

Notes from 2019 Title 24 Part 6 Code Development Cycle Utility-Sponsored Stakeholder Meeting for Nonresidential Lighting Topics

Posted July 12, 2017

Meeting Information

Meeting Date: March 22, 2017
Meeting Time: 9:00am – 12:00pm
Meeting Host: California Statewide Utility Codes and Standards Team

Attendees

First Name	Last Name	Contact	Organization
Statewide Utility Codes and Standards Team			
<i>Utility Staff</i>			
Kelly	Cunningham	KACV@pge.com	Pacific Gas & Electric
Marshall	Hunt	mbh9@pge.com	Pacific Gas & Electric
Jim	Kemper	James.Kemper@ladwp.com	Los Angeles Department of Water & Power
Chris	Kuch	christopher.kuch@sce.com	Southern California Edison
Al	Mendoza	Alvaro.Mendoza@sce.com	Southern California Edison
Dave Roland	Roland	David.Roland@smud.org	Sacramento Municipal Utility District
<i>Codes and Standards Enhancement (CASE) Team Members</i>			
Steffi	Becking	sbecking@energy-solution.com	Energy Solutions
Heidi	Hauenstein	hhauenstein@energy-solution.com	Energy Solutions
Erin	Linney	elinney@energy-solution.com	Energy Solutions
Michael	McGaraghan	mmcgaraghan@energy-solution.com	Energy Solutions
Erin	Linney	elinney@energy-solution.com	Energy Solutions
Jon	McHugh	jon@mchughenergy.com	McHugh Energy
Axel	Pearson	curaine@energy-solution.com	Energy Solutions
Mudit	Saxena	msaxena@vistar-energy.com	Vistar Energy
Annie	Kuczkowski	annie@clantonassociates.com	Clanton & Associates
California Energy Commission Participants			
Veronica	Martinez	Veronica.Martinez@energy.ca.gov	California Energy Commission
Adrian	Ownby	adrian.ownby@energy.ca.gov	California Energy Commission
Daniel	Wong	daniel.wong@energy.ca.gov	California Energy Commission
Javier	Perez	jperez@energy.ca.gov	California Energy Commission
Heriberto	Rosales	hrosales@energy.ca.gov	California Energy Commission
Other Participants			
Tanya	Hernandez		Acuity Brands
Doug	Avery		Avery Energy Enterprises
Russ	King		Benningfield Group
Cori	Jackson		CLTC, UC Davis

Elizabeth	Morgan		Dialight
Andy	Smith		Dialight
Kyle	Landis		Disneyland Resort
Greg	Copley		Ecology Action
Philip	Hall		Enlighted
George	Nesbitt		Environmental Design / Build
Gina	Rodda		Gabel Energy
Gregg	Ander		Gregg D. Ander, LLC
Scott	Ziegenfus		Hubbell Inc.
John	Martin		International Association of Lighting Designers
Lyn ECA	Gomes		kW Engineering
Susan	Callahan		LEDVANCE LLC
Harold	Jepsen		Legrand
Glenn	Savage		LG Electronics
Michael	Jouaneh		Lutron
Michael	Scalzo		National Lighting Contractors Association of America
Mark	Lyles		NBI
Alex	Boesenberg		NEMA
John	Arent		NORESKO
Rebecca	Rice		NORESKO
Kyra	Weinkle		NORESKO
Alex	Hillbrand		National Resource Defense Council (NRDC)
Richard	Haring		Philips Lighting
Kelly	Seeger		Philips Lighting
Bret	Barrow		Politico Group
Neall	Digert		Solatube International, Inc.
Laura	Carpenter		Terralux
Paul	Pohl		Terralux
Cedric	Van den Haute		Terralux
Michael	Mutmansky		TRC Energy Services
Greg	Bennorth		Universal Lighting Technologies
Stephanie	Boyle		Universal Lighting Technologies
Paul	Schaller		Universal Lighting Technologies
Konstantinos	Papamichael		University of California, Davis (UCD)
Charles	Knuffke		WattStopper

