Memorandum

To: California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

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From: Michael Lindsey
IALD Representative

Pages: 6

cc:

Project: April 4, 2011 Staff Workshop
2013 Building Energy Efficiency Standards

Sent via: Email//Post

Regarding: Docket No. 10-BSTD-01

Comments:

Dear California Energy Commission,

On behalf of the IALD Energy & Sustainability Committee, I'm pleased to submit the following comments regarding the draft lighting language for consideration in the upcoming 2013 California Building Energy Efficiency Standards.

Please review the items listed below noting that recommended revisions or additions to the code are indicated within the language as **BOLD** and items recommended for removal are indicated as ~~strikethrough.~~ Other items are simply listed as comments for consideration that we would like your team to be aware of as you finalize the language of the code.

Lighting in Multi-Family & Hotel Corridors		
Location:	Language:	Proposed Language Revision
Section 131, Part (b), Item (d)	(d) Shut Off Controls 6. Occupant sensors that reduce lighting power in the space by at least 50% and are compliant with Section 119 shall be installed in the following spaces: 1. Corridors 2. Stairwells 3. Aisle Ways in Warehouses 4. Open Spaces in Warehouses	(d) Shut Off Controls 6. Occupant sensors that reduce lighting power in the space by at least 50% and are compliant with Section 119 shall be installed in the following spaces: 1. Corridors 2. Stairwells ~~3. Aisle Ways in Warehouses~~ ~~4. Open Spaces in Warehouses~~

Comments:

As this portion of the code is set to be specific for hotel corridors and stairwells, we believe that the warehouse references for aisleways and open spaces are in the incorrect portion of the code. Our recommendation would be to review the location and likely move to "Lighting Warehouses"

Lighting Warehouses		
Location:	Language:	Proposed Language Revision

Comments:

We had no comment to this particular portion of the code as our team did not encompass relevant experience in these applications to properly comment.

Non-Residential Daylighting		
Location:	Language:	Proposed Language Revision
Section 143, Part (c), Item (1)	At least 75% of the wattage of general lighting shall be in or partially in skylit daylit zones or primary sidelit daylit zones	

Comments:

In general, our comments are concerned with the difference between daylight in regards to geometry vs. adequate daylight being delivered to the space.

For instance, Section 143 lists 75% of watts need to be in daylit zones with automatic control, however, it does not speak to the effectiveness of the daylight in that space. If the building is located in the middle of downtown, it is likely to be obstructed by other high-rise buildings therefore there may be little or no daylight contribution.

Section 143, Part (c), Item (6a)	A. Have a glazing material or diffuser that has a measured haze value greater than 90 percent…	

Comments:

Requirement 143 (c) 6A requiring diffuse skylights is controversial based on our past design experience. While we appreciate the desire for increased energy savings, we also recognize the desire of clients and designers for the direct and dynamic effect of direct light in some applications. In the past IALD has suggested that this requirement only be 90% of horizontal skylights, and/or an exemption be allowed for lobbies, lounges, etc. in which some direct sunlight would be acceptable as it creates an interesting dynamic in the space.

Section 146, Part (d)	(d) Luminaires providing general lighting that are in, or partially in, the secondary sidelit daylit zones, and not included in the primary sidelit zones shall be controlled independently by an automatic daylighting control device…..	

Comments:

We have found that daylight harvesting controls within small rooms (such as would be affected by this language) are not cost effective where vacancy sensors are more appropriate and can achieve more savings. Also, this requirement would likely need to be met for perimeter conference rooms as well which won't show the savings that is suggested when the room is rarely used and utilizes a vacancy sensor.

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Non-Residential Controllable Lighting		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

The general comment is in regards to study involving the dimmability of induction lamping. In our experience, we have not seen manufacturers that can consistently and reliably dim this technology. We would ask that manufacturers offering this be recognized so we can properly address the viability of this as part of the study.

Non-Residential Demand Responsive Lighting Controls		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

No current comment regarding the language

Non-Residential Egress Lighting Controls		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

Technically the code requires 1 FC average along path of egress during occupied hours as accurately noted in the proposed language. However, if lighting on the egress system wanted to be turned off but the concern is that people would still be present in the building, an option would be to leave the fixtures on occupancy sensor control.

As long as it's properly designed, this would illuminate the path of travel only when the building is occupied as it would detect the movement of the occupant.

On previous projects worked on by our team, an AHJ has approved this approach of occupancy sensor control.

Non-Residential Indoor Lighting Controls		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

No specific revisions to the proposed language are recommended. Overall, the approach of reducing general lighting in office spaces but allowing more for task lighting, is the desired direction of our organization to better achieve real energy savings throughout the life of a building.

This approach however, is dependent on the proper infrastructure being in place as listed in "Office Task Plug Load Circuit Control".

