LUTRON ELECTRONICS CO., INC.

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California Energy Commission
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Submitted via email: docket@energy.ca.gov

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

Re: Docket No. 2014-BSTD-01

Lutron Electronics Co., Inc. comments on the 2016 Title 24 Part 6 staff workshop on draft language for the residential and nonresidential building energy efficiency standards and associated documents

Dear Commissioner McAllister,

Thank you for the opportunity to review and provide comments on the lighting proposals discussed during the CEC Pre-rulemaking Workshop on November 3, 2014. 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 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 proposal are shown below as deleted text in ~~strikeout~~, and suggested new text in underline:

a. **100.1 Definitions and Rules of Construction.** The current language does not account for alterations that involve power systems (e.g. receptacles) thus receptacle control is not required for alterations by definition because receptacles are not "water-heating, space-conditioning system, lighting system, envelope...". This suggestion below is in-line with the new language for Section 141.0(b)2O Electrical Power Distribution Systems. Also, thermostat definition should be changed to allow for multi-part thermostats. There are many multi-part thermostat systems such as this one (http://www.lutron.com/TechnicalDocumentLibrary/367-2020.pdf) where the temperature measure device is separate from the wall controls and separate from the HVAC controller/processor. It is a whole-system that works together. These systems are beneficial because the temperature measuring device and the wall controls can be in different locations which allows for better performance. Thus, we suggest the following change:

> **ALTERATION** is any change to a building's water-heating system, space-conditioning system, lighting system, electrical power distribution system, or envelope that is not an addition. Alteration is also any change that is regulated by Part 6 to an outdoor lighting system or covered process that is not an addition. Alteration is also any change that is regulated by Part 6 to signs located either indoors or outdoors.
>
> **THERMOSTAT** is an automatic control device or system used to maintain temperature at a fixed or adjustable setpoint.

b. **130.1(C)2 Shut-OFF Controls.** Change 10 minute timeout values to 20 minutes to align with Section 110.9(b)4F. If an occupancy sensor with a 20 minute timeout can be used in these spaces then a countdown timer with 20 min setting should be allowed. Also, 10 minutes is too short of a period that may cause false offs. Thus, we suggest the following change:

> **EXCEPTION 1 to Section 130.1(c)2:** Single-stall bathrooms less than 70 square feet, and closets less than 70 square feet may use countdown timer switches with a maximum setting capability of ~~ten~~ 20 minutes to comply with the automatic shut-Off requirements.

c. **130.5 Electrical Power Distribution Systems.** The 2016 Standard should actually require energy monitoring not disaggregation of circuits. This aligns better with ASHRAE 90.1-2010 and 2013. Thus, we suggest the following change:

> ~~**(b) Disaggregation of Electrical Circuits /**~~ **Electrical Energy Monitoring.** ~~Electrical power distribution systems shall allow i~~Install~~ation of measurement~~ devices for monitoring the electrical energy usage of load types according to TABLE 130.5-B...

d. **Table 140.6-A Lighting Power Density Adjust Factors**. Additional advanced lighting control strategies of High-end Trim/Tuning and Continuous Daylight Dimming to OFF should be added to the table per the recommendation of the October 2014 CASE report--Nonresidential Lighting Controls: Clarification and Control Credits (http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-06-

24_workshop/final_case_reports/2016_Title_24_Final_CASE_Report-Lighting_Clarification_PAF_Oct2014.pdf). PAF factors of 0.10 for High-end trimmed lighting and 0.10 for continuous daylight dimming to OFF.

e. **150.0(k)1B Blank Electrical Boxes.** The total number of boxes should not be limited to number of bedrooms but rather the number of total rooms so that homeowners can install a ceiling fan or luminaire in these boxes for each room if desired. Thus, we suggest the following change:

> **150.0(k)1B Blank Electrical Boxes**. The number of electrical boxes that are more than 5 feet above the finish floor and do not contain a luminaire or other device shall be no greater than the number of ~~bed~~rooms. These electrical boxes must be served by a dimmer, ~~or~~ vacancy sensor, or fan speed control

f. **150.0(k)1C Recessed Luminaires in Ceilings**. The propose language prohibits screw-based lamps in the most popular lighting fixtures in a home. The only reason mentioned during the meeting to eliminate screw-based lamps from recessed luminaires was heat issues. The standard should allow all screw-based JA-8 compliant lamps to comply in recessed fixtures especially since many of the requirements of JA-8 already address the heat and any rated life issues such as the requirement for a high elevated temperature light output ratio. Remove this unfair screw-based restriction for recessed downlights because there are screw-based reflector lamps available that have been specifically designed to operate well in these luminaires. We suggest the following changes:

