

# 2022 Energy Code

## Multifamily Significant Changes



California Energy Commission  
April 2023



# Agenda

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- 2022 Energy Code basics
- Navigating the 2022 Energy Code
- All buildings significant changes
- Multifamily significant changes
  - Mandatory
  - Prescriptive
  - Additions and alterations
- Resources



# Energy 2022 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.



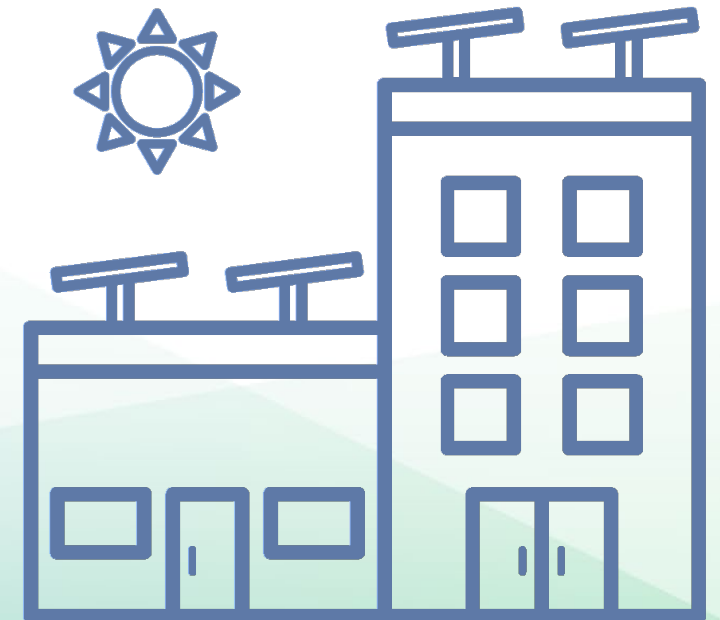
CALIFORNIA  
ENERGY COMMISSION  
Gavin Newsom, Governor

2020 EDITION  
JANUARY 2020  
CEC-140-2020-001



# 2022 Energy Code Goals

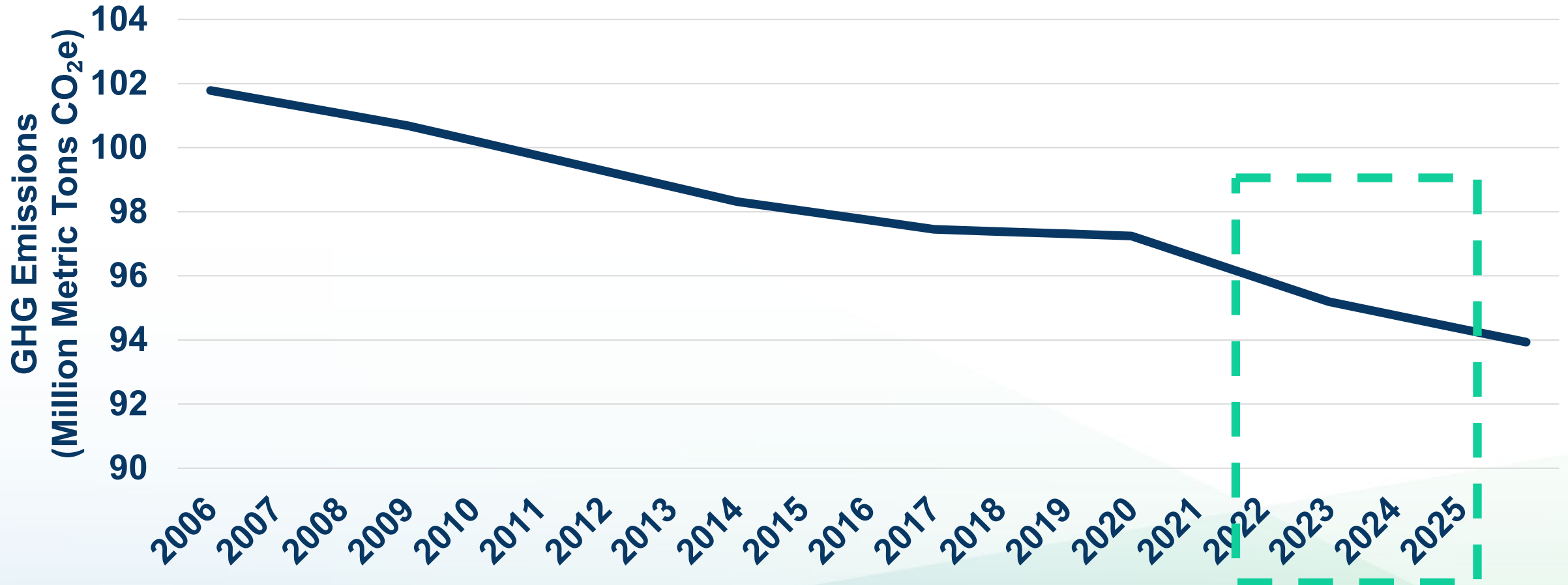
- Increase building energy efficiency cost-effectively
- Contribute to California's GHG reduction goals
- Enable pathways for all-electric buildings
- Reduce residential building impacts on electricity grid
- Promote demand flexibility and self-utilization of PV
- Provide tools for local government reach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





# Energy Code Environmental Benefit

## Reduced Statewide Emissions



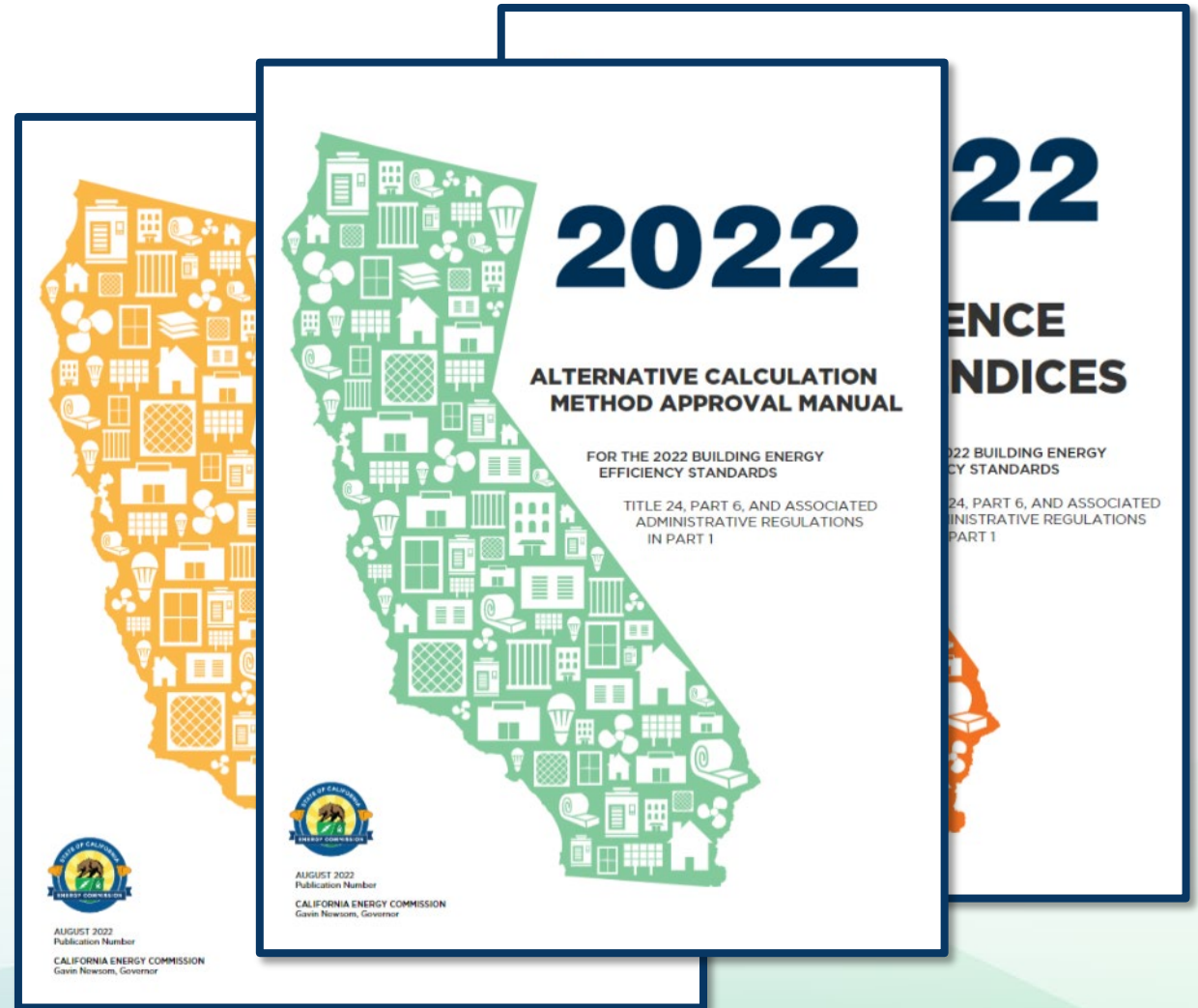
Source: CEC Impact Analysis 2005, 2008, 2013, 2016, 2019, 2022



