



TITLE 24, PART 6 2025 CODE CYCLE

Lighting Language Cleanup

Initiative Overview & Recommendations

Nonresidential, Single Family, and Multifamily Lighting

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February 24, 2023



Introductions



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Agenda

Background & Introductions *5 min*

Proposed Cleanup & Code Change Ideas *45 min*

Cleanup Ideas

- Overall Structure
- Multilevel Lighting Control
- Control Interactions
- Electrical Power Distribution
- Residential

Cleanup & Code Change Idea

- Tailored Method
-

Discussion & Next Steps *15 min*





Background

- Goals & Objectives
- Public Participation
- Targeted Topics

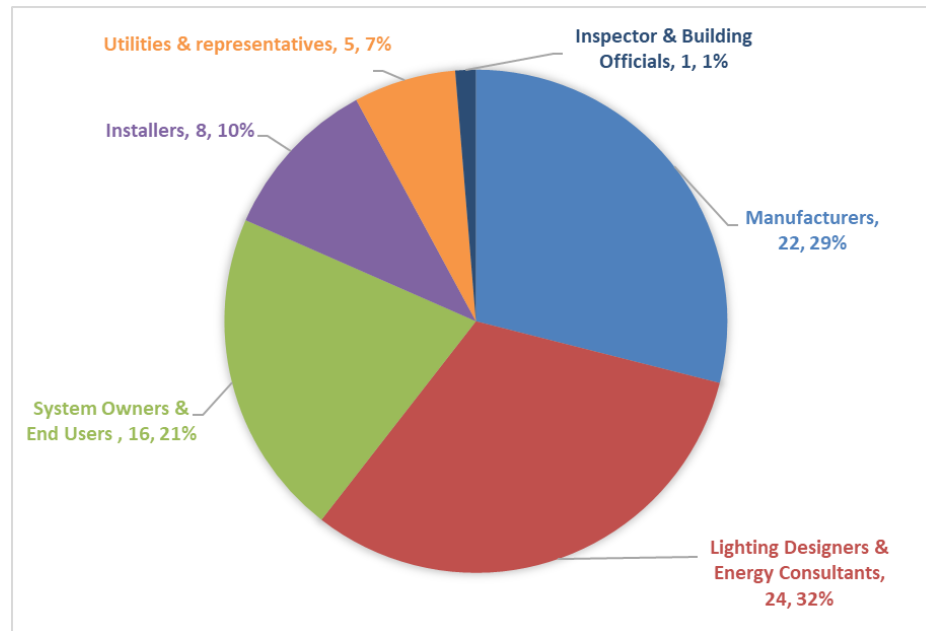
Goals & Objectives

- Establish a working group of industry stakeholders to develop recommendations that simplify & clarify the nonresidential & residential lighting language contained in the 2022 Energy Code
- Improve code comprehension & compliance among contractors, code officials, building owners and others involved in lighting projects in California



Public Participation

- 76 individuals representing 6 key stakeholder groups were invited to participate Q1 2022
- Public call to participate on the CLTC website
- Graph shows breakdown by stakeholder group, number of individuals invited, and percent of total invited.
- 40 participants are actively participating (53%)



Targeted Topics

Topic	Stakeholder Participants	Engagement (Out of 40 Participants)
Automatic Daylighting Controls	10	29%
Demand Responsive Controls	10	29%
Multilevel Lighting Controls	9	26%
Outdoor Lighting	9	26%
Control Interactions	8	24%
Shut-OFF Controls	7	21%
Lighting Power Allowances	7	21%
Controlled Environment Horticulture Lighting	7	21%
Overall Structure of the Energy Code	6	18%
Residential	6	18%
Manual Area Controls	5	15%
Multifamily Buildings	5	15%
Sign Lighting	5	15%
Power Adjustment Factors	3	9%
Lighting Wattage Exclusions	3	9%
Acceptance Testing Requirements	3	9%
Electrical Power Distribution	3	9%
Compliance Manual	2	6%
Lighting Definitions	2	6%

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Review of Code Language Markup

- Cleanup Ideas
 - Overall Structure
 - Multilevel Lighting Control
 - Control Interactions
 - Electrical Power Distribution
 - Residential
- Code Change Idea
 - Tailored Method