Non-Residential Lighting Retrofits		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

Our concern lies with the fact that much of the data was generated via survey response. We would appreciate more of a modeling or simulation of real world application that was performed in other code analysis'.

Non-Residential Outdoor Lighting Controls		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

We again question the viability of dimming or hi/low switching for Metal Halide, High Pressure Sodium, and Induction lamping as our experience has not shown reliability of this control technology with these light sources.

Non-Residential Parking Garage Lighting & Controls		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

No current comment regarding this language.

Office Task Lighting Plug Load Circuit Control		
Location:	Language:	Proposed Language Revision
N/A		

Comments:

The move toward influencing a more task-ambient lighting design approach is certainly an item that our organization would like to pursue.

Residential Lighting		
Location:	Language:	Proposed Language Revision
Section 150 (k), Item (1), Part (c)	C. Recessed downlights: Recessed downlights shall not contain medium based screw-base sockets	C. Recessed downlights: Recessed downlights ~~shall not contain~~ containing medium based screw-base sockets shall have lamp efficacies of 30 lumens / W.

Comments:

Our recommendation would be to implement specific efficacy requirements within the medium based socket of recessed downlights. Currently lighting manufacturers are developing LED retrofit lamps primarily built around the medium base socket as they can be installed in the billions of sockets. Also, banning the medium base sockets, eliminates the potential for lamp manufacturers to further develop efficient technology around this base, including possible improvements to halogen/incandescent lamps.

Location:	Language:	Proposed Language Revision
Section 150 (k), Item (11), Part (b)	B. Chandeliers, pendants, and sconces installed in hallways shall not contain medium screw base sockets	

Comments:

This approach again does not support the movement by the manufacturing community to develop technology around the medium base socket which is primarily utilized in current residential applications.

We would again recommend exploring efficacy requirements in lieu of complete removal of these sockets in decorative fixtures with exposed lamps.

Retail Lighting		
Location:	Language:	Proposed Language Revision
Table 146-G TAILORED METHOD	Retail merchandise sales, wholesale showrooms = 14.0 W/ lin ft. wall display	Retail merchandise sales, wholesale showrooms = ~~14.0~~ 15.0 W/ lin ft. wall display

Comments:

To adequately light wall displays, we agree that 17.0 W/lin ft. is likely excess with today's emerging technologies; however, our experience has also shown that 15.0 W/lf is as low as can be advisable utilizing cutting edge, energy efficient technology. Many projects require a 2 light approach utilizing fluorescent lighting for "general/fill light" and ceramic metal halide for "key/accent" lighting.

Our team has developed a more detailed example showing this arrangement if it is desirable to review and discuss.

Table 146-G TAILORED METHOD	Retail Allowed Floor display (W/ft^2) = 1.0	Retail Allowed Floor display (W/ft^2) = ~~1.0~~ 1.1

Comments:

Our experience has shown that to adequately light a 4 ft^2 floor display that may house a mannequin, we commonly need (2) 20W Ceramic Metal Halide sources to properly illuminate as well eliminate undesirable shadows. Our recommendation would be to pursue a reduction of 0.1 W/ft^2 as opposed to 0.2 W/ft^2 at this time.

Thank you for allowing us the opportunity to be involved in this process and provide our comments as we believe that with our organizations active involvement, we can continue to work as partners in influencing energy legislation in a positive manner. We certainly look forward to reviewing the upcoming 45 day language as it addresses everyone's contribution thus far to legislative language.

Finally, we thought it would also be beneficial for your team to recognize the Energy Codes Statement that was developed through the IALD and will now be in conjunction with the IES (Illuminating Engineering Society) as a joint position statement on how we view the future of energy code legislation and how we would like to influence these steps moving forward.

Feel free to contact me directly should you have any questions regarding the submitted comments.

Regards,

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INTERNATIONAL ASSOCIATION OF LIGHTING DESIGNERS IALD

ENERGY CODES: MOVING FORWARD

INTERNATIONAL ASSOCIATION OF LIGHTING DESIGNERS

12 APRIL 2011

BACKGROUND

In the United States, new versions of the model energy codes have been completed, and the next three-year code development cycle is about to begin. In the past, the US Department of Energy has set aggressive energy reduction goals for the model codes. For the next code cycle, we would not be surprised to see a further reduction in building energy use from the recently completed ANSI/ASHRAE/IES 90.1 and IECC-2012. How might this be achieved? The IALD Energy and Sustainability Committee and the IES have considered this question and both organizations have come to some conclusions to help guide energy code and green building codes development efforts. Because these conclusions concern fundamental approaches, they may also be applicable to energy code development worldwide.

Lighting Power Densities

Lighting Power Density (LPD) is the principal method for regulating lighting power limits in the US.

