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Docket Number: 17-AAER-07*

**Statewide Utility CASE Team Response to Draft Staff Report on: General Service Lamps (Expanded Scope)**

*Additional submitted attachment is included below.*

# General Service Lamps (Expanded Scope)

Codes and Standards Enhancement (CASE) Initiative  
For PY 2018: Title 20 Standards Development

Response to Draft Staff Report on:  
**General Service Lamps (Expanded Scope)**  
17-AAER-07

September 17, 2018

Prepared for:



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ELECTRIC COMPANY



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## Executive Summary

The California Energy Commission's (Energy Commission) proposal to expand the scope of general service lamps by aligning with the federal definitions and requirements will result in an unprecedented amount of energy savings and progress towards California's climate goals. The Statewide Codes and Standards Enhancement Team strongly supports the Energy Commission's proposal and provides the following recommendations for refining and adopting it.

- The Energy Commission should adopt the definitions and backstop language as proposed, aligning with United States Department of Energy on the scope and sales prohibition.
- The Energy Commission should adopt the proposed expanded scope definitions as soon as possible and consider the earliest possible effective date, because the energy and cost savings from this measure are disproportionately significant relative to other appliance efficiency standards regulated by the Energy Commission through California's Appliance Efficiency Regulations, Title 20, and delays may lead to market uncertainties.
- The Energy Commission should revise assumptions that are too conservative, thereby undervaluing key measure evaluation parameters, such as the luminous efficacy, rated lifetime, and incremental cost of qualifying products.
- The Energy Commission should consider that replacement lamps are technically feasible and replacement products are readily available.

## I. Introduction

The Codes and Standards Enhancement (CASE) initiative presents recommendations to support California Energy Commission’s (Energy Commission) efforts to update California’s Appliance Efficiency Regulations (Title 20) to include new requirements or upgrade existing requirements for various technologies. Three California Investor-Owned Utilities (IOUs) – Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE) – sponsored this effort (herein referred to as the Statewide CASE Team). The program goal is to prepare and submit recommendations that will result in cost-effective enhancements to improve the energy and water efficiency of various products sold in California. This CASE document is a response to the Energy Commission Draft Staff Report for general service lamps (GSL).

The California IOUs have worked with the lighting industry for years to advance the market adoption of energy-efficient lighting. We have invested millions of dollars towards incentive programs in support of high-efficacy lamps, assisting in the maturation of the most efficient and highest-performing lighting technologies. As part of this long-term strategy, the Statewide CASE Team advocates for standards that lock in savings and prevent backsliding of energy conservation measures.

The state and national transitions from low-efficacy incandescent and halogen light sources to higher-efficacy light-emitting diodes (LEDs) has and will continue to yield an unprecedented amount of energy savings. The Statewide CASE Team believes that the California market is already prepared to complete this transition. Over the last decade, LED prices have reduced drastically, product diversity has increased significantly, and consumer acceptance is now widespread, with over a third of national lamp shipments being LEDs (NEMA 2018), and with some national retailers selling exclusively LED lamps. The Energy Commission’s proposal to expand the scope of GSLs by aligning with the federal definitions and requirements effectively completes this transition and will result in significant progress towards California’s climate goals. The Statewide CASE Team strongly supports the Energy Commission’s proposal and provides the following recommendations for refining and adopting it.

## II. Recommendations

### 1. The Energy Commission should adopt the definitions as proposed, aligning with United States (U.S.) Department of Energy (DOE).

U.S. Congress (Congress) enacted the Energy Independence and Security Act (EISA) in 2007, which defined “general service lamp” to include general service incandescent lamps, compact fluorescent lamps, general service LEDs, and “any other lamps that the Secretary determines are used to satisfy lighting applications traditionally served by general service incandescent lamps.”<sup>1</sup> In addition to establishing standards, the EISA statutes require U.S. DOE to determine whether “the exemptions for certain incandescent lamps should be maintained or discontinued.”<sup>2</sup> U.S. DOE was acting within the context of these two clauses when it finalized new definitions for GSLs in the

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<sup>1</sup> 42 U.S.C. §6291(BB)(i)(IV)

<sup>2</sup> 42 U.S.C. §6295(i)(6)(A)(i)

January 19, 2017, GSL Final Rules,<sup>3</sup> thereby clarifying which lamp types the Secretary (U.S. DOE) has determined to fall within the definition of GSLs.

