Residential light bulb market regulatory activity and market transformation

The impact of lighting efficiency standards and utility programs

By Shana Doby, ICF

Summary

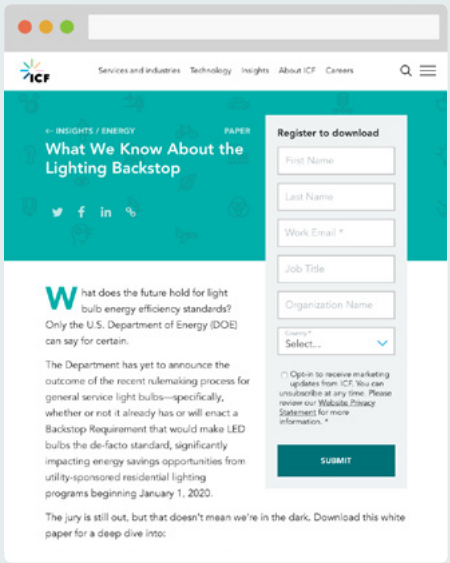
There have been a lot of questions in recent years about the future of light bulbs due to uncertainties surrounding the regulatory landscape for efficiency standards. Confusion is primarily tied to the questions of what are the standards and what bulb types are subject to those standards. Utility-sponsored residential lighting programs face the challenge of planning for future energy savings amid this confusion.

Until recently, stakeholders have had to rely on speculation and circumstantial information to understand potential outcomes. However, clarity was provided on September 5, 2019, when the U.S. Department of Energy (DOE) published two items to the *Federal Register* related to efficiency standards for light bulbs: 1) final rule for the definition for general service lamps (GSLs) and 2) notice of proposed determination (NOPD) for standards for general service incandescent lamps (GSILs).

The publications from DOE clarified these key items:

- **GSL definition:** The GSL definition will remain the same as the definition effective in the market today, which essentially applies to the 40W, 60W, 75W, and 100W A-line bulb.

The Facts Behind the Lighting Backstop



ICF published a white paper in May 2018, "The Facts Behind the Lighting Backstop," which provided background and an overview of activities through that time. It can continue to be used as a resource for additional information.

- **Backstop:** The 45 lumen per Watt (lm/W) backstop was not automatically triggered, and therefore the efficiency standard is not scheduled to change on January 1, 2020.
- **State-specific standards and preemption:** Federal efficiency standards supersede state standards. Therefore, no state has the legal authority to enforce a standard that is more stringent than the federal standard, including California and Nevada.
- **Efficiency standards:**
  - The final rule specified that it did not contain a determination on GSL efficiency standards.
  - The NOPD is a preliminary determination that GSIL efficiency standards do not need to be amended.

On November 4, 2019, two lawsuits were filed against DOE objecting to the final rule. Those who filed the lawsuits have stated that DOE acted illegally in reversing its January 2017 rules that expanded the GSL definition and, therefore, the types of bulbs that would have been required to be more efficient on January 1, 2020. Because lawsuits have been filed, the courts will make the final determination. This process will take time. However, the final rule is an enforceable law and will remain the governing law unless it is changed by the courts at some point in the future. This paper provides a brief recap of the Energy Independence & Security Act of 2007 (EISA) and the regulatory background. It then goes into more detail around the recent regulatory activities, stakeholder reactions, and market activity, all of which contribute to a better understanding of the future of light bulbs in utility energy efficiency programs.

EISA requirements

To understand recent activities and the implications of the September 2019 publications from DOE, it is important to understand the regulatory background, beginning with EISA. EISA was signed into law by President George W. Bush on December 19, 2007, aiming to move the United States toward greater energy independence and security. EISA *Section 321. Efficient Light Bulbs*[1] provided the guiding document for lighting efficiency standards. It provided the definition of a GSL, the legal term for 'light bulb.' EISA also set efficiency standards and outlined a pathway for DOE to determine whether standards should be increased further. A backstop requirement was also included in EISA, which provided for a possible 45 lm/W efficiency standard beginning January 1, 2020.

[1] EISA. 1/4/2007. https://www.govinfo.gov/content/pkg/BILLS-110hr6enr/pdf/BILLS-110hr6enr.pdf. Section 321, pages 82-96.

Efficiency standard. The minimum efficiency standard for bulbs, shown in Table 1, was prescribed by EISA and went into effect 2012–2014. This created the market we have today: traditional A-line incandescent bulbs have been replaced by halogen bulbs that meet the new minimum efficiency standards that are about 28% more efficient than the previous incandescent technology.

