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Lutron Comments on the 2022 Title 24 Part 6 Building Energy Efficiency Standards Pre-Rulemaking Express Terms

THIS DOCUMENT SUPERSEDES TN 237045. Just editorial changes to correct the titles of the document.

Additional submitted attachment is included below.

March 8, 2021

Submitted via: <https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-BSTD-03>

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

Re: Docket No. 19-BSTD-03

Lutron Electronics Co., Inc. Comments on the 2022 Title 24 Part 6 Building Energy Efficiency Standards Pre-Rulemaking Express Terms

Dear Commissioner McAllister,

Thank you for the opportunity to review and provide comments on the 2022 Title 24 Part 6 Pre-Rulemaking Express Terms. These comments are submitted on behalf of Lutron Electronics Co., Inc. **Our main concern is about the change in Section 150.0(k)2F where we feel that a more careful cost effectiveness calculation would result in bigger – and cost justified – energy savings.**

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 proposed 2022 Title 24 Part 6 Pre-Rulemaking Express Terms are shown below. The changes are indicated in the text by underlining (for additions) and ~~strike through~~ (for deletions) to the draft language.

Our main concern is about the change in Section 150.0(k)2F where we feel that a more careful cost effectiveness calculation would result in bigger – and cost justified – energy savings.

Subchapter 4-130

- 1. Section 130.1(c)6D Partial OFF occupant sensing controls are required for aisle ways and open area in warehouses, library book stack aisles, corridors and stairwells, and specified offices.**

Lutron comments: To prevent any confusion on the requirements, make it explicitly clear that lighting that turns OFF in unoccupied control zones is also compliant. IECC 2018, IECC 2021, and ASHRAE 90.1-2022 all have similar requirements for lighting open offices and they all state that full OFF is also compliant so there is no confusion. IECC 2018, for instance, states *“Control functions that switch control zone lights completely off when the zone is vacant meet this requirement.”*

Changes:

- ii. Within 20 minutes of the control zone being unoccupied, the occupant sensing controls shall uniformly reduce lighting power in the control zone to no more than 20 percent of full power. Control functions that switch control zone lights completely off when the zone is vacant meet this requirement; and

- 2. Section 130.1(c)8**

Lutron comments: Remove the captive card key controls option for hotel guestrooms. Captive card key controls are a manual control (not automatic) that are easily and often bypassed thereby negating any potential energy savings. Most of the time upon check-in, the hotel provides two keys to the guest and tells them to always keep one key in the slot to get power into the room, so even when the guests leave the room, one of their keys is left in the slot, the lighting stays on, and no energy savings is realized. What’s more, when no key cards are in the slot there is no power to the lighting. So, guests who are not familiar with their hotel room will have limited visibility (especially upon entry into the room) which can cause a safety or dissatisfaction issue for the guest. Lastly, green building design standards like ASHRAE 189.1 have recognized the captive key card shortcomings and don’t allow for their use to comply. Title 24 2022 should not allow them for compliance either. The standard should require only automatic guestroom controls that will guarantee the energy savings and provide guests with a more satisfactory experience.

Changes:

8. Hotel motel guest rooms shall have ~~captive card key controls~~, occupant sensing controls, or other automatic controls such that, no longer than 20 minutes after the guest room has been vacated, lighting power is switched off.

3. Section 130.1(d) Automatic Daylighting Controls.

Lutron comments: To increase energy savings from automatic daylighting controls, the threshold should be reduced to 75 watts in primary sidelighted zone and 150 wattage for the secondary daylight zone. ASHRAE Standard 90.1-2022 will be using these new thresholds and in this matter Title 24 2022 should be consistent with Standard 90.1. This analysis (<https://title24stakeholders.com/wp-content/uploads/2019/06/Daylighting-Control-Threshold-Analysis-Memo.pdf>) determined that daylighting controls provide for cost-effective energy savings at these (and higher) wattage levels as a result of reduced costs for lighting equipment since 2013. In 2013, lighting was predominately fluorescent which needed either a dimming ballast or multiple ballasts adding between \$30 - \$100 per fixture. Nowadays, lighting is predominantly LED, where dimming drivers are a standard no-cost feature of LED equipment. Other costs have changed between 2013 and now as a result of daylight sensors commonly being integral to the fixtures and not requiring separate installation.