# 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

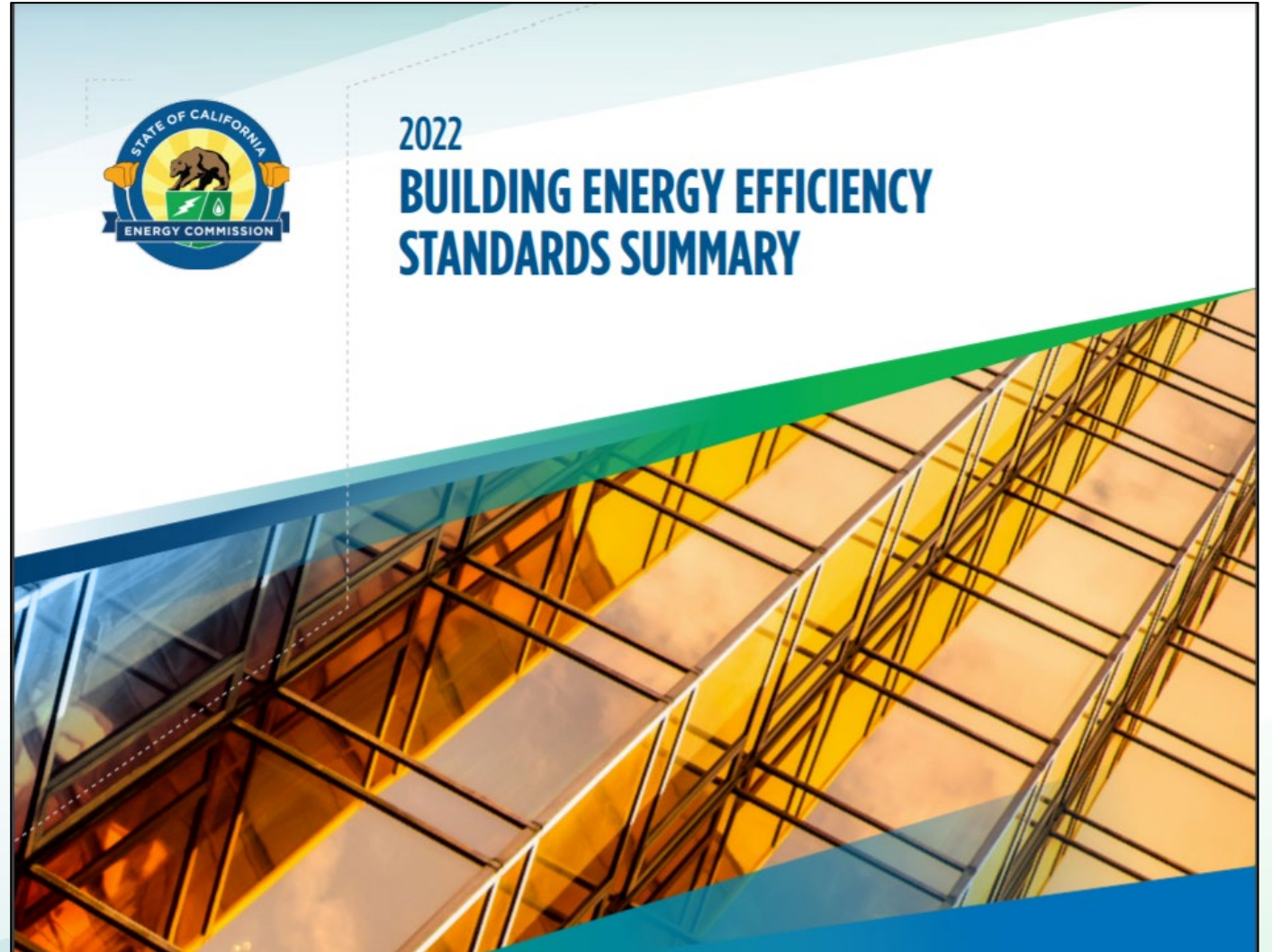
- Energy Code
- Reference Appendices
- Compliance Manuals
- Software
- Forms





# 2022 Energy Code Highlights

- Heat pump baselines
- Solar and battery storage
- Ventilation requirements
- Lighting LED baselines
- 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 standard building design
- New heat pump baselines

## Performance approach

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





# 2022 Performance Metrics

New for 2022

## Energy performance calculations

- 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



# 2022 Compliance Software

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Performance approach must use approved compliance software versions

- Nonresidential and multifamily
  - CBECC 2022.2.1
  - EnergyPro 9.1
  - IES 1.0

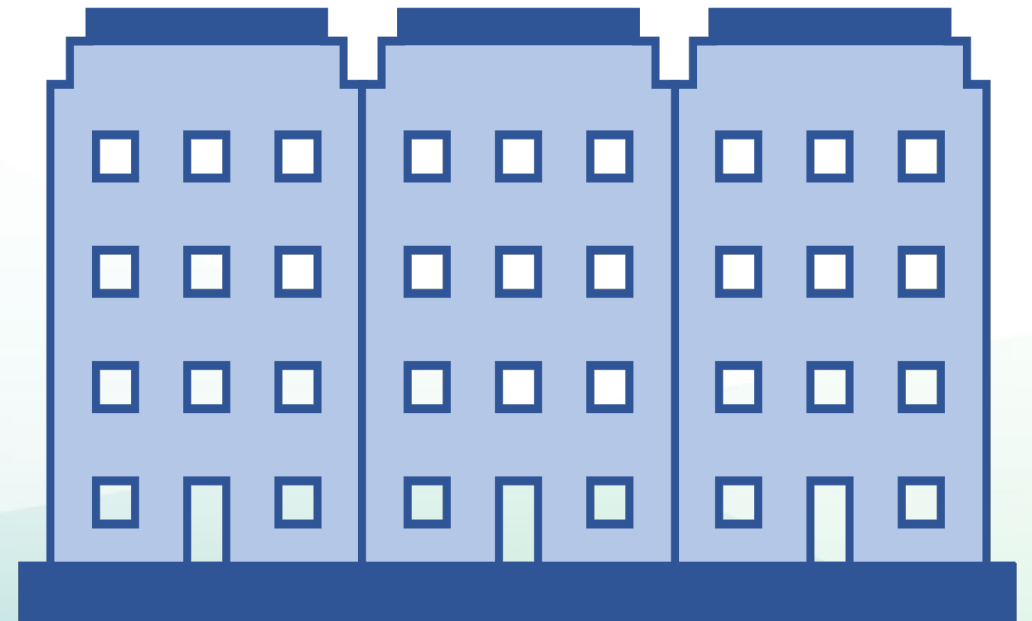


# Multifamily Defined

## All Buildings § 100.1

### Multifamily building

- Occupancy group R-2
  - Not hotel/motel building or timeshare property
- Occupancy group R-3 non-transient congregate residence
  - Not boarding houses of more than 6 guests
  - Not alcohol or drug abuse recovery homes of more than 6 guests
- Occupancy group R-4





# **Navigating the 2022 Energy Code**





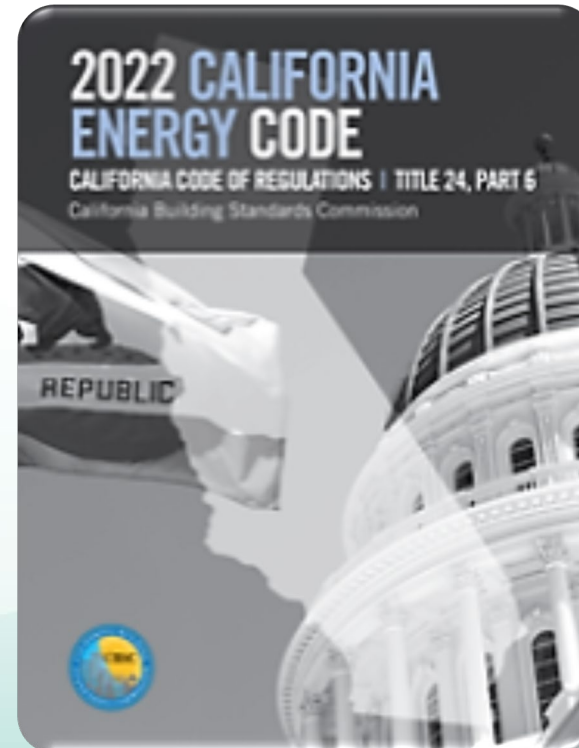
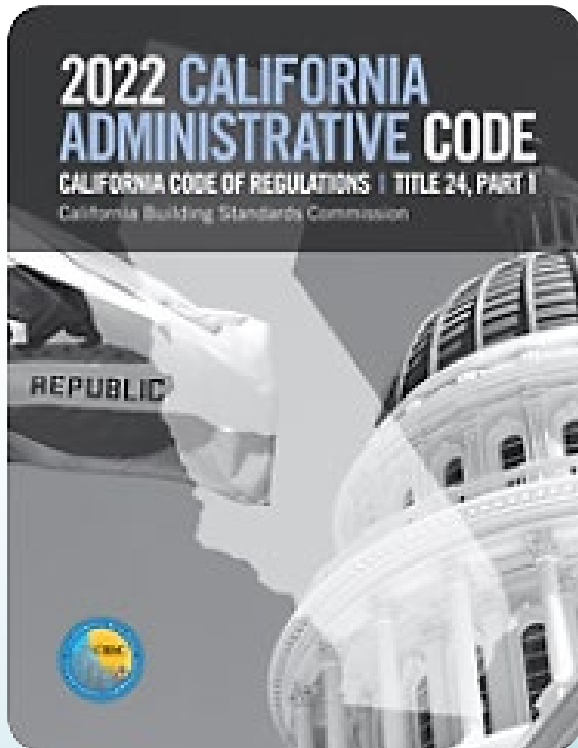
# Title 24 – California Building Code

## Part 1 - Administrative Code

- Chapter 10
- §§ 10-101 – 10-115
- Administrative requirements

## Part 6 - Energy Code

- Subchapters 1 – 9
- §§ 100.0 – 180.4
- Technical requirements





# 2022 Energy Code Table 100.0-A

Occupancies	Application	Mandatory	Prescriptive	Performance	Additions/Alterations
All Buildings	General	100.0, 100.1, 100.2, 110.0	100.0, 100.1, 100.2, 110.0	100.0, 100.1, 100.2, 110.0	100.0, 100.1, 100.2, 110.0
Multifamily	General	160.0	170.2	170.1	180.0
Multifamily	Envelope (conditioned)	110.6, 110.7, 110.8, 160.1	170.1(a)	170.1	180.0
Multifamily	Ventilation and Indoor Air Quality	160.2	N.A.	170.1	180.0
Multifamily	HVAC (conditioned)	110.2, 110.5, 160.3	170.2(c)	170.1	180.0
Multifamily	Water Heating	110.3, 160.4	170.2(d)	170.1	180.0
Multifamily	Indoor Lighting	110.9, 160.5	170.2(e)	170.1	180.0
Multifamily	Outdoor Lighting	110.9, 160.5	170.2(e)	170.1	180.0
Multifamily	Electrical Power Distribution	110.11, 160.6	N.A.	N.A.	180.0
Multifamily	Pool and Spa Systems	110.4, 110.5, 160.7	N.A.	N.A.	180.0
Multifamily	Solar Ready Buildings	110.10, 160.8	N.A.	N.A.	180.0
Multifamily	Electric Ready	160.9	N.A.	N.A.	N.A.
Multifamily	Solar PV and Battery Storage Systems	N.A.	170.2(f), (g), (h)	170.1	N.A.

