

Appendix I:

Energy Independence and Security Act Backstop: Status and Potential Program Impacts

To: Laura Martel, Efficiency Maine
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Subject: EISA 2020 Backstop: Status and Potential Program Impacts
Date: September 12, 2018

There is significant uncertainty over the future of the lighting market, and whether or not there is a need for ongoing program support. This memo provides details on the background and status of the 2007 Energy Independence and Security Act (EISA) legislation, the transformation of the lighting market, and conclusions and implications for Efficiency Maine Lighting Programs.

Background and Status of the EISA Legislation¹

In 2007, EISA established minimum efficiency standards for various technologies, including lighting.² Within the stipulations for screw-based lighting requirements, EISA established three standards:

1. Adopted a technology-neutral standard for lighting, providing broad expectations for lighting efficiencies, and flexibility for manufacturers in meeting them. This technology-neutral stance expanded the reach of lighting legislation regulating minimum performance of bulbs to include General Service Incandescent Lamps (GSILs), Compact Florescent Lamps (CFLs), general service light-emitting diode (LED) or organic light-emitting diode (OLED), and “any other lamp that the Secretary of Energy determines are used to satisfy lighting applications typically served by General Service Lamps (GSLs), with certain exceptions”.
2. As a result, EISA also set minimum efficiency standards regarding the importation and manufacturing for GSILs in 2012 through 2014, incrementally increasing the demand for better performance. In response, the market replaced traditional and inefficient incandescent bulbs with halogens.
3. Finally, to ensure review of these standards in an ever-changing market, EISA put forth a requirement by the Department of Energy (DOE) to reevaluate the standards

¹ Note that additional details on the original EISA legislation, the Backstop Provision, and the status of the rulemaking can be found from a recent ICF white paper: Doby, Shana and Frank Molander, ICF (2018). “The Facts Behind the Lighting Backstop.” <https://www.icf.com/resources/white-papers/2018/the-lighting-backstop>

² Early Independence & Security Act of 2007 (EISA). Pub L. 110-140. 121 Stat. (December 19, 2007). <https://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>

between 2014 and 2016 and issue a rulemaking by January 1, 2017 that either confirms or amends the stipulations established by EISA in 2007. In the absence of this rule, a backstop requirement was included, setting a minimum efficiency standard of 45 lumens per watt beginning January 1, 2020.

While the initial phase in of the EISA lighting efficiency standards occurred relatively smoothly, general industry consensus is that the EISA backstop adoption is not as straightforward. Specifically, the EISA legislation required the Secretary finalize a rulemaking assessing effectiveness of the initial 2012-2014 standards prior to January 1, 2017. The legislation further stated that if the Secretary fails to make that rulemaking, the 45 lumens per watt efficacy standard – required of sales (i.e., not allowing for any “sell-through” of remaining inefficient technologies that do not meet this standard) – should be enacted on January 1, 2020.

For any new standards to come into effect, however, the DOE was to issue a final rule to codify the statute in the Federal Register, which has not happened. Specifically, at the time of this memo, the secretary has not published a rulemaking assessing the initial phases of the EISA phase-in, nor has the DOE published a final rule turning the 45 lumens per watt standard into law. As such, there is heated debate in the lighting industry on whether the backstop has been triggered.

Confusing the debate, on January 19, 2017, the DOE filed two rules with the Federal Register that expanded the definition of GSLs starting in 2020 to include specialty bulb types formerly exempt from EISA legislation, such as candelabras, globes, and reflectors.³ This rulemaking explicitly does not confirm or amend the original EISA efficiency standards set by the bill in 2007 and implemented between 2012 and 2014. As such, this expanded definition of GSLs without guidance on the impending performance requirements has left many stakeholders in the lighting industry uncertain about expectations moving forward.

