International Energy Conservation Code
Electric Power, Lighting, and Renewables (PLR) Subcommittee

Meeting Agenda

Nov. 14, 2022
11:00 AM EST to 1:00 PM EST (2 hours)
Webex Link

Committee Chair: Michael Jouaneh (mjouaneh@lutron.com); **Committee Vice Chair:** Jack Bailey (jbailey@oneluxstudio.com); **Note Taker:** Michael Myer (Michael.myer@pnnl.gov)

1. Call to order – Jouaneh **[start 11:02 am]**

2. Roll Call – Bailey (11 SC voting members needed for quorum)

	First Name	Last Name	Category	Company
	Ali	Alaswadi*	Gov. Regulator	DC
	Jack	**Bailey***	**User**	**One Lux Studio/Int'l Assoc. of Lighting Designers**
	Bernard	Bauer	User	Integrated Lighting Concepts
	Payam	Bozorgchami	Gov. Regulator	CA Energy Comm
	Joe	Cain	Manufacturer	Solar Industries Assoc
	Nick	Ferzacca	User	IMEG Corp.
	Anthony	Floyd*	Gov. Regulator	City of Scottsdale
	Glenn	Heinmiller	User	Lam Partners/Int'l Assoc. of Lighting Designers
	Bryan	Holland*	Standards Promulgator	NEMA
	Harold	Jepsen	Manufacturer	Legrand
	Michael	**Jouaneh***	**Manufacturer**	**Lutron**
	Joyce	Kelly	User	GLHN Architects & Engineers
	Andrew	Klein*	Consumer	BOMA
	Mark	Lien	Standards Promulgator	IES
	Jon	McHugh	Gov. Regulator	McHugh Energy
	Hope	Medina*	Gov. Regulator	Cherry Hills Village
	Melissa	Moseley*	User	HDR/American Society of Interior Designers
	Susan	Musngi*	Consumer	Camden
	Michael	**Myer**	**Consultant**	**PNNL**
	Steven	Rosenstock*	Utility	Edison Electric Institute
	Wayne	Stoppelmoor	Manufacturer	Schneider Electric
	Mitchell	Tolbert	Gov. Regulator	City of Austin
	Michael	Turns	Utility	MA Program Administrator

*denotes member of EC4 consensus committee

3. Introduction of any guests -- Bailey (name/representation type into chat)

4. Review/approve agenda – Jouaneh

5. Meeting conduct -- Jouaneh

- Antitrust Reminder
- Identification of Representation / Conflict of Interest (CP#7 Section 5.1.10)
- Code of Ethics

