

Natural Resource Defense Council
Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
Alliance to Save Energy
Consumer Federation of America
National Consumer Law Center
Northeast Energy Efficiency Partnerships
Northwest Energy Efficiency Alliance
Northwest Power and Conservation Council

February 23, 2015

Ms. Lucy deButts
C/o Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program, MS EE-2J
1000 Independence Ave., SW
Washington, DC 20585-0121

RE: Energy Conservation Standards for General Service Lamps
Docket Number EERE-2013-BT-STD-0051
RIN 1904-AD09

Dear Ms. deButts:

On behalf of the Natural Resources Defense Council (NRDC), Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Alliance to Save Energy, Consumer Federation of America, National Consumer Law Center, Northeast Energy Efficiency Partnerships, Northwest Energy Efficiency Alliance and Northwest Power and Conservation Council, we respectfully submit the following comments on the Department of Energy's (DOE's) December 1, 2014 Preliminary Technical Support Document (PTSD) for energy conservation standards for general service lamps (GSLs).

1. Introduction and background

In 2007, Congress established national standards for general service incandescent lamps (GISLs). The first tier of standards, phased in from January 2012 through January 2014, have resulted in the introduction of new lighting options for consumers, expanded markets for high efficiency lighting products, and generated significant energy and bill savings for consumers. To ensure continued innovation and further energy savings, Congress required DOE to develop new standards for a broader category of general service lamps (GSLs) by January 2017, including

GSILs, CFLs, LEDs and other previously unregulated lamp types, as warranted. According to the law, the new standards must, “produce savings that are greater than or equal to the savings from a minimum efficiency standard of 45 lumens per watt....” If not, then a backstop standard of 45 lumens per watt for all GSLs is triggered. We appreciate DOE’s efforts to comply with the Congressional requirements and deadlines for GSL standards.

Given DOE’s interpretation of the Congressional budget rider affecting implementation and enforcement of the existing GSIL standards, DOE is not considering amended standards for GSILs in this rulemaking. While we believe that DOE has taken an inappropriately broad view of the budget rider (we and Earthjustice addressed this topic in our comments at the Framework stage), we agree with the determination in the Preliminary TSD that not including GSILs in the scope of this rulemaking will cause the backstop standards to be triggered. The shift from today’s halogen incandescent lamps to much more efficient alternatives would yield very large savings that overwhelm the incremental savings available from efficiency improvements to CFLs or LEDs. Therefore, it will not be possible to achieve savings equivalent to a 45 lpw standard for all GSLs without improving the efficacy of GSILs.

In the sections below, we respond to key issues raised by DOE and address other important considerations for this rulemaking. The list below summarizes some of the key issues we elaborate in these comments.

- We agree with DOE that the backstop standard will become effective for all GSLs in 2020 due to DOE’s implementation of the Congressional budget rider.
- We support DOE’s proposed technology neutral approach to product classes because it allows all lighting technologies to compete on a level playing field and we support DOE’s use of a standard in the form of a continuous function;
- We recommend that DOE evaluate additional candidate standard levels in order to more completely cover the full range of efficiency improvements available, including multiple levels that can be met by CFLs;
- We support DOE’s proposal to eliminate many exemptions, and recommend the agency consider additional exemptions (including the current special treatment for candelabra and intermediate base lamps) for elimination to increase energy savings and to prevent loopholes from eroding energy and bill savings;
- We support DOE’s proposal to update CFL quality specifications and urge the agency to consider some additional improvements in order to ensure that high- efficiency lighting products satisfy consumer expectations.
- We recommend that DOE evaluate establishing power factor standards using the criteria used to develop energy conservation standards.
- We support DOE’s proposed approach for modified spectrum GSLs, which eliminates special treatment.
- We urge DOE to update its market and product price analyses.

