

## DOCKETED

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**Lutron Electronics Co., Inc. Comments on the 2019 Title 24 Part 6 Building Energy Efficiency Standards 45-Day Language**

*Additional submitted attachment is included below.*

February 20, 2018

Submitted via: <https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=17-BSTD-02>

Mr. Andrew McAllister  
Commissioner  
California Energy Commission  
1516 Ninth Street  
Sacramento, California 95814

Re: Docket No. 17-BSTD-02

**Lutron Electronics Co., Inc. Comments on the 2019 Title 24 Part 6 Building Energy Efficiency Standards 45-Day Language**

Dear Commissioner McAllister,

Thank you for the opportunity to review and provide comments on the 2019 Title 24 Part 6. These comments are submitted on behalf of Lutron Electronics Co., Inc.

As you may know, Lutron was founded in 1961 and is headquartered in Coopersburg, Pennsylvania. From dimmers for the home, to lighting management systems for entire buildings, the company offers more than 17,000 energy-saving products, sold in more than 100 countries around the world. In the U.S. alone, Lutron products save an estimated 10 billion kWh of electricity, or approximately \$1 billion in utility costs per year. The company's early inventions— including the first solid-state dimmer invented by Lutron's founder, Joel Spira—are now at the Smithsonian's National Museum of American History in Washington, DC.

Please find our detailed comments below. We look forward to working with you further on this important project. Please contact Michael Jouaneh at 610-282-5350 or [mjouaneh@lutron.com](mailto:mjouaneh@lutron.com) if you have questions or would like more information on these comments. Thanks again for your consideration.

Respectfully submitted,



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The comments and suggested edits to the proposed 2019 Title 24 Part 6 45-Day Language are shown below:

## Chapter 2-110

### 1. Section 110.9 Mandatory Requirements for Lighting Controls.

Lutron comments: We support moving the Title 20 lighting controls requirements for self-contained lighting controls into section 110.9 provided that the requirements are removed from Title 20 so that there are no inconsistencies.

### 2. Section 110.12 Mandatory Requirements for Demand Management.

Lutron comments: See suggested changes and rationale below.

Changes:

#### (a) Demand responsive controls.

1. All demand responsive controls shall communicate with ~~be an~~ OpenADR 2.0a or later ~~OpenADR 2.0b~~ Virtual End Node (VEN), as specified under Clause 11, Conformance, in the applicable OpenADR 2.0 Specification.

~~2. All demand responsive controls shall be capable of using one or more of the following or communications that occur within the building: Wi-Fi, ZigBee, BACnet, Ethernet, or hard-wiring.~~

**(c) Demand Responsive Lighting Controls.** Nonresidential buildings larger than 10,000 square feet shall ~~be capable of~~ automatically reducing lighting power in response to a Demand Response Signal. ~~For compliance, the building shall demonstrate that the control is capable of reducing power in controlled spaces by reducing the lighting power by a minimum of 15 percent below the total installed lighting power.~~ General lighting shall be reduced in a manner consistent with the uniform level of illumination requirements in TABLE 130.1-A.

Rationale:

- The demand responsive controls themselves are not VENs, but they should have a way to communicate with an OpenADR compliant VEN.
- "OpenADR 2.0a or later" should be compliant instead of specifying version 2.0a or 2.0b. In other words, when OpenADR 3.0 comes out, VENs that support 3.0 should be acceptable for compliance.
- Most lighting systems currently don't have OpenADR natively as part of the system. The language should explicitly state that a VEN must be installed that can receive an OpenADR

signal and can communicate with the lighting system using any protocol downstream of the VEN. Do not specify the protocols that the demand responsive systems must use within the building.

- Most importantly, after receiving the ADR signal, the lighting power should actually change (not just be capable of changing) from the current lighting power consumption. That is, if the lights are already at 85% of total installed power, they should be further reduced. The total percentage change would be negotiated between utilities and their customers. Also, the second sentence that starts with “for compliance” should be removed as it is already covered in the acceptance testing requirements. The sentence also causes confusion as most think this is the requirement, not just guidance on acceptance testing. Thus, we urge the Commission to strike it.

## Chapter 4-130

### **3. Section 130.0(c). Luminaire classification and power.**

Lutron comments: Suggested changes for clarity and other rationale below.

Changes:

130.0(c)1A and 1B: Strike the word “replamping” as it doesn’t apply to LED lighting. So, they should read as follows:

1. A. The maximum ~~replamping~~ rated wattage of a luminaire shall be listed on a permanent, preprinted, factory-installed label, as specified by UL 1574, 1598, 2108, or 8750, as applicable; and
2. B. The factory-installed maximum ~~replamping~~ rated wattage label shall not consist of peel-off or peel-down layers or other methods that allow the rated wattage to be changed after the luminaire has been shipped from the manufacturer.

