



# 2022 Energy Code

## Nonresidential Sign Lighting Requirements

California Energy Commission

March 2024



# Agenda

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- 2022 Energy Code basics
- Nonresidential requirements
  - Mandatory
  - Prescriptive
  - Additions and alterations
- Resources



# 2022 Energy Code Basics



# Energy Code History

## Warren-Alquist Act established CEC in 1974

- Authority to develop and maintain Building Energy Efficiency Standards (Energy Code)
- Requires CEC to update periodically, usually every 3 years
- Requires Energy Code to be cost-effective over economic life of building

### WARREN-ALQUIST ACT

Warren-Alquist  
State Energy Resources  
Conservation and  
Development Act

Public Resources Code  
Section 25000 et seq.



CALIFORNIA  
ENERGY COMMISSION  
Gavin Newsom, Governor

2022 EDITION  
JANUARY 2022  
CEC-140-2022-001



# 2022 Energy Code Goals

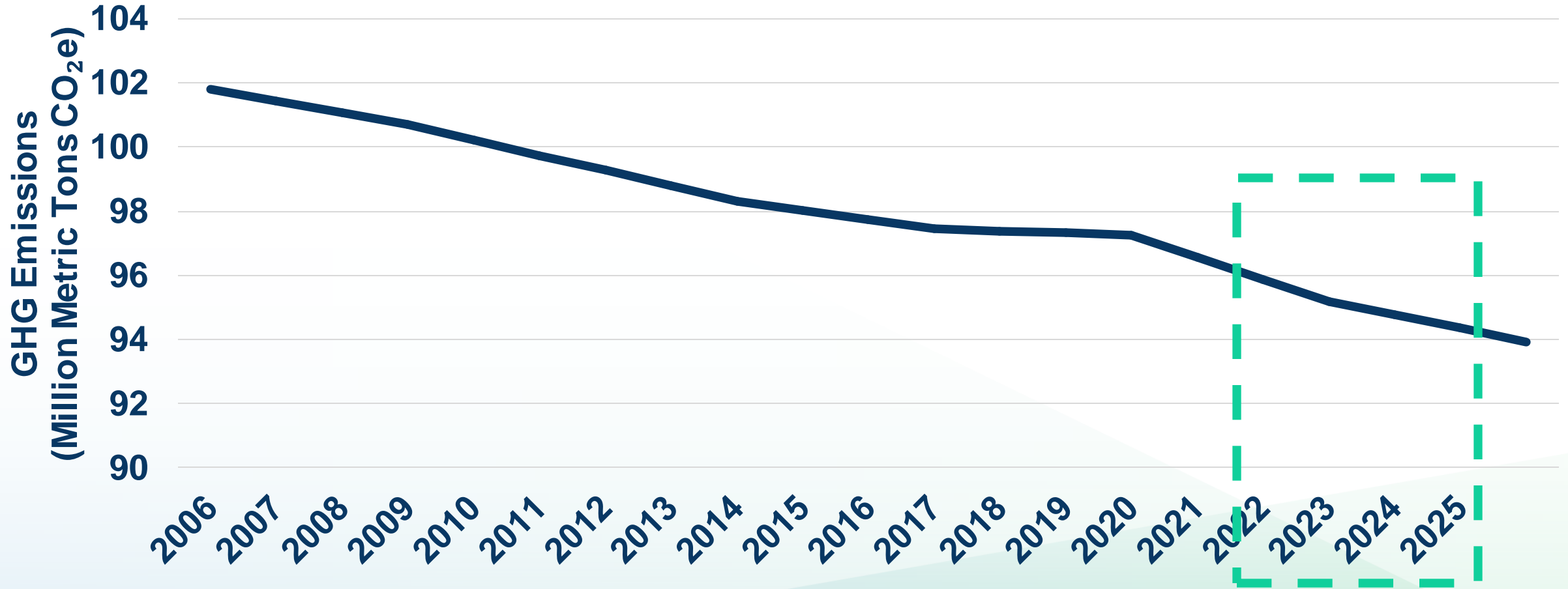
- Increase building energy efficiency cost-effectively
- Contribute to California's greenhouse gas (GHG) reduction goals
- Enable pathways for all-electric buildings
- Reduce residential building impacts on the electricity grid
- Promote demand flexibility and self-utilization of photovoltaic (PV)
- Provide tools for local government reach codes