2. The backstop requirement will take effect absent inclusion of GSILs in the rulemaking.

In the PTSD, “DOE requests any data suggesting that the EISA 2007 backstop criteria will not be met (Issue 21).” The backstop minimum efficiency standard of 45 lumens per watt (lpw) will

be triggered for all GSLs as long as the budget rider forbids the agency from improving efficiency standards for GSILs. According to NEMA's shipment data¹ for the most recent quarter, halogen and incandescent lamps (GSILs) make up more than 50% of current GSL sales. Given past trends, we expect that much of the market growth for LEDs will come at the expense of CFLs, leaving the market share of halogen lamps at around 50% through 2020. A 45 lumen per watt standard would result in very large savings as all GSILs sales would shift to other GSL lamp types which deliver efficacies well in excess of 45 lpw. Replacement CFLs and LEDs produce around 60 to 90 lpw, and LED efficacies are projected to continue to get better. In very rough terms, we estimate that a 45 lpw standards would save 72 TWh² annually once all installed lamps complied with such standards. We do not believe there is any way for DOE to establish a standard that covers only non-GSIL products that would come close to achieving even a significant fractions of these savings levels. Furthermore, if GSILs remained subject to today's standards while other GSLs were required to improve, such an approach would likely make inefficient GSILs have a more favorable first-cost advantage, shifting the market to these less efficient lamps. Therefore, if DOE remains unable to consider standards for GSILs, the backstop will be triggered.

3. We support DOE's proposed product classes and the continuous equation structure of its efficiency standards.

DOE has proposed creating two overall product classes: integrated GSLs, which includes self-ballasted CFLs and integrated LED lamps, and non-integrated GSLs, such as pin-based CFLs. In addition, DOE has further broken down integrated GSLs into two classes based on lumen output: 310 to 1999 lumens and 2000- 2600 lumens (high lumen output lamps). To address efficiency, DOE proposed the use of smooth continuous curves where minimum allowable efficacy levels (lpw) are expressed as a function of lamp light output (lumens).

We think the above approaches make a lot of sense. The product class structure recognizes that many technologies provide the service of general illumination and allows all technologies to compete on a level playing field. We agree with DOE's creation of a separate subclass for integrated lamps that have very high light output. These lamps may require different technological approaches that affect efficiency in order to manage heat and stay within a size that fits in consumers' fixtures. High lumen output lamps may not be able to achieve the same efficacies as those in the lower lumen range.

The continuous function standard form is far superior to the bin approach used in current standards. This bin approach had the unintended consequence of incentivizing manufacturers to shift their halogen lamps to the far left corner of the bin. As a result, today's halogen incandescent lamps are almost 10% dimmer than the incandescent lamps they are intended to replace. For example, today's typical halogen incandescent lamps that replace the conventional

¹ <http://www.nema.org/news/Pages/Compact-Fluorescent-Lamp-Shipments-Continue-to-Lag.aspx>

² This very rough estimate developed for the authors by Mike McGaraghan of Energy Solutions assumes the following to assess impact of a 45 lpw standard post 2020: average halogen lamp = 45W; 50% of sockets have halogen lamps; 1000 operating hours per year per lamp. Total sockets = 2010 total from DOE's Lighting Market Characterization with a 0.7% annual growth rate. With a 45 lpw standard, we assume 75% of halogen sockets shift to LEDs and 25% to CFLs. Avg LED = 5W; avg. CFL = 14W.

100W incandescent lamp provide only 1490 lumens as opposed to the 1600-1650 lumens provided by conventional 100W lamps.

DOE's proposed continuous function results in efficiency requirements that scale with light output. The brighter the bulb, the greater its efficiency. This approach removes the incentive for manufacturers to market dimmer bulbs as a means to comply with the standards.

4. DOE should evaluate additional CSLs.

DOE has used a covered CFL as the representative lamp for the baseline integrated low lumen (310-1999) product class. This representative lamps has an initial light output of 750 lumens and initial power draw of 14 Watts. DOE evaluated CSLs above the baseline level. CSL 1 is represented by a 13 Watt lamp that produces 800 initial lumens and is a bare spiral lamp, with a rated efficacy of 61.5 lumens per watt (LPW). DOE then uses A-shaped LEDs that produce 800 initial lumens and draw between 12 and 9.5 initial watts, with corresponding rated efficacies of 66.7 to 84.2 LPW as representative lamps for CSLs 2 through 5

CFLs exist in today's market with a broader range of efficacies than DOE has evaluated and should include additional CSLs that better cover this range. Today's 60 Watt replacement bare spiral CFLs typically produce between 800 and 900 initial lumens and draw between 13 and 14 W, with a range of efficacies between 61.5 and 69.2 LPW. Some 100 watt replacement CFLs achieve lpw levels that exceed 70.