Meeting Agenda

Time*	Topic	Presenter
9:00 – 9:15	Introduction	Kelly Cunningham (PG&E)
9:15 – 10:10	Indoor Lighting Sources	Bernie Bauer (Integrated Lighting Concepts) Jon McHugh (McHugh Energy) Michael McGaraghan (Energy Solutions) Chris Uraire (Energy Solutions)

10:10 – 11:05	Indoor Lighting Controls	Erin Linney (Energy Solutions) Stefaniya Becking (Energy Solutions)
11:05 – 11:55	Lighting Alterations	Stefaniya Becking (Energy Solutions) Mudit Saxena (Vistar Energy)
11:55 – 12:00	Review and wrap-up, next steps	Kelly Cunningham (PG&E)

Key Takeaways and Action Items

1. Introduction

- a. No action items.

2. Indoor Lighting Sources

- a. Key takeaway: Proposal needs to be clear on color tuning and whether or not color tuning LEDs will be accommodated.
- b. Key takeaway: High CRI and warm colors lower efficacy, but are necessary for certain spaces. Make sure they are accommodated appropriately.
- c. Key takeaway: High heat areas in industrial spaces may not be ideal for LEDs.
- d. Action item: Jon McHugh to follow up with Michael Mutmanský on 7-year cost-effectiveness cycle.

3. Indoor Lighting Controls

- a. Key takeaway: The Statewide CASE Team is gathering data on user acceptance for daylight dimming plus OFF controls.
- b. Key takeaway 2: Stakeholders suggested that the proposed code language/compliance manuals should be clear that the requirement is to have the time-switch programmed to manual ON; all time switches have capability to do auto-ON. In addition, the exceptions for manual ON for time-switch should be made explicit.
- c. Action item 1: Follow up with stakeholders to take the Indoor Controls Stakeholder Survey to gather feedback on the proposed code changes.

4. Lighting Alterations

- a. Key takeaway: Concerns around Option 3 remain (self-reporting the baseline, opportunity for “gaming” the system).
- b. Key takeaway: Simplifying the code language for lighting alterations is needed.
- c. Key takeaway: The definition of “enclosed space” needs to be revisited.
- d. Action item: Clarify the difference between Criteria A and C in Table 141.0-D in the proposed draft language.
- e. Action item: Consider simplifying Section 141.0(b)2K.
- f. Action item: Follow up with Greg Copley (Ecology Action) regarding the concern around “per enclosed space” application of Option 3 and the burden of compliance documentation.

Meeting Notes

Introduction

- Kelly Cunningham (PG&E, Utility CASE Team) presented.

- Presentation available [here](#).

Comments and Feedback

1. No comments or questions.

Indoor Lighting Sources

- Mike McGaraghan (Energy Solutions, Utility CASE Team), Jon McHugh (McHugh Energy, Utility CASE Team), and Chris Uraine (Energy Solutions, Utility CASE Team) presented.
- Presentation available [here](#).

