

# Meeting Notes

Posted May 2023



Notes from 2025 Title 24, Part 6 Code Cycle Utility-Sponsored Stakeholder Meeting for:

## Lighting Language Cleanup, Controlled Environment Horticulture, and Nonresidential Daylighting

### Meeting Information

**Meeting Date:** 5/16/2023

**Meeting Time:** 10:00 am – 11:45 pm

**Meeting Host:** California Statewide Utility Codes and Standards Enhancement Team

### Meeting Agenda

Time	Topic	Presenter
10:00 AM	Welcome and Introduction	Nikki Westfall, Energy Solutions Javier Perez, PG&E Kelly Cunningham, PG&E
10:20 AM	Lighting Language Cleanup	Sally Blair, NORESCO and California Lighting Technology Center, UC Davis
10:35 AM	Controlled Environment Horticulture (CEH)	Kyle Booth, Energy Solutions
11:05 AM	Daylighting	Yao-Jung Wen, Energy Solutions
11:35 AM	Conclusion / Wrap-Up	Nikki Westfall, Energy Solutions
11:45 AM	Adjourn	

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## Meeting Participants (available upon request by emailing [info@title24stakeholders.com](mailto:info@title24stakeholders.com))

### Action Items from Meeting

- The Statewide CASE TEAM followed up on all questions or comments that required a response and were not discussed during the meeting.

### Key Points from Meeting

This proposal for Lighting Language Cleanup, Controlled Environment Horticulture, and Nonresidential Daylighting is important because:

- Stakeholders continue to ask for simplification of code requirements and compliance process; the lighting language cleanup is in response to that request.
- The CEH and daylighting proposals represent cost effective significant savings potential.

## Stakeholder Feedback Impacting Proposals

CASE Teams rely on feedback from stakeholders to create the best proposals possible. Since Round 1, stakeholder input has impacted this proposal in these ways:

### Regarding the Lighting Language Cleanup (Tailored Method):

- Lighting designers are very concerned that this simplification will result in a reduction in wattage allowance for spaces that require layered lighting designs. We have spoken to several lighting designers to understand the use cases for Tailored method and craft the simplification options presented at this second-round workshop.
- The feedback today was valuable to understand from the lighting community which option they would most support and connect with any stakeholders who have strong opinions or additional insight regarding this simplification measure.

### Regarding the Controlled Environment Horticulture Lighting CASE report:

- Some stakeholders noted a concern with using DesignLights Consortium's (DLC) Horticultural Lighting Requirements V3.0 as code minimum efficacy. The reasoning was that DLC's requirements are best practices and should not be used to set code minimum efficiencies. There is precedent for utilizing DLC's requirements for horticultural lighting codes such as the code requirements for cannabis lighting in Massachusetts.
- Stakeholders also noted concern about grow light incentives going away with the proposed increase in minimum Photosynthetic Photon Efficacy PPE. To help mitigate this potential issue, the Statewide CASE Team is exploring options to develop incentive paths for horticultural lighting through other programs such as Cal NEXT, the CA statewide electric emerging technology program.

### Regarding the Daylighting CASE report:

- In response to the feedback from multiple stakeholders about the automatic daylighting controls requirements in the current code, and the language being confusing and ambiguous, the Statewide CASE Team proposed significantly rearranged code language to increase clarity and conciseness of the requirements.
- Stakeholders urged the Statewide CASE Team to consider the potential awkward design situation the proposed code language could create, namely, the primary sidelit or skylit daylit zone may be exempted from the automatic daylighting controls requirements while the secondary daylit zone is required for such controls. In response, the Statewide CASE Team modified the trigger of the secondary daylit zone automatic daylighting controls required to be based on the combined wattage of the primary and secondary daylit zones instead of the secondary daylit zone alone. This change also aligns the proposed requirements with the requirements of the daylight responsive control in ASHRAE 90.1.

