

**Appliance Standards Awareness Project  
Northeast Energy Efficiency Partnerships  
Alliance to Save Energy  
Consumer Federation of America  
Northwest Energy Efficiency Alliance  
American Council for an Energy Efficient Economy**

Commissioner McAllister  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

September 18, 2017

Dear Commissioner McAllister,

These comments by the Appliance Standards Awareness Project (ASAP), the Northeast Energy Efficiency Partnerships, the Alliance to Save Energy, the Consumer Federation of America, the Northwest Energy Efficiency Alliance and the American Council for an Energy Efficient Economy on the California Energy Commission (CEC) Phase II Pre-rulemaking for general service lamps (GSL) Docket No. 17-AAER-07 follow on similar comments submitted on June 16, 2017. We have participated in CEC's pre-rulemaking process and applaud the CEC for undertaking this Pre-rulemaking, and for the opportunity to provide comment.

***1. We recommend that the CEC adopt the current US DOE definition for GSL as published on January 19, 2017 as part of California's Title 20 appliance regulations.***

The federal definition of GSLs was expanded through two final rules published by the Department of Energy (DOE) in the Federal Register on January 19, 2017. The expanded GSL definition comes into effect federally on January 1, 2020 and significantly increases savings from the federal GSL energy conservation standards by closing several loopholes created by exemptions for some lamp types under the prior GSL definition, and by covering some additional popular lamp types which had previously fallen under other standards. The DOE rules also provide improved definitions for a range of lamps which remain exempted from the federal GSL definition, reducing the potential for new loopholes.

DOE's rulemaking process for the expanded GSL definition was transparent, inclusive and thorough. DOE held extensive discussions with the lighting industry, energy efficiency advocates, electric utilities and consumer organizations during the rulemaking and the final rule rules took into account the status of the GSL market, the global transition to solid-state lighting, and the availability of complying products in different lamp categories. The resulting expanded GSL definition effectively balances the interests of stakeholders at the national level, and is the correct definition to use in California.

The report *General Service Lamps (Expanded Scope)* prepared by the California Statewide Investor-Owned Utilities Codes and Standards Enhancement (CASE) initiative and submitted under this docket provides a detailed description of the benefits to the state of California from the adoption of the revised DOE GSL definitions. This report estimates incremental statewide savings of 2.8 terrawatt hours of electricity and net economic benefits to Californians worth \$8.3 billion from adopting the DOE's revised GSL definition. These savings are in addition to the savings already expected from the January 1, 2018 implementation of the 45 lumens per watt (lpw) federal GSL standard for lamps that meet the current CEC definition for GSLs. The CASE report also estimates an incremental 413,000 million tons of CO<sub>2</sub> equivalent emissions savings.

**2. We also recommend that the CEC modify the expanded federal definition for GSL to extend the range of products covered to include dimmer lamps.**

The expanded federal GSL definition published by DOE on January 19, 2017 applies to certain lamps with rated outputs from 310 to 3,300 lumens. We reiterate the recommendation made in ASAP's June 16, 2017 comments to this docket that the CEC amend the federal definition when adopting it at the state level to make the lower limit of this range consistent with existing California standards for similar products. The existing California standard applicable to medium-base LED lamps starts at 200 lumens, and the California standard for candelabra-base LED lamps starts at 150 lumens. We recommend that the CEC extend coverage in the California GSL definition down to 200 and 150 lumen output for medium and candelabra base lamps respectively to make the federal GSL definition more consistent with existing California standards.

**3. We recommend that the CEC adopt an expanded definition for GSL's to come into effect as soon as feasible to maximize economic and environmental benefits.**

LEDs have penetrated both the California and US lighting markets far more rapidly than expected. According to the National Electric Manufacturers Association (NEMA), by the first quarter of 2017 over 45% of A-line lamps shipped were already either LEDs or CFLs<sup>1</sup>. California is a recognized leader among states in efficient lighting adoption. About 45% of homes in the "Pacific" region in DOE's most recent Residential Energy Consumption Survey (data collected in 2015) reported all or most bulbs installed as either CFLs or LEDs. The lamp types that were added under DOE's new GSL definition (e.g. reflector lamps, decorative and globe-shaped lamps) are still primarily incandescent<sup>2</sup>, but LED versions of these lamp types are widely available at reasonable prices, as documented in the CASE report.

