

# BLUEPRINT

CALIFORNIA ENERGY COMMISSION  
EFFICIENCY DIVISION

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## 2019 ENERGY CODE: LOW-RISE RESIDENTIAL SUMMARY OF MAJOR CHANGES

The most significant change in the 2019 Building Energy Efficiency Standards (Energy Code) for low-rise residential buildings is the introduction of photovoltaic (PV) requirements in the prescriptive standards. There are also significant changes related to the indoor air quality requirements. This is a summary of these and other major changes:

### *Mandatory Measures*

1. Walls with 2x6 framing require R-20 minimum insulation for wood-framed; or 0.071 maximum U-factor. **§ 150.0(c)2**
2. Modifications to the indoor air quality requirements of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 62.2 are included for various building and dwelling unit configurations such as horizontally attached buildings, or central ventilation systems. Balanced or continuously operating supply or exhaust ventilation system required. Home Energy Rating System (HERS) verification required when kitchen range hoods are installed. **§ 150.0(o)**
3. Minimum efficiency reporting value (MERV) 13 air filters (or equivalent) are required for heating, cooling, and on the supply side of ventilation systems. **§ 150.0(m)12**

4. Fan efficacy requirements are 0.45 watts/cubic feet per minute (CFM) or less for gas furnace air-handling units; or 0.58 watts/CFM or less for air-handling units that are not gas furnaces. New fan efficacy requirement for small-duct high-velocity forced-air systems. **§ 150.0(m)13B, C, D**

### *Prescriptive Compliance*

1. New PV solar electric generation requirement. **§ 150.1(c)14**
2. New prescriptive **Table 150.1-B** for multifamily buildings. **§ 150.1(c)**
3. Wall U-factors in climate zones 1-5 and 8-16 reduced to 0.048 maximum in single-family buildings; climate zones 6-7 remain at 0.065 maximum. **§ 150.1(c)1B**
4. New exterior door U-factor 0.20 maximum and National Fenestration Rating Council (NFRC) labeling requirements. **§ 150.1(c)5, § 110.6(a)5**
5. Quality insulation installation (QII) for all single-family buildings in all climate zones, and multifamily buildings in all climate zones except climate zone 7. HERS verification required. **§ 150.1(c)1E**
6. New prescriptive options for heat pump water heaters for newly constructed buildings, additions, and alterations. **§ 150.1(c)8, § 150.2(a)1D, § 150.2(b)1H**