Market forces will also be driving efficiency gains as the availability of more efficient individual LEDs translate into fewer LEDs to deliver the same amount of light, less heat to dissipate, lower power draw and corresponding smaller components, etc. DOE should continue to monitor developments in the LED market and ensure that the highest CSLs evaluated reflect the latest LED market developments. These trends to higher LED efficiency yield not only improved bulb efficiency, but lower production costs and retail prices for LED bulbs We also urge DOE to consult with the Energy Information Administration and the agency's solid state lighting program to ensure that expected efficiency trends are captured in the analysis.

5. We agree with DOE's proposal to eliminate many exemptions and encourage the agency to consider eliminating a few more, including ending special treatment for candelabra and intermediate base lamps.

A. Shape and base type – We support broadening the standard to cover more shapes and base types. We think DOE should include all lamps that provide light between 310 and 2600 lumens in the GSL standards scope. (Below we provide recommendations for DOE to also address lamps between 2601 and 3300 lumens). All general service lamps within that lumen range should be included regardless of the shape of the lamp's cover, or the size of the lamp's base. DOE should limit any exemptions to those lamps which cannot provide general service illumination due to technical, definable characteristics.

Limiting covered lamps to a list of conventional shapes, as designated by a list of ANSI shapes, does not have any technical basis and creates an incentive for manufacturers to evade the

standards by making a slight modification to the shape of the lamp. We have unfortunately already seen manufacturers evade past efficiency standards by tweaking the exterior shape of their incandescent reflector lamps simply for the purpose of evading DOE's standards. The shapes of these slightly modified new lamps, referred to as elliptical reflector and bulged reflectors, or ER and BR lamps for short, did not provide any additional functionality. By providing a loophole in the standards, the Congressionally-enacted standards failed to ensure that consumers received the efficient incandescent reflector lamp the standards had intended, and manufacturers who made the investments necessary to produce lamps that comply with the standards were put at an economic disadvantage due to this uneven playing field. DOE must broaden the scope of the standard to eliminate such loopholes.

We also urge DOE to discontinue special treatment for lamps with candelabra and intermediate bases. Currently, GSIL versions of these lamps are subject to wattage limits only. The fact that a lamp has a candelabra or intermediate screw base, which is simply a smaller diameter base, has limited bearing on the efficiency the lamp can achieve. There is nothing inherently unique about these lamp besides the size of the screw base. Candelabra and intermediate base lamps are available using very inefficient incandescent technology as well as energy-saving CFL and LED technology. Contrary to DOE's claims on page 3-11 of the PTSD, there are numerous CFL and LED lamp models available on the market with both candelabra bases and a candelabra or flame shaped envelope. Some available LED lamps mimic the look of incandescent alternatives. A recent search on Home Depot's website (go to: <http://www.homedepot.com/b/Electrical-Light-Bulbs-LED-Light-Bulbs/Decorative/N-5yc1vZbm79Z1z0xeud>) showed several dozen LED lamps with candelabra base and/or candelabra flame shaped lamps as well as various CFL based options.

Our support for including any lamp type as a covered lamp is contingent on DOE ultimately setting a standard for that lamp type. We do not support DOE covering a lamp type and, thereby preempting state standards, without also establishing standards.

B. We concur with DOE's determination that 3-way, shatter proof, vibration resistant/vibration service, and rough service lamps are available at much higher levels of efficiency than historic incandescent lamps and no longer warrant special treatment.

As we have previously commented via oral and written comments, the current exclusion or special treatment of these lamp types represents a potential loophole. While this loophole may not be widely exploited currently, the market incentive to sell these lamp types will increase dramatically once Tier 2 and its higher requirements go into effect.

For example, one could easily apply a very low cost silicone coating on top of an old inefficient incandescent lamp and avoid having to comply with the efficiency requirements. Regarding vibration service lamps, we have already seen examples of such lamps that only cost 25 cents when purchased in a multipack and to make matters worse this lamp is even less efficient than the old incandescent as the 60W vibration service lamp only produces 600 lumens, 25% less light than a conventional GSIL using the same input power.

