Meeting Notes

Notes from 2022 Title 24, Part 6 Code Cycle
Utility-Sponsored Stakeholder Meeting for:

Lighting Part 1 – Outdoor Sources & Daylighting

Posted September 18th, 2019

Meeting Information:

Meeting Date: September 5, 2019
Meeting Time: 8:30am – 12:30 pm PST
Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Attendees:

First Name	Last Name	Email	Affiliation
Utility Staff			
Kelly	Cunningham	KACV@pge.com	PG&E
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Simon	Lee	Simon.lee@energy.ca.gov	Energy Commission
Other			
James	Benya		Benya Burnett Consultancy
Jim	Levy		Up-Light Electrical Engineering
Clifton	Lemon		Clifton Lemon Associates
Eleanor	Lee		LBNL
Dave	Young		ETC Connect
Miguel	Malabanan		LADWP
Ted	Pope		2050 Partners
Taro	Zabalaga		LADWP
Nima	Jafarian		Xicato
Luke	Sabala		NPS
Taoning	Wang		LBNL
Cori	Jackson		California Lighting Technology Center
Thomas	Culp		Birch Point Consulting
Adrian	Ownby		CEC
Tom	Paine		Consol
Connie	Samla		SMUD
Daniel	Arevalo		Mobile Modular
Michael	Jouaneh		Lutron
Kelly	Seeger		Signify
Rahul	Athalye		NORESCO
Bernard	Bauer		ILC Lighting
Roy	Eads		Cal Certs
Vrushali	Mendon		Resource Refocus

Tom	Martin		CA HCD
Erik	Page		Erik Page Associates
Therese	Fisher		ASWB
Douglas	Avery		Avery Energy
Robert	Raymer		CBIA
Vinay	Prakash		Ushio
Emily	Bowers		IALD
Pete	Strasser		Intl Dark Sky Org
Alex	Boesenberg		NEMA
Ericka	Schoen		Acuity Brands
Sally	Blair		NORESCO
Wayne	Alldredge		VCA Green
Saman	Parsi		Owen Group
Nicole	Hathaway		California Lighting Technology Center
Anthony	Lee		Douglass Lighting Controls
Alex	Baker		IES
Diane	Weber		Illumetek
Bruce	Monighan		City of Sacramento
Robert	Storar		Building Energy Services & Tech Consultants
Michael	Keller		Satco Products
Neall	Digert		Solatube
Daniel	Wong		CEC
Maria	Nazar		Engineering 350
Mark	Conover		
Tanya	Hernandez		Acuity Brands
Camille	King		Integris Solutions
Michael	Scalzo		NLCAA
Joe	Loyer		CEC
Jeffrey	Parry		
Conrad	Carino		ClimaTec

Meeting Notes

1.1) Welcome and Meeting Ground Rules

- Alanna Torres (Statewide CASE Team) presented.

1.2 CEC Process Overview

- Payam Bozorgchami (California Energy Commission) presented.
- Kelly Cunningham (PG&E, Statewide Utility Codes & Standards Team) presented.

1.3 CASE Presentation I: Nonresidential and Multifamily Outdoor Sources

- Presentation and submeasure proposal summaries available here.

1.3.1 Lighting Zone Reclassification

1. Peter Strait (California Energy Commission): I'd like to provide some context to this proposal. Currently lighting zones (LZ) are based on census data. There is a difference between urban cluster and urbanized center, and urban cluster is in LZ 2. We want to find out if local jurisdictions designate certain zones as well as if lighting designers/installers are concerned with lighting zones. We are interested in hearing from any stakeholders about we should switch to - either land use or stay on Census-based version.
2. Sean Denniston (New Buildings Institute): I also have concerns about if this measure will impact occupant safety.
    a. Nancy Clanton (Clanton and Associates, Inc.): IES already accounts for occupant safety when developing their standards.
3. James Benya (Benya Burnett Consultancy): What about communities that have already adopted LZ per sec 10-114? This already exists in Malibu and Riverside County.
    a. Nancy Clanton (Clanton and Associates): This is a concern and a large barrier for any cities that have already adopted LZ per sec 10-114. We will need to work with local communities and respect their decisions.
4. James Benya (Benya Burnett Consultancy): Are there statewide zoning standards?
    a. Annie Kuczkowski (Clanton and Associates, Inc.): We are currently considering this in the 2022 CASE measures.
5. James Benya (Benya Burnett Consultancy): RP-8 does not recognize LZs.
    a. Annie Kuczkowski (Clanton and Associates, Inc.): The special applications listed in the IES handbook do provide various lighting level recommendations per lighting zone. RP-8 deals with right of way (ROW) lighting which is not part of Title 24, Part 6. The new IES LP-2 and LP-11 will be addressing lighting zones for all non-ROW areas.
6. Neall Digert (Solitude): This proposed change has been a long-time-coming, but the challenge will be to work with communities that have adopted their own lighting use zone definitions and requirements.
7. Clifton Lemon (Clifton Lemon Associates): ROW zones, like roadways, are exempted from restrictions on levels. Roadway lighting is common in residential areas, so a mechanism is needed to cover both. Public ROW is essential to consider.