TABLE 1. MINIMUM EFFICIENCY STANDARD ESTABLISHED BY EISA

Rated Lumen Range	Typical Lamp Wattage*	Maximum Rated Wattage**	Minimum Rated Lifetime	Effective Date***
1490-2600	100	72	1,000 hours	1/1/2012
1050-1489	75	53	1,000 hours	1/1/2013
750-1049	60	43	1,000 hours	1/1/2014
310-749	40	29	1,000 hours	1/1/2014

*Typical Lamp Wattage refers to rated wattage of traditional incandescent bulbs.
**Maximum Rated Wattage is the new standard set by the first phase of EISA.
***Effective Date refers to the date the product is manufactured or imported.

GSIL definition. EISA defined a GSIL[2] as a standard incandescent or halogen medium screw base bulb that is intended for general service applications. It has a range of not less than 310 lumens and not more than 2,600 lumens, and operates at a voltage range at least partially within 110 to 130 volts. Exempt from the definition (and efficiency standards) were 22 bulb types, including reflectors, 3-way bulbs, bug lights, rough service, vibration service, many decorative bulbs, and more.

GSL definition. EISA defined a GSL[3] as a GSIL, CFL, LED, or organic LED (OLED) bulb. Exemptions include the same 22 bulb types exempt from the GSIL definition, as well as general service fluorescent lamps and incandescent reflector lamps.

Therefore, EISA effectively required that efficiency standards were only applicable to traditional 40W, 60W, 75W, and 100W A-line bulbs.

Backstop requirement. EISA included several backstop requirements. Some backstop requirements impacted specific bulb types, but the commonly known backstop requirement—which has been the subject of debate—is related to the GSL efficiency standard. Beyond the initial standard that rolled out 2012-2014, EISA required DOE to conduct a rulemaking process to make a determination on whether that standard should be increased further.

[2] EISA. 1/4/2007. https://www.govinfo.gov/content/pkg/BILLS-110hr6enr/pdf/BILLS-110hr6enr.pdf. Section 321, pages 82-83.

[3] EISA. 1/4/2007. https://www.govinfo.gov/content/pkg/BILLS-110hr6enr/pdf/BILLS-110hr6enr.pdf. Section 321, page 85.

If DOE made a determination to amend the standard, a final rule with the new standard was to be published no later than January 1, 2017, and it would have an effective date no sooner than three years after the publication date. In the event that DOE did not complete the prescribed rulemaking by January 1, 2017, EISA included a backstop requirement that would prohibit the sale of any GSL that does not meet a minimum efficiency standard of 45 lm/W effective with the sale of products on or after January 1, 2020.

When and if this backstop was triggered has been a source of debate: Was the 45 lm/W backstop requirement automatically triggered when DOE did not release a new efficiency standard by January 1, 2017? Some stakeholders have contended that it was. However, this is inconsistent with the fact that other backstop requirements were implemented, but at a later date than what was specified by EISA, and only after DOE followed the required process of law to enact those backstops, which requires a final rule[4] to be published in the *Federal Register*.[5] The 45 lm/W backstop requirement never underwent that process of law. DOE addresses this backstop in the recent final rule, as explained later.

General service lamp definitions, 2017

On January 19, 2017, DOE published two new GSL definitions as final rules in the *Federal Register*, which expanded the GSL definition to include essentially any medium or candelabra screw base bulb found in a residential application. Exhibit A demonstrates the difference between the original EISA and January 2017 GSL definitions. While these definitions were published as final rules in 2017, the effective date was January 1, 2020.

EXHIBIT A: GSL DEFINITIONS

EISA and September 2019

Active definition

January 2017

Effective 1/1/20

[4] The 'final rule' is the publication of an enforceable law. It includes an explanation of why the rule is necessary, provides an effective date, states the basis and purpose of the rule (the goals or problems the rule will address), and identifies the agency's legal authority for issuing the rule.

[5] The *Federal Register* is a daily publication of the U.S. federal government that issues proposed and final administrative regulations, providing clarity on what regulations are effective and enforceable.