Energy efficient CFLs and/or LEDs already exist on the market to meet the needs of each of these lamp types, and in some cases provide superior functionality. As LED lamps are not filament based, they are a lot more robust than vibration service incandescent lamps. Similarly, LED products, such as Cree's A-line lamps have a plastic enclosure that offers shatter resistance.



Regarding 3-way lamps, 3-way LED and CFL lamps already exist on the market designed to replace 30/70/100W conventional incandescent lamps. CFL lamps designed to replace 50/100/150W incandescent 3-way lamps already exist and we fully expect LED lamps designed to meet these higher light output levels to enter the market within the next couple of years, well before the 2020 effective date.

C. We largely agree with DOE's truncated list of exempt products with a few exceptions.

We agree with DOE's determination that the following lamps provide overall illumination and can serve in general lighting applications and as such would no longer warrant an exemption: left hand thread, marine lamps, lamps of various shapes (such as G, T, B, BA, CA, G25, etc.).

For lamps that DOE continues to exempt, the agency must develop clear legal definitions for each exempted lamp type. For example, for colored and black lights in order to prevent a manufacturer from simply applying an inexpensive removable cover over an incandescent lamp that would convert a colored or black light to a conventional lamp if removed, we recommend that DOE include language in its definition that would not exempt colored or black light lamps that are operable once one or more components are removed.

In addition, the definition of colored incandescent lamp includes lamps with a correlated color temperature (CCT) below 2500K. As this is not that far from the 2700K of conventional lamps, this too might represent a potential loophole that we ask DOE eliminate in its regulations.

Regarding appliance lamps, we recommend DOE establish a maximum allowable light output level of no more than 400 lumens or so to prevent sales of these lamps from escalating. These

lamps are used in ovens and the primary unique characteristic is the thicker glass that enables the lamp to withstand higher temperatures. One could easily envision this type of lamp that looks and operates like a conventional incandescent from being heavily marketed in the future. This level of light output, just below conventional 40W lamps would be sufficient to illuminate the small oven spaces for which they are intended.

Without adding the 400 lumen limit, a manufacturer could simply take today's 43 W halogen incandescent and tweak it to come just under 40W, add a thicker glass enclosure and market it as providing equivalent amount of light as a 60W lamp and identify it as an appliance lamp in smaller print on the front of the package. We suggested this light output limit as well to prevent a manufacturer from adding a thicker glass enclosure and slightly reducing today's 43 W halogen incandescent.

We also encourage DOE to take a closer look at potentially removing current exemptions for: plant lights, silver bowl, marine signal and mine service. Some of these products may be capable of providing overall or general illumination and not warrant an exemption. In each case, DOE should at a minimum develop a tight definition that will avoid exploitation of the exemption as a loophole.

D. We agree with DOE's decision to not include MR16s in this docket.

We agree with DOE's decision to not pursue standards for MR-16s at this time. The California Energy Commission (CEC) is developing standards for these products and by allowing that process to play out, DOE will permit states to drive efficiency improvements for these products. We disagree with DOE's finding that energy efficient options do not currently exist for MR16s. There are many high quality LED lamps in this form factor that meet a range of application needs. If DOE needs a rationale for not pursuing standards for MR16 lamps in addition to allowing the CEC process to develop, we encourage DOE to consider the same rationale used for not developing standards for other reflectors at this time. Namely, as long as the rider prevents DOE from updating incandescent reflector lamps standards, improved standards for substitutes or near-substitutes could backfire, further shifting the market to the unregulated lamps.

E. We recommend DOE consider standards for lamps between 2601 and 3300 lumens. Conventional 150W incandescent lamps produce around 2500 - 2700 lumens. In random store visits, we have observed the increased prominence and stocking of 150W and 200W incandescent lamps.

