Consortium for Energy Efficiency

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January 8, 2010

Alex Baker
US Environmental Protection Agency
Ariel Rios Building 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Richard Karney
US Department of Energy
1000 Independence Avenue SW, EE2J
Washington, DC 20585

Dear Mr. Baker and Mr. Karney:

The Consortium for Energy Efficiency (CEE) respectfully submits the following comments in response to the ENERGY STAR Qualified Lighting Integration Proposal, released by the Environmental Protection Agency (EPA) and the Department of Energy (DOE) on December 4, 2009. The following comments, which were developed by the CEE Residential and Commercial Lighting Committee (Committee), are supported by the organizations listed below.

General Comments

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 38 U.S. states and 8 Canadian provinces. In 2009, CEE members directed over $6 billion of energy efficiency program budgets in the two countries. In short, CEE represents the groups that are actively working to make ENERGY STAR the relevant platform for energy efficiency across North America.

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. CEE thanks EPA and DOE for developing the proposed integration plan for ENERGY STAR qualified lighting as we believe it demonstrates the administration's commitment to achieving transformative energy efficiency improvements—a goal that we share.

CEE strongly supports the enhancements outlined in the Integration Proposal, including the use of a technology neutral approach for ENERGY STAR fixture and lamp specifications. The Committee is eager to participate in the stakeholder process to develop these specifications to ensure that the resulting specifications are appropriately stringent and to assist EPA in overcoming the inevitable challenges in integrating the specifications, including equitably addressing the unique attributes of these technologies, e.g., flicker, mercury, and dimming in fluorescent lighting and zonal lumen density in solid state lighting (SSL).

In pursuing a program that relies on technology neutral specifications, balances aesthetic and functional considerations, and delivers enhanced quality assurance, CEE thanks ENERGY STAR for clearly outlining its commitments to: 1) administer specification revision processes that are open, transparent, and incorporate stakeholder input while providing adequate transition time, 2) capture increased efficiency and economies of scale from an integrated approach, and 3) remove overlap or contradiction between specifications to eliminate confusion. CEE agrees that by honoring these commitments, the ENERGY STAR Lighting Program will be poised to capture even greater energy savings in the future.

Residential Light Fixtures

In ENERGY STAR's work to integrate the Program Requirements for Residential Light Fixtures (RLF) and for Solid-State Lighting Luminaires, CEE supports the proposal to consider the fixture type (defined by industry accepted sources) when establishing testing requirements. This approach would use a luminaire efficiency metric for those products where light output is an important attribute for the consumer ("functional" fixtures) and a light source efficiency metric for those products where appearance is more important than light output ("decorative" fixtures). The approach would place the additional burden and cost of luminaire efficiency testing only on those products for which light output is an important factor in the consumer's purchase decision.

The success of this approach depends upon the level of consensus reached within the lighting and efficiency industries about the fixture type definitions referenced by the ENERGY STAR program. ENERGY STAR is proposing to base its fixture type definitions on a 2009 white paper from the National Electrical Manufacturers Association (NEMA) and the American Lighting Association (ALA).[1] Based on its review of the NEMA-ALA white paper, CEE presents the following questions for ENERGY STAR to consider. First, a large group of applications fall into the category titled "both functional and decorative," including chandeliers, pendants, surface mount products, and portable fixtures. We request greater clarity from ENERGY STAR about how it will

[1] LSD 51-2009: Solid State Lighting—Definitions for Functional and Decorative Applications, NEMA Lighting Systems Division & American Lighting Association, 2009.

assess these products. Because they have some functional attributes, will their efficiency be measured at the luminaire level? (Conceptually, CEE supports this approach.) If not, how will ENERGY STAR prevent the "both functional and decorative" category from becoming a loophole that offers less burdensome product qualification? Second, the white paper lists wall sconces as a "decorative" fixture type, though they are often used in hotel corridors, elevator lobbies, common areas, etc., as the sole source of illumination. In these cases, the sconces are serving a functional purpose, not only a decorative one. How will this particular circumstance be addressed by ENERGY STAR? And, on a larger scale, what steps will ENERGY STAR take to develop consensus in the lighting and efficiency industries about the fixture type definitions it references?