In response to this uncertainty, the National Electrical Manufacturers Association (NEMA) filed a lawsuit against the DOE in March of 2017 requesting clarity over the backstop requirement, lightbulb efficiency standards, and the definition of GSLs. In July of the same year, both parties signed a Settlement Agreement, dismissing the lawsuit and providing a path forward for clarifying regulations in the lighting industry. Based on the Settlement Agreement, the DOE agreed to:

³ Department of Energy (January 19, 2017). Energy Conservation Program: Energy Conservation Standards for General Service Lamps (10 CFR Part 430). https://www.energy.gov/sites/prod/files/2017/01/f34/gsl_definition_finalrule_2016-12-29_0.pdf

1. Issue a Notice of Data Availability (NODA) for halogen bulbs to increase data available to adequately assess the impact and value of current standards (released August 15, 2017).⁴
2. Mitigate potential loopholes in the definition through consistent monitoring of exempt bulb sales, looking for instances where sales exceed projections by 100% or more, suggesting a shift in purchasing behavior incongruent with the push towards energy efficiency. A first step in this process was completed in December 2017 (with an effective date of January 25, 2018), when DOE eliminated the exemption for rough service lamps and vibration service lamps because sales of these lamps had exceeded 200 percent of the benchmark established in 2015.⁵ DOE continues to investigate 3-way incandescent lamps, 2,601-3,300 lumen GSILs, and shatter-resistant lamps.
3. Issue a Supplemental Notice of Proposed Rulemaking (SNOPR) that addresses standards for LEDs, specifically. This was scheduled to be released in May of 2018 (or as agreed to in the settlement five months after the Final Rule on rough service and vibration service lamps). However, at the time of writing this memo, nothing yet had been issued, and no information has been provided about a possible release date. *These delays could also lead to a delay in the effective date for any ruling, due to an EISA requirement that a final rule should be effective not earlier than three years after the date on which the final rule is released.*⁶

There are three governing factors that must be satisfied in order for DOE to change an efficiency standard for any technology. All three of these conditions must be met. Standards must be:

- Economically justified (e.g., minimal impact to retail price);
- Technologically feasible (i.e., can the product be made?); and
- Save a significant amount of energy.

It will take DOE time to analyze the data and conclude the rulemaking process, but lighting manufacturers have consistently stated that the halogen lamp technology cannot be modified to a higher efficiency level while meeting all three of these conditions.

⁴ Department of Energy (August 15, 2017). Energy Conservation Program: Data Collection and Comparison with Forecasted Unit Sales of Five Lamp Types (10 CFR Part 430) [EERE-2011-BT-NOA-0013]. <https://www.energy.gov/sites/prod/files/2018/07/f53/five-exempted-lamp-types-noda.pdf>

⁵ Department of Energy (December 26, 2017). Energy Conservation Program: Energy Conservation Standards for Rough Service Lamps and Vibration Service Lamps; Final Rule. (10 CFR Part 430) <https://www.regulations.gov/document?D=EERE-2017-BT-STD-0057-0001>

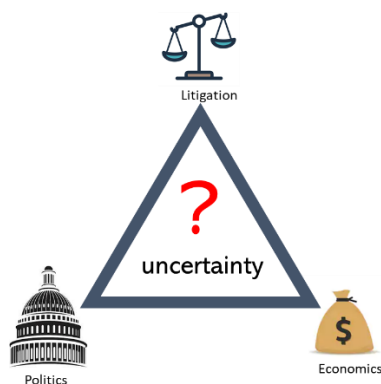
⁶ Doby, Shana and Frank Molander, ICF (2018). "The Facts Behind the Lighting Backstop." <https://www.icf.com/resources/white-papers/2018/the-lighting-backstop>

The NODA will definitively result in DOE reviewing efficiency standards for halogen bulbs. The Settlement Agreement stated that the NODA may also result in DOE reassessing the GSL definition. The new GSL rules released in January 2017 expanded the definition to include reflectors and many decorative lamps. If the GSL rules are reassessed, it is possible that these bulb types may once again be exempt from federal efficiency standards. Even if they are included, the expansion of the GSL definition in the January 2017 rules implied that a sell through period of existing inventory would be allowed (i.e., the reflector and specialty lamps would not be subject to a “hard stop” of sales on January 1, 2020).