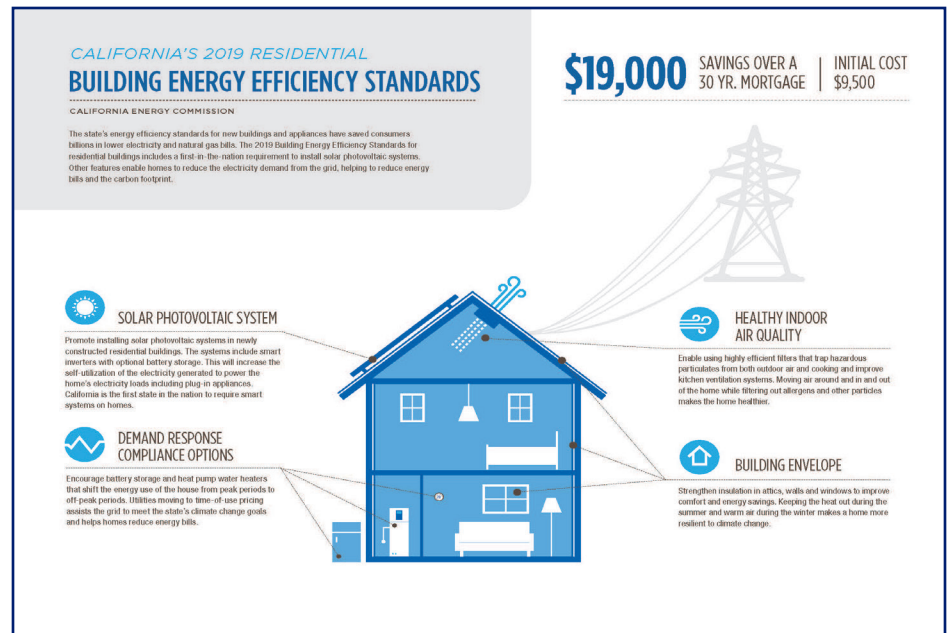
## Performance Compliance

Compliance for newly constructed buildings is now based on a proposed energy design rating (EDR) index, where a score of 100 represents a 2006 International Energy Conservation Code compliant building, and a score of zero represents a building that has zero net energy consumption based on the time-dependent valuation (TDV) energy consumption. The total EDR is calculated using approved compliance software as specified by the 2019 Alternative Calculation Method Approval Manual and includes an energy efficiency EDR, a solar electric generation and demand flexibility EDR, and the total EDR. **§ 150.1(b)1, § 110.1**

## Additions and Alterations

1. Changed the prescriptive requirement for continuous insulation on existing walls with wood siding; if siding is not removed, only cavity insulation is required. **§ 150.2(a)1**
2. QII is not required for additions that are 700 square feet or less. **§ 150.2(a)1B**
3. Roof and ceiling insulation for prescriptive additions of 700 square feet or less require R-38 minimum in climate zones 1, 11-16; or R-30 minimum in climate zones 2-10. A radiant barrier is required in climate zones 2-15. **§ 150.2(a)1B**
4. Natural gas is available for newly constructed buildings if a gas service line can be connected to the site without a gas main extension. For additions, natural gas is available if a gas service line is connected to the existing building. **§ 100.1**

The 2019 Energy Code *What's New for Residential* summary and infographic are both available [here](#).



2019 Residential Infographic

## 2019 ENERGY CODE: NONRESIDENTIAL, HOTEL AND MOTEL, HIGH-RISE RESIDENTIAL SUMMARY OF MAJOR CHANGES

The most significant changes in the 2019 Energy Code for nonresidential, hotel and motel, and high-rise residential buildings are in lighting design. These and other changes include:

### Lighting

1. Revised and streamlined luminaire classification and wattage requirements. **§ 130.0(c)**
2. Clarified and streamlined manual area controls, multi-level lighting controls, and automatic daylighting controls requirements. Restrooms to comply with occupancy sensor control requirements. New section for indoor lighting control interactions. **§ 130.1**
3. Changed indoor and outdoor lighting power allowances based on LED lighting technologies. Revised lighting power density values in **Tables 140.6-B to 140.6-G**, and **Table 140.7-B**. **§ 140.6, § 140.7**

4. New prescriptive requirements and power adjustment factors for daylighting devices including horizontal slats, light shelves and clerestory fenestrations. **§ 140.3(d), § 140.6(a)2L**
5. New lighting power adjustment for small aperture tunable-white and dim-to-warm LED luminaires. **§ 140.6(a)4B**
6. Revised and streamlined outdoor lighting controls requirements. **§ 130.2(c)**
7. New separate lighting power allowance values for concrete-surfaced and asphalt-surfaced hardscape outdoor lighting application in **Table 140.7-A**. **§ 140.7**
8. Revised and streamlined alteration requirements. Merged three sections into one altered indoor lighting systems section. Aligned two reduced power options on controls, and alterations using power reduction limited to 5,000 square feet. Revised and consolidated **Table 141.0-F**. **§ 141.0(b)2I**