The Statewide CASE Team, in conjunction with industry and other lighting experts, worked closely with U.S. DOE to determine which lamp types are typically used in general service lighting applications, as well as which specialty lamps are not used in general service lighting, and should thus be exempt from the GSL definition. The Statewide CASE Team leveraged its years of experience administering lighting rebate programs, developing lighting standards for buildings codes (i.e., California Title 24), conducting appliance saturation surveys, and participating in other activities to provide U.S. DOE with input on lamp types typically used for general service lighting. The revised federal definitions for GSLs in the Final Rules (and in effect the definitions proposed by the Energy Commission) reflect consumer usage behaviors and are therefore consistent with Congress's intent to prohibit the sale of (ban) low-efficacy lighting for general service applications. For these reasons, the Statewide CASE Team supports the Energy Commission's proposal to align definitions with those determined by the Secretary.<sup>4</sup>

## **2. The Energy Commission should adopt the backstop language as proposed, aligning with U.S. DOE by implementing a sales ban.**

Congress also enacted in EISA a failsafe mechanism (i.e., backstop requirement), to ensure that low-efficacy general service lighting would be banned nationally by January 1, 2020, should U.S. DOE fail to finalize by January 1, 2017, a rule that results in at least the energy savings of a minimum 45 lumen-per-watt (LPW) requirement. Since U.S. DOE did not finalized any GSL standards,<sup>5</sup> the “backstop requirement” has been triggered:

42 U.S.C. §6295(i)(6)(A)(v)

BACKSTOP REQUIREMENT.—IF THE SECRETARY FAILS TO COMPLETE A RULEMAKING IN ACCORDANCE WITH CLAUSES (I) THROUGH (IV) OR IF THE FINAL RULE DOES NOT PRODUCE SAVINGS THAT ARE GREATER THAN OR EQUAL TO THE SAVINGS FROM A MINIMUM EFFICACY STANDARD OF 45 LUMENS PER WATT, EFFECTIVE BEGINNING JANUARY 1, 2020, THE SECRETARY SHALL PROHIBIT THE SALE OF ANY GENERAL SERVICE LAMP THAT DOES NOT MEET A MINIMUM EFFICACY STANDARD OF 45 LUMENS PER WATT.

The Statewide CASE Team believes that standards based on date of sale, without regard for date of manufacture, would bring clarity regarding which products can be sold and lead to long-term market benefits. Because the date of manufacture is typically provided in a manufacturer-specific date code, it is not readily accessible to all market actors. This leaves significant uncertainty as to whether a product was manufactured before or after the effective date of the standard. Since the Title 20 standards apply to “any person, including a retailer, manufacturer, contractor, importer or distributor, that sells or offers for sale an appliance,”<sup>6</sup> a sales ban, particularly one that effectively prohibits the sale of a distinct technology, can be more effectively heeded by conscientious consumers, retailers, and distributors. This will lead to improved compliance rates, which will ultimately yield energy savings. The Statewide CASE Team thus supports the Energy Commission's

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<sup>3</sup> 82 F.R. 7276 and 82 F.R. 7322

<sup>4</sup> 10 e-C.F.R. §430.2 Amendments published January 19, 2017

<sup>5</sup> U.S. DOE Docket EERE-2013-BT-STD-0051

<sup>6</sup> 20 C.C.R. §1609(a)

proposal to implement a sales ban, thereby aligning with the national ban that will go in effect on January 1, 2020.

### **3. The Energy Commission should adopt the proposed expanded scope definitions as soon as possible and should consider the earliest possible effective date.**

In recognition of California’s leadership in energy conservation, Congress also granted California the right to adopt the backstop requirement as early as January 1, 2018:

42 U.S.C. §6295(i)(6)(A)(vi)

(VI) STATE PREEMPTION.—NEITHER SECTION 6297(B) OF THIS TITLE NOR ANY OTHER PROVISION OF LAW SHALL PRECLUDE CALIFORNIA OR NEVADA FROM ADOPTING, EFFECTIVE BEGINNING ON OR AFTER JANUARY 1, 2018—

(I) A FINAL RULE ADOPTED BY THE SECRETARY IN ACCORDANCE WITH CLAUSES (I) THROUGH (IV);

(II) IF A FINAL RULE DESCRIBED IN SUBCLAUSE (I) HAS NOT BEEN ADOPTED, THE BACKSTOP REQUIREMENT UNDER CLAUSE (V); OR

(III) IN THE CASE OF CALIFORNIA, IF A FINAL RULE DESCRIBED IN SUBCLAUSE (I) HAS NOT BEEN ADOPTED, ANY CALIFORNIA REGULATIONS RELATING TO THESE COVERED PRODUCTS ADOPTED PURSUANT TO STATE STATUTE IN EFFECT AS OF DECEMBER 19, 2007.