## MEETING NOTES

During the meeting, questions and comments were submitted in three distinct formats which are provided in these meeting notes in these [hyperlinked for quick access] sections:

1. **In-Meeting Questions / Comments:** Questions and comments submitted verbally during the meeting via the 'raise hand' function in GoTo Webinar, where participants were unmuted to speak, or in some cases, comments submitted in writing were discussed verbally during the meeting (in which case the person that commented may not be identified in these notes).
2. **Questions / Comments Submitted Via GoTo Webinar:** See this section for questions and comments submitted in written format via the GoTo Webinar question pane.
3. **Mentimeter Polls & Responses:** This section includes public comments and questions, including screen shots of the polls that were conducted during the meeting, and responses to those polls.

Due to time limitations, not all written questions and comments were discussed during the meeting but all have responses available in these meeting notes.

### In-Meeting Questions / Comments

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#### Lighting Language Cleanup

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No questions were asked during the first two agenda sections 'Lighting Language Cleanup' and 'Controlled Environment Horticulture'.

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#### Daylighting

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1. **Comment via GoTo Webinar by Dawn Hollingsworth: In your modeling was any consideration given to building orientation and surface reflectances? For example there are changing light levels north, south, east, west and the models are rather simplistic and not considering occupancy comfort. I have to make sure occupants are comfortable with the amount of light that comes in at various times of day. There's an overarching concept of task illuminance where spaces need volumetric lighting and other surfaces need to be lit, not just the task.**
  - a. **CASE Team Response (Yao-Jung Wen):** In our model, we analyzed the lighting condition with the window of the model facing all 4 cardinal directions and took average of energy from those results. In addition, we didn't just use a simple static sky condition but used the CEC weather files, which contains annual hour-by-hour varying sky conditions for each of the 16 California climate zones analyzed. In terms of human comfort aspect; we did focus on task illuminance and general lighting. There is non-general lighting that could be utilized to address human comfort aspect and provide volumetric lighting. Only general lighting was considered and required to implement automatic daylighting controls.

- b. **CASE Team Response (John McHugh)** added: The control of lighting adjacent to windows reduces high contrast. The use of daylighting controls improves lighting in spaces. General lighting provides task lighting and some circulation lighting so the analysis is somewhat conservative. Regarding blinds, we looked at a previous study of several hundred occupancies and 75% had blinds open. Method being used is radiant ray-tracing simulation of the space.

**Controlled Environment Horticulture (CEH), Kyle Booth**

**2. Question submitted via Mentimeter during the poll that asked stakeholders “Any additional information to provide that could inform CEH lighting costs, savings or feasibility?”: Anonymous Question: “Cost comparisons by fixtures – was this for same PPF?”**

- a. **CASE Team response, Kyle Booth:** Yes, we looked at 300-650w LED horticultural luminaires, trying to keep a similar average PPF. We looked at similar ranges that would have similar outputs.

**Wrap-Up**

- All Draft CASE Reports will be posted May through June at title24stakeholders.com
- Meeting adjourned at 11:50 AM PST

**Questions / Comments Submitted Via GoTo Webinar**

The questions and comments below are provided as-submitted in the GoTo Webinar Question pane. Responses provided by CASE Team support team. In addition, some of these questions were verbally discussed during the meeting and are captured in the In-Meeting Questions / Comments section above.