Changes:

EXCEPTION 3 to Section 130.1(d): Rooms in which the combined total installed general lighting power in the Skylit Daylit Zone and Primary Sidelit Daylit Zone is less than ~~120~~ 75 watts, or in which the combined total installed general lighting power in Secondary Sidelit Daylit Zone is less than ~~120~~ 75 watts, or in which the combined total installed general lighting power in primary and secondary sidelit daylit zone is less than ~~240~~ 150 ~~W~~watts, or in parking garage areas where the total combined general lighting power in the sidelit daylit zones is less than 60 watts.

Subchapter 7-150

4. Section 150.0(k)2E Automatic Off Controls.

Lutron comments: 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.

Changes:

- i. In bathrooms, garages, laundry rooms, utility rooms, and walk-in closets, at least one installed luminaire 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 operation ~~using the manual control required under Section 150.0(k)2A.~~

5. Section 150.0(k)2F Dimming Controls.

Lutron comments: The draft Title 24 2022 language is a significant backslide in energy efficiency compared with Title 24 2019 requirements. The draft language still has the requirements for the lighting controls but there is an exception which eliminates their use in most instances. Today, luminaires that are or contain JA8 light sources, must use a dimmer or an occupancy sensor or vacancy sensor. The new language and new exception remove these requirements when the circuit lighting power is less than 50 watts, essentially negating the requirement. A permanent energy-saving control should be used as they help maintain and ensure energy savings over the long term. Thus, we urge the commission to not backslide on the lighting controls requirements with an excessive exception. For dimmers, our analysis shows that at the building level with no restriction to the connected load, most of the applications save energy cost effectively using the CEC Benefit-to-Cost Ratio (See Figure 1). If each room needs to be cost-effective, then it should be limited to no more than 20 watts instead of 50 watts. 20 watts has a 1.02 Benefit-to-Cost ratio which passes the CEC criteria for cost effectiveness (See Figure 2). Lastly, allow for occupancy/vacancy sensors to be an alternative to dimmers in the habitable spaces just like they are today. This will help provide more flexibility in the design and for the users.

Changes:

Preferred Option:

~~EXCEPTION 2 to Section 150.0(k)2F: Luminaires connected to a circuit with controlled lighting power of less than 50 watts are not required to have dimming controls.~~ Luminaires controlled by an occupancy or vacancy sensor providing automatic-off functionality.

OR

Acceptable Option:

~~EXCEPTION 2 to Section 150.0(k)2F: Luminaires connected to a circuit with controlled lighting power of less than 50 watts are not required to have dimming controls.~~

EXCEPTION 3 to Section 150.0(k)2F: Luminaires controlled by an occupancy or vacancy sensor providing automatic-off functionality.

Figure 1: Dimmer Cost Effectiveness Across a Range of Connected Loads, Usage, Costs, and Light Levels

