

# 2025 Multifamily Update Overview

CB25 MF EC  
44522

## Training Objectives

- ✦ Identify **major areas of change** in Residential 2025 Title 24 Energy Code requirements for:
  - ✧ Overall scope and application
  - ✧ Multifamily

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- Virtual Compliance Assistant

# Course Conventions

## Mandatory



- ★ Always required regardless of compliance approach used

## Prescriptive



- ★ Required when using the Prescriptive compliance approach

## Performance



- ★ Optional feature accounted for when doing Performance-based computer modeling

# 2025 Code Breaker: What's New for Multifamily

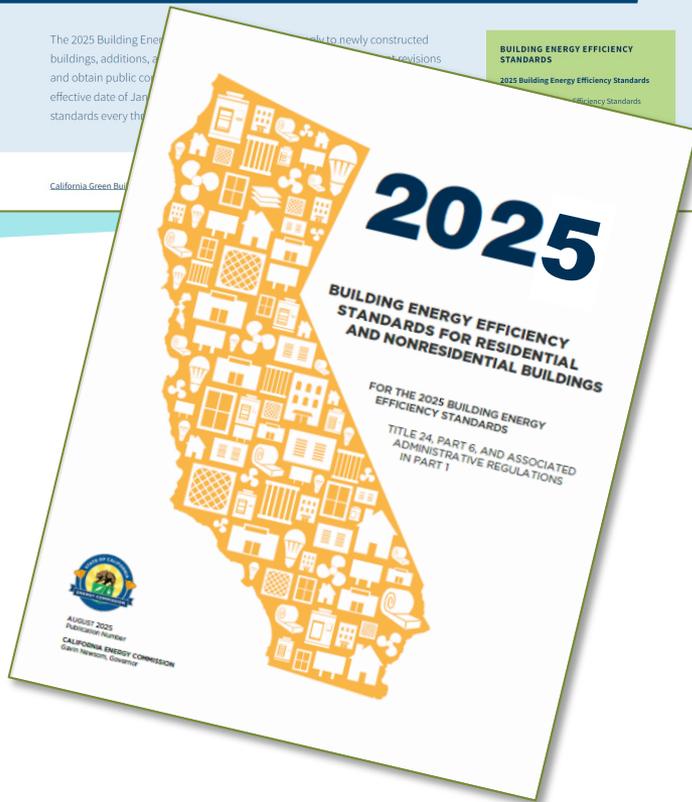
## 1. Overview

2. Mandatory Measures
3. Prescriptive Measures
4. Next Steps

### ✦ Explore changes in overall scope and application in:

- ✦ Applicable Occupancy Types
- ✦ Timeline for Code Implementation
- ✦ Building Energy Efficiency Ratings (Performance Approach)
- ✦ Field Verification Terminology (HERS/ECC)
- ✦ CARB and Refrigerants

# 2025 Energy Code



## Implementation Date

January 1, 2026

Any projects that apply for a permit on or after this date will be subject to the 2025 Energy Code requirements

Information and documents available on the CA Energy Commission website at:

