

March 23, 2015

Ms. Taylor Jantz-Sell
US Environmental Protection Agency
Ariel Rios Building 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Ms. Jantz-Sell:

The Consortium for Energy Efficiency (CEE) respectfully submits the following comments in response to the *ENERGY STAR® Luminaire Criteria Discussion Document and Draft 1 Version 2.0*, released by the US Environmental Protection Agency (EPA) on October 10, 2014 and December 17, 2014.

CEE is the binational organization of energy efficiency program administrators and a staunch supporter of the ENERGY STAR Program. CEE members are responsible for ratepayer funded efficiency programs in 45 US states, the District of Columbia, and seven Canadian provinces. In 2012, CEE members directed nearly \$6.6 billion of the \$8 billion in energy efficiency and demand response program expenditures in the two countries. These comments are offered in support of the local activities CEE members carry out to actively leverage the ENERGY STAR brand. CEE consensus comments are offered in the spirit of strengthening ENERGY STAR so it may continue to serve as the national marketing platform for energy efficiency.

CEE highly values the role ENERGY STAR plays in differentiating energy efficient products and services that the CEE membership supports locally throughout the US and Canada. We appreciate the opportunity to provide these comments.

CEE Supports EPA Rationale for Increased Efficacy Levels for Directional Luminaires

Given the significant improvements in the performance of directional ENERGY STAR luminaires in the market, the continued rapid development of energy efficient technologies, and the likelihood that the effective date of the ENERGY STAR Luminaire Criteria will be in 2016, we appreciate the EPA goal to increase efficacy levels for directional luminaires. There is also a significant opportunity to capture additional energy savings in this category because the current efficacy requirements for directional luminaires are less stringent than those for the other product categories: nondirectional and inseparable luminaires. By calling for increased lighting efficacy in

directional luminaires, ENERGY STAR maintains market relevance by drawing attention to the top performing products in the market, and enhancing the energy savings that are available to efficiency programs and consumers.

The EPA proposal to increase efficacy for directional luminaires is based on an analysis of currently certified products as well as efficacy increases in LED technology that US Department of Energy (US DOE) has projected for 2015. EPA has also identified that a range of products is performing at these levels today, and has indicated that by the time the specification takes effect in 2016, additional improvements in source efficacy are expected.

The EPA proposal references the factors that were considered in the course of revising the specification; however, a detailed analysis as to how the specific efficacy numbers were derived has not been made available. Given this, CEE is supportive of the overarching EPA rationale for increasing efficacy for directional luminaires, but finds that it is unable to fully assess the specific efficacy requirements set forth in the proposal without the benefit of insight into how the levels were established.

CEE Does Not Support ENERGY STAR Establishing Future “Tier” Levels

The EPA Discussion Document proposed a strategy of signaling future efficacy levels based on the pace of technological progression observed in lighting, theorizing that this approach would enable the ENERGY STAR program, stakeholders, and end users to plan ahead more effectively and hence capture greater savings. We grant that EPA analysis suggests a significant opportunity to capture future savings and that, in theory, this could support the identification of future targets based on an expectation that the evolution of efficient lighting technology will continue apace. While CEE understands the intent of this approach, we do not believe it is feasible to establish, with confidence, that future ENERGY STAR performance requirements will adhere to the ENERGY STAR guiding principles. For example, ENERGY STAR seeks to ensure that consumer investment in increased efficiency is recovered within a reasonable period of time. In this instance, it is possible that the price points of products meeting higher efficacy levels could shift significantly before the new levels become effective, thus diminishing program ability to accurately assess cost-effectiveness.

Another related concern is the principle that qualifying products are broadly available. When projecting future levels, product availability is less certain. In light of these challenges, we wonder whether there may be a role for the development of ENERGY STAR Most Efficient recognition criteria in this product category and, in general, suggest that greater value is maintained when ENERGY STAR is able to address the implications of ongoing market evolution through more direct means. In this way, the ENERGY STAR brand promise, which is so important to the future success of over 60 product areas, can be maintained while serving the stated objective of continuing to advance performance. In addition, CEE performance tiers represent an opportunity

to identify technically achievable and projected cost-effective performance levels independent of a consumer facing product labeling effort.

