



California Energy Commission
Attention: Docket No. 15-BSTD-01
Dockets Office
1516 Ninth Street, MS-4
Sacramento, CA 95814

To Whom It May Concern,

The Engineering Enterprise has the following comments concerning the 45 Day Language of California's 2016 Building Energy Efficiency Standards (Title 24 Part 6).

The Engineering Enterprise is an electrical and lighting design firm with more than 40 years experience dedicated to providing services of unique quality and range. Our electrical design and engineering experience is significant and includes numerous types of projects, both renovation and new construction, ranging from small retail stores to large office campus facilities. This list encompasses auditorium, civic, convention, data center, detention, educational, healthcare, hospitality, housing, industrial, laboratory, library, low rise and high rise offices, parking garages, recreational, theatrical, retail and transportation facilities located throughout the United States and in several foreign countries. Due to the unique experience and diversity within The Engineering Enterprise, the firm is able to offer specialized design services tailored to the client's needs. Of particular importance to each project is the firm's extensive research and application of new technologies and their impact on the project. The primary goal of The Engineering Enterprise is to produce designs that accommodate the client's needs and are technically sound, innovative, cost effective and are completed on schedule.

Section 100.1 - Definitions and Rules of Construction

1. The definition of "Building" is any structure or space. I do not understand how or why the definition of building would include a space within a structure such as a tenant improvement space. This definition because very confusing for most people when taken in context of the code, for example, lighting power in buildings over 10,000 square feet shall have demand response capabilities. It would be much clearer to state that spaces over 10,000 square feet shall have demand response capabilities. Break out the definition of building and space.

Section 110.10.B(e) Mandatory Requirements for Solar Ready Buildings

1. The reference to the main electrical panel should be changed to electrical panel. Almost all solar installations tie into the panelboard nearest the PV array which may be a panel closer to the roof. The main electrical panel is always near the ground level furthest away from a roof PV system.
2. Why does the code require a space for a double pole breaker, the requirement should be 3 pole depending on how large the PV system is. Also, many installations tap off the panelboard bus and go to an enclosed breaker which meets the utility requirements to have a separate disconnect.
3. In general this section is trying to mandate requirements that are all ready well established in the NEC and common PV practices. For example, if I have a PV system on a roof near a 60A panel I will tie into that panel. NEC requires that the bussing be no less than 80% of all the input breakers, if my PV breaker is only 50A that gives a total of 110A and I would be allowed to have a 100A rated bus in the panelboard. Why does title 24 require the bussing to be a minimum 200A?

Section 130.1(a) - Area Controls

1. Exception 2 to Section 130.1(a)2. This exception simply adds cost to a project and will never be utilized. If there is a keyed switch or central switch for a public bathroom why would it ever be turned off when there is a motion sensor in the space? I strongly suggest that public multi-stall bathrooms be allowed to not have manual control and only have automatic on/off occupancy sensor control.

Section 130.1(b) Multi-Level Lighting Controls

1. Lighting in certain areas shall be allowed to have manual on/off control without dimming as long as the fixtures are dimmable through other means, similar to the 2013 code. For example, in a corridor I don't see any users dimming a space when they walk into it; rather I think the dimming should come through tuning for day to day use. This would ensure that the correct light levels for the space are met without wasting energy. Typically if the manual dimming switch in a corridor was available it would be turned on to 100%.
2. Exception 2 to Section 130.1(b). How does this exception apply to LED fixtures where there are not traditional lamps to quantify? Exception should read as it does but also address LED fixtures.

Section 130.5(b) - Disaggregation of Electrical Circuits/Electrical Energy Monitoring