<https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

# Occupancy Types

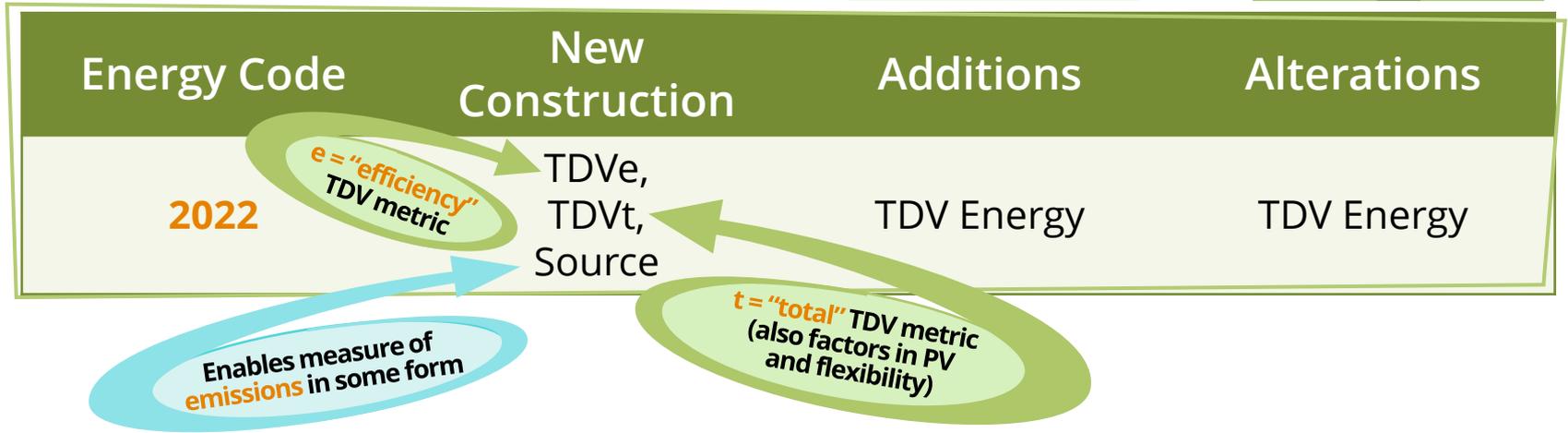
Group	Occupancy Type	Examples	
A	Assembly	Theaters, churches, arenas, amusement parks	
B	Business	Office buildings, banks, schools above 12 <sup>th</sup> grade	
C	Organized Camps	Outdoor group living experience <b>(exempt from Energy Code)</b>	
E	Education	K-12 schools	
F	Factory	Food processing, airports, dry cleaning, foundries	
H	High Hazard	Detonation, accelerated burning, health hazards	
I	Institutions	Convalescent homes, board and care (24 hours), hospitals	
	I-2	Hospitals and 24-hour medical care facilities	
	I-3	Correctional facilities <b>(exempt from Energy Code)</b>	
	I-4	Daycare facilities <b>(exempt from Energy Code)</b>	
<b>New</b>	L	Laboratories	Buildings with one or more lab suites
	M	Mercantile	Grocery stores, department stores
	R	Residential	Any building used for sleeping purposes:
	Uses NR code	R-1	Hotels, motels and similar businesses
	Uses MF code	R-2	Apartment buildings, dormitories and multi-user residences with more than 2 dwelling units
	Uses SF or MF	R-3	Single-family homes and duplexes, as well as other permanent dwellings
	Uses MF code	R-4	Care facilities and similar businesses
	S	Storage	Home goods, tires, food products, parking garages
	U	Miscellaneous	Agricultural, barns, greenhouses, carports

Energy Code now applies to labs



# Evolving Building Energy Efficiency Ratings

## For Multifamily Construction



### Time Dependent Valuation (TDV):

"TDV Energy" is the time varying energy used by the building to provide space conditioning, water heating and specified building lighting. It accounts for the energy used at the building site and consumed in producing and delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

### Source Total Metric (Source):

A separate metric based on "hourly source energy," which establishes a "carbon-proxy" analysis of the building in kBtu/sf-yr units to support decarbonization and electrification policy goals.

# Evolving Building Energy Efficiency Ratings



## For Multifamily Construction



Energy Code	New Construction	Additions	Alterations
2022	Source, TDVe, TDVt	TDV Energy	TDV Energy
2025	Source, LSCe, LSCt	LSCe	LSCe

### Source Energy (Source):

The long run marginal source energy of fossil fuels that are combusted as a result of building energy consumed either directly at the building site or to meet the electrical demand of the building considering the long-term marginal hourly resources of Commission-projected electric system resource procurement. For a given hour, the value in that hour for each forecasted year is averaged to get a lifetime average source energy.

### Long-term System Cost (LSC):

CEC-projected present value of costs to California's energy systems over a period of 30 years. Does not represent a prediction of individual utility bills. Ensures that all modeled building features are specified on a one-for-one equivalent energy use or equivalent energy cost basis. Consists of large data sets that convert electricity, gas and propane to LSC energy. The rate of conversion varies for each hour of the year, climate zone, energy type (electricity, natural gas and propane), and building type (low-rise residential, high-rise residential, nonresidential, and hotel/motel).