6. Review key actions from last meeting and approve minutes – Jouaneh **[end by 11:10 am]**

7. Update on process/schedule

8. New business.

PLR Summer Items – Teams link for latest info. **[end by 12:50 pm]**

PLR SUMMER SESSION

	Advocate	PLR Vote	Working Group	Likely Outcome	11-Jul-22	8-Aug-22	12-Sep-22	10-Oct-22	14-Nov-22	Final Outcome
ıting & Control Alterations: This section is quite unclear. The ve good merit and it was felt consensus could be reached and time.	Harold Jepsen	YES	JB, HJ, JM, MT, AK, AA, MJ	Likely Committee Proposal	X	X				
ıire HE lighting in residential applications for range hoods, fans, and ceiling fans.	Jack Bailey	YES	HJ, JB, JM	Likely Individual Proponent	X	X				
ıire installation of "fast charge" EV at new fuel dispensing ıde hotels or other building types too. One-for-one?	Jack Bailey	YES	JB, PB, JM...,	Likely Committee Proposal	X	X				
ːs 10 times more light in exit stairs than 2018. PLR should to 2018 levels in a proposal for IBC 2027.	Jack Bailey	YES	JB, JM, NF, AA, MM, MT, GH	Committee Proposal - Not Time Critical			X			
her modifications to IBC / IFC 2027 to make it easier for ıwitched off, or to reduce required egress light levels.	Jack Bailey	YES	JB, JM, NF, AA, MM, MT, MJ	Committee Proposal - Not Time Critical			X			
ıment of mandatory/permissive requirement for onsite ırces and energy storage systems. CEPI-7 and CECPI-2	Joe Cain	YES	BH, JC, JM, WS, MT, NF	Likely Individual Proponent	X	X				
ıze rooftop solar during power outages. Requires a transfer ətic, or manual with some kind of instruction placard on the mited circuits. Perhaps this is connected with a battery ədy provision. And then some identification in the building will function on solar power during outages.	Duane Jonlin	YES	NF/DJ, WS, JM, JC, PB, JB	Likely Committee Proposal	X	X				
anguage for Lighting (complying with IES recommended	Chair		GH				X			
Energy Monitoring	Chair		WS, SR, JK, HJ				X			
Lighting Performance	Chair		MJ, JB, JM	Delete this placeholder section			X			
Lighting Dimming and Tuning	Chair		JB, MJ, JM, HJ				X			
ncrease Occupancy Sensors	Chair		HJ, JB, GH, JK, JM				X			
ncrease Daylight Area	Chair		JM, HJ, JB				X			
Residential Lighting Control	Chair		BH, MJ, GH, HJ				X			
Light Power Reduction	Chair		GH, JM					X		
Efficient Elevator	Chair		SR, JM, Jeff Boldt					X		
Renewable Energy	Chair		JC, MT, JM, WS, PB					X		
Lighting Load Management	Chair		MJ, JM, HJ, JK					X		
Automated Shading	Chair		MJ, JB, JM, HJ					X		
Electric Energy Storage	Chair		JC, MT, PB, JM, WS					X		

Summer item proposals ready for PLR discussion and vote. See link to review each one prior to our meeting:

- Lighting alterations
- L05 resi lighting controls
- Range hood lighting
- L04 additional daylight
- L06 reduced lighting power

Other summer item proposals that we have public comment for PLR to act on:

- CED1-81 (406.2.5 IES recommendations)
- CED1-080-22 high end trim (L02 of energy credits)
- CED1-071-22 (G01 load management)

9. Other business – Jouaneh **[end by 12:59 pm]**

- Teams site
- Future meetings
- Other?

10. Future meeting(s): **11:00 am – 1:00 pm ET on Monday Nov. 21, 2022 (if needed). If no additional Nov. meeting needed, then next meeting is Dec. 5, 2022, 11 am – 2 pm ET (every 1st and 3rd Mondays thereafter).**

10. Adjourn **[1:00 pm]**

FOR FURTHER INFORMATION BE SURE TO VISIT THE ICC WEBSITE:
ICC Energy webpage
Code Change Monograph
FOR ADDITIONAL INFORMATION, PLEASE CONTACT:
Subcommittee Chair

C405.1.1 Lighting for dwelling units. No less than 90 percent of the permanently installed lighting serving sleeping units and dwelling units, including lighting integrated into range hoods and exhaust fans, shall be provided by lamps with an efficacy of not less than 65 lm/W or luminaires with an efficacy of not less than 45 lm/W.

Exceptions:

1. Lighting integral to a kitchen appliances ~~or exhaust hood~~.

2. Antimicrobial lighting used for the sole purpose of disinfecting.

C405.2.5 Specific application controls. Specific application controls shall be provided for the following:

5. Lighting integrated into range hoods and exhaust fans shall be controlled independently of fans.

C406.2.5.6 L06 Reduced lighting power. Interior lighting within the whole building shall comply with all the requirements of this section. The net connected interior lighting power (LPn) shall be 95 percent or less than the net interior lighting power allowance (LPAn) determined in accordance with Section C405.3.2.2. In R-1 and R-2 occupancies the credit is calculated for all common areas other than dwelling units and sleeping units. No less than 95 percent of the permanently installed light fixtures in dwelling units and sleeping units, including ceiling fans with integral light kits but excluding kitchen appliance lighting, shall be provided by high efficacy lamps with a minimum efficacy of 90 lumens per watt or high efficacy luminaires that have a minimum efficacy of 55 lumens per watt. Energy credits shall not be greater than four times the L06 base credit from Section C406.2 and shall be determined using Equation 4-25:

Reason:

A quick search of home improvement stores like Home Dept and Lowes makes clear that range hoods and exhaust fans are commonly provided with high efficacy LED lighting. There is no reason not to make this an enforceable requirement of the code similar to other lighting sources.