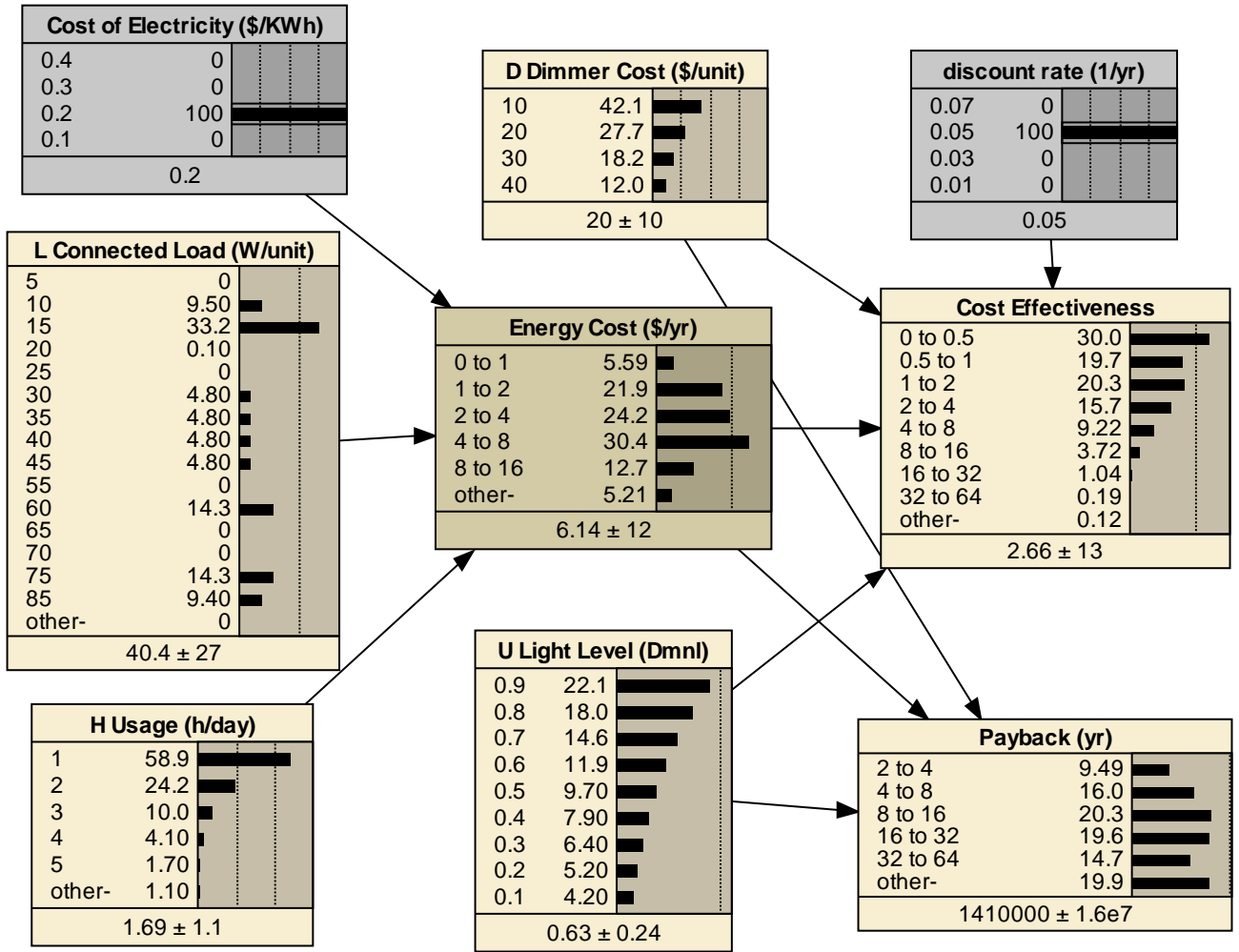


Fig. 1 shows that from a building level perspective, using the connected lighting load distribution (W/unit) and the average lighting usage hours (h/day) taken from the [CEE Residential Lighting Controls Market Characterization](#) report, dimmers in typical 3 bedroom, 2 bathroom home are cost effective in 50.2% of the cases (i.e. Benefit-to-Cost Ratio greater than 1.0). The cost effectiveness improves if we use 3-hours per day usage (per the [Lighting Facts](#) label) instead of 1.69 hours per day, and/or a 3% discount rate instead of 5%.