General service lamp final rule, 2019

On September 5, 2019, DOE issued a final rule to the *Federal Register*, "Energy Conservation Program: Definition for General Service Lamps."[6] This publication is a final rule, meaning that it is enforceable law that provides official guidance for light bulbs. Legal challenges to this final rule were initiated on November 4, 2019, by way of two lawsuits. The court system will resolve the lawsuits, but the legal process and proceedings will take time. Unless or until the courts revise or reverse any part of the final rule, it is the guiding document for lighting regulations. This final rule addressed three items, as described below: the GSL definition, the 45 lm/W backstop, and federal preemption, which addresses state-specific efficiency standards. The final rule does not make a determination for whether efficiency standards should be amended. DOE states in this final rule that it "will make that determination in a separate rulemaking."[7]

EISA and September 2019

Active definition

GSL definition

In the September 5th final rule, DOE withdrew the two January 2017 GSL definitions that were scheduled to take effect on January 1, 2020. By withdrawing those definitions, the existing EISA definition that is in effect today will remain in effect. Since the final rule eliminates definitions that were not yet effective, there will be no change in the market. Existing efficiency standards will continue to apply to 40W, 60W, 75W, and 100W A-line bulbs. Table 2 shows the impact to utility programs as a result of this definitional ruling.

TABLE 2. UTILITY PROGRAM VIABILITY

Bulb type	Part of GSL definition?	Viable for utility programs?
40W, 60W, 75W, 100W A-line	Yes	Yes, unless efficiency standards change
Directional & decorative	No	Yes, regardless of a change to efficiency standards

Rationale and objections

DOE stated that the January 2017 definitions "included certain GSLs and GSILs in a manner that is not consistent with the best reading of the statute."[8] On February 11, 2019—prior to the publication of the final rule—DOE released a notice of proposed rulemaking (NOPR) announcing its intent to maintain the existing regulatory definition.

[6] "Energy Conservation Program: Definition for General Service Lamps." 9/05/2019. https://www.govinfo.gov/content/pkg/FR-2019-09-05/pdf/2019-18940.pdf.

[7] "Energy Conservation Program: Definition for General Service Lamps," page 2. 9/5/2019. https://www.govinfo.gov/content/pkg/FR-2019-09-05/pdf/2019-18940.pdf.

[8] "Energy Conservation Program: Definition for General Service Lamps," page 2. 9/5/2019. https://www.govinfo.gov/content/pkg/FR-2019-09-05/pdf/2019-18940.pdf.

In the NOPR, DOE stated it "determined that the legal basis underlying those [January 2017] revisions misconstrued existing law," and its intent was to bring the definition into compliance.[9]

In response to this NOPR, some efficiency advocates and other stakeholders provided objections. As presented in the September 5th release, those opposed include Earthjustice, the Natural Resources Defense Council (NRDC), Sierra Club, the Appliance Standards Awareness Project (ASAP), the California Energy Commission (CEC), Pacific Gas & Electric (PG&E), San Diego Gas & Electric (SDG&E), and the Attorneys General of California, New York, New Jersey, Oregon, Colorado, Connecticut, Illinois, Maine, Maryland, Michigan, Minnesota, North Carolina, Vermont, Washington, the Commonwealth of Massachusetts, the District of Columbia, and the City of New York.

The final rule presented many of the objections and the rationale behind those objections. One prominent objection relates to the anti-backsliding provision from the Energy Policy and Conservation Act (EPCA), [10] which bars decreases in energy efficiency. Those citing the anti-backsliding provision state that as a result of revising the GSL definition to remove some bulb types, those bulb types will not be subject to efficiency standards, and therefore they will be subject to a weaker standard or no standard at all. DOE addressed the anti-backsliding concern by pointing to the legality of the January 2017 definitional changes, stating that "the government cannot illegally backslide from a position it could not legally stand upon in the first place."[11]

On November 4, 2019, objections to the final rule were made official by way of two lawsuits filed against DOE. One lawsuit was filed by a group of agencies including NRDC, Earthjustice (representing the Sierra Club, Consumer Federation of America, and Massachusetts Union of Public Housing Tenants), the U.S. Public Interest Research Group, and Environment America.[12] The second lawsuit was led by Attorneys General in New York (Letitia James) and California (Xavier Becerra), and included Colorado, Connecticut, Illinois, Maryland, Massachusetts, Maine, Michigan, Minnesota, New Jersey, Nevada, Oregon, Vermont, Washington state, New York City, and Washington D.C.[13]

[9] "Energy Conservation Program: Energy Conservation Standards for General Service Lamps," notice of proposed rulemaking (NOPR), page 1. 2/11/2019. https://www.govinfo.gov/content/pkg/FR-2019-02-11/pdf/2019-01853.pdf.

[10] The Energy Policy and Conservation Act of 1975 (EPCA) is a U.S. Act of Congress, which was a response to the 1973 oil crisis, and intended to provide energy efficiency, among other things.

[11] "Energy Conservation Program: Definition for General Service Lamps," page 4. 9/5/2019. https://www.govinfo.gov/content/pkg/FR-2019-09-05/pdf/2019-18940.pdf.