Question Asked	Response	Responder
Hi Yao - there are already ray-tracing algorithms in certified non-res Compliance Software. (A) Why did you use a non-T24 certified software to do the ray-tracing? (B) Did you compare those non-T24 certified ray-tracing results against the T24-certified Compliance Software that uses ray-tracing? - Liam	We've got to do some follow-up on this. Hope you're well (Jasmine)	Jasmine Shepard
There is significant missing data from this daylight model on Slide 8. How do we know, for example, that the non-certified ray-tracing software used the CEC's hourly weather files (i.e. cloud cover), which impacts the energy saving calculations? Did it use the 2022 weather? Did it use the CEC-approved materials for reflectances? The T24-certified	Hi Liam, we will follow up with you after this call. Thank you for your comments. Hi Liam, we're going to be following up on your questions soon	Julia Forberg, Jasmine Shepard

Question Asked	Response	Responder
Compliance Software that uses ray-tracing already has to be compared against the public's T24 Compliance Software that does not use ray-tracing. -Liam		
There are many assumptions missing from this "agnostic" daylighting model.	Rob can you email ywen@energy-solution.com we'd like to discuss which assumptions you've identified as missing from the daylighting model	Annie Kuczkowski
Is that documented anywhere?	Detailed information is documented in the Draft CASE Report, which will be published soon. Please check back on the daylighting measure section of the title24stakeholders.com website or sign up for the newsletter on title24stakeholders.com to be notified when the CASE Reports are published.	Yao-Jung Wen
Will an OFF step be required as done in 90.1-2022? Did you analyze adding an OFF step?	The off stop will not be required although it is required in AS/NZS 90.1 2022. It was not included in our analysis. The minimum level for daylight dimming required would remain at 10% as adopted in the 2022 code.	Julia Forberg
Ok. Some additional energy savings to be had for the 2028 cycle then.	Assuming this question is related to the dimming-to-OFF question above. The Statewide CASE Team will evaluate whether to propose dimming-to-OFF for the 2028 code cycle when the time comes.	Yao-Jung Wen
Do the code relate to EVERY building type - - what if any might be exempt? Performing theatre seating areas & ?? Thank you.	Hi, Meredith, It depends on the requirement in the code. Some have exemptions for specific occupancies or space types such as healthcare.	Sally Blair
Occupancy L and I3-4 are the only building types in which there are no Energy Code requirements, including lighting.	Current Labs HVAC proposal for 2025 has bringing Occupancy L into the requirements for Labs.	DJ Joh
Conference rooms might need to be split separately due different occupancy patterns to determine FLH.	Thank you for the comment Peter. We'll take another look at the conference room FLH	Annie Kuczkowski

Question Asked	Response	Responder
Its a loaded question. Not one that can be discussed in 15min. I'd love to have a conversation about the code if possible. Additional allowances are needed in many locations. The crunch in LPD is killing creative design for a more general look.	Thank you for your comment, Melissa! Melissa, please email me at SBlair@noresco.com	Nikki Westfall, Sally Blair
There is no need for lamp standards.. just fixtures	Thank you for the feedback.	

## Mentimeter Polls & Responses

### Introduction

Go to [www.menti.com](http://www.menti.com) and use the code 8612 1865

**Welcome! The 2025 Title 24 Energy Code Update Meeting will begin soon. While we wait, let's get acquainted. Where are you located?**

Locations mentioned in the word cloud: houston texas, boulder co, alameda ca, fair oaks ca, davis, northern ca, vermont, new york, wisconsin, los angeles, sacramento, south carolina, losangeles.

**CALIFORNIA ENERGY CODES & STANDARDS**  
A STATEWIDE UTILITY PROGRAM



What industry are you in? **11** Answers

Lighting Design	Lighting Design	Non-profit/advocate
Energy consulting	Horticulture infrastructure, lighting and adaptive daylight controls.	HVAC equipment Manufacturer
Utility - LADWP	Lighting Research	Lighting Design
Architectural Lighting Designer	Lighting manufacturer	

What industry are you in? **18** Answers

Utility - LADWP	Lighting Research	Lighting Design
Architectural Lighting Designer	Lighting manufacturer	Greenhouse
Energy efficiency consultant	HVAC Manufacturing	Architectural Lighting Design
CEH - Greenhouse Manufacturing	lighting designer	Commercial Compliance Software

