



# CALIFORNIA STATEWIDE UTILITY CODES AND STANDARDS PROGRAM

*2019 Title 24 Codes & Standards Enhancement (CASE) Proposal*

## Nonresidential Lighting Alterations

September 8<sup>th</sup> 2016

**Energy Solutions**





## 2019 Title 24 Code Cycle and Alterations

- No proposed code changes at this time.
- Need to quantify the effect of expected lower 2019 Lighting Power Densities (LPDs) on energy savings from alterations, particularly from 50% / 35% wattage reduction compliance option.



# 2016 Title 24 Lighting Alterations: Triggers

Triggers for Entire Luminaire Alteration	Triggers for Luminaire Component Modification
<ul style="list-style-type: none"><li>• Removing and reinstalling (same luminaires) <math>\geq 10\%</math> of existing luminaires; OR</li><li>• Replacing or adding entire luminaires (3+ luminaires); OR</li><li>• Adding, removing, or replacing walls or ceilings along with any redesign of the lighting system (3+ luminaires).</li></ul>	<ul style="list-style-type: none"><li>• Component modifications in place (replacing ballasts or drivers and the associated lamps, permanently changing the light source, or the optical system); AND</li><li>• <math>\geq 70</math> existing luminaires per floor per tenant per year are modified.</li></ul> <p>Note: lamp replacements alone and ballast replacements alone are not a modification if installed and powered w/o modifying the luminaire.</p>

Exempt Projects:  $\leq 2$  luminaires are replaced or reinstalled.



## 2016 Title 24 Lighting Alterations: Compliance Options for Entire Luminaire and Component Modification

Compliance Option	Control Requirements
<b>Option 1</b> ≤ 85% of LPD allowance	<ul style="list-style-type: none"><li>• Manual area controls</li><li>• Multi-level lighting controls OR two level lighting control for each enclosed space (≥100 sf/enclosed space and lighting load &gt;0.5 W/sf)</li><li>• Auto shut-off controls</li></ul>
<b>Option 2</b> > 85% and ≤ 100% of LPD allowance	<ul style="list-style-type: none"><li>• Manual area controls</li><li>• Multi-level lighting controls (≥100 sf/enclosed space and lighting load &gt;0.5 W/sf)</li><li>• Auto shut-off controls</li><li>• Auto daylighting controls</li><li>• Demand responsive controls (&gt; 10,000 sf/single building AND ONLY when the alteration also changes the area of the space, changes the occupancy type of the space, or increases the lighting power)</li></ul>
<b>Option 3</b> wattage reduction <ul style="list-style-type: none"><li>• 50% for office, retail, and hotel</li><li>• 35% for all other</li></ul>	<ul style="list-style-type: none"><li>• Manual area controls</li><li>• Auto shut-off controls (except 130.1(c)1D, separate shut-off controls for display/ornamental; 130.1(c)6B, full or partial off occupancy sensing in library stacks; 130.1(c)6C, full or partial off occupancy sensing in corridors and stairwells; 130.1(c)7A, partial off occupancy sensing in corridors and stairwells in hotels; 130.1(c)8, guest room card key/occupancy sensing)</li></ul>



# 2016 Title 24 Lighting Wiring Alterations

Triggers	Requirements
<p>Wiring alterations that:</p> <ul style="list-style-type: none"><li>• Add a circuit feeding luminaires; OR</li><li>• Replace, modify, or relocate wiring b/w a switch or panelboard and luminaires; OR</li><li>• Replace lighting control panels, panelboards, or branch circuit wiring.</li></ul>	<ul style="list-style-type: none"><li>• <math>\leq 100\%</math> of LPD allowance</li><li>• Manual area controls</li><li>• Multi-level lighting controls OR two level lighting control (for each enclosed space)</li><li>• Auto shut-off controls (some)</li><li>• Auto daylighting controls (ONLY where wiring alterations include <math>\geq 10</math> luminaires within the primary sidelit daylit zone or the skylit daylit zone)</li></ul>



# Summary of 2016 Title 24 Requirements

Lighting Alterations Quick Reference	LPD	area switch	area switch	not override cntrls	separate switch display	dimming	bi-level switching	auto-shut-off either	auto-shut-off, separate display	countdown switches	timeclock timed override	holiday feature time clock	occ sensor only - class, conf rm	motion partial off: warehouse	motion partial off: library	motion partial off: corridor, stair	motion partial off hotel corridors	motion partial off garage	guestroom key card/occ sensor	auto daylighting controls - primary sidelit and skylit	auto daylighting parking garage	demand response > 10,000 sf
	140.6	130.1(a)1	130.1(a)2	130.1(a)3	130.1(a)4	130.1(b)	Multi-level	130.1(c)1A-C	130.1(c)1D	130.1(c)2	130.1(c)3	130.1(c)4	130.1(c)5	130.1(c)6A	130.1(c)6B	130.1(c)6C	130.1(c)7A	130.1(c)7B	130.1(c)8	130.1(d)2	130.1(d)3	130.1(e)
<b>2016 Adopted</b>																						
Entire Luminaire 141.0(b)2Ii > 10%/space	> 85% <100%	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	120 W	60 W	Y
Entire Luminaire 141.0(b)2Ii > 10%/space	< 85%	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Entire Luminaire 141.0(b)2Iii: <b>50% less power than existing office, retail, hotel, 35% other</b>	NA	Y	Y	Y				Y		Y	Y	Y	Y	Y	Y	Y	Y	Y				
Component Modification, 141.0(b)2Ji: > 70 luminaires/project, > 10%/space	> 85% <100%	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	120 W	60 W	Y
Component Modification, 141.0(b)2Ji: > 70 luminaires/project, > 10%/space	< 85%	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Component Modification, 141.0(b)2Jii: > 70 luminaires/project, <b>50% less power than existing office, retail, hotel, 35% other</b>	NA	Y	Y	Y				Y		Y	Y	Y	Y	Y				Y				
Wiring Alterations 140.1(b)2K > 2 luminaires	<100%	Y	Y	Y			Y	Y			Y	Y								10+ L	10+ L	



# Feedback Request from Stakeholders

To provide input, please call or email

## **CASE Report Lead**

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