Overall Structure of the Energy Code

- Add modern digital features to Energy Code in compliance with ADA requirements
 - Expand bookmarks & add hyperlinks
 - Flowchart/decision tree function
 - Collect comments & suggested edits
- Update subsection naming conventions
 - Ex. 170.2(c)4Niv → 170.2(c)4.N.iv
- Align terminology with ASHRAE 90.1 and IECC
- Reorganize tables to appear after first reference instead of end of section
- Italicize defined terms

**Poll questions
coming up!**

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1. Add modern digital features to Energy Code in compliance with ADA compliant documentation best practices according to Rehabilitation Act Section 508 requirements
 - a. Expand existing bookmark features in PDF version into the body of the document to tables, defined terms, etc.
 - i. Add hyperlinks any referenced Standards/Appendices/Manuals
 - b. Move from just PDF to online version on CEC's website (similar to Reference Code Ace)
 - a. Add a flowchart/decision tree feature for projects with relevant links to local jurisdiction's Codes &

Standards. This may be best accomplished in partnership with Energy Code Ace as an expansion of the *Virtual Compliance Assistant*.

- b. Add font/color formatting to help differentiate between sections of the code and visual indicators to identify where a reader is in the Energy Code (e.g., TurboTax approach)
- c. Ability for CEC to collect comments and suggested edits for future cleanup initiatives

2. Naming Conventions

- a. Add periods after subsection letters and numerals, example Section 170.2(c)4Niv would change to Section 170.2(c)4.N.i
- b. Updating the naming convention could help support moving the Energy Code to an online format and automating into software from a software coding standpoint.

Poll

Would new features in an online version (project flowchart, comments section, etc.) and the addition of more features like hyperlinking in the PDF (to tables, terms, etc.) help you navigate the Energy Code better than you do now? Yes, No, Maybe, Don't know

Poll

Would refined naming conventions for subsections help you navigate the Energy Code better than you do now?

Example: Section 170.2(c)4Niv would change to Section 170.2(c)4.N.iv

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- a. Add periods after sub-section letters and numerals, example Section 170.2(c)4Niv would change to Section 170.2(c)4.N.iv
- b. Updating the naming convention could help support moving the Energy Code to an online format and automating into software from a software coding standpoint.

Multilevel Lighting Controls

- Simplify Table 130.1-A by:
 - **Option 1: Deleting it and moving continuous dimming language to main paragraph.**
 - Option 2: Removing duplicate/outdated light source types & uniformity column
- Simplify uniformity requirements
- Remove classroom exception

Since 2019, our LPD allowances have been based on LED technology which is now commonly offered with continuous dimming.

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The 2025 Code Cycle effective date is planned for January 1, 2026, one year after the new legislation is set to go into effect banning linear fluorescents

https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB2208

This bill would **prohibit**, on and after **January 1, 2025**, a pin-base type compact fluorescent lamp or a **linear fluorescent lamp**, as defined, from being offered for final sale, sold at final sale, or distributed in this state as a new manufactured product. The bill would exempt various lamps that meet specified criteria from that prohibition, including lamps used for image capture and projection and lamps used for disinfection.

Multilevel Lighting Controls Language Cleanup: OPTION 1

Simplify Table 130.1-A by **deleting it** and moving continuous dimming language to main paragraph.

The general lighting of any enclosed space area 100 square feet or larger with a connected lighting load that exceeds 0.5 watts per square foot shall provide multilevel lighting controls that:

~~1. Allow the level of lighting to be adjusted up and down.~~

~~2. Do not reduce the uniformity of illuminance. The multilevel controls shall:~~

~~3. 1. Provide continuous dimming from 10-100 percent power. the number of control steps specified in TABLE 130.1-A; and~~

~~**EXCEPTION 1 to Section 130.1(b)1:** Classrooms with a connected general lighting load of 0.6 watts per square foot or less shall have a minimum of one control step between 30-70 percent of full rated power, regardless of luminaire type.~~

~~2. Meet the uniformity requirements specified in TABLE 130.1-A.~~

~~**EXCEPTION 1 to Section 130.1(b):** An enclosed space area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps or has only one inseparable SSL luminaire.~~

~~**EXCEPTION 2 to Section 130.1(b):** Restrooms.~~

~~**EXCEPTION 3 to Section 130.1(b):** Healthcare facilities.~~

Multilevel Lighting Controls Language Cleanup: OPTION 2

Simplify Table 130.1-A by removing duplicate/outdated light source types and uniformity column.

