

BLUEPRINT

CALIFORNIA ENERGY COMMISSION
EFFICIENCY DIVISION

IN THIS ISSUE

- 2019 Energy Code: Focus on Lighting
 - Nonresidential Lighting Changes
 - Residential Lighting Changes
 - Future Energy Codes
- 2019 Energy Code: Central Heat Pump Water Heaters
- Covid-19 Essential Workers
- 2019 Energy Code: PV Requirements for ADUs
- 2019 Energy Code: Updated Cool Roof Brochures
- 2019 Energy Code: Approved Lighting ATTCPs
- Q&A
 - Calculation of Allowed Indoor Lighting Power
 - Outdoor Solar Powered Lighting

2019 Energy Code: Focus on Lighting

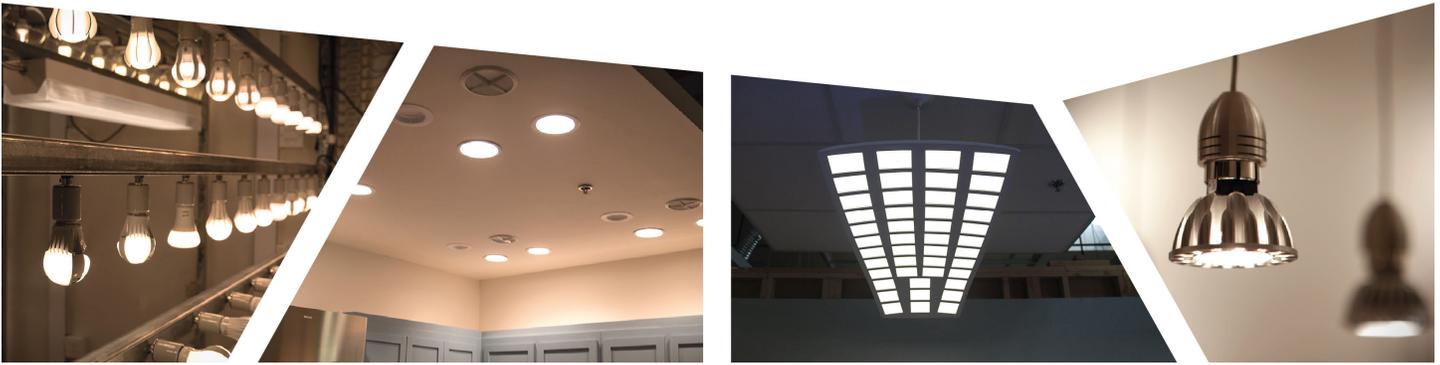
California's Building Energy Efficiency Standards (Energy Code) have continued to evolve since 1978. Statewide over the past 40 years, the Energy Code has not only helped save energy, but has also saved Californians billions of dollars on their utility bills.

The 2019 Energy Code went into effect on January 1, 2020, and brought some significant changes to residential and nonresidential buildings. For the first time, newly constructed homes are required to utilize a photovoltaic (PV) system to generate renewable energy. Overall, single-family homes will use 53 percent less energy than those built under the 2016 Energy Code, after accounting for more rigorous efficiency measures and renewable energy generation.

Nonresidential buildings will use 30 percent less energy than those built under the 2016 Energy Code. A significant portion of those savings are attributed to changes in the lighting requirements.

Nonresidential Lighting Changes

The biggest change is to the prescriptive indoor and outdoor lighting power allowances. Under the 2016 Energy Code, high performance T8 linear fluorescent lighting was used as the baseline for indoor lighting power density (LPD) calculations. Under the 2019 Energy Code, the baseline is LED lighting. The shift to LED lighting has significantly reduced LPDs. On average, indoor LPDs have been reduced by 28 percent when utilizing the area category method of compliance. This accounts for the single largest energy savings of all changes in the 2019 Energy Code. Because LED lighting is already widely used in the industry, this may not have a substantial effect on the way lighting systems are designed. It will, however, effect the overall energy consumption of these buildings, allowing less energy trade-offs between lighting and other aspects of the building, like the building envelope.



The 2019 Energy Code now regulates healthcare facilities, including hospitals. There is massive potential for energy savings in hospitals due to their continuous operation and high-energy end use intensity. Hospitals must meet lighting power allowance requirements and some of the mandatory lighting control requirements.

For existing buildings, prescriptive lighting alteration compliance pathways have been simplified. Lighting alterations are no longer separated into different categories or types. Indoor lighting alterations are now triggered when 10 percent or more of the luminaires in an enclosed space are altered. The required lighting controls will be dependent on the proposed lighting power. Additionally, the compliance pathway for reducing the existing lighting power continues to be an option, however it is now limited to buildings that are 5,000 square feet or less.