## Mechanical

1. MERV 13 air filters (or equivalent) are required for heating and cooling systems. Filtration requirements extended to supply-only ventilation systems and the supply side of balanced ventilation systems. **§ 120.1(b), (c)**
2. New ventilation requirements for high-rise residential dwelling units, now aligned with ASHRAE 62.2. Must be a balanced system or a continuously operating supply or exhaust system. HERS blower door test required for continuously operating ventilation systems. **§ 120.1(b)**
3. Kitchen range hoods in high-rise residential dwelling units require HERS verification and acceptance testing to ensure Home Ventilating Institute certification complies with ASHRAE 62.2 minimum airflow and sound rating requirements. **§ 120.1(b)**
4. Incorporated natural and exhaust ventilation procedures of ASHRAE 62.1. Updated **Table 120.1-A** to include minimum ventilation rate for more spaces. **Table 120.1-B** added for minimum exhaust rate for certain spaces. **§ 120.1**
5. Expanded economizer fault detection and diagnostics requirements to all cooling systems over 54,000 Btuh with an air economizer. **§ 120.2(i)**

## Envelope

1. Exception for the site-built fenestration default calculations reduced from 1,000 square feet to 200 square feet. **§ 110.6**
2. Exterior doors now included in NFRC rating and labeling requirements. **§ 110.6**

## Covered Processes

1. New fan efficiency and automatic sash closure requirements, includes acceptance testing, for laboratory fume hoods. **§ 140.9(c)1, 4**
2. New efficiency and system control requirements for adiabatic condensers serving refrigerated warehouses and supermarkets. **§ 120.6(b)**

## Healthcare Facilities

Healthcare facilities overseen by the California Office of Statewide Health Planning and Development are now included in the scope of Energy Code. Exceptions are incorporated to ensure appropriate application.

The 2019 Energy Code *What's New for Nonresidential* summary and infographic are both available [here](#).

## 2019 ENERGY CODE: CBECC SOFTWARE AND ACM MANUALS APPROVED

The Energy Commission has approved the 2019 public domain CBECC-Res residential and CBECC-Com nonresidential software used to demonstrate performance compliance with the 2019 Energy Code. Also approved are the 2019 Residential and Nonresidential Alternative Calculation Method (ACM) Reference Manuals as required by Public Resources Code Section 25402.1(e). The ACM Reference Manuals document the modeling methods used in the 2019 CBECC Compliance Software.

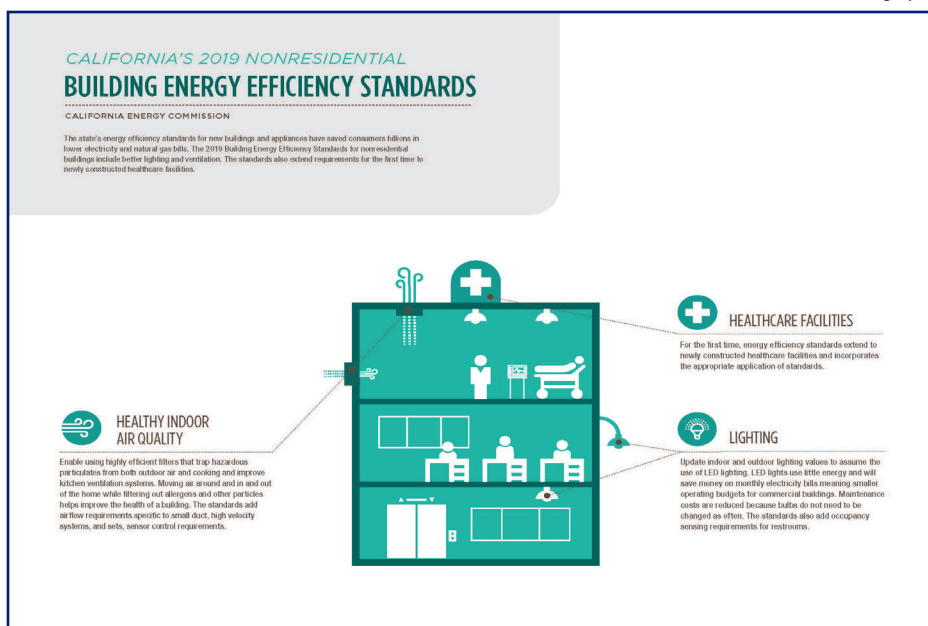
CBECC software is a free computer program developed by the Energy Commission. This software is used to demonstrate compliance with the Energy Code. CBECC software is an open source software. This makes all of the source code of one of the world's most advanced building modeling software programs available to the public at no cost. Other entities can alter the source code to help meet their energy efficiency goals.