The general lighting of any enclosed space area 100 square feet or larger with a connected lighting load that exceeds 0.5 watts per square foot shall provide multilevel lighting controls that allow the level of lighting to be adjusted up and down. Uniformity of illuminance shall not be reduced by multilevel lighting controls. The multilevel controls shall:

~~1. Provide the number of control steps specified in TABLE 130.1-A; and~~

~~**EXCEPTION 1 to Section 130.1(b)1:** Classrooms with a connected general lighting load of 0.6 watts per square foot or less shall have a minimum of one control step between 30-70 percent of full rated power, regardless of luminaire type.~~

~~2. Meet the uniformity requirements specified in TABLE 130.1-A.~~

EXCEPTION 1 to Section 130.1(b): An enclosed space area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps or has only one inseparable SSL luminaire.

EXCEPTION 2 to Section 130.1(b): Restrooms.

EXCEPTION 3 to Section 130.1(b): Healthcare facilities.

Multilevel Lighting Controls: OPTION 2

TABLE 130.1-A MULTILEVEL LIGHTING CONTROLS AND UNIFORMITY REQUIREMENTS

Luminaire Type	Minimum Required Control Level/Steps (percent of full rated power ¹)	Uniform level of illuminance shall be achieved by:
LED luminaires and LED light source systems	Continuous dimming, 10-100 percent	Continuous dimming—10-100 percent
Line-voltage sockets except GU-24	Continuous dimming 10-100 percent	Continuous dimming—10-100 percent
Low-voltage incandescent systems	Continuous dimming 10-100 percent	Continuous dimming—10-100 percent
Fluorescent luminaires	Continuous dimming 20-100 percent	Continuous dimming—20-100 percent
GU-24 sockets rated for fluorescent ≤ 20 watts; Pin-based compact fluorescent ≤ 20 watts ² Linear fluorescent and U-bent fluorescent ≤ 13 watts	Minimum one step between 30-70 percent	Continuous dimming; or Stepped dimming; or Switching alternate lamps in a luminaire.

Track Lighting	Minimum one step between 30-70 percent	Continuous dimming; or Stepped dimming; or Separately switching circuits in multi-circuit track with a minimum of two circuits.
Luminaire with four or more linear fluorescent/and U-bent fluorescent lamps > 13 watts	Minimum one step in each range: 20 - 40 percent 50 - 70 percent 75 - 85 percent 100 percent	Stepped dimming; or Continuous dimming; or Switching alternate lamps in each luminaire, having a minimum of 4 lamps per luminaire illuminating the same area and in the same manner
All other light sources, including HID and Induction	Continuous dimming, 10-100 percent OR Minimum one step between 30 - 70 percent	Stepped dimming; or Continuous dimming; or Switching alternate lamps in each luminaire, having a minimum of 2 lamps per luminaire, illuminating the same area and in the same manner.

1. Full rated input power of driver, ballast and lamp, corresponding to maximum ballast factor
2. Includes only pin-based lamps: twin-tube, multiple twin-tube, and spiral lamps

Multilevel Lighting Controls: OPTION 2

TABLE 130.1-A MULTILEVEL LIGHTING CONTROLS REQUIREMENTS

Luminaire	Minimum Required Control Level (percent of full rated power ¹)
LED luminaire	Continuous dimming, 10-100 percent
Luminaire with four or more linear fluorescent/U-bent fluorescent lamps > 13 watts	Minimum one step in each range: 20 - 40 percent 50 - 70 percent 75 - 85 percent 100 percent
All other	Continuous dimming, 10-100 percent OR Minimum one step between 30 - 70 percent

1. Full rated input power of [driver](#), ballast and [lamp](#), corresponding to maximum ballast factor

Poll question coming up!

Poll

Do you prefer:

- OPTION 1: Deleting the table, or
- OPTION 2: Removing duplicate/outdated light sources and uniformity column?

Control Interactions

The Controls Interactions subcommittee recommends **deleting Section 130.1(f)** as we believe the guidance duplicates information in Section 130.1(a) through (e) and Section 110.9.

Backup recommendation:

- Add referenced Section names and numbers
- Add overview table to summarize written recommendations

**POLL QUESTION
NEXT SLIDE**

Poll

Do you utilize the guidance provided in the Control Interactions section (Section 130.1(f))?

