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Mr. Andrew McAllister
Commissioner
California Energy Commission
Dockets Office, MS-4
Re: Docket No. 14-BSTD-01
1516 Ninth Street
Sacramento, CA 95814-5512



November 24, 2014

Cree Comments on Draft Language for the Residential and Nonresidential Building Energy Efficiency Standards and Associated Documents – 2016 Building Energy Efficiency Standards

Dear Commissioner McAllister

Cree welcomes the opportunity to participate in the Building Energy Efficiency Standards process with the CEC, and to provide the attached comments on the Proposed Title 24 efficiency recommendations.

Cree (Nasdaq: CREE), headquartered in Durham, N.C., is the leading U.S.-based developer and manufacturer of LEDs and LED Lighting products. Cree is leading the widespread adoption of LED lighting and making energy-wasting traditional lighting technologies obsolete through the use of energy-efficient, mercury-free LED lighting. Cree is a leading innovator of lighting-class LEDs, LED lighting and semiconductor products for power and radio-frequency (RF) applications.

As of October 14, 2014, Cree, Inc. owned or was the exclusive licensee of approximately 1,400 issued U.S. patents and 2,450 issued foreign patents. Cree innovation developed the TW Series LED Bulb that was First to Meet California Energy Commission Quality Lighting Specification in September of 2013. Cree's product families include LED fixtures and bulbs, LED lighting control systems, blue and green LED chips, high-brightness LEDs, lighting-class power LEDs, power-switching devices and RF devices. Cree products are driving improvements in applications such as general illumination, electronic signs and signals, power supplies and solar inverters.

LED Lighting provides California the opportunity to achieve unprecedented energy savings in residential and non-residential applications. Studies commissioned by the U.S. Department of Energy have shown that widespread adoption of LED lighting can remove as much as 10% of the total electrical load in the U.S. Key to realizing these savings is driving adoption, and widespread adoption requires lighting that does not force consumers and businesses to compromise on light quality and their lighting experience.

Our detailed comments follow, and we welcome the opportunity to contribute to this important effort.

Regards,

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Following are Cree's comments and recommendations on the Draft Language for the Residential and Nonresidential Building Energy Efficiency Standards – Docket No. 14-BSTD-01. We address the following items for **Appendix JA8 – Qualification Requirements for Residential Luminaires Using High Efficacy Light Sources:**

1. JA8.4.1 Luminous Efficacy
2. JA8.4.3 Start Time
3. JA8.4.5 Color Rendering Index and R9
4. JA8.4.6 Dimming and Flicker
5. JA8.5 Marking

Item 1) Luminous Efficacy

The current proposal is to require a minimum of 45 lumens/Watt for high-efficacy sources.

Cree's Recommendation is to set the minimum to at least 55 lumens/Watt.

Comments: Luminous efficacy of 45 lumens/Watt is easily attainable with current technology. Given the timeframe for implementation of these new requirements, California should aim higher.

Item 2) Start Time

The current proposal is to have a start time no greater than 0.5 seconds.

Comments: Cree supports this proposed requirement, as it is reasonable and cost-effective to implement.

Item 3) Color Rendering Index and R9

The current proposal is to have a minimum CRI of 90 and a minimum R9 of 50.

Cree's Recommendation is to align the light quality requirements, as well as most of the other performance requirements, between Title 20, Title 24 and the Voluntary California Quality LED Lamp Specification. Require CRI minimum of 90, R9 minimum of 50 and Efficacy minimum of 55 lpw (higher than the current 45 lpw number). Manufacturers can design and build to a common set of requirements, consumers and businesses will enjoy a consistent experience, and California will facilitate greater energy-efficient lighting adoption.

Comments: The primary objective of these standards is to drive energy savings in California. To maximize savings, we need to maximize adoption. Traditional lighting companies have repeatedly demonstrated that they are satisfied with limited adoption of energy-efficient lighting, as they continue to sell inefficient lighting to the rest of the market. Cree is solely focused on LED lighting, and our target is 100% adoption of energy-efficient LED lighting. 100% adoption requires lighting that's better, not compromised in important elements. Efficient lighting products that aren't installed and used deliver zero energy savings.