Other changes to the nonresidential lighting requirements include:

Line voltage medium screw-base recessed luminaires can now utilize the rated wattage of the

installed screw-base lamp if the lamp is certified per Reference Joint Appendix JA8 (JA8).

Public restrooms are now required to utilize occupancy sensing controls to turn lights off when the restroom is vacant. Multi-level lighting controls are no longer required for public restrooms.

Exceptions to the automatic daylighting control requirements have been added. Sidelit daylight zones with overhangs and skylit daylight zones with external shading may be exempt from automatic daylighting controls when meeting specific criteria. Sidelit daylight zones in retail merchandise sales areas and wholesale showroom areas are now exempt from automatic daylighting controls.

Power adjustment factors for utilizing clerestory fenestration, light shelves, and horizontal slats to increase daylighting for indoor areas have been added.

Automatic scheduling controls are required for outdoor lighting. The scheduling control must be capable of reducing outdoor lighting power by at least 50 to 90 percent during scheduled unoccupied periods.

Residential Lighting Changes

JA8 high efficacy light source requirements remain relatively unchanged, however, products certified under the 2019 Energy Code must be labeled with an updated "JA8-2019" or "JA8-2019-E" marking. Existing products certified under the 2016 Energy Code with either "JA8-2016" or "JA8-2016-E" markings may be used for compliance under the 2019 Energy Code. These products do not need to be retested or relisted in the California Energy Commission (CEC) Modernized Appliance Efficiency Database System (MAEDbS). JA8-2019 certified products may be used for compliance under the 2016 Energy Code.

Other changes to the residential lighting requirements include:

Night lights, step lights, and path lights are not required to be a high efficacy light source or controlled by a vacancy sensor if they are rated at 5 watts or less and emit 150 lumens or less.

Lights internal to drawers, cabinets, and linen closets are not required to be a high efficacy light source or controlled by a vacancy

sensor if they are rated at 5 watts or less, emit 150 lumens or less, and are controlled to automatically turn off when the drawer, cabinet, or linen closet is closed.

Future Energy Codes

The CEC is responsible for adopting, developing, and updating the energy code every three years. Development of the **2022 Energy Code** is already underway with a number of new efficiency measures under evaluation. For lighting, these measures include, but are not limited to: occupancy control in open plan office spaces, daylight dimming-to-off control, reduction of lighting power allowances, and networked lighting controls.

The Energy Code provides an important contribution in helping to achieve ambitious statewide energy efficiency and greenhouse gas (GHG) emission reduction goals. Moving forward, the CEC will continue to work on minimizing the environmental impact of California's buildings by reducing building energy use and GHG emissions through cost effective energy codes.

2019 Energy Code: Central Heat Pump Water Heaters

The CEC's Executive Director has approved specific water heating systems serving multiple dwelling units for compliance with the 2019 Energy Code as meeting the requirements per Section 150.1(c)8C. Central heat pumps provide a pathway to decarbonize water-heating systems for multifamily buildings, while complying with the Energy Code.

The qualification criteria for these systems varies by climate zone. The criteria may require installing a solar water heating system, or additional PV system capacity per dwelling unit. In climate zone 16 (the coldest California climate zone), additional

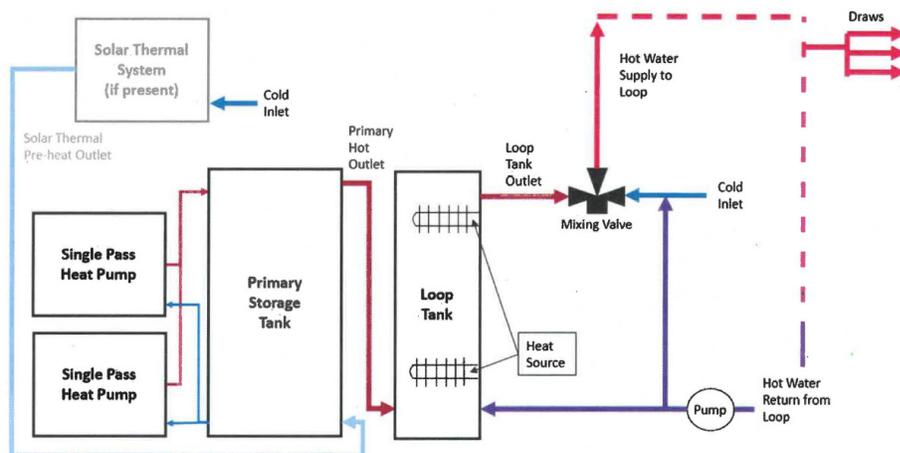
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pipe insulation is also required. See the example system schematic in Figure 1.

The new option allows projects to comply via the prescriptive or performance approach. Download the latest version of **CBECC-Res 2019.1.2** or **CBECC-Com 2019.1.2** to model compliance using the performance approach.

