. https://www.federalregister.gov/documents/2019/12/27/2019-27515/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps.

[22] 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;[22] 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.

Figure 5: EISA Phase I Exempt Inefficient Bulb Shelf Share

Non-linear Halogen and Incandescent bulbs



Drug and Specialty stores only stocked efficient bulbs in 2016 and 2019, respectively.
Membership Clubs did not stock incandescent bulbs.

See the Data ►

2.3.2 Phase I and Phase II Bulb Efficacy Compliance

Although its status remains uncertain, it seems unlikely that the 2017 GSL redefinition will be implemented. The fate of the 45 Lm/W backstop is also unknown, but it may yet be triggered. However, introduction of the backstop does not change the exemption status of bulbs from Phase I as no incandescent or halogen bulbs satisfy the 45 Lm/W backstop.

In fact, the most efficient halogen bulb of covered or unknown status achieves 33 Lm/W, and the most efficient incandescent is 21 Lm/W. Furthermore, it seems that more than one-fourth of all covered halogens (29% of 589 bulbs across all channels) and nearly all covered incandescents (98% of 174 bulbs across all channels) do not meet current (Phase I) federal minimum efficiency requirements (Table 7, which shows the compliant percentage).[23] To be clear, these small numbers of incandescent and halogen GSL bulbs (GSIL) are not known to be exempt based on the coverage criteria explained in Appendix B. While NMR has not verified the non-exempt status of each bulb listed due to breadth of the sample and incompleteness of available bulb characteristics, data cleaning and review suggests that these are largely non-exempt (e.g., Sylvania 60A/W/VERT/RP). These covered bulbs are either being legally sold from stockpile, or

[23] Federal Register vol. 84, № 248 (December 27, 2019). 10 CFR Part 430 Energy Conservation Program: Energy Conservation Standards for General Service Incandescent Lamps Table II.1 – Federal Energy Conservation Standards for Standard Spectrum GSILs https://www.federalregister.gov/d/2019-27515/p-147

are being manufactured domestically or imported, despite EISA Phase I prohibitions. However, we stress that the numbers of bulbs found in this category are fairly small.

Table 7: Fraction of GSIL Federal Conservation Standard Compliant Bulbs

EISA	Bulb Type	2016	2017	2018	2019
Phase I	Halogen	65%	75%	78%	71%
Phase I	Incandescent	1%	0%	1%	2%
Phase II	Halogen	0%	0%	0%	0%
Phase II	Incandescent	0%	0%	0%	0%

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 TRC, 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.

3.1 Key Findings

- Of all technologies, only mean LED prices have consistently decreased since 2016.
- LED prices have decreased at Hardware and Discount stores more than other channels, which may reflect the application of program incentives in these stores.
- In 2019, average smart LED prices decreased for the first time in three years.
- After falling steeply for the past three years, prices of globe and reflector LEDs stabilized or increased in 2019 (Figure 10 and Figure 11, respectively).
- Except for reflectors, multi-pack LEDs have a higher discount per bulb than other technologies for most shapes; for multi-pack reflectors, all technologies show deep discounts, with no single technology consistently having the largest discount.

3.2 Overall Prices

Table 8 shows that the price per bulb has increased since 2016 for all technologies except LEDs, although the trend varies by shape (see Section 3.7) and channel (Figure 6). Note that earlier CFL and halogen values are lower than in the 2018 report due to recategorization of some bulbs based on information from the 2019 data set, particularly the identification of numerous GU-base CFLs. Note that CFL prices in 2016 and 2017 may also have included program incentives. The program discontinued CFL support in 2018, when most lost ENERGY STAR qualification due to a specification change.

Table 8: Price per Bulb by Type

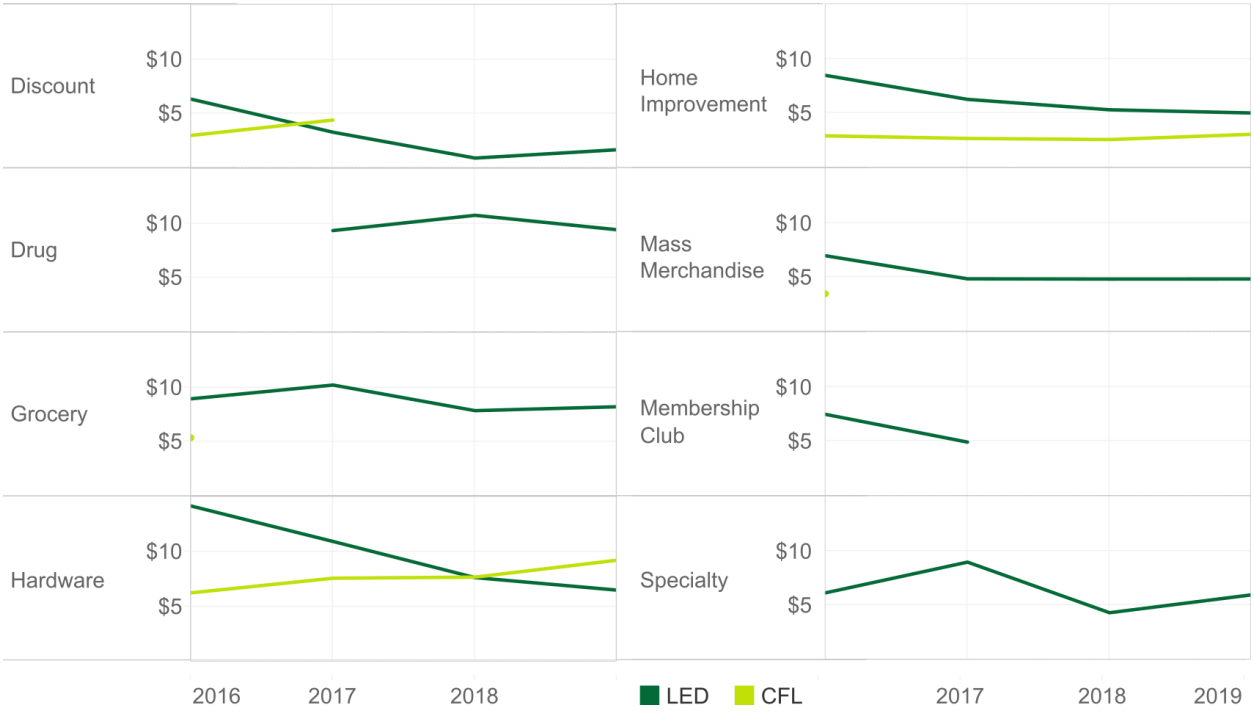
$ per bulb	Median				Mean			
Type	2016	2017	2018	2019	2016	2017	2018	2019
LED	$7.97	$5.84	$4.76	$4.99	$9.00	$7.31	$5.98	$5.69
CFL	$3.16	$5.00	$3.16	$2.99	$4.48	$5.97	$4.84	$4.60
Halogen	$2.99	$3.00	$3.25	$3.00	$4.75	$5.32	$5.40	$5.18
Incandescent	$2.00	$2.24	$2.35	$2.50	$2.77	$2.92	$3.29	$3.40