[12] United States Court of Appeals for the Second Circuit. Petition for Review. 11/4/2019. https://www.nrdc.org/sites/default/files/nrdc-petition-department-energy-20191104.pdf.

[13] United States Court of Appeals for the Second Circuit. Petition for Review. 11/4/2019. https://ag.ny.gov/sites/default/files/2019_11_04_petition_for_review_gsl_definition_rule_withdrawal_final.pdf.

With the filing of these lawsuits, we now know that the courts will be responsible for determining whether there will be any changes to the final rule. However—unless the courts decide to overturn the final rule and until that determination is made—the GSL definition as defined in the September 5th final rule is the enforceable law.

Considering the November 4, 2019, date of the lawsuits, it will likely be no sooner than the second half of 2020 before the courts rule. If the courts make a determination that will impact market availability of light bulbs, an implementation timeframe must be considered to understand when a change in the market is possible. ICF estimates that an implementation timeframe would require at least one year, which makes late 2021 the earliest possible date of change in the market. The considerations for this timeframe are discussed later, under "Impact of the final rule on the market."

45 lm/W backstop

The final rule states that the 45 lm/W backstop requirement was not triggered. The efficiency standard for GSLs therefore will not change unless a separate regulatory action creates a new, enforceable standard that's published as a final rule in the *Federal Register*—or unless legal action reverses DOE's decision. This means that the market will continue to have the same ability to sell LED, CFL, halogen, and exempted incandescent light bulbs.

If there is a change to standards as a result of regulatory or legal action, the same timeframe as described for the GSL definition applies. Based on communication with a range of lighting manufacturers, ICF estimates that industry would need at least one year for the implementation timeframe. If there is a change caused by the November 2019 lawsuits, it will likely be no sooner than the second half of 2020 before the courts rule. That makes late 2021 the earliest possible date of change in the market. If there is a change spurred by regulatory activity, that timeline could begin slightly earlier or later, depending on the course of action and related activities.

Rationale and objections

DOE's rationale for this ruling is based on two things. First, its interpretation of the EISA backstop requirement is premised on DOE making a determination that the GSIL standards should be amended. In other words, the backstop was not triggered by DOE simply failing to publish a final rule on standards. DOE first had to make a determination that the standards required an amendment. Since DOE never made that determination, the backstop was not triggered.

EISA included multiple backstops, including backstops specific to five exempt bulb types. If the sales rates of any of those bulbs exceeded allowed rates, DOE was required to issue standards for the affected bulb(s). If DOE failed to issue standards, the related backstop was to go into effect. Vibration service and rough service bulbs met the conditions for standards to be put into place, but DOE did not issue standards.

Given these circumstances, the related backstops should have been implemented. That action would have prohibited those bulbs from exceeding 40W and limited sales to single packs only (no multipacks). However, the backstops were not automatically enacted. New regulations were not put into place until DOE published a final rule for standards on vibration service and rough service bulbs in the *Federal Register* on December 26, 2017;[15] the final rule became effective January 25, 2018. This demonstrates the necessary activity DOE took for those backstops to move from EISA legislation to implementation.

Second, DOE cited the process of law as a reason for the backstop not being automatically triggered. The 45 lm/W backstop cannot go into effect without following the proper process of law[14]. DOE pointed to the final rule for the backstops of the vibration service and rough service bulbs as a demonstration of that process. See the sidebar for detail on these backstops.

Opposition to DOE's position on the 45 lm/W backstop is due to the belief that it was automatically triggered on January 1, 2017, because of DOE's failure to complete the standards rulemaking as required. Opponents also asserted that the backstop does not require the legal process cited by DOE, but rather it should be treated as administrative formality.

With regards to the backstop, DOE states that it will need to be addressed in a future rulemaking, but only if the Secretary determines that the GSIL standards need to be amended. DOE also stated in this final rule that it will address efficiency standards for bulbs in a separate rulemaking. DOE's second publication to the *Federal Register* on September 5, 2019, addresses standards for GSILs. This is explained in the following section, "DOE notice of proposed determination on GSIL standards."

State-specific standards and preemption

The final rule also clarified that states are prohibited from creating a state-specific efficiency standard that exceeds the federal standard. This clarification was needed because five states have established state-level efficiency standards for light bulbs. Four of those states passed laws to require an efficacy of 45 lm/W beginning January 1, 2020: Colorado, Nevada, Washington, and Vermont. California's legislation has already been implemented, requiring an efficacy of 45 lm/W for GSLs beginning on January 1, 2018, and higher efficacy for general service LEDs.