The success of this approach also depends on how the program is implemented in the market. Conceptually, CEE supports the proposal to evaluate the efficiency of fixtures that are clearly "functional" (regardless of technology) at the luminaire level and the proposal to evaluate the efficiency of fixtures that are clearly "decorative" (regardless of technology) at the light source level. However, before supporting the approach in more than concept, we need to understand how these specifications would be rolled out in the market. Would functional and decorative products be differentiated at retail with different versions of the ENERGY STAR label? Would the fact that decorative products have less burdensome testing requirements (presumably enabling manufacturers to price these products lower than functional ones) encourage consumers to purchase decorative fixtures to serve a functional purpose? What are the unintended consequences of this approach and how will they be managed by ENERGY STAR?

CEE understands that for fixtures types currently covered by the SSL luminaires specification, no immediate changes are proposed. To assist stakeholders in understanding whether fixtures that are qualified under the RLF and SSL luminaires specifications in the near term are equivalent in performance and to inform the formal specification integration process set to begin in February 2010, CEE requests that a side by side analysis of ENERGY STAR fixture specifications be developed and shared with stakeholders. To maximize the usefulness of this document, this side by side analysis should indicate not only what the specification requirements are, but also how representative the requirements are of typical use for a given application. For example, was the minimum light output for recessed downlights within the SSL luminaires specification (575 initial lumens for recessed downlights of > 4.5" aperture) set to be consistent with the light output from standard light sources?

CEE seeks greater clarity from ENERGY STAR regarding the use of application categories in the technology neutral ENERGY STAR fixture specification being developed in 2010. Currently, the SSL luminaires specification requires testing methods, efficacy requirements, and light distribution patterns that vary based on the specific fixture type (e.g., recessed downlight, undercabinet, outdoor pathway, etc.). We would like to better understand whether these

application categories would continue to be used once a technology neutral specification is developed.

Finally, for planning purposes, CEE requests additional detail on the timeline of the specification integration process. We understand that it will begin in February 2010 and we request an estimate from ENERGY STAR about the completion date and about the effective date of the resulting specification.

Replacement Lamps

CEE supports the development of technology-neutral specifications for ENERGY STAR lighting and agrees with the proposal to integrate the current ENERGY STAR Compact Fluorescent Lamp (CFL) specification and the Integral LED Lamp specification, though we foresee challenges in equitably addressing the unique characteristics in each technology, (e.g., directional vs. omni-directional light distribution) and in ensuring that the resulting specification is appropriately stringent. To help ENERGY STAR overcome these challenges, CEE looks forward to participating in the replacement lamp specification integration process. To inform its comments, CEE will draw upon the expertise of the Residential Lighting Committee, which has been working over the past year to identify potential enhancements to the ENERGY STAR CFL specification. The outcomes of this ongoing Committee work will be summarized and communicated to ENERGY STAR as soon as possible so it can serve as an input to the replacement lamp specification integration process.

Due to the fact that the CFL specification was recently revised and the Integral LED Lamp specification was recently finalized, CEE also supports the timing of this integration process, set to begin in late 2010 after the completion of the fixture specification.

Commercial and Industrial Light Fixtures

CEE would like to better understand how an ENERGY STAR presence in commercial and industrial lighting would fit within the broader ENERGY STAR approach to the commercial and industrial sectors, which focuses on assessing and improving efficiency at the whole building level. Until we gain greater clarity on this question, CEE is not prepared to comment on the proposal to explore expanding the current ENERGY STAR SSL luminaires specification for limited commercial applications to a technology-neutral specification for commercial lighting. If stakeholders agree during a future specification development process that an ENERGY STAR label for commercial and industrial lighting applications is warranted, CEE asks ENERGY STAR to provide sufficient notice so that we can convene members to discuss how existing programs for commercial and industrial buildings and for commercial and industrial lighting should be modified to reflect the presence of an ENERGY STAR label for lighting in these markets.

Verification Testing

CEE supports ENERGY STAR's plans to develop and maintain a robust and comprehensive quality assurance program to verify that qualified lighting products perform at or above the level set by ENERGY STAR specifications. Based on the March 2009 ENERGY STAR Summary of Lighting Programs, 87 organizations rely on the ENERGY STAR label in their promotion (e.g., financial incentives and/or consumer education) of efficient lighting locally.