    a. Peter Strait (California Energy Commission): Title 24, Part 6 LZ requirements do not currently apply to public roadway lighting and the topic of lighting zone classification is not including an expansion of Title 24, Part 6 into roadways.
        i. James Benya (Benya Burnett Consultancy): That is correct. They need to match.
8. James Benya (Benya Burnett Consultancy): Contractor net (for compliance) is too low. One must include contractor markup, general conditions, GC markup and other costs in these estimates.
    a. Annie Kuczkowski (Clanton and Associates, Inc.): Noted.
    b. Kelly Cunningham (PG&E): Jim, what other policy tools could be used?
9. James Benya (Benya Burnett Consultancy): You also need to keep in mind city ordinances requiring specific illuminance values. These light level requirements are often well in excess of RP-8-18, eg City of Redding (Redding = 1 FC minimum). Those proposing code changes should address the existing realities of city governments throughout the state.
    a. Michael Mutmansky (TRC): Jim, are you proposing that Redding be permitted to disregard IES when setting design criteria? Do they need to adjust their criteria?
10. Anthony Lee (Douglas Lighting Controls): Is this proposal retroactive to installed lighting or new construction?
    a. Peter Strait (California Energy Commission): Generally, this is applicable to alteration projects.
    b. Chris Uraine (Energy Solutions): Please reach out to the Statewide CASE Team if you have concerns.
11. Clifton Lemon (Clifton Lemon Associates): I see a move toward land-use driven standards as a move in the right direction. It is better for designers and buildings to work directly with city planners and municipalities.

1.3.2 Lighting Power Allowance for Hardscape

1. James Benya (Benya Burnett Consultancy): Net price needs to include tax.
2. Ann Kuczkowski (Clanton and Associates): Emergency egress requirements are also being considered for this measure.
3. Jim Levy (Up-Light Electrical Engineering): In my experience, lighting levels in California are 1.0 FC minimum and are set by the police department.
    a. Clifton Lemon (Clifton Lemon Associates): I agree. Minimal light levels for security cameras needs more clear data. There is disagreement about lighting levels for security in general. Police departments will have strong voices in this matter.
    b. Jim Levy (Up-Light Electrical Engineering): Most cities require a min of 1.0 FC in all parking and drive areas while walkways have a .25 FC.
    c. Annie Kuczkowski (Clanton and Associates, Inc.): Agreed, we will be looking into this.
4. Tanya Hernandez (Acuity Brands): Do we know why IES RP-20 committee is reverting back to 1998 levels?
    a. Annie Kuczkowski (Clanton and Associates): IES and Virginia Tech Transportation Institute (VTTI) conducted a study looking at lighting levels and found that lighting levels were too high. They may improve sense of safety but did not actually improve visibility.
    b. James Benya (Benya Burnett Consultancy): They also found that vertical levels are critical.

    c. Nancy Clanton (Clanton and Associates, Inc.): Vertical is sometimes tough to calculate. It's an ongoing discussion but for now VTTI said verticals are not as important as horizontals. When you are close to a property line, it is difficult to specify. It is an ongoing discussion.
    d. Ann Kuczkowski (Clanton and Associates): Per IES, vertical lighting measures are in the drive aisle centers.
5. Nicole Hathaway (California Lighting Technology Center): Is the proposed code change considering changing the approach to calculating total power allowance that currently combines the area wattage allowance, linear wattage allowance and initial wattage allowance?
    a. Annie Kuczkowski (Clanton and Associates): We are not pursuing a change to this approach.
6. Bernard Bauer (Integrated Lighting Concepts): In some cases, I do think these city standards (often based on legacy HPS) are higher than needed with LED sources that have adequate color rendering.
7. Jim Levy (Up-Light Electrical Engineering): Reduction of max pole heights is making it difficult for good lighting design and efficiency. These lower heights are driving averages up overall to get the 1.0 FC minimum Cities are asking for lower and lower mounting heights and we should get cities to allow taller poles. We are also able to control lighting spill much better using LEDs.
    a. James Benya (Benya Burnett Consultancy): To meet uniformity requirements, you will need poles around 17' to 20' high or higher.
    b. Annie Kuczkowski (Clanton and Associates): Per Title 24, Part 6, any light above 24 feet does not need a motion sensor. It is interesting if designers and contractors are establishing smaller poles
8. Clifton Lemon (Clifton Lemon Associates): Do Jim's comments related to the dynamic between urban planning issues balancing rights of car and pedestrians?
9. Jim Levy (Up-Light Electrical Engineering): Most cities are not getting good outdoor lighting advice. Title 24, Part 6 and IES should work with them.
    a. Clifton Lemon (Clifton Lemon Associates), Bernard Bauer (ILC Lighting), James Benya (Benya Burnett Consultancy): We agree.
    b. Annie Kuczkowski (Clanton and Associates): We are looking at how best to educate people on the new measures.
    c. James Benya (Benya Burnett Consultancy): I am relighting parts of downtown Los Gatos because of too-short poles used for pedestrian safety and parking.
10. Tanya Hernandez (Acuity Brands): Is comparing selected products under various best design practices (mounting height, mounting location, typical lumen outputs, BUG ratings) a typical practice? Would it be a good idea to use "not so good" design practices too?
    a. Annie Kuczkowski (Clanton and Associates): We are looking at all practice types.
11. Kelly Cunningham (PG&E): If anyone has contacts at cities who are interested in lighting reach codes that require measures such as controls, lower LPAs, or other requirements to extend beyond the 2019 standards, please reach out to us at info@localenergycodes.com. We are offering technical support for reach codes for lighting again in the 2019 cycle.
    a. Jim Levy (Up-Light Electrical Engineering): 10 feet maximum heights were just brought up.