## Multifamily relevant sections

§100.1 Definitions

§ 110.0-110.12 All buildings

§ 160.0-160.9 Mandatory requirements

§ 170.0-170.2 Prescriptive requirements

§ 180.0-180.4 Additions and alterations



# Restructuring of Multifamily Mandatory Requirements

New for 2022

## 2019 Sections with Multifamily

- §120.0: High-rise residential
  - Mandatory requirements
- §§ 130.0-130.4: High-rise residential
  - Mandatory requirements for lighting systems and equipment
- §130.5: High-rise residential
  - Mandatory requirements for electrical power distribution systems
- §150.0: Low-rise residential
  - Mandatory features and devices

## 2022 Newly Created Sections

- §§160.0-160.9: Multifamily buildings
  - Mandatory requirements



# Restructuring of Multifamily Prescriptive Requirements

New for 2022

## 2019 Sections with Multifamily

§§140.0-140.8: High-rise residential

- Performance and prescriptive compliance approaches

§150.1: Low-rise residential

- Performance and prescriptive compliance approaches

## 2022 Newly Created Sections

§§170.0-170.2: Multifamily buildings

- Performance and prescriptive compliance approaches



# Restructuring of Multifamily Addition Alteration Requirements

New for 2022

## 2019 Sections with Multifamily

§141.0: High-rise residential

- Additions, alterations, and repairs

§150.2: Low-rise residential

- Additions and alterations to existing low-rise residential buildings

## 2022 Newly Created Sections

§§180.0-180.4: Multifamily buildings

- Additions, alterations, and repairs to existing multifamily buildings



# All Buildings Significant Changes

Administrative §§ 10-103, 10-114, 10-115

Mandatory §§ 110.2, 110.12



# 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



# Outdoor Lighting Zones Administrative Requirements

## All Buildings § 10-114

- Updates outdoor lighting zones
- Establishes state default values
- Removes reporting criteria for amendments

TABLE 10-114-A Lighting Zone Characteristics And Rules For Amendments By Local Jurisdictions

Zone	Ambient Illumination	State wide Default Location	Moving Up to Higher Zones	Moving Down to Lower Zones
LZ0	Very Low	Undeveloped areas of government designated parks, recreation areas, and wildlife preserves.	Undeveloped areas of government designated parks, recreation areas, and wildlife preserves can be designated as LZ1 or LZ2 if they are contained within such a zone.	Not applicable
LZ1	Low	Rural areas, as defined by the 2010 U.S. Census. These areas include: single or dual family residential areas, parks, and agricultural zone districts, developed portion of government designated parks, recreation areas, and wildlife preserves. Those that are wholly contained within a higher lighting zone may be considered by the local government as part of that lighting zone.	Developed portion of a government designated park, recreation area, or wildlife preserve, can be designated as LZ2 or LZ3 if they are contained within such a zone.  Retail stores, located in a residential neighborhood, and rural town centers, as defined by the 2010 U.S. Census, can be designated as LZ2 if the business operates during hours of darkness.	Not applicable.
LZ2	Moderate	Urban clusters, as defined by the 2010 U.S. Census.  The following building types may occur here: multifamily housing, mixed use residential neighborhoods, religious facilities, schools, and light commercial business districts or industrial zoning districts.	Special districts within a default LZ2 zone may be designated as LZ3 or LZ4 by a local jurisdiction.  Examples include special commercial districts or areas with special security considerations located within a mixed-use residential area or city center.	Special districts may be designated as LZ1 by the local jurisdiction, without any size limits.
LZ3	Moderately High	Urban areas, as defined by the 2010 U.S. Census.  The following building types may occur here: high intensity commercial corridors, entertainment centers, and heavy industrial or manufacturing zone districts.	Special districts within a default LZ3 may be designated as a LZ4 by local jurisdiction for high intensity nighttime use, such as entertainment or commercial districts or areas with special security considerations requiring very high light levels.	Special districts may be designated as LZ1 or LZ2 by the local jurisdiction, without any size limits.
LZ4	High	None.	Not applicable.	Not applicable.

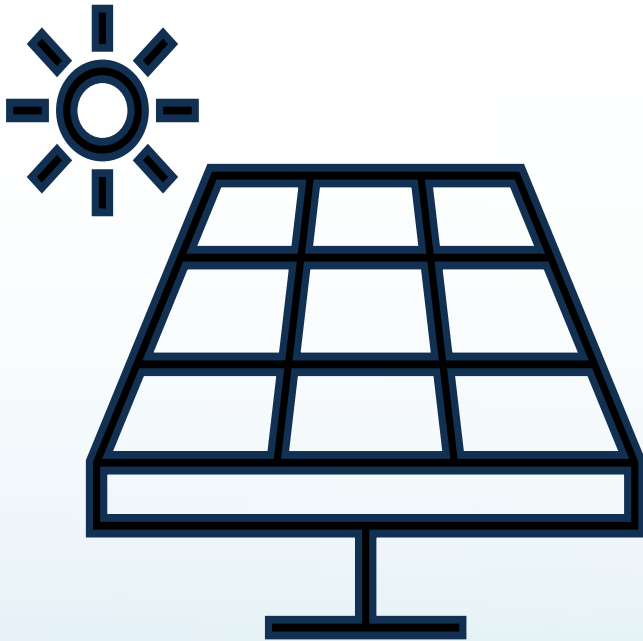




# Community Shared Solar Administrative Requirements

All Buildings § 10-115

Updated for 2022



- Updates to enhance community-scale projects as alternative to on-site installation of PV and energy storage systems
- Adds requirements
  - Participation period
  - CC&Rs
  - Ability to opt-out
  - Size no larger than 20 megawatts
  - Reporting



# Space-Conditioning Equipment Mandatory Requirements

All buildings § 110.2(a), Tables 110.2-A-J

Revises various efficiencies to match federal requirements in Tables

Updated for 2022

- 110.2-A Air conditioners and condensing units
- 110.2-B Heat pumps
- 110.2-C Air-cooled gas engine heat pumps
- 110.2-D Water chilling packages
- 110.2-E Packaged terminal air conditioners and packaged terminal heat pumps
- 110.2-F (formerly 110.2-G) Heat rejection equipment
- 110.2-G (formerly 110.2-H) Variable refrigerant flow (VRF) air conditioners
- 110.2-H (formerly 110.2-I) Electrically operated variable refrigerant flow air-to-air and applied heat pumps
- 110.2-I (formerly 110.2-J) Warm-air furnaces and combination warm-air furnaces/air-conditioning units
- 110.2-J (formerly 110.2-K) Gas and oil-fired boilers



# HVAC Efficiency Mandatory Requirements

## All Buildings § 110.2, Table 110.2-B

Updated for 2022

TABLE 110.2-B HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS

Equipment Type	Size Category	Rating Condition	Efficiency <sup>a</sup>	Test Procedure <sup>b</sup>
Air Cooled (Cooling Mode), both split system and single package	≥ 65,000 Btu/h and < 135,000 Btu/h		11.0 EER <u>14.1</u> IEER	AHRI 340/360
<u>Air Cooled</u> <u>(Cooling Mode), both split system and single package</u>	≥ 135,000 Btu/h and < 240,000 Btu/h		10.6 EER <u>13.5</u> IEER	<u>AHRI 340/360</u>
<u>Air Cooled</u> <u>(Cooling Mode), both split system and single package</u>	≥ 240,000 Btu/h		9.5 EER <u>12.5</u> IEER	<u>AHRI 340/360</u>
Water source (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	86°F entering water	13.0 EER	ISO-13256-1
Groundwater source (cooling mode)	< 135,000 Btu/h	59°F entering water	18.0 EER	ISO-13256-1
Ground source (cooling mode)	< 135,000 Btu/h	77°F entering water	14.1 EER	ISO-13256-1
Water source water-to-water (cooling mode)	< 135,000 Btu/h	86°F entering water	10.6 EER	ISO-13256-2
Groundwater source water-to-water (cooling mode)	< 135,000 Btu/h	59°F entering water	16.3 EER	ISO-13256- <u>2</u>



# Mandatory Requirements for Space-Conditioning Equipment

All buildings § 110.2(a), Tables 110.2-K-N

New for 2022

## Adds new tables

- 110.2-K DX-DOAS units, single package and remote condenser
- 110.2-L Floor-mounted air conditioners and condensing units for computer rooms
- 110.2-M Ceiling-mounted air conditioners and condensing units for computer rooms
- 110.2-N Heat pump and heat recovery chillers





# Mandatory Requirements for Space-Conditioning Equipment

Federal Requirement EERE-2014-BT-STD-0048-0102

## Department of Energy (DOE)

- Equipment meets new EER2, SEER2, HSPF2 federal requirements after January 1, 2023
  - Split AC based on install date
  - Package AC and split heat pump based on manufacture date





# Demand Management Mandatory Requirements

All Buildings § 110.12(c, e)

Updated for 2022

- Revises demand responsive lighting controls trigger to 4,000 watts or greater of total installed lighting power subject to § 130.1(b)
  - Meet lighting acceptance per NA7.6.3
- Adds demand responsive requirements for controlled receptacles
  - Exceptions
    - When demand responsive lighting controls is not required
    - Health or life safety