Factors Contributing to the Uncertainty of the EISA 2020 Backstop

Apex Analytics believes there are at least three interrelated factors contributing to the uncertainty over the EISA 2020 Backstop: legal challenges, economic interests, and political climate. These three factors are shown graphically in Figure 1, and described in more detail below.

Figure 1. Factors Contributing to Uncertainty Regarding the EISA 2020 Backstop



- **Legal Challenges:** As noted above, the lighting manufacturers, through NEMA, have legally challenged DOE, as well as California, regarding the backstop. NEMA has argued DOE has failed to complete the rulemaking, and thus the backstop has not been triggered. Regardless of the outcome of the EISA application, we expect years of litigation from interested parties.
- **Economic Interests:** Shorter lifetime products, like halogens, lead to more frequent store visits, sales, and profits. Manufacturers have also reported that there are higher profit margins with halogens compared to LEDs. Additionally some halogens are manufactured in the U.S., compared to LEDs which are largely imported; eliminating halogens could therefore lead to the closing of factories and loss of jobs.

- **Political Climate:** The current political administration has clearly shown a preference for minimizing or eliminating federal regulation, having delayed appliance energy efficiency standards on a number of products already.⁷

Although DOE has not indicated what direction they will rule, the legal challenges and economic interests, under the current political climate, make it highly unlikely the current administration will enact the EISA 2020 Backstop as written.

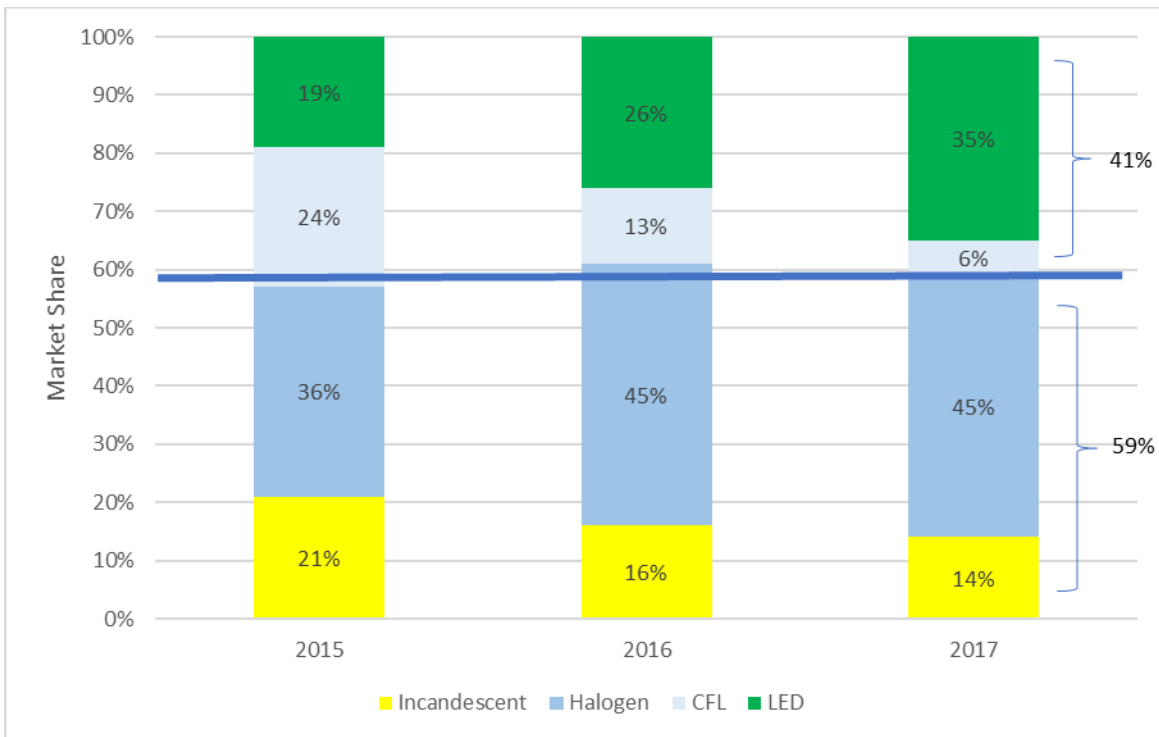
Will the Lighting Market Transform Without the Legislation?