Comments and Feedback

1. Discussion on Scope
 - a. Andy Smith (Dialight): Do the nonresidential indoor lighting requirements in Title 24, Part 6 apply to industrial applications as well? Are Title 20 and Title 24 not applicable to industrial installations?
 - i. Kelly Cunningham (PG&E, Utility CASE Team): The standards do apply to industrial applications. See the Nonresidential Compliance Manual Section 1.7, Scope and Application [here](#).
 - b. Andy Smith (Dialight): Do Sections 140.6 (Interior) and 140.7A (Exterior) apply to the code change proposal?
 - i. Chris Uraine (Energy Solutions, Utility CASE Team): This code change proposal only applies to Section 140.6. There is a separate code change proposal for Section 140.7.
2. Discussion on LPD
 - a. Tanya Hernandez (Acuity Brands): I am curious about efficacy for specific products when lighting power density is the focus of the code.
 - i. Chris Uraine (Energy Solutions, Utility CASE Team): Efficacies for specific products are important because they help inform LPD levels.
 - b. Michael Mutmansky (TRC Energy Services): It is important to resolve the question of whether color-changing LEDs are going to be accommodated in the LPD values as a 'reasonable' design approach for general lighting in non-residential applications. I expect there is a considerable amount of support for this from some factions in the lighting industry, however it is not necessarily universal.
3. Discussion on Cold Environments
 - a. Elizabeth Morgan (Dialight): Cold storage areas are difficult places to install occupancy sensors due to the possibility of condensation build-up in air pockets in occupancy sensors that can potentially block the lenses used in the sensors.
 - b. Michael Mutmansky (TRC Energy Services): Frost build-up on light sources is still an issue, which will reduce the effectiveness compared to a non-refrigerated space.
4. Discussion on ASHRAE 90.1
 - a. Gina Rodda (Gabel Energy): I support Title 24, Part 6 matching ASHRAE 90.1 category names.
 - b. Michael Mutmansky (TRC Energy Services): Is the ASHRAE documentation publicly available? This has not generally been the case in the past.

- i. John Martin (International Association of Lighting Designers): ASHRAE 90.1 methodology is under review because it is not as comprehensive or realistic as designers need it to be.
 - ii. Michael Mutmansky (TRC Energy Services): The ASHRAE 90.1 process has been somewhat scattered and prone to the “hand” of individuals, as well.
 - iii. Kelly Seeger (Philips Lighting): Title 24, Part 6 would adopt the structure. As a member of the ASHRAE 90.1 lighting subcommittee, I can say it is a rigorous structure. In addition to designers’ opinions, there are a lot of lighting professionals with expertise who are contributing to the development process.
 - iv. Gina Rodda (Gabel Energy): Title 24, Part 6 would not adopt the values, due to the different measuring requirements.
 - v. Michael McGaraghan (Energy Solutions, Utility CASE Team): Yes. We're not necessarily using the same LPD values as ASHRAE in all space types. We're aligning where appropriate, and trying to match the space type/area type descriptors. We're doing our own analyses of the LPD values using Title 24, Part 6’s criteria for cost-effectiveness, feasibility, etc.
 - vi. Michael Mutmansky (TRC Energy Services): ASHRAE does not have the cost-effectiveness requirement, so this may be a big consideration on some facets of the analysis compared to ASHRAE.
 - vii. Michael McGaraghan (Energy Solutions, Utility CASE Team): Yes. All proposed values for Title 24, Part 6 must be shown to be cost-effective to be adopted. Note California's higher cost of energy than the national average.
5. Discussion on High CRI/Warm Colors
 - a. Elizabeth Morgan (Dialight): High CRI and warmer colors do lower the LPW. In industrial facilities, high CRI is usually not needed for their work. A high CRI is needed in inspection areas for food.
 - i. Kelly Seeger (Philips Lighting): Yes. There is no provision in the ASHRAE 90.1 LPDs for high CRI or warm color temp lights, etc.
 - ii. Elizabeth Morgan (Dialight): The requirement of controls in certain industrial retrofits can be so costly, the end-user may not upgrade lighting.
6. General Comments Regarding LEDs
 - a. Michael Jouaneh (Lutron): Title 24, Part 6 should only require the max wattage of drivers for modular LEDs that do not require any rewiring. The drivers that require rewiring for additional lighting should be required to use the max wattage on the fixture’s label.
 - b. Elizabeth Morgan (Dialight): High heat areas are not ideal for LED luminaires in industrial spaces.
 - c. Tanya Hernandez: I’m surprised nonresidential Title 24, Part 6 code has not followed the residential Title 24, Part 6 requirements, which have an allowance for LED screwbase fixtures.
 - i. Jon McHugh (McHugh Energy, Utility CASE Team): We are not aware of low efficacy sources with lifespans more than 25,000 hours. Thus, we do not expect low efficacy sources to be used in screwbase fixtures.
 - ii. Gina Rodda (Gabel Energy): This is a good approach. I have not seen any projects specify non-LED for track lighting in the past three years. However, we should acknowledge that people could put use as much wattage as possible as long as it’s LED.