The Energy Commission adopted standards for GSLs in 2008 under a narrower scope – predominantly only A-line lamps – because U.S. DOE had not yet conducted the rulemaking to revise the list of exempted lamp types. Once U.S. DOE finalized the revised GSL definitions, the Energy Commission released a Notice of Invitation to Participate in the GSL “expanded scope” pre-rulemaking on April 21, 2017.<sup>7</sup> The Statewide CASE Team subsequently recommended that the Energy Commission adopt the revised definitions as soon as possible to remain consistent with Congress’s original intent to regulate all general service lighting, and to allow California to do so by January 1, 2018.<sup>8</sup> Insomuch as this date has passed, the Statewide CASE Team encourages the Energy Commission to continue California’s leadership by considering adopting and enforcing the full scope of the GSL standards as early as possible. The following points emphasize the importance of doing so.

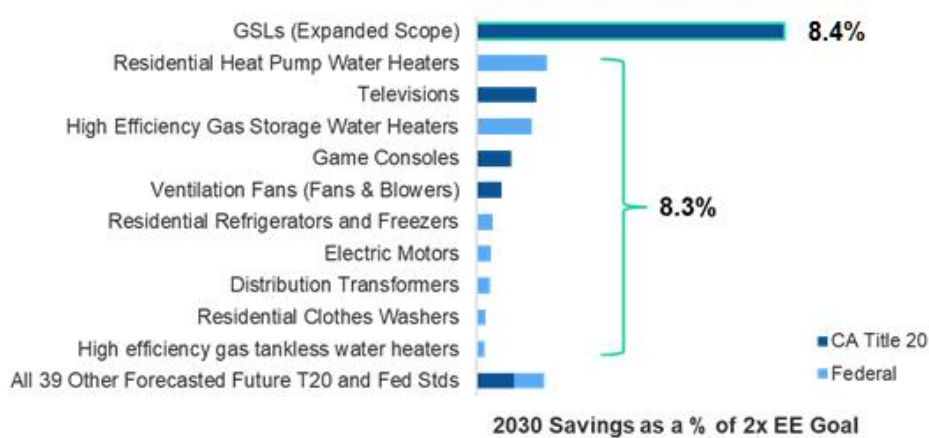
#### **A. The energy and cost savings from this measure are disproportionately significant relative to other appliance efficiency standards regulated by the Energy Commission through Title 20.**

As indicated by the Energy Commission’s analysis, the proposed revisions expanding the scope of the GSL efficacy requirements to other lamp types will lead to significant financial benefits for Californians. These benefits should not be understated. As shown in Figure 1, the projected 2030 energy savings from the proposed measure would achieve 8.4 percent of California’s 2030 “doubling efficiency” energy savings target established in California Senate Bill 350 (SB 350) (CEC 2017). Figure 1 also shows the projected 2030 energy savings from all the future appliance standards that were forecasted in the Energy Commission’s SB 350 Doubling Energy Efficiency Savings by 2030 Potential Study, which did not include this GSL expanded scope measure. On its own, the proposed measure can save more energy by 2030 than the next ten

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<sup>7</sup> CEC 2017. “Notice of Invitation to Participate and Staff Webinar Regarding Phase II Pre-Rulemaking”

<sup>8</sup> California IOU Comments Response to Invitation to Submit Proposals - General Service Lamps (Expanded Scope) (<https://efiling.energy.ca.gov/GetDocument.aspx?tn=221219>)



**Figure 1: Savings potential of future appliance standards towards California’s 2030 doubling of energy efficiency goal (SB 350).**

Source: CEC 2017. “Energy Commission’s SB 350 Doubling Energy Efficiency Savings by 2030 Potential Study.”

highest potential appliance standard savings combined (collectively only 8.3 percent of target). This comparison highlights the seriousness of any delay or impediment to the adoption of this staff proposal.

