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Comments on the Proposed 2019 CALGreen Requirements

Additional submitted attachment is included below.

Comments on Proposed 2019 CALGreen Voluntary Energy Efficiency Standards

California Statewide Utility Codes and Standards Team

November 27, 2017

The Codes and Standards Enhancement (CASE) initiative presents recommendations that support California Energy Commission (Energy Commission) efforts to update the California Building Energy Efficiency Standards (Title 24, Part 6) and the California Green Building Standards (Title 24, Part 11 or CALGreen) with new or revised new requirements. The four largest California Investor Owned Utilities – Pacific Gas and Electric Company, San Diego Gas and Electric, Southern California Edison, and SoCalGas® – and two Publicly Owned Utilities – Los Angeles Department of Water and Power and Sacramento Municipal Utility District – sponsored this effort. The Statewide CASE Team appreciates the opportunity to participate in the 2019 CALGreen code development processes in which the Energy Commission will adopt voluntary energy requirements that can serve as model ordinances for local jurisdictions that wish to adopt more stringent requirements than those required statewide by Title 24, Part 6.

The Statewide CASE Team urges the Energy Commission to consider the feedback on the CALGreen code change proposals that is presented below.

1. Considerations for Outdoor Lighting Correlated Color Temperature Proposal

The Statewide CASE Team supports the proposal that outdoor lighting power allowances (LPAs) in CALGreen shall be no greater than 90 percent of the mandatory LPAs in Title 24, Part 6. The proposed LPAs being considered for the 2019 Title 24, Part 6 Standards were not designed to require the *most* energy efficient lighting designs available; they left room for significant design flexibility while generally requiring the use of LED technology. System designs using ten percent less power are already feasible, and efficacies continue to increase for LED luminaires while costs continue to decline. Therefore, setting a reach level of 90 percent of the mandatory allowances for local jurisdictions, and entities that are looking to exceed the statewide mandatory standards, is appropriate.

The Statewide CASE Team is encouraged to see the Energy Commission considering CALGreen requirements that aim to limit light pollution, steer the market towards lighting designs that minimize negative impacts on biological systems, and minimize negative consumer reactions to high efficacy lighting systems. In part due of these concerns, there is currently a trend in outdoor lighting design towards “warmer” (low) correlated color temperature (CCT) lighting systems, even though low CCT systems tend to have slightly lower efficacies than high CCT systems. In developing the 2019 LPA proposals for Title 24, Part 6, the Statewide CASE Team ensured that warmer CCT systems (e.g., 3000 Kelvin (K) or less) could be used to comply with the proposed standards. Comments received from stakeholders stressed the importance of ensuring that the standards would not inadvertently push lighting designs towards higher CCTs. For all of these reasons, the Statewide CASE Team is generally supportive of initiatives that will encourage outdoor lighting design towards warmer CCTs.

However, we caution the Energy Commission that issues around artificial lighting and its impacts on biological systems are complex. This topic is undergoing significant debate in the lighting and medical fields. While a 3000 K limit in CALGreen may be a positive first step towards addressing many of the issues related to health, light pollution, and consumer acceptance, the Statewide CASE Team would welcome the opportunity to work with the Energy Commission to refine this approach and consider other alternatives. Below we have highlighted the key issues the Energy Commission should consider before the proposed 3000 K limit for outdoor lighting in CALGreen is finalized.

Applicability of the CCT Metric

The American Medical Association has issued guidance advising all outdoor lighting designs to utilize warm CCT luminaires, but this approach has also received significant pushback from other stakeholders. As explained by the Illuminating Engineering Society (IES) in a position statement published in August 2017,¹ “Correlated Color Temperature (CCT) is inadequate for the purpose of evaluating possible health outcomes” because it is “only one component of light exposure (spectral composition) of what are well known and established multi-variable inputs to light dosing that affect sleep disruption, including the quantity of light at the retina of the eye and the duration of exposure to that light.” Furthermore, CCT is not always a perfect indicator of melanopic content, which is a widely-accepted factor impacting the circadian system associated with higher risk for sleep disruption and associated health concerns. LED light sources can vary widely in their spectral distribution (and therefore, their melanopic content) at any given CCT. While CCT may be the best current metric that is widely available in the industry, it may not be the best long-term solution for use in the building standards.

Alternate Metrics

The Lighting Research Center, IES, and other stakeholders have been working on another metric known as Circadian Stimulus.² This metric combines spectral distribution, light levels (intensity), direction of light, and duration of exposure to develop a single rating system designed to limit negative impacts on people from lighting at night. Initial research suggests that a Circadian Stimulus value less than 0.1, for a duration of less than an hour, should not suppress melatonin, though this is still a new metric that may require further study and testing. The Statewide CASE Team recommends that the Energy Commission engage with stakeholders who have been working on this metric and consider whether it is appropriate for consideration in the building standards, and/or whether there is a role for the Energy Commission to support further development of the metric.