See the Chart ► Sample sizes ►

3.3 CHANNEL

The price per LED has fallen by nearly two-thirds since 2017 in Hardware stores, while remaining relatively constant at Home Improvement centers and Mass Merchandise stores. CFL prices have been steadily increasing at Hardware stores, while they remain unchanged at Home Improvement centers.

Figure 6: Price per Efficient Bulb by Channel



See the Data ►

3.4 ENERGY STAR & PROGRAM INCENTIVE

The price of both ENERGY STAR and non-ENERGY STAR LEDs has generally decreased over time, although non-ENERGY STAR median and mean prices showed a small increase between 2018 and 2019 (Table 9). The average differential between the prices of qualified and non-qualified models in 2019 was the highest recorded. For context, the average price per bulb of National Grid's lighting program, which only incentivizes ENERGY STAR LEDs, is included in Table 9. These incentives exceed the difference in price between the average ENERGY STAR and non-ENERGY STAR bulb.

Table 9: Price per LED by ENERGY STAR Status

$ per bulb	Median				Mean			
Status	2016	2017	2018	2019	2016	2017	2018	2019
Non-ENERGY STAR	$8.97	$6.48	$5.00	$5.98	$9.87	$7.99	$6.55	$6.85
ENERGY STAR	$5.99	$4.99	$4.16	$3.99	$8.40	$6.78	$5.53	$4.86
Difference	$2.98	$1.49	$0.84	$1.99	$1.47	$1.21	$1.02	$1.99
Incentive†					**$5.10**	**$3.55**	**$2.65**	**$3.71**

† 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 of on-going evaluations of the Massachusetts upstream programs. These databases included both Massachusetts and Rhode Island program sales.

See the Chart ►

Sample sizes ►

3.5 SMART BULBS

Smart LED prices decreased significantly in 2019 to roughly match those in 2016 (with a lower mean in 2019, but a higher median) (Table 10). However, the sample sizes for this category remain comparatively small, and the technology and marketing of these products is shifting rapidly. For example, the team noted fewer multi-pack starter kits with base stations in the review of this year's data, and some manufacturers have introduced limited feature "LED+" bulbs.

Table 10: Price per Smart LED

$ per bulb	Median				Mean			
Type	2016	2017	2018	2019	2016	2017	2018	2019
Smart LED	$15.97	$23.50	$24.99	$16.45	$23.13	$29.00	$29.16	$18.96

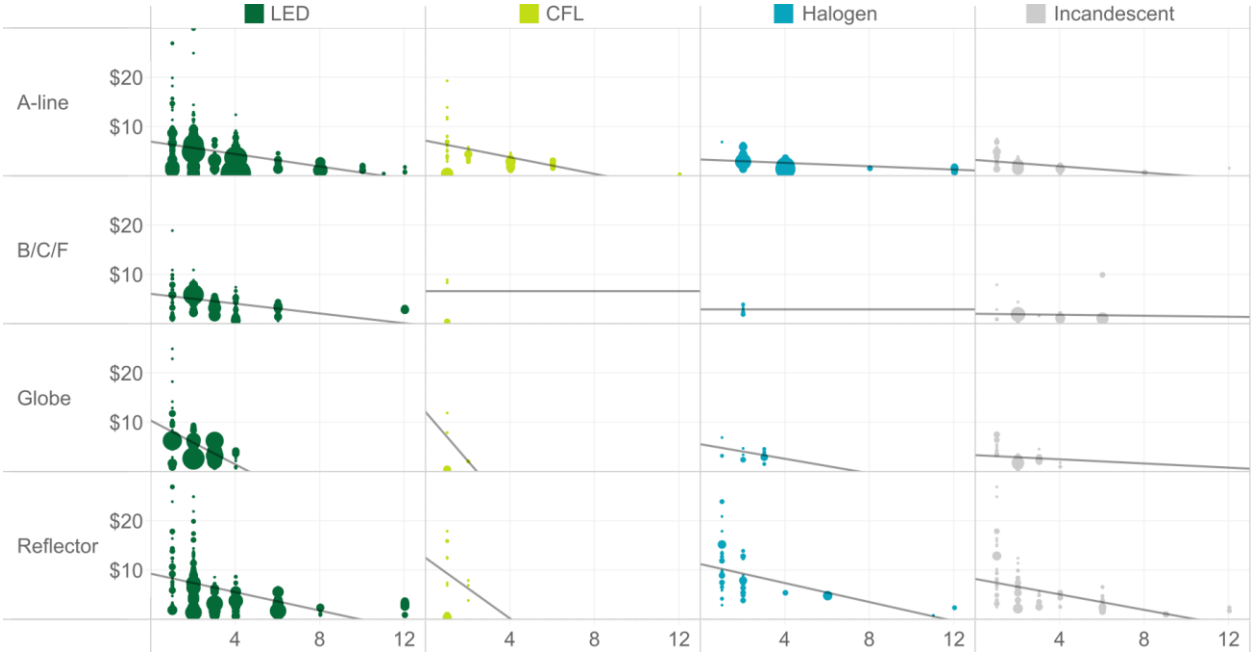
Sample sizes ►

3.6 MULTI-PACKS

Light bulbs are frequently sold in packages with a variety of counts; packs commonly range from 1 to 24 bulbs. Often, multi-bulb packs have a lower price per bulb due to a volume discount. An ideal analysis of this phenomenon would require matching multi-bulb packs of different counts for the same model; however, due to inconsistencies in data collection and model numbering, such an analysis is impractical. Nevertheless, it is possible to compare the price per bulb vs. package count without accounting for variations resulting from differences in models (e.g., highly priced smart bulbs are more likely to be sold individually).