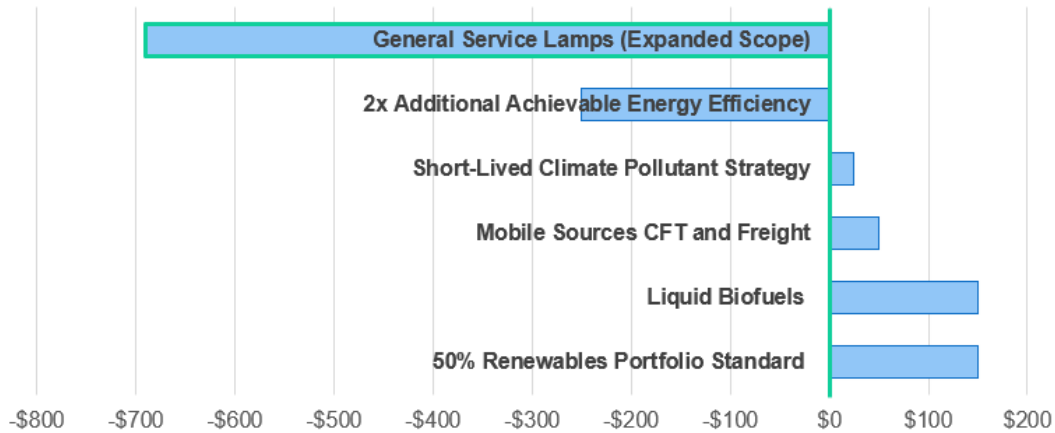
In addition, the proposed scope expansion is also exceptionally cost-effective by any reasonable measure and should therefore be a part of any least-cost plan to achieve California’s efficiency and greenhouse gas (GHG) emissions goals. Figure 2 compares the cost per metric ton of carbon dioxide (MtCO<sub>2</sub>) abated for the proposed measure to all other measures in the California Air Resources Board (CARB) 2030 Scoping Plan (other codes and standards initiatives fall within the “2x additional achievable energy efficiency” bar).<sup>9</sup> This shows that the proposed measure can yield more than twice the net economic benefits per MtCO<sub>2</sub> abated compared to the overall estimate for energy efficiency. Furthermore, because the cost per MtCO<sub>2</sub> eliminated is negative, any delay in enforcing this eventual measure would yield a net cost to California ratepayers. To put this in perspective, the Energy Commission should consider that for every month that the measure is *not* adopted, the GHG emissions equivalent of about 40,000 Californian vehicles is released into the atmosphere. Because CO<sub>2</sub> emissions persist in the atmosphere for up to 200 years (IPCC 2018), adopting the standard later will not nullify the damage caused by delay or inaction. To protect air quality and to minimize the accumulation of GHG pollution, we recommend that the Energy Commission adopt and enforce the proposed measure as soon as possible.

**B. Delays and inaction lead to market uncertainties.**

The national sales ban will take effect on January 1, 2020. The longer California’s definition remains different from the U.S. DOE determination, the longer retailers and consumers are in the dark about which products will be regulated. This prevents effective planning and increases potential of “stranded products” – lamps stuck in retail inventory up to the last minute. The proposed measure adopted as soon as possible will give clear direction, reducing these

<sup>9</sup> GSL electricity and monetary savings derived from the Energy Commission’s staff proposal analysis. GHG savings and costs were determined using GHG emissions and cost per MtCO<sub>2</sub> from CARB’s scoping plan (CARB 2017).





**Figure 2: Estimated cost per MtCO<sub>2</sub> abated by the proposed GSL measure. Negative values are extremely cost-effective.**

Source: Statewide CASE Team Analysis of California’s 2017 Climate Change Scoping Plan (CARB 2017).<sup>9</sup>

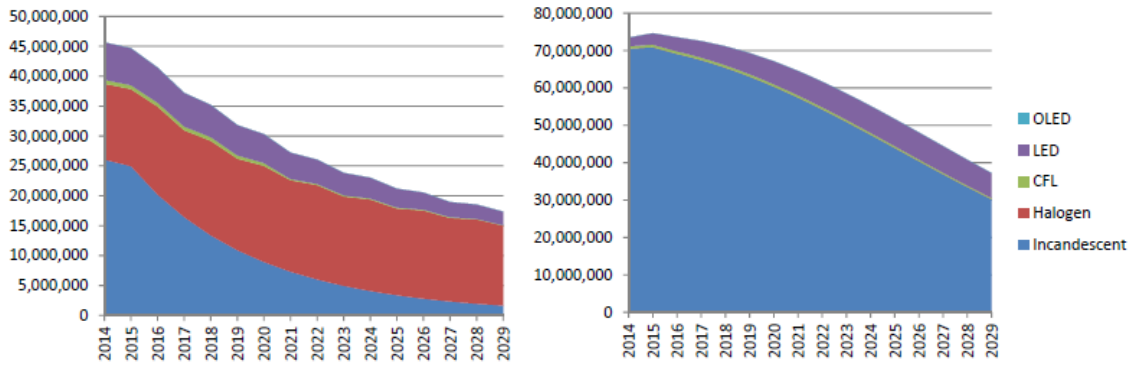
uncertainties and help utility programs to better work with manufacturers and retailers to incentivize lighting products. As noted above, this will lead to decisiveness and improved compliance rates, which will ultimately yield long-term market transformation.

