

# 2016 California Energy Code (CEC) Changes

## SUMMARY

New and altered homes are to become more efficient in several ways to create energy and environmental savings for Californians. Building systems that include updates are: High Performance Attics, High Performance Walls, Improved Water Heating System Efficiency and High Efficacy Lighting.

Changes to the nonresidential requirements largely follow ASHRAE 90.1 national standards and include energy conservation measures related to the following building systems: Door and Window Interlocks, Direct Digital Controls, Outdoor Lighting, Escalators and Elevators.

## SIGNIFICANT CHANGES

NEW - CHANGE	CEC SECTION/TABLE NUMBER	COMMENTARY (RESIDENTIAL)	MASTER PLAN IMPACT YES - NO	
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0	<b>Mandatory Requirements (Residential Envelope).</b> There are several new thresholds for mandatory envelope requirements including a new exception allows for 30 sqft for dual glazed greenhouse windows.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/>	150.1	<b>Prescriptive High Performance Walls.</b> In Climate Zones 1-5 & 8-16, above grade framed wall assemblies must not exceed a maximum U-factor of 0.051. In Climate Zones 6 & 7, the maximum U-factor is 0.065.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/>	150.1	<b>Prescriptive High Performance Attics.</b> There are three options that may be used to comply: Two options allow ducts and air handler to be located in the attic; One option requires ducts and air handler to be located in conditioned space.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/>	150.2	<b>Prescriptive Additions.</b> Provides several options that allow for extensions of existing wood-framed walls to retain the same dimensions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0(m)	<b>Mandatory Requirements (Residential Mechanical).</b> All ducts in conditioned spaces must include R-4.2 insulation. Duct leakage requirement has been reduced to 5% maximum for single family homes.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.1	<b>Prescriptive Requirements.</b> Provides the duct insulation requirements for high performance attic. Air flow requirements for whole house fans (cfm/sf) attic vent areas (sf/cfm) requirements have been reduced.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	110.3(c)7	<b>Mandatory Isolation Valves (Domestic Hot Water).</b> Instantaneous water heaters with an input rating of 6.8kBTU/hr (2 kW) or greater need an isolation valve on the cold water supply and hot water leaving the water heater. Each valve will need a hose bibb or other fitting allowing for flushing the water heater when the valves are closed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SIGNIFICANT CHANGES (cont'd)

NEW - CHANGE	CEC SECTION/TABLE NUMBER	COMMENTARY (RESIDENTIAL)	MASTER PLAN IMPACT YES - NO
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.1(c)8	<b>Domestic-Water-Heating-System.</b> Water heater prescriptive efficiencies have been Increased. Options have been provided for 3 different (gas or propane) systems, which include efficiency and pipe insulation requirements.	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.2(b)1G	<b>Mandatory Water Heater Pipe Insulation.</b> For water heater replacements, install piping insulation per mandatory requirements. Insulation for existing accessible piping must meet the requirements of Sections 150.0(j)2Ai, iii and iv.	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	Guidebook (NSHP)	<b>Onsite Renewable Systems.</b> Compliance credit for installing PV systems is only available if the project used a performance approach and meets several other conditions. Note: Taking the PV system credit does not require HERS verification unless getting a rebate from the New Solar Homes Partnership (NSHP)	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0(k)	<b>Mandatory High Efficacy Lighting (Residential Lighting).</b> All permanently installed light fixtures shall be high efficacy, including screw-based which must contain JA8 compliant lamps.	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0(k)G	<b>Screw Based Luminaires.</b> Must contain JA8 compliant light sources. Must not be contained in recessed downlight luminaires. Incandescent sources are prohibited from having a GU-24 base (per Title 20 Section 1605.3(k).	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/>	150.0(k)B	<b>Blank Electrical Boxes.</b> The number of blank electrical boxes more than 5 feet above the finished floor shall not be greater than the number of bedrooms. These electrical boxes must be served by a dimmer, vacancy sensor, or fan speed control.	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0(k)2J	<b>Bathrooms, Garages, Laundry Rooms, and Utility Rooms.</b> At least one fixture must be controlled by a vacancy sensor.	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0(k)2L	<b>Under Cabinet Lighting.</b> Any under cabinet lighting (including kitchen) must be switched separately from other lighting systems.	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	150.0(k)3	<b>Outdoor Lighting.</b> Must be high efficacy and include a manual on/off switch and one of the following: Photocontrol and motion sensor; Photocontrol and automatic time switch control; Astronomical time switch control; Energy Management Control System.	<input checked="" type="checkbox"/> <input type="checkbox"/>