Successful new products follow an "S" shaped adoption curve in the market place described by Everett Rogers in *Diffusion of Innovation* and shown generically in Figure 1. The first 15-16% of purchasers of a new product can be described as "innovators" or "early adopters" who are willing to pay often higher prices and also to take the time to find new products. If early adopters have a positive experience with the product, the "early majority" cohort of purchasers starts to buy. Because the early majority represents roughly one third of potential purchasers, sales volumes tend to increase during this time and product prices drop. Market penetration increases rapidly during this period, but after the early

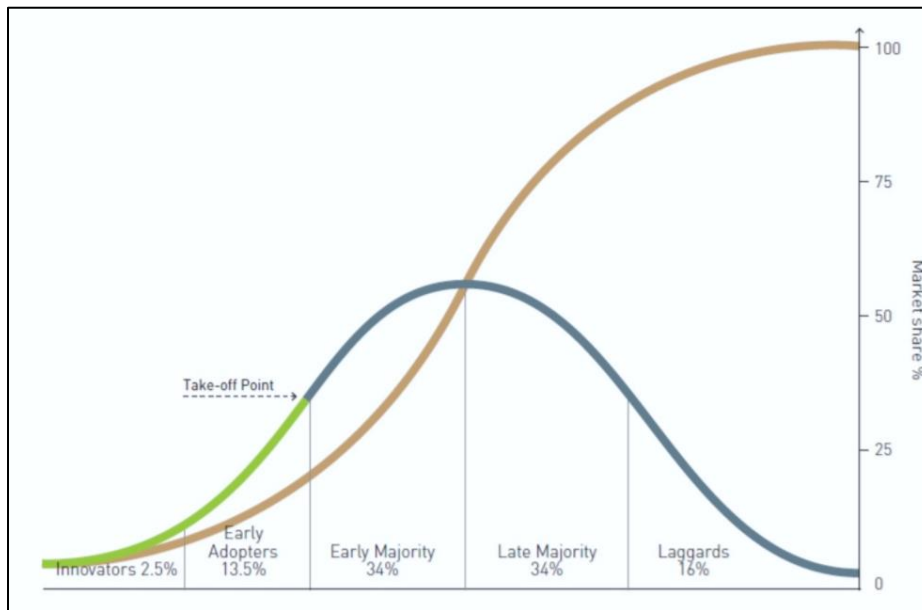
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<sup>1</sup> NEMA lamp index <http://www.nema.org/Intelligence/Pages/Lamp-Indices.aspx>

<sup>2</sup> *Impact of the EISA 2007 Energy Efficiency Standard on General Service Lamps*, LBNL-1007090, January 2017

majority cohort have fully adopted the product the rate of market penetration begins to slow. Eventually, the next third of customers known as the “late majority” begin to purchase, and they are eventually followed by the “laggards”. As shown in Figure 1, after about half of potential full market penetration has been reached, the rate of market penetration usually slows, and it can take a very long time for the “laggard” group to adopt a product. Full penetration of a new product into the market is achieved when the slope of the “S” curve turns flat and market share no longer increases. Many household appliances in the US are effectively at full penetration. Due to market failures or other reasons some purchasers never adopt a new product, even when it would be economically beneficial for them to do so, and relatively few products reach 100% of all potential consumers as the result of market forces alone.

Figure 1: Diffusion of Innovation Curve



LEDs have proven to be very popular, and have experienced a very steep market penetration curve during the last couple of years. However, shipment data reported by NEMA suggests that A-lamp LEDs may now be near the end of the early majority stage of market penetration. Without CEC and federal GSL standards we should expect the rate of LED adoption to begin to slow soon. Billions of GSLs are currently in use in the US and LED GSLs typically require only one fifth to one quarter the electricity to produce the same light as equivalent incandescent GSLs. This means that every percentage of GSL market share that remains incandescent when it could be replaced by a percentage of LED market share represents large amounts of missed savings for Californians, wasted electricity, and missed reductions in terms of carbon dioxide emissions. Effective minimum energy efficiency standards for GSLs are necessary to ensure that the benefits of this new technology are realized as quickly as possible.

Thank you for the opportunity to comment. We commend the CEC and participants on this collaborative process and look forward to a conclusion by the end of 2017.

Sincerely,



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