Figure 7 explores the relationship between package count and per bulb price for different bulb shape and technology combinations. The chart excludes smart, three-way, non-white, motion-sensing, and very high- or low-intensity bulbs. The data points in these package size vs. price scatter plots are scaled to proportional to the shelf share,[24] but the trend lines are unweighted. Multi-pack pricing effects are manifested by the steepness of the trend lines and appear to be strongest for LEDs and reflectors.

Figure 7: Price per Bulb vs. Package Count by Shape



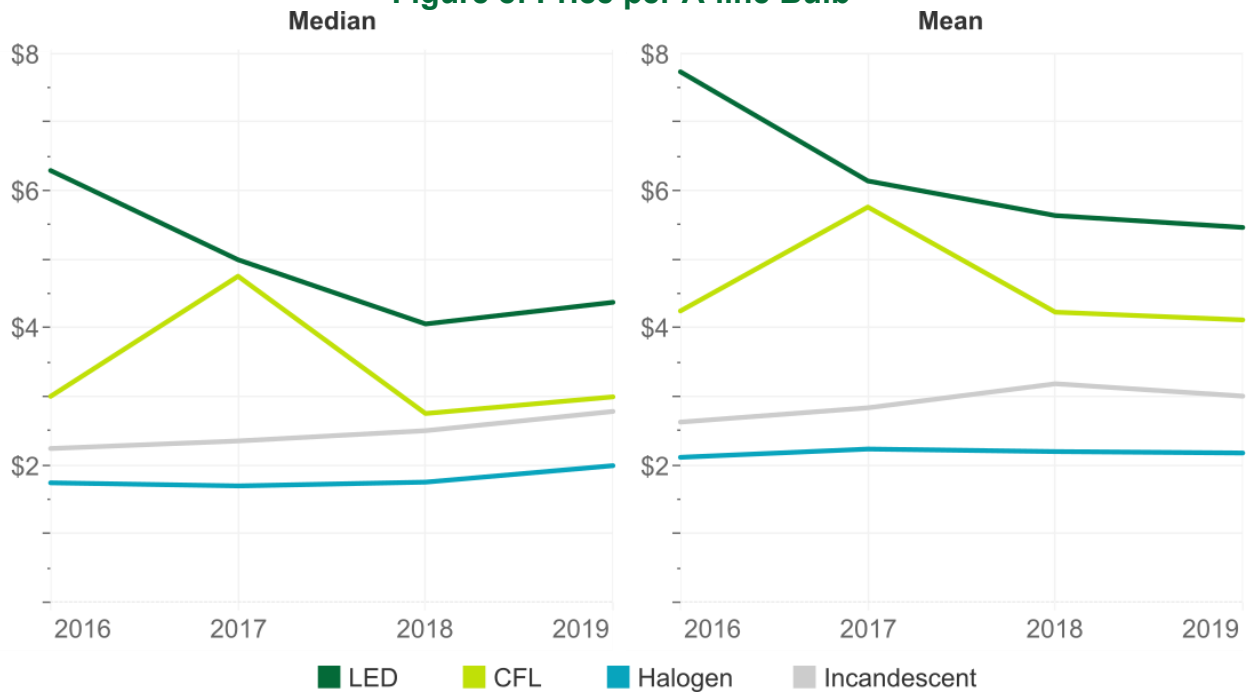
See the data ►

[24] Therefore, the figure excludes 2016 data due to the lack of comparable front-facing information for this year.

3.7 SHAPE[25]

The average prices of inefficient A-line bulbs in Rhode Island have remained flat the past four years, while those of LEDs have decreased steadily since 2017, as shown in Figure 8. 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 and National Grid ceased supporting them), but the price per CFL have now returned to pre-2017 levels.

Figure 8: Price per A-line Bulb



See the Data ►

The steady decline in average A-line LED prices in Figure 8 masks variation that exists across incandescent equivalence bins in Table 11, specifically a decrease in price among brighter bulbs vs. static to increasing prices for dimmer bulbs.

Table 11: Average Price per A-line LED Bulb by Incandescent Equivalent

Equivalent Wattage	2016	2017	2018†	2019
25–45	$2.97	$5.00	$4.04	$4.41
50–65	$4.28	$4.19	$4.60	$4.48
75	$8.57	$7.21	$6.01	$5.22
≥100	$13.15	$10.55	$9.34	$8.67

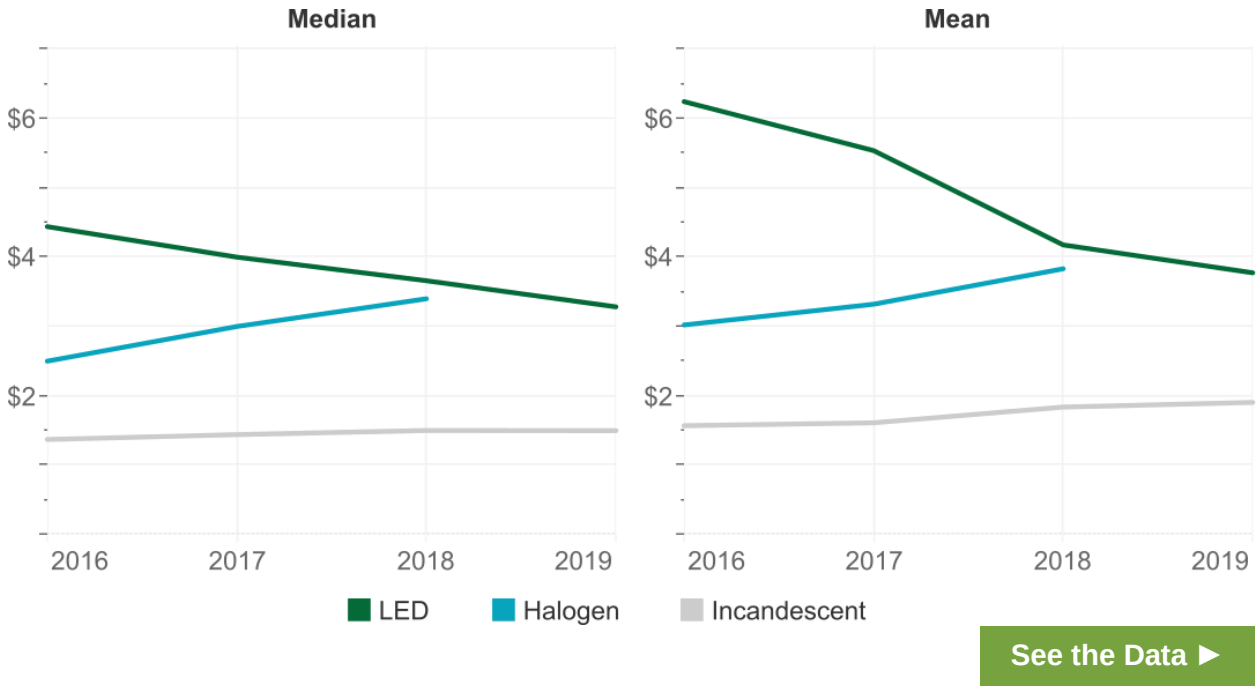
† NMR reassigned many bulbs using information from the 2019 data set, resulting in lower prices ($0.86–$1.16) than previous reports, except for a slight increase in the 50–65W category ($0.19).