What industry are you in? **26** Answers

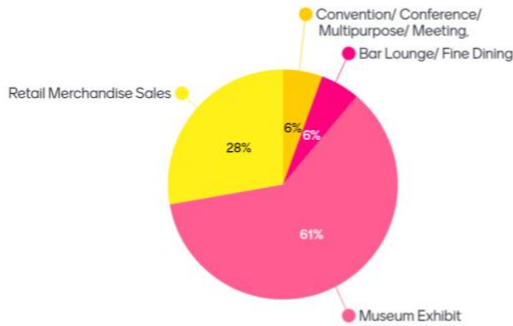
HVAC Design/Consulting	lighting, daylighting, codes and standards	non-profit/advocate
Lighting Retrofits	Agricultural energy efficiency consulting	Architectural Lightng designer
Electrical Engineer Consultant and Lighting Specifier	Power Utility	



# Lighting Language Cleanup, Sally Blair

Go to [www.menti.com](http://www.menti.com) and use the code 8612 1865

Which of the following Function Areas need allowances for wall display, floor/task or very valuable display case lighting? (Select all that apply)



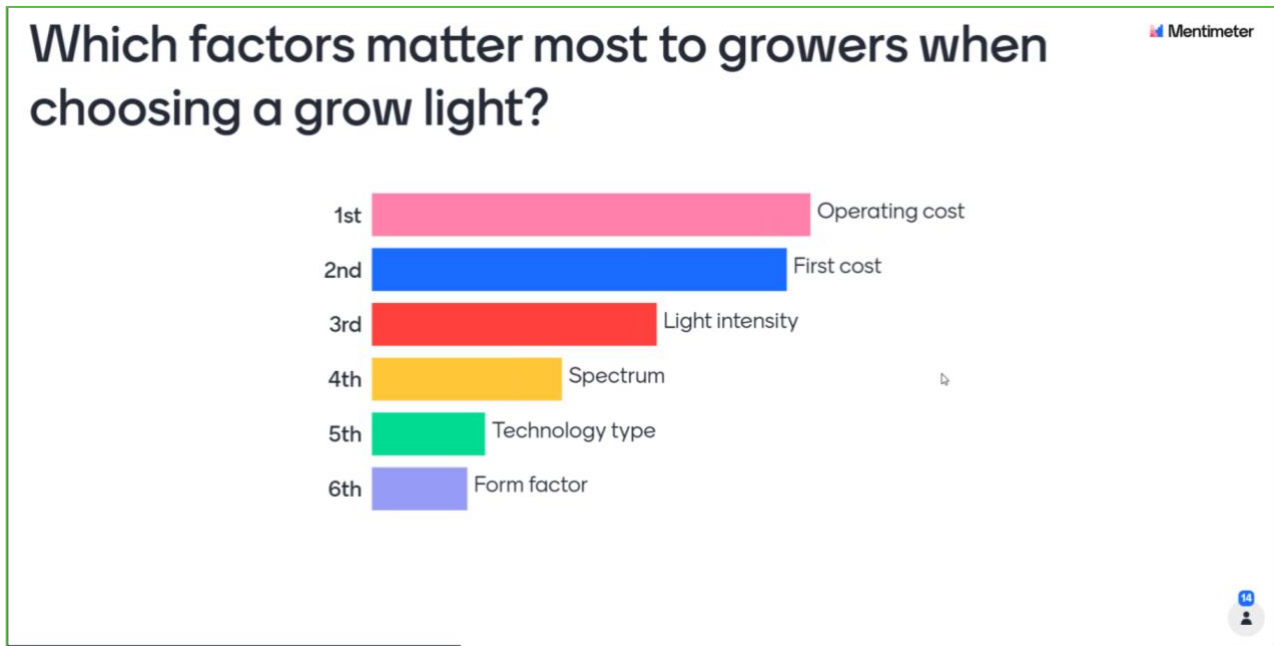
Space Function	Tailored	Area Category	Complete Building
Retail Merchandise Sales	409 (19%)	1517 (72%)	180 (9%)
Dining Area	62 (6%)	850 (80%)	152 (14%)
Multipurpose Area	18 (0.5%)	3025 (99.5%)	-
Exhibit Museum Area	12 (2.1%)	45 (79%)	-
Main Entry Lobby	7 (0.2%)	2798 (99.8%)	-
Conference Area	4	See Multipurpose	-
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	-

18

Please rank the three options we just talked about in order of most desirable (1) to least desirable (3).