There is also energy to be saved in controlling ventilation fans separately from lighting in bathrooms. The uses are not coincident. In a bathroom with a window one may choose to use the fan and not the light during the day when bathing. In the evening, one may choose to use the light and not the fan when grooming.

Ceiling fans are subject to NAECA regulation, so efficacy of the lighting kits cannot be regulated under base code. However, these can be included in the lighting efficacy requirements of L06.

C406.2.5.5 L05 Residential light control. In buildings with Group R-2 occupancy spaces, interior lighting systems shall comply with the following:

1. In common areas, the following space types ~~restrooms, laundry rooms, storage rooms, and utility rooms~~ shall have ~~automatic full OFF~~ ~~occupancy~~ occupant sensor controls that comply with the requirements of C405.2.1.1: Laundry/washing areas, dining areas, food preparation areas, seating areas, exercise areas, playing areas, and massage spaces. ~~Each additional control device shall control no more than 5,000 sq.ft (464 m2).~~

2. In dwelling units, not less than one receptacle in each living room and each sleeping room shall be controlled by a switch in that room.

3. Each dwelling unit shall have a switch ~~main control~~ by the main entrance that turns off all the lighting and all switched receptacles in the dwelling unit. The switch shall be clearly labeled. ~~Two switched receptacles shall be provided in living and sleeping rooms or areas and clearly identified. All switched receptacles shall be located within 12 inches (30 cm) of an unswitched receptacle. The main control shall be permitted to have two controls, one for permanently wired lighting and one for switched receptacles. The main controls should be clearly identified as "lights master off" and "switched outlets master off."~~

Reason:

This is primarily, but not entirely, an editorial cleanup. The following issues are addressed by this proposal:

1. Some of the listed common area space types are already required to have occupant sensor controls in base code (restrooms, storage rooms).
2. Space types are revised to conform to the list of spaces in C405.3.2(2) for consistency with other sections of the code, and to improve enforceability.
3. *Occupant sensor* is a defined term in the code, but occupancy sensor is not.
4. No common areas in residential building would have individual rooms greater than 5,000 sf.
5. The proposal was not clear on the quantity of switched receptacles required – two per apartment unit, or two per living and sleeping room. We revised to one per living and sleeping room.
6. Usually in residential construction switched receptacles are counted as meeting NEC receptacle requirements. We were not clear on why these are required to be in addition to NEC receptacle requirements (which is the effect of requiring a non-dim receptacle within 12 inches).
7. Having two controls at the main entry makes it more likely that the receptacle switch control will just be left "on".

~~**C503.5 Lighting systems.** New lighting systems that are part of the alteration shall comply with Sections C405 and C408.~~

~~**Exception:** Alterations that replace less than 10 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.~~

~~**C503.5.1 Lighting acceptance testing.** Where an alteration requires compliance with Section C405 or any of its subsections, lighting systems that serve the alteration shall comply with Section C408.3.~~

Replace C503.5 in its' entirety with the following:

C503.5 Lighting systems. Lighting systems that are part of the *alteration* shall comply with Sections C503.5.1 and C503.5.2.

C503.5.1 Interior Lighting and Controls. *Alterations* to interior lighting and controls shall comply with the following:

1. Where the size or configuration of interior spaces is altered, lighting in those spaces shall comply with C405 and lighting controls in those spaces shall comply with C405 and C408.

2. Where the lighting within interior spaces is altered, lighting in those spaces shall comply with C405 and lighting controls in those spaces shall comply with C405 and C408.

3. Where the lighting controls within interior spaces are altered, the lighting controls in those spaces shall comply with C405 and C408.

Exception: Compliance with C405.2.9 (demand responsive lighting controls) is not required when less than 90 percent of the luminaires in the building are replaced.

C503.5.4 Exterior Lighting and Controls. *Alterations* to exterior lighting and *controls* shall comply with the following:

1. Where the connected exterior lighting power is increased, all exterior lighting, including lighting which is not proposed to be altered, shall comply with C405.5, and all lighting which is added or altered shall be controlled in accordance with C405.2 and C408.