Sample sizes ►

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

Figure 9 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.[26] CFLs and halogens in these smaller form factors are rare, resulting in a sample size that was too small to include for CFLs. Incandescent B/C/F bulb prices have remained relatively consistent since data collection began, while those of LEDs continue to decrease and are now only twice as expensive as incandescents.

Figure 9: Price per B/C/F Bulb

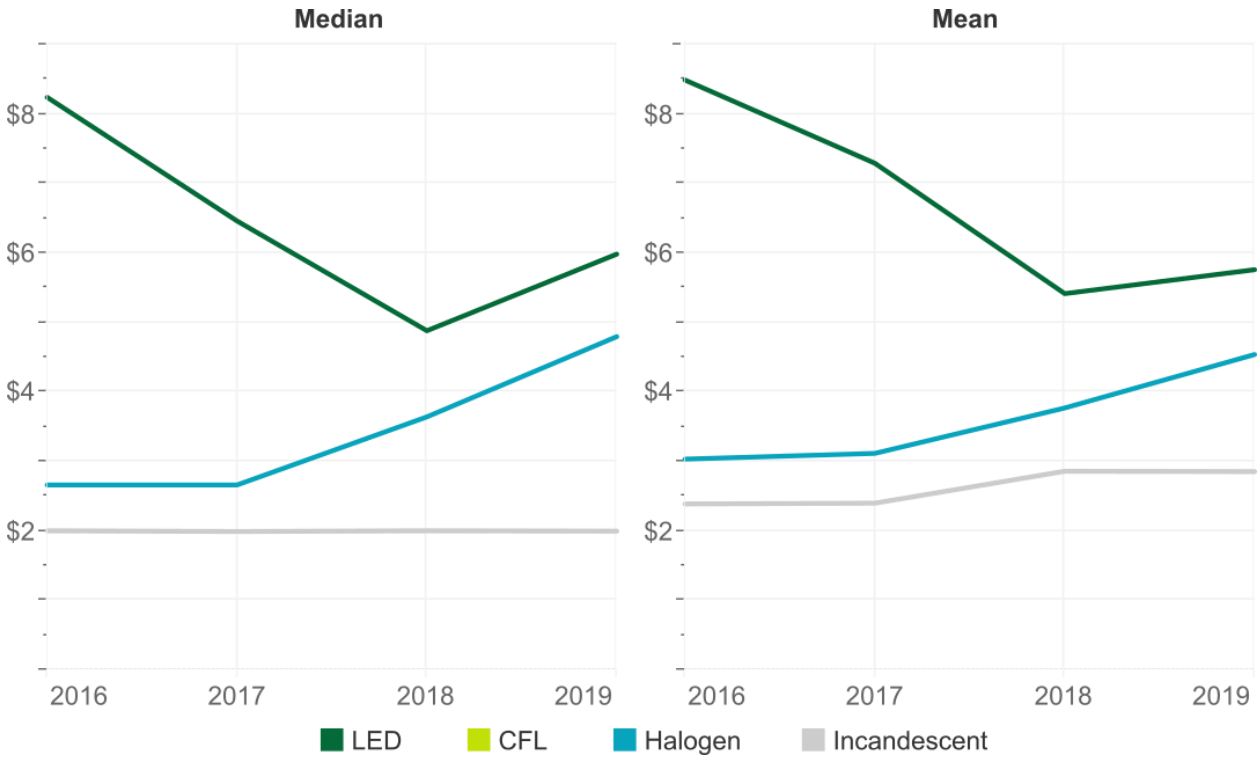


See the Data ►

[26] Based on the raw data furnished by TRC (then Lockheed Martin) in 2018 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 increased since last year but decreased overall since 2016, while inefficient globe prices (especially halogens) have increased, as shown in Figure 10. Incandescent prices have remained relatively stable. CFLs are omitted due to small sample sizes.

