



NRDC Comments on the Proposed Voluntary California Quality LED Lamp Specification

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On behalf of the Natural Resources Defense Council (NRDC) and our more than 1.3 million members and electronic activists, we respectfully submit our comments on the proposed Voluntary California Quality LED Lamp Specification. NRDC staff has been at the forefront of policy development and advocacy to increase the energy efficiency and quality of lamps, more commonly referred to as light bulbs, for more than 20 years and most recently has been an active participant in the spec setting processes at ENERGY STAR and discussions tied to dimmability of energy saving lamps.

Our comments fall into two categories: a) purpose/stringency of this specification, and b) feedback on specific technical issues and elements of the proposal. In summary, we think it's essential for policy makers at the CPUC and CEC to develop a comprehensive strategy that clearly defines the role and stringency of specifications that would be used to establish:

- Future Title 20 regulations (mandatory requirements that would apply to bulbs sold in California),
- Threshold for eligibility for utility incentives and/or procurement by California governmental agencies and other institutions, and
- Premium or stretch specification that could be used to qualify for higher incentive levels than the base incentive.

As currently written the California Quality LED specification is being developed to establish incentive eligibility criteria while the requirements in the specification represent those of a premium bulb. This disconnect needs to be addressed before the specification and related policies are finalized. We also recommend policy makers carefully evaluate the applicability of the ENERGY STAR specification that is due to be finalized by the end of 2012.

PURPOSE/STRINGENCY

It is commonly understood that successful adoption of LED lamps requires the lamps to not only save energy, but to last a reasonably long time and to deliver a satisfying customer experience in terms of “light quality” and distribution. The EPA ENERGY STAR program is in the late stages of developing a comprehensive set of requirements that are meant to ensure the bulb purchased by a customer meet these criteria.

The ENERGY STAR labeling program not only brings with it a reasonably stringent specification it also brings numerous additional benefits:

- Historically many large retailers only stock lamps that meet the ENERGY STAR requirements and contain the label
- It provides a single national specification that enables manufacturers and retailers to produce a national product line and help drive down cost, rather than having to develop, produce and stock different bulbs for different parts of the country.
- EPA has a comprehensive product qualification and compliance verification program that includes off the shelf testing of ENERGY STAR labeled lamps and delisting of non compliant models.

We urge the CEC, CLTC, utilities and other California stakeholders to actively engage in the ENERGY STAR specification setting process and to evaluate the final version of the specification prior to establishing a California Quality LED Lamp specification of its own. It is quite possible that the ENERGY STAR specification will be sufficiently stringent that it can serve as the “floor” for eligibility for utility incentive programs in California and a suitable specification for bulk procurement programs by government agencies and other interested parties. Bulbs that meet the ENERGY STAR requirements would not only save energy but they would also help ensure the user has a decent experience and is likely to come back for more.

We suggest the CEC, CPUC and utilities consider the following tiered approach and create up to three tiers of specifications:

a) Tier 1 – basic set of requirements that will ensure the bulb is efficient and consumers will not have a bad/unsatisfactory experience with the bulb. These requirements could become part of a future Title 20 mandatory standard. It would likely not be as comprehensive or stringent as ENERGY STAR. For example it would probably have a much lower lifetime requirement, perhaps just 5 or 10,000 hours. This would prevent bulbs with very short life times (eg fail in first year or two) from being sold, but allow designs with lifetimes shorter than those required by ENERGY STAR to be sold with the opportunity to bring lower cost models to the market. Rebates would be provided for bulbs that significantly exceed these requirements.

b) Tier 2- a set of requirements meant to reflect a “good” bulb, that is long lasting and would become the floor for eligibility for utility incentives. We encourage California to use ENERGY STAR for this tier unless EPA fails to adequately address key criteria. In that case California would adopt ENERGY STAR plus a few minor tweaks.

c) Tier 3 - set of requirements meant to represent the best bulbs on the market today or in the near future. This would form the basis for a higher rebate level, at least initially, to justify the premium performance/features this bulb provides. Ideally the larger incentive would help accelerate the development and sales of these advanced bulbs and many of these elements would be incorporated into the next version of ENERGY STAR.