# Energy Code Environmental Benefit

## Reduced Statewide Emissions



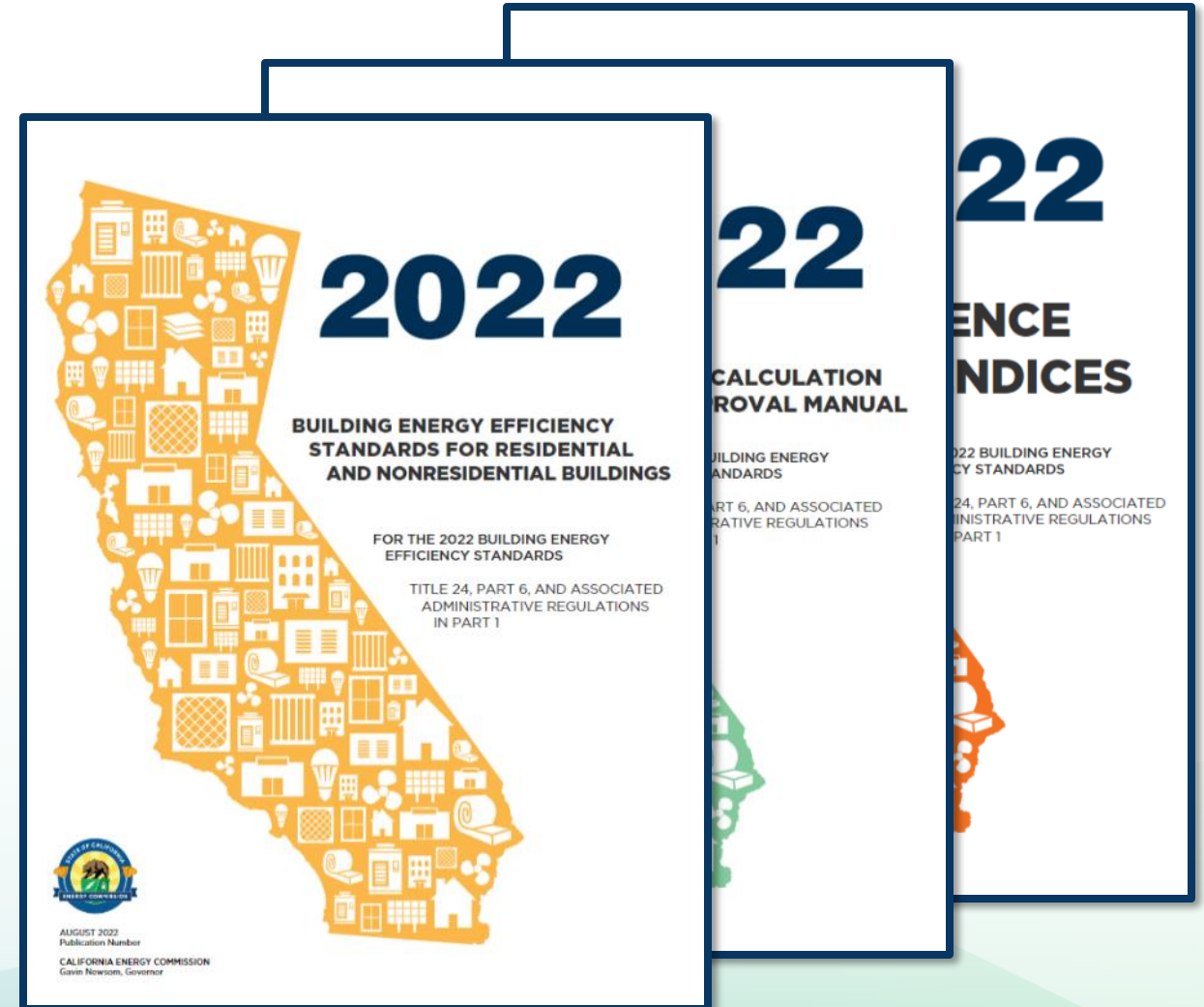
Source: CEC Impact Analysis 2005, 2008, 2013, 2016, 2019, 2022



# 2022 Energy Code

**Effective January 1, 2023**

- Building permit applications submitted on or after Jan 1, 2023
- Must use 2022 tools
  - Software
  - Forms





# 2022 Documents Online

## 2022 Building Energy Efficiency Standards

The Building Energy Efficiency Standards (Energy Code) apply to newly constructed buildings, additions, and alterations. They are a vital pillar of California's climate action plan. The 2022 Energy Code will produce benefits to support the state's public health, climate, and clean energy goals.

