



# 2022 Energy Code

## Nonresidential Electrical Power Distribution (EPD) Requirements

California Energy Commission

March 2024



# Agenda

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- 2022 Energy Code basics
- Nonresidential requirements
  - Mandatory
  - 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)

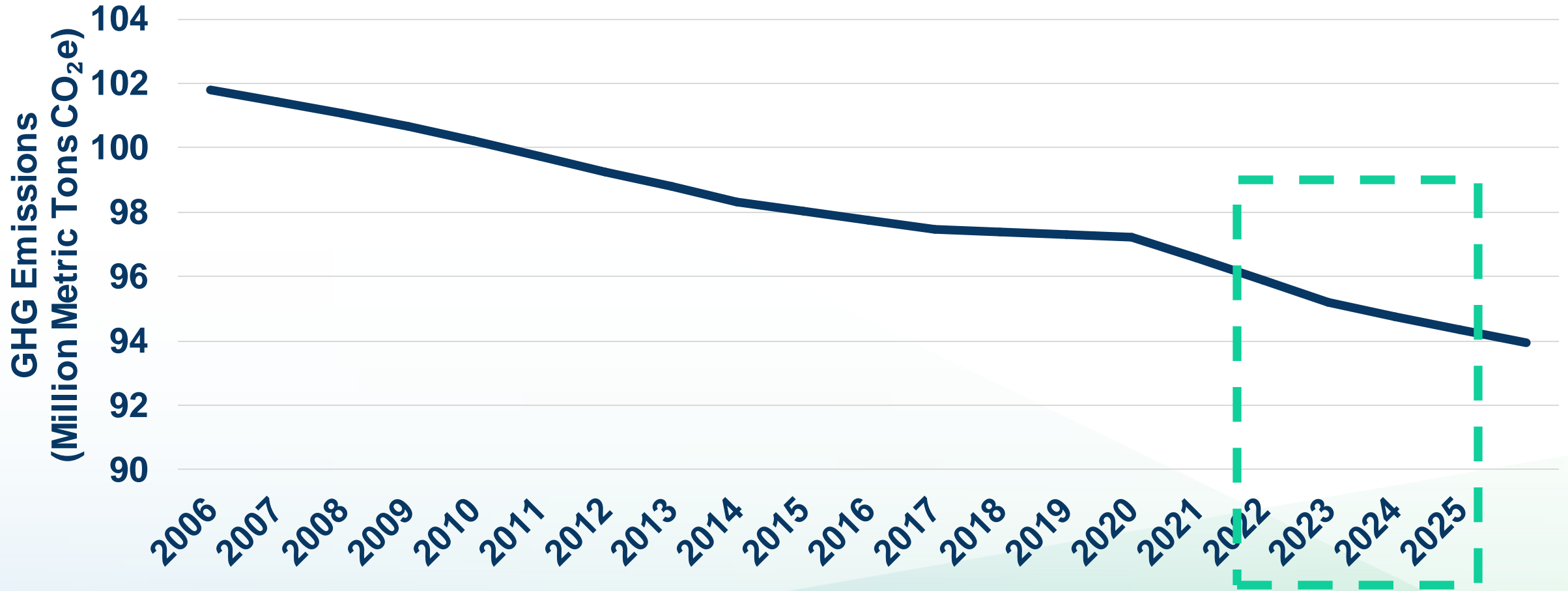
Provide tools for local government reach codes