- d. Michael Mutmansky (TRC Energy Services): Jon McHugh, please follow up with me on the seven-year cost-effectiveness cycle. I have some questions.
 - i. Action item: Jon McHugh will follow up with Michael Mutmansky regarding the seven-year cost-effectiveness cycle.

Indoor Lighting Controls

- Erin Linney and Stefaniya Becking (Energy Solutions, Utility CASE Team) presented.
- Presentation available [here](#).

Comments and Feedback

1. Discussion on Code Change Proposal
 - a. Philip Hall (Enlighted): I suggest Title 24, Part 6 removes the requirement for a sensor in nonresidential restrooms and only requires occupancy sensors.
 - b. Gina Rodda (Gabel Energy): The switch can be made inaccessible in current code, and that is not being removed (i.e., lock it up, or special key to control) if there are more than two stalls.
 - c. Michael Mutmansky (TRC Energy Services): I think that would require a change to the National Electrical Code (NEC).
 - d. Philip Hall (Enlighted): If using low voltage system, could one switch turn ON or OFF all restroom lighting?
 - e. Philip Hall (Enlighted): I suggest the 2019 Title 24, Part 6 proposal does not require full OFF for daylighting controls, as this may cause occupants to disable daylight controls. There should not be a switch at all. It is disturbing to occupants to have the lighting in daylight zone turn ON and OFF.
 - i. Kelly Cunningham (PG&E, Utility CASE Team): We have heard this from several stakeholders, but we need to collect evidence and documentation. We have also heard the opposite, that it is fine.
 - f. Michael Scalzo (National Lighting Contractors Association of America): Can you clarify the intent of the statement regarding how end-users can adjust after commissioning for daylight plus OFF?
 - i. Kelly Cunningham (PG&E, Utility CASE Team): We do not intend to advise anyone to change settings after commissioning/ATT. The comment refers to what can be enforced, which is that the system be set this way at the time of inspections.
 - g. Charles Knuffke (WattStopper): The previous Title 24, Part 6 code allowed an occupancy sensor to be considered the area controlled device. This was removed I believe in 2008 or 2013 code. This complicated two spaces in particular – restrooms and warehouses, since the customers may not want switches in those spaces at all.
 - h. Charles Knuffke (WattStopper): I'm not asking that switches not be allowed, but that an occupancy sensor be considered the area switching device again.
2. Discussion on Light Quantity
 - a. Kelly Cunningham (PG&E, Utility CASE Team): We have heard this from several stakeholders that lighting turning ON/OFF in the daylight zones can be disruptive, but we need to collect evidence and documentation. We have also heard that it is not disruptive.