The California Energy Commission (CEC) updates the Energy Code every three years. On August 11, 2021, the CEC adopted the 2022 Energy Code. In December, it was approved by the California Building Standards Commission for inclusion into the California Building Standards Code. The 2022 Energy Code encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and more. Buildings whose permit applications are applied for on or after January 1, 2023, must comply with the 2022 Energy Code.

**2022 Energy Code for Residential and Nonresidential Buildings**

[2022 ENERGY CODE >](#)

Expand All

- Supporting Documents – Appendices, Compliance Manuals, and Forms +
- Software – Compliance Software, Manuals, and Tools +

### BUILDING ENERGY EFFICIENCY STANDARDS - TITLE 24

- 2025 Building Energy Efficiency Standards
- 2022 Building Energy Efficiency Standards** ^
  - Workshops, Notices, and Documents
- 2019 Building Energy Efficiency Standards
- 2016 Building Energy Efficiency Standards
- Past Building Energy Efficiency Standards
- Climate Zone tool, maps, and information supporting the California Energy Code
- Online Resource Center
- Solar Assessment Tools

### RELATED LINKS

Workshops, Notices, and Documents

### CONTACT

[Building Energy Efficiency Standards - Title 24](#)


Toll-free in California: 800-772-3300  
Outside California: 916-654-5106

### SUBSCRIBE

Building Energy Efficiency Standards

Email \*

SUBSCRIBE



- Energy Code
- Reference Appendices
- Compliance Manuals
- Software
- Forms

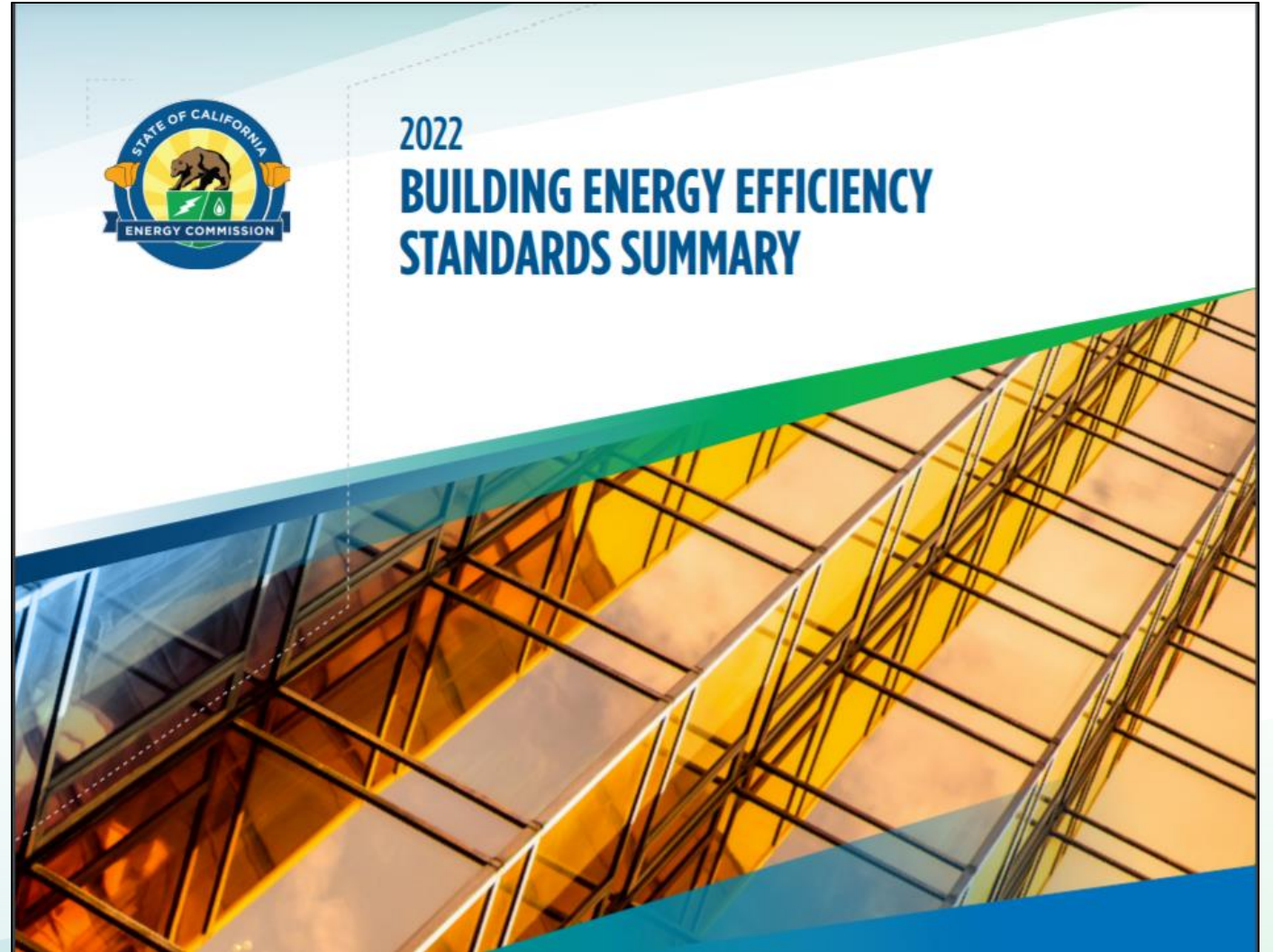






# 2022 Energy Code Highlights

- Heat pump baselines
- Solar and battery storage
- Ventilation requirements
- Lighting
- Multifamily restructuring





# Energy Code Requirements

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## Mandatory requirements

- Minimum efficiency requirements must always be met
- Can never trade off

## Prescriptive requirements

- Predefined efficiency requirements
- May supersede mandatory requirements
- Different requirements for newly constructed buildings, additions, and alterations



# Compliance Approaches

## Prescriptive approach

- Simple approach, no trade-offs
- Defines the standard building design
- 2022 heat pump baselines

## Performance approach

- Most flexible approach, allows for trade-offs
- Must meet all mandatory requirements
- Requires the use of CEC-approved software
- Proposed building design meets or exceed standard building design





# 2022 Performance Metrics

New for 2022

## Source energy performance calculations

- Nonresidential and multifamily
  - Hourly source energy
  - TDV Efficiency
  - TDV Total