**4. The Energy Commission should revise assumptions that are too conservative, thereby undervaluing the measure.**

While the Energy Commission’s analysis has proven the proposed measure to be extremely cost-effective, the Energy Commission noted that the assumptions in the analysis are very conservative. The Energy Commission further indicated during the August 28, 2018 Staff Workshop that the analysis assumptions were deliberately conservative to show that the benefits of the measure far outweigh its costs, even under conservative estimates. The Statewide CASE team understands that the Energy Commission’s strategy to demonstrate cost-effectiveness in the most conservative scenarios to justify adoption. However, this also has the effect of under-estimating the total savings that will be achieved from this measure and the total net present benefits to the state of California. We believe that in addition to demonstrating cost-effectiveness in conservative scenarios, the Commission should also establish savings and cost-effectiveness analyses for more typical use cases to better represent the impacts of this standard. The Statewide CASE Team recommends, to the extent that such adjustment do not delay measure adoption, the Energy Commission make the following adjustments.

**A. Qualifying products should be assumed to produce 80 lumens per watt.**

The Energy Commission assumed in the staff proposal analysis that the representative qualifying products would produce 45 LPW, which is equivalent to the minimum requirement. During the August 28, 2018 Staff Workshop, the Energy Commission further explained that part of the reason for using this conservative assumption, rather than considering that most products will in fact have efficacies that far exceed 45 LPW, was that the Energy Commission had already claimed the incremental savings beyond 45 LPW (up to 80 LPW) in the general service LED rulemaking (CEC 2015). However, that rulemaking only considered LED lamp shipments that



**Figure 3: Forecasted shipments of medium screw base directional (left) and candelabra (right) lamps in California 2014–2029.**

Source: CEC 2015. “Staff Report: Analysis of SDDL and General Service LED Lamp Efficiency.” Opportunities.”<sup>11</sup>

were forecasted prior to the DOE Final Rules, when directional and decorative lamps were not yet considered to be within the scope of the 45 LPW backstop requirement.

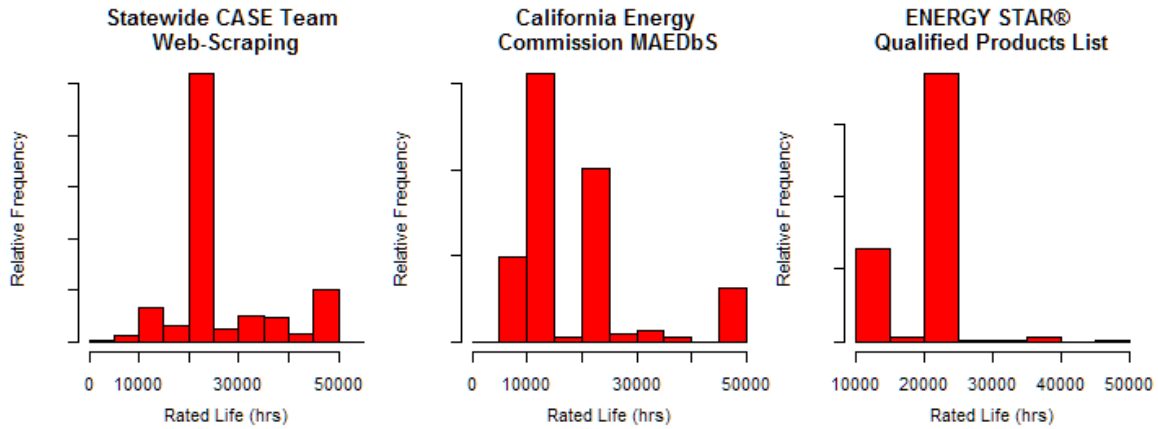
As shown in Figure 3, the Energy Commission’s previous forecasts assumed that only 18 percent and nine percent of directional and decorative lamp shipments, respectively, would be LEDs in the year 2020. The savings claimed during the general service LED rulemaking covered only this minor portion of directional and decorative lamp shipments. The updated forecast presented in the current staff proposal analysis correctly indicates that the shipments of non-qualifying products, including incandescent and halogen directional and decorative lamps, will effectively decrease to zero in the year 2020, and be replaced by lamps capable of meeting the minimum 45 LPW requirement. These lamps will be mostly state-regulated LEDs that produce no less than 80 LPW. Therefore, the Statewide CASE Team recommends the Energy Commission assume that qualifying products product 80 LPW.