An interesting “twist” in the debate over the backstop is that NEMA is arguing that LEDs have significantly dropped in price, are gaining substantial market share, and will ultimately dominate the market without the need of a legislated ban on sales of less efficient lamps (i.e., the backstop is not needed since the market is already transforming). This would suggest that maybe programs aren’t needed, regardless of the legislation, since LEDs will dominate the market anyway. While there are indications that the market is transforming, the data show that full transformation has not yet occurred.

Analysis of U.S. sales data suggests that the significant rise in LED sales is largely coming at the expense of CFLs: efficient market share has largely stayed flat for the last three years, and is still less than 50% of all lamps sold. For example, as shown in Figure 2, sales of efficient lamps (CFLs and LEDs) have held steady at approximately 41% of all lamp sales from 2015-2017.

⁷ <http://aceee.org/press/2017/12/statement-aceee-and-asap-federal> (accessed on July 27, 2018).

Figure 2. U.S. Retail Lighting Sales by Lamp Type and Year⁸

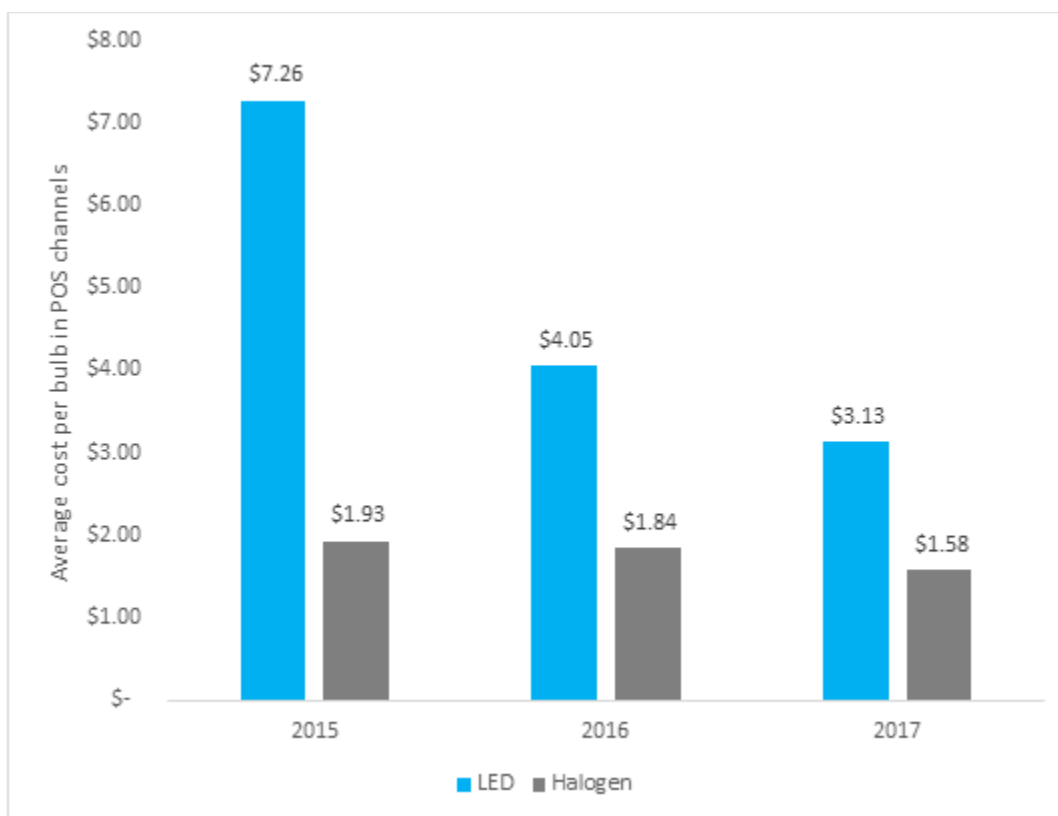


While LEDs have dropped in price, they do remain the most expensive option, approximately double the cost of halogens in 2017 (Figure 3). Furthermore, most manufacturers and retailers think that the significant price drops of the last few years will not continue, and that LED prices will drop at a reduced rate compared to prior years or have stabilized.⁹

⁸ Consortium for Energy Efficiency Data (CREED) LightTracker Analysis (2018).

⁹ NMR Group, Inc, for the Electric and Gas Program Administrators of MA. "Lighting Supplier Insights – Wave 2 (Study RLPNC 16-2)." February 24, 2018.

Figure 3. Average Price of Halogens and LEDs¹⁰



So why would the manufacturers be suggesting on one hand that that market is transforming on its own, but on the other hand data (including publicly released NEMA data) show otherwise? We believe that when assessing the rate of historic and likely future LED adoption manufacturers are assuming that efficiency programs will continue to fuel the growth of LED sales. In fact, when asked about LED market share with and without program intervention in Massachusetts, manufacturers estimated about a relative 36% increase in LED sales with program incentives vs. without program incentives (e.g., increasing market share from 47% to 64% in 2020 for standard lamps).¹¹

Conclusions