The list of approved software versions and their corresponding approval and expiration dates is available [here](#).

The 2019 Residential ACM Reference Manual is available [here](#).

The 2019 Nonresidential ACM Reference Manual is available [here](#).

2019 Nonresidential Infographic



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Toll free in CA

916-654-5106  
Outside CA

HOURS

8 a.m. – 12 p.m. and  
1 p.m. – 4:30 p.m.

## 2016 ENERGY CODE: NEW FACT SHEETS AND VIDEOS FOR COVERED PROCESSES

New educational fact sheets and videos are now available on the Online Resource Center (ORC). The fact sheets and videos provide an overview of the 2016 Energy Code mandatory and prescriptive requirements for covered processes in nonresidential, high-rise residential, hotel and motel buildings. To view the new fact sheets and videos, please visit the **ORC**.

### *Fact Sheets: Covered Processes*

- » Quick Reference Guide
- » Refrigerated Warehouses
- » Commercial Refrigeration
- » Enclosed Parking Garages
- » Process Boilers
- » Compressed Air Systems
- » Elevators
- » Escalators and Moving Walkways
- » Computer Rooms
- » Commercial Kitchens
- » Laboratory Exhaust Systems

### *Videos: Mandatory and Prescriptive Requirements for Covered Processes*

- » Course 3A: Mandatory Requirements for Refrigerated Warehouses
- » Course 3B: Mandatory Requirements for Commercial Refrigeration
- » Course 3C: Mandatory Requirements for Enclosed Parking Garages
- » Course 3D: Mandatory Requirements for Process Boilers
- » Course 3E: Mandatory Requirements for Compressed Air Systems
- » Course 3FG: Mandatory Requirements for Elevators, Escalators, and Moving Walkways
- » Course 3H: Prescriptive Requirements for Computer Rooms
- » Course 3I: Prescriptive Requirements for Commercial Kitchens
- » Course 3J: Prescriptive Requirements for Laboratory Exhaust Systems

COVERED PROCESS	STANDARDS SECTION	ACCEPTANCE TESTING	COVERED EQUIPMENT/ REQUIREMENTS*	APPLICABILITY*
Refrigerated Warehouses	120.6(a)	Yes	Envelope, under-slab heating, evaporators, compressors, infiltration barriers	Refrigerated spaces $\geq$ 3,000 ft <sup>2</sup> , or spaces added together $\geq$ 3,000 ft <sup>2</sup> on the same refrigeration system
Commercial Refrigeration	120.6(b)	No	Refrigerated cases: condensers, compressors, display case lighting, heat recovery	Retail food stores with conditioned floor space $\geq$ 8,000 ft <sup>2</sup>
Enclosed Parking Garages	120.6(c)	Yes	Exhaust and ventilation fan controls; CO sensor location, certification, and monitoring	Enclosed parking garages with exhaust rate $\geq$ 10,000 cfm
Process Boilers	120.6(d)	No	Combustion air shut-off, fan motors, exhaust stack oxygen concentration level limits	Process boilers with input $\geq$ 2.5 MMBtu/hr, or with combustion air fan motors $\geq$ 10 hp
Compressed Air Systems	120.6(e)	Yes	Trim compressors, minimum primary storage, compressor controls	Compressed air systems with online compressor(s) horsepower $\geq$ 25 hp
Elevators	120.6(f)	Yes	Lighting power density, ventilation fan efficiency, automatic shut-off controls	All new and altered elevators
Escalators and Moving Walkways	120.6(g)	Yes	Maximum speed and acceleration, automatic speed reduction, passenger detection	New and altered escalators and moving walkways located in airports, hotel, and transportation function areas
Computer Rooms (Data Centers)	140.9(a)	No	Economizers, reheat, humidification, fan power and controls, containment	Computer rooms and data centers with a power density $>$ 20 watts/ft <sup>2</sup>
Commercial Kitchens	140.9(b)	Yes	Exhaust hood airflow rate, makeup and transfer air, exhaust and ventilation controls	New and altered commercial kitchens with exhaust hoods
Laboratory Exhaust Systems	140.9(c)	No	Controls coordinating exhaust and makeup air to maintain room pressure and/or air changes	Laboratory exhaust systems requiring $\leq$ 10 air changes per hour