Figure 2: Dimmer Cost Effectiveness Using 20 W Connected Load

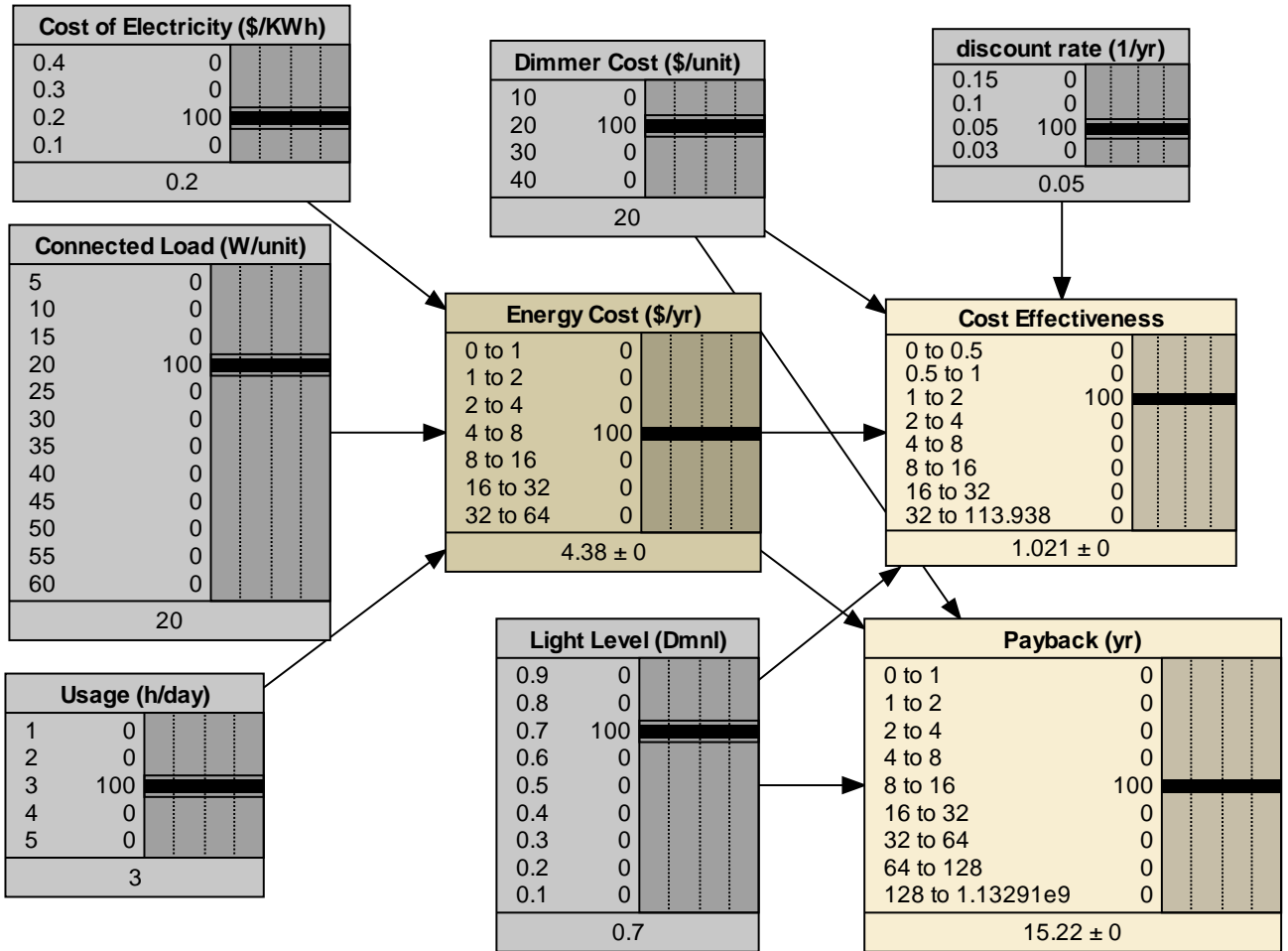


Fig. 2 shows that at a room level, using a 20 watt connected lighting load distribution (W/unit) and the average lighting usage hours of 3 hours per day (h/day) taken from the [Lighting Facts](#) label, dimmers are cost effective (i.e. Benefit-to-Cost Ratio greater than 1.0). The cost effectiveness improves if we use a 3% discount rate instead of 5%, and/or higher than 20 watt connected lighting loads.

6. Table 150.0-A Classification of High Luminous Efficacy Light Sources

Lutron comments: To avoid confusion, the Commission should provide definitions to the new terms added to this table: Dim-to-warm, tunable-white, and Color-tunable. We have provided some proposed definitions below.

Changes (add to lighting definitions in Section 100.1):

Dim-to-warm (also known as warm dim) is a light source capable of simultaneously decreasing its correlated color temperature as its light output decreases, typically resembling the change in color temperature of an incandescent lamp as it dims.

Tunable white a light source capable of adjusting its correlated color temperature while maintaining its relative light output and capable of adjusting its light output while maintaining its correlated color temperature.

Color tunable a light source capable of emitting highly saturated light of varying hues, as well as white light, for example by varying the relative intensity of individual emitters within the light source.