# LSC as a Compliance Metric (2025)



## Efficiency LSC

*a score representing the building energy efficiency expressed in terms of LSC based metric*

## Total LSC

*a score representing the building's Total LSC while also factoring in PV + Flexibility*

## Source

*a score representing the building energy efficiency expressed in terms of an hourly source carbon based metric*

Single Family Title 24 Performance

Calculation	Heating	Cooling	Int Lighting	Ext Lighting	Appliances	Receptacle	PV	Batt	IAQ	DHW	LSCe	LSCt	Source
Standard	1.87	2.83	1.75	0.42	5.79	6.96	-6.81	0.00	0.90	3.26	8.86	16.97	10.08
Proposed	2.01	3.65	1.75	0.42	5.80	6.96	-8.14	0.00	0.90	2.68	9.24	16.03	5.82

LSC shown as \$/sqft-yr of conditioned floor area

Does NOT Comply - Review LSCe, LSCt and Source Scores



All three ratings must show Proposed values that are equal or better (lower) than Standard

2025 Title 24 / 2019 ASHRAE

A building complies ONLY if **all three** compliance scores are met (each Proposed Design score is **lower or equal** to Standard Design score)



# Terminology Change: “HERS” is now “ECC”

§10-103.3



Through 2022 Energy Code Cycle	Starting 2025 Energy Code Cycle	Definition
“HERS”	“ECC”	<ul style="list-style-type: none"> <li>ECC = “<b>Energy Code Compliance</b>” Program</li> <li>Confirms compliance with Energy Code via field verification and diagnostic testing as applicable in <b>Residential</b> construction:                             <ul style="list-style-type: none"> <li>New Construction</li> <li>Additions</li> <li>Alterations</li> </ul> </li> <li>Program requirements moved from T20 to T24</li> </ul>
HERS Provider	ECC-Provider	<ul style="list-style-type: none"> <li>An <b>organization</b> approved by the CEC to administer the ECC program per Energy Code Section 10-103.3</li> </ul>
HERS Rater	ECC-Rater 	<ul style="list-style-type: none"> <li>A <b>person</b> trained, tested, and certified by an ECC-Provider</li> <li>Performs ECC field verification and diagnostic testing</li> </ul>
	ECC-Rater Company	<ul style="list-style-type: none"> <li>An <b>organization</b> certified by an ECC-Provider</li> <li>Offers field verification and diagnostic testing services by the ECC-Rater Company’s ECC-Raters</li> </ul>
HERS Measures	ECC Measures	<ul style="list-style-type: none"> <li>Building feature installations that must demonstrate compliance with Energy Code via field verification and diagnostic testing</li> </ul>



# What's Happening with Refrigerants?

- ✦ The **California Air Resources Board (CARB) [Refrigerant Management Program](#)**:
  - ✧ Supports California's Global Warming Solutions Act of 2006
  - ✧ Requires leak inspections, repairs, and record keeping indicating how greenhouse gas (GHG) emissions have been reduced from equipment
  - ✧ Began prohibiting the use of certain hydrofluorocarbons (HFC) in [new air conditioning equipment](#), [refrigeration equipment](#), and [chillers](#).

## *Systems Required to be Charged with Low Global Warming Potential (GWP) Refrigerant from the Factory\**

End-Use (New Equipment)	Prohibited Refrigerants	Effective Date
Room/wall/window air-conditioning equipment, PTACs, PTHPs, portable air-conditioning equipment, and residential dehumidifiers	≥ 750 GWP	1/1/2023
Other air-conditioning equipment (Residential and Nonresidential)	≥ 750 GWP	1/1/2025
Variable Refrigerant Flow (VRF) system	≥ 750 GWP	1/1/2026
Chillers:		
• Air-conditioning, process refrigeration designed for chilled fluid leaving the chiller at temperatures > <b>35°F (2°C)</b>	≥ 750 GWP	1/1/2024
• Process refrigeration designed for chilled fluid leaving the chiller at temperatures ≤ <b>35°F (2°C) and &gt; -10°F (-23°C)</b>	≥ 1,500 GWP	1/1/2024
• Process refrigeration designed for chilled fluid leaving the chiller at temperatures ≤ <b>-10°F (-23°C) and &gt; -58°F (-50°C)</b>	≥ 2,200 GWP	1/1/2024
Refrigeration equipment containing > 50 pounds refrigerant	≥ 150 GWP	1/1/2022