SIGNIFICANT CHANGES (cont'd)

NEW - CHANGE	CEC SECTION/TABLE NUMBER	COMMENTARY ( <b>NONRESIDENTIAL</b> )	MASTER PLAN IMPACT YES - NO
<input type="checkbox"/> <input checked="" type="checkbox"/>	120.7	<b>Mandatory Requirements (Envelope).</b> Wall insulation levels have been changed for metal framed and metal demising. All other mandatory insulation levels are unchanged. Additional exceptions apply for dedicated data centers.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	140.3 & Table 140.3	<b>Prescriptive Requirements.</b> Prescriptive envelope requirements have been updated in Table 140.3-B & C. Prescriptive roof/ceiling insulation tradeoff for Aged Solar Reflectance Table 140.3 has been updated and applies to new installations as well as roof replacements.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	120.6(g)	<b>Escalators and Moving Walkways.</b> Will be required to run at lower speeds when unoccupied while not in use in use in high traffic areas like airports, hotels, and transportation function areas.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	120.6(f)	<b>Elevators.</b> Energy efficient lighting and fan changes. Automatic shut-off controls for lights and fans after 15 minutes of no service. Lighting and ventilation to be operable during emergency stop situations while occupied with passengers.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	110.2	<b>Mandatory Equipment Efficiencies (Mechanical).</b> Air conditioning unit efficiencies have increased. Chiller and DX equipment efficiencies have become more stringent.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/>	120.2(i)	<b>Economizers.</b> New mandatory requirements for Fault Detection and Diagnostics (FDD) on all economizers installed on new air-cooled packaged DX units with cooling capacity of 54,000 Btu/hr or greater. Stand alone or integrated FDD accepted per Section 120.2(i).	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	120.2 & 140.4	<b>HVAC System Controls.</b> Mandatory Direct Digital Controls (DDC) must be capable of monitoring several points, have optimum start/stop controls, and perform automatic information transfers. Prescriptive HVAC Shut-off Sensors for Windows and Doors when left open for more than five minutes, sensors will adjust thermostats to disable the HVAC equipment by resetting the temperature setpoints. Exemptions for doors with automatic closers or any space without thermostatic controls.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	120.8	<b>Nonresidential Building Commissioning.</b> Commissioning is required for all new buildings with nonresidential conditioned space, including nonresidential spaces in hotel/motel and high-rise residential buildings. The Owner's Project Requirements (OPR) must include building envelope performance expectations. Section 10-103 in Part 1 specifies that the Design Reviewer may be a licensed architect or licensed contractor in addition to a professional engineer.	<input type="checkbox"/> <input checked="" type="checkbox"/>

SIGNIFICANT CHANGES (cont'd)