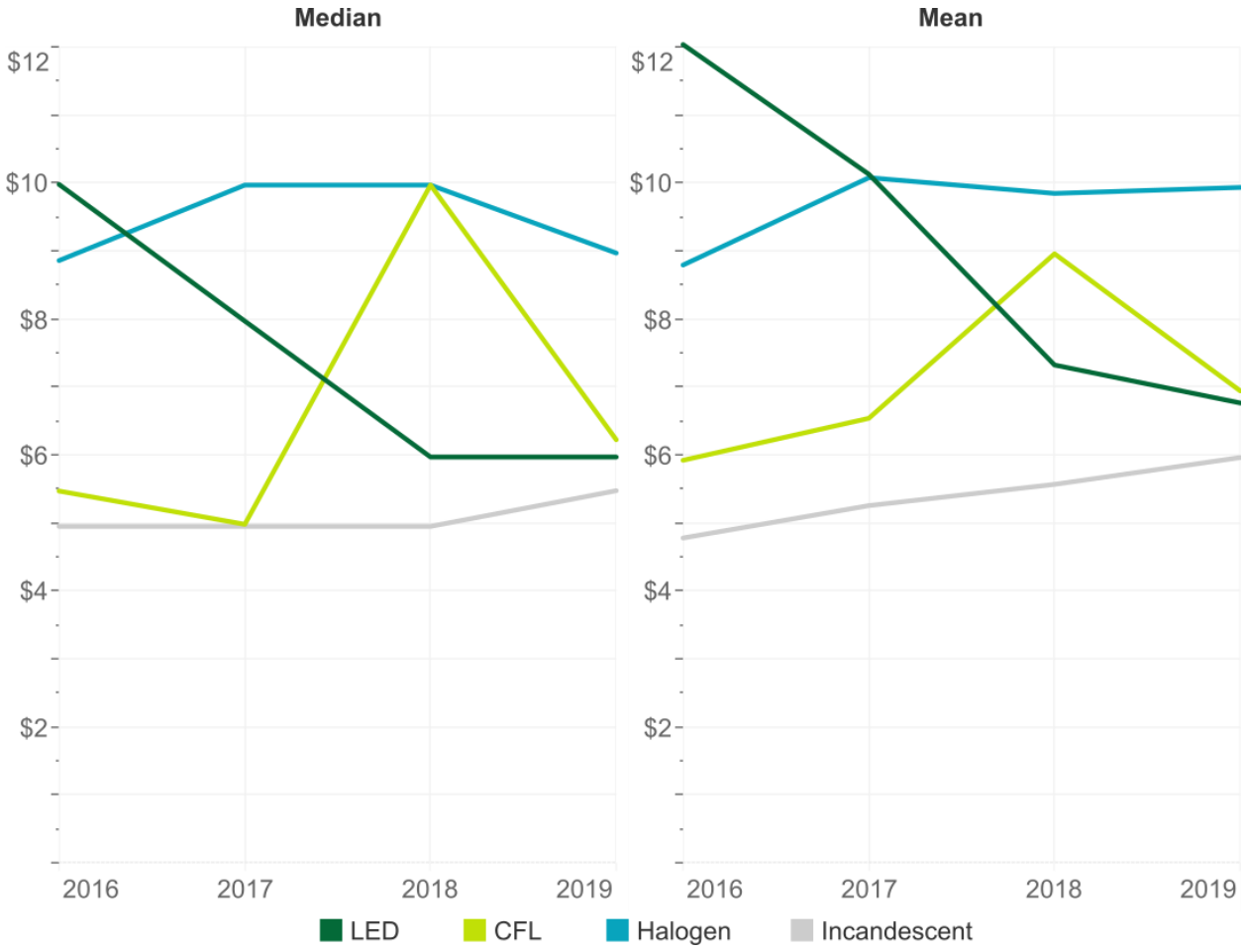
Figure 10: Price per Globe Bulb



See the Data ►

LED prices have fallen dramatically for reflector bulbs, and both the median and mean reflector LED prices are lower than all but incandescents for the second year running (Figure 11). Note that these customer-facing prices include the application of program incentives. CFL reflector prices have normalized after peaking sharply in 2018. The figure also shows more modest increases in the average price of inefficient reflectors.[27] Although there was a spike in CFL reflectors in 2018, it is worth noting that both the proportion of reflectors and total number of bulbs that are CFL continue to diminish, from 4% (45) in 2016 to less than 1% (12) in 2019, which contributes to volatility in summary statistics.

Figure 11: Price per Reflector Bulb

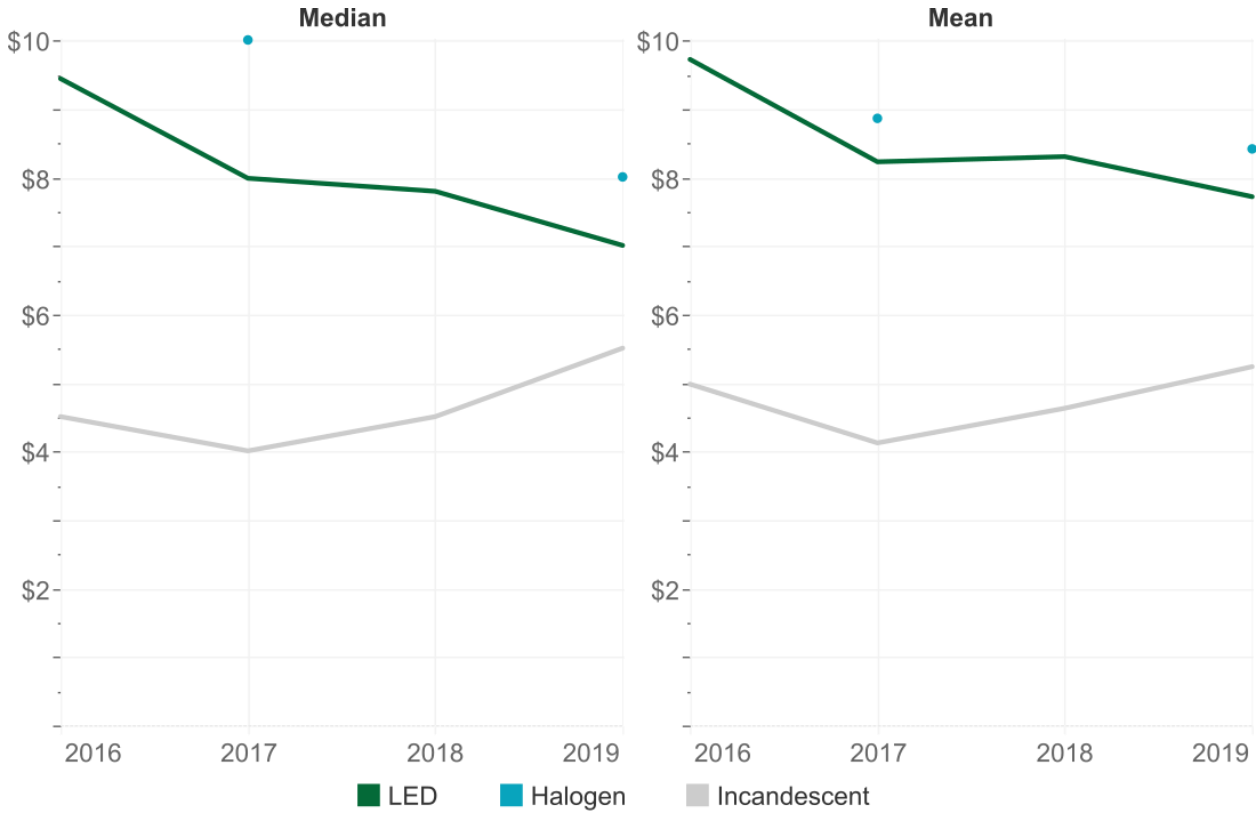


See the Data ►

[27] Due to the recategorization and exclusion of some bulbs after reconciling 2016-2018 data with that from 2019, previous years' halogen reflector prices are $1-2 higher per bulb than in the 2018 report. The 2018 report showed a similar, but flatter, trend for halogen bulbs, at approximately $8 per bulb rather than the $9-$10 shown here.