# Multifamily Significant Changes

Mandatory §§ 160.0 – 160.9



# Dwelling Unit Ventilation and IAQ Mandatory Requirements

Multifamily §160.2(b)2Avi, Tables 160.2-E, F, G

Updated for 2022

## Local mechanical exhaust

- Nonenclosed kitchen – demand controlled mechanical exhaust system
- Enclosed kitchen and bathrooms - demand controlled or continuous mechanical exhaust system
- Demand controlled mechanical exhaust
  - Accessible ON-OFF control or auto control not impeding occupant ON control
  - Meet or exceed minimum airflow Table 160.2-E or minimum capture efficiency per Table 160.2-E and Table 160.2-G
- Continuous mechanical exhaust
  - Manual ON-OFF control not required to be accessible to multifamily dwelling unit occupant
  - Minimum ventilation per Table 160.2-F





# Dwelling Unit Ventilation and IAQ Mandatory Requirements

New for 2022

TABLE 160.2-E: Demand-Controlled Local Ventilation Exhaust Airflow Rates and Capture Efficiency

Application	Compliance Criteria
Enclosed Kitchen or Nonenclosed Kitchen	Vented range hood, including appliance-range hood combinations shall meet either the capture efficiency (CE) or the airflow rate specified in Table 160.2-G as applicable
Enclosed Kitchen	Other kitchen exhaust fans, including downdraft: 300 cfm (150 L/s) or a capacity of 5 ACH
Nonenclosed Kitchen	Other kitchen exhaust fans, including downdraft: 300 cfm (150 L/s)
Bathroom	50 cfm (25 L/s)

TABLE 160.2-F: Continuous Local Ventilation Exhaust Airflow Rates

Application	Airflow
Enclosed kitchen	5 ach, based on kitchen volume
Bathroom	20 cfm (10 L/s)

TABLE 160.2-G: Kitchen Range Hood Airflow Rates (cfm) and ASTM E3087 Capture Efficiency (CE) Ratings According to Dwelling Unit Floor Area and Kitchen Range Fuel Type

Dwelling Unit Floor Area (ft <sup>2</sup> )	Hood Over Electric Range	Hood Over Natural Gas Range
>1500	50% CE or 110 cfm	70% CE or 180 cfm
>1000 – 1500	50% CE or 110 cfm	80% CE or 250 cfm
750 – 1000	55% CE or 130 cfm	85% CE or 280 cfm
<750	65% CE or 160 cfm	85% CE or 280 cfm



# Dwelling Unit Ventilation and IAQ Mandatory Requirements

Multifamily § 160.2(b)2A via, Table 160.2-H

Updated for 2022

Airflow measurement of local mechanical exhaust

- Attached dwelling units
- Ventilation duct sizing (minimum diameter) alternative to airflow test
- Per Table 160.2-H: Prescriptive ventilation system duct sizing (ASHRAE 62.2, Table 5-3)

TABLE 160.2-H: Prescriptive Ventilation System Duct Sizing [ASHRAE 62.2: Table 5-3]

Fan Airflow Rating, cfm at minimum static pressure <sup>f</sup> 0.25 in. water (L/s at minimum 62.5 Pa)	≤ 50 (25)	≤ 80 (40)	≤ 100 (50)	≤ 125 (60)	≤ 150 (70)	≤ 175 (85)	≤ 200 (95)	≤ 250 (120)	≤ 350 (165)	≤ 400 (190)	≤ 450 (210)	≤ 700 (330)	≤ 800 (380)
Minimum Duct Diameter, in. (mm) <sup>a,b</sup> For Rigid duct	4 <sup>e</sup> (100)	5 (125)	5 (125)	6 (150)	6 (150)	7 (180)	7 (180)	8 (205)	9 (230)	10 (255)	10 (255)	12 (305)	12 <sup>d</sup> (305)
Minimum Duct Diameter, in. (mm) <sup>a,b</sup> For Flex duct <sup>c</sup>	4 (100)	5 (125)	6 (150)	6 (150)	7 (150)	7 (180)	8 (205)	8 (205)	9 (230)	10 (255)	NP	NP	NP



# Dwelling Unit Ventilation and IAQ Mandatory Requirements

Multifamily § §160.2(b)2B,C

Updated for 2022

## HERS field verification and diagnostic testing

- Whole dwelling unit ventilation airflow performance
  - Verified per RA3.7.4.1 or NA2.2.4.1
- Kitchen local mechanical exhaust vented range hoods
  - Verified per RA3.7.4.3 or NA2.2.4.1.4
- HRV and ERV fan efficacy
  - Fan efficacy  $\leq 1.0$  W/cfm HERS verified

## Central ventilation system duct sealing

- Duct sealed per CMC §603.10
- Leakage  $\leq 6\%$  of rooftop fan or central fan designed airflow



# Common Use Area Ventilation Mandatory Requirements

Multifamily §§160.2(c)7, 160.2(d)

## Design and control requirements for quantities of outdoor air

- Designed outdoor air rates operated at minimum levels per §160.2(c)3 or at rate required for exempted or covered process make up system
- VAV capable of maintaining measured outside air rates within 10% of designed minimum
- Measured outside air rate of constant volume mechanical ventilation and space conditioning systems within 10% of required outside air rate

## Parking garages

- Enclosed parking garages meet § 120.6(c)



# Dwelling Unit HVAC Systems Mandatory Requirements

## Multifamily § 160.3(b)5A, J-K

Updated for 2022

- Air ducts and plenums insulation
  - Minimum R-6.0
  - No duct insulation required if enclosed in conditioned space and HERS verified
- Porous inner core flex duct have non-porous layer or air barrier
- Duct system sealing and leakage testing
  - Total leakage of duct not more than 12% of the air handler airflow
  - Duct system leakage to outside not more than 6% of air handler airflow
- Buildings with 4 or more habitable stories exempted from HERS verification; installing contractor conducts the testing
- Buildings with 4 or more habitable stories in climate zone 1,3,5 and 7 exempted



# Dwelling Unit HVAC Systems Mandatory Requirements

## Multifamily § 160.3(b)5L

Updated for 2022

### System airflow rate and fan efficacy

- Static pressure probe HSPP or PSPP conform to RA3.3.1.1
- Single zone/zonally controlled central forced air systems verified per RA3.3
  - Fan efficacy  $\leq 0.45$ W/cfm for gas furnace air handling unit
  - Fan efficacy  $\leq 0.58$ W/cfm without gas furnace
  - Small duct high velocity forced air system  $\leq 0.62$  W/cfm verified per RA3.3
- Buildings with 4 or more habitable stories exempted from HERS verification; installing contractor conducts the testing
- Buildings with 4 or more habitable stories in climate zone 1 exempted

Number of Habitable Stories	Verifier
Three or less	HERS rater
Four or more	Installing contractor



# Common Use area HVAC Systems Mandatory Requirements

Multifamily §160.3(c)2H, §160.3(d)1

Updated for 2022

- New ducts systems tested by HERS Rater have leakage rate  $\leq 6\%$  of nominal air handler airflow rate and
  - Provides conditioned air to an occupiable space for constant volume, single zone and space conditioning system
  - Serves single zone  $< 5,000 \text{ ft}^2$  of conditioned floor area
  - Ducts combined surface area  $> 25\%$  of entire duct system
- Or meet testing requirements CMC §603.9.2

## Mechanical acceptance testing

- Equipment certified per NA7 and comply with § 160.3(d)3



# Pipe and Tank Insulation Mandatory Requirements

## Multifamily §160.4(f)1

Updated for 2022

- Piping insulated per Table 160.4-A
- Multifamily hot water systems with water temperature greater than 140°F per Table 120.3-A

*TABLE 160.4-A PIPE INSULATION THICKNESS – Multifamily Domestic Hot Water*

Fluid Operating Temperature Range (°F)	Insulation Conductivity			Nominal Pipe Diameter (in inches)				
	Conductivity (in Btu·in/h·ft <sup>2</sup> ·°F)	Mean Rating Temperature (°F)		< 1	1 to <1.5	1.5 to < 4	4 to < 8	8 and larger
<b>Multifamily Domestic Hot Water Systems</b>			<b>Minimum Pipe Insulation Required (Thickness in inches or R-value)</b>					
105-140 <sup>2</sup>	0.22-0.28	100	Inches	1.0	1.5	2.0	2.0	2.0
			R-value	R 7.7	R 12.5	R 16	R 12.5	R 11





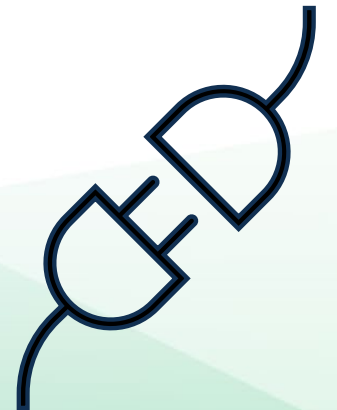
# Dwelling Unit Electric Ready Mandatory Requirements

Multifamily § 160.9(a-c)

New for 2022

## Systems using gas or propane meet electric ready

- Heat pump space heater ready
  - 240V, 30A circuit with termination 3-feet from air-handler; reserve double pole breaker in main panel
- Electric cooktop ready
  - 240V, 50A circuit with termination 3-feet from cooktop; reserve double pole breaker in main panel
- Electric clothes dryer ready
  - 240V, 30A circuit with termination 3-feet from clothes dryer location; reserve double pole breaker in main panel





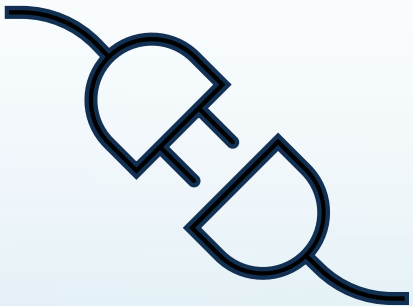
# Common Area Electric Ready Mandatory Requirements

Multifamily § 160.9(c)2

New for 2022

## Systems using gas or propane meet electric ready

- Electric clothes dryer ready
  - Conductors or raceway installed, labeled for future 240V use
  - Capacity either
    - 24 amps at 208/240 volt per clothes dryer
    - 2.6 kVA for each 10,000 BTUs per hour of rated gas input or gas pipe capacity
    - Electrical power required to provide equivalent functionality of gas-powered equipment





# Check Your Understanding

## Multifamily dwelling unit electric ready

Does each new dwelling unit need to comply individually with the electric ready requirements?