There is little doubt that LEDs are a superior technology to CFLs and have gained substantial market share over the last few years, but this progress has been fueled by hundreds of

¹⁰ Consortium for Energy Efficiency Data (CREED) LightTracker Analysis (2018). Note data represent the “point-of-sale” channels, based on actual “at the register” prices from the grocery, dollar, drug, discount, mass merchandiser, and selected club retailers.

¹¹ NMR Group, Inc, for the Electric and Gas Program Administrators of MA. “Lighting Supplier Insights – Wave 2 (Study RLPNC 16-2).” February 24, 2018.

millions of dollars of incentives (approximately \$500 million/year over the last few years)¹², as well as the expectation that LEDs were going to be the only available technology for sale by 2020 due to the EISA backstop. Manufacturers, in fact, have been caught in a price war, a veritable “battle for the socket” since the long lifetime of LEDs means years of waiting before a lamp fails again and a competing manufacturer has a chance of filling that socket with one of its own lamps.

The uncertain fate of the backstop, however, could provide manufacturers with more years of producing, marketing, and selling more profitable halogens, and the legal challenges and political climate only serve to fuel this uncertainty. While there is a temptation to think the market is transformed, the data above show that’s not currently the case.

Had Massachusetts cut lighting programs earlier, Massachusetts residential customers would have spent approximately \$70/year per home more on their electric bills, or collectively have spent \$190 million more in annual electric bills.

Furthermore, cutting incentives could lead consumers to purchase the lower priced, less efficient halogen lamps. In fact, a recent study comparing Massachusetts (which has continued to run aggressive lighting programs) to New York (which had determined the residential lighting market was transformed and cut all upstream lighting incentives in 2014) found significantly higher LED in saturation in Massachusetts compared to New York: saturation of LEDs was 27% in MA compared to 14% in New York.¹³ Had Massachusetts cut lighting programs earlier, Massachusetts residential customers would have spent approximately \$70/year per home more on their electric bills, or collectively have spent \$190 million more in annual electric bills.¹⁴ The study provided convincing evidence that eliminating incentives too early could lead to stagnation and potential backsliding, so much so that ConEd reintroduced upstream LED incentives in late 2017.