LEDs prices in the “Other Shape” category remain considerably higher than those of incandescents, but they became less than twice as expensive in 2018 and the gap continued to narrow in 2019 (Figure 12).

Figure 12: Price per Other Shape Bulb



See the Data ►

Appendix A Data Tables

A.1 METHODOLOGY

Table 12: Counts of Sampled Stores by Channel†

Channel	2016	2017	2018	2019
Discount	18	13	4	8
Drug	1	1	6	5
Grocery	12	11	10	9
Hardware	8	12	16	13
Home Improvement	4	3	10	9
Mass Merchandise	7	7	4	6
Membership Club	1	2	–	–
Specialty	3	6	3	3
TOTAL	**54**	**55**	**53**	**53**

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

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A.2 STOCKING

A.2.1 Linear Bulb Shelf Share

Table 13: Counts of Fluorescent Linear Bulbs

Channel	Type	2016	2017	2018	2019
Discount	LED	–	–	–	–
Discount	Fluorescent	35	43	–	2
Hardware	LED	–	26	27	72
Hardware	Fluorescent	26	340	329	241
Home Improvement	LED	–	126	201	308
Home Improvement	Fluorescent	13	363	728	1,401
Mass Merchandise	LED	–	4	28	9
Mass Merchandise	Fluorescent	32	97	69	65

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A.2.2 Non-linear Bulb Shelf Share

Table 14: Shelf Share by Type and Channel

Channel	Type	2016	2017	2018	2019
Discount	LED	30%	61%	72%	70%
Discount	CFL	14%	3%	4%	1%
Discount	Halogen	10%	4%	3%	10%
Discount	Incandescent	47%	31%	21%	20%
Drug	LED	100%	70%	44%	53%
Drug	CFL	0%	0%	1%	0%
Drug	Halogen	0%	25%	32%	19%
Drug	Incandescent	0%	5%	23%	29%
Grocery	LED	29%	47%	48%	48%
Grocery	CFL	43%	4%	5%	9%
Grocery	Halogen	9%	16%	12%	14%
Grocery	Incandescent	19%	32%	36%	29%
Hardware	LED	45%	43%	44%	60%
Hardware	CFL	4%	4%	2%	1%
Hardware	Halogen	12%	13%	16%	10%
Hardware	Incandescent	40%	40%	38%	30%
Home Improvement	LED	53%	64%	63%	72%
Home Improvement	CFL	5%	2%	3%	2%
Home Improvement	Halogen	16%	13%	12%	8%
Home Improvement	Incandescent	26%	20%	22%	18%
Mass Merchandise	LED	56%	65%	86%	84%
Mass Merchandise	CFL	0%	0%	0%	0%
Mass Merchandise	Halogen	25%	16%	6%	7%
Mass Merchandise	Incandescent	18%	19%	7%	9%
Membership Club	LED	73%	77%	–	–
Membership Club	CFL	23%	10%	–	–
Membership Club	Halogen	4%	13%	–	–
Membership Club	Incandescent	–	–	–	–
Specialty	LED	68%	22%	97%	19%
Specialty	CFL	10%	2%	0%	81%
Specialty	Halogen	13%	6%	3%	0%
Specialty	Incandescent	9%	70%	0%	0%

See Table 4 in Section 2.2.1 for overall composition numbers.

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Table 15: Counts of Non-linear Bulb Sample Size by Channel

Channel	2016	2017	2018	2019
Discount	7,849	1,211	602	779
Drug	4	40	171	135
Grocery	4,290	1,309	481	1,161
Hardware	7,035	3,487	3,921	3,525
Home Improvement	13,268	2,438	5,586	5,383
Mass Merchandise	15,250	3,083	1,516	1,705
Membership Club	651	62	–	–
Specialty	423	1,073	120	229
TOTAL	**48,770**	**12,703**	**12,397**	**12,917**

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A.2.3 ENERGY STAR

Table 16: ENERGY STAR LED Shelf Share

Channel	2016	2017	2018	2019
Discount	100%	95%	93%	83%
Drug	100%	21%	28%	61%
Grocery	96%	66%	76%	69%
Hardware	77%	69%	67%	66%
Home Improvement	57%	56%	56%	58%
Mass Merchandise	67%	52%	49%	58%
Membership Club	11%	8%	–	–
Specialty	96%	76%	87%	91%

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A.2.4 EISA

Note: 100% – Exempt – Unknown = Covered

Table 17: EISA PhaseIHalogen Shelf Share

	Exempt				Unknown			
Channel	2016	2017	2018	2019	2016	2017	2018	2019
Discount	57%	55%	42%	18%	1%	8%	0%	18%
Drug	–	0%	5%	16%	–	0%	0%	16%
Grocery	26%	37%	43%	30%	0%	0%	0%	17%
Hardware	59%	66%	65%	68%	0%	0%	0%	7%
Home Improvement	51%	65%	57%	54%	0%	0%	0%	0%
Mass Merchandise	17%	14%	15%	19%	0%	0%	0%	4%
Membership Club	0%	0%	–	–	0%	0%	–	–
Specialty	44%	79%	0%	0%	0%	0%	0%	0%

Table 18: EISA PhaseIIncandescent Shelf Share

	Exempt				Unknown			
Channel	2016	2017	2018	2019	2016	2017	2018	2019
Discount	84%	93%	70%	94%	2%	2%	3%	1%
Drug	–	100%	90%	90%	–	0%	5%	3%
Grocery	89%	92%	84%	89%	0%	2%	2%	2%
Hardware	92%	90%	94%	94%	1%	5%	1%	1%
Home Improvement	84%	93%	89%	90%	3%	1%	8%	8%
Mass Merchandise	82%	88%	75%	92%	1%	3%	7%	5%
Membership Club	0%	0%	–	–	0%	0%	–	–
Specialty	0%	86%	0%	0%	0%	0%	0%	0%

Table 19: EISA PhaseICounts

	Halogen				Incandescent			
Channel	2016	2017	2018	2019	2016	2017	2018	2019
Discount	803	53	19	79	3,607	357	125	152
Drug	–	10	55	25	–	2	39	39
Grocery	406	222	65	166	800	418	165	335
Hardware	1,009	519	674	437	2,659	1,163	1261	881
Home Improvement	2,285	270	604	329	3,279	366	938	600
Mass Merchandise	3,937	481	88	120	2,649	562	101	143
Membership Club	27	8	–	–	0	0	–	–
Specialty	55	68	4	0	37	753	0	0