- Yes. When gas appliances are installed for cooking, water heating, space heating, or clothes drying, each dwelling unit is required to comply with the electric ready requirements.





# Multifamily Significant Changes

Performance and Prescriptive: §§ 170.0 – 170.2













# Insulation Prescriptive Requirements

## Multifamily § 170.2(a)2

New for 2022

- Wall insulation U-factors by assembly type per Table 170.2-A
- Demising walls meet mandatory per § 160.1(b)7

TABLE 170.2-A Walls

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Metal-Building any fire rating	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.057	0.057	0.057	0.057	0.057
Framed (wood, metal, and others) >1hr fire rating	0.059	0.059	0.059	0.059	0.059	0.065	0.065	0.059	0.059	0.059	0.051	0.059	0.059	0.051	0.051	0.051
Framed (wood, metal and others) ≤1hr fire rating <sup>3</sup>	0.051	0.051	0.051	0.051	0.051	0.065	0.065	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051
Mass Light <sup>4,5</sup>	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.077 R 13	0.059 R 17
Mass Heavy	0.253	0.650	0.650	0.650	0.650	0.690	0.690	0.690	0.690	0.650	0.184	0.253	0.211	0.184	0.184	0.160



# Insulation Prescriptive Requirements

## Multifamily § 170.2(a)5

Updated for 2022

- Floor insulation U-factors by assembly per Table 170.2-A

TABLE 170.2-A Floors/Soffits

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Slab Perimeter, Three Habitable Stories or less	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	U 0.58 R 7.0
Wood Framed	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19	U 0.037 R 19
Raised Mass	U 0.092 R 8.0	U 0.092 R 8.0	U 0.269 R 0	U 0.269 R 0	U 0.269 R 0	U 0.269 R 0	U 0.269 R 0	U 0.269 R 0	U 0.269 R 0	U 0.269 R 0	U 0.092 R 8.0	U 0.138 R 4.0	U 0.092 R 8.0	U 0.092 R 8.0	U 0.138 R 4.0	U 0.092 R 8.0
Other	0.048	0.039	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.039	0.071	0.071	0.039	0.039	0.039

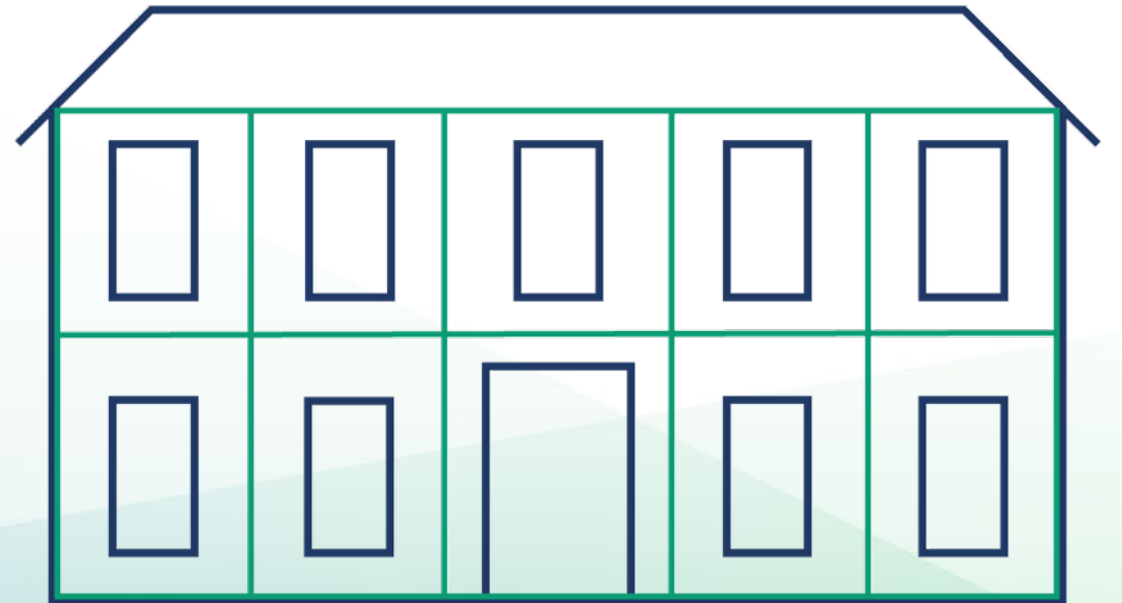


# Insulation Prescriptive Requirements

## Multifamily § 170.2(a)6

### Quality insulation installation (QII)

- Required per Table 170.2-A
- Three habitable stories or less
- Climate zones 1-6 and 8-16
  - Climate zone 7 excluded
- HERS verified per RA3.5
- Includes air barrier verification



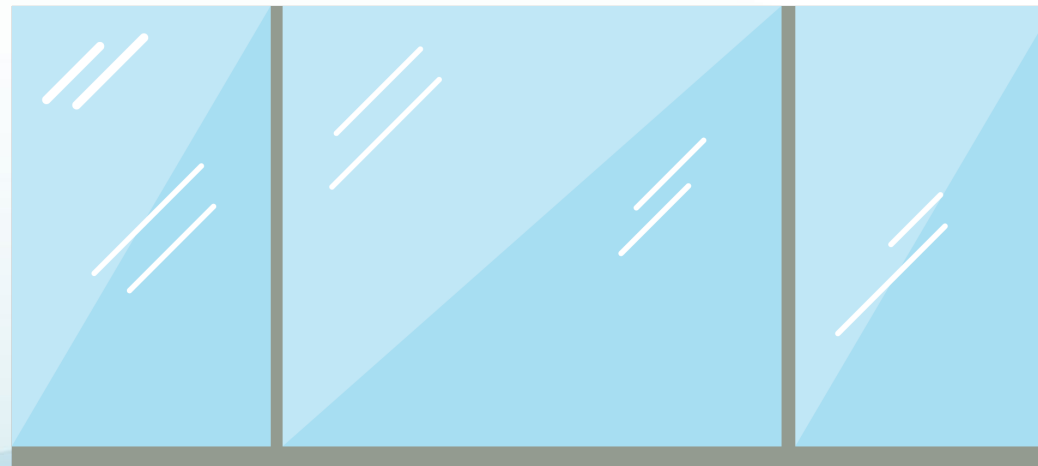


# Fenestration Prescriptive Requirements

## Multifamily § 170.2(a)3

Updated for 2022

- Vertical fenestration and glazed doors by window and floor area
  - Maximum 20% window to conditioned floor area
  - Maximum 40% window to gross exterior wall area
- Total skylights maximum 5% gross roof area
  - Atria over 55 feet high maximum 10% gross roof area







# Dwelling Unit HVAC Prescriptive Requirements

## Multifamily § 170.2(c)3A

New for 2022

### Space conditioning systems serving dwelling units

- Multifamily buildings with three or fewer habitable stories
  - In climate zones 1-15, heating system shall be heat pump
  - In climate zone 16, heating system shall be air conditioner with furnace
- Multifamily buildings with more than three habitable stories:
  - In climate zones 2-15, heating system shall be heat pump
  - Climate zones 1 and 16, heating system shall be dual-fuel heat pump
- Other system types may comply using performance



# HVAC Prescriptive Requirements

Multifamily § 170.2(c)3Bi, Table 170.2-K

New for 2022

## Refrigerant charge testing for dwelling units

- Climate zones 2, 8-15 per Table 170.2-K
- Or fault indicator display per JA6
- HERS Rater field verification required three or less habitable stories
- Dwelling units with 4 or more habitable stories exempted from HERS verification; installing contractor conducts the testing









# Dwelling Unit HVAC Prescriptive Requirements

## Multifamily § 170.2(c)3Biii

Updated for 2022

### Central fan integrated ventilation systems serving individual dwelling units

- CFI fan efficacy maximum
  - 0.45 W/cfm for gas furnace air-handling units
  - 0.58 W/cfm for air-handling units that are not gas furnaces
- HERS verified per RA3.3
  - Intermittent systems certified per RA3.7.4.2
  - Dwelling units with 4 or more habitable stories exempted from HERS verification; installing contractor conducts the testing



# HVAC

# Prescriptive Requirements

## Multifamily § 170.2(c)3Biv

Updated for 2022

### If installing balanced ventilation systems

- Energy recovery ventilator (ERV) or heat recovery ventilator (HRV)
  - Climate zones 1, 2, 11-16
    - HERS verification three habitable stories or less
    - Field verified four or more habitable stories
  - Serving individual dwelling units
    - Minimum sensible recovery efficiency of 67%
    - Fan efficacy no more than 0.6 Watts per cfm
  - Serving multiple dwelling units - four or more habitable stories
    - Minimum sensible recovery efficiency 67%
    - Fan power per § 170.2(c)4A
    - Recovery bypass or control to directly economize with ventilation air based on outdoor air temperature limits per Table 170.2-G
- No ERV or HRV
  - Climate zones 4-10 three habitable stories or less
  - Heat pump space conditioning system
  - Fan efficacy no more than 0.4 Watts per cfm
- Buildings with 4 or more habitable stories exempted from HERS verification; installing contractor conducts the testing



# Common Use Area HVAC Prescriptive Requirements

## Multifamily § 170.2(c)4Aia

New for 2022

### Fan systems with electrical input $\geq 1$ kW

- Fan power budget (kw)
  - (Fan system airflow X sum of fan power allowance) / 1,000
  - Building at elevations > 3,000 ft use correction factor in 170.2-D
- Fan power allowance dependent on system type

Fan System Type	Fan System Power Allowance
Single-cabinet	Table 170.2-B and Table 170.2-C
Supply-only	Table 170.2-B
Relief	Table 170.2-C
Exhaust, return, transfer	Table 170.2-C
Complex	Fan power – Table 170.2-B Supply airflow – Table 170.2-B for each fan Return, exhaust airflow – Table 170.2-C for each fan