1.3.3 Multifamily Outdoor Lighting Allowance

1. Clifton Lemon (Clifton Lemon Associates): Would a new multifamily section copy most of the language from the nonresidential standards?
    a. Elizabeth McCollum (TRC): A multifamily section may borrow language from the Residential and Nonresidential sections but will have specification language for all multifamily buildings.
2. James Benya (Benya Burnett Consultancy): I would recommend that this code change should either make existing language simpler or prove that it saves energy and is cost-effective.
    a. Nima Jafarian (Xicato): I would like to also add that it should improve quality of emitted light.
    b. James Benya (Benya Burnett Consultancy): Warren Alquist doesn't include environmental considerations
3. Jim Levy (Up-Light Electrical Engineering): Would this be easier if we required lighting to be designed by "lighting designer"?
    a. Peter Strait (California Energy Commission): We would have to draft regulation based on worst possible "lighting designer."
    b. Clifton Lemon (Clifton Lemon Associates): Lighting designers would support that change, but the trend is going in opposite direction. The worst case scenario could be widescale non-compliance, which may be happening already.
4. Simon Lee (California Energy Commission): We need to consider that special Security Lighting for retail may be requested by some for mixed-use properties.
    a. James Benya (Benya Burnett Consultancy): CALGreen applies to multi-family 8 domiciles or more.
    b. Michael Mutmansky (TRC): That is exactly what we are trying to fix.
5. Clifton Lemon (Clifton Lemon Associates): There is a disconnect between the public and private realms. Lighting codes and standards need to be aligned with those involved in urban planning form a land-use standpoint.
6. James Benya (Benya Burnett Consultancy): RP-8 does not address security lighting, how will this be accommodated?
7. Jim Levy (Up-Light Electrical Engineering): I have a lot of plans that must work at the 1.0 FC minimum. I will ask for permission to share.
8. James Benya (Benya Burnett Consultancy): I am concerned that these proposals are forcing "good design." Code should prevent bad design.
    a. Michael Mutmansky (TRC): If we set LPAs too low to allow good design, there is a problem. We can acknowledge that without these consideration in the analysis, we will be encouraging bad design.
9. James Benya (Benya Burnett Consultancy): Have you tested a parking lot design for a multifamily building site with driveways and roads?
    a. David Douglass-Jaimes (TRC): We will be testing the proposal in a variety of multifamily project types including multi-building.
10. Michael Jouaneh (Lutron): Glare ratings should not be considered outdoor controls.
    a. Michael Mutmansky (TRC): We may want to revisit the BUG rating system
    b. Clifton Lemon (Clifton Lemon Associates): I agree with the need for mitigating light trespass, this exists almost everywhere but especially in residential areas.

11. James Benya (Benya Burnett Consultancy): Cost effectiveness must be tested with good luminaires, not cheap gear.
12. Simon (California Energy Commission): We need to consider a wide variety of luminaire products with the proposed BUG rating change is available as this new requirement of G1, G0 and G2 dawns on top of existing BUG requirements.
    a. Michael Mutmansky (TRC): The concern is that there may not be enough lighting products available with the appropriate Glare rating (the G in BUG). We are developing a survey which will gather a wide variety of applications and ways to do lighting design and we will spread the data over a whole host of products. One of the factors that will be considered is the G rating of the luminaires available. We will ensure that the calculations do not favor a specific product type or category, and will attempt to ensure that a representation of the G0-G2 products are included in the analysis
13. Wayne Alldredge (VCA Green): Lighting controls on a per fixture basis is the best option.
14. Jim Levy (Up-Light Electrical Engineering): U0 needs to adjusted.
15. Michael Mutmansky (TRC): We agree. The BUG system was developed over 10 years ago and there were few LED products available on the market. These had much lower outputs than the current lighting products and agree that IES should perform a new analysis of the BUG rating system on whether the values currently set in the BUG tables are appropriate the lighting products available today. This would also ensure the values are addressing the particular concerns that the BUG system was designed to address.
16. Wayne Alldredge (VCA Green): When considering the dimming requirements and occupancy sensing, the installation of the wiring increases the costs.
    a. Bernard Bauer (Integrated Lighting Concepts): How do we monitor that this happens less?
    b. Wayne Alldredge (VCA Green): A good way to monitor is by identifying specifications on how the fixtures are to be programmed and specifications for photo controls mounted under fixtures to prevent bird dropping syndrome.
17. James Benya (Benya Burnett Consultancy): BUG system is based on TM15 and uses zonal lumens from candlepower. Why are LEDs different?
    a. Michael Mutmansky (TRC): When values were set for the BUG system, there were little to no LED products available since it was 2005. We want to look to see if values set in the BUG system are still appropriate with currently available products.
18. Michael Jouaneh (Lutron): Is there a definition of what is considered multifamily?
    a. Peter Strait (California Energy Commission): 4 or more dwellings in the same building is multifamily. There is a separate distinction between low-rise and high-rise buildings. There is no grey area.
    b. Michael Mutmansky (TRC): Our goal is to bring all requirements together into one place under multifamily.
19. Elizabeth McCollum (TRC): We will also be looking to unify requirements, so there are no differences between high-rise and low-rise.
    Peter Strait (California Energy Commission): Multifamily is 4 or more dwelling units. The difference between low and high rise is defined as to 3 or more/fewer floors. We plan to clarify and simplify (and separate) high and low rise for both the residential and nonresidential standards. This is where things could get more complicated.