Today, CFL lamps that produce equivalent amounts of light to conventional 150 W incandescent lamps already exist on the market from multiple manufacturers (see: <https://www.1000bulbs.com/category/150-watt-equal-compact-fluorescents-2700K/>). In addition, we expect LED efficiency levels to continue to increase thereby paving the way for new LED lamps that deliver these higher light levels to be introduced to the market well before 2020. Therefore, we recommend DOE at a minimum raise its current proposed scope beyond 2600 lumens to 3300 lumens to ensure lamps that somewhat exceed today's 150W incandescent lamps are also covered and to remove any incentive to introduce slightly brighter bulbs as a means to avoid the standards.

6. We concur with DOE's decision to update the quality requirements for CFLs and are comfortable delaying establishment of quality specifications for LEDs at this time.

We agree that DOE has the authority to amend the current CFL quality requirements and consider new quality requirements. We agree with the general idea of updating the quality spec levels to those contained in the current ENERGY STAR lamp specification (Version 1.0). These levels will help ensure consumers have a good experience and achieve the energy savings and longevity the lamp is intended and marketed to provide. Unlike other ENERGY STAR product categories, the vast majority of CFLs on the market meet the existing ENERGY STAR requirements and are listed on EPA's list of qualified products. In addition, the current specification was finalized in 2014 and the DOE regulations will not go into effect until 2020.

We also urge DOE to consider levels that are ultimately adopted as part of Version 2.0 currently under development. In some cases, EPA is considering levels widely available in the market today, which may be appropriate and have broad support as the basis for a regulatory minimum in the year 2020.

In Table 3.3.1, DOE proposes a list of parameters to cover and corresponding requirements for medium base compact fluorescent lamps. We have reviewed DOE's proposal and are in general agreement, with a few minor exceptions/recommendations provided below:

Lumen maintenance and lamp survival at 1000 hours. The test procedure utilized by ENERGY STAR currently requires a sample size of 10 lamps, 5 base up and 5 base down, unless the manufacturer restricts specific use or position. EPCAct 2005 (i.e. the current DOE standards) only required 5 samples. We recommend DOE utilize 10 samples in its requirements to be consistent with ENERGY STAR. We also support inclusion of ENERGY STAR's requirement that all units shall be surviving at 1000- hours, and no more than 3 units may have lumen maintenance <75% at 40% of rated life.

Run-up time. One of the complaints some consumers voice about CFLs is the reduced level of light some CFLs produce when first turned on and the time it takes for the lamp to reach full brightness. On February 13, 2015, EPA issued its first draft of Version 2.0 of its lamp specification, which required: "Reported value of time for lamp to achieve 80% stabilized light output shall be \leq 60 seconds." This value represents a significant update from the Version 1.0 requirement which allowed 120 seconds (i.e., twice as long). We think this is an important improvement that will result in greater consumer satisfaction. Furthermore, EPA noted in the materials supporting the draft Version 2.0 that many lamps meet this requirement already. (From the EPA material: "Analysis on the Lamps Certified Product List shows that 89% of CFLs meeting the efficacy levels proposed in this draft have a run-up time of 60 seconds or less.")

Regarding LED quality requirements, the Preliminary TSD indicates that DOE does not believe EPCA explicitly authorizes the Department to adopt performance quality metrics for LEDs. Preliminary TSD at 2-38. Although we believe that DOE does possess the authority to require that LED performance provide the consumer satisfaction necessary to assure that the energy savings anticipated from energy conservation standards are achieved in practice, because

the California Energy Commission is currently evaluating its own performance quality metrics for LEDs, we are not recommending that DOE consider adopting such requirements at this time.

7. DOE should evaluate power factor as an energy conservation standard for CFLs.

EPCA specifically authorizes DOE to consider a power factor requirement for CFLs. Because power factor is a measure of energy savings, DOE should evaluate power factor levels using the evaluation tools of the standards program. As described in the California Investor Owned Utilities comments to this docket, improved power factor yields direct consumer savings on consumer utility bills in addition to savings for all utility consumers (i.e. there are savings on both sides of the utility meter). DOE's analytical methods are appropriate for evaluating the costs and benefits of improved power factor and determining a level that provides the maximum level energy savings that are technologically feasible and economically justified. Furthermore, our understanding is that CFLs sold in some economies (e.g. India and some lamps sold in the European Union) already are required to meet high power factor requirements. DOE should investigate these requirements and the technologies used and cost impacts to meet those standards. We understand that these products contain a power factor correction chip (PFC) that yields CFLs with power factors as high as 0.9.