As we read through the CEC draft staff report dated September 2012 it was not clear what level of ambition the California Quality LED Lamp Specification was targeting. Given the very stringent requirements contained in some parts of the spec, it seemed more like the authors were creating a specification for a premium or “best” bulb, rather than just a “good/better” bulb. While we support the notion of a specification and tier more stringent than ENERGY STAR, we do not believe it is appropriate to tie eligibility to utility incentives to such a high set of requirements. Below we provide feedback on specific elements of the draft staff report.

TECHNICAL FEEDBACK

1. **Color Rendering Index** – NRDC supports the CRI and R9 requirements set by ENERGY STAR.

The draft CA LED Quality specification includes a CRI of 90 instead of the 80 proposed by ENERGY STAR. Barring further evidence of the benefits and a clear understanding of the costs and energy/performance impacts of moving to a higher CRI, we cannot support the proposal for a higher CRI. More discussion is provided below

- *CRI is an imperfect metric* – CRI is an index meant to compare how light is rendered compared to an incandescent. A score of 100 is given for an incandescent light source. CRI by its nature is an imperfect metric as it ties everything to how the light from an incandescent looks. While incandescent light bulbs might be the base case, there is no reason why future light sources must so closely replicate the light from an incandescent.

Due to the limitations of this metric, many lighting science experts are working to develop a new metric called the Color Quality Scale (CQS). We encourage CEC and other stakeholders to evaluate this updated metric and determine if longer term specifications set in California, ENERGY STAR, etc should incorporate it once its finalized.

- *There is no empirical data showing consumers prefer lamps with a CRI of 90 over 80* – Consumer preference for a particular lamp based on its “light quality”

is a function of several variables, including CCT, CRI, light output, etc.. To our knowledge there is very limited data available, if any, showing that consumers prefer lamps with a CRI of 90 over 80. In fact, an excerpt from recent informal study by Consumer Reports in their 2011 Guide to Lightbulbs at <http://www.consumerreports.org/cro/resources/streaming/PDFs/Consumer+Reports+Lightbulb+Review+Facebook.pdf> stated:

“Most of the tested bulbs are in the low 80s; a few reached the upper 80s and low 90s. A CRI of at least 80 is generally recommended for interior lights, and differences of fewer than five points are insignificant. Few of our staffers complained about the CRI of the LEDs we tested or of the CRI of CFLs in the past.”

- *GE Reveal Lamps have a CRI of <80 and outsell many lamps with higher CRI* - While we are not advocates for the GE Reveal “modified spectrum” product line, one should note that this product line is a very high seller and commands price premium of up to 100% over equivalent “soft white” lamps. Interestingly enough the Reveal lamps have a CRI of just under 80. This example contradicts the assertion that consumers will be dissatisfied with a CRI of lower than 90.
- *More data is needed to understand the cost impacts of moving to a higher CRI* – It is widely believed that it costs more to manufacture a lamp that has a higher CRI. We encourage manufacturers to share as much data as possible with CEC to better understand the relationship between CRI and cost. Even if CRI of higher than 80 was desirable we need to trade that off against the incremental cost such a change would cost. For example, most consumers would likely prefer a LED bulb that had a CRI around 80 that costs \$20 per bulb than one that had a CRI of 90 and cost \$25 or \$30.

One reference point that can be found is Philips 60W replacement A-lamp. The L Prize winning lamp includes red LEDs in order to achieve a CRI of 90 and costs around \$50. A lamp based on this design that does not deploy the red LED and has a CRI in the low 80’s costs under \$25 or less than half.