In past comments on other ENERGY STAR product categories, including televisions, set-top boxes, and dishwashers, CEE raised concerns when ENERGY STAR recommended setting future performance levels. We believe the same issues apply to this proposal. To maximize savings and maintain relevance in the market, it is ideal for ENERGY STAR to continue to evaluate all specifications frequently and undertake revisions as dictated by market conditions. CEE recognizes that specifying future ENERGY STAR requirements significantly ahead of the proposed effective date promises certain benefits, such as affording manufacturers longer lead times, reducing the number of specification revisions to be undertaken, and ensuring that ENERGY STAR is positioned to ramp up its performance requirements over time. However, if these scheduled increases fail to correctly reflect future market conditions, we are concerned that the needs of efficiency programs may be susceptible to falling out of alignment with ENERGY STAR and that consumers may not realize the expected cost-effective energy savings.

Regardless, if the strategy of specifying future requirements goes forward, we believe that EPA would be well served by explicitly informing stakeholders that EPA reserves the right to amend the program's future requirements in order to protect the integrity of the ENERGY STAR brand. We also suggest that it would be prudent for ENERGY STAR to undertake a market review at least six months before a scheduled change goes into effect, preferably timed to key decision points for the lighting industry, including retail procurers, to ensure that the changes being contemplated remain in line with the ENERGY STAR guiding principles.

CEE Supports Modifying Light Engine Definitions to be More Inclusive of New Product Designs

We suggest that the current ENERGY STAR definition for light engines does not capture the significant technical developments that have occurred in the market with regard to product design. In particular, manufacturers have made advancements in developing luminaires that successfully incorporate replaceable components through more sophisticated light engines that include multiple LED modules and drivers. CEE has been very supportive of these new product designs because luminaires designed with replaceable components can prevent consumers from having to discard the entire luminaire in the event of the failure of one element. Like EPA, CEE sees value in supporting markets for replaceable parts, both for purposes of enhancing serviceability as well as for promoting resource conservation. Products submitted for consideration in the 2014 *Lighting for Tomorrow* competition highlighted the fact that some fixtures are employing replaceable module approaches, but lack one or more characteristics that would allow them to meet the current EPA definition of an LED light engine. As result, these fixtures are unable to receive ENERGY STAR certification, and CEE members are unable to promote these high performing luminaires within their programs. In recognition of the fact that light engines have evolved significantly, CEE supports adoption of the EPA updated definition for

light engines so that it is more inclusive of the variation of product designs available in the market.

CEE Supports Retaining Requirements for Color Angular Uniformity, Start Time, and Zonal Lumen Density to Ensure Product Quality

Given the ongoing evolution of luminaires, CEE supports EPA efforts to reassess the relevance of the different metrics included within the ENERGY STAR Luminaire criteria to reflect product development and market trends. CEE appreciates the careful analysis that was conducted, and supports EPA's decision to retain requirements for color angular uniformity, start time, and zonal lumen density to support the objective of only certifying high light quality products that yield a positive consumer experience. The CEE Lighting Committee has carefully reviewed the feedback from EPA recognized test laboratories that have significant experience regarding performance of all lighting products in the market. Based on their knowledge of the market, test laboratories have shared concerns about poor performance of non-ENERGY STAR products with regard to start time, color angular uniformity, and zonal lumen density. Accordingly, CEE favors the application of minimum performance levels for these three metrics in order to maintain consistently high quality among ENERGY STAR luminaires.

CEE Recommends Careful Consideration of Qualification and Promotion for Screw Based Luminaires within the ENERGY STAR Program

CEE appreciates the potential for increasing the penetration of efficient lighting products through ENERGY STAR recognition of screw based luminaires that are shipped from the factory with ENERGY STAR lamps. However, CEE also sees certain risks to this approach. We recognize that designs incorporating this approach tend to simplify the process of replacing a lamp as compared with designs that require a pin based lamp, because there is much wider availability of screw based lamps in the market. But by the same token, luminaires that are compatible with a variety of screw based lamp types leave the door open for consumers to install a less efficient lamp upon replacement. CEE members believe there will ultimately be some portion of consumers that will choose to install inefficient lamps after their ENERGY STAR lamps fail, and this possibility reduces the lifetime savings they are able to claim for screw based ENERGY STAR luminaires.

Furthermore, CEE questions the pertinence of awarding an ENERGY STAR designation to a luminaire that may not, in and of itself, be inherently energy efficient. In other words, if the included lamp is what confers ENERGY STAR qualification on the luminaire, CEE suggests that EPA may wish to consider alternative approaches to messaging for screw based luminaires that are sold in this manner. One solution could be allowing manufacturers to display the ENERGY

STAR logo on the packaging, provided an ENERGY STAR lamp is included within. In this scenario, it would still be important to convey on the packaging that it is the **lamp** that qualifies for ENERGY STAR, not the luminaire.