We have reviewed ENERGY STAR's qualified product list for non-directional CFLs. Of the 1,189 models on the list, 225 had a power factor of 0.5 and 957 had a power factor of 0.6. As 80% of the listed models already have a power factor of 0.6, we recommend DOE consider a power factor of at least 0.6. DOE should also thoroughly investigate the higher power factors recommended by the CA IOUs. To inform its decision making process, we also encourage DOE to investigate CFL products sold overseas.

8. We agree with DOE's proposal to eliminate special treatment for modified spectrum lamps

We concur with DOE's determination that a manufacturer can produce a modified spectrum lamp without a decrease in efficacy and that a separate product class for modified spectrum lamps GSLs is not warranted. High efficacy modified spectrum CFL and LED lamps are currently on the market from numerous manufacturers with a wide variety of light output levels and shapes.

The current break that allows modified spectrum lamps to be 25% less efficient than non-modified spectrum general service incandescent lamps is far too generous. Manufacturers are increasingly opting to produce modified spectrum halogen incandescent products as it provides the easiest means to comply with the existing standards. This trend can be observed by visiting big box retailers such as Target and Home Depot where the shelf space dedicated to modified spectrum incandescent replacement products sometimes far exceeds that provided for non-modified spectrum incandescent halogen lamps. (See figure below which shows that two out of the three 60 Watt replacement halogen incandescent models offered at Target were modified spectrum.) As a result, consumers who purchase these products are receiving less light than the conventional incandescent lamp they meant to replace. While we do not have access to specific

sales data, it is likely that some portion of consumers will be disappointed by the lower light levels and choose to bump up to the next level of light output. This choice would shift these consumers to 75W equivalent lamp, instead of the 60W, resulting in increased energy consumption



9. DOE should update its market analysis to incorporate additional data sources

DOE's estimates for the market distribution of lamps across the four lumen ranges analyzed is inconsistent with pre-EISA data and more recent studies on lamp market share. Data from 2000 and 2006 (see Table 1) on standard incandescent lamp sales indicates that 75- and 100-watt lamps combined for 42.6% and 40% of the market in these years, respectively. Over this time, the market share for 60-watt lamps reached 46% of sales. These data suggest that lamps over 750 lumens accounted for a very large majority of all purchases, while lamps under 750 lumens (i.e., 40-watt incandescents) made up a much smaller portion of the market. The market share for each lumen bin remained relatively stable over the 2000 to 2006 time period with a small decline in 75-watt bulbs offset by increases in 60-watt and 100-watt lamp sales.

Table 1: Breakdown of Sales of Standard Incandescent Lamp Types

Wattage	2000	2006
40 watt	13.5%	13.0%
60 watt	43.3%	46.0%
75 watt	24.6%	19.0%
100 watt	18.0%	21.0%
150 watt	0.5%	1.0%
TOTAL	100.0%	100.0%

Note: Data only for sales of Soft White, Vibration Resistant, and Standard Clear Lamps

Source:

California Lighting Technology Center. 2008. Efficiency Opportunities for Edison-Based Luminaires. CEC-400-2008-007. Prepared for California Energy Commission.

Given the relative stability in the market share for lamps over this period, it is reasonable to assume that consumers would seek to purchase replacement halogen, CFL and LED lamps for these sockets that fall within similar lumen ranges to the standard incandescent lamps being replaced. The Cadeo Group numbers used in DOE's analysis present a different picture. For the residential sector, the data indicate that lamps providing less than 750 lumens account for more than 30% of the market, whereas higher lumen lamps (the 1050-1999 lumens or 75- and 100-watt equivalents) account for roughly 16% of the market. These data would require a large shift in consumer purchases from higher to lower lumen lamps.

Table 2 compares data on the saturation of lamps by lumen range from two recent sources to the Cadeo Group data presented by DOE. Differences between these studies could result from the specific lamp types included in the analysis (e.g., the Northwest study split out general service and dimmable lamps from other common lamp types) or treatment of modified-spectrum lamps which provide lower lumens. DOE should consider data from a wider range of sources, including those cited here.