CEE agrees with the proposal to continue to operate the verification testing programs that are already in place while a more comprehensive verification testing program is developed for implementation in the longer term. Within the enhanced verification testing program, CEE encourages ENERGY STAR to increase the level of detail it provides to stakeholders when test results indicate a product is not meeting ENERGY STAR specifications. To inform their promotion of efficiency lighting locally, CEE members would benefit from additional information on the product's performance (e.g., on what parameters it fell short and by how much) and on any decisions made by EPA regarding the product's ENERGY STAR qualification (e.g., was it disqualified and if not, why). A level of detail similar to that provided by the Program for the Evaluation and Analysis of Residential Lighting (PEARL) would best meet the energy efficiency programs' needs.

In developing the enhanced verification testing program, CEE also encourages ENERGY STAR to draw upon recent work of the Consortium to define members' test data and information needs for Solid State Lighting. In a Position Paper released in November 2009 (attached), CEE members outlined the information they will use to assess the efficiency and performance of fixtures using SSL. While the purpose of the Position Paper was to ensure that CEE members' interests are consistently and accurately conveyed to the SSL industry, the information contained therein was developed and considered by a host of program administrators and may serve as a logical starting point for the ENERGY STAR verification testing program. To inform the ENERGY STAR process, CEE would be happy to convene its members to extend the Position Paper to cover the other technologies to be included in the ENERGY STAR lighting program.

Test Procedures

To ensure accurate and reliable test results, CEE believes that industry standard test procedures are the strongest basis for ENERGY STAR lighting specifications. We appreciate that industry standard test procedures are still under development for some performance attributes covered under ENERGY STAR lighting specifications (e.g., lumen maintenance projection and light engine testing for SSL and dimmer compatibility for fluorescent lighting) and we fully support DOE's efforts to accelerate the development of these test procedures, as described in Table 3 of the Integration Plan.

Thank you for your consideration of these comments. Please contact CEE Senior Program Manager Rebecca Foster at (617) 337-9265 with any questions.

Sincerely,

Marc Hoffman

Executive Director

CC: Kathleen Hogan, DOE

Jim Brodrick, DOE

Ann Bailey, EPA

Supporting Organizations

Avista

BC Hydro

Cape Light Compact

Efficiency Maine

Efficiency Vermont

Energy Trust of Oregon

National Grid

New York State Energy Research and Development Authority

Northeast Energy Efficiency Partnerships

NSTAR

Pacific Gas & Electric

Puget Sound Energy

Sacramento Municipal Utility District

San Diego Gas & Electric

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Wisconsin Focus on Energy

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Position Paper on Solid State Lighting in Efficiency Programs

This position paper is intended to support the energy efficiency program industry in its effort to effectively communicate with the SSL industry and responsibly identify and assess applications that appear ready for SSL promotion and market introduction. The information below was developed by CEE members in response to questions and considerations typically encountered by members in the course of communications with the SSL industry. By having the benefit of responses developed and considered by a host of program administrators and making these readily available to all CEE members, the intention is to better ensure that members' interests are consistently and accurately conveyed to the SSL Industry. This will help to advance the greater objective of our work, to accelerate the integration and promotion of quality, efficient SSL products by CEE member organizations and others that can benefit from resulting momentum.

Basics on Voluntary Efficiency Programs

What are common drivers of energy efficiency programs?

Energy efficiency programs, including those administered by CEE members, independently determine the nature and approach employed within their respective programs, considering a host of objectives and factors. Although there are variations across energy efficiency programs in the U.S. and Canada, many independently opt to incorporate standard elements recommended by CEE, such as CEE's Super-Efficient Specifications or Recommended Guidelines (See the Energy Efficiency Program Requirements for SSL section).

Energy efficiency programs are usually funded through utility ratepayer contributions—assessed through utility bills—with the money specifically designated for advancing energy efficiency goals. Together, U.S. and Canadian energy efficiency budgets topped $4.5 billion in 2008, as explained in the CEE's 2008 Annual Industry Report. Because most energy efficiency programs are overseen by state regulatory entities (e.g., public utility commissions), sales data and/or project information is generally required to demonstrate that the money spent by the efficiency program is generating the expected benefits in its jurisdiction.