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A.3 PRICING

Table 20: Counts of Price per Bulb by Type

Type	2016	2017	2018	2019
LED	1,844	2,506	3,397	3,707
CFL	280	131	136	72
Halogen	702	661	692	540
Incandescent	1,686	1,939	1,803	1,526

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A.3.1 Channel

Table 21: Price per Efficient Bulb by Channel

		Mean				*n*			
Channel		2016	2017	2018	2019	2016	2017	2018	2019
Discount	CFL	$3.05	$4.45	$2.46	$4.00	71	16	5	2
Discount	LED	$6.37	$3.34	$0.98	$1.74	165	103	40	88
Drug	CFL	–	–	$4.10	–	–	–	1	–
Drug	LED	$9.96	$9.34	$10.74	$9.42	4	21	69	37
Grocery	CFL	$5.40	$0.55	$2.03	$1.00	74	9	7	2
Grocery	LED	$8.96	$10.22	$7.88	$8.23	59	301	136	235
Hardware	CFL	$6.28	$7.60	$7.70	$9.24	73	83	59	20
Hardware	LED	$14.16	$10.94	$7.66	$6.52	427	583	840	1276
Home Improvement	CFL	$2.95	$2.71	$2.62	$3.09	43	17	62	41
Home Improvement	LED	$8.48	$6.28	$5.33	$5.04	421	533	1735	1415
Mass Merchandise	CFL	$3.51	–	$5.16	$3.94	11	–	2	1
Mass Merchandise	LED	$6.98	$4.87	$4.85	$4.86	739	878	556	642
Membership Club	CFL	$1.26	$5.83	–	$1.00	6	4	–	6
Membership Club	LED	$6.15	$8.96	$4.34	$5.97	17	69	21	14
Specialty	CFL	$3.98	$2.50	–	–	2	2	–	–
Specialty	LED	$7.48	$4.94	–	–	12	18	–	–

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A.3.2 ENERGY STAR

Table 22: Counts of Price per Bulb by ENERGY STAR Status

Type	2016	2017	2018	2019
No	746	1,098	1,517	1,581
Yes	1,098	1,408	1,882	2,129
TOTAL	**1,844**	**2,506**	**3,399**	**3,710**

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A.3.3 Smart Bulbs

Table 23: Counts of Price per Smart LED

Type	2016	2017	2018	2019
Smart LED	19	56	91	152

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A.3.4 Multi-packs

Some uncommon, higher count packages are omitted for space considerations.

Table 24: Average Price per Bulb by Type, Shape, & Package Size

Type / Shape		1	2	3	4	5	6	8	10	12
A-line	$	$7.62	$5.36	$3.51	$2.68	$0.60	$3.04	$1.51	$1.63	$1.14
LED	*n*	1,092	971	130	1,049	1	25	111	20	10
A-line	$	$6.26	$4.29	$3.33	$2.51	$3.00	$2.68	–	–	$0.41
CFL	*n*	84	32	1	98	1	17	–	–	1
A-line	$	$1.72	$3.25	–	$1.76	–	$0.83	$1.62		$1.46
Halogen	*n*	26	327	–	590	–	2	21	–	23
A-line	$	$3.46	$2.11	$0.47	$1.19	–	$0.67	$0.77	–	$1.67
Incandescent	*n*	222	420	2	26	–	1	1	–	1
Reflector	$	$11.58	$6.03	$3.55	$3.50	–	$3.09	$1.54	–	$3.00
LED	*n*	1,077	892	186	143	–	179	7	–	34
Reflector	$	$7.48	$6.31	–	–	–	–	–	–	–
CFL	*n*	48	3	–	–	–	–	–	–	–
Reflector	$	$11.40	$7.34	$3.36	$5.50	–	$4.96	–	–	$2.46
Halogen	*n*	457	190	10	6	–	10	–	–	1
Reflector	$	$7.46	$5.10	$2.93	$3.50	–	$3.24	–	–	$2.14
Incandescent	*n*	294	145	54	23	–	45	–	–	48
B/C/F	$	$7.06	$5.52	$3.13	$3.17	–	$3.03	–	–	–
LED	*n*	110	194	167	74	–	33	–	–	–
B/C/F	$	$3.79	–	$1.33	–	–	–	–	–	–
CFL	*n*	8	–	1	–	–	–	–	–	–
B/C/F	$	$5.97	$3.11	–	–	–	–	–	–	–
Halogen	*n*	4	30	–	–	–	–	–	–	–
B/C/F	$	$5.12	$1.93	$1.66	$1.18	–	$1.13	–	–	–
Incandescent	*n*	34	358	1	156	–	81	–	–	–
Globe	$	$8.50	$5.31	$3.71	$3.49	–	–	–	–	–
LED	*n*	281	298	255	46	–	–	–	–	–
Globe	$	$8.12	$2.15	–	–	–	–	–	–	–
CFL	*n*	8	1	–	–	–	–	–	–	–
Globe	$	$5.03	$3.28	$2.60	–	–	–	–	–	–
Halogen	*n*	29	13	35	–	–	–	–	–	–
Globe	$	$5.04	$1.78	$2.30	$1.29	–	–	–	–	–
Incandescent	*n*	178	229	64	20	–	–	–	–	–

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A.3.5 Shape

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In Table 25 through Table 28 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 25: Price per LED Bulb by Shape

$ per bulb	Median				Mean			
Shape	2016	2017	2018	2019	2016	2017	2018	2019
A-line	$6.29	$4.99	$4.06	$4.37	$7.73	$6.14	$5.63	$5.35
B/C/F	$4.44	$4.00	$3.66	$3.28	$6.24	$5.54	$4.18	$3.77
Globe	$8.24	$6.49	$4.88	$5.98	$8.53	$7.29	$5.41	$5.76
Reflector	$10.00	$7.99	$5.99	$5.99	$12.06	$10.15	$7.34	$6.79
Other	$9.43	$7.97	$7.78	$6.99	$9.71	$8.21	$8.29	$7.70

Table 26: Price per CFL Bulb by Shape

$ per bulb	Median				Mean			
Shape	2016	2017	2018	2019	2016	2017	2018	2019
A-line	$3.00	$4.75	$2.75	$2.99	$4.24	$5.76	$4.23	$4.11
Reflector	$5.49	$5.00	$9.99	$6.25	$5.94	$6.56	$8.98	$6.96
Other	$9.99	$10.49	–	–	$9.99	$10.49	–	–