\* Exceptions may apply. See listed Energy Efficiency Standards section(s) for details.

# Q&A

## Outdoor Electric Heating

### Does the Energy Code regulate outdoor electric heating?

No. The Energy Code does not regulate outdoor heating, whether electric, or any other fuel type. Space conditioning systems regulated by the Energy Code, are defined as being associated with conditioned spaces inside a building.

## Flag Pole Lighting

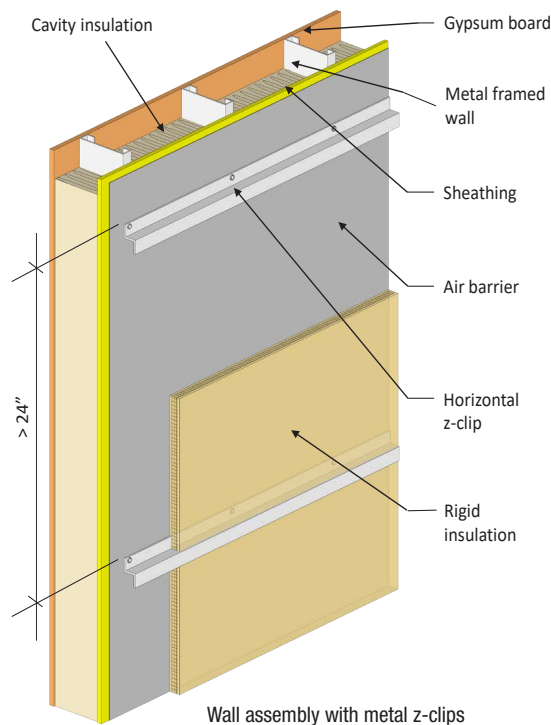
### Is the lighting power for a flagpole exempt from the 2016 Energy Code?

Yes. Lighting for a flagpole is considered lighting for a public monument. As described in the exceptions to § 140.7(a), lighting power for public monuments is exempt from § 140.7 of the 2016 Energy Code. Note that while the power is exempt, this lighting is still subject to the applicable control requirements of § 130.2(a), § 130.2(c)1 and § 130.2(c)2 of the 2016 Energy Code.

## Continuous Insulation and Z-Clips

### Is a metal z-clip considered a break in the continuous insulation when continuous rigid insulation is installed on horizontal 16-gauge z-clips, spaced 16" on center?

Yes. For z-clip horizontal or vertical spacing up to 24", use the values found in the 2016 Joint Reference Appendix JA4, Table 4.3.14. For spacing greater than 24", the z-clip is considered a fastener.



## FOR MORE INFORMATION

Online Resource Center (ORC):  
<https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/online-resource-center>

Home Energy Rating System (HERS):  
<https://www.energy.ca.gov/programs-and-topics/programs/home-energy-rating-system-hers-program>

Acceptance Test Technician Certification Provider Program (ATTCP):  
<https://www.energy.ca.gov/programs-and-topics/programs/acceptance-test-technician-certification-provider-program>

2016 Approved Compliance Software:  
[https://www.energy.ca.gov/title24/2016standards/2016\\_computer\\_prog\\_list.html](https://www.energy.ca.gov/title24/2016standards/2016_computer_prog_list.html)

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