*\*Other programs within California may have additional requirements for stationary refrigeration systems, such as the South Coast Air Quality Management District (AQMD) [Rule 1415.1](#)*





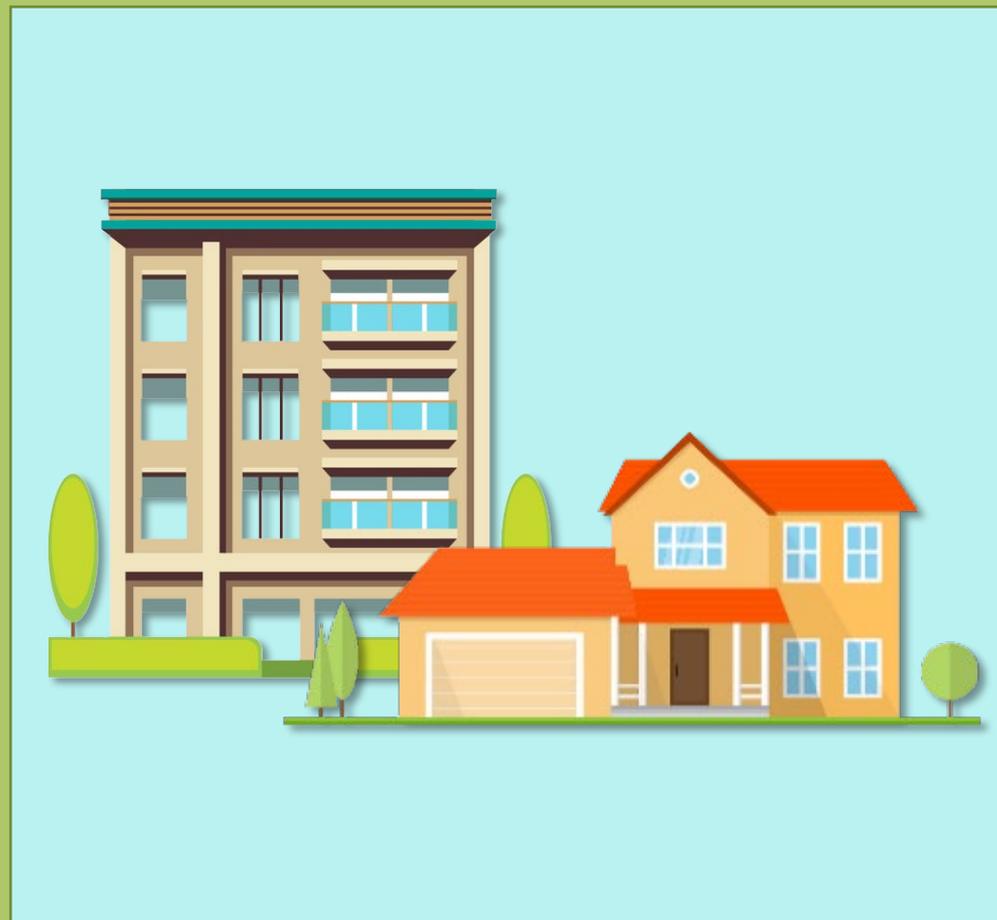
## Check Your Understanding 1.1

### What do you think?

1. Which energy efficiency rating is used to evaluate Multifamily building performance under 2025 Energy Code?

- a) EDR (Energy Design Rating)
- b) LSC (Long-term System Cost)
- c) TDV (Time Dependent Valuation)
- d) LCC (Life Cycle Cost)

LSC will be used to evaluate 2025 **single-family** and **multifamily** building performance in New Construction, Additions, and Alterations.