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Table 2: Comparison of Data on Lamp Saturation by Lumen Range

Lumen range	Northwest RSBA (NEEA 2013) ³	Northeast (NMR 2013) ⁴	Cadeo Group ⁵
310-749	10%	12%	32%
750-1049	69%	61%	50%
1050-1489	13%	10%	8%
1490-1999	8%	16%	8%

10. DOE needs to correct its pricing analysis

We have reviewed the lamp pricing analysis performed by DOE and offer the preliminary comments below. In addition, we encourage DOE to carefully consider the more detailed and comprehensive comments provided on this topic by the California Investor Owned Utilities:

- The prices shown in the examples for CSLs 2 and 3 reflect products that are being discontinued and replaced by new, more efficient products that are also less expensive than the prior versions
- The DOE analysis does not appear to adequately take into account the market share and lower cost of lamps sold in multi-packs. As explained during the January workshop, DOE weighted the per bulb cost of a lamp sold in a one pack with that of a bulb sold in a multi-pack. This approach does not give adequate weight to the lower price and higher volume of lamps sold via multi-packs. We recommend DOE modify its analysis to weight each bulb equally, meaning the cost of the bulb in four pack would be counted 4 times and the cost of a bulb sold in a one pack would be counted 1 time. In addition, DOE must take into account the rates at which single packs and multipacks are sold. We do not have such data, but consumers are accustomed to buying lamps in multi-packs and they are a far better value. Therefore, we would expect multi-packs to sell in higher volume than single packs.
- DOE asked for input on the incremental cost between 60 and 100W replacement LED lamps. There is currently a sizable incremental cost between 60 and 100W replacement LED lamps. Over time we fully expect the cost of both products to come down, with larger reductions observed for the 100 Watt replacements. As the 100 W replacement will have more LEDs and consume more power it will be a more expensive lamp to manufacture and will continue to have a higher retail price than the 60W replacement

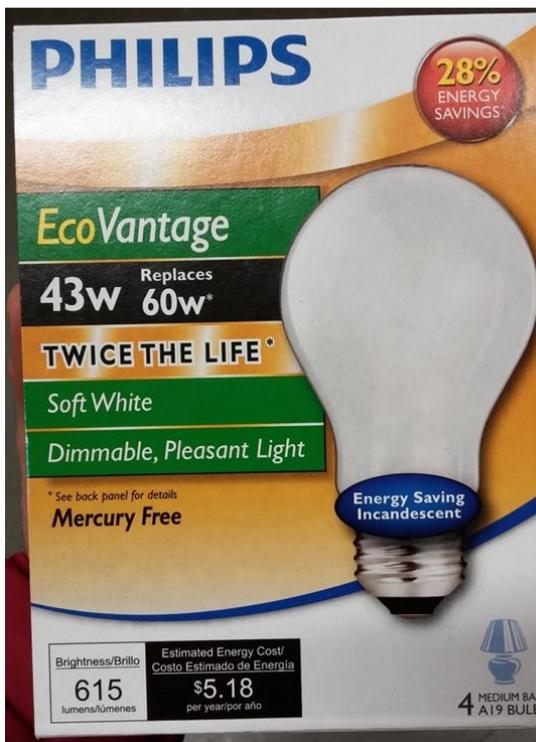
³ Northwest Energy Efficiency Alliance, 2013. Residential Building Stock Assessment. Field research conducted by Ecotope in 2011-12.

⁴ NMR Group, Inc. 2013. Results of the Massachusetts Onsite Lighting Inventory Final. Prepared for Cape Light Compact, NSTAR, National Grid, Unitil, Western Massachusetts Electric, Energy Efficiency Advisory Council Consultants.

⁵ As referenced in the Preliminary TSD.

11. We recommend DOE, in coordination with the Federal Trade Commission (FTC) create and implement minimum lumen equivalency levels that may be used in lamp marketing claims.