1. Section 130.5(b)2. It is unclear if this requires a metering system to be installed if we utilize a deductive disaggregation approach. Many if not all 480V distribution systems utilize a 480V panelboard for lighting loads which also feeds a transformer/208V panel for plug loads. If this statement requires a metering system then essentially this means that all 480V projects would have to install a metering system or separately feed the transformers and panelboards, both of which are very costly.
2. This section does not address small projects where only one panelboard would need to be installed to serve all electrical loads. Is an owner required to install a metering system for a small space with only one panelboard and a few circuits? This would be a huge cost for a small project and would virtually provide no benefit since the other requirements such as demand response (central control programming) are not required. I believe there should be an exception that allows a tenant spaces with a single panelboard to be exempt from this requirement.
3. What is the intention of this section eventually going to be? I would have thought that a metering system would be required under the 2016 code but it still is not. If an owner is required to disaggregate the loads but not install a metering system then what is the benefit? It would not be possible to make a building retroactively add a metering system in the future if the electrical distribution is existing.
4. This section still does not address any emergency loads from a generator, UPS, or Inverter. Is a project with a generator required to disaggregate loads? Other codes require that "Emergency" and "Standby" loads be separated by different transfer switches and often times lighting and fire alarm are on the emergency side and can have a very small load. Does this section require that I break out these loads on different panels? Even in a sizable project this would mean that there would be only a few circuits on multiple panels. For standby loads would I need a separate panel for elevators, HVAC, and plugs? This would be an astronomical cost to the project and gives virtually no benefit if a metering system is not required to be installed. Emergency loads must be addressed.
5. This section which provides no means of actually saving energy requires more equipment to be installed and increases construction cost which requires more resources and energy than it saves. The high level intention of this credit is understandable but in reality has no benefit to the owner or environment.

Section 130.5(c) Voltage Drop

1. Simply put, why is this a requirement of Title 24? This is already a code requirement in the NEC and CEC.

Section 130.5(d) Circuit Controls for 120-Volt Receptacles.

1. This requirement increases the cost to a project and from my experience provides little benefit. When the code was written what was the intended equipment to be plugged into the controlled receptacles? I can think of only one piece of equipment in a modern office space that would need to be shut off by occupancy or time schedule control, portable lighting. Computer monitors already have self regulated energy saving protocols when not being used. Cell phone chargers are USB and plug into computers or computer monitors. Also, I wouldn't want a charger to be shutoff if I left the space for a short period of time. I would never turn off my office phone and there is no other equipment. The only equipment I can see needed to be controlled would be portable lighting and this would typically be only one plug in an entire office space or cubicle. There is also no requirement of what equipment if any should be plugged into these outlets. I suggest that the code be revised to only require one plug in the required spaces be controlled and not one within every 6 feet. The 6 foot requirement ultimately requires that additional plugs be added to the space which increases the cost of the project.
2. I have seen many consultants simply provide a double duplex (one controlled, one uncontrolled) at every location where a normal single duplex would be provided. This doubles the power required to serve these spaces as the NEC requires that each receptacle account for 180 Watts of power. This also increases wiring and devices increasing the cost of the project. The energy used to produce and install all this extra equipment should be taken into consideration.
3. It is difficult to know how to design these requirements into a furniture system which is typically picked out during construction. Requiring one receptacle within 6 feet of an uncontrolled would have to be regulated by the furniture manufacture who might not know the requirements. Most furniture has hardwired task lighting so in this scenario I can't think of one piece of equipment that would be plugged into the controlled receptacle. This also would shift most of the load to the other circuits which could potentially overload a circuit breaker.

Section 140.7 Requirements for Outdoor Lighting

1. Table 140.7-A. The general hardscape allowance has been reduced more than 50%. This seems completely unreasonable and I would like to understand the thought process behind this. Our current installations would not come close to meeting these new requirements while still maintaining the appropriate light levels.

Section 141.0.1 - Lighting Alterations

1. Section is poorly written. Unclear what the 10% requirement is now, I would imagine that if more than 10% the requirements of 140.6 are required.

Section 150.0(k) - Residential Lighting

1. Section 150.0(k).1. Is the intention that no low efficacy lights are allowed in residential applications anymore? There must be an exception for ornamental lighting such as chandeliers, sconces, pendants, etc. This would not allow any decorative fixtures in homes in California as virtually none of them have integrated LED lamps, all have medium base sockets.
2. Section 150.0(k)2.J. Installing occupancy sensors in bathrooms may cause false offs when someone is in a shower. I highly doubt that the lighting loads will be separated so that only one light fixture is on an occupancy sensor and not all of them. I would remove bathrooms from this section and still allow manual control with no override as long as high efficacy luminaries are used.

Sincerely,



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Associate