130.0(c)4: For inseparable SSL luminaires, the maximum rated wattage shall be the maximum rated input wattage of the SSL luminaire as specified in Section 130.0(c)1 when tested in accordance with UL 1598, 2108, 8750, or IES LM-79.

130.0(c)5: For LED tape lighting and other LED linear lighting that do not require a luminaire housing with the installation, the maximum rated wattage shall be the maximum rated input wattage of the lighting as specified in Section 130.0(c)1 when tested in accordance with UL 2108, 8750, or IES LM-79.

Add a definition of “luminaire housing” to section 100.1 as follows: Luminaire housing is the mechanical enclosure of SSL luminaire that includes the LED light engine, driver, and the means by which the luminaire is connected to building power.

Rationale:

- These changes clarify the requirements. In addition to these edits, we would like to work with the Commission on the Compliance Manual for these sections. We think that a table with images of key lighting fixture types, a description of them, and a reference to which luminaire classification and power provision they fall under will eliminate ambiguities and inconsistencies that may arise so that lighting power is always calculated the same for each type of light source.
- The term luminaire housing is undefined, and it is unclear which provision covers which application. For instance, SSL lighting that uses a constant voltage LED driver that is connected to a linear LED strip that includes a diffuser and heat sink should fall under 130.0(C)5, however, some may say the diffuser and heat sink qualify as a housing which make this kind of lighting fall under 130.0(c)6C. It is the ambiguity of “luminaire housing” that causes this confusion.

#### 4. Section 130.1(f) Control Interactions.

Lutron comments: To ensure energy savings and prevent wasted energy during a demand response event, lighting levels should be reduced not increased during the event. What’s more is that the demand responsive lighting provision in section 110.12 states that lighting must be reduced during a demand response event. So, the word “increase” here conflicts with that provision. Please strike “increase”. This change will still permit unusual lighting systems that increase load during demand response events, but not mandate the capability to increase lighting loads during demand response.

Changes:

4. The multi-level lighting control shall permit the demand responsive control to ~~increase or~~ decrease the lighting during a demand response event and to return it to the level set by the multilevel control after the event.

## Chapter 6-141

### **5. Section 141.0(b)2Piv Electrical Power Distribution Systems. Circuit Controls for 120-Volt Receptacles and Controlled Receptacles.**

Lutron comments: To increase energy savings and align with ASHRAE 90.1, modify this provision such that if new receptacles are added in the spaces listed in 130.5(d), then the new receptacles in the space must comply with the requirements of 130.5(d). Suggested language below:

iv. Circuit Controls for 120-Volt Receptacles and Controlled Receptacles. For entirely new or complete replacement of electrical power distribution systems, the entire system shall meet the applicable requirements of Section 130.5(d). For existing space renovations, in office areas, lobbies, conference rooms, kitchen areas in office spaces, copy rooms, and hotel/motel guestrooms, newly installed receptacles shall comply with 130.5(d).

Exception: Spaces that install just one new receptacle.

## Chapter 7-150

### **6. Section 150.0(k)2I Interior Lighting Switching Devices and Controls.**

Lutron comments: Suggested changes and rationale below.

Changes:

I. In bathrooms, garages, laundry rooms, and utility rooms, at least one luminaire in each of these spaces shall be controlled by an occupant or vacancy sensor ~~providing automatic off functionality~~. If an occupant sensor is installed, it shall be initially configured to manual-~~on or partial-on~~ operation ~~using the manual control required under Section 150.0(k)2C~~.

Rationale:

- All occupancy and vacancy sensors “provide automatic off functionality”. So, this phrase is not needed.
- For increased energy savings, occupancy sensors should be initially configured to either partial-on or manual-on operation. Commercial studies (e.g. <http://lightingcontrolsassociation.org/2009/04/09/cltc-study-demonstrates-major-energy-savings-for-bilevel-occupancy-sensors/>) have shown partial-on saves more than manual-on as occupants were satisfied with partial lighting levels.

- The phrase “using the manual control required under Section 150.0(k)2C” can be interpreted to mean that the sensor configuration must be done by the manual control, yet the sensor itself can also be the manual control. Thus, the phrase is not needed and causes confusion.

## 7. Section 150.0(k)3 Residential Outdoor Lighting.

Lutron comments: The Commission is missing a large energy saving opportunity by not requiring lighting controls for permanent hard-wired outdoor lighting that is not attached to a building. There are some larger homes that have extensive landscape lighting that should be controlled. Especially if the Commission is serious about achieving net zero energy residential buildings by 2020. Suggested change to 150(k)3A below:

- For single-family residential buildings, permanently installed outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, shall meet the requirement in item i and the requirements in either item ii or item iii:

## Joint Appendix 8 – Qualification Requirements for High Efficacy Light Sources

### 8. Section JA 8.3.3 Start Time Test.

Lutron comments: Suggested changes and rationale below.