# Energy Code Environmental Benefit

## Reduced Statewide Emissions



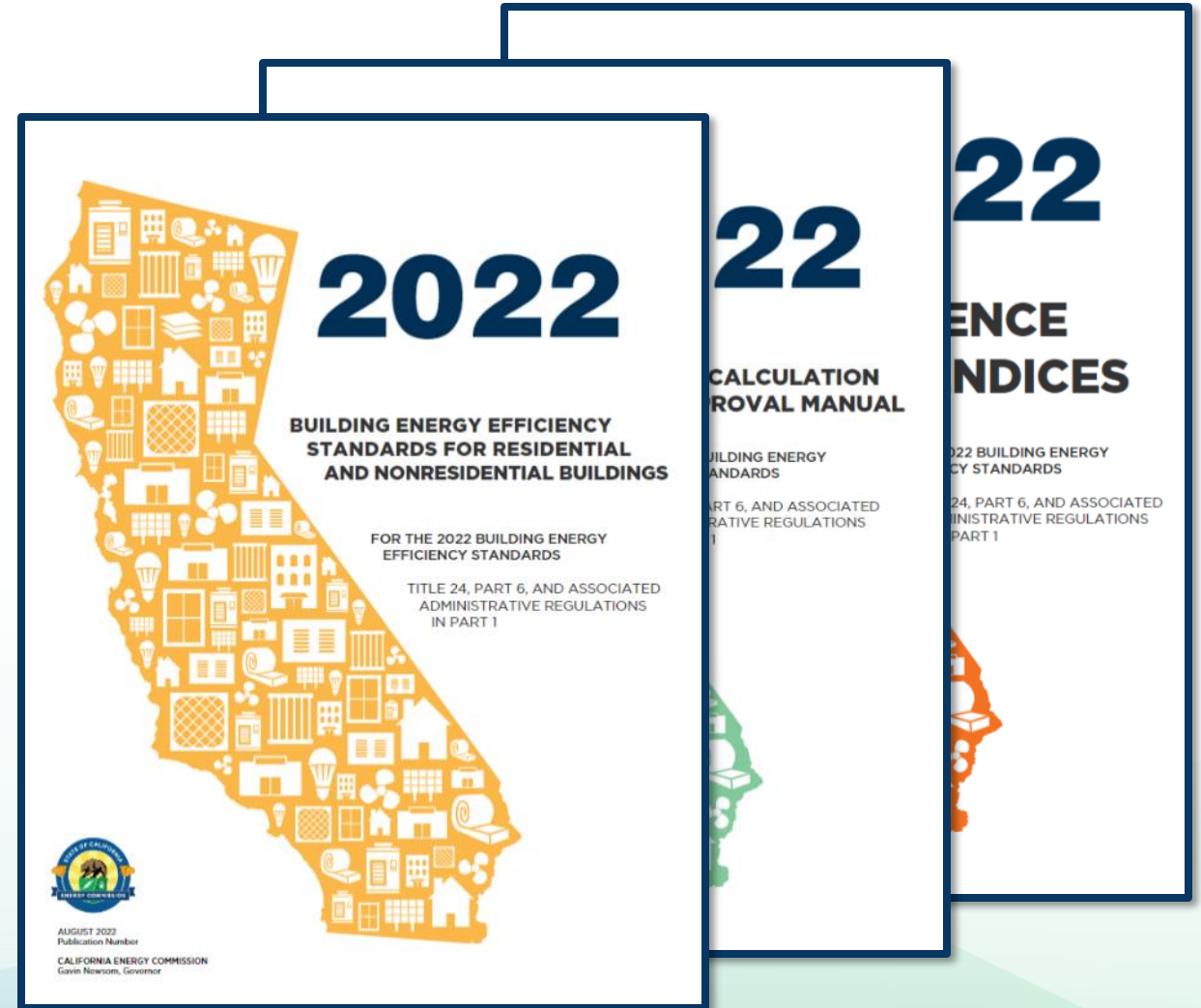
Source: CEC Impact Analysis 2005, 2008, 2013, 2016, 2019, 2022