**B. Rated lifetime estimates should be assumed to be 25,000 hours, which is more typical of LED lamps.**

An important benefit of the GSL standard is that it saves time and money for California consumers through an effectively longer product lifetime. A qualifying LED lamp lasts twelve times as long as a typical incandescent, on average (see Figure 4). The Energy Commission has acknowledged this benefit in the staff proposal analysis, but assumes a rated lifetime of only 10,000 hours, whereas LEDs typically have a rated life of 25,000 hours or more.

To identify a more representative value, the Statewide CASE Team assessed three sources: 1) the product offerings on retailer websites, i.e., web-scraping,<sup>10</sup> 2) the Energy Commission’s Modernized Appliance Efficiency Database System (MAEDbS) for state-regulated LEDs, and 3) the ENERGY STAR® qualified products list for lamps. Figure 4 shows the resulting histograms of rated lifetimes for the products assessed from these sources. All sources confirm that an assumption of 10,000 hours is a very conservative estimate, with rated lifetimes up to five times higher. The Statewide CASE Team web-scraping analysis also suggests that most product offerings – the majority of products that consumers will see – have rated lifetimes of 25,000

<sup>10</sup> The Statewide CASE Team collected the product offerings and their relevant attributes from eight major online retailers: 1000bulbs.com, acehardware.com, bulbamerica.com, bulbs.com, homedepot.com, lowes.com, topbulb.com, and walmart.com



**Figure 4: Histograms of rated life from three sources.**

Sources: Statewide CASE Team Analysis, CEC MAEDbS, ENERGY STAR® Products List (lamps).

hours. Therefore, the Statewide CASE Team recommends the Energy Commission use a 25,000-hour lifetime as representative of the qualifying products.

**C. Lifecycle costs should be calculated using the service lifetimes instead of rated lifetime.**

In a study on the impacts of EISA, Kanter et al. modeled the service lifetime of the various lamp types covered in the staff proposal based on lamp retirement probability (LBNL 2017). They noted that “a large proportion of LED GSLs are retired before reaching 25,000 hours of use” due to renovation. These models better reflect the amount of time that a consumer will use the qualifying lamp; therefore, the Statewide CASE Team recommends that the Energy Commission use these service lifetime values when calculating lifecycle costs for the various lamp types in the staff proposal analysis. The recommended values are presented in Table 1.

**Table 1. Recommended Service Lifetime in Years**

|                                | <b>Residential Life (Years)</b> | <b>Commercial Life (Years)</b> | <b>Sector-Weighted Life (Years)<sup>a,b</sup></b> |
|--------------------------------|---------------------------------|--------------------------------|---|
| Large Diameter Reflector Lamps | 13                              | 4.4                            | 12.7  |
| Decorative Lamps               | 17/19                           | 5.1/8.5                        | 16.9  |
| Globe Lamps                    | 19.6                            | 3.7                            | 18.0  |
| EISA-Exempt Lamps              | 16                              | 8.6                            | 14.8  |

<sup>a</sup> Uses sector weights in Table A-4 of the Energy Commission Staff Report Analysis.

<sup>b</sup> LBNL report considers 40W-equivalent and 60W-equivalent decorative lamps separately. For the purposes of this response, the average of the two values are used to determine the sector-weighted life (LBNL 2017).