Electrical Power Distribution

- Hotel guest room time delay language for controlled receptacles in Section 130.5(d)4
 - Currently 30 minute time delay
- Hotel guest room time delay language for lighting in Section 130.1(c)8
 - Currently 20 minute time delay

Would reducing the time delay for controlled receptacles from 30 minutes to 20 minutes in Hotel Guest rooms impact your ability to meet the Energy Code with the technology you typically specify?

Poll

Would reducing the time delay for controlled receptacles from 30 minutes to 20 minutes in Hotel Guest rooms impact your ability to meet Energy Code with the technology you typically specify?

Residential

- Table 150.0-A currently defines ‘high luminous efficacy light sources’ by identifying which light sources are “automatically” vs. must meet JA8 requirements
- Subcommittee feels this adds unnecessary complexity and does not follow the pattern of the rest of the Energy Code requirements
- **Proposed clean up:**
 - Delete Table 150.0-A and refer directly to JA8 in Section 150.0(k)1A.
 - Add items in left column of Table 150.0-A as new Exception 4.

**POLL QUESTION
COMING UP!**

1. Light Source Luminaire Requirements

A. **Luminaire Efficacy.** All installed luminaires and lamps shall meet the requirements in [Joint Appendix JA8TABLE 150.0-A](#).

EXCEPTION 1 to Section 150.0(k)1A: Integrated device lighting. Lighting integral to exhaust fans, [kitchen](#) range hoods, bath vanity mirrors, [ceiling fan kits that are subject to federal appliance regulations](#), and [garage door](#) openers.

EXCEPTION 2 to Section 150.0(k)1A: Navigation lighting such as night lights, step lights, and path lights less than 5 watts.

EXCEPTION 3 to Section 150.0(k)1A: Cabinet Lighting. Lighting internal to drawers, cabinetry, and linen closets with an efficacy of 45 lumens per watt or greater.

[EXCEPTION 4 to Section 150.0\(k\)1A: The following luminaires:](#)

- [1. LED light sources installed outdoors.](#)
- [2. Inseparable Solid State Lighting \(SSL\) luminaires containing colored light sources that are installed to provide decorative lighting.](#)
- [3. Pin-based linear fluorescent or compact fluorescent light sources using electronic ballasts.](#)
- [4. High intensity discharge \(HID\) light sources including pulse start metal halide and high pressure sodium light sources.](#)
- [5. Luminaires with hardwired high frequency generator and induction lamp.](#)

TABLE 150.0-A CLASSIFICATION OF HIGH LUMINOUS EFFICACY LIGHT SOURCES

Light sources in this column other than those installed in ceiling recessed downlight luminaires are classified as high luminous efficacy and are not required to comply with Reference Joint Appendix JA8.	Light sources in this column are required to comply with Reference Joint Appendix JA8 and shall be certified and marked as required by JA8.
<ol style="list-style-type: none"> 1. LED light sources installed outdoors. 2. Inseparable Solid State Lighting (SSL) luminaires containing colored light sources that are installed to provide decorative lighting. 3. Pin-based linear fluorescent or compact fluorescent light sources using electronic ballasts. 4. High intensity discharge (HID) light sources including pulse start metal halide and high pressure sodium light sources. 5. Luminaires with hardwired high frequency generator and induction lamp. 6. Ceiling Fan Light Kits subject to federal appliance regulations. 	<ol style="list-style-type: none"> 7. All light sources installed in ceiling recessed downlight luminaires. Note that ceiling recessed downlight luminaires shall not have screw base sockets regardless of lamp type as specified in Section 150.0(k)1C. 8. Any light source not otherwise listed in this table.