22



Go to [www.menti.com](http://www.menti.com) and use the code 2538 0766

What steps can the industry take to support CEH HVAC/D codes development moving forward?

Help to develop standards appropriate to the industry.	industry standards	This is largely a policy issue; if financial incentives for growers to overcome first cost barrier can be preserved then using DLC "best practice" to set efficacy standards becomes more feasible
No more COGEN ALLOWED	Speak directly to growers; and review latest research.	
More case studies	field research	Push ASHRAE to develop: - CEA specific equipment testing methods - 90.1 efficiency requirements - commissioning guideline for CEA
Make sure that you are gathering input from as many growers / facility managers as possible (from different CEH facility types), as well as vendors/installers (including electricians)	Allow for incentives to help achieve code!	
Have development tied into a lighting wattage allocation per sq Ft instead of mandating lighting technology, so HVAC policy can become predictable	Survey of existing control strategies. Test method under partial versus full reheat conditions	Work with ASABE on standards.
	Have CEC examine the DOE testing requirements for dehumidifiers. Difficult to follow the exact testing requirements of 10 CFR 430	

Go to [www.menti.com](http://www.menti.com) and use the code 2538 0766

Any additional information to provide that could inform CEH lighting costs, savings, or feasibility?

10 Answers

Mentimeter

Include networked lighting controls cost and savings

First cost is a huge barrier for cannabis growers due to lack of access to affordable financing and legal banking

by the time they recovered the costs, they have to replace the lamps.

It is:  
<https://www.ledsmagazine.com/horticultural-lighting/article/14288469/cannabis-market-stalls>

Does this 30-year period of analysis take into account the life of the lamp? That is the biggest barrier I'm hearing from growers: that the ROI is so long on LEDs, that by the time they recovered the

The ROI is under 2 years with current cost of fixtures v HPS

Expected useful life of luminaires HID and LED Impact of spectrum on product quality Dimming in greenhouses

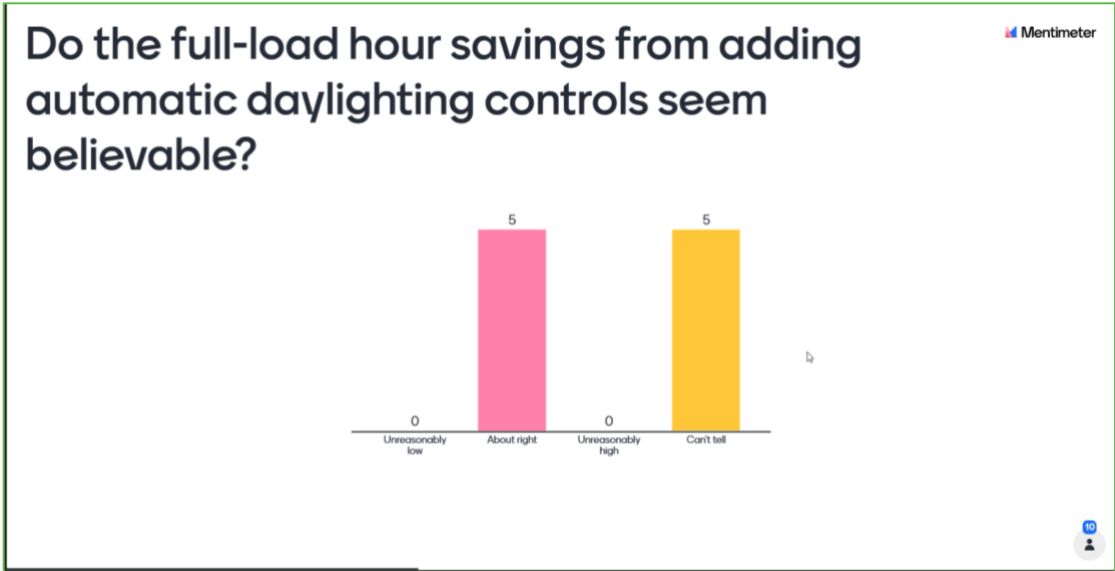
It's not about the fixture wattage, it's about plant productivity, still missing UVAB and Far Red spectrums in your analysis