- i. Michael Mutmansky (TRC Energy Services): A lot of this is dependent on the quality of the light in the space and not necessarily the quantity.
 - b. Jon McHugh (McHugh Energy): Secondary daylight zone is rarely at two times the designed illuminance. Do we simplify by having the same requirements for primary daylight zones? Any thoughts would be helpful.
 - i. Philip Hall (Enlighted): I have rarely seen enough light in the secondary daylight zone to pass acceptance testing. I believe that requiring that when daylight illuminance in the daylight zone is greater than 200 percent of the design illuminance is too high since many spaces cannot pass acceptance testing at 150 percent.
 - ii. Michael Mutmansky (TRC Energy Services): The issue is that relatively low-angle light occurs in the secondary zone.
 - iii. Michael Scalzo (National Lighting Contractors Association of America): I agree with Philip Hall.
 - iv. Jon McHugh (McHugh Energy, Utility CASE Team): Philip, the 150 percent can be achieved by shining a flashlight into the photo sensor.
 - v. Philip Hall (Enlighted): Why is shining a flashlight a solution to saving energy? This is only a method to pass the test.
 - vi. Michael Scalzo (National Lighting Contractors Association of America): Flashlights are not part of the acceptance testing procedures.
 - vii. Jon McHugh (McHugh Energy, Utility CASE Team): There is nothing in NA7.6.1 Automatic Daylighting Control Acceptance document that prohibits using a flashlight and this approach has been used for years in testing systems. The compliance manual states, “if natural conditions are not adequate at the time of the test, shine a bright flashlight or other light source onto the photosensor.”
 - viii. John Arent (NORESKO, Utility CASE Team): I think the idea is to induce conditions (200 percent of design fc) that may not be present at the time of the test.
 - ix. Michael Scalzo (National Lighting Contractors Association of America): A flashlight would not work when testing a closed loop system.
 - x. Michael Jouaneh (Lutron): I support that the proposal is consistent with ASHRAE 90.1.
3. Discussion on Manual ON
 - a. Harold Jepsen (Legrand): The exceptions to time-switch manual ON seems to pick up the common area cases where it makes sense to allow auto time based ON. I agree with the approach for Manual ON.
 - b. Jon McHugh (McHugh Energy, Utility CASE Team): The manual ON proposal is for time-switch controls only. We are not changing the current occupancy sensor requirements.
 - c. Michael Scalzo (National Lighting Contractors Association of America): Manual ON with time-switch could increase cost if a controls system is not used.
 - d. Michael Jouaneh (Lutron): The proposed code language needs to make it clear that time-switch is programmed to manual ON; all time switches have capability to do auto-ON. Also, exceptions need to be cleared up for manual ON for time-switch. Why not allow time-switch to be either manual ON or partial ON, like in ASHRAE 90.1? At least for some spaces where partial on sensors are permitted?

4. Discussion on Compliance
 - a. Greg Copley (Ecology Action): Fewer forms would be helpful, in general. Many jurisdictions are overwhelmed when you show up with six forms for a relatively small project.
 - b. Gina Rodda (Gabel Energy): This would not be applicable to all project then, since commissioning is a trigger based on building size, and only new buildings.
 - i. Jon McHugh (McHugh Energy, Utility CASE Team): Correct.
 - c. Jon McHugh (McHugh Energy, Utility CASE Team): For clarification, the commissioning agent is someone who is different from acceptance testing technician. Person reviews plans, how commissioning was done, etc.
5. Discussion on Hours of Operation
 - a. Michael Mutmansky (TRC Energy Services): You are using DEER for the hours of operation? DEER doesn't specifically have hours for restrooms in most (any?) buildings. What space type are you using? DEER has restroom area in a number of building types.
 - i. Stefaniya Becking (Energy Solutions, Utility CASE Team): Yes, we are using DEER2014.
 - ii. Mudit Saxena (Vistar Energy, Utility CASE Team): DEER does have separate hours and lighting energy profiles for restroom. Although DEER 2016 has more nuance/distinct values for restrooms (and other spaces) compared to DEER 2014 in restroom hours. We can talk more offline.
6. General Discussions
 - a. John Arent: How is "large retail" vs. "stand-alone retail" defined?
 - i. Jon McHugh (McHugh Energy, Utility CASE Team): Large retail is big box retail.

Lighting Alterations

- Stefaniya Becking (Energy Solutions, Utility CASE Team) and Mudit Saxena (Vistar Energy, Utility CASE Team) presented.
- Presentation available [here](#).

Comments and Feedback

1. Discussion on Proposal
 - a. Gina Rodda (Gabel Energy): Many low wattage and/or cheap LEDs are not dimmable. These are used in corridors a lot, and the partial OFF would be a hardship.
 - i. Michael Jouaneh (Lutron): Would full OFF and partial OFF be required for stairwells in Option 3?
 - ii. Kelly Cunningham (PG&E, Utility CASE Team): The proposal leaves the exception for corridors and partial OFF controls intact, as it is in the 2016 Standards. The proposal is to remove the exception for stairwells where options have become more cost-effective.
 - iii. Kelly Cunningham (PG&E, Utility CASE Team): Partial OFF would be required under this proposal during occupied hours. The rest of the "after hours" provisions under 130.1(c) that may apply would still be required as well.
 1. Doug Avery (Avery Energy Enterprises): I'm not sure why corridors are not included?