Rationale and objections

DOE cites federal preemption as the rationale for this direction. Preemption refers to the principle that the federal law preempts—or invalidates—state law when there is a conflict between federal and state laws.

[14] ICF's Reg Map® provides a "Guide to the U.S Federal Informal Rulemaking Process." https://www.icf.com/resources/reports-and-research/2018/reg-map.

[15] Simmons, Daniel R. United States Government. Energy Efficiency and Renewable Energy. 12/26/2017 Energy Conservation Program: Energy Conservation Standards for Rough Service Lamps and Vibration Service Lamps. Final rule. Washington, DC. https://www.govinfo.gov/content/pkg/FR-2017-12-26/pdf/2017-27744.pdf.

Due to preemption, the federal efficiency standard supersedes state standards and prohibits states from creating more stringent standards.

Therefore, no state has the legal authority to enforce a standard that is more stringent than the federal standard. This includes California and Nevada, for which EISA provided special preemption considerations that would have allowed them to implement the federal efficiency standard as much as two years earlier than the federal effective date. However, DOE stated that those conditions were not met.

In response to the February 2019 NOPR, a few opponents commented that some states will resume their own regulation of bulbs if there is not a more stringent federal standard, noting that this would create difficulties for retailers to implement compared to a single national standard. The final rule stated that this patchwork approach will not be required. Since federal preemption overrules state standards, it essentially creates a national approach for retailers. With federal preemption, a federal court may intervene to bring a state into compliance with the federal law if it tries to enforce a more stringent state standard. Particular states may also file lawsuits in an effort to implement more stringent standards. This issue may also be addressed through the legal process with the November 4th lawsuits. Therefore, the question of whether states can implement their own standards may be addressed by the court system as well.

DOE notice of proposed determination on GSIL standards

The second item DOE posted to the *Federal Register* on September 5th pertaining to light bulbs was a NOPD and request for comment.[16] In the NOPD, DOE announced its initial determination that no changes are needed for GSIL standards. EISA required DOE to undertake a rulemaking to determine whether GSIL standards should be amended. As a result of DOE's analysis, its recommendation is to have GSIL standards remain unchanged. This would result in no change in the market for GSILs.

In making the proposed determination to maintain current standards for GSILs, DOE considered whether an increased standard would be technologically feasible, would save a considerable amount of energy (for products that were technologically feasible), and would be economically justified. Additionally, DOE conducted a manufacturer impact analysis. As a result of these analyses, DOE determined that GSIL standards do not need to be amended because it would not be economically justified and because it would not save a significant amount of energy.

[16] Energy Conservation Program: Energy Conservation Standards for General Service Lamps. Notice of proposed determination and request for comment. 9/05/2019. https://www.federalregister.gov/documents/2019/02/11/2019-01853/energy-conservation-program-energy-conservation-standards-for-general-service-lamps.

The NOPD is a step in the regulatory process whereby DOE formally and publicly announced the results of its analysis on GSIL efficiency standards. A comment period was open until November 4, 2019, and many comments and information were submitted by both those in support of and opposed to the NOPD. DOE held a public meeting on October 15, 2019, where it presented some details from the NOPD and received questions from stakeholders.

With the comment period closed, DOE is reviewing the information submitted. There are no timing guidelines or requirements for this review phase, but it will likely take several months before DOE announces the next step. For example, after DOE issued the NOPR proposing to withdraw the GSL definitions on February 11, 2019, nearly seven months elapsed before the final rule was issued on September 5, 2019. The next step from the NOPD could take more or less time, but ICF projects that it will likely be well into 2020 before there is a determination on whether a final rule will be issued for GSIL standards.

The November 4th lawsuits do not apply to the NOPD, as legal action cannot be taken until DOE makes a final determination. The platform for formally opposing the NOPD is submitting comments during the comment period.

Impact of the final rule on the market

Prior to DOE's September 5th final rule, there was uncertainty over what the light bulb market would look like beginning January 1, 2020. That was the recorded effective date for both the January 2017 GSL definitions and the 45 lm/W backstop.