# Common Use Area HVAC Prescriptive Requirements

## Multifamily § 170.2(c)4Aib

New for 2022

### Fan systems

- Fan system input power depends on
  - Designed fan power for each fan or fan array in system
  - Efficiency losses of variable speed drives
  - Clean pressure drop
- Designed fan power methods
  - Table 170.2-E-1
  - Provided by manufacturer
  - Maximum electrical input power on motor nameplate



# Common Use Area HVAC Prescriptive Requirements

## Multifamily § 170.2(c)4C

Updated for 2022

### Economizers

- Cooling air handler with mechanical cooling capacity over 33,000 Btu/hr per Table 170.2-E-2 shall include air or water economizer
- Some exceptions

Table 170.2-E-2 Chilled Water System Cooling Capacity

	Total Building Chilled Water System Capacity, Minus Capacity of the Cooling units with Air Economizers	
Climate Zones	Building Water-Cooled Chilled Water System	Air-Cooled Chilled Water Systems or District Chilled Water Systems
15	≥ 960,000 Btu/h (280 kW)	≥ 1,250,000 Btu/h (365 kW)
1-14	≥720,000 Btu/h (210 kW)	≥940,000 Btu/h (275 kW)
16	≥1,320,000 Btu/h (385 kW)	≥1,720,000 Bu/h (505 kW)



# Common Use Area HVAC Prescriptive Requirements

## Multifamily § 170.2(c)4Ni

Updated for 2022

### Dedicated outdoor air systems (DOAS) configurations

- DOAS unit complies with exhaust air heat recovery requirements and separate independent space-conditioning system complies with economizer requirements
- DOAS unit and separate space cooling system
  - Provides at least the minimum ventilation air flow rate per § 120.1(c)3 and provides at least 0.3 cfm per ft<sup>2</sup> during economizer operation
  - Ventilation sensible energy recovery ratio of at least 60% or enthalpy recovery ratio of at least 50%
  - Energy recovery bypass or control to directly economize with ventilation air based on outdoor air temperature limits per TABLE 170.2-G
- DOAS units with airflow rate > 1,000 cfm meet demand ventilation control requirements





# Common Use Area HVAC Prescriptive Requirements

## Multifamily § 170.2(c)4O, Table 170.2-J

Table 170.2-J: Energy Recovery Requirements by Climate Zone and Percent Outdoor Air at Full Design Airflow (≥ 8,000 hours per year)

% Outdoor Air at Full Design Airflow	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
≥10% and <20%	≥10,000	≥10,000	NR	NR	NR	NR	NR	NR	NR	≥40,000	≥40,000	≥20,000	≥10,000	≥10,000	≥10,000	≥10,000
≥20% and <30%	≥2,000	≥5,000	≥13,000	≥9,000	≥9,000	NR	NR	NR	NR	≥15,000	≥15,000	≥5,000	≥5,000	≥5,000	≥5,000	≥5,000
≥30% and <40%	≥2,000	≥3,000	≥10,000	≥6,500	≥6,500	NR	NR	NR	≥15,000	≥7,500	≥7,500	≥3,000	≥3,000	≥3,000	≥3,000	≥3,000
≥40% and <50%	≥2,000	≥2,000	≥8,000	≥6,000	≥6,000	NR	NR	NR	≥12,000	≥6,000	≥6,000	≥2,000	≥2,000	≥2,000	≥2,000	≥2,000
≥50% and <60%	≥2,000	≥2,000	≥7,000	≥6,000	≥6,000	NR	NR	≥20,000	≥10,000	≥5,000	≥5,000	≥2,000	≥2,000	≥2,000	≥2,000	≥2,000
≥60% and <70%	≥2,000	≥2,000	≥6,000	≥6,000	≥6,000	NR	NR	≥18,000	≥9,000	≥4,000	≥4,000	≥2,000	≥2,000	≥2,000	≥2,000	≥2,000
≥70% and <80%	≥2,000	≥2,000	≥6,000	≥5,000	≥5,000	NR	NR	≥15,000	≥8,000	≥3,000	≥3,000	≥2,000	≥2,000	≥2,000	≥2,000	≥2,000
≥80%	≥2,000	≥2,000	≥6,000	≥5,000	≥5,000	NR	NR	≥12,000	≥7,000	≥3,000	≥3,000	≥2,000	≥2,000	≥2,000	≥2,000	≥2,000





# Dwelling Units Water Heating Prescriptive Requirements

## Multifamily § 170.2(d)1

Updated for 2022



Source: Energy Code Ace

### Individual water heater serving dwelling units either

- Single 240-volt heat pump water heater
  - Climate zones 1 and 16 compact hot water distribution system
  - Climate zone 16 drain water heat recovery system
- Single NEEA-rated Tier 3 heat pump water heater
  - Climate zone 16 drain water heat recovery system
- Gas or propane instantaneous water heater
  - Input of 200,000 Btu per hour or less



# Central Water Heating Prescriptive Requirements

## Multifamily § 170.2(d)2-3

New for 2022

### Central heat pump water heater (HPWH) serving multiple dwelling units

- Hot water return from recirculation loop connects to recirculation loop tank
  - Not directly connected to primary HPWH inlet or primary thermal storage tanks
- Electric recirculation loop tank (auxiliary heating) capable of multi-pass water heating operation
- When multiple storage tanks are used
  - Single pass primary HPWH, primary thermal storage tanks piped in series
  - Multi-pass primary HPWH, primary thermal storage tanks piped in parallel
- Primary storage tank temperature setpoint shall be at least 135°F
- Recirculation loop tank temperature setpoint at least 10°F lower than primary thermal storage tank temperature setpoint
- Minimum heat pump water heater compressor cut-off temperature no more than 40°F ambient air temperature
- Must be recirculation system
- Design documentation provided per JA14.4



# Indoor and Outdoor Lighting Prescriptive Requirements

## Multifamily § 170.2(e)

Updated for 2022

- Dwellings units meet § 160.5(a)
  - Align closely with single-family
- Common use areas
  - Align closely with nonresidential
  - Thresholds removed
  - Meet one set of requirements
  - Updated LPD values
- Outdoor lighting
  - Thresholds removed
  - Meet one set of requirements



Source: Energy Code Ace



# Solar Photovoltaic Prescriptive Requirements

## Multifamily § 170.2(f)

Updated for 2022

### Buildings 3 habitable stories or less

- No larger than what can be installed in available solar access roof area (SARA) or per Equation 170.2-C
- SARA includes area of building's roof space, area of roof space on covered parking areas, carports, and other newly constructed structures on site that can structurally support PV system
- Exceptions to SARA
  - Any roof area that has less than 70% annual solar access
  - Occupied roof areas as specified by CA Building Code § 503.1.4



# Solar Photovoltaic Prescriptive Requirements

Updated for 2022

## Multifamily § 170.2(f), Table 170.2-T

### Buildings 3 habitable stories or less

- $kW_{PV} = (CFA \times A) / 1000 + (N_{DU} \times B)$ 
  - $kW_{PV} = kW_{dc}$  size of PV system
  - CFA = Conditioned floor area
  - $N_{DU}$  = Number of dwelling units
  - A = CFA adjustment factor
  - B = Dwelling unit adjustment factor

Climate Zone	A - CFA	B - Dwelling Units
1	0.793	1.27
2	0.621	1.22
3	0.628	1.12
4	0.586	1.21
5	0.585	1.06
6	0.594	1.23
7	0.572	1.15
8	0.586	1.37
9	0.613	1.36
10	0.627	1.41
11	0.836	1.44
12	0.613	1.40
13	0.894	1.51
14	0.741	1.26
15	1.56	1.47
16	0.59	1.22



# Solar Photovoltaic Prescriptive Requirements

## Multifamily § 170.2(f)

Updated for 2022

### Exceptions to PV for buildings 3 habitable stories or less

- Number of habitable stories exceptions removed
- Steep slope roofs areas with azimuth between 300 degrees and 90 degrees not included in SARA, no PV if SARA is less than 80 ft<sup>2</sup>
- No PV systems required when PV size is less than 1.8 kWdc
- Areas with high snow loads where PV is not possible
- Buildings approved by AHJ prior to January 1, 2020
  - Shading from roof designs and configurations for steep-sloped roofs included in SARA
  - Roof areas that are not allowed to have PV, not considered in SARA
- PV system size reduced by 25% if battery storage system minimum 7.5 kWh installed per Reference Joint Appendix JA12





# Solar Photovoltaic Prescriptive Requirements

## Multifamily § 170.2(g)

New for 2022

### Buildings 4 habitable stories or more

- PV no less than smaller of either
  - $\text{kW}_{\text{PVdc}} \text{ rating} = (\text{CFA} \times A) / 1000$ 
    - CFA = Conditioned floor area in  $\text{ft}^2$
    - A = PV capacity factor for building type and climate zone
  - SARA x 14 Watts per  $\text{ft}^2$
  - Mixed-use
    - One or more building types is at least 80 % of floor area
    - Each occupancy system size combined for total system size



# Solar Photovoltaic Prescriptive Requirements

## Multifamily § 170.2(g), Table 170.2-U

New for 2022

### Buildings 4 habitable stories or more

Building Type	Factor A – Minimum PV Capacity (W/ft <sup>2</sup> of conditioned floor area) Climate Zones 1, 3, 5, 16	Factor A – Minimum PV Capacity (W/ft <sup>2</sup> of conditioned floor area) Climate Zones 2, 4, 6-14	Factor A – Minimum PV Capacity (W/ft <sup>2</sup> of conditioned floor area) Climate Zone 15
Grocery	2.62	2.91	3.53
High-Rise Multifamily	1.82	2.21	2.77
Office, Financial Institutions, Unleased Tenant Space	2.59	3.13	3.80
Retail	2.62	2.91	3.53
School	1.27	1.63	2.46
Warehouse	0.39	0.44	0.58
Auditorium, Convention Center, Hotel/Motel, Library, Medical Office Building/Clinic, Restaurant, Theater	0.39	0.44	0.58