    - Efficiency, PV + battery



# Demonstrating Compliance

- **Compliance forms confirm Energy Code is met**
- Completed by responsible party
  - Designers, consultants, builders, contractors, technicians, HERS raters, etc.
- Submitted to enforcement agencies for verification

Updated for 2022

Type of form	Single-family	Multifamily 3 or less habitable stories	Nonresidential Multifamily 4 or more habitable stories
Certificate of compliance	CF1R	LMCC	NRCC
Certificate of installation	CF2R	LMCI	NRCI
Certificate of verification	CF3R	LMCV	NRCV
Certificate of acceptance	-	-	NRCA



# Forms Registration and Certification

All Buildings § 10-103

Updated for 2022

## Multifamily buildings 3 or fewer habitable stories

- When HERS verification is required all LMCC, LMCI, and LMCV forms must be registered with HERS provider data registry

## Multifamily buildings 4 or more habitable stories

- NRCV must be registered with HERS provider when required
- When lighting or mechanical acceptance test is required all NRCC, NRCI, and NRCA forms must be recorded with ATTCP



# 2022 Compliance Software

Performance approach must use approved compliance software versions

- Nonresidential and multifamily
  - CBECC 2022.3.0
  - EnergyPro 9.2
  - IES 2.0



# Mandatory Requirements







# 130.3(a) Sign Lighting Controls

**Sign lighting control requirements** apply to nonresidential and hotel/motel buildings; do not apply to healthcare facilities.

1. **Indoor signs** (except for exit signs) must be controlled by an automatic time-switch control or an astronomical time-switch control.
2. **Outdoor signs:**
  - A. Must be controlled with Automatic time-switch and photosensor, or astronomical time-switch control. Exceptions for tunnels and permanently covered outdoor areas that are lit 24 hours per day, 365 days per year.
  - B. Signs on at night and more than 1 hour during day must have dimmer that can automatically reduce power by  $\geq 65\%$  at night. Exceptions for tunnels and large covered areas illuminated both day and night.



# 130.3(a)3, 110.12 Demand Responsive Electronic Message Center Control

Controls for an **Electronic Message Center (EMC)** with load > 15 kW must:

- Be capable of automatically **reducing lighting power by a minimum of 30%** in response to a demand response signal; and
- Be a certified OpenADR 2.0a or 2.0b Virtual End Node (VEN) or certified as being capable of responding to OpenADR 2.0b VEN.
  - More information is available at the CEC's [Demand Responsive Lighting Control](#) webpage
- **Exception:** EMCs not permitted by health or life safety statute, ordinance, or regulation to be reduced.