Incorporate Circadian-based controls vs. 24 hours/day to produce growth

Standardized light recipes for more plant types

Cost comparisons by fixtures - was this for same PPF?

## Daylighting, Yao-Jung Wen, Energy Solutions



Go to [www.menti.com](https://www.menti.com) and use the code 6405 1777

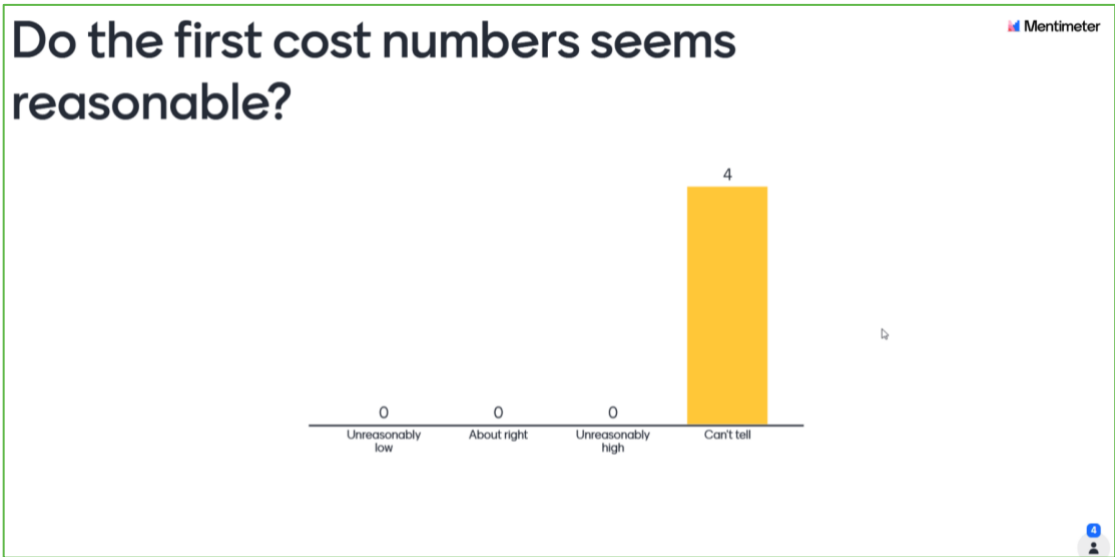
Are there other common control solutions for implementing automatic daylighting controls we should consider?

3 Answers

No

It looks like you covered the most common control systems.

Could consider including dual-loop sensors



Go to [www.menti.com](http://www.menti.com) and use the code 6405 1777

Click and drag

Is it appropriate to use CA electrician rate for installation, commissioning, and maintenance? \$86-\$158/hr (non-unionized) \$107-\$198/hr (unionized)

7 Answers

Mentimeter

yes

yes

yes

yes

would a blended rate between the two make sense?

Can you include both and present them as a range?

Talk to manufacturers, lighting maintenance companies and building owners groups



Do photosensors or other components need to be replaced during the 30-year period of analysis?

Mentimeter

deer database review likely  
only if technology change  
lens exposed to uv  
how many luminaires