# 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

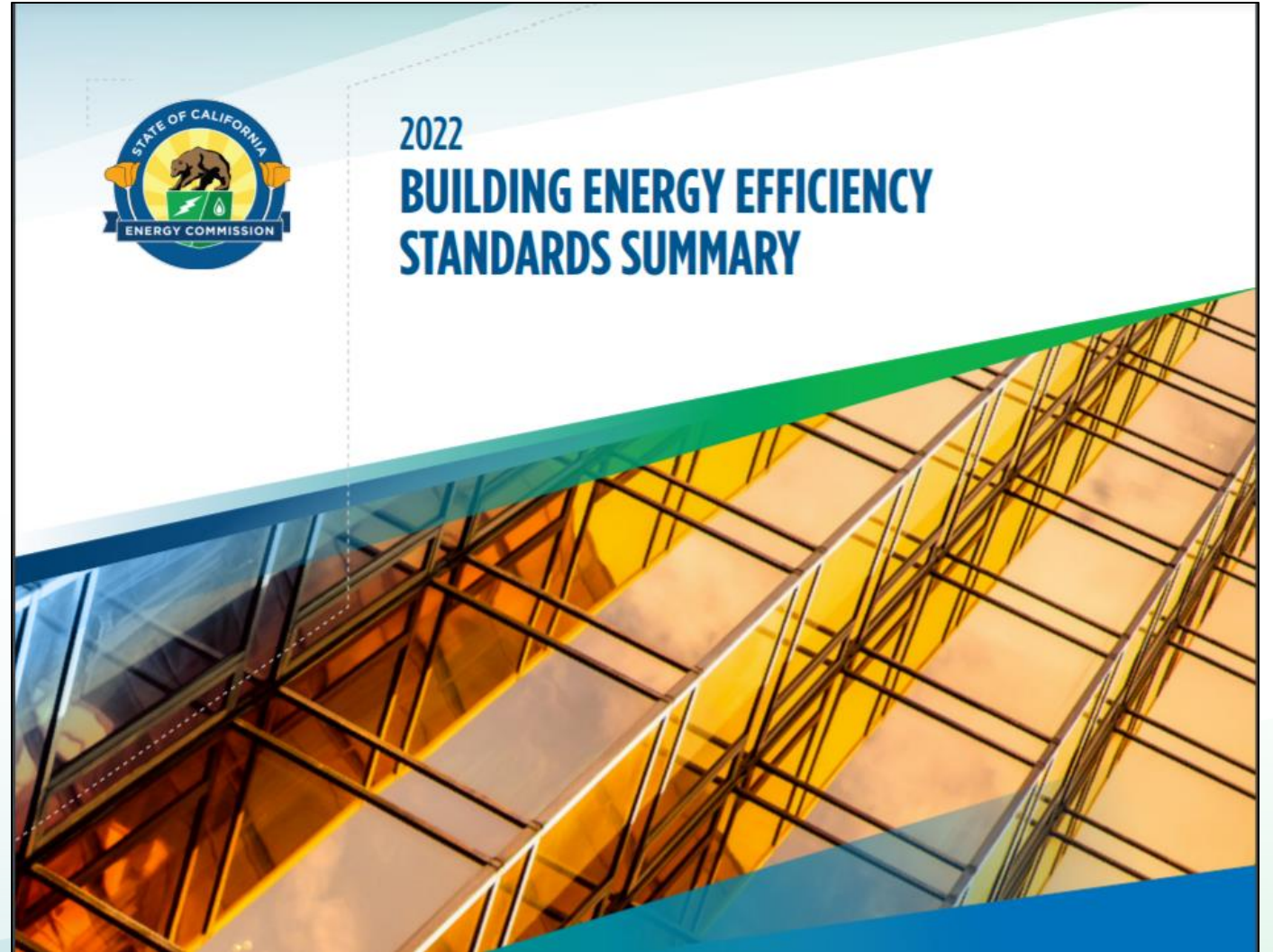






# 2022 Energy Code Highlights

- 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

Updated for 2022

- Completed by responsible party
  - Designers, consultants, builders, contractors, technicians, HERS raters, etc.
- Submitted to enforcement agencies for verification

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

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Performance approach must use approved compliance software versions

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



# **Mandatory Requirements (Incl. Additions and Alterations)**





# 110.11 Low-Voltage Dry-type Distribution Transformers

## Low-voltage dry-type distribution transformers:

- Must be certified by the manufacturer as required by the Title 20 Appliance Efficiency Regulations
- Must be listed in the Modernized Appliance Efficiency Database System

## Low-voltage dry-type distribution transformer is a distribution transformer that:

- Has an input voltage of 600 volts or less; and
- Is air-cooled; and
- Does not use oil as a coolant

CA .GOV CALIFORNIA ENERGY COMMISSION

SEARCH

Help | Back To Login

### Advanced Search

The Advanced Search allows you to create a narrower search by selecting unique model criteria. You will be guided to select the category, type, then narrow your search results with additional filters. In this search you can select the fields displayed in the results by checking the "Select All" box. There are also additional filters that can be applied to look up specific model information.