A complete list of installation criteria and system requirements is in the **Executive Director Determination letter**.

Figure 1: Example central heat pump water heater system schematic



Covid-19 Essential Workers

The CEC is available to support essential workers in the construction field. The Energy Standards hotline is responding to emails daily, Monday through Friday. Please leave a voice message to receive a telephone response. In addition, the CEC has determined that **Home Energy Rating System (HERS)** raters and **Acceptance Test Technicians (ATTs)** are considered essential workers. For more information see the **CEC's Advisory notice** and the message from Chair Hochschild on the **CEC's response to Covid-19**.

For Energy Code training online or on-demand see Energy Code Ace's **Training Schedule**.

2019 Energy Code: PV Requirements for ADUs

The 2019 Energy Code PV system prescriptive requirements under Section 150.1(c)14 apply only to newly constructed detached accessory dwelling units (ADUs) for which the permit application was submitted on or after January 1, 2020. Smaller ADUs will require smaller PV systems, or may be exempt from the PV system requirements if they meet Exception 1 to Section 150.1(c)14:

- No PV is required if the effective annual solar access is restricted to less than 80 contiguous square feet by shading from existing permanent natural or man-made barriers external to the dwelling, including but not limited to trees, hills, and adjacent structures. The effective annual solar access shall be 70 percent or greater of the output of an unshaded PV array on an annual basis.

The PV system can be installed on the ADU, or on the main house. In the event that panels are added to an existing PV system to satisfy the PV system requirements for the ADU, those additional panels must be part of the ADU's permit application.

The PV system requirements do not apply to alterations or additions to existing homes, including detached additions where an existing detached building is converted from unconditioned to conditioned space (this is an addition per the Energy Code definitions).

Note: Energy Code requirements, including the PV requirements, do not apply to mobile home ADUs, which are subject to Title 25, not Title 24.

2019 Energy Code: Updated Cool Roof Brochures

The CEC has published two new brochures on the 2019 Energy Code – *Low-rise Residential Cool Roofs* and *Nonresidential, High-rise Residential, Hotel and Motel Cool Roofs*. These brochures are available for download from the **Online Resource Center Envelope** web page.

These brochures include information on the following requirements for cool roofs:

- Solar reflectance and thermal emittance
- Solar reflectance index
- Mandatory labeling requirements
- Prescriptive requirements
- Code triggers for roof alterations
- Exceptions to the requirements

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(Title 24, Part 6) questions.



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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.

2019 Energy Code: Approved Lighting ATTCPs

Lighting controls acceptance test technician certification provider (ATTCP) training has been approved for the 2019 Energy Code. The CEC has approved the lighting controls ATTCP application updates for the 2019 Energy Code from both the California Advanced Lighting Controls Training Program (CALCTP) and the National Lighting Contractors Association of America (NLCAA). CALCTP and NLCAA can train, certify, and recertify lighting controls acceptance test technicians and their employers under the 2019 Energy Code. For more information, visit the **ATTCP web page**.

Q&A

Calculation of Allowed Indoor Lighting Power

Are retail store buildings permitted to use the Complete Building Method lighting power density values listed in Table 140.6-B?

Yes. Retail stores were added to Table 140.6-B in the 2019 Energy Code.

Is the parenthetical language correct in Section 140.6(c)1A that seems to suggest retail stores cannot use Table 140.6-B?

No. The parenthetical example in Section 140.6(c)1A is incorrect. Retail store buildings are permitted to use the Complete Building Method for the 2019 Energy Code. Fortunately, parenthetical language does not have legal effect, and the CEC has added this errata to the list of corrections for the **2022 Energy Code** update.

Outdoor Solar Powered Lighting

Are self-contained solar powered portable path luminaires subject to the requirements of the Energy Code?

No. If a permit is not required for the installation of this lighting, then it is exempt from the Energy Code. The CEC does not anticipate that this lighting would require a permit, but please confirm with the enforcement agency.

Are self-contained solar powered pole-mounted luminaires subject to the requirements of the California Energy Code?

Yes. If a permit is required for the installation of this lighting, then it must comply with Energy Code. The CEC anticipates that this lighting would require a permit given that it is a permanent improvement, but please confirm with the enforcement agency.

Note: Temporary outdoor lighting is exempt from Section 140.7(a) and the control requirements of Section 130.2(c)3.

FOR MORE INFORMATION
Online Resource Center (ORC):

www.energy.ca.gov/orc

Home Energy Rating System (HERS):

www.energy.ca.gov/HERS

Acceptance Test Technician Certification Provider Program (ATTCP): www.energy.ca.gov/ATTCP

2019 Approved Compliance Software:

www.energy.ca.gov/title24/2019standards/2019_computer_prog_list.html

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