Initial test results by DOE’s Caliper testing program showed extensive “over claims” being made by manufacturers when making comparisons to conventional incandescent lamps. For example, several LED makers made claims such as 10W = 60W, even though their lamps were much dimmer than the 800 or greater lumens that a conventional 60W incandescent lamp produced. Furthermore, several manufacturers are producing modified spectrum halogen incandescent lamps that produce only 620 lumens, roughly 200 lumens less than the conventional 60W incandescent lamp and making equivalency claims to 60W lamps. It’s only in the fine print where the consumer can see that this equivalency claim is referring to incandescent modified spectrum lamps. Below is an example of Philips’ EcoVantage product which contains a 60W equivalency claim. The buyer is unlikely to be aware that this is a modified spectrum lamp since this information is relegated to the fine print on the back of the package. This example is not meant to single Philips out as other manufacturers are marketing their products in a similar way and making similar claims.



* Compared to a 60 watt A19 incandescent bulb with 860 lumens and a lifetime of 1,000 hours (or compared to a 60 watt A19 incandescent modified spectrum bulb with 640 lumens and a lifetime of 1,000 hours), this 43 watt modified spectrum EcoVantage bulb with 615 lumens and a lifetime of 2,000 hours saves 28% energy.

This bulb meets the modified spectrum lumen requirements stated in the Energy Independence and Security Act of 2007 (EISA).

This bulb uses energy saving incandescent technology (also called energy saving halogen). The halogen capsule inside enables this EcoVantage bulb to perform like a standard incandescent bulb while using less energy.

* Comparada con una bombilla incandescente A19 de 60 vatios con 860 lúmenes y una vida útil de 1000 horas (o comparada con una bombilla incandescente A19 de espectro modificado de 60 vatios, con 640 lúmenes y una vida útil de 1000 horas), Esta bombilla de espectro modificado EcoVantage de 43 vatios con 615 lúmenes y una vida útil de 2000 horas ahorra 28% de energía.

Esta bombilla cumple con el requerimiento de lúmenes para una bombilla de espectro modificado establecido en la Ley de Independencia y Seguridad Energética del 2007 (EISA-2007).

Esta bombilla usa tecnología incandescente ahorradora de energía (también llamada halógena ahorradora de energía). La cápsula halógena que se encuentra dentro permite que esta bombilla EcoVantage se desempeñe como una bombilla incandescente estándar usando menos energía.

- Beautiful, Soft White Light
- Saves 28% Energy*



To help consumers make well informed purchasing decisions, we recommend DOE work closely with FTC to establish minimum equivalency levels. Manufacturers who choose to make a claim such as “10W = 60W” or “replaces 60W bulb” should be required to comply with the corresponding lumen output levels contained in a table established by FTC and DOE. We recommend DOE consider the lumen equivalency table published by ENERGY STAR in its

specification as a starting point. Manufacturers would not be required to make a lumen equivalency claim if they prefer not to.

Respectfully submitted,

/s/ Noah Horowitz

Noah Horowitz, Director, Center for Energy Efficiency Standards
Natural Resources Defense Council



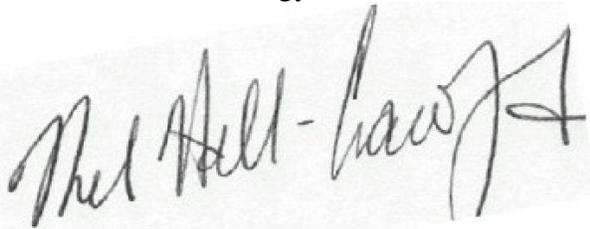
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Jennifer Amann, Building Program Director
American Council for an Energy-Efficient Economy



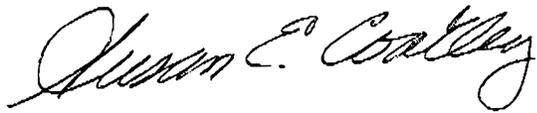
Rodney Sobin, Director of Research and Regulatory Affairs
Alliance to Save Energy



Mel Hall-Crawford
Energy Projects Director
Consumer Federation of America



Charles Harak, Senior Attorney
National Consumer Law Center on behalf of its low-income clients



Susan E. Coakley, Executive Director
Northeast Energy Efficiency Partnerships



Charlie Stephens, Senior Energy Codes and Standards Engineer
Northwest Energy Efficiency Alliance



Tom Eckman, Manager, Conservation Resources
Northwest Power and Conservation Council