To search historical models, please set the appliance status to archived.

Questions can be directed to [Appliances@energy.ca.gov](mailto:Appliances@energy.ca.gov) or to the Appliances Hotline, toll free at (888) 838-1467 or outside California (916) 651-7100. Search instructions are also available.

**Select Appliance Type**

Select Category: Transformer Products | Select Appliance: Transformers | Select Appliance Status: Approved

**Select Fields to Display**

Select/Deselect All

Manufacturer  Brand  Model Number  Transformer Type

Phase  KVA  Output Power  Total Loss Power

Nameplate Efficiency  Efficiency Std  Nameplate Efficiency 2  Efficiency 2 Std

Nameplate Efficiency 3  Efficiency 3 Std  Regulatory Status  Add Date

Reference Number

**Filters**

Please Select | Please Select | Please Select | Please Select | Please Select

Search Clear



# 110.11 Low-Voltage Dry-type Distribution Transformers Cont.

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## Exceptions:

- Autotransformer, drive transformer, grounding transformer
- Machine tool transformer, non-ventilated transformer
- Rectifier transformer, regulating transformer
- Sealed transformer, special-impedance transformer
- Testing transformer, transformer with tap range of 20 percent or more
- Uninterruptible power supply transformer
- Welding transformer



# 130.5(a) Service Electrical Metering

Each electrical service or feeder must have a permanently installed metering system which measures electrical energy per Table 130.5-A

- Utility meter satisfies the metering requirement (show instantaneous kW, kWh over utility defined period)
- If a utility meter is not installed, meter capability is dependent on kVA of the service
- Exception: EPDS subject to California Electrical Code Article 517

TABLE 130.5-A MINIMUM REQUIREMENTS FOR METERING OF ELECTRICAL LOAD

Metering Functionality	Electrical Services rated 50 kVA or less	Electrical Services rated more than 50kVA and less than or equal to 250 kVA	Electrical Services rated more than 250 kVA and less than or equal to 1000kVA	Electrical Services rated more than 1000kVA
Instantaneous (at the time) kW demand	Required	Required	Required	Required
Historical peak demand (kW)	Not required	Not required	Required	Required
Tracking kWh for a user-definable period.	Required	Required	Required	Required
kWh per rate period	Not required	Not required	Not required	Required





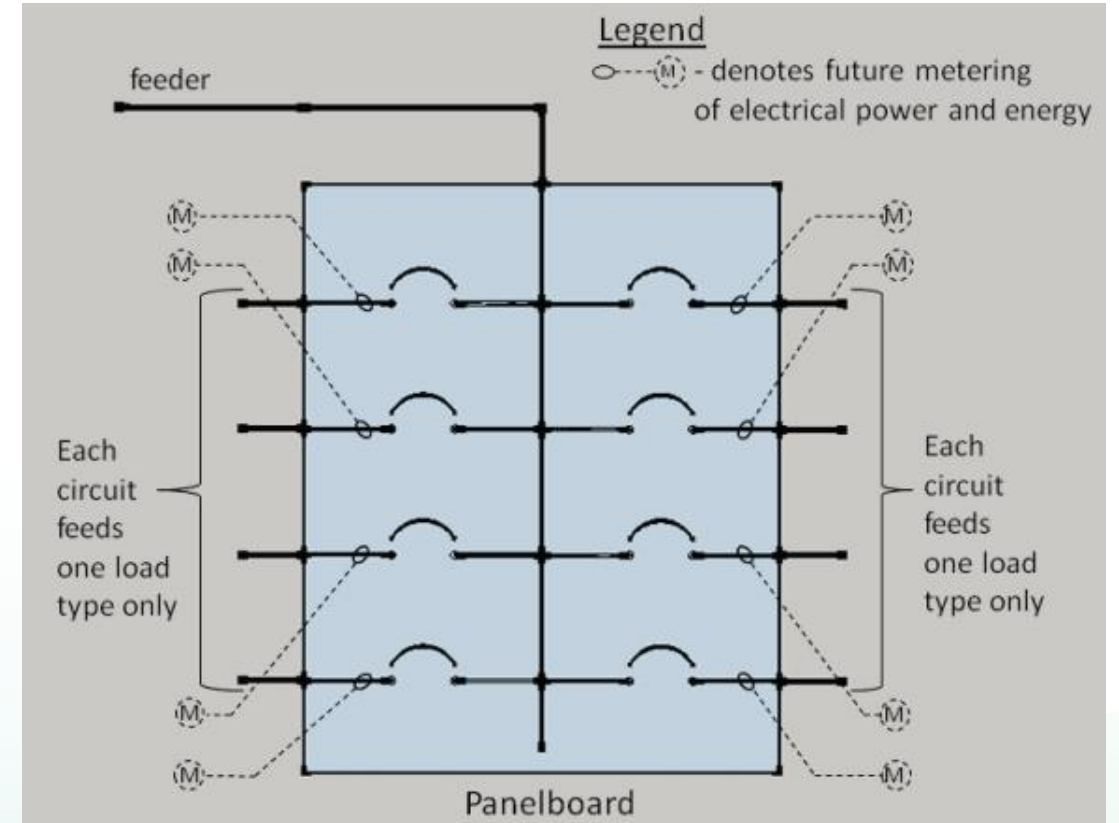
# 130.5(b), 141.0(b)2P Separation of Electrical Circuits