CEE Supports Recognition of Controllable and Connected Lighting if Particular Representations of Benefits to Consumers and Programs are Specified by the Manufacturer

CEE supports ENERGY STAR efforts to recognize luminaires with enhanced controllability and communication functionality. While programs may not yet be able to claim additional savings for these types of fixtures, we see these products as desirable in terms of other benefits. In particular, CEE Connected Committee has categorized the potential benefits of connectivity into “utility benefits” and “customer benefits,” as outlined below. CEE recognizes that some overlap in these categories may exist.

Utility Benefits

- **Grid balancing and load management** Connectivity has the potential to enhance product ability to contribute to a smarter grid, and offset or postpone the need for new supply side resources. A connected product with a dispatchable load that can predictably both shed or absorb capacity could intelligently avoid peak periods, respond to a utility demand response signal, or smooth out the impact of intermittent renewable generation resources.
- **Program EM&V data** Connected products have the ability to provide program administrators with specific data to measure the impact of their energy efficiency and demand response programs. Members are particularly interested in leveraging connected products to measure the persistence of savings in behavior change programs; however, many widget programs could benefit from field data collection. Performance data collected on a frequent basis, for example, 15 minute intervals, can also provide important information about energy savings opportunities within the home that inform program design and targeted program offerings.
- **Ancillary services** Interest in using demand response and energy efficiency resources to supply low cost reliability products to the bulk electricity system is of increasing interest due to the anticipated impacts of large scale intermittent generation and the ongoing need to address unexpected changes in energy demand or supply. Connected products can enable the higher levels of accuracy and precision that are required when measuring program impacts intended for use in these markets.
- **Enhanced customer engagement** Connected products that offer predictable energy information via open communication pathways have the potential to contribute to CEE member efforts to better understand and serve particular customer market segments through the development of targeted DSM programs.
- **Integrated DSM program offerings** Many CEE members continue to face regulatory and organizational silos when it comes to efficiency, demand response, rates and tariffs, and renewables. Connected products that help meet critical objectives for each of these organizational silos offer an opportunity to bridge these regulatory divides and invite coordinated promotion to the benefit of customers and society.

Customer Benefits

- **Financial savings through new energy efficiency and demand response opportunities**
Connected products can provide actionable information that will compel energy saving behaviors and empower customers to more wisely manage their energy use. The ability to capitalize on time of use rates and participate in DSM programs may be enhanced in a connected world if products meet the consensus needs of program administrators.
- **New non-energy benefits** CEE members have the opportunity to better serve their customers by identifying connected products that will provide new amenity in a consistent, credible manner. Carefully screened connected products can provide remote control, enhanced comfort and convenience, data security, and enhanced customer engagement.

We ask that the ENERGY STAR criteria for connected luminaires be designed to enable benefits such as these, and that, in general, all connected requirements specified by EPA be characterized by a clear link to an intended benefit.

We Applaud EPA Commitment to Open, Nonproprietary Communications and Seek the Additional Specification of Pathways to Ensure Consumer Realization of Potential Benefits

CEE applauds the EPA proposal to disallow architectures that fail to provide an open, nonproprietary means of achieving grid connectedness with the appliance via interoperability with open standard peripherals and applications within the bounds of the customer's premises. A number of communication technologies and protocols are presently used by consumers, depending on available infrastructure and regulatory environments. Maintaining an appropriate focus on openness, function, and communication technology neutrality allows EPA to define the salient objectives of a connected architecture for end use integration, while avoiding conflicts with the efforts of standards bodies to develop, validate, and ratify the evolving portfolio of intelligent grid communications topologies. These bodies include the Institute of Electrical and Electronics Engineers, Society of Automobile Engineers, American Society of Heating, Refrigeration Air-conditioning Engineers, Consumer Electronics Association, American Society for Testing and Materials, National Institute of Standards and Technology, and others. We encourage EPA to keep this high level principle in mind as it develops tight language to ensure open, nonproprietary communication.

Such an approach, coupled with the assurance that connected products support multiple communication pathways, ensures that the customer has the ability and flexibility to choose how their end uses are connected in the future, and also avoids any onus on the customer to purchase ancillary devices to fully enable two-way connectedness. EPA's proposal appears to provide the flexibility necessary to allow manufacturers, utilities, and other efficiency and demand response program administrators to support customer needs, however, we are concerned that as a critical mass of DSM administrators seek to connect with an end use, additional requirements will prove

necessary. This is particularly true for the more traditional direct load control programs, where regulators have come to expect that the DSM administrator has established a long-term, reliable connection with customers that does not rely on either customer broadband or the maintenance of a cloud network by a product manufacturer. While we believe that an open, nonproprietary means for achieving two-way connectedness within the bounds of the customer's premises should be a base requirement for obtaining connected certification, CEE supports alternative means as long as these modes are made available in addition to those that ensure that the customer has the ultimate say, and ensures that emerging communication pathways are not squelched. Further, we note the importance of support from ENERGY STAR on the subject of compatibility across multiple products and manufacturers, such that customers continue to retain flexibility relative to future product choice across manufacturers.