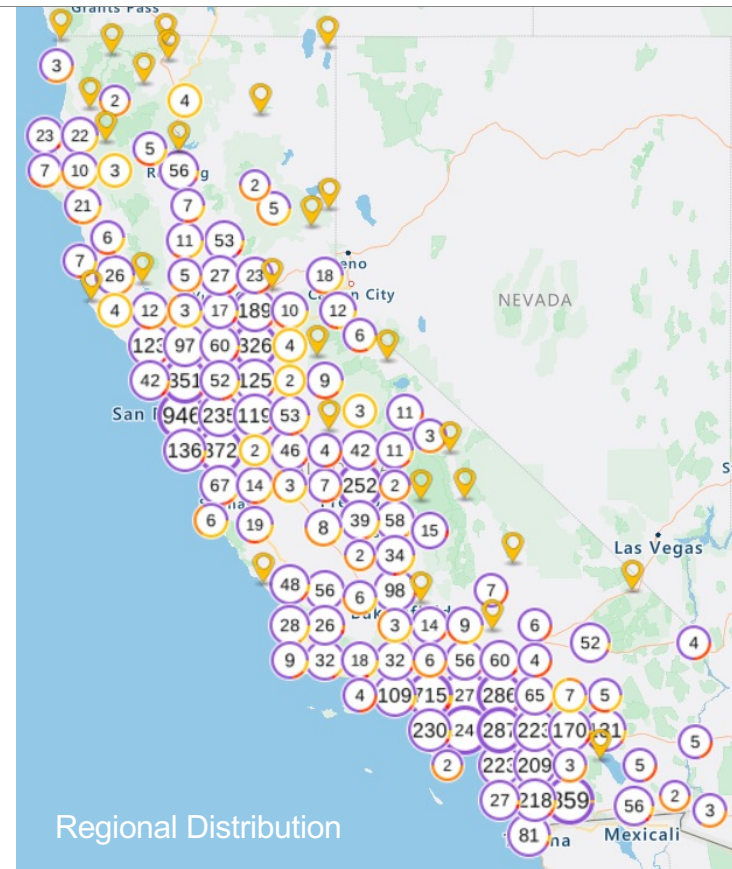
Poll

Would being pointed to JA8 requirements directly instead of via
Table 150.0-A make the Energy Code easier to understand?

Yes, No, Maybe, Don't know

Simplify Based on Compliance Data

- Looked at how real projects are complying
- Dataset includes 12,520 indoor lighting scopes
- Projects are from all over the State
- New construction & alterations



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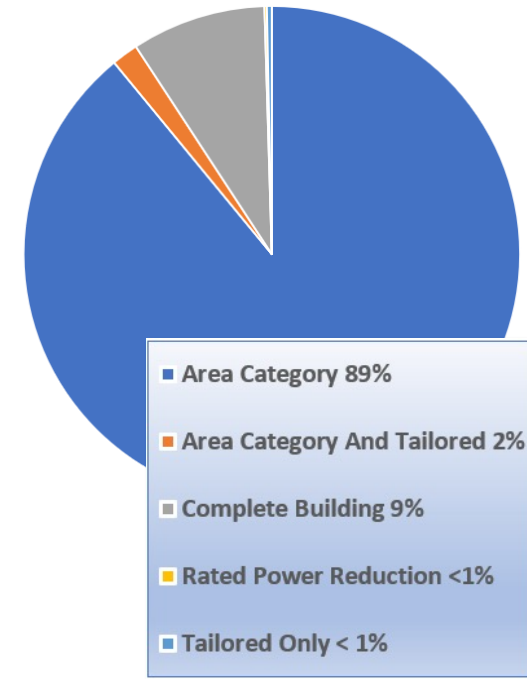
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- We wanted to look at how projects were actually complying with lighting requirements for opportunities to simplify, so we gathered some data
- The data includes 12,520 indoor lighting scopes and represent new construction and alteration projects all over the state

Data Showed....

- 98% of projects use Area Category or Complete Building
- Of the projects using Tailored, only a few space types are utilized

Space Function	Tailored	Area Category	Complete Building
Retail Merchandise Sales	409	1517	180
Dining Area	62	850	152
Multipurpose Area	18	3025	-
Exhibit Museum Area	12	45	-
Main Entry Lobby	7	2798	-
Conference Area	4	See Multipurpose	-
Showroom Area	3	-	-
Religious Worship Area	2	58	4
Grocery Store Area	2	272	6
Meeting Center Area	1	See Multipurpose	-
Auditorium Area	1	34	-



- The data showed that the vast majority of indoor lighting scopes were complying via Area Category method, followed by Complete Building method. Very few projects are complying via AC + Tailored, Rated Power Reduction or Tailored only.
- Of the projects using Tailored method, only a few of the space function areas are using Tailored allowances. The top two are Retail & Dining, which is not surprising.
- Even so, many projects with these same space types are complying using Area Category, and to a lesser extent some are complying with Complete Building Method too.
- Based on this data, and the fact that Tailored Method requires support via training, tables in the forms, inclusion in the compliance software and manuals, etc. it may be that we can provide adequate wattage allowances without Tailored—that's where we'd like to hear from you.