# Solar Photovoltaic Prescriptive Requirements

## Multifamily § 170.2(g)

New for 2022

### Exceptions to PV for buildings 4 habitable stories or more

- No PV system required when
  - Total of all available solar access roof area (SARA) is less than 3% of conditioned floor area
  - Required PV system size is less than 4 kWdc
  - SARA contains less than 80 contiguous ft<sup>2</sup>
  - Areas with high snow loads where PV is not possible
  - Multi-tenant buildings in areas utility does not provide virtual net metering (VNEM) or community solar program



# Battery Storage Prescriptive Requirements

## Multifamily § 170.2(h)

New for 2022



- Battery storage ONLY applies to buildings 4 or more habitable stories with PV
- Must meet both rated energy capacity and rated power capacity requirements in Table 170.2-V
  - Values based upon kW rating of required PV per Equations 170.2-E and 170.2-F



# Battery Storage Prescriptive Requirements

Multifamily § 170.2(h), Table 170.2-V

New for 2022

## Battery storage capacity factors

	Factor B – Energy Capacity	Factor C – Power Capacity
<b>Storage-to-PV Ratio</b>	<b>Wh/W</b>	<b>W/W</b>
Grocery	1.03	0.26
High-Rise Multifamily	1.03	0.26
Office, Financial Institutions, Unleased Tenant Space	1.68	0.42
Retail	1.03	0.26
School	1.87	0.46
Warehouse	0.93	0.23
Auditorium, Convention Center, Hotel/Motel, Library, Medical Office Building/Clinic, Restaurant, Theater	0.93	0.23



# Battery Storage Prescriptive Requirements

## Multifamily § 170.2(h)

New for 2022

### Minimum rated energy capacity (Equation 170.2-E)

- $\text{kWh}_{\text{batt}} = \text{kW}_{\text{PVdc}} \times B / D^{0.5}$ 
  - $\text{kWh}_{\text{batt}}$  = Rated useable energy capacity of battery storage system in kWh
  - $\text{kW}_{\text{PVdc}}$  = PV system capacity per § 170.2(g) in kWdc
  - B = Battery energy capacity factor per Table 170.2-V for building type
  - D = Rated single charge-discharge cycle AC to AC (round-trip) efficiency of battery storage system



# Battery Storage Prescriptive Requirements

## Multifamily § 170.2(h)

New for 2022

### Minimum rated power capacity (Equation 170.2-F)

- $\text{kW}_{\text{batt}} = \text{kW}_{\text{PVdc}} \times C$ 
  - $\text{kW}_{\text{batt}}$  = Power capacity of battery storage system in kWdc
  - $\text{kW}_{\text{PVdc}}$  = PV system capacity per § 170.2(g) in kWdc
  - $C$  = Battery power capacity factor per Table 170.2-V for building type



# Battery Storage Prescriptive Requirements

## Multifamily § 170.2(h)

New for 2022

### Exceptions

- No battery storage system required
  - Installed PV system size is less than 15% of size determined by Equation 170.2-D
  - Buildings with battery storage system requirements with less than 10 kWh rated capacity



# Check Your Understanding

## PV and battery storage

Are PV and battery storage mandatory for all multifamily buildings?



- Not mandatory requirement
- PV is prescriptive requirement for all multifamily
  - Some differences depending on the number of stories
- Battery storage is prescriptive requirement for four or more stories with PV
- Some exceptions may apply
- Will be difficult to trade-off



# Multifamily Significant Changes

Additions and Alterations: §§ 180.0 - 180.4





# Additions

# Mandatory Requirements

## Multifamily §180.1

Updated for 2022

### Additions to existing multifamily buildings

- Meet mandatory §§ 110.0-110.9, 160.0-160.1, 160.2(c, d), 160.3-160.7
- Meet either § 180.1(a) or (b)
- Exception: Space conditioning system ducts
  - Any length of ducts extended from existing duct system to serve the addition to meet duct sealing and duct insulation requirements per §§ 180.1(b)2Ai and 180.1(b)2Aii
- Exception: Dwelling unit space heating system
  - New or replacement space heating systems serving addition may be heat pump or gas



# Ventilation Additions Prescriptive Requirements

Multifamily §180.1(a)2, §180.1(b)3

Updated for 2022

## Whole dwelling unit mechanical ventilation

- Additions to existing building exempt if
  - Not more than 1,000 ft<sup>2</sup>
  - Junior accessory dwelling units

## Local mechanical exhaust

- Local exhaust fan meet §§160.2(b)2A*vi* and 160.2(b)2B



# Roof Alterations Prescriptive Requirements

## Multifamily § 180.2(b)1A

Updated for 2022

### Roof replacement, recover, or recoat

- More than 50% or 2,000 ft<sup>2</sup>, whichever is less
- Expands climate zones for cool roofs
- Revises exceptions

Roof Type	Climate Zone	Minimum Three-Year Aged Solar Reflectance	Minimum Thermal Emittance	Minimum SRI
Steep-sloped	4, 8-15	0.20	0.75	16
Low-sloped	2, 4, 6-15	0.63	0.75	75



# Roof Alterations Prescriptive Requirements

Multifamily § 180.2(b)1Aiii

Updated for 2022

## Area of roof replacements and recovers

- Adds above deck roof insulation for low-sloped roofs
  - Climate zones 1, 2, 4, 8-16
    - R-14 or U-factor 0.039
  - Exceptions
    - Roof recovers with new R-10 insulation added above deck
    - Existing mechanical equipment located on roof not disconnected and lifted, limited to R-10 or maximum allow per manufacturer
    - At drains and other low points, tapered insulation less than R-14, if average thermal resistance equals or exceeds R-14
    - Area of roof recoat



# Insulation Alterations Prescriptive Requirements

## Multifamily § 180.2(b)1Bi

New for 2022

### Adds ceiling insulation for altered vented attic and entirely new ducts and air handler in vented attic

- Climate zones 1-4, 8-16 assembly U-factor 0.020 or R-49
  - Exception: climate zones 1, 3, 4, 9 with existing R-19 at ceiling
- Air seal all accessible areas of ceiling in climate zones 2, 11-16
  - Exceptions
    - Existing R-19 at ceiling
    - Atmospherically vented combustion appliances in dwelling unit
- Recessed luminaires must be insulated in climate zones 1-4, 8-16
  - Exception: climate zones 1-4, 8-10 with existing R-19 at ceiling
- Attic ventilation comply per CBC requirements
- Additional exceptions
  - R-38 existing insulation installed at ceiling
  - Alteration would disturb asbestos, unless made in conjunction with abatement
  - Knob and tube wiring located in attic
  - Accessible attic space not large enough to accommodate R-value, entire accessible space shall be filled with insulation and comply with § 806.3 of Title 24, Part 2.5.
  - Attic space above altered dwelling unit is shared with other dwelling units and § 180.2(b)1Bi not triggered for other dwelling units



# HVAC Alterations – Dwelling Unit Prescriptive Requirements

Multifamily § 180.2(b)2Ai-ii, Table 180.2-C

Updated for 2022

## Entirely new or complete replacement

- Meet §§ 160.2(a)1, 160.3(a)1, 160.3(b)1-3, 160.3(b)5-6, 160.3(c)1, 170.2(c)3B, 180.2(b)2Av, Table 180.2-C

## Altered duct systems

- If more than 25 feet of new or replacement ducts are installed
  - Duct sealing required
  - Duct insulation per Table 180.2-C
- Entirely new ducts and air handler in vented attic comply with attic insulation requirements of § 180.2(b)1Bi
- Exception
  - Buildings with 4 or more habitable stories exempt from HERS verification; installing contractor conducts the testing

TABLE 180.2-C DUCT INSULATION R-VALUE

<b>Climate Zone</b>	3, 5 through 7	1, 2, 4, 8 through 16
<b>Duct R-Value</b>	R-6	R-8



# Water Heating Alterations Prescriptive Requirements

## Multifamily § 180.2(b)3

Updated for 2022

### Altered and replacement water-heating for individual dwelling units

- Newly installed and existing accessible piping meet § 160.4(f)
- If recirculation meet RA4.4.9

### Water heater options

- Natural gas or propane
- HPWH
  - Storage tank not located outdoors
    - Placed on rigid surface insulated to R-10 or more
  - Communication interface meets §1 10.12(a) or has ANSI/CTA-2045-B port
- HPWH
  - NEEA Tier 3 or higher
- If existing system is electric resistance
  - May replace with electric water heater
- Water heating system approved by CEC executive director



# Ventilation Alterations Prescriptive Requirements

Multifamily §180.2(b)5A

Updated for 2022

## Mechanical ventilation systems and IAQ for dwelling units

- New or complete replacement ventilation systems includes new fan and ducts
  - Meet mandatory ventilation per § 160.2(b)2
  - Entirely new or complete replacement duct system includes at least 75% new duct material
    - Up to 25% may be reused from existing system if parts are accessible and sealed





# Ventilation Alterations Prescriptive Requirements

Multifamily §180.2(b)5Bi

New for 2022

## Mechanical ventilation for IAQ - altered ventilation systems

- Whole dwelling unit ventilation
  - If airflow was required by previous permit, then shall meet or exceed §§ 160.2(b)2Aiv or 160.2(b)2Av, with HERS verification
  - If it was not required earlier, then no requirements
- Replacement ventilation fans
  - Fans rated for airflow and sound per ASHRAE 62.2 §§ 7.1, 7.2
  - Rated no less than required airflow rate
- Air filters
  - If air filtration was required by previous permit, then shall comply with § 160.2(b)1
  - If it was not required earlier, then no requirements



# Ventilation Alterations Prescriptive Requirements

Multifamily §180.2(b)5Bii

New for 2022

## Altered dwelling unit local mechanical exhaust

- Bathroom fans meet local ventilation per § 160.2(b)2Avi
- If kitchen exhaust previously met requirements either
  - Local exhaust
    - New kitchen exhaust meet § 160.2(b)2Avi
  - Vented range hood or fan
    - Meet or exceed previously required airflow or 100 cfm, whichever is greater
- Replacements ventilation fans
  - Rated for airflow and sound at no less than required airflow rate
  - Meet ASHRAE 62.2 § 7.1 and § 160.0(b)2Avif



# Check Your Understanding

## Multifamily water heater alterations

Will a replacement 240v HPWH in an outdoor water heater closet comply with the prescriptive alteration requirements?