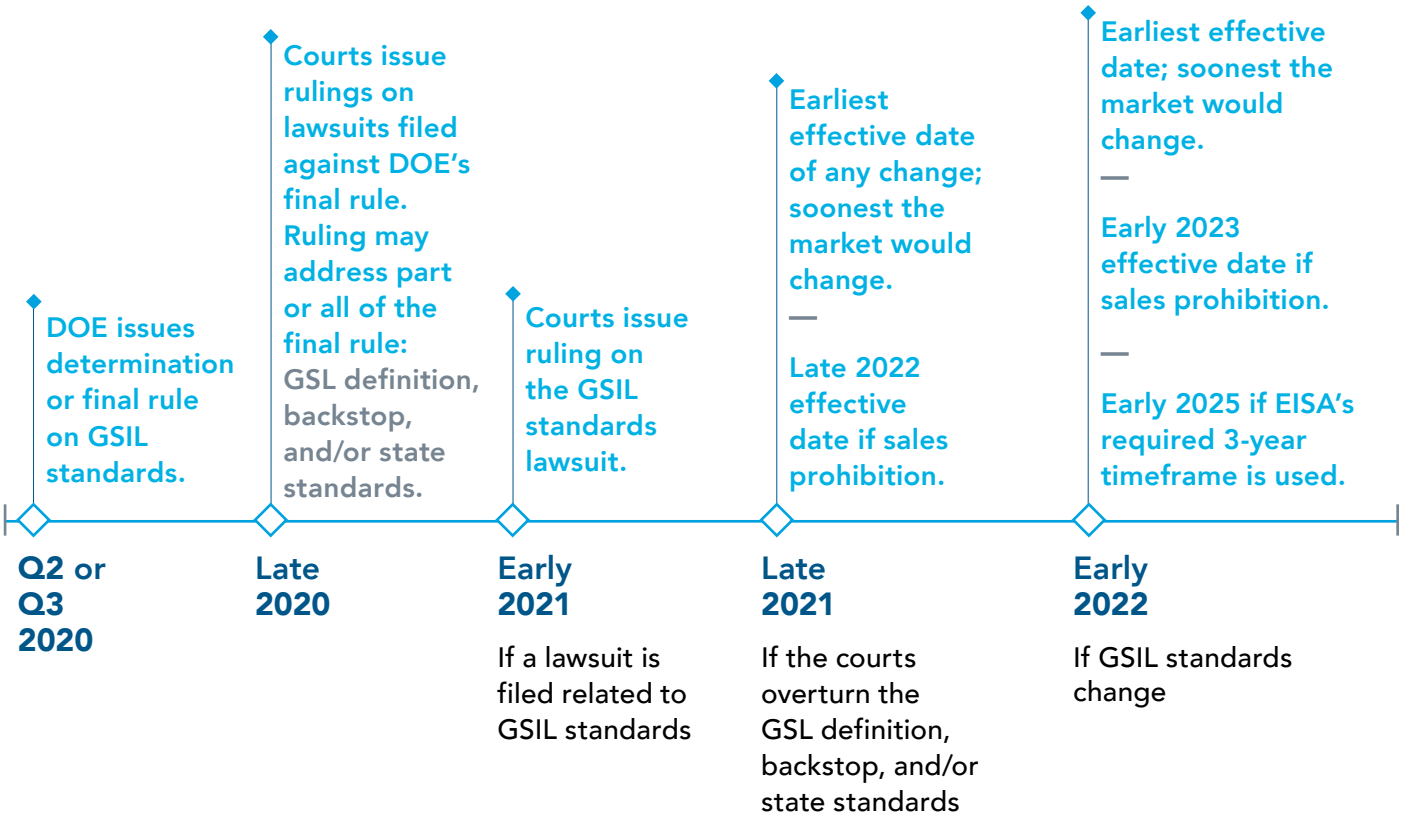
The September 2019 final rule provides clarity to stakeholders: the light bulb market will not change. A-line 40W, 60W, 75W, and 100W light bulbs will continue to be subject to the EISA efficiency standards that rolled out 2012-2014. Therefore, halogen A-line 40W, 60W, 75W, and 100W light bulbs will continue to be available.

The November 2019 lawsuits challenge DOE's final rule, which may impact any or all of the final rule's three components: GSL definition, 45 lm/W backstop, and state-specific standards. Before these lawsuits were filed, the American Council for an Energy-Efficient Economy (ACEEE)[17] issued a press release stating that "a range of attorneys general as well as the Natural Resources Defense Council, Earthjustice, and many other organizations spoke out against DOE's plan to roll back the scope of standards and will undoubtedly consider legal challenges." Now that lawsuits have been filed, the decision of whether to uphold or overturn one or more elements of this final rule will go to the court system. ICF expects the legal process to take at least one year to reach resolution, so it is unlikely the courts will make a determination prior to the second half of 2020.