## Check Your Understanding 1.2

### What do you think?

2. A new low-rise multifamily building requires **field verification and diagnostic testing** for Quality Insulation Installation (QII). Under 2025 Energy Code, who must perform this work?

- a) HERS-Rater
- b) Installing Contractor
- c) ECC-Rater

The role formerly known as a "HERS-Rater" is now called an "ECC-Rater."



# 2025 Code Breaker: What's New for Multifamily

1. Overview

**2. Mandatory**

3. Prescriptive Measures

4. Next Steps

## ★ Review what's new in the 2025 Energy Code for:

- ✧ Wall Insulation
- ✧ Mechanical Ventilation
- ✧ DHW Pipe Insulation
- ✧ Heat Pump Water Heater Reqs.
- ✧ Pools and Spas



# Defining Multifamily Spaces

## Dwelling Unit

- ✦ **Single unit** providing complete, independent living facilities for one or more persons
- ✦ Includes:
  - ✧ Access
  - ✧ Permanent provisions for:
    - ◆ Living
    - ◆ Sleeping
    - ◆ Eating
    - ◆ Cooking
    - ◆ Sanitation

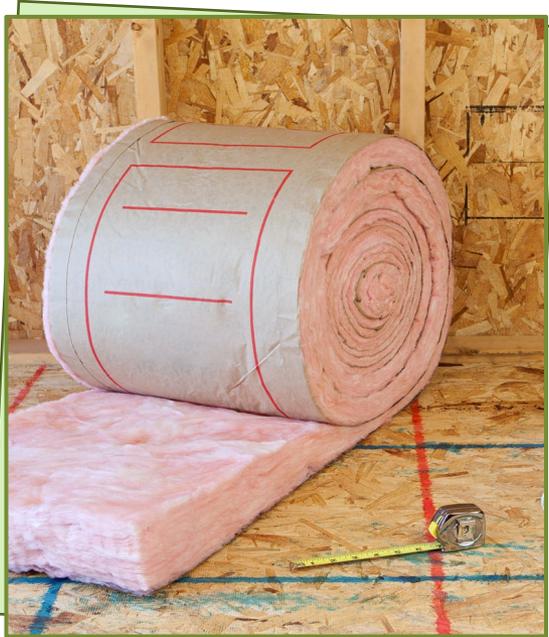
## Common Use Areas

- ✦ Occupancy “R” spaces that do **NOT** include dwelling units:
  - ✧ Community rooms
  - ✧ Corridors
  - ✧ Laundry rooms serving multiple units
  - ✧ Lobbies
  - ✧ Lounges
  - ✧ Storage spaces that only serve a Multifamily “R” occupancy
- ✦ Does **NOT** include:
  - ✧ Any of the above serving a Nonresidential occupancy of the building





For above grade walls separating conditioned & unconditioned space or ambient air



## Wood-framed

### ★ Mandatory Measure Updates

✧ **Wood-framed** wall assemblies shall have the following **maximum** area-weighted average **U-factor**:

◆ **2 x 4: 0.095**

Reduced  
from 0.102

◆ **2 x 6: 0.069**

Reduced  
from 0.071

◆ **Other: 0.102**

No change

✧ Compliance with U-factors may be demonstrated by installing wall insulation with:

◆ **R-15** in **2 x 4** assemblies

◆ **R-21** in **2 x 6** assemblies

◆ 16 inches on center spacing

Increased  
from R-13

Increased  
from R-20





## New Construction

## Additions & Alterations

- ✦ All dwelling units in a Multifamily building shall use the **same whole-dwelling-unit ventilation system type**
- ✦ The dwelling unit shall comply with **both** requirements below:
  - ✦ **Balanced OR Supply Ventilation**
  - ✦ **Compartmentalization (Blower Door) Testing**

- ✦ Dwelling units may use any one of the following:
  - ✦ Balanced ventilation
  - ✦ Supply ventilation
  - ✦ Exhaust ventilation
- ✦ Testing not required

Exhaust Ventilation is allowed in Additions/Alterations

Exhaust Ventilation no longer allowed in New Construction

Compartmentalization testing required for all ventilation types (was only non-balanced in 2022)

These are **Mandatory Measures**.