- Yes. HPWH are allowed for replacements
  - Water heater closets are allowed
  - Must meet pipe insulation requirements
  - Follow manufacturer instructions for ventilation





# Resources





# Multifamily Summary

## What's New for Multifamily

- Summary of significant changes
- Code references
- Download from the [Online Resource Center](#)



### California Energy Commission 2022 Building Energy Efficiency Standards What's New for Multifamily

#### Multifamily What's New for 2022 Summary

The 2022 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, and moves all requirements for multifamily buildings to their own subchapters under Sections 160.0-180.4.

#### Administrative Regulations:

- Lighting controls and mechanical systems Acceptance Test Technician Certification Providers (ATTCs) must record related Certificates of Compliance, Installation, and Acceptance Testing in an electronic database. §10-103.1(c)3H and §10-103.2(c)3H
- Outdoor lighting zones (LZ) updated and rural areas moved to LZ1 and urban clusters added to LZ2. Building types added to state defaults, and notification requirements for LZ amendments were removed. §10-114
- Energy Commission-approved community shared solar or renewable system and energy storage system qualification requirements updated. §10-115

#### Mandatory Requirements:

- Minimum HVAC efficiency requirements updated for various equipment types, and minimum efficiency requirements added for Dedicated Outside Air System (DOAS), ACs serving computer rooms, and heat pump and heat recovery chiller packages. §110.2
- Demand responsive lighting controls trigger changed to 4,000 watts or more, and requirements added for controlled receptacles. §110.12 & §160.5(b)4E
- All envelope insulation, vapor retarder, and fenestration requirements unified. §160.1
- For dwelling units, new requirements for central fan integrated ventilation systems requiring a motorized controlled damper, damper controls, and variable ventilation. §160.2(b)2Aii
- For dwelling units, vented kitchen range hoods require ventilation rates or capture efficiencies based on conditioned floor area and fuel type (see Tables 160.2-E, F, and G). §160.2(b)2Aivc2
- For dwelling units, installed Heat recovery ventilation (HRV) and energy recovery ventilation (ERV) systems must have a Home Energy Rating System (HERS) verified maximum fan efficacy of 1.0 W/cfm. §160.2(b)2Biii
- For common areas, filter racks or grilles shall be gasketed or sealed to prevent air from bypassing the filter. §160.2(c)1D
- Mechanical ventilation systems of enclosed parking garages must meet the requirements of §120.6(c). §160.2(d)
- For dwelling units, duct leakage and HVAC airflow and fan watt draw testing is conducted by installing contractor in buildings with four or more habitable stories. Exceptions are provided for certain climate zones. §160.3(b)5K & §160.3(b)5L
- For common areas, formerly prescriptive duct leakage testing is now mandatory. §160.3(c)2H
- New acceptance testing requirements added for dwelling units. §160.3(d)2
- Water heating piping must be insulated per Table 160.4-A. §160.4(f)
- Indoor and outdoor lighting requirements unified and applicability clarified for dwellings, common areas, and outdoor lighting. §160.5
- Requirements clarified for communal pool and spa systems versus private single-tenant pools and spas. §160.7(b)
- New electric ready requirements for space heating, cooking, and clothes dryers serving individual dwelling units and common areas, when gas equipment is installed. Electrical infrastructure must be provided and reserved to the equipment location for the future installation of electrical appliances. §160.9(a)-(c)

#### Prescriptive Compliance:

- All envelope requirements unified. Vertical fenestration and glazed doors area requirements based on conditioned floor area and gross wall area. Fenestration efficiency values dependent on type, climate zone, and number of habitable stories. §170.2(a)



# 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



# HERS Program

## HERS Program information



- Newly constructed buildings
- Additions
- Alterations of residential and nonresidential buildings
- California whole-house home energy ratings
- HERS building performance contractors



**CHEERS**

- Newly constructed buildings
- Additions
- Alterations of residential and nonresidential buildings



# ATTCP Program

## 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



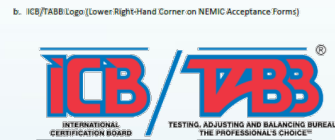


# ATTCP Program

## ATTCP Program information

### Mechanical Systems

- California State Pipe Trades Council (CSPTC)
- National Energy Management Institute Committee (NEMIC)
- National Environmental Balancing Bureau (NEBB)
- Refrigeration Service Engineers Society (RSES)





# 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

### 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)

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



# 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

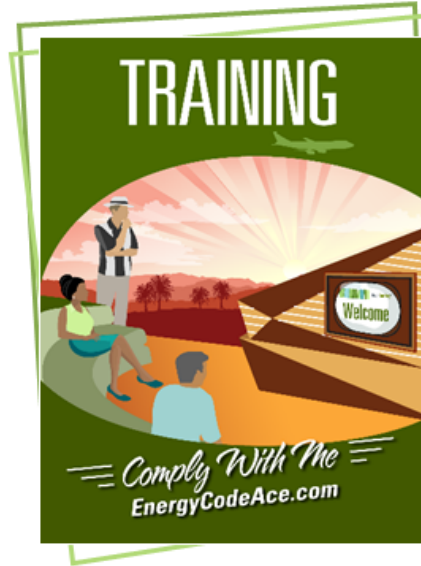


Email

- [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

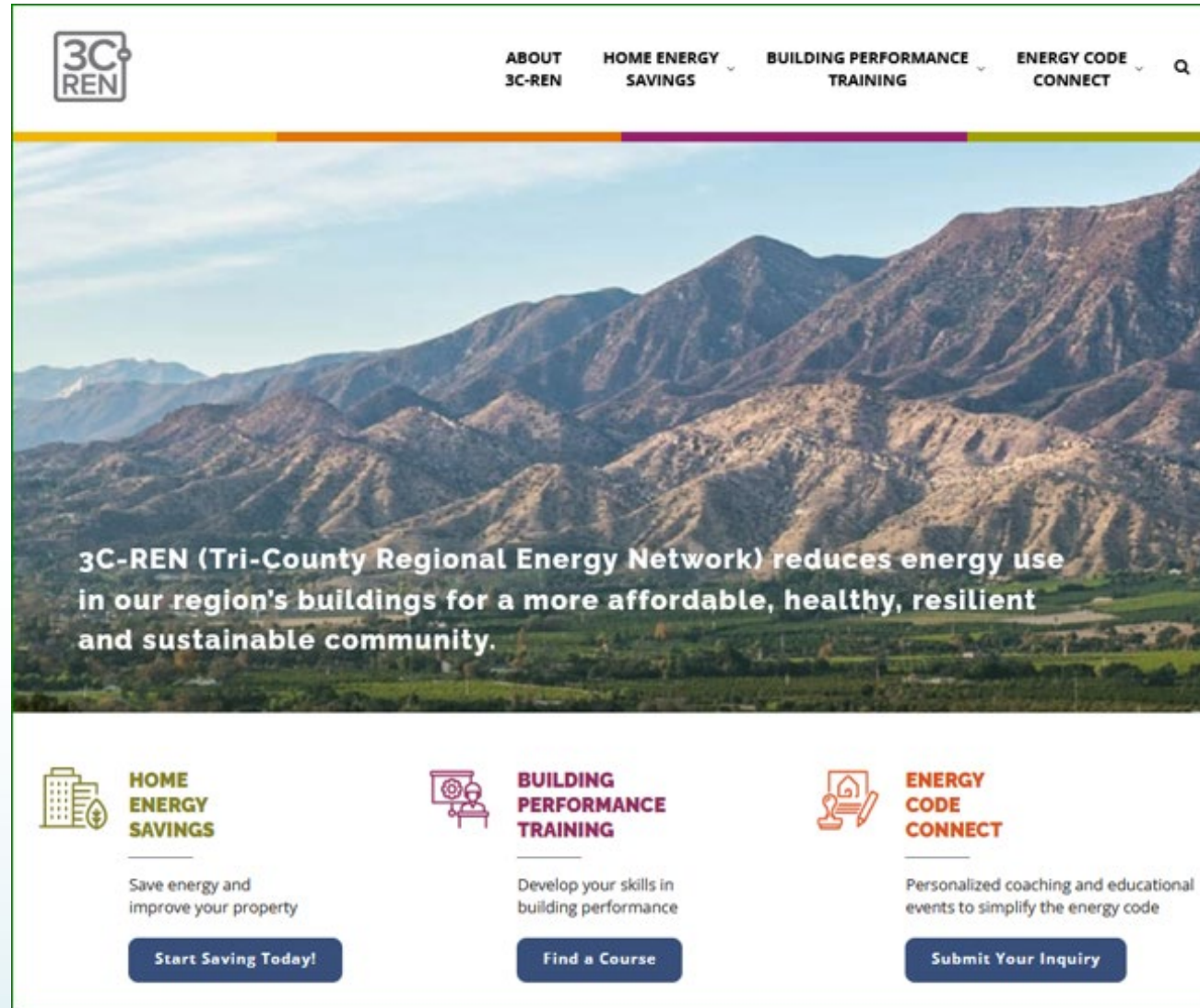
- Training is activity based and delivered in a variety of formats:**
- ✦ Live Online instructor-led
  - ✦ Online self-study
  - ✦ Recorded webinars
  - ✦ YouTube — live streaming & videos

- 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 screenshot shows the homepage 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 navigation 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 shows the BayREN website interface. At the top left is the BayREN logo with the tagline "Local Governments Engineering Our Communities". To the right of the logo is a navigation bar with links: "» HOW TO GET STARTED", "» FIND A CONTRACTOR", "» FIND AN ASSESSOR", and "» PARTNER WITH US". Further right is an accessibility icon (A) and a search bar with a magnifying glass icon and the text "Search".

On the left side, there is a vertical menu with the following items: "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 background image of a park with people sitting at tables. Overlaid on the right side of this image is a dark purple circular graphic containing the text: "Score big with smart energy upgrades." Below this text is a sub-headline: "Upgrade your multifamily building and earn cash back — starting at \$750/unit." At the bottom of the graphic is a yellow button labeled "Learn More".





**Thank you**