Changes:

For light sources that provide a fade-in feature, the initial plateau shall be the point where the light output of the device begins following its fade-in curve, as specified in the U.S. Environmental Protection Agency ENERGY STAR Program Requirements for Lamps and Luminaires Start Time Test Method ~~memo~~-dated ~~September~~ October 25, 2017.

~~For light sources with a standby mode consuming no more than 0.2 watts of power, the start time test may be performed with the product receiving power and in this mode. In this case, the start time shall be the time between the sending of an on signal to the device via an appropriate control and the initial plateau.~~

Rationale:

- The EPA has published the official test method so instead of citing the memo, the Commission should cite the actual test method.  
<https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Start%20Time%20Test%20Method.pdf>



- Remove the second paragraph because there is no established test method and guesses on how to do it are inconsistent. Consumer experience will be different than lab conditions.

**9. Section JA 8.3.7 Tests for Minimum Dimming Level, Flicker, and Audible Noise.**

Lutron comments: The Commission should use the NEMA 77- 2017 flicker test method instead of Joint Appendix 10 (JA10). NEMA 77 provides a better method of flicker measurement than JA10. The recommended Pst and SVM metrics more adequately address visible flicker and stroboscopic effects through frequencies up to 2000Hz. The Commission can adjust the NEMA 77 limits as needed (e.g. Pst and SVM to 1.0 or less). This change would make the flicker requirement more stringent than before.

**10. Section JA 8.4.1 Luminous Efficacy.**

Lutron comments: Strike this provision as it belongs in the Title 20 Appliance Efficiency Regulations since this is a product efficiency requirement. It should not be in the Title 24 Part 6 building efficiency standard.

**11. Section JA 8.4.4 Color Characteristics.**

Lutron comments: The commission should allow for 5,000 Kelvin Correlated Color Temperature (CCT) light sources to give consumers the choice of cooler lighting in certain applications. Higher color temperatures may be preferred in non-living spaces such as utility rooms, garages, and laundry rooms.

**12. Section JA 8.4.6 Dimming, Reduced Flicker Operation and Audible Noise.**

Lutron comments: Delete "as type 1 or type 2 products" as the latest NEMA SSL 7A -2015 does not have Type 1 or 2 anymore. Cite the latest NEMA SSL 7A – 2015. And per above comments, strike JA10 and replace it with NEMA 77 – 2017.

Changes:

(b) LED-based light sources designed to be connected with or dimmed by forward phase cut dimmers shall meet the requirements of NEMA standard SSL 7A -- 2015 ~~as Type 1 or Type 2 products.~~

(c) Light source in combination with specified control shall provide "reduced flicker operation" when tested at 100 percent and 20 percent of full light output with a Pst of 1.0 or less and SVM of 1.0 or less as specified in JA10, where reduced flicker operation is defined as having percent amplitude modulation (percent flicker) less than 30 percent at

frequencies less than 200Hz, tested according to the requirements in NEMA 77 -- 2017 Joint Appendix JA-10.

**13. Section JA 8.6 Data Reporting.**

Lutron comments: Make the appropriate changes to Table JA-8 per our comments above--CCT of 5,000 or less; replace JA10 with NEMA 77 – 2017 and list the compliance thresholds for Pst and SVM at 100% and 20% light output; and strike the efficacy requirement since it is already covered in Title 20. See these changes below. No changes to the rest of TABLE JA-8.

Changes:

TABLE JA-8 DATA TO BE RECORDED AND SUBMITTED TO THE CALIFORNIA ENERGY COMMISSION

Initial Efficacy	Value (lumens/Watt)	≥ 45 lumens/Watt
Correlated Color Temperature (CCT)	Number Kelvin	≤5000 4000 Kelvin.
See <u>NEMA 77 – 2017 A10 Table 10-1</u> for flicker data test method requirements and permissible answers	<u>Pst and SVM</u>	<u>Pst and SVM of 1.0 or less &lt;30% for frequencies of 200 Hz or below, at 100% light output</u>
See <u>NEMA 77 – 2017 A10 Table 10-1</u> for flicker data test method requirements and permissible answers	<u>Pst and SVM</u>	<u>Pst and SVM of 1.0 or less &lt;30% for frequencies of 200 Hz or below, at 20% light output</u>

**Joint Appendix 10 – Test Method for Measuring Flicker of Lighting Systems and Reporting Requirements**

Lutron comments: We prefer that NEMA 77 - 2017 replace JA10 altogether per above and to avoid the confusion and inconsistencies of two different flicker test methods.