Specifically, we make the following observations:

- **Information based behavior change demand response programs are emerging, and merit the support of ENERGY STAR.** In several states, demand response portfolios are increasingly adding new programs that communicate information, for example, a peak price or reliability challenge, via a compelling consumer engagement technology, such as an in home display. These types of programs commonly ride the coattails of an engaging technology that provides nonenergy benefits, and often communicate via an Internet or cellular connection. This program approach, which is distinctly different from direct load control, is designed to share the responsibility of program implementation with third parties, and may not face the challenges we highlight in making the argument that EPA ought to require connectivity within the physical premises of the home. However, these programs remain in the minority, and CEE members report that direct load control programs are expected to remain common in many states for the foreseeable future. Consequently, we recommend that the ENERGY STAR Program require communication pathways that support both direct load control programs and emerging information based behavior change programs.
- **While customer supplied broadband may be a viable way to achieve connectedness within a customer's home, we note that there remain a significant number of customers nationally who do not have access to broadband or wireless.** Furthermore, there are customers who may not be willing to commit to the use of their broadband connection by their utility for purposes of enabling demand response. Given that the ENERGY STAR Program is a mass-market program, we recommend that a connected end use be equipped to communicate via all major communication pathways so as not to inadvertently preclude or limit market development and participation in potential utility programs. Requiring the inclusion of a standardized modular port is another option that addresses the fact that program administrators operating under diverse sets of conditions, such as differing regulatory or geographic environments, customer density, or asset life cycle, are likely to benefit from access to a variety of communication technologies to reach devices for demand response, energy efficiency, and other amenities afforded by connected. A modular approach that is based on an open standard is one option to address this diversity and provide consumers with flexibility.
- **Regulators in some states may determine that cloud solutions compromise customer data privacy and security due to the introduction of a third party into the flow of customer data**

and appliance control. We recommend EPA carefully address how its connectivity requirements will safeguard customer data.

- **Requiring that appliances communicate in an open, nonproprietary manner from within the customer's premises, in addition to any cloud connectivity, optimizes the customer's ability to choose who manages their appliance in the future.** For example, a customer may choose to pay their local cable company to, in addition to managing cable broadcast recordings, manage when their appliance consumes energy based on their current rate structure. However, a few months later, that same customer may decide to allow their security system provider to manage their appliance's energy consumption along with their security settings and lighting to maximize savings and comfort. Open access within the physical premises of the home helps ensure that the customer is afforded the ability to choose which offer to participate in based on individualized needs and wants.
- **We suggest that the DOE and EPA take steps to ensure that connected appliances are capable of receiving and responding to price signals as well as reliability signals.** Some CEE members are moving toward offering time based pricing in the residential market. A customer may enroll in a time based rate to capture the financial benefits of their connected appliance. In this scenario, signals sent to an appliance would be price based, as opposed to reliability based. Our understanding is that the current US DOE draft test procedure for demand response functionality only addresses reliability based signals, though time based pricing is mentioned as a possible signal type. While reliability will be an important consideration for demand response events, the price of power will also be important and could more frequently determine demand response events, particularly for purposes of delaying and shifting load. Consequently, a test method that can evaluate the appliance's ability to respond to price signals will be necessary to verify that the consumer will capture the financial benefits of remand response. This is especially true of cyclic, intermittent end uses. The consumer's ability to shift load to lower price, off-peak periods would be greatly enhanced with price signal capabilities.
- Lastly, CEE support for connectivity is contingent on the availability of credible test methods to evaluate such functionality. As such, CEE is supportive of ENERGY STAR efforts to develop new test methods that are sufficient to evaluate differences in functionality enabled by enhanced controllability or connectedness. In addition to the development of test methods for color tuning and standby power, CEE recognizes that it may also be desirable to evaluate color shift dimming. As with all test methods, CEE supports efforts to ensure performance while minimizing cost to manufacturers.

Thank you for your consideration of these comments. Please contact CEE Program Manager Eileen Eaton at (617) 337-9263 with any questions.

Sincerely,



Ed Wisniewski
Executive Director