Exception: Where the total exterior lighting power is increased by less than the Base Site Allowance in Table C405.5.2(2) and existing lighting controls undergo functional testing to verify that lights are automatically turned off when daylight is present and satisfies the lighting needs.

2. Where exterior lighting *controls* are added or altered, those portions of the lighting control system which are added or altered shall comply with C405.2 and C408.

TABLE C406.2(1) - BASE ENERGY CREDITS FOR GROUP R-2, R-4, AND I-1 OCCUPANCIES

Revise table to make all values for L04 zero ("x").

TABLE 406.2(2) - BASE ENERGY CREDITS FOR GROUP I-2 OCCUPANCIES

Revise table to make all values for L04 zero ("x").

TABLE 406.2(3) - BASE ENERGY CREDITS FOR GROUP R-1 OCCUPANCIES

Revise table to make all values for L04 zero ("x").

TABLE 406.2(5) - BASE ENERGY CREDITS FOR GROUP A-2 OCCUPANCIES

Revise table to make all values for L04 zero ("x").

TABLE 406.2(9) - BASE ENERGY CREDITS FOR OTHER OCCUPANCIES

Revise table to make all values for L04 zero ("x").

C406.2.5.4 L04 Increase daylight area. The total daylight area of the building ~~project~~ (DLA_{BLDG}) ~~with continuous daylight dimming meeting the requirements of C405.2.4~~ determined by Equation 4-23 shall be at least 5 percent greater than the typical ~~daylit~~ daylight area (DLA_{TYP}) from Table C406.2.5.4.

Equation 4-23

$DLA_{BLDG} = DLZ / LFA$

DLZ = The total building floor area located within primary and secondary *daylight zones* complying with C405.2.4.2 or C405.2.4.3 and provided with *daylight responsive controls* complying with C405.2.4.1, ft^2 or m^2.

~~G~~LFA = The total building floor area used to determine the lighting power allowance in C405.3.2 ~~Project gross lighted floor area~~, ft^2 or m^2.

Credits for measure L04 shall be determined by ~~based on~~ Equation 4-24 or Equation 4-25, whichever is less:

Equation 4-24

$EC_{DL} = EC_{DL5} \times 20 \times (DLA_{BLDG} - DLA_{TYP})$

Equation 4-25

$EC_{DL} = EC_{DL5} \times 20 \times (DLA_{MAX} - DLA_{TYP})$

where:

EC_{DL} = ~~The lesser of actual area of daylight zones in the building with continuous daylight dimming, ft^2 or m^2 and (GLFA x DLA_{MAX}) see Table C406.2.5.4. Daylight zones shall meet the criteria in Sections C405.2.4.2 and C405.2.4.3 for primary sidelit daylight zones, secondary sidelit daylight zones, and toplit daylight zones~~. The number of credits achieved by this measure.

EC_{DL5} = ~~C406.2.5.4~~ L04 base energy credits from ~~Section C406.2~~ Tables C406.2(4), C406.2(6), C406.2(7), and C406.2(8).

DLA_{TYP} = Typical ~~%~~ percent of building floor area with daylight control (as a fraction) from Table C406.2.5.4.

DLA_{MAX} = Maximum percent of building floor area with daylight control that can be counted for compliance with this measure, from Table C406.2.5.4.

TABLE C406.2.5.4 - ADDED DAYLIGHTING PARAMETERS

Revise table to add one line as follows:

Building use type	DLA_{TYP}	DLA_{MAX}
Groups S-1 and S-2; Other than warehouse	0%	0%

Revise table to delete one line as follows:

Building use type	DLA_{TYP}	DLA_{MAX}
~~Group I-2, R, and other; Medical, hotel, multifamily, dormitory, and other~~	~~NA~~	~~NA~~

Reason:

There are several problems with this credit which are corrected by this proposal:

1. This credit can only be achieved for occupancies where there are values provided for DLA_{TYP} and DLA_{MAX} in Table C406.2.5.4 - otherwise the credit cannot be calculated. The relevant tables in C406.2 are amended to indicate that L04 cannot be achieved for those occupancies where DLA_{TYP} and DLA_{MAX} are not provided.
2. C406.2.5.4 says that the credit is achieved when "the daylight area of the building is at least 5% greater than a percentage". Equation 4-23 is added to convert DLA_{BLDG} to a percentage so that this comparison can be made.
3. GLFA (gross lighted floor area) is not a readily understood term. It is not used anywhere else in the code, and the word "gross" is unclear. This is revised to LFA (lighted floor area) and given a clear meaning.
4. EC_{DL} is very confusing as the description includes conditional logic. This is broken into two separate equations for clarity.
5. Table C406.2.5.4 is amended to indicate clearly that buildings in Group S-1 and S-2 which are not warehouse cannot obtain the credit.