2. Kelly Cunningham (PG&E, Utility CASE Team): This is due to concerns about retrofit conditions and costs. We welcome data that shows otherwise.
 - b. Javier Perez (CEC): For Table D, left column, how is replacing luminaires in "C" different from "A"?
 - i. Stefaniya Becking (Energy Solutions, Utility CASE Team): "A" and "C" overlap. "A" describes the scenario of one-for-one luminaire replacement without adding, removing, or replacing walls or ceilings, thus "A" has a narrower scope than "C." We will clarify the proposed language in the next version.
 - ii. Jon McHugh (McHugh Energy, Utility CASE Team): Also, note criteria "B," adding a new luminaire.
 - iii. Kelly Cunningham (PG&E, Utility CASE Team): We are still working through the proposal and may need additional clarification.
 - iv. Javier Perez (CEC): Thank you.
 - c. Michael Jouaneh (Lutron): It seems simpler to require all of 130.1(c) even for Option 3.
 - i. Stefaniya Becking (Energy Solutions, Utility CASE Team): The argument for keeping the exception for corridors under Option 3 is the fact that hard ceiling is common in corridors.
 - d. Michael Jouaneh (Lutron): Perhaps remove table 141.0D? Option 3 can only be used for one-for-one or luminaires modified in place. Strike lighting wiring alterations, Section K. They should also have to meet table 141.0E.
 - e. Laura Carpenter (Terralux): IES lighting levels are a recommendation and not a requirement.
2. Discussion on Option 3
- a. Michael Jouaneh (Lutron): Path 3 in the draft proposal is only applicable for one-for-one and luminaires modified in place. All other alterations should have to do path 1 or 2, right?
 - b. Doug Avery (Avery Energy Enterprises): For Option 3, there is currently only "self-reporting" to verify baseline. What reasonable measures are being considered to ensure accurate reporting of baseline and post installation conditions? I wanted to highlight the serious issues with self-reporting and the need for third party verification to avoid "gaming" the code.
 - i. Philip Hall (Enlighted): I agree that there needs to be 3rd party verification.
 - ii. Michael Jouaneh (Lutron): I agree too.
 - c. John Martin (International Association of Lighting Designers): Allowing a code-approved path that is significantly less expensive to implement than any other path allows some less ethical providers to sell "improvements" that don't improve lighting.
 - i. Doug Avery (Avery Energy Enterprises): Agreed.
3. Discussion on Scope and Definition issue
- a. John Arent (NORESKO, Utility CASE Team): Does specifying "in enclosed space" affect the "percent of code LPD" requirement?
 - i. Greg Copley (Ecology Action): The line "existing wattage of all lighting in enclosed" space seems impossible to enforce. It also seems like it could add a significant amount of paperwork only to document luminaires that won't be replaced/retrofitted.

- ii. John Arent (NORESKO, Utility CASE Team): I agree with Greg. What about mezzanine - open floor plan offices?
 - iii. Gina Rodda (Gabel Energy): We need a better definition of “enclosed space,” which often doesn't have value in large rooms that have multiple functions, e.g., grocery store, restaurant.
- 4. Discussion on Methodology
 - a. John Martin (International Association of Lighting Designers): Does any of the model review/vetting process include sampling actual installations?
 - i. Stefaniya Becking (Energy Solutions, Utility CASE Team): Not at this time.
 - b. Cori Jackson (CLTC): Does the Alteration Model account for having reasonable amount of lighting in considered spaces under Option 3? In other words, will cutting wattage by a required percentage lead to spaces being compliant, but insufficiently lit?
 - i. Stefaniya Becking (Energy Solutions, Utility CASE Team): The Alteration Model does not account for having reasonable amount of lighting under Option 3. Spaces that unable to cut existing wattage by the required percentage and maintain reasonable amount of lighting are expected to use Option 1 or 2 to comply with the code.