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Michael Siminovitch Comments on 15-Day Express Terms 2019 CALGREEN Voluntary Provisions

Additional submitted attachment is included below.

Considerable scientific data currently exists indicating that light at night can be a significant issue in terms of circadian disruption leading to poor health and wellness outcomes. I'm attaching a series references and citations that support this assertion. In addition, both Nancy Clanton and Jim Benya will provide further direct insights into this equation. Two well recognized organizations, the International Dark Sky Association and the American Medical Association (AMA) have adopted recommendations for 3000 Kelvin (K) exterior lighting. After much criticism and discussion, the AMA has just reaffirmed this position.

In terms of near-term practical experience with the issues associated with color temperature, a few years ago we (Jim Benya and UC Davis) were involved with the City of Davis, by request, in their street light retrofit effort to move from high pressure sodium (HPS) to solid-state technology. This relighting effort initially focused on higher color temperature (4000/4500+ K) driven largely by energy savings considerations. This decision was ultimately controlled by attribution and cost considerations only. As this relighting effort moved forward, significant issues arose due to glare, poor optics, light distribution characteristics and stray light resulting in a considerable level of community concern. We were asked to look into the issues with the objective of identifying a potential course of action to address the community concerns that arose after the first deployment of high color temperature lighting.

The primary focus of our effort was to move to a much lower color temperature, 2700 K, which reduced the potential for direct glare as well as sky glow resulting from blue light scattering. This effort involved a series of demonstrations, community surveys and site visits. Overall, community support was quite high for the lower color temperature lighting, 2700 K, which residents found to be generally less intrusive and harsh as compared to the original high color temperature deployment by the city. While not perfect, this was a positive move forward. Approximately four years later, there hasn't been any issues associated with safety, accidents, complaints or lack of visibility. From my understanding working with city management, numerous cities have followed up with the City of Davis leadership team on exploring similar approaches within their own municipalities. This is certainly consistent with the comments and reviews provided by both Jim Benya and Nancy Clanton.

Apart from this project, CLTC was involved with the City of Davis bicycle paths and parkway lighting that now uses a 2700 K LED lighting system in combination with adaptive controls to reduce light during periods of inactivity. This was also received well by the community with no reports of accidents or other related issues associated with either the light sources or controls.

The University of California, Davis also committed to relighting efforts moving from a 4000 K to 3000 K maximum for all area, pathway, building perimeter (wall packs) and associated lighting. UC Davis is the largest fully networked campus in the United States, working to reduce both energy and light pollution through use of adaptive controls. UC Davis is deeply committed to providing safe night time environment and mitigating environmental impacts in terms of light pollution and circadian disruption.

The key issue with the proposed standard is attribution and related cost issues associated with moving from 4000 K to 3000 K. Industry concerns have been focused on efficacy as a significant driver in the attribution process here in California. This is perhaps key to the long term, background argumentation being put forward against this standard currently. Additional concerns that cost increases may limit the number of fixture sales with finite program dollars within a municipality is entering the equation. These economic drivers have artificially incentivized higher efficacy approaches and reduced product cost, which in the past preferentially biased high CCT product. However, this artificial discrepancy in efficacy and cost it is rapidly diminishing.

For example, UC Davis and the California Lighting Technology Center are currently involved with a large retrofit project where considerations for product could have included 4000 K or 3000 K fixtures. The commercial 3000 K fixture produces 3700 lumen with a power of 37 watts. The 4000 K equivalent produces approximately 3800 lumens, also at 37 watts. This is approximately a 3 percent differential in efficacy (or, approximately one watt per fixture if equalizing on lumens). Additionally, both of these fixtures are essentially the same in terms of cost to UC Davis. This current commercial lighting project illustrates that the efficacy-cost equation driving attribution should not be the "real" argument against using lower color temperature recommendations and products.

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There is mounting evidence that high color temperature lighting can contribute to light pollution and potential health/well-being impacts due to circadian disruption. Ultimately, we are evolving an incremental process toward a "best/no harm" solution and the burden of proof here is on the advocates for higher color temperature. They should prove these products are not contributing (more) to circadian disruption/night time light pollution as compared to a lower CCT product with 3000 K. We are in the process of doing better, there's no efficiency, cost or visual function rationale that supports doing otherwise.

In closing, there are certainly unanswered questions and remaining challenges in better understanding the health impacts associated with light at night. We need to invest further in research towards defining the "best/no harm" specifications. Is it 3000 K, 2700 K or 2200 K that best addresses safety health and environmental interests? Certainly, 3000 K is a good first step that may help navigate us to a future answer that appropriately defines the best specification. Until we know more, the best path forward on public policy is to be careful and prudent by limiting the amount of blue light at night with a first step being a transition to a 3000 K recommendation.

With attribution and cost largely an issue of the past we have no reason to not pursue a 3000 K standard.

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