- The LPDs in the recently completed model codes are as low as they can be, based on 2009 technology.
- While lighting power density limits should be as low as possible, they should still allow quality lighting results. We believe that the current method of developing LPDs (90.1 Lighting Subcommittee modeling and consensus, with DOE technical support) is basically sound.
- LPDs must always be based on reasonable models using available technology. Some small reductions in LPDs might be possible in the next code cycle due to ongoing improvements in the efficacy of various light source technologies.
- Large reductions in lighting energy use will not be achievable solely by reducing LPDs.

Lighting Controls

The new versions of the model codes significantly expand the prescriptive lighting control requirements. There are still opportunities for some additional controls requirements to be added to the codes.

- We support more extensive use of occupancy sensors and daylight responsive controls, and other control techniques that will reduce lighting energy use without reducing lighting quality.
- We do not think significant reductions in lighting energy use are likely due to additional controls requirements.

Daylighting

The only way we are going to see significant reductions in lighting energy use is by lighting our buildings with daylight, and leaving the electric lighting systems for night-time use.

- Daylight should be the primary source of light for buildings whenever practical.
- To realize major reductions in lighting energy use through daylight optimization, a major shift in the way we design and site our buildings is required – this is not just a matter of designing electric lighting systems and controls differently.
- We support mandatory energy code provisions that require daylighting of buildings to reduce building energy use while improving indoor environmental quality. We understand that developing daylighting energy code requirements is extremely difficult. We are committed to this effort and are already at work on it though supporting the International Green Construction Code (IGCC), LEED, and other development processes.

Integrated Design Process and Performance Path Compliance

Improved energy performance in buildings will not be achieved without considering trade-offs among building systems in order to find the optimal balance. An integrated design process is promoted by the performance path and will likely lead to better performing buildings because it will inspire design for maximum energy savings across the building as a whole.

- We support increased use of a performance path, possibly including mandatory use for buildings of certain size and/or type.
- We call on the DOE and others to improve the capabilities of energy modeling software. This is essential to the success of the performance path as an energy savings method. Current software does not always accurately predict lighting energy savings from lighting controls and daylighting, thus discouraging their use. Software must be able to consider more variables to more accurately predict the implications of design decisions.
- Performance based methods should accommodate atypical building designs, and should not discourage innovative energy saving designs. They should properly measure and give full credit for all energy saving techniques used.

Post-Occupancy Commissioning and Code Enforcement

In the US, energy codes can ensure that regulate how buildings is are *designed and constructed* to code. But there is no mechanism in the codes that ensures that the building *performs* as designed. In many cases the energy savings anticipated by the code are never realized.

- We support the development of mandatory energy code provisions for post-occupancy commissioning of lighting controls. These provisions must require the certification of commissioning and/or inspection and verification by code officials or other qualified entities.
- We support the inclusion of detailed inspection checklists for lighting systems in the energy code, and call on DOE to provide greater funding for training of building code officials to help them enforce the codes and monitor results over time.

Outcome Based Codes

Even if buildings are designed, constructed, and commissioned properly, they will not achieve the predicted energy savings if they are poorly operated and maintained. Significant building energy savings can be realized if buildings are operated effectively over time to maintain initial design efficiencies, or appropriately upgraded with new technologies.

- Up to 30% of a building's energy consumption is currently unregulated (plug loads, computers, refrigeration, etc.) We support the development of post-occupancy enforcement mechanisms in energy codes (known as Outcome Based Codes) which have the effect of regulating all aspects of building energy use. We acknowledge that there are significant procedural and legal issues with this approach that will have to be resolved, but we believe that this could be the most effective way of regulating and reducing building energy use in the long run.

CONCLUSION

Lighting power density limits will probably continue to be the primary means of regulating lighting efficiency, but large improvements in lighting efficiency will not be realized by reductions in LPD values alone. If significant reduction in the energy use of new and existing buildings is going to be realized, new energy code methods and procedures must be developed, and changes to fundamental building design approaches must be explored. In order to save significant amounts of energy, codes of the future must move toward regulation of energy consumption (post-occupancy) as well setting standards for building performance.

We support the exploration of new code methods that will reduce building energy use without reducing lighting quality. Codes should not prevent good design results, nor should they be the cause of bad results. New methods should be based on sound data on building and human performance, and what is possible with known technologies. Proposed methods should be shown – through predictive modeling or studies of existing buildings – that they will reduce energy use. Metrics should never be based on arbitrary energy reduction amounts.

The approaches presented above could lead to significant reductions in building energy use. IALD and IES members are already discussing these issues. Through our collective involvement with the development of the IECC, Standard 90.1, the IGCC, Standard 189.1, and LEED, we will work to develop new methods that can significantly reduce energy use *and* allow the design of high-quality lighting in buildings to produce effective, comfortable, safe, and pleasing environments.