2.1 Daylight

2.1.1 Automatic daylight dimming to OFF

1. James Benya (Benya Burnett Consultancy): Since typical commercial lighting operates at 0.4 watts/square foot, have you evaluated cost effectiveness?
    a. Jasmine Shepard (Energy Solutions): In the 2019 code cycle, daylight dimming was proven cost effective. Costs were confirmed during stakeholder outreach.
    b. Mudit Saxena (Vistar Energy): Daylighting controls are cost effective at an installed wattage of 120 watts.
    c. Jon McHugh (McHugh Energy): The threshold for daylighting controls is watts so it adjusts to larger spaces as LDP drops.
    d. Wayne Alldredge (VCA Green): I'm an Acceptance Test Technician, I can provide additional feedback.
    e. Wayne Alldredge (VCA Green): Not all nonresidential buildings are at 0.4 watts/square foot,
    f. Jim Levy (Up-Light Electrical Engineering): Daylight dimming is usually just adding cost and not achieving savings.
    g. Clifton Lemon (Clifton Lemon Associates): I agree that daylighting controls are rarely adjusted, they're also rarely commissioned correctly.
2. Anthony Lee (Douglas Lighting Controls): Seattle energy code requires dim-to-OFF for daylighting.
3. Wayne Alldredge (VCA Green): Unfortunately required test methods create confusion for contractors.
4. Eleanor Lee (LBNL): Has anyone's clients raised concerns with on/off controls and lamp life?
5. Clifton Lemon (Clifton Lemon Associates): I'd recommend adding façade engineers and MEP firms to market actors.
6. Eleanor Lee (LBNL): Are roller shades/blinds and their use modeled for energy savings?
    a. Jasmine Shepard (Energy Solutions): No, CBECC does not include roller shade use.
7. Kelly Seeger (Signify): The power needed by LED drivers to dim to low levels needs to be considered as a part of the cost effectiveness.
    a. Mudit Saxena (Vistar Energy): Thank you Kelly, we will take your concerns into consideration.
8. John McHugh (McHugh Energy): I think the dimming requirements are not required in architectural dimming.
9. Wayne Alldredge (VCA Green): The biggest problem I've seen in the field is from installers not knowing how to program the systems. This results from architects not specifying light levels with lighting designers, and then electricians/installers do not have targets for lighting controls.
    a. Jasmine Shepard (Energy Solutions): Yes, agreed. This works when there is good, simple to understand design and implementation practices.
10. Eleanor Lee (LBNL): Is there any specification in the code on the time delay to OFF?
    a. Simon Lee (Energy Commission): In the 2019 code, the time delay to OFF is not specified.
    b. Anthony Lee (Douglas Lighting Controls): We have seen 10 minutes to be as least disruptive.

    c. Jasmine Shepard (Energy Solutions): We are trying to look at whether there is already standardization across manufactures.
    d. Clifton Lemon (Clifton Lemon Associates): I can connect you with a few people to advise on this topic.
11. Wayne Alldredge (VCA Green): The City of Davis proved to their attorneys that it was safer to have shorter delays and dimming levels because it actually aided in safety, particularly for women. They see the lights change, they know there's movement.
12. James Benya (Benya Burnett Consultancy): When saving 0.04 watts/square foot (10%) over nominally 500 hours per year impact (average), one will save only .02 kWh/sf/yr. That is worth less than $0.04/year. How is this cost effective?
    a. Jasmine Shepard (Energy Solutions): I will connect with you about this.
13. Peter Strait (Energy Commission): If dim to OFF is made a requirement, it would be a requirement to be capable of turning off in a response to a high level of lighting.
14. Anthony Lee (Douglas Lighting Controls): The bigger questions is what lag to add to turn the lights back ON when it gets darker?
    a. Mudit Saxena (Vistar Energy): That is a good point on the 10 min lag time, we will follow up with you.
15. Michael Jouaneh (Lutron): This has been in ASHRAE 90.1 for a while with no issues. End users need to be educated that the OFF step is how the system should work. Allowing an end user to adjust the system later to dim to low level instead is important to address any complaints.
16. James Benya (Benya Burnett Consultancy): The cost issues tell me it shouldn't be a code issue.
17. Peter Strait (Energy Commission): Note that we need a complete cost analysis to adjust scope or thresholds in either direction - it's not a trivial undertaking, and without it we cannot have sufficient justification to make the change.
    a. Jasmine Shepard (Energy Solutions): In the 2019 CASE Report, most cost data was done by reaching out to contractors and designers. What additional work should be done to calculate costs?
    b. Peter Strait (Energy Commission): It depends on the specific change. Some requirement new equipment or changes to existing features on the same equipment.
    c. Jasmine Shepard (Energy Solutions): Given other daylighting measures, additional costs may be incurred.
    d. Peter Strait (Energy Commission): A big hurdle is that the amount of savings going from 5% dimming to OFF is worth the cost since that is only 5%.
    e. Jasmine Shepard (Energy Solutions): The current threshold is 35%.
    f. Peter Strait (Energy Commission): Since current baseline is LED, LEDs can already be dimmed a lot.
    g. Nicole Hathaway (California Lighting Technology Center): CLTC agrees with the integration design approach. We published a guide on best practices: https://cltc.ucdavis.edu/sites/default/files/files/publication/Daylighting_181008_Web.pdf
        i. Mudit Saxena (Vistar Energy): Thank you for sharing this resource. We will review.
    h. James Benya (Benya Burnett Consultancy): Neither IECC or ASHRAE 90.1 need to meet the cost-effectiveness requirement of the Warren Alquist Act.

18. James Benya (Benya Burnett Consultancy): Egress lighting is required in every space and needs to exist. The building code may prohibit turning off lights in occupied spaces.
19. Eleanor Lee (LBNL): See report for occupant response to individual fixtures turned to off. p. 121 of this report - https://facades.lbl.gov/sites/all/files/Downloads/NYC-Living-Lab-Final-Report.pdf. Slightly different mode of control but may be indicative of lighting quality issues in open plan offices.
20. Wayne Alldredge (VCA Green): Daylighting programming is simple if you have a design light level as a target in each controlled zone. Electricians have been using a loophole that allows one sensor to control multiple zones. If you have one sensor per zone, the light levels are maintained very well and there are very few complaints.
21. Wayne Alldredge (VCA Green): Why not remove the "to off" in the daylighting language?
    a. Jasmine Shepard (Energy Solutions): "To Off" is in alignment with ASHRAE and moving the PAF to mandatory.
    b. Wayne Alldredge (VCA Green): My understanding is that this loophole is now closed in the 2019 code.
    c. Jasmine Shepard (Energy Solutions): Thanks Wayne, we will follow up with you to discuss further.