> **150(k)1C Recessed Luminaires in Ceilings.** Luminaires recessed into ceilings shall meet all of the following requirements:
>
> v. ~~Shall not use screw based lamps and~~
>
> **150(k)1G Screw based luminaires.** Screw based luminaires shall meet all the following requirements
>
> ~~i. the luminaires shall not be recessed luminaires~~
>
> ii. the luminaires shall contain lamps that comply with Joint Appendix JA-8 and
>
> iii. the installed lamps shall be labeled as compliant with JA-8.
>
> **Table 150.0A High Efficacy Light Sources.**
>
> 6. All light sources in recessed luminaires. ~~Note that recessed luminaires shall not have screw bases regardless of lamp type as described in Section 150.0(k)1C.~~

g. **150.0(k)2 Interior Lighting Switching Devices and Controls**.

i. Must add "leading-edge" to this as SSL 7A only cover leading-edge phase cut dimmers. We suggest the following change:

> **150.0(k)2A**. All leading-edge phase cut dimmers shall comply with NEMA SSL 7A.

ii. **150.0(k)2J.** The next standard should require all luminaires in these non-living spaces to be on an energy-saving control, not just one luminaire in those spaces, especially if by 2020 new residential spaces are supposed to be Net Zero Energy. If anything, it should be written the other way around so that only one luminaire, in a room with multiple luminaires, can be uncontrolled. Additionally, the

standard should allow a dimmer to be one of the complaint controls in a bathroom especially since JA-8 complaint light sources will be dimmable dimmers. Different light levels are needed (e.g. low level at night, higher level for grooming, etc.). Table 9 in the January 2014 CEE Residential Lighting Controls Market Characterization (http://library.cee1.org/content/cee-residential-lighting-controls-market-characterization) shows a 51% to 82% (depending on light source) reduction in wattage in bathrooms from using dimmers. Also, a partial-ON occupant sensor should be allowed as they have been proven to save even more energy than vacancy sensors because occupants are usually satisfied with 50% of the lighting ON (see http://lightingcontrolsassociation.org/cltc-study-demonstrates-major-energy-savings-for-bilevel-occupancy-sensors/). We suggest the following changes:

> J. In Bathrooms, Garages, Laundry Rooms, and Utility Rooms, ~~at least one~~ all luminaires in each of these spaces shall be controlled by a dimmer, vacancy sensor, or partial-on occupant sensor.

iii. **150.0(k)2K.** Hallways are a key space were lighting should be controlled beyond a standard switch. Many people use dimmers in hallways especially during the nighttime where folks prefer a very low light level to not disturb other occupants that may be sleeping in the adjunct bedrooms. What's more is that there is significant energy savings for using dimmers or vacancy sensors in hallways as evidenced in the January 2014 CEE Residential Lighting Controls Market Characterization (http://library.cee1.org/content/cee-residential-lighting-controls-market-characterization). Table 7 in the CEE study shows a 53% reduction in ON hours in the hallway with vacancy sensors. And Table 9 shows a 51% to 82% (depending on light source) reduction in wattage in hallways. We suggest the following changes:

> K. Dimmers, partial-on occupancy sensor, or vacancy sensors shall control all luminaires required to have light sources compliant with Reference Joint Appendix JA8.
>
> EXCEPTION 1 to Section 150.0(k)2K: Luminaires in closets less than 70 square feet.
> ~~EXCEPTION 2 to Section 150.0(k)2K: Luminaires in hallways.~~

h. **150.0(k)3 Residential Outdoor Lighting.** Landscape lighting is still not addressed. All exterior lighting should be controlled, not just the exterior lighting that is attached to a building. We suggest the following changes:

> 150(k)3A. For single-family residential buildings, outdoor lighting ~~permanently mounted to a residential building or other buildings on the same lot~~ shall meet all of the following requirements in item (i) and the requirements in either item (ii) or item (iii):

i. **Appendix JA10 – Test Method for Measuring Flicker of Lighting Systems and Reporting.**
The reporting requirements imposed by JA10 and related requirements being added to T24 presents unprecedented burdens and confusion on manufacturers:

- As proposed, 110.9(b)3 will require the entire dimming system including the light sources to be designed and tested to comply with JA10. Since there are few, if any, manufacturers who provide

entire systems, it is not clear exactly how this would be coordinated, who would perform the testing, and who would do the required reporting.

- The testing and reporting requirements appear to be unrealistic and unsustainable. There are endless existing combinations of phase-cut dimmers, other control types, LV transformers, light sources, lamps/ballasts, and lamps/drivers that could be installed in a given application. Also, new products in all these categories are being developed quickly. In brief, the testing and reporting requirements are onerous and endless.
- Comments in the CASE report stating that the testing is similar to what is required for Energy Star compliance is misleading. Energy Star is voluntary, not a legal requirement of sale. Energy Star has no flicker compliance criteria, only a requirement to report results. Energy Star scope is far more limited only covering self-ballasted lamps intended as replacement for incandescent lamps.

We suggest that the CEC remove JA10 entirely.