## Newly constructed buildings

- EPDS designed to allow for measuring loads according to TABLE 130.5-B
- Allows flexible approaches for providing measuring ability

## Alterations

- Only applicable for complete replacements of power distribution systems
- Most projects will not fall under this trigger
- **Exceptions:**
  - For each load type, up to 10% of connected load may be of any type
  - EPDS subject to California Electrical Code Article 517





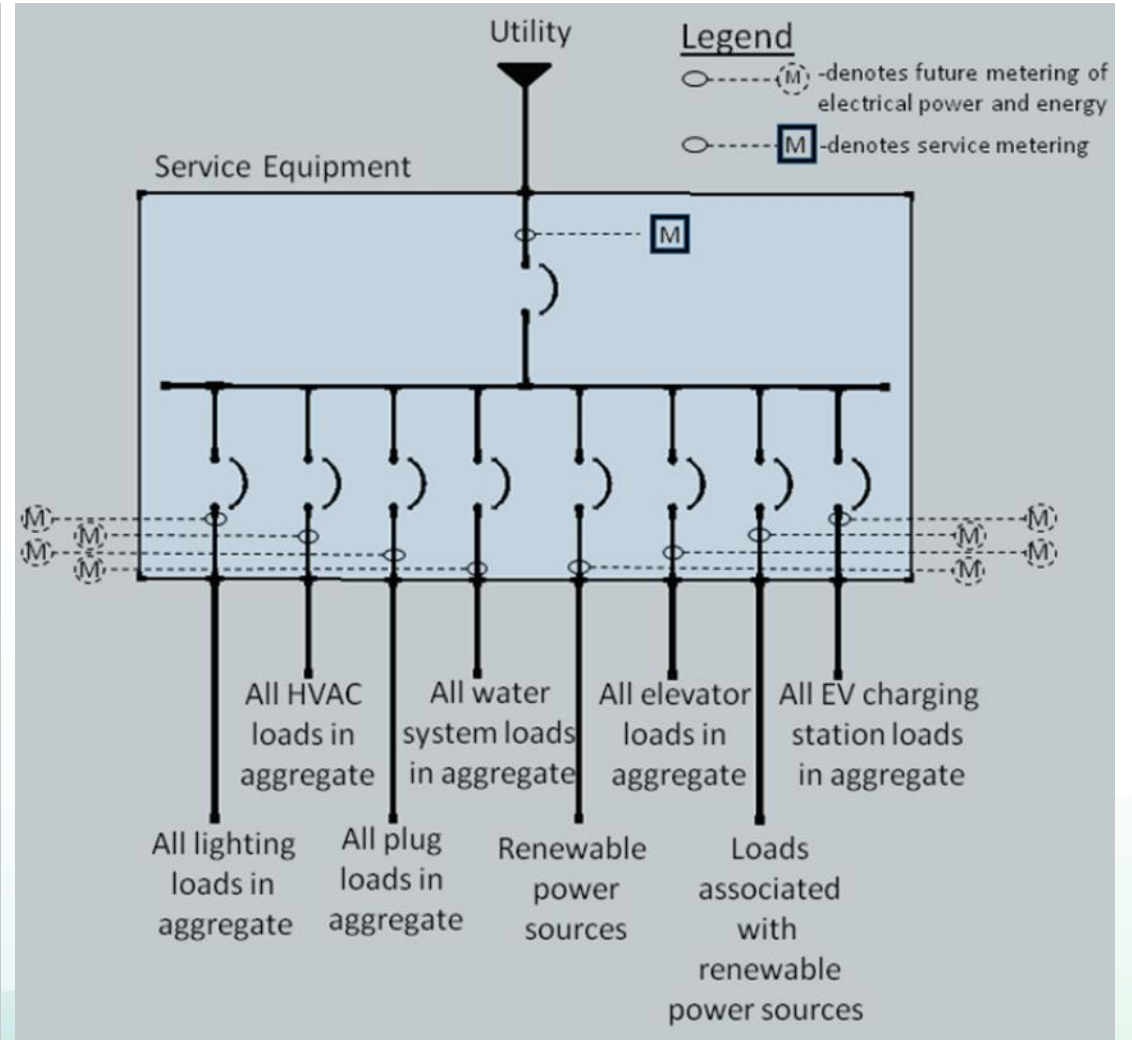
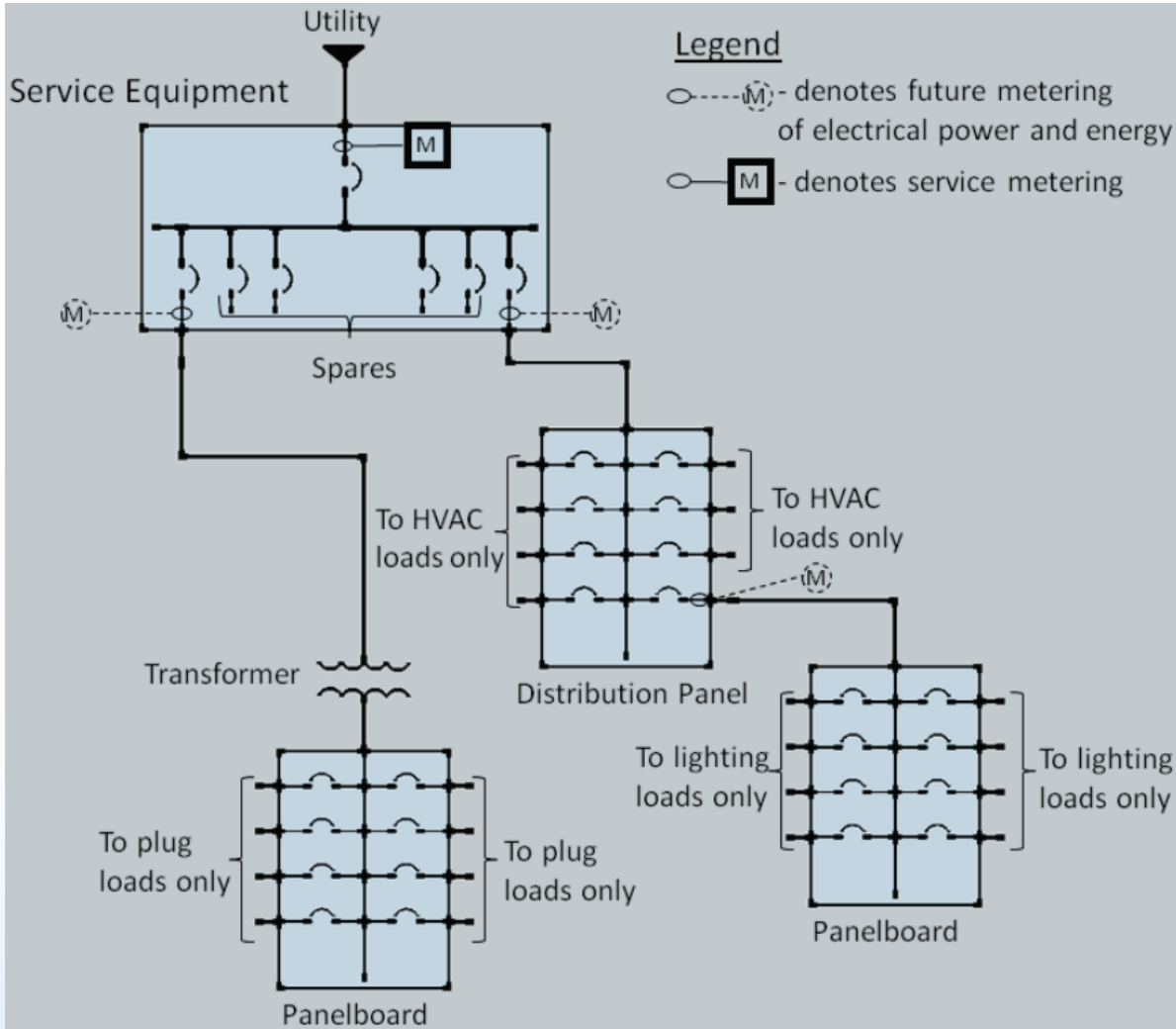
# TABLE 130.5-B