- *Let’s get data first before setting a specification* – The CLTC and CLASP have agreed to work together to conduct human factors and other research on consumer preference relative to color quality. We whole heartedly support this research. The results of this research and any additional studies that might become available should be used to inform the CA LED Quality specification. The California process is out of sequence, as it bases its specification on an assumption and then conducts research to validate or invalidate the assumption. The right path is to do the research first and then adjust the specification and CRI requirement as warranted.

2. Lifetime

NRDC supports the 25,000 and 35,000 rated lifetime requirements for residential and commercial bulbs, and corresponding lumen maintenance values, as currently proposed. These higher levels are warranted based on the incremental energy and electric bill savings that will be achieved. These longer lived products provided additional leverage/cost effectiveness for utility incentives.

3. Dimmability

While we agree that dimmability should be included in the CA LED Quality specification, we offer a slightly different approach that includes:

a) Do not require all omni-directional lamps be dimmable. Instead require all lamps to either be clearly labeled as NOT DIMMABLE on the front of the package or if labeled as dimmable then to meet a set of dimmability requirements set forth in the specification.

As most omni-directional lamps are not used in dimmable circuits, we do not think California should require dimmability for all these lamps in order to be eligible for incentives. Taking out dimming requirements will reduce the cost of the bulb and removes the need for more complicated circuitry from the design.

As a large percentage of directional lamps are used with dimmers, we do support the proposal for all directional lamps to be dimmable and to meet the relevant dimming requirements in order to be eligible for a rebate.

b) We encourage California stakeholders to work with ENERGY STAR to develop a set of dimming requirements. NRDC believes these should include:

1. Lamp must dim down to 10 – 20% of full light output.
2. Lamp must restrike from this dimmed position.
3. Lamp shall not produce objectionable flicker.
4. Testing shall be done with an agreed upon list of dimmers. As not all bulbs will work with every dimmer, the manufacturer should be able to pick x out of y dimmers to use for the testing. (e.g., must pass on 4 out of the 6 listed dimmers)

We do not agree with proposed approach of simply requiring manufacturers to include on the package a list of 3 dimmers that the lamp will work with. We reached this conclusion as most consumers have no idea what dimmer they currently have nor are they likely to be willing to change their dimmer simply to use a new light bulb. The reality is most purchasers of new dimmable LED lamps will be installing it into a fixture that already has a functioning dimmer.

4. Shape/Scope

The current proposal references specific ANSI shapes such as A (the typical incandescent shape), G for round globes, etc. We think this approach is unnecessarily limiting as it might prohibit some uniquely shaped lamps on the market today or future innovative lamps from qualifying. The key criteria we believe should be the overall dimensions of the bulb – will it fit into the socket/fixture? – and whether or not it provides light in a pattern that is expected.

5. Timing and Testing

As part of these discussions, CA policy makers and utilities must carefully consider the timing of their effort. For example, the more stringent California makes its requirements, the longer it will take for manufacturers to qualify and/or produce models that comply. To minimize delays tied to testing, we urge California to the maximum extent possible to harmonize its efforts with ENERGY STAR in terms of metrics and test methods. This provides tangible benefits:

- Manufacturers will only have to test their products once, saving time and money. Manufacturers will be able to use the same test results to determine compliance with ENERGY STAR and also with the California LED Quality specification; even if it differs in the levels it sets.
- California will benefit from the product qualification and verification processes used by ENERGY STAR.

On this topic, we encourage further dialogue between California policy makers and ENERGY STAR to coordinate on verification testing. ENERGY STAR provides a mechanism for stakeholders to nominate bulbs to test and California could nominate models to be included in future rounds of testing. If done right, data could be reported on a model specific basis not only whether a model passed or failed ENERGY STAR, but also whether it met California's requirements, to the extent they differ from ENERGY STAR.

California policy makers and incentive program administrators should also map out a time line that is realistic. For example if CA finalizes its specification in early to mid 2013, the earliest incentives tied to this specification could be applied is calendar year 2014. This of course assumes that models on the market today can already meet these levels and that additional testing is not required.