In addition, energy efficiency programs need assurance that the expected energy savings will be realized over the life of the product they helped to promote. This aspect explains why energy efficiency programs require detailed product information as described in the Recommended Guidelines and why many reference specifications, such as those set by CEE and ENERGY STAR,

in their programs. The price of products is also an important factor because if a fixture costs more than the energy savings delivered over its lifetime, it won't be cost-effective for the end consumer.

Lastly, energy efficiency programs often (though not in all cases) need to demonstrate to the end customer that they supported the product in some way, e.g., through a rebate.

What types of incentives do efficiency programs commonly use?

Generally, energy efficiency programs use several methods to promote energy efficient products and services (and some programs may combine elements). One common method is to offer incentives for the more efficient product or service. Although individual programs often include incentives, the incentive amounts often differ as they are typically determined by a screening process that includes considerations such as the total cost of the incentive (to the end customer) and the total benefits (energy and non-energy benefits in that particular service area based upon the costs of delivering incremental energy services). In most cases, the resulting system and/or customer benefits must be equal to or greater than the cost.

There are two basic types of incentives.

- Prescriptive Incentives – These incentives are provided at a set dollar amount per product as detailed above. This approach is most commonly used in residential programs, as well as some commercial programs. Prescriptive incentives are generally at the product scale.
- Performance Incentives – These incentives are more customized than prescriptive incentives. They are commonly used in the commercial sector (generally businesses and industrial facilities) and they vary based on the energy savings that are applicable to the particular project in question. Performance incentives generally apply to more complex system-level improvements.
- Incentives can be directed to different market actors.

Upstream Incentives – These incentives target manufacturers or retailers. These incentives can have a greater impact on the end buyer than downstream incentives (see below) because they result in a lower wholesale cost.

Market Share Incentives – One type of upstream incentive is a market share incentive, where a manufacturer or retailer is rewarded when they increase the product's share in the market over time. The incentive level may be measured based on manufacturer shipments to the service territory, retailer sales data, or retailer shelf-space surveys.

Cooperative Advertising – In this type of upstream incentive, funding is made available to participating market actors (manufacturers, retailers, contractors, etc.) for advertising designed specifically to promote energy efficient products. The advertising copy is

approved by the energy efficiency program and the cost of approved advertising is shared by the energy efficiency program and the market actor.

Salesperson Incentives – This type of incentive encourages the retail, showroom, or distributor sales staff to make higher sales of qualifying products. (It is currently being utilized in for select SSL products in the Wisconsin Focus on Energy program.)

Downstream Incentives – These incentives target the end buyer of the product or service.

Mail-In Rebates – This downstream incentive can be distributed by efficiency programs, manufacturers, or retailers. A mail-in rebate is submitted by the buyer, after purchase, to the sponsoring energy efficiency program for processing.

Instant Coupons – This incentive type takes an instant discount off of the qualifying product at retail. The retailer then collects the coupons and sends them to the sponsoring energy efficiency program for processing.

<table>
<tr><th colspan="2">Common Residential Program Types</th><th colspan="2">Common Commercial Program Types</th></tr>
<tr><td rowspan="4">Manufacturer/ Retailer/ Distributor</td><td>Prescriptive (most)</td><td rowspan="4">Manufacturer/ Retailer/ Distributor</td><td rowspan="4">Performance or prescriptive</td></tr>
<tr><td>Market Share (some)</td></tr>
<tr><td>Cooperative Advertising (some)</td></tr>
<tr><td>SPIFFS (some)</td></tr>
<tr><td>In-house programs (such as audits or new construction)</td><td>Performance or prescriptive</td><td>On-site programs (such as audits or new construction)</td><td>Performance or prescriptive</td></tr>
</table>

For more information, please see the Commercial and Residential Lighting Program Summaries, each of which include details about the SSL programs offered by CEE members.

Basics on Energy Efficiency Program Approaches to SSL

Efficiency programs are cautious but optimistic about SSL. Why?