Simplification Proposal

Objective:

Remove Tailored Method and provide Additional Allowances under Area Category Method *without decreasing or increasing wattage allowances.*

TABLE 140.6-C AREA CATEGORY METHOD – LIGHTING POWER DENSITY VALUES (WATTS/FT²)

Primary Function Area		Allowed LPD for General Lighting (W/ft ²)	Additional Lighting Power	
			Qualified Lighting Systems ¹	Additional Allowance (W/ft ² , unless noted otherwise)
Convention, Conference, Multipurpose & Meeting Area		0.75	Decorative/Display	0.25
Dining Area	Bar/Lounge and Fine Dining ceiling height <= X'	0.45	Decorative/Display Wall Display MH <= 10'6" Wall Display MH 10'7"-14' Wall Display MH > 14'	X W/ft X W/ft X W/ft
	Bar/Lounge and Fine Dining ceiling height > X'	0.XX	Floor & Task MH <= 10'6" Floor & Task MH 10'7"-14' Floor & Task MH > 14'	0.XX 0.XX 0.XX
	Cafeteria/ Fast Food	0.45	Decorative/Display	0.25
Family & Leisure		0.40	Decorative/Display	0.25
Museum Area	Exhibition/Display ceiling height <= X'	0.60	Decorative/Display Wall Display MH <= 10'6" Wall Display MH 10'7"-14' Wall Display MH > 14'	X W/ft X W/ft X W/ft
	Exhibition/Display ceiling height > X'	0.XX	Floor & Task MH <= 10'6" Floor & Task MH 10'7"-14' Floor & Task MH > 14'	0.XX 0.XX 0.XX
	Restoration Room	0.70	Detailed Task Work	0.35
Lobby, Main Entry	ceiling height <= X'	0.70	Decorative/Display Wall Display MH <= 10'6" Wall Display MH 10'7"-14' Wall Display MH > 14'	X W/ft X W/ft X W/ft
	ceiling height > X'	0.XX		
Retail Sales Area	Grocery Sales	1.00	Decorative/Display	0.35
	Retail Merchandise Sales	0.95	Decorative/Display Wall Display MH <= 10'6" Wall Display MH 10'7"-14' Wall Display MH > 14'	X W/ft X W/ft X W/ft
			Floor & Task MH <= 10'6" Floor & Task MH 10'7"-14' Floor & Task MH > 14' Valuable Display Case	0.XX 0.XX 0.XX 0.XX
Fitting Room	0.60	External Illuminated Mirror Internal Illuminated Mirror	40 W/ea 120 W/ea	

¹ "MH" is the Mounting Height which is the height in feet above finished floor and bottom of the luminaire

³—Tailored method. Requirements for using the Tailored Method include the following:

- I want to start by saying the objective of this proposal is not to decrease nor increase wattage allowances. This is not about relaxing or making the code requirements more strict. This is about simplifying the code and all the code support materials based on how people are complying.
- If very few projects are using Tailored Method and most are using Area Category, perhaps we can provide the wattage allowances needed under Area Category.
- The proposal is to look at the top 5 space function area types that are using Tailored and see if we can provide Additional Allowances under Area Category instead.
- The proposed Additional Allowances do not exactly match the specialty allowances in the current Tailored method because the base general lighting allowances are not the same for Area Category Method and Tailored. But again, the intention is to create equitable wattage allowance and not increase or decrease the stringency of the code.

Poll

Indicate how often you use Tailored Method for compliance.
%'s

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Multiple choice:

- Never
- Almost never
- Sometimes
- Often
- All the time
- I do not document lighting compliance

Poll

Would you support the concept discussed to remove Tailored Method and add new Area Category Additional Allowances for Retail, Museum, Main Entry Lobby, Dining & Multipurpose spaces?

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Multiple choice:

- Yes
- No
- Need more information

If answered Need more information, please put what information you would need in the chat.



Discussion and Next Steps

We want to hear from you!

- POLL QUESTION NEXT SLIDE:
 - Provide **any last comments or feedback** on this presentation now, verbally or add to GoTo Questions Pane
- More information on pre-rulemaking for the 2025 Energy Code at <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

Please provide comments on this measure by March 10, 2023. Please send comments to info@title24stakeholders.com and copy CASE Authors (see contact info on following slide).

Poll

Discussion, last comments, or feedback?

Thank You

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