2.1.2 Mandatory Secondary Daylit Zone Automatic Controls

1. Clifton Lemon (Clifton Lemon Associates): Is there potential code change in this cycle for secondary daylit zone (SDZ) requirements?
    a. Mudit Saxena (Vistar Energy): We are proposing moving SDZ requirements from Section 140.6(d), a prescriptive requirement to 130.1(d), to a mandatory requirement.
2. Jon McHugh (McHugh Energy): If one has a daylight control system that uses open loop controls and has set a different gain for secondary versus the primary, is this a loophole?
    a. Wayne Alldredge (VCA Green): About 75% of electricians are using the loophole.
3. Clifton Lemon (Clifton Lemon Associates): Does this mean that lighting controls are getting easier? I am not sure if this is accurate.
    a. James Benya (Benya Burnett Consultancy): According to research, operational and commissioning issues are a major problem with daylighting controls.
    b. Mudit Saxena (Vistar Energy): I agree, this is a concern. The market should have evolved with better technology and training, but there may be more work needed.
4. Clifton Lemon (Clifton Lemon Associates): LLLCs are certainly more common but not ideal for daylight sensors.
    a. Mudit Saxena (Vistar Energy): We would like to know more about this, we will follow up.
5. Anthony Lee (Doughlas Lighting Controls): Are people fine with LLLC and uneven lights levels in open spaces? Do they get complaints from owners?
    a. Mudit Saxena (Vistar Energy): Not sure. However, Eleanor has shared interesting report that we will review, and it may have more information on this issue.
    b. James Benya (Benya Burnett Consultancy): No, we do not hear many complaints. You cannot tell the difference in light levels of 2:1 easily.
6. James Benya (Benya Burnett Consultancy): This does not mean that the contractor installs or commissions them.
    a. Mudit Saxena (Vistar Energy): Yes, this is an important distinction.

7. Wayne Alldredge (VCA Green): To qualify, our projects use the performance approach through modeling.
    a. Jasmine Shepard (Energy Solutions): Thanks for the background on 100% performance, this is helpful to know.
8. Cori Jackson (California Lighting Technology Center): Will you be looking at the 120 watts exemption since LPDs have come down?
    a. Mudit Saxena (Vistar Energy): 120 watts is a wattage exemption. With 120 watts on daylighting controls, the savings can cover installation costs and with LPDs coming down that number will not be impacted. You will need to have more area in your daylight zone to get to 120 watts. Many buildings will find themselves exempted, which is fine. We will continue with the given wattage exemption in Title 24, Part 6.
9. Clifton Lemon (Clifton Lemon Associates): Simple daylight sensor placement is an issue.
    a. Anthony Lee (Douglas Lighting Controls): Placement is the hardest part to communicate.
    b. Clifton: Who is responsible to making these decisions?
    c. Wayne Alldredge (VCA Green): Best results with closed loop sensors when they are strategically placed in each daylight zone in a representative reflective area of that zone.
10. Dave Young (ETC Connect): Most engineers specify both primary and secondary zones because they do not know there is an option to trade off the SDZ.
    a. Jasmine Shepard (Energy Solutions): Noted.
11. Michael Jouaneh (Lutron): Is wattage exemption a total lighting power in all daylight zones in a space?
    a. Simon Lee (California Energy Commission): It is total in an enclosed space, not per daylight zone.
12. Wayne Alldredge (VCA Green): An issue with the combination sensors is that the control is typically set by an offset of the secondary zone to the primary. When the sunlight angle changes, the actual light levels change between zones, but the offset in the controls stays the same, and therefore the resulting controlled light level is incorrect at different times of the year and even every day.
    a. Mudit Saxena (Vistar Energy): This is a multizone control detail. Thanks for information, we will follow up with you
    b. Eleanor Lee (LBNL): Regarding multi-zone control with single photosensor, we have found very good results since gain can be tuned for individual fixtures both in NYC project and also in a FLEXLAB and burn-in field study (http://eta-publications.lbl.gov/sites/default/files/genentech_burn-in.pdf)
13. Wayne Alldredge (VCA Green): James Benya, you are working on high-end projects. Controls for commoditized buildings do make sense.
14. Mudit Saxena (Vistar Energy): PAF will encourage usage of these advanced daylighting controls and will most likely start with high end projects and work their way into the market.
15. Wayne Alldredge (VCA Green): James Benya was saying controls do not make sense given low power of LEDs.
16. James Benya (Benya Burnett Consultancy): It can work both ways. We work on clinics, schools and high end buildings.
17. Michael Jouaneh (Lutron): You should look at dynamic shading systems.
    a. Eric Shadd (Determinant): The Statewide CASE Team talked about looking at those in the 2019 code cycle, but this is not something we are looking at currently.

18. Dave Young (ETC Connect): Are there studies regarding occupant comfort in daylight zones? What happens when the majority of the light is coming from the windows, from a low elevation at the side/front/back of a person, rather than overhead. Do they get enough light on their task, or do they override the controls to get what they need?
19. Peter Strait (California Energy Commission): Title 24, Part 6 standards are minimum standards, not best practice or BACT-style requirements. We cannot necessarily mandate best practice.
20. Simon Lee (California Energy Commission): Are there any issues using a single sensor for both primary zone and secondary zone?
    a. Cori Jackson (California Lighting Technology Center): We have had a number of designers and specifiers who ask specifically for this to be allowed in code.
21. Wayne Alldredge (VCA Green): Please add the design light level to #2 plan checker requirement.
22. James Benya (Benya Burnett Consultancy): You have to indicate design light levels for the CLCATT. But I do not believe there is significant difference for +/- 50% variance.
    a. Wayne Alldredge (VCA Green): Is there any liability on the lighting designer if there was a recommendation that didn't work well vs not recommending a light level at all?
    b. Mudit Saxena (Vistar Energy): This is a worthwhile discussion on how particular lighting levels are achieved.
23. Eleanor Lee (LBNL): By moving to mandatory, will this discourage proper analysis of designs that would have (may have) been done under the performance-based approach (eg sizing window, selection of Tvis, etc.)?
    a. Mudit Saxena (Vistar Energy): Will discuss further on this issue with you offline.