**D. Incremental costs of EISA-Exempt lamps should be less; the prices for these lamps have continued to decrease.**

Since three-way lamps are the most expensive type of EISA-exempt lamps, to be conservative, the Energy Commission used price estimates of three-way lamps to serve as representative pricing for all EISA-exempt lamps in the staff proposal analysis. The Statewide CASE Team believes that the value is high for the following reasons:

- i. Prices have decreased significantly in the last year. The Statewide CASE Team recommended a representative price of \$16.97 for three-way lamps in our September 18, 2017, CASE Proposal. Over the last year, the cost of three-way lamps has decreased significantly. The Statewide CASE Team searched on Google.com for “three-way LED bulb” and assessed the top-selling products from the top-two search results. The resulting products and their unit prices are shown in Table 2. Nine of the thirteen lamps surveyed now cost less than half of the representative cost used in the staff proposal analysis. The average cost of all thirteen products is \$10.43, which is also a significant decrease.
- ii. Three-way lamps consist of less than a third of EISA-Exempt lamp shipments. U.S. DOE, in coordination with the National Electrical Manufacturers Association, tracks the annual shipments of five EISA-Exempt lamp types: rough service lamps, vibration service lamps, shatter resistant lamps, three-way lamps, and General Service Incandescent Lamps with light output 2600-3300 lumens.<sup>11</sup> The latest report for 2016 and 2017 shipments suggest that rough service, vibration service, and shatter resistant lamps consist of about 30 percent of EISA-Exempt lamp shipments, and they each have incremental costs of nearly zero.

For these reasons, the Statewide CASE Team recommends that the Energy Commission consider the cost of the qualifying EISA-Exempt lamp to be 70 percent of \$10.43, or \$7.60. With a non-qualifying EISA-Exempt lamp cost of \$1.99, as reported in the staff proposal analysis, the incremental cost for the lamp type should be **\$5.61**.

**Table 2. Retail Price for Top-Selling Three-Way LED Lamps (two retailers)**

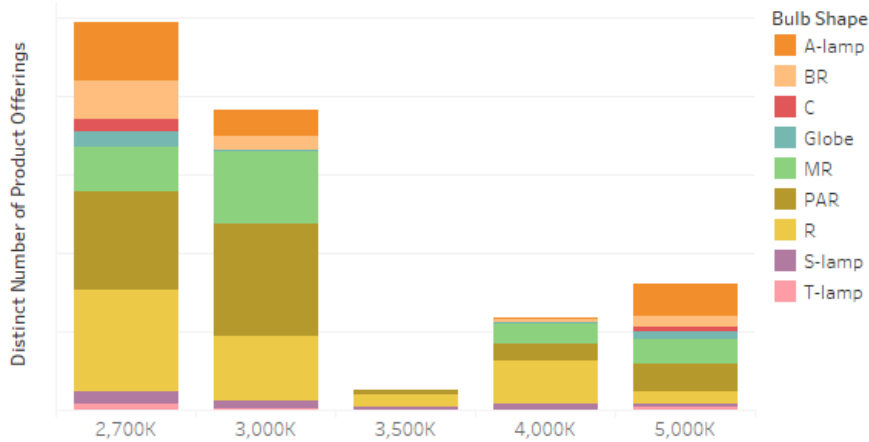
| Description   | Unit Price     |
|---|----------------|
| 50-100-150W Equivalent Soft White 3-Way A21 Non-Dimmable LED Light Bulb                             | \$20.01        |
| 100-Watt Equivalent A21 3-Way LED Light Bulb Soft White   | \$7.97         |
| 40/60/100-Watt Equivalent A19 3-Way LED Light Bulb Daylight   | \$7.97         |
| 40W/60W/100W Equivalent Soft White (2700K) A21 3-Way Exceptional Light Quality LED Light Bulb       | \$10.34        |
| 40-Watt/60-Watt/100-Watt Equivalent LED Light Bulb Soft White 3-Way Energy Star                     | \$14.34        |
| 60-Watt Equivalent A19 LED SceneSwitch Light Bulb Soft White/Daylight/Warm Glow                     | \$5.44         |
| 60-Watt Equivalent A19 LED SceneSwitch Light Bulb Daylight/Soft White/Warm Glow                     | \$8.97         |
| 100-Watt Equivalent Soft White Omni A19 3-Way LED Light Bulb  | \$8.83         |
| LED A21 - 3-Way Light Bulb - 5/9/16 Watt - 40/60/100 Watt Equal – 3000K                             | \$8.12         |
| LED A21 - 3-Way Light Bulb - 5/9/16 Watt - 40/60/100 Watt Equal – 5000K                             | \$8.12         |
| LED A21 - 3-Way Light Bulb - 5/9/16 Watt - 40/60/100 Watt Equal – 2700K                             | \$8.22         |
| LED A21 - 3-Way Light Bulb - 5/9/16 Watt - 40/60/100 Watt Equal – 3000K                             | \$8.69         |
| LED A21 - 3-Way Light Bulb - 5.5/10.5/17 Watt - 40/75/100 Watt Equal - 500/1000/1600 Lumens – 2700K | \$18.54        |
| <b>Average</b>  | <b>\$10.43</b> |

Source: Statewide CASE Team Analysis.