# Prescriptive Requirements





# 140.8 Prescriptive Requirements for Signs

Compliance with sign lighting power will be based on wattage allowance or usage of specific light source types:

- **Maximum Allowed Lighting Power (wattage allowance)**
  - Internally illuminated signs: 12 watts/square foot
  - Externally illuminated signs: 2.3 watts/square foot
- **Alternate Lighting Sources**
  - Automatically complies if specific light sources are used
  - Unfiltered LEDs and neon must comply with alternate lighting sources method
- **Exceptions**
  - **Unfiltered incandescent lamps** that are not part of an electronic message center (EMC), an internally illuminated sign, or an externally illuminated sign.
  - **Exit signs** shall meet the requirements of the Appliance Efficiency Regulations.
  - **Traffic signs** shall meet the requirements of the Appliance Efficiency Regulations.

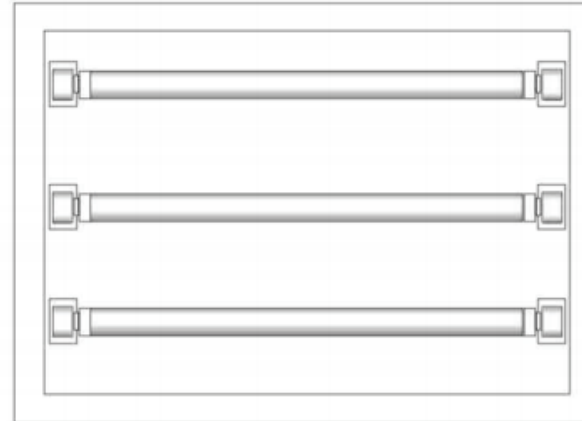
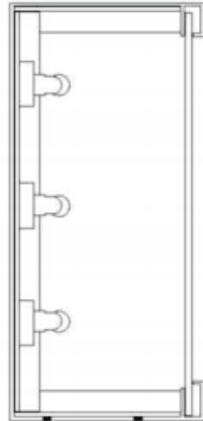


# 140.8(a)1 Maximum Allowed Lighting Power

## Internally illuminated signs

- Allowed lighting power is the product of the illuminated face area and 12 watts/ft<sup>2</sup>
- Double-faced signs use only the area of a single face