Rapid progress in solid-state lighting (SSL) research and development (see the Department of Energy's SSL R&D Portfolio) has resulted in the advent of light-emitting diodes (LED) for general lighting applications. LEDs offer a number of advantages over current lighting technology. In addition to significant energy savings, high-quality LEDs have been shown to last longer and require less maintenance than incandescent and most fluorescent products. Most LEDs contain no mercury, lead, or other known disposal hazards. They excel in cold applications such as outdoor signs, street and area lighting, along with refrigerated display cases.[i]

LED technology is developing very rapidly, with new generations of LED light engines being developed about every 6 to 9 months. White LEDs are expected to replace existing lighting technologies in the not so distant future, but in the near term this rapid evolution can lead to poor quality products entering the market.[ii] Efficiency programs only want to support LED products that deliver significant energy savings and provide a high level of consumer satisfaction.

Why are energy efficiency programs interested in quality?

Recent tests conducted by the Department of Energy (DOE) CALiPER Program reveals that many product performance claims do not hold up under testing. Some time will need to pass before a level of consistently high performance can be achieved across the industry.

LED luminaires and replacement lamps available today often claim long life, usually 50,000 hours, which exceeds the life ratings of nearly all other light sources (except for some electrodeless sources). These claims are based on the estimated lumen depreciation of the LED used in the product and often do not account for other components or failure modes. One of the key lessons learned from early market introduction of compact fluorescent lamps is that long life claims need to be credible and backed-up with appropriate manufacturer warranties.[iii]

Applications and Product Design

Which technologies are of interest to energy efficiency programs?

Energy efficiency programs have observed rapid progress in the development of the SSL market. It has moved from niche applications (holiday strands, night lights, refrigerated cases) toward general illumination in outdoor and commercial spaces (parking lighting, commercial spaces, accent lighting).

Energy efficiency programs working in both commercial and residential buildings are interested in efficient and high-quality LED lighting products that can replace incumbent technologies without

compromising light output, light quality, or the convenience of dimming. To date, efficiency program efforts have targeted applications where directional light can be maximized and where the delivered light level is close to or better than other available light sources.

Why is the design of the SSL product important?

The optical, thermal and electrical systems need to be carefully designed, in order for a LED fixture to be able to deliver energy savings, maintain its performance over time, and work successfully within the electrical network.

Fixture efficiency (lm/W) and light distribution play an equal role in determining optical efficiency. Fixture efficiency is a function of the secondary optics and light loss within the fixture. To produce a high quality fixture, a manufacturer must carefully consider the lens or diffuser they are using, the placement of the light source, the shape of the fixture housing, and materials used in the fixture housing.[iv] Good design that considers both fixture efficiency (lm/W) and light distribution is required to achieve energy efficiency and produce minimal light pollution.

Heat management and an awareness of the operating environment are critical considerations to the design and application of LED luminaires for general illumination. Ensuring necessary light output and life of LEDs requires careful thermal management, typically requiring the use of the fixture housing as a heat sink or at least as an element in the heat removal design. Luminaires therefore have a fundamental and typically large effect on the luminous flux produced by the LEDs, and on the rate of lumen depreciation over time.[v]

If excess heat is not properly managed, it directly affects both short-term and long-term LED performance. The immediate effects are color shift and reduced light output which can lead to accelerated lumen depreciation and, thus, shortened useful life. As a result, it is necessary for the Junction Temperature (Tj) to be kept as low as possible and within manufacturer specifications in order to maximize the performance potential of LEDs.[vi]

The electronics of the driver selected will also significantly impact the performance of a fixture. Higher quality products will use drivers with high driver efficacy and good LED current control. In addition, fixtures with good electrical characteristics will have high power factors, and minimize total harmonic distortion and electronic magnetic interference.

LED "drop-in" replacement lamps, such as Edison-based reflector lamps or MR-16 replacements, are in theory designed to provide the necessary heat sinking for the LEDs. However, given that they are installed in fixtures not specifically designed for LEDs, good heat management could be a challenge.[vii] Efficiency programs are evaluating these kinds of products now and including them in their programs on a case by case basis.

Energy Efficiency Program Requirements for SSL

What product information do energy efficiency programs require?

Through the Residential and Commercial SSL Committee, CEE members have worked together to develop Recommended Guidelines for evaluating SSL products for inclusion in their programs. The Committee believes that the following test information and documentation is necessary to assess product performance and help enable the timely integration and promotion of quality, efficient SSL products:

Recommended Guidelines for Evaluating SSL Products for Inclusion in Efficiency Programs

Information Needs

The following is a list of CEE membership's information needs to evaluate the performance of SSL products as of June 2009.