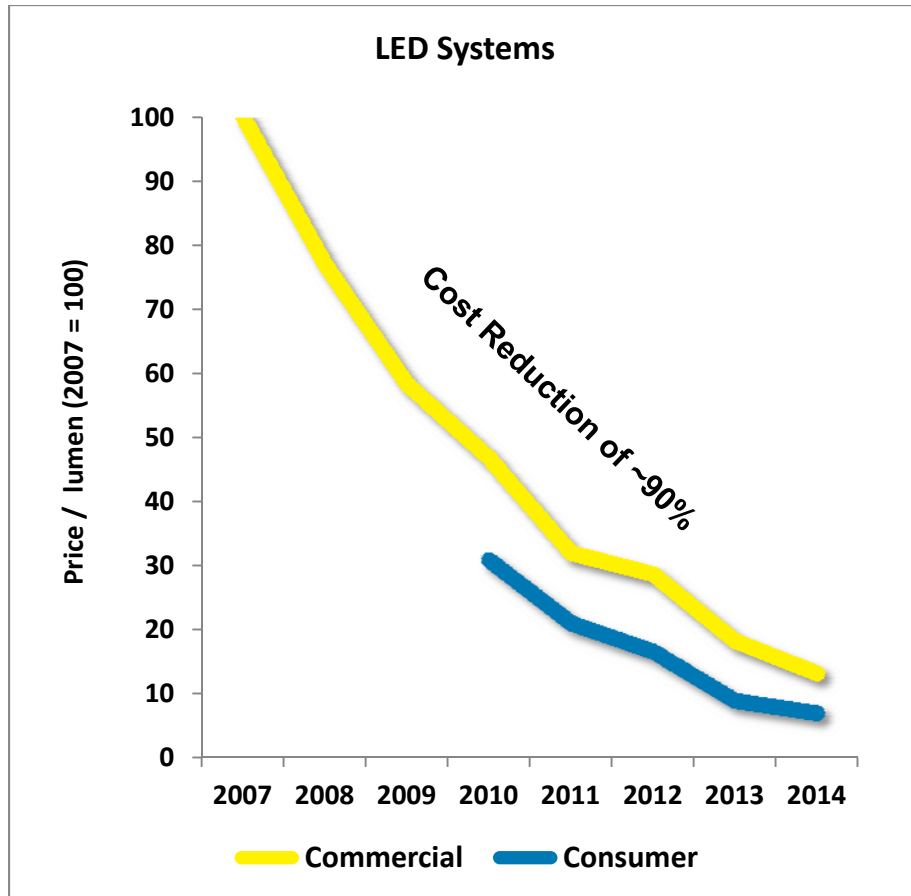
California should set the light quality bar high enough to facilitate adoption across the market. Committed manufacturers will innovate to deliver low-cost, high efficacy lamps with great light quality. Cree has delivered products to market using multiple technical approaches to achieve high-CRI, high-efficacy performance at competitive prices. Innovation is what is driving the LED lighting market adoption, and California should leverage coming improvements to achieve available energy savings.

Some parties have recommended against using CRI in energy efficiency standards. CRI is the accepted and well-understood metric available today, and at higher values, when used in conjunction with an R9 requirement, is a very accurate measure of light color quality. While the industry works to develop, approve and gain acceptance for an improved measure, standards should continue to specify CRI with R9.

To comments that a higher CRI causes excessive costs, we would argue that all product design elements require tradeoffs and impact cost. Requirements for dimming, power factor, efficacy, lumen output, lifetime, and others all impact product cost.

It's critically important that the standards don't compromise on the elements that drive adoption and product satisfaction. High CRI is not hard to do with today's LED technology, and adds minimal cost. Efforts by some industry members to drive down the CRI requirements use arguments that are outdated, irrelevant or outright disingenuous and are focused on "dumbing down" the performance of LED lighting to protect other technologies and to maintain revenue streams from obsolete products.

Cost is not an excuse for delivering an inferior product to market. For example, Cree introduced our 80 CRI down light in January, 2014 at a retail price of \$26.97, and recently introduced a new 90 CRI down light at \$24.97 with equivalent efficacy compared to the earlier version. Also, Cree recently debuted a new LED MR16 lamp with 92 CRI/R9 >50 at equivalent efficacy and a lower price (\$10 reduction at retail) than the previous 80 CRI version. As shown in the diagram below, Cree has consistently delivered significant cost decreases, while improving performance, and targets similar future improvements.



Failure to align the requirements of the multiple standards or compromising on light quality or other important performance elements will reduce adoption in California and decrease realized savings.

Item 4) Dimming and Flicker

Current recommendation is to require a dimmable lamp to dim to 10% of its full light output, meet the requirements of NEMA standard SSL7A as Type 1 or Type 2 products and pass a flicker test as specified in Joint Appendix JA10.

Comments: Cree supports the specification and flicker test as specified.

Item 5) Marking

Current recommendation is to list maximum rated input wattage, total luminous flux, CCT and CRI of the light source on a permanent, factory-installed label on the light source or light source housing. Product shall also contain marking indicating “CA T-24 JA8 compliant” and the date of manufacture.

Cree’s Recommendation supports the marking requirements with the request that California develop a **small** “mark” for JA8 compliancy. This will reduce the space needed on the product.