The **Prescriptive Approach** will require **balanced** ventilation, which we'll cover shortly.





★ **New formula** to calculate **minimum ventilation** for occupiable spaces

✧ **Equation 160.2-H:** Minimum Outdoor Airflow Rate ( $V_z$ )



◆ Outdoor airflow rate ( $V_z$ ) to be **the larger of**

## Occupant-based Equation

$$V_z = R_p \times P_z$$

## Area-based Equation

$$V_z = R_a \times A_z$$

✧ Where:

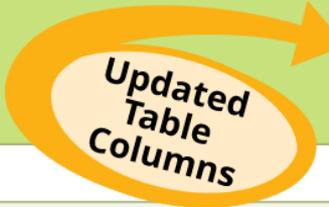
- ◆  $R_p$  = 15 CFM of outdoor airflow per person
- ◆  $P_z$  = The expected number of occupants

✧ Where:

- ◆  $R_a$  = Area-based minimum ventilation airflow rate in **Table 160.2-B**
- ◆  $A_z$  = The net **occupiable floor area** of the ventilation zone, in ft<sup>2</sup>

*Excerpt of Table 160.2-B: Minimum Occupant Load Density and Ventilation Rates for Multifamily Common Use Areas*

Space Type	Minimum Occupant Load Density (p/1000 ft <sup>2</sup> )	Area-based Minimum Ventilation $R_a$ (cfm/ft <sup>2</sup> )	Air Class
Bars, cocktail lounges	33	0.2	2
Break rooms	33	0.15	1





**Table 160.2-B: Minimum Occupant Load Density and Ventilation Rates for MF Common Use Areas**

Space Type	Minimum Occupant Load Density (p/1000 ft <sup>2</sup> )	Area-based Minimum Ventilation R <sub>a</sub> (cfm/ft <sup>2</sup> )	Air Class	Notes
Bars, cocktail lounges	33	0.2	2	
Break rooms	33	0.15	1	F
Coffee stations	33	0.15	1	F
Conference/meeting	33	0.15	1	F
Corridors	5	0.15	1	F
Computer (not printing)	5	0.15	1	F
Daycare (through age 4)	14	0.15	2	
Dining rooms	33	0.15	2	
Disco/dance floors	100	0.15	2	F
Freezer and refrigerated spaces (<50°F)	0	0	2	E
Game arcades	45	0.15	1	
Gym, sports arena (play area)	10	0.15	2	E
Health club/aerobics room/weight room	10	0.15	2	
Kitchen (cooking)	3	0.15	2	
Laundry rooms, central	5	0.15	2	
Lobbies/pre-function	33	0.15	1	F





**Table 160.2-B: Minimum Occupant Load Density and Ventilation Rates for MF Common Use Areas**

Space Type	Minimum Occupant Load Density (p/1000 ft <sup>2</sup> )	Area-based Minimum Ventilation R <sub>a</sub> (cfm/ft <sup>2</sup> )	Air Class	Notes
Multiuse assembly	33	0.15	1	F
Occupiable storages rooms for dry materials	2	0.15	1	
Occupiable storages rooms for liquids or gels	2	0.15	2	B
Office space	5	0.15	1	F
Reception areas	5	0.15	1	F
Shipping/receiving	2	0.15	2	B
<b>Spectator areas</b>	33	0.15	1	F
Swimming (deck)	33	0.15	2	C
Swimming (pool)	10	0.15	2	C
Telephone/data entry	33	0.15	1	F
All others	5	0.15	2	



Updated Table Columns



New

**Notes:**

**B** – Rate may not be sufficient where stored materials include those having potentially harmful emissions.

**C** – Rate does not allow for humidity control. “Deck area” refers to the area surrounding the pool that is capable of being wetted during pool use or when the pool is occupied. Deck area that is not expected to be wetted shall be designated as an occupancy category.