As noted above, the legal challenges and economic interests, under the current political climate, make it highly unlikely the current administration will enact the EISA 2020 Backstop as originally written (with a “hard stop” on sales of halogens on January 1, 2020). In fact, even if DOE were to complete a ruling in 2018, EISA requires that a final rule cannot be enacted sooner than three years after the date the rule is released, so that alone would push out any requirement until 2021 at the earliest, and possibly later (e.g., a 2019 ruling wouldn’t take effect until 2022).

¹² ENERGY STAR Summary of Lighting Programs, September 2017 Update. <https://www.energystar.gov/ia/partners/downloads/2017%20ENERGY%20STAR%20Summary%20of%20Lighting%20Programs.pdf>

¹³ NMR Group, Inc, for the Electric and Gas Program Administrators of MA. RLPNC Study 17-9 2017-18 Residential Lighting Market Assessment Study. March 28, 2018. http://ma-eeac.org/wordpress/wp-content/uploads/RLPNC_179_LtgMarketAssessment_28March2018_FINAL-1.pdf

¹⁴ Barclay, David. “Keep Calm and Carry On: Why Upstream Lighting Programs Are Still Important.” International Energy Program Evaluation Conference, Baltimore, MD, August 2017.

Implications for Efficiency Maine Lighting Programs

Apex Analytics, therefore, recommends that Efficiency Maine continue to offer upstream incentives for LEDs until, at the earliest, the Backstop becomes in effect or LEDs become the predominant technology. Even after the Backstop becomes in effect there could be opportunities for residential lighting programs, particularly if there is allowance for sell-through (as in the EISA 2012-2014 Phase-In), and through direct install programs that focus on retrofit lighting upgrades. The programs, however, should reflect increasing adoption of LEDs in that:¹⁵

- ***Measure lifetime should continue to be reduced:*** Although the technical life of an ENERGY STAR LED is 15,000 hours (approximately 15 years), in absence of the program it's highly likely the socket would eventually have had an LED installed. The Residential Lighting Uniform Methods Project (UMP) recommends choosing a "sunset date" beyond 2020 on which to claim savings, reflecting the uncertainty of EISA, the likelihood of sell through, and the lifetime of a halogen (e.g., even a halogen installed in 2019 could well be beyond 2020).¹⁶ The measure lives in the Efficiency Maine Retail and Residential TRM Version 2019.1 of seven years for bulbs with rated hours of use of 15,000 hours is consistent with the UMP recommendation.
- ***Expect NTG to decline:*** With the strong likelihood that LEDs will gain market share over time, particularly if DOE enacts some form of legislation, the level of free-ridership is likely to increase over time.
- ***Volume sales will decrease:*** The increasing saturation of LEDs and longer lifetime means that that fewer sockets will turn over naturally, leading to lower year over year sales. Even direct installation programs will find less sockets in a home that contain inefficient lamps. Efficiency Maine has incorporated increased LED socket saturation in the projected LED program participation for Triennial Plan IV by decreasing the number of LED bulbs incentivized each year.

With these factors, the potential remains for cost-effective residential lighting saving opportunities over the next few years. Terminating the residential lighting program too early could delay the adoption of LEDs, leaving significantly large amounts of savings on the table, and costing consumers millions of dollars in increased energy bills while the legislative and judicial branches are debating the outcome of EISA.

¹⁵ Efficiency Maine has already begun incorporating some of these suggested assumptions to their current residential lighting assumptions. For example, the current assumptions assume a "step function" in savings, with a 45 lumens/watt baseline after 2022.

¹⁶ National Renewable Energy Laboratory. "Chapter 6: Residential Lighting Evaluation Protocol. The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures". October 2017. <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0ahUKEwjv8WCSJLcAhXly4MKHV0iBW0QFghGMAM&url=https%3A%2F%2Fwww.nrel.gov%2Fdocs%2Ffy17osti%2F68562.pdf&usg=AOvVaw0sy-8TdZUvGc8vnYlmZ4HR>