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<input checked="" type="checkbox"/> <input type="checkbox"/>	140.6	<p><b>Prescriptive Calculation Methodology (Lighting).</b>                      Allowed Lighting Power Densities are reduced for both Complete Building and Area Category Methods per Tables 140.6-B &amp; C.                      Lighting Power Density Values for the Tailored Method are updated per Table 140.6-G. Allowances in Table 140.6-D remain unchanged</p>	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	130.1 & 140.6	<p><b>Indoor Lighting Controls.</b> An additional exception is included for Mandatory Shut-Off Controls.  <b>Mandatory Multi-Level Controls</b> shall be provided for enclosed areas 100 ft<sup>2</sup> or greater with a general lighting load greater than 0.5 w/ft<sup>2</sup>. Some exceptions apply.  <b>Mandatory Partial-ON Occupancy Sensor</b> for areas requiring occupant sensing controls (offices ≤ 250 ft<sup>2</sup>, multipurpose rooms &lt; 1,000 ft<sup>2</sup>, classrooms, and conference rooms), and multilevel controls, the occupant sensing controls shall function as partial-ON or vacancy sensor. Where no multi-level controls are required, an automatic full-on occupancy sensor is acceptable.  <b>Control Credits:</b> Power Adjustment Factors (PAF) listed in Table 140.6-A have been updated and include several options.</p>	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	141.2.1	<p><b>Entire Luminaire Alterations.</b> Renamed for clarity. Lighting shall meet the lighting power allowance in Section 140.6 and altered permanently installed luminaires shall meet the applicable requirements in Table 141.0-E if the following options occur:</p> <ul style="list-style-type: none"> <li>• Removing/reinstalling 10% or more of the existing luminaires (if there are more than 2) in a space, or</li> <li>• Replacing or adding entire luminaires, or</li> <li>• Adding, removing, or replacing walls or ceilings along with lighting redesign.</li> </ul> <p>When replacing existing luminaires and the alteration is not in conjunction with adding, removing or replacing walls or ceilings, the new luminaires must:</p> <ul style="list-style-type: none"> <li>• Reduce rated power by 50% for office, retail and hotel occupancies and 35% for all others, compared to the original luminaires, at full light output, and</li> <li>• Meet all the control requirements in the Sections listed.</li> </ul>	<input type="checkbox"/> <input checked="" type="checkbox"/>

SIGNIFICANT CHANGES (cont'd)

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<input type="checkbox"/> <input checked="" type="checkbox"/>	141.2J	<b>Luminaire Component Modifications.</b> Formerly, luminaire modifications-in-place. Alterations that replace the ballasts or drivers and the associated lamps in the luminaire, or permanently change the light source or the optical system of the luminaire. Modifying the components of fewer than 70 existing luminaires on a single floor or within a tenant space within a year, does not trigger code. If there are 70 or more modifications per year on a single floor or tenant space, then the project needs to meet lighting power allowances and reduced power ratings. Modifications should not prevent or disable multi-level, shout-off or daylight controls.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	141.0(b)2K	<b>Lighting Wiring Alteration.</b> Alterations that add a circuit feeding luminaires, that replace, modify or relocate wiring between a switch or panelboard and luminaires, or replace lighting control panels, panelboards, or branch circuit wiring. Wiring alterations (unless strictly to add lighting controls) in each enclosed space shall meet the control requirements of the sections listed. Exceptions for all lighting alterations are included at the end of this section.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/>	Table 140.7-A	<b>Hardscape Lighting Power (Outdoor Lighting).</b> Zone 0 has been added for undeveloped areas of state or national parks.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	Table 140.7-B	<b>Specific Applications in Lighting Power.</b> Lighting power allowances for building entrances/exits are reduced. Lighting power allowances for ATM machines is now specified.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	130.2(c)3	<b>Motion Sensors.</b> Must be able to reduce lighting power of each luminaire by at 40% (90% max.). Sales lot and sales canopies are no longer exempt.	<input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	141.(b)2L	<b>Outdoor Lighting Alterations.</b> Alteration to outdoor lighting shall meet several mandatory control requirements. Added or altered luminaires that increase the connected light load must meet applicable control and specific lighting application requirements. Control requirements are also provided for alterations that do not increase the connecting lighting load but where the greater of 5 luminaires or 10% of existing luminaires are replaced <b>and</b> for alterations that do not increase the connecting lighting load but where the greater of 5 luminaires or 50% of existing luminaires are replaced. An exception to lighting control acceptance testing is provided for a total of 20 or fewer controlled luminaires	<input type="checkbox"/> <input checked="" type="checkbox"/>