Light Pollution Control and BUG Ratings

Light level (intensity) is likely a more significant factor than spectrum or CCT on the health of people, flora, and fauna. For this reason, better control of outdoor lighting systems may be a more important factor to consider than CCT. Currently, Section 130.2 of Title 24, Part 6 includes BUG (backlight, uplight, and glare) light pollution requirements for each lighting zone. One opportunity to strengthen these requirements thereby further limiting light pollution would be to shift all the requirements in Title 24, Part 11 up one lighting zone. For example, the BUG requirements for Lighting Zone 2 in Title 24, Part 6 would be the requirements for Lighting Zone 3 in Title 24, Part 11. The rationale for this is that a significant area of the state is technically classified as Lighting Zone 3 despite having lower population densities that are more in line with Lighting Zones 2 or 1. This is because lighting zone designations for individual projects are established based on the population density of the city in which the project

¹ <https://www.ies.org/policy/position-statements/ies-board-position-on-ama-csaph-report-2-a-16-human-and-environmental-effects-of-light-emitting-diode-led-community-lighting/>

² http://www.lrc.rpi.edu/resources/newsroom/LDA_CircadianStimulus_Oct2016.pdf

occurs. Many cities are classified as Lighting Zone 3, but tend to have large areas within the city limits where population density is significantly lower than the threshold for Lighting Zone 3 designation. Increasing the stringency of CALGreen to shift the BUG requirements up one Lighting Zone could help reduce light pollution and represents an opportunity to further limit the negative impacts of outdoor lighting.

Application-Specific Considerations

One final consideration regarding the proposed 3000 K CCT limit for outdoor lighting is that certain applications may warrant exceptions. The Energy Commission may receive dissent related to sports lighting (in particular professional sports lighting with television broadcasts). The Statewide CASE Team recommends the Energy Commission solicit input on which applications may have a need for higher CCTs, and the rationale behind these needs.

In conclusion, the Statewide CASE Team is supportive of efforts to address health and safety concerns related to outdoor lighting, and encourage the Energy Commission to engage with stakeholders to develop and consider long-term strategies that may address the challenges posed by artificial lighting more effectively than a CCT limit. The Statewide CASE Team is interested in working with the Energy Commission to explore alternative voluntary requirements to address light pollution, public health, and issues related to biological impacts of outdoor lighting.

2. CALGreen Requirements Should be Developed Taking Local Jurisdiction's Needs into Account

The Energy Commission should develop voluntary CALGreen requirements taking the needs of local jurisdictions into account. Voluntary CALGreen requirements are model codes that local jurisdictions can adopt if they choose to do so. The Statewide CASE Team encourages the Energy Commission to pursue the following to make it easier for local jurisdictions to use voluntary CALGreen requirements as a framework for local building ordinances:

- *Use clear, concise, and straightforward code language.* This will make it easier for staff from local jurisdictions to explain the requirements to local decision makers and market actors (e.g., builders, manufacturers, building owners, and building occupants) who are impacted by the requirement.
- *Offer a reasonable method for compliance verification.* Many local building departments have expressed concern about the time and resources that are required to verify compliance with the building code requirements. Voluntary CALGreen requirements, which local jurisdictions would be adopting as add-ons to all mandatory building code requirements, should have a reasonable method for compliance verification. These methods should call for an appropriate allocation of resources from building departments and others involved in the enforcement process (e.g., HERS Raters).
- *Consider providing tools and resources to support adoption of local ordinances.* Before a local building efficiency ordinance takes effect, local jurisdictions must demonstrate that it is cost-effective. They also need to consider how they will enforce the ordinance. The Statewide CASE Team encourages the Energy Commission to support local jurisdictions that wish to adopt voluntary CALGreen requirements as local ordinances. This could include providing a cost-effectiveness analysis for each measure in each climate zone so local governments do not have to complete their own cost-effectiveness analyses. Offering example compliance documents for each measure could also be helpful.

In addition, the Statewide CASE Team encourages the Energy Commission to review all proposed code requirements for Title 24, Part 6 and Part 11, and consider whether a proposed requirement would

inadvertently prohibit local jurisdictions from adopting innovative ordinances. Local governments should be encouraged to pursue ordinances that suite localized needs while encouraging efficiency, grid harmonization, renewable generation, and/or greenhouse gas emissions reductions.

3. Support for Voluntary Dock Seal Requirement

The Statewide CASE Team supports the proposal to require on dock doors of non-refrigerated warehouses as a prerequisite to CALGreen Tier 1 or Tier 2 requirements. The Statewide CASE Team originally proposed this measure as requirement for Title 24, Part 6 in a limited number of climate zones. While a number of manufacturers already offer products that meet the proposed standards, including a voluntary requirement in CALGreen for the 2019 code cycle that applies to all California climate zones could help improve product performance and reduce cost for building occupants of warehouses and large retail facilities.

To support this proposed change to CALGreen, the Statewide CASE Team has issued an addendum to the Dock Seals Final CASE Report. The addendum evaluates the cost effectiveness of dock seals in all California climate zones using a range of assumed operating schedules. The addendum shows that dock seals are cost effective in a majority of California climate zones when assuming a high-frequency operating schedule.

The Final CASE Report: Dock Seals with the Addendum is available here:

http://title24stakeholders.com/wp-content/uploads/2017/11/2019-T24-CASE-Report_Dock-Seals_With-Addendum_11.17.2017.pdf.

4. Conclusion

Statewide CASE Team appreciates the opportunity to provide comments on the proposed 2019 CALGreen voluntary energy efficiency standards and looks forward to continued participation in the process.