



CALIFORNIA LIGHTING TECHNOLOGY CENTER  
DEPARTMENT OF DESIGN

633 Peña Drive  
Davis, CA 95618  
Phone: (530) 747-3838  
Fax: (530) 747-3812  
cltc.ucdavis.edu

U.S. Environmental Protection Agency  
ENERGY STAR Program  
Ms. Taylor Jantz-Sell  
ENERGY STAR Lighting Program Manager  
1200 Pennsylvania Ave., NW, Room 6202J  
Washington, DC 20460

Re: Comments on EPA's ENERGY STAR Program Requirements  
Product Specification for Lamps (Light Bulbs), Version 1.0, Draft 3

January 17, 2013

Dear Ms. Jantz-Sell:

The California Lighting Technology Center, University of California, Davis, believes the ENERGY STAR program is critical to advancing consumer adoption of high-quality, energy-efficient lighting technologies. Transforming the nation's lighting from incandescent to solid-state technology will ultimately achieve significant energy savings, and it has the potential to greatly increase the quality of lighting as an amenity in our homes and places of work. However, this transformation will require the very best in LED technology to satisfy consumers' expectations for lighting quality and to support lasting changes in consumer purchasing patterns.

Traditionally, ENERGY STAR lamp requirements have largely focused on efficacy. When applied to CFLs, this narrow scope was coupled with utilities' programmatic focus on lower costs. This approach drove manufacturers to produce high-efficacy, low-cost products that, as a result, were lower in quality. These products have failed to engage American consumers. ENERGY STAR studies on market penetration of energy-efficient light sources show that less than 9 percent of American homes have reached the practical saturation level indicative of successful market transformation. Despite many years of ENERGY STAR support and massive utility program investments, this dismal level of market penetration persists because of the significantly lower quality of energy-efficient light sources compared to incandescent technology. Incandescent lamps may perform poorly in terms of energy use, but they excel in terms of lighting quality.

LEDs now present us with a second chance to transform the lighting market. The energy savings opportunity is larger than with CFLs, and LEDs have the potential to deliver lighting quality that comes much closer to incandescent light sources. We urge ENERGY STAR to establish high standards for color rendering and color consistency in LED replacement lamps by specifying a minimum CRI of 90 or above and color consistency of four MacAdam ellipses or better. While we understand that these color metrics constitute only part of a longer list of quality metrics, such as those related to dimming, flicker, longevity, and spectral composition for circadian rhythm requirements, they represent a starting point in addressing consumer preferences and expectations.

The California Energy Commission has already adopted a Voluntary California Quality LED Lamp Specification for residential applications, which includes a minimum CRI requirement. This is a clear indication that the industry and the utilities are ready and able to meet higher quality standards, yet leadership is still needed at the national level, in the form of quality-based ENERGY STAR specifications. A two-tier standard may be the best interim solution, as there are many suitable uses for LED lamps that provide lower color quality; the issue is ensuring that these are suitably labeled for consumers.



CALIFORNIA LIGHTING TECHNOLOGY CENTER  
DEPARTMENT OF DESIGN

633 Peña Drive  
Davis, CA 95618  
Phone: (530) 747-3838  
Fax: (530) 747-3812  
cltc.ucdavis.edu

We urge ENERGY STAR to develop a “Premium Quality” specification that will encourage the evolution of high-quality LED lamps with color quality comparable or superior to the incumbent incandescent technology. Our concern is that the current requirements for ENERGY STAR LED lamps fall short, and, as a result, may fail to win over the American consumer. We can certainly afford to err on the higher end of lighting quality to increase the chances of realizing market transformation. This needs to happen as soon as possible, to guide manufacturers to higher quality products, before the market is flooded with products that fall short of consumer expectations.

We encourage ENERGY STAR to refocus efforts on consumer preferences, including color quality and consistency, as LED lamps already far exceed incandescent lamps in terms of efficacy. Furthermore, compromises in efficacy for increased color quality are relatively small, and certainly worthwhile if they help LED lamps achieve broader consumer adoption. This approach is the best evidence-based strategy for seizing this sizable opportunity to achieve energy savings in the United States.

Sincerely,

Michael Siminovitch  
Rosenfeld Chair in Energy Efficiency, UC Davis  
Director, California Lighting Technology Center  
+1 (530) 747-3835  
[mjsiminovitch@ucdavis.edu](mailto:mjsiminovitch@ucdavis.edu)

Konstantinos Papamichael, Ph.D.  
Co-Director, California Lighting Technology Center  
+1 (530) 747-3834  
[kpapamichael@ucdavis.edu](mailto:kpapamichael@ucdavis.edu)

James R. Benya, PE, FIES, FIALD  
Director, Advanced Lighting Design Program, California Lighting Technology Center  
+1 (530) 747-3807  
[jrbenya@ucdavis.edu](mailto:jrbenya@ucdavis.edu)