**Figure 7-2: Single-faced Internally Illuminated Cabinet Sign with Fluorescent Lamps and Translucent Face**

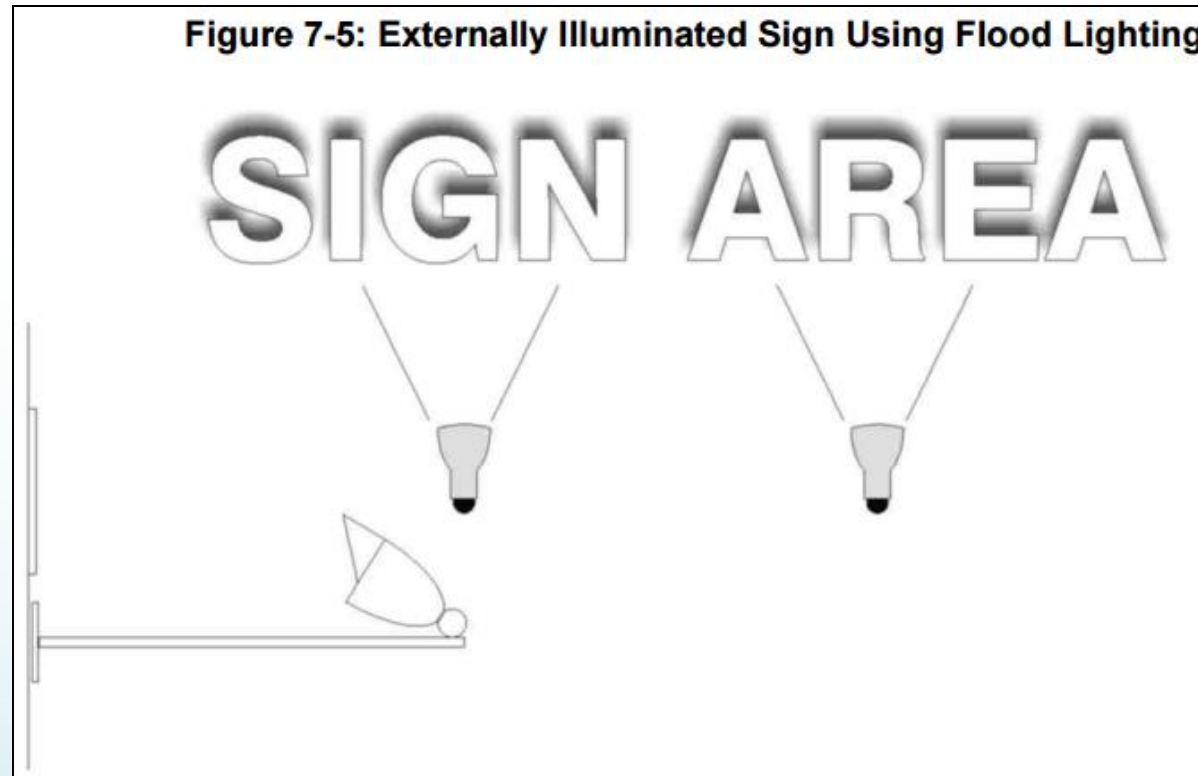




# 140.8(a)2 Maximum Allowed Lighting Power

## Externally illuminated signs

- Allowed lighting power is the product of the illuminated face area and 2.3 watts/ft<sup>2</sup>





# 140.8(b) Alternate Lighting Sources

Light sources will comply if meeting specific efficiency requirements:

- **High pressure sodium**
- **Metal halide (MH)**
  - Pulse start or ceramic MH with ballast efficiency  $\geq 88\%$ ; or
  - Pulse start MH  $\leq 320$  watt with ballast efficiency  $\geq 80\%$  (Not including 175 watt or 250-watt MH lamps)
- **Neon or cold cathode**
  - Rated output current  $< 50$  mA: power supply/transformer efficiency  $\geq 75\%$ ; or
  - Rated output current  $\geq 50$  mA: power supply/transformer efficiency  $\geq 68\%$



# 140.8(b) Alternate Lighting Sources Continued

Light sources will comply if meeting specific efficiency requirements:

- **Fluorescent lighting**
  - Use only lamps with CRI  $\geq 80$ ; or
  - Use electronic ballasts with output frequency  $\geq 20$  kHz
- **LED**
  - Power supply efficiency  $\geq 80\%$
- **Compact Fluorescent**
  - Cannot contain medium screw base socket (E24/E26)





# **Additions and Alterations**





# 141.0(b)2M Alterations to Existing Signs

**Sign lighting alterations** must meet power requirements of 140.8 when:

- Increasing connected lighting load; or
- Replace and rewire > 50% of ballasts; or
- Relocate sign to a different location on the same site or on a different site

## Note

- Replacing ballasts or lamps alone does not trigger requirements
- There are no control requirements for sign lighting alterations
- New signs must meet power and control requirements



# Resources





# Online Resource Center

[www.energy.ca.gov/orc](http://www.energy.ca.gov/orc)



## Handouts

- Fact sheets
- Guides

## Tools

- Checklists
- Blueprint newsletter

## Training

- Presentations
- Videos

## Links

- Internal resources
- External resources



# New Resource Hub

## Homeowners and renters

- Information about water and space heating, cooking, EV charging, incentives

## Contractors

- Information about training, tools, incentives

## Local government representatives

- Information about model policies, permitting, training, incentives

Links on the [Building and Home Energy Resource Hub](#)





# ATTCP Program - Lighting

## ATTCP Program information

### Lighting Controls

- National Lighting Contractors Association of America (NLCAA)
- California Advanced Lighting Controls Training Program (CALCTP)



National Lighting Contractors  
Association of America



California Advanced Lighting  
Controls Training Program



# Blueprint Newsletter

## Energy Code quarterly newsletter

- Updates
- Clarifications
- Frequently asked questions



Issue 138
April - June 2022

# BLUEPRINT

CALIFORNIA ENERGY COMMISSION  
EFFICIENCY DIVISION

### IN THIS ISSUE

- 2022 Energy Code: Multifamily Summary
- 2022 Energy Code: Compliance Software
- 2019 Energy Code: HERS Verifications
- Q&A
  - Solar PV for Multifamily Buildings
  - Multifamily Water Heating
  - Multifamily Common Use Areas

For additional help with the Energy Code see Energy Code Ace's **online offerings** of trainings, tools, and resources.