2.1.3 Power Adjustment Factor and Shading Improvements

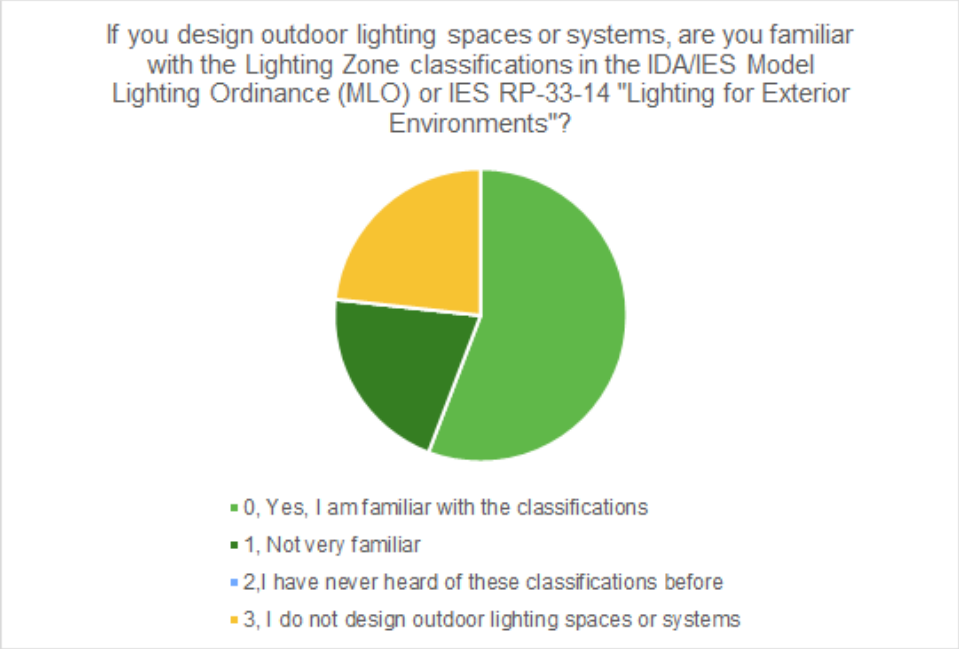
24. James Benya (Benya Burnett Consultancy): Are PAFs useful at modern LED power densities? Is cost effectiveness is a related issue?
    a. Eric Shadd (Determinant): I will need to confirm, but PAFs are trade-offs and so do not need to be cost-effective.
25. James Benya (Benya Burnett Consultancy): It is necessary to maintain 1 footcandle at minimum on the path of egress when building is occupied.
26. Eleanor Lee (LBNL): There are a lot of advanced exterior shading solutions that are operable (such as awnings) and transmit daylight and provide solar shading. Are the PAF and RSHGC determined for a class of products only opaque and non-operable?
    a. Eric Shadd (Determinant): We are now looking at opaque and non-operable.

    Poll 4 below
27. Eleanor Lee (LBNL): For Poll 4, effective shading devices or ones that look nice.
    a. Eric Shadd (Determinant): Effective shading devices.
28. James Benya (Benya Burnett Consultancy): I voted for 5-10%. It is best to work with architects to choose when needed.
29. Eleanor Lee (LBNL): There are a lot of advanced exterior shading solutions that are operable and transmit daylight and provide shading. Are PAF and RSHGC determined?
    a. Thomas Culp (Birch Point Consulting) – AHSRAE 90.1 has a method for accounting.

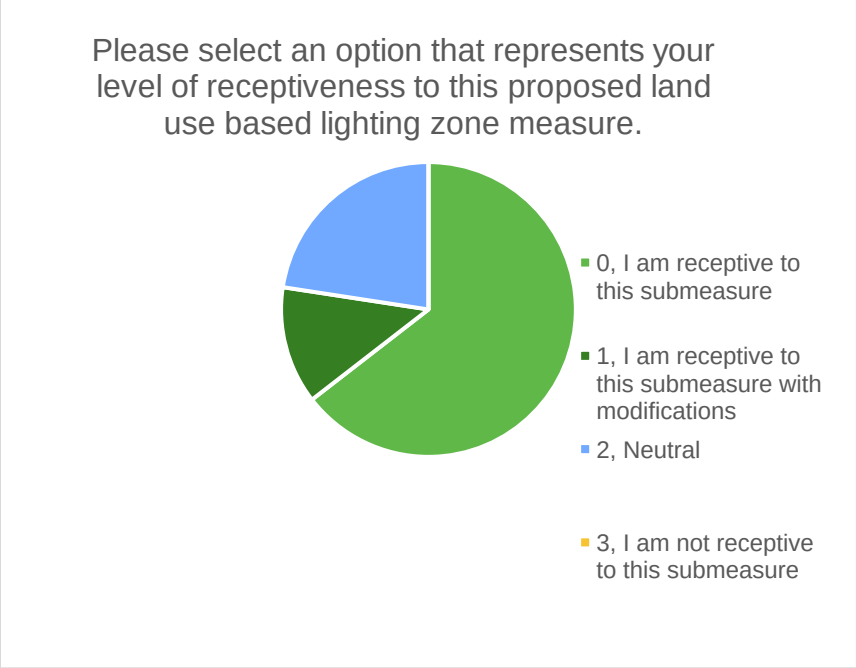
    b. Eleanor Lee (LBNL): Tom, Eric Shadd is proposing to remove the Visible Transmittance (Tvis) requirement (eliminated in (140.3(d)3F) but kept in Reference Appendix so a little confused on what he is proposing).
    c. Eric Shadd (Determinant): We are talking about shade itself not fenestration.
30. James Benya (Benya Burnett Consultancy): We have found that north facing facades seldom need shades except at the summer solstice and very early AM / late PM, or when there is a large reflective surface.
31. Michael Jouaneh (Lutron): Static shading may not work well at all times of the year.
    a. Eric Shadd (Determinant): We will conduct a full year simulation.
32. Eleanor Lee (LBNL): Proposed PAF language applies to east and west. Why is that?
    a. Eric Shadd (Determinant): Vertical is a good way to look at it for future analysis. There will be more technology to look at in future.
33. Thomas Culp (Birch Point Consulting): Horizontal louvers and shades will work on east and west but is not as good as on the south or with vertical fins.
34. Eleanor Lee (LBNL): Redline markup of PAF code is still very drafty.
35. Nima Jafarian (Xicato): Is there going to be any discussion on integrated shades like the kind that view manufacturers?
    a. Eric Shadd (Determinant): We are looking at technologies that are already in the PAF language but there is plan to look at more technology in future.
    b. Kelly Cunningham (PG&E): IOU team is working with a technical white paper to support entry to dynamic glazing into CBECC-Com.
36. Eleanor Lee (LBNL): If you look at the UE most exterior shading is seasonally operable. This eliminates the need for air conditioning during the summer, this is something we might consider.
37. Wayne Alldredge (VCA Green); The problem I see with reflected light is the effect on daylight sensors. A design for shielding closed loop sensors from reflected light louvers would be good.
    a. Eric Shadd (Determinant): This is very interesting and useful.