TABLE 130.5-B MINIMUM REQUIREMENTS FOR SEPARATION OF ELECTRICAL LOAD

Electrical Load Type	Electrical Services rated 50 kVA or less	Electrical Services rated more than 50kVA and less than or equal to 250 kVA	Electrical Services rated more than 250 kVA and less than or equal to 1000kVA	Electrical Services rated more than 1000kVA
Lighting including exit and egress lighting and exterior lighting	Not required	All lighting in aggregate	All lighting disaggregated by floor, type or area	All lighting disaggregated by floor, type or area
HVAC systems and components including chillers, fans, heaters, furnaces, package units, cooling towers, and circulation pumps associated with HVAC	Not required	All HVAC in aggregate	All HVAC in aggregate and each HVAC load rated at least 50 kVA	All HVAC in aggregate and each HVAC load rated at least 50kVA
Domestic and service water system pumps and related systems and components	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Plug load including appliances rated less than 25 kVA	Not required	All plug load in aggregate Groups of plug loads exceeding 25 kVA connected load in an area less than 5000 sf	All plug load separated by floor, type or area Groups of plug loads exceeding 25 kVA connected load in an area less than 5000 sf	All plug load separated by floor, type or area All groups of plug loads exceeding 25 kVA connected load in an area less than 5000 sf
Elevators, escalators, moving walks, and transit systems	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Other individual non-HVAC loads or appliances rated 25kVA or greater	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Industrial and commercial load centers 25 kVA or greater including theatrical lighting installations and commercial kitchens	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Renewable power source (net or total)	Each group	Each group	Each group	Each group
Loads associated with renewable power source	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Charging stations for electric vehicles	All loads in aggregate	All loads in aggregate	All loads in aggregate	All loads in aggregate



# 130.5(b) Separation of Electrical Circuits





# 130.5(c), 141.0(b)2P Voltage Drop

**Combined** voltage drop of feeder conductors and branch circuits must **not exceed 5%**

## Alterations

- Applicable when both feeders and branch circuits are added or replaced
- **Exception:** voltage drop permitted by CA Electrical Code Sections 647.4, 695.6, and 695.7



# 130.5(d), 141.0(b)2P Controlled Receptacles

## Controlled receptacles are required in:

- Office areas
- Lobbies
- Conference rooms
- Kitchen areas in office spaces
- Copy rooms
- Hotel and motel guest rooms

## Requirements for controlled receptacles:

- Automatic time-switch controls (plus 2-hour override) or motion control
- Controlled receptacle must be marked
- At least one controlled receptacle or split wired receptacle within 6 feet of uncontrolled receptacle







# 130.5(d), 141.0(b)2P Controlled Receptacles Continued

## Hotel/Motel Guest rooms

- At least 50% of receptacles must be controlled
- Captive card key or occupancy sensing controls
- Shut-off after 30 minutes of vacancy

## Alterations

- Only applicable for complete replacements of power distribution systems
- Most alteration projects will not need to meet controlled receptacle requirements

## •Exceptions:

- Receptacles specifically for refrigerators and water dispensers in kitchen areas
- Receptacles located a minimum of six feet above the floor that are specifically for clocks
- Receptacles for network copiers, fax machine, A/V and data equipment other than personal computers in copy rooms



# 130.5(e), 141.0(b)2P Demand Responsive Controls and Equipment

See §110.12 for requirements for demand responsive controls and equipment, including demand responsive controls for controlled receptacles.