[17] *DOE's Light Bulb Standards Rollback Will Cost Americans $14 Billion Each Year.* ACEEE. 9/4/19. https://aceee.org/press/2019/09/doe-s-light-bulb-standards-rollback

The courts may decide to uphold all components of the final rule, leading to no changes in the market and no impact on the viability of residential utility lighting programs. However, in the event that the courts overturn any component of the final rule, an immediate effective date would not be feasible. Retailers and manufacturers would require time to prepare for a change of such magnitude—a conversion of the entire U.S. market to LED bulbs[18]. Industry would need to rid itself of the ineligible halogen and incandescent products, which includes selling all inventory of manufactured product that is available on retail shelves or at manufacturer warehouses, as well as components and parts farther back in the supply chain.

EXHIBIT B: ICF PROJECTS THE FOLLOWING TIMELINE



[18] CFLs would also comply with a higher 45 lm/W standard. However, market share dropped to 4.3% for CFL A-line bulbs as of the second quarter of 2019 and is essentially non-existent for other bulb types, and there is no indication that market share for CFLs will increase. Market share is based on the "A-line Index" published by the National Electrical Manufacturers Association (NEMA). *LED A-line, Halogen, and CFL Lamp Shipments Decrease in Second Quarter 2019 Compared to First Quarter 2019.* NEMA. https://www.nema.org/Intelligence/Indices/Pages/LED-A-line-Halogen-and-CFL-Lamp-Shipments-Decrease-in-Second-Quarter-2019-Compared-to-First-Quarter-2019.aspx.

Industry would also need time to significantly increase LED production. Changing to what would essentially become an LED-only market (given the extremely low market share of CFLs) would be an enormous undertaking. It would require an appropriate amount of time for preparation of the entire supply chain, from procuring components and negotiating those contracts, to retooling factories, assembling and manufacturing new products, shipping products from Asia to the U.S., receiving new products through domestic warehouses, all the way to placement of products on retail shelves for consumers to purchase. There is a lot of ground to cover to convert the entire U.S. market. Important points to consider are avoiding disruption in the availability of products on retailer shelves for consumer purchases, as well as preventing a significant financial hardship to retailers and manufacturers.

If there is a new standard—and the effective date is based on the date a product is manufactured or imported by (which is the common practice)—ICF estimates a minimum of one year is required for industry to prepare for the transition of products, with potentially more or less time for certain product types. In the event of a sales prohibition, which was the condition of the 45 lm/W backstop, additional time would be required, possibly up to two years. Additionally, EISA required a minimum of three years between the announcement of a new standard and the effective date. This three-year timeline may also be taken into consideration if there is a new standard.

ICF projection on standards. Based on both publicly available information (including the DOE September 5, 2019, release) and conversations with lighting retailers and manufacturers, ICF projects that there will not be a change to the GSL definition or efficiency standards in effect and enforceable at any point in 2020. This assessment considers the timeline for resolution of the lawsuits and the reasonable amount of time it would take for industry to adjust if a change were imposed. This also considers the regulatory process if DOE were to make a determination to create new efficiency standards.

Potential impact on utility-funded residential lighting programs. From the perspective of program planning for utilities, halogen A-line bulbs will be available beyond January 1, 2020. As a result, standard A-line LEDs will continue to be viable for utility programs in the near future unless there are changes to the standards or GSL definition. If the courts overturn any of the decisions, industry would need time to come into compliance, which would require a minimum of one year. This pushes the earliest possible effective date to late in 2021, making utility programs viable at least through the same timeframe. ICF considers these to be conservative estimates, as many variables could potentially delay the process and related timelines.

Given DOE's clarifications in the final rule, the light bulb market will continue to look the same as today for the foreseeable future. Therefore, utilities would benefit from including residential lighting in programs in the short-term and building in flexibility for the long-term.

Market data and utility programs

Should utilities continue to provide funding for residential lighting programs amidst the ongoing confusion with the regulatory environment? To answer this question, it is critical to understand the impact of utility programs on the light bulb market. Industry partners have consistently shared data with ICF providing evidence that:

- Stores with a utility program sell more LEDs than stores with no utility program.
- Stores with a utility program that sell halogens/incandescents consistently sell fewer halogens/incandescents than stores with no utility program.
- When a utility program is turned on, LED sales increase and halogen/incandescent sales decrease.
- When a utility program is turned off, halogen/incandescent sales increase and LED sales decrease.

One measurement that can help demonstrate the impact of utility programs is the comparison of light bulb sales in retail stores that have a utility program ("utility stores") to retail stores that have no active utility program ("non-utility stores"). Comparing sales rates of LED, CFL, halogen, and incandescent bulbs in utility stores to sales rates in non-utility stores provides a good indication of the level of influence that utility programs have on consumer purchasing behavior.