- Results from LM-79 test reports (from independent labs, possibly including NVLAP facilities)
- Results from LM-80 test reports (from independent labs, possibly including NVLAP facilities)
- In-situ temperature testing (from OSHA approved Nationally Recognized Testing Laboratories)
- L_{70} determination
- Warranty information
- IES files
- Frequently asked questions (FAQ) or tutorials that explain the LM-79 and L_{70} reports

What specific information from the above list is required?

- LM-79 Test Reports: Energy efficiency programs require independent testing according to IES LM-79 that provides efficacy, output, color, and photometric distribution of LED products. It is important for manufacturers to note that both an Integrating Sphere Test and a Goniophotometer test are required to provide all the necessary information. Manufacturers should provide LM-79 testing report(s) with the following data:
    - Electrical Data, including input voltage, current in (A)mperes, power in (W)atts, power factor and THD.
    - Total Light Output, including luminous flux in Lumens, luminous efficacy in Lumens/Watt, and a zonal Lumen summary.
    - Luminous Intensity Distribution, including candela distribution and polar graph. (Additional data including spacing criteria, coefficient of utilization (CU) and isoilluminance plot may be requested.)

    - Color characteristics, including color temperature (CCT), color rendering index (CRI), chromaticity coordinates, and spectral power distribution (SPD).
- LM-80 Test Reports: Manufacturers should provide the LED Package Manufacturer IES LM-80 Test Report with results showing relative (%) light output over time at 55°C, 85°C and at a third temperature at the manufacturer's choice.
- In-situ Temperature Test Reports: Manufacturers may be asked to provide a report indicating the temperature of the hottest LED In-Situ in ANSI/UL 1598-04 (hardwired) or ANSI/UL 153-05 (corded) environments. This temperature measurement will be used with LM-80 data to validate lumen maintenance and useful life of product. Note that this temperature measurement should be specially requested by the manufacturer as they are getting their UL testing.
- L^{70} Determination: Manufacturers should provide written explanations of how L_{70} lifetime of products is determined using the IES LM-80 standard and in-situ temperature tests referenced below.
- Warranty: Energy efficiency programs require manufacturers to disclose their warranties for products under consideration. Manufacturers may be asked to provide 3-5 year warranties on LED products.
- IES Files: Manufacturers may be asked to provide absolute photometric testing data in IES LM-63 electronic file format.
- Additional Criteria - In addition to the information needs listed above, select efficiency organizations may also ask to see the following:
    - Proof of UL Listing: Manufacturers will often be asked to provide evidence of UL listing of product, including UL file number.
    - Accurate Literature Based on Testing Results: Many energy efficiency programs will seek confirmation that the test results of the product are the same as the product ratings listed in manufacturer literature or packaging. Products with inflated or inaccurate claims may not be eligible for rebates.
    - SSL Lighting Facts™ label: Many energy efficiency programs will look favorably on manufacturers that have joined the SSL Quality Advocates Program, and used the Lighting Facts™ label on their product packaging or specification sheets.[viii]

Where should manufacturers submit these data?

At the present time, the above information may be submitted directly to the CEE member energy efficiency program administrator with whom the manufacturer is interested in working (although a courtesy copy to CEE is requested).

CEE has defined the necessary characteristics of a binational database that could house the necessary SSL product information and provide energy efficiency programs with an expedited, efficient way to access the needed information (see below). This database is envisioned as an inclusive, common screening tool that CEE members could use to access product information to inform specification development and to assess products to determine if they meet their individual program needs. The central collection of these data would inform member programs without requiring members to replicate each other's data collection efforts and without overburdening manufacturers. CEE is currently evaluating options for developing such a database.

Necessary Attributes of an Information Database

The following is a list of considerations CEE will use to evaluate options for housing the above SSL information in a centralized resource to ensure that it meets member needs.