### 2022 Energy Code: Multifamily Summary

The 2022 Building Energy Efficiency Standards (Energy Code) reorganizes low-rise (three or fewer habitable stories) and high-rise (four or more habitable stories) multifamily buildings into one building type, updates the multifamily buildings definition in § 100.1, and moves all requirements for multifamily buildings to §§ 160.0-180.4. This and other significant changes include:

*Mandatory Requirements*

- Updates minimum efficiencies for HVAC equipment; adds minimum efficiency requirements for dedicated outdoor air systems (DOAS), heat pump, and heat recovery chiller packages. § 110.2
- Changes demand responsive lighting controls trigger to 4,000 watts or more; adds requirements for controlled receptacles. §§ 110.12, 160.5(b)4E

- Unifies envelope insulation, vapor retarder, and fenestration requirements. § 160.1
- For dwelling units
  - Adds requirements for central fan integrated ventilation systems requiring a motorized controlled damper, damper controls, and variable ventilation. § 160.2(b)2Aii
  - Requires vented kitchen range hoods ventilation rates or capture efficiencies based on conditioned floor area and fuel type per Tables 160.2-E, F, G. § 160.2(b)2Avic2
  - Requires a HERS-verified maximum fan efficacy of 1.0 Watts per cfm for heat recovery ventilation (HRV) and energy recovery ventilation (ERV) systems. § 160.2(b)2Biii
  - Adds mechanical acceptance testing requirements. § 160.3(d)2
  - Adds electric-ready requirements when gas equipment is installed for space heating, cooking, and clothes dryers. § 160.9(a-c)

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# Stay Connected

## Receive Energy Code updates

- [Subscribe to Efficiency Division emails](#)
  - Appliances
  - Blueprint
  - Building Standards
- Respond to confirmation email

## Follow the California Energy Commission







# Energy Code Hotline



Monday through Friday

- 8:00 a.m. to 12:00 p.m.
- 1:00 p.m. to 4:30 p.m.

Call

- 800-772-3300 in CA
- 916-654-5106 outside CA

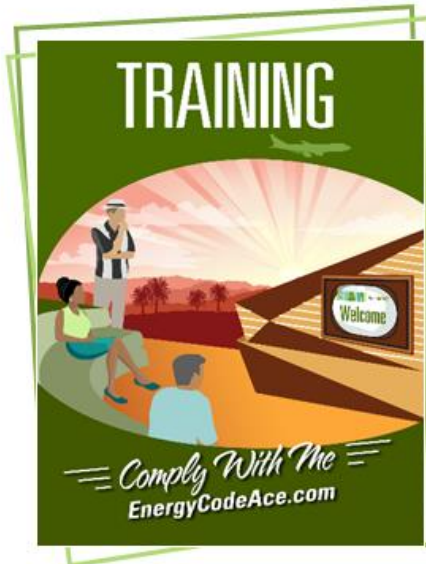
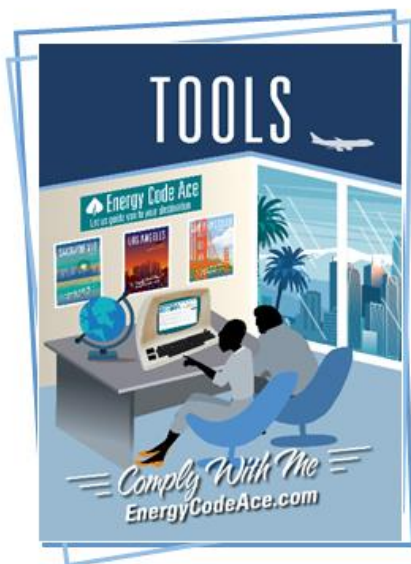


Email

- [Title24@energy.ca.gov](mailto:Title24@energy.ca.gov)



# Energy Code Ace



- Tools help automate tasks:**
- ✦ Energy Code Product Finder
  - ✦ Forms Ace
  - ✦ Image Ace
  - ✦ Navigator Ace
  - ✦ Nonres. Indoor Lighting Wheel
  - ✦ Q&Ace
  - ✦ Reference Ace
  - ✦ Timeline Ace
  - ✦ Virtual Compliance Assistant

- Training is activity based and delivered in a variety of formats:**
- ✦ Live Online instructor-led
  - ✦ Recorded webinars
  - ✦ Online self-study
  - ✦ YouTube — live streaming & videos