(a).Demand responsive controls shall be:

1.All demand responsive controls shall be:

A. Certified OpenADR 2.0a or OpenADR 2.0b Virtual End Node under Clause 11, Conformance, in the applicable OpenADR 2.0 or:

B. Certified by the manufacturer capable of responding to demand response signal from a certified OpenADR 2.0b Virtual End Node.

(e).Demand Responsive Controlled Receptacles where controlled receptacles shall be capable of automatically turning off all loads connected to the receptacle from a response to a demand signal.



# 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](#)





# 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



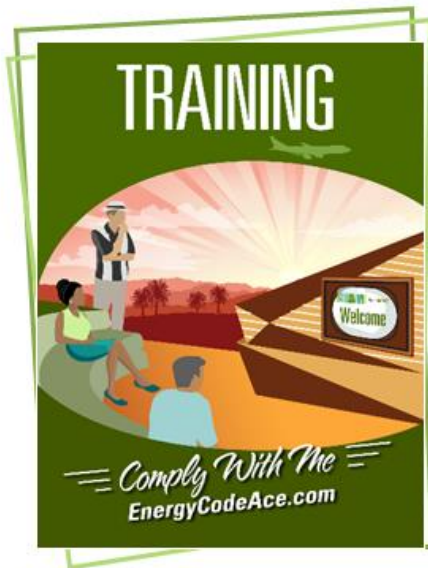
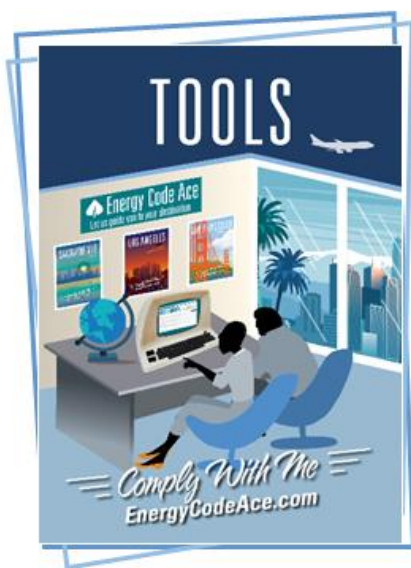
Email

- [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". 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" and includes the subtext "Save energy and improve your property" and a "Start Saving Today!" button. The second column is titled "BUILDING PERFORMANCE TRAINING" and includes the subtext "Develop your skills in building performance" and a "Find a Course" button. The third column is titled "ENERGY CODE CONNECT" and includes the subtext "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

The screenshot displays the BayREN website interface. At the top left is the BayREN logo with the tagline "Local Governments Empowering Our Communities". A green navigation bar contains the following links: >> HOW TO GET STARTED >> FIND A CONTRACTOR >> FIND AN ASSESSOR >> PARTNER WITH US. A search bar is located in the top right corner. A vertical menu on the left side lists: REBATES & FINANCING, HOME LEARNING CENTER, EVENTS & TRAINING, LOCAL GOVERNMENT RESOURCES, and ABOUT. Below the menu are social media icons for Facebook, LinkedIn, Twitter, Instagram, and YouTube. The main content area features a large image of a park with a playground and people sitting at tables. Overlaid on the right side of this image is a dark purple circular callout containing the text: "Score big with smart energy upgrades." and "Upgrade your multifamily building and earn cash back — starting at \$750/unit." Below this text is a yellow "Learn More" button. A small icon of stacked coins with a dollar sign is positioned above the callout. At the bottom right of the main image are left and right navigation arrows.



# 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**