## **5. The Energy Commission should consider that replacement lamps are technically feasible and that replacement products are readily available.**

As the Energy Commission noted in the staff proposal analysis, U.S. DOE had considered that 45 LPW is technically feasible for lamps falling within the definition of GSL, even if some lamp types are not currently available at that efficacy level. The Statewide CASE Team encourages the Energy Commission to continue leveraging U.S. DOE’s conclusions, as the analysis was robust and

<sup>11</sup> DOE Pre-Publication. “Notice of Data Availability on Data Collection and Comparison with Forecasted Unit Sales of Five Lamp Types” (<https://www.energy.gov/sites/prod/files/2018/07/f53/five-exempted-lamp-types-noda.pdf>)



**Figure 5: Number of high CRI LED product offerings for various CCTs.**

Source: Statewide CASE Team analysis.

conducted with input from manufacturers, consumer groups, utilities, and other stakeholders. To further support this conclusion, the Statewide CASE Team offers the following considerations in response to the Energy Commission’s request for additional data on product availability.

**A. Availability of state-regulated LEDs at various correlated color temperatures (CCT).**

The Statewide CASE Team assessed the products offered by several online retailers to identify the high color rendering index (CRI) LED types that are available at various CCTs. Figure 5 shows a compilation of the number of LED product offerings (discrete URLs) that are available in the five most popular CCTs having a CRI greater than or equal to 90.<sup>12</sup> The figure suggests that high CRI LEDs are widely available at the most popular CCTs across several lamp shapes.

**B. Availability of E11-base replacement lamps.**

The E11 base type is often associated with relatively small form factors. When coupled with high lumen output, smaller form factors can present a challenge LED designs. However, the Statewide CASE Team does not believe that this base type warrants an exemption, as the relevant lamp applications have already been addressed by U.S. DOE:

- i. **E11-base lamps with light output 550-1200 lumens** are available as compact fluorescent lamps that will meet the 45 LPW requirement.
- ii. **E11-base lamps with light output greater than 1200 lumens** exist only in the T4 shape, and T4 lamps are exempt from the GSL definition. U.S. DOE acknowledged in the January 19, 2017, GSL Final Rule that high lumen output T-Shape LEDs of one-inch diameter or less are not yet technically feasible and exempted these lamp types.

In assessing which form factors and lumen output ranges are not available in LED technology, the Energy Commission should consider the applications for which these lamps serve, and whether such applications could be serviced by other lamp types such that consumer utility is not reduced. The Statewide CASE Team does not believe base type or lamp shape alone is

<sup>12</sup> While there are state-regulated LEDs with CRI less than 90, the Statewide CASE Team uses this value as a conservative estimate for lamp types that would meet the state-regulated LED requirements, since this information is not readily available through online retailers.

indicative of a unique consumer utility without context as to how the base or shape is relevant to the lamp application.

### III. Conclusion

The Statewide CASE Team would like to reiterate its support for the Energy Commission's proposal to align with U.S. DOE by updating GSL definitions, thereby expanding the scope of the GSL efficacy requirements to additional lamp types. The Statewide CASE Team further supports the Energy Commission's efforts to issue a sales ban, such that it will be consistent with the national sales ban on GSLs. Lastly, the Statewide CASE Team supports conclusions determined in the staff proposal analysis, but encourages the Energy Commission to refine assumptions to better represent real-world savings.

With the Energy Commission's staff proposal adopted, California will achieve several terawatt-hours of energy savings in the first year alone, advancing the State significantly closer to its statewide GHG targets, as outlined by SB 350. The proposed measure is unquestionably cost-effective, technically feasible, and already garnering widespread acceptance among consumers. As such, the Energy Commission should adopt and enforce all proposed language as soon as possible to achieve immense statewide energy benefits, reduce market uncertainty, and continue its national leadership on this measure.

### IV. References

1. CARB (California Air Resources Board). 2017. "California's 2017 Climate Change Scoping Plan." [https://www.arb.ca.gov/cc/scopingplan/scoping\\_plan\\_2017.pdf](https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf)
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