- Resources provide quick, useful guidance:**
- ✦ Fact Sheets
  - ✦ Checklists
  - ✦ Application Guides
  - ✦ Submit a Question
  - ✦ Trigger Sheets
  - ✦ Useful Links

Join us at [EnergyCodeAce.com](http://EnergyCodeAce.com)



# 3C-REN

The image shows a screenshot of the 3C-REN website. At the top left is the 3C-REN logo. To its right is a navigation menu with four items: "ABOUT 3C-REN", "HOME ENERGY SAVINGS", "BUILDING PERFORMANCE TRAINING", and "ENERGY CODE CONNECT", each with a dropdown arrow. A search icon is located to the right of the menu. Below the navigation is a large banner image of a mountain range. Overlaid on the bottom of the banner is the text: "3C-REN (Tri-County Regional Energy Network) reduces energy use in our region's buildings for a more affordable, healthy, resilient and sustainable community." Below the banner are three columns of content. The first column is titled "HOME ENERGY SAVINGS" with a house icon and the text "Save energy and improve your property" and a "Start Saving Today!" button. The second column is titled "BUILDING PERFORMANCE TRAINING" with a person at a computer icon and the text "Develop your skills in building performance" and a "Find a Course" button. The third column is titled "ENERGY CODE CONNECT" with a house and document icon and the text "Personalized coaching and educational events to simplify the energy code" and a "Submit Your Inquiry" button.

**3C-REN**

[ABOUT 3C-REN](#) [HOME ENERGY SAVINGS](#) [BUILDING PERFORMANCE TRAINING](#) [ENERGY CODE CONNECT](#)

**3C-REN (Tri-County Regional Energy Network) reduces energy use in our region's buildings for a more affordable, healthy, resilient and sustainable community.**

**HOME ENERGY SAVINGS**  
Save energy and improve your property  
[Start Saving Today!](#)

**BUILDING PERFORMANCE TRAINING**  
Develop your skills in building performance  
[Find a Course](#)

**ENERGY CODE CONNECT**  
Personalized coaching and educational events to simplify the energy code  
[Submit Your Inquiry](#)



# BayREN

A screenshot of the BayREN website homepage. The page features a green navigation bar with links: "» HOW TO GET STARTED", "» FIND A CONTRACTOR", "» FIND AN ASSESSOR", and "» PARTNER WITH US". A search bar is located in the top right corner. The main content area shows a large image of a park with a playground and people sitting at tables. A dark purple circular overlay on the right contains the text "Score big with smart energy upgrades." and "Upgrade your multifamily building and earn cash back — starting at \$750/unit." with a "Learn More" button. The left sidebar contains navigation links: "REBATES & FINANCING", "HOME LEARNING CENTER", "EVENTS & TRAINING", "LOCAL GOVERNMENT RESOURCES", and "ABOUT". Social media icons for Facebook, LinkedIn, Twitter, Instagram, and YouTube are at the bottom left.

**BAYREN**  
Local Governments Empowering Our Communities

» HOW TO GET STARTED » FIND A CONTRACTOR » FIND AN ASSESSOR » PARTNER WITH US

Search

REBATES & FINANCING

HOME LEARNING CENTER

EVENTS & TRAINING

LOCAL GOVERNMENT RESOURCES

ABOUT

f in t i y

**Score big with smart energy upgrades.**

Upgrade your multifamily building and earn cash back — starting at \$750/unit.

Learn More



# Inland Regional Energy Network (I-REN)



**iren.gov**  
**info@iren.gov**

## Codes and Standards

### Training and Education Program

- Free ICC-approved training sessions for 2022 Energy Code (Title 24, Part 6) requirements → [www.iren.gov/161/CS-Trainings](http://www.iren.gov/161/CS-Trainings)
- Requested training courses can also be scheduled

### C&S Technical Support Program

Request Free Technical Assistance from Local Code Experts—Reach Code Development, Permit Guides, Etc. → [www.iren.gov/162/CS-Technical-Support](http://www.iren.gov/162/CS-Technical-Support)

### Ask a Code Mentor an Energy Code Question

Submit queries online and receive a personalized response addressed by energy code experts within two business days! → [www.iren.gov/162/CS-Technical-Support](http://www.iren.gov/162/CS-Technical-Support)



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San Bernardino Council of Governments (SBCOG)  
Western Riverside Council of Governments (WRCOG)

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**Thank you**