Poll Results:

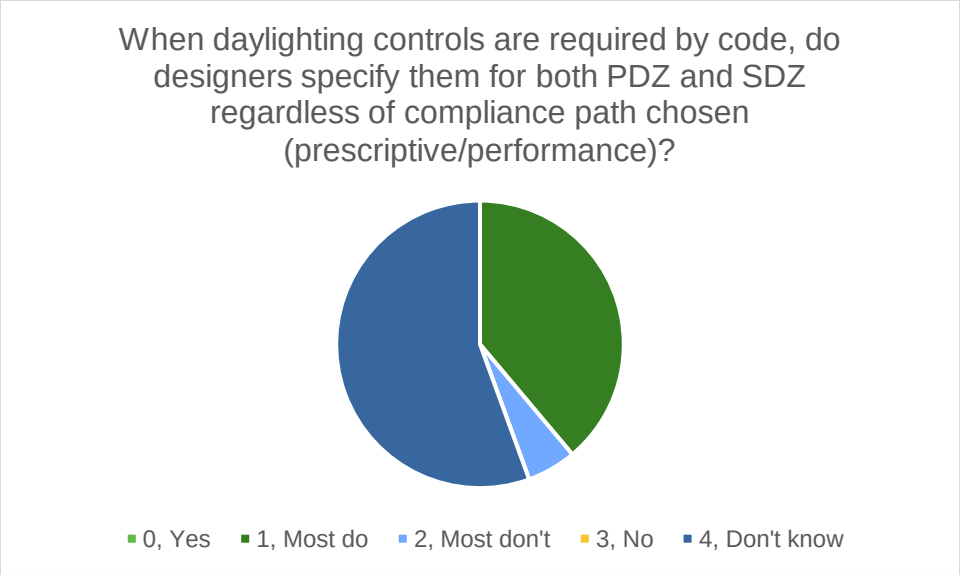
Poll 1:



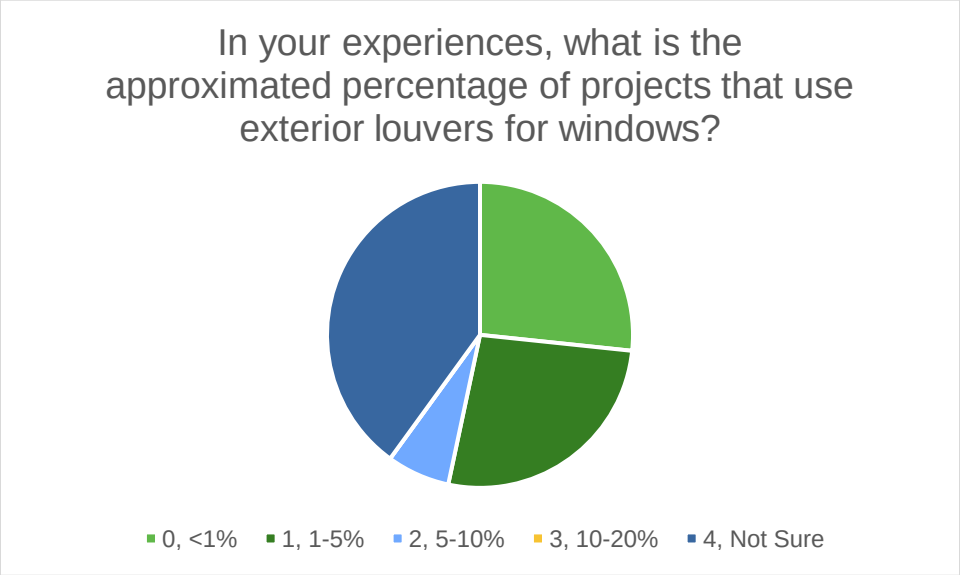
Poll 2:



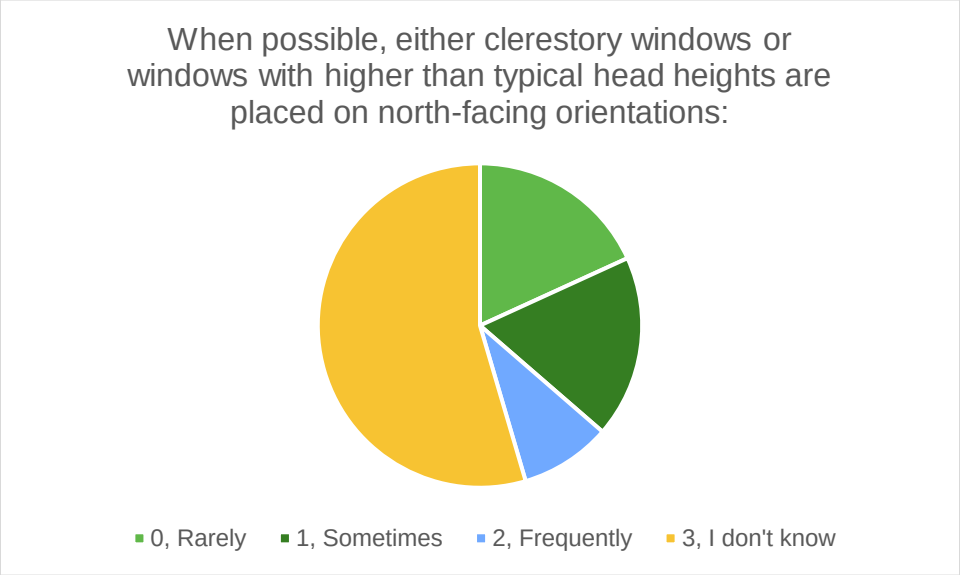
Poll 3:



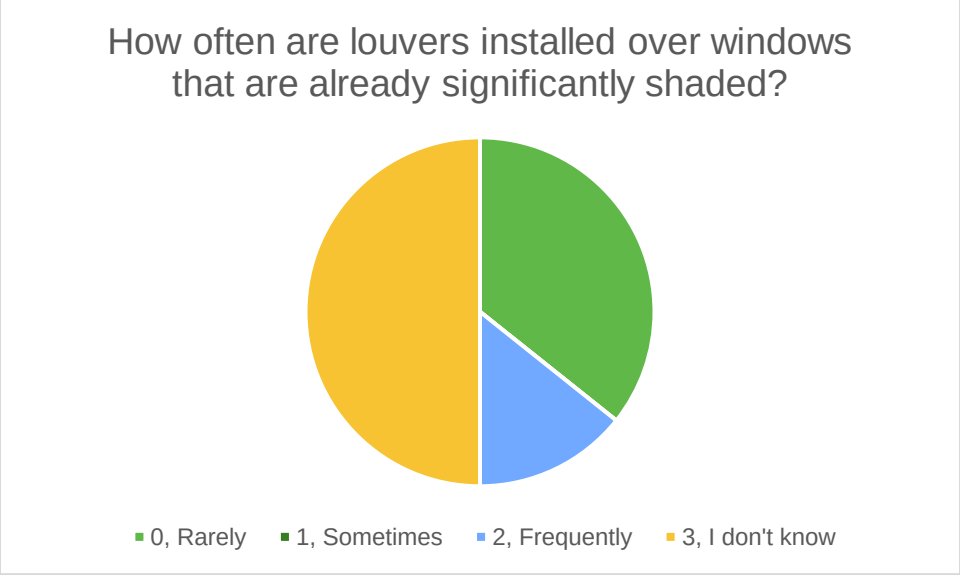
Poll 4:



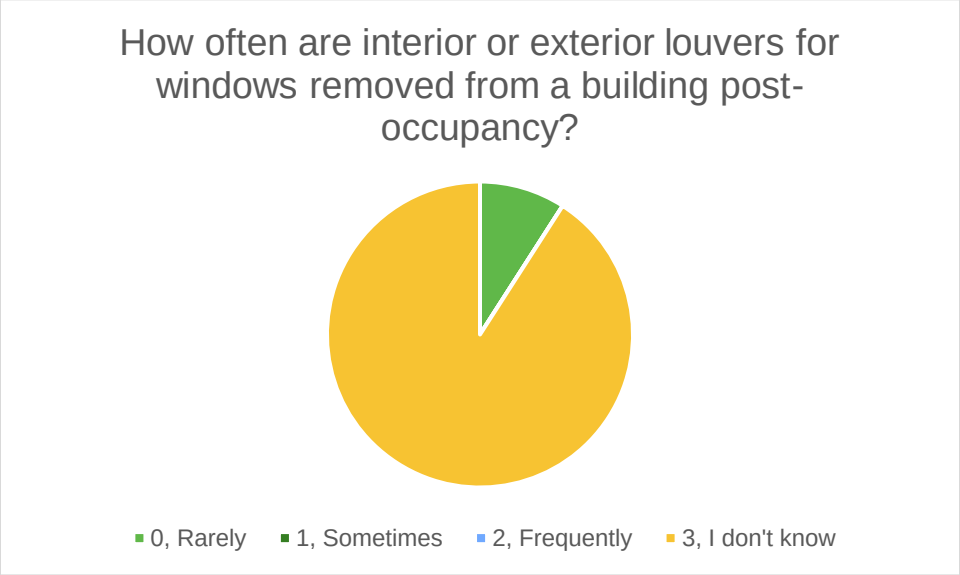
Poll 5:


When possible, either clerestory windows or windows with higher than typical head heights are placed on north-facing orientations:
0, Rarely
1, Sometimes
2, Frequently
3, I don't know

Poll 6:


How often are louvers installed over windows that are already significantly shaded?
0, Rarely
1, Sometimes
2, Frequently
3, I don't know

Poll 7:


How often are interior or exterior louvers for windows removed from a building post-occupancy?
0, Rarely
1, Sometimes
2, Frequently
3, I don't know