- Scope
    - Inclusive of all manufacturers of general illumination SSL products
    - No minimum threshold for product performance
    - Inclusive of all general illumination products:
    - Commercial/residential
    - Indoor/outdoor
    - Luminaires/replacement lamps
- Host Organization
    - Credible
    - Independent
    - Flexible, ability to readily add or change content, reports or system scope
    - Responsive to needed changes
    - Timely with changes and updates
    - Challenge Process in Place
- System Functionality
    - Web-based
    - Searchable by one or more considerations
    - Intuitive, based on Web usability principles
    - Readily available and easily accessible to all CEE members
    - Password protected
    - Has the storage and processing capacity to handle the anticipated data needs and requests
    - Includes date-stamp and flags for users when report is over one year old
    - Indicates information source

Related Issues

Why are independent testing lab reports necessary?

Energy efficiency programs are seeking key pieces of data, e.g. LM-79 reports, from independent testing laboratories to ensure that performance can be verified in the most rigorous assessments. Independent testing laboratories should be pre-qualified to follow LM-79 testing standards for integrating sphere and/or goniophotometric testing of SSL luminaires and lamps. Although the preferred source of data is independent test laboratories, energy efficiency programs are tracking the development of the National Voluntary Laboratory Accreditation Program (NVLAP) for LM-79 and are open to accepting NVLAP reports when that program becomes operational for SSL. The following is a list of test labs that are currently qualified for LM-79 testing (per 2008 CALiPER reports):

Laboratory	Integrating Sphere	Goniophotometry
Intertek, Cortland, NY	✓	✓
Independent Testing Laboratories, Inc, CO	✓	✓
Luminaire Testing Laboratory, Inc, PA	✓	✓
OnSpecX/CSA, GA	✓	
Lighting Sciences, Inc, AZ		✓

How does ENERGY STAR relate to energy efficiency programs?

The ENERGY STAR label is recognized by more than 70% of American households.[ix] ENERGY STAR specifications exist for a variety of lighting types, now including some SSL applications. Energy efficiency programs often give priority to products with the ENERGY STAR label or require ENERGY STAR qualification as a prerequisite for product promotion due to the fact that ENERGY STAR helps determine which products meet efficiency requirements and customer expectations regarding performance. However, there may be certain applications and product types where energy efficiency programs will develop their own qualifying specifications for products, particularly in the commercial sector. (An example of this is LED Refrigerated Case Lighting, where an ENERGY STAR label does not apply.)

Is RoHS compliance required?

The Restriction of Hazardous Substances (RoHS) is a European directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC. While most LEDs contain no mercury or lead as stated above, LED manufacturers should be aware of RoHs laws. RoHS restricts or sets maximum concentration values (MCV) for six hazardous materials, two of which are lead and mercury.[x]

Products containing these materials must comply with RoHS to be sold in Europe. In the United States, RoHS is currently voluntary, with NEMA encouraging US lighting suppliers to have RoHS compliancy by 2010.[xi] California has adopted its own RoHS directive, titled Electronic Waste Recycling Act of 2003, or EWRA. CA RoHS restricts MCV for four of the hazardous materials (including lead) and applies to covered electronic devices. Other states are reviewing whether or not to adopt similar laws. As well, there is a trend for lighting manufacturers to promote their products as RoHS compliant.[xii] RoHS compliance is not identified within CEE's Recommended Guidelines (as it's not currently a universal element of member programs), though energy efficiency programs continue to be steadfast about promoting energy efficient lighting products that are high quality for consumers and that mitigate the impact on the environment and human health. It is possible that energy efficiency programs may begin requiring RoHS compliant products in the future.

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[i] http://www1.eere.energy.gov/buildings/ssl/using_leds.html

[ii] http://www1.eere.energy.gov/buildings/ssl/reliability_overview.html

[iii] http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/cfls_july_lessons.pdf

[iv] http://www.cree.com/products/pdf/LED_Luminaire_Design_Guide.pdf

[v] http://www1.eere.energy.gov/buildings/ssl/thermal_mgt.html

[vi] http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/thermal_led_feb07_2.pdf

[vii] http://www1.eere.energy.gov/buildings/ssl/luminaire_efficacy.html

[viii] http://www.lighting-facts.com/

[ix] http://www.cee1.org/eval/2008_ES_survey_rep.pdf

[x] http://www.rohs.eu/english/index.html

[xi] http://www.geappliances.com/email/lighting/specifier/downloads/A_Short_Guide_to_Lamp_Disposal.pdf

[xii] http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=25001-26000&file=25214.9-25214.10.2

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