Table 27: Price per Halogen Bulb by Shape

$ per bulb	Median				Mean			
Shape	2016	2017	2018	2019	2016	2017	2018	2019
A-line	$1.74	$1.70	$1.75	$1.99	$2.11	$2.23	$2.20	$2.17
B/C/F	$2.50	$3.00	$3.40	$3.37	$3.02	$3.32	$3.83	$3.25
Globe	$2.66	$2.66	$3.64	$4.80	$3.03	$3.07	$3.77	$4.54
Reflector	$8.88	$9.99	$9.99	$8.99	$8.81	$10.10	$9.87	$9.96
Other	$9.99	$9.99	$9.97	$7.99	$9.99	$8.85	$7.98	$8.40

Table 28: Price per Incandescent Bulb by Shape

$ per bulb	Median				Mean			
Shape	2016	2017	2018	2019	2016	2017	2018	2019
A-line	$2.14	$2.35	$2.49	$2.50	$2.53	$2.73	$3.03	$2.87
B/C/F	$1.37	$1.44	$1.50	$1.50	$1.57	$1.61	$1.84	$1.90
Globe	$2.00	$1.99	$2.00	$2.00	$2.39	$2.40	$2.86	$2.85
Reflector	$4.97	$4.97	$4.97	$5.50	$4.80	$5.28	$5.59	$5.98
Other	$4.49	$3.99	$4.49	$5.49	$4.96	$4.11	$4.61	$5.22

Table 29: Counts of Price per Bulb by Type and Shape

Shape	2016	2017	2018	2019	2016	2017	2018	2019
	LED				CFL			
A-line	833	1,144	1,380	1,501	216	96	114	58
B/C/F	233	357	520	579	10	4	3	2
Globe	171	253	388	474	7	6	3	
Reflector	573	675	966	956	45	23	16	12
Other	34	77	143	189	2	2	–	–
	Halogen				Incandescent			
A-line	389	354	371	310	530	564	512	438
B/C/F	15	17	12	6	549	586	551	463
Globe	28	34	26	17	457	536	449	382
Reflector	265	238	274	185	267	281	317	257
Other	5	18	9	22	95	215	112	134

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Table 30: Counts of A-line LED Bulb by Equivalent Wattage

Equivalent Wattage	2016	2017	2018	2019
25–45	56	300	396	390
50–65	101	430	564	609
75	35	155	137	164
≥100	47	235	269	322
Unknown	594	24	14	16

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Appendix B EISA Exemption Flow Charts

Figure 13: EISA Phase I

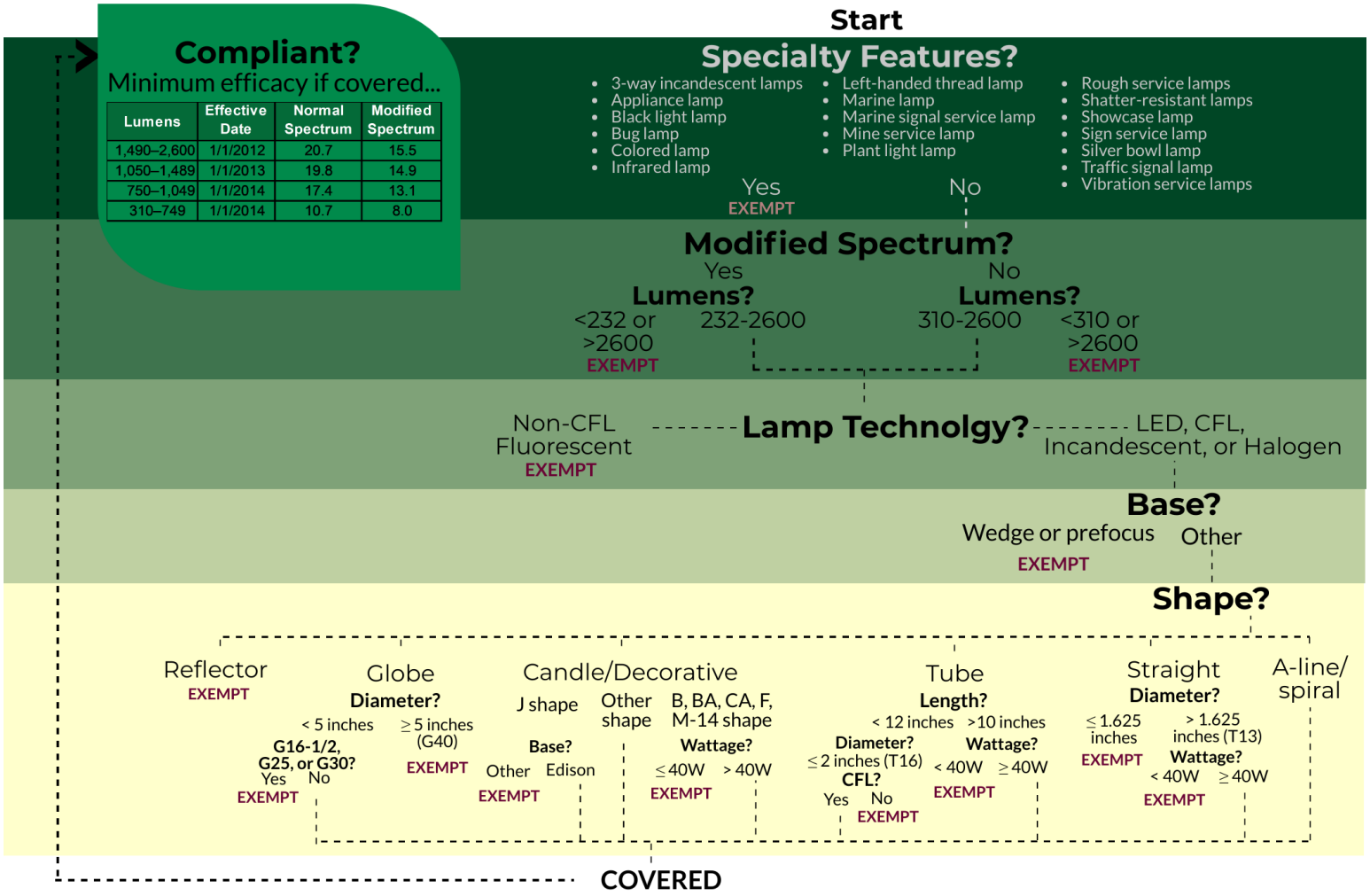

Figure 14: EISA Phase II