ICF has worked with retailers and manufacturers across a variety of retail outlets to obtain data showing the sales of bulbs in utility stores compared to sales in non-utility stores. While data consistently shows that stores with a utility program sell more LEDs and fewer halogens and incandescents than stores with no utility program, the differences in sales rates can vary greatly. Many factors can influence the level of impact on sales rates, including the value of the incentive, final retail price the consumer pays, product placement within the store, availability of inventory in the store, and marketing (i.e. point of purchase signs in the light bulb department). This makes it difficult to pinpoint an "average" impact on sales in utility versus non-utility stores.

When comparing utility to non-utility stores, LED sales in utility stores range from about 65% to more than 200% higher than LED sales in non-utility stores, with about 100%–105% being the most common sales lift reported. Data has also shown that LED sales often increase by 100% or more when a utility program is turned on for a particular retail store, compared with the sales rate preceding program activation. These findings demonstrate a large increase in sales of LED products where there is a utility program, whether compared to the same store prior to a program being executed or to stores with no utility program.

Sales data is highly confidential, and specific data cannot be shared or published. The data presented here is not comprehensive and cannot be considered conclusive. However, all data considered has been directionally consistent and provides indication of the impact of utility programs on the sales of LED, halogen, and incandescent bulbs. There has been no "outlier" data that contradicts this assessment. The conclusion drawn from this data is very important: without utility programs, customers will purchase more halogens and incandescents and fewer LEDs. If utility programs end prior to a regulatory change, evidence indicates that it will result in reduced LED sales and increased halogen and incandescent sales, and therefore, increased power consumption.

While there is an expectation that a utility program will drive higher sales rates for LEDs, data has also shown that utility programs have been successful at reducing the sales of halogen and incandescent bulbs. Since the rate of LED sales impacts the rate of halogen and incandescent sales, the same factors influencing LED sales (listed above) have an impact on halogen and incandescent sales. Data has shown that utility stores sell 22–26% fewer halogen and incandescent bulbs than non-utility stores. Data has also shown a similar rate of increase in halogen and incandescent sales when utility programs are turned off and the retail prices of LED bulbs are increased.

Conclusion

ICF recommends the continuation of residential utility lighting programs through late 2021 at a minimum. After 2021, utilities should remain flexible and keep the option available to fund residential lighting programs, as program viability is very possible after 2021. Further analysis of market conditions would need to be considered for continuation beyond 2023.

There are still some unknowns related to the future, but there is better clarity today than we've had for quite some time. The final rule and market data help inform utility program planning for the immediate future. The landscape for light bulbs continues to evolve, so flexibility is crucial. Based on data from partners, there is evidence that utility programs are very effective at driving purchases of LED bulbs and reducing purchases of halogen and incandescent bulbs. If residential utility programs are ended prior to a regulatory change, the market faces a very high risk—and likelihood—of more halogens and incandescents and fewer LEDs being purchased, pushing more energy consumption onto the grid.

The final rule DOE issued on September 5, 2019, provides clarity on the GSL definition, the 45 lm/W backstop, and state-specific standards. The lawsuits filed on November 4, 2019, from those opposed to the final rule may create changes to the light bulb market, but it will be several months (estimated to be the second half of 2020) before the courts make a determination. If changes impact the bulb types that can be sold, the effective date will be no sooner than late 2021, which will allow retailers and manufacturers time to come into compliance. If DOE does not proceed with the NOPD and therefore proceeds with a rulemaking process for GSIL standards, that process will take time. Likewise, if DOE does proceed with the NOPD and passes a final determination that GSIL standards will not change, legal opposition is likely. In either scenario, ICF projects that there will be no change to GSIL standards that will be effective in the market any sooner than late 2021.

If the GSL definition and efficiency standards do not change, market share and consumer purchasing behavior are the best indicators to determine the lifetime of residential utility programs. In this scenario, utility programs should plan for an eventual (not immediate) shift away from standard A-lines and toward specialty bulbs.

At the point in the future when the market saturation of LEDs increases, there will be remaining opportunity for standard A-lines for first-time LED customers by targeting low income, hard-to-reach, or otherwise disadvantaged customers. These customers can be reached through outlets such as dollar chains, independent hardware, and marketplaces.

Even after A-lines are transitioned and reach market saturation, decorative bulbs will continue to have viability for utility programs because LED market share of decorative bulbs is significantly behind LED market share of standard A-line bulbs.

Author Bio

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