6. Table C406.2.5.4 is amended to strike the occupancy groups which are currently indicated as "NA". This does not need to be in C406.2.5.4 when the tables in C406.2 are amended to show that L04 is not available for these occupancies.

Proposed IECC PLR SC Code Change Proposal
Working group final 29 October 22
Revision to IECC-C Public Comment Draft #1

Revise C406.2.5.6 L06, the reduced lighting power additional efficiency option

Revise as follows:

C406.2.5.6 L06 Reduced lighting power. Interior lighting within the whole building shall comply with all the requirements of this section.

1.The ~~net~~ connected interior lighting power (LP~~n~~) determined in accordance with C405.3.1 shall be 95 percent or less than the ~~net~~ interior lighting power allowance (LPA~~n~~) determined in accordance with Section ~~C405.3.2.2.~~ C405.3.2. Energy credits shall not be greater than four times the L06 base credit from Section C406.2 and shall be determined using Equation 4-25.

2. ~~In R-1 and R-2 occupancies the credit is calculated for all common areas other than dwelling units and sleeping units. No less than 95 percent of the~~ All permanently installed lighting ~~fixtures in~~ serving *dwelling units* and *sleeping units*, ~~excluding kitchen appliance lighting~~, including lighting integrated into range hoods and exhaust fans, shall be provided by ~~high efficacy~~ lamps with ~~a minimum~~ an efficacy of not less than 90 lumens per watt or ~~high efficacy~~ by luminaires that have ~~a minimum~~ an efficacy of not less than ~~55~~ 65 lumens per watt.

Exceptions:

1.Lighting integral to a kitchen appliance ~~or exhaust hood~~

2. Antimicrobial lighting used for the sole purpose of disinfecting

$EC_{LPA} = EC_5 \times 20 \times (LPA_{~~n~~} - LP_{~~n~~})/LPA_{~~n~~}$ (Equation 4-25)

where:

EC_{LPA} = additional energy credit for lighting power reduction

$LP_{~~n~~}$ = ~~net~~ connected interior lighting power calculated in accordance with SectionC405.3.1, watts, ~~excluding any additional lighting power allowed in Section C405.3.2.2.1~~

$LPA_{~~n~~}$ = interior lighting power allowance calculated in accordance with the requirements of Section C405.3.2~~.2~~, watts, ~~less any additional interior lighting power allowed in Section C405.3.2.2.1~~

EC_5 = L06 base credit from Section C406.2

Reason:
This section required some editorial fixes to align with IECC 2024 PC#1. Additionally, some minor changes in stringency are proposed. The proponent of CEPI-193 (DoE) was involved in development of these proposed changes.

- The reference to the section that defines how lighting power is calculated was corrected (C405.3.2)

- The explanation that dwelling units and sleeping are excluded from the calculation is no longer needed due to the addition of C405.3.1 exception #1 in PC Draft #1

- The requirement that no less than 95% of lighting comply, was removed. This is appropriate for an additional efficiency option and simplifies the requirement significantly.

- The language regarding kitchen appliance/exhaust fans was revised to match a draft PLR SC proposal that makes this change.

- Wording was revised to match C405.1.1 in PC draft#1

- Luminaire efficacy threshold was increased to 65 LPW. This is appropriate for an additional efficiency option.

- The exclusion of additional lighting power from the calculation of credits was removed. This will align with the way that COMCheck calculates the percentage reduction in power below code allowed and simplifies the calculation. This change may slightly increase stringency for some projects but does not reduce stringency for any project.

Cost Impact:

The code change proposal will neither decrease nor increase the cost of construction