**E** – Where combustion equipment is intended to be used on the playing surface or in the space, additional dilution ventilation, source control, or both shall be provided.

**F** – Ventilation air for this occupancy category shall be permitted to be reduced to zero when the space is in occupied-standby mode.

# Multifamily DHW Pipe Insulation

§160.4(e)



- ✦ 2025 Energy Code has a set of **new Mandatory Measures** for Multifamily Domestic Hot Water (DHW) pipe insulation installation
- ✦ Measures covered under **§160.4(e)** include insulation:
  - ✦ Installation requirements
  - ✦ Location
  - ✦ Thickness (**Table 160.4-A**)
  - ✦ Protection



## Mandatory Ventilation Requirements for HPWH Installations **without** Ducts

(all occupancies)

- ★ Installation space to have a **minimum volume** that is the **greater of**:

- ✧ 100 ft<sup>3</sup> per kBtu per hour of compressor capacity, or manufacturer guidance;

**OR**

- ★ HPWH installation space to be **vented to a communicating space via permanent openings**

- ✧ Fully louvered door **or** high and low grilles
- ✧ Total Net Free Area 125 in<sup>2</sup> + 25 in<sup>2</sup> per kBtu per hour of compressor capacity, or manufacturer guidance (whichever is greater)





(all occupancies)

## Mandatory Ventilation Requirements for HPWH Installations **with Ducts**

- ✦ The space joined to the installation via ducts, minus the volume of the HPWH installation space, to have a **minimum volume** that is the greater of:
  - ✧ 100 ft<sup>3</sup> per kBtu per hour of compressor capacity, or manufacturer guidance
- ✦ All duct connections and building penetrations **sealed**
- ✦ **Minimum R-6 insulation** for exhaust air ducts and all ducts crossing pressure boundaries
- ✦ Additional installation requirements apply per **§110.3(c)7B4** if only the HPWH inlet or outlet is ducted



➤ Ducting only the inlet or exhaust across the pressure boundary could **interfere with balanced ventilation** systems. Consider this when specifying HPWH location and ventilation method.





If new MF **dwelling units** use **individual gas** or **propane** water heaters, then these Mandatory Measures apply to each WH:

## Individual Heat Pump Water Heater Ready

Removed from §160.4(a)  
and updated/added  
to Electric Ready MM  
§160.9(e)

### ✦ Make Space

- ✦ Construction drawings shall designate a space for the future HPWH location that is a **minimum of 39" x 39" x 96"** tall

### ✦ Condensate Drain

- ✦ Must be plumbed to be **no more than 2 inches higher** than the base of the installed water heater, and allow natural draining without pump assistance





If new MF **dwelling units** use **individual gas** or **propane** water heaters, then these Mandatory Measures apply to each WH:

## Individual Heat Pump Water Heater Ready

Removed from §160.4(a) and updated/added to Electric Ready MM §160.9(e)

### ✦ Power Requirements

- ✦ A dedicated **125 volt, 20 amp** electrical receptacle that is connected to the electric panel with a **120/240 volt** 3 conductor, **10 AWG** copper branch circuit (rated at 30 amps minimum) and accessible to the water heater with **no obstructions**
- ✦ Both ends of the unused conductor shall be labeled with the word *“Spare”* and be electrically isolated
- ✦ A reserved **single pole** circuit breaker space in the electrical panel to be labeled *“Future 240V Use”*





## Individual Heat Pump Water Heater Ready

### ✦ Ventilation Method to Meet **ONE** of the Following:

- ✧ Designated space for future HPWH shall have a **minimum volume of 700 ft<sup>3</sup>** **OR**



If HPWH space is designed to vent **indoors**, future HPWH shall:

**OR** If HPWH space is designed to vent to **building exterior**, future HPWH shall:

Vent to an interior communicating space in the **same pressure boundary**

Vent to **exterior**

Vent via **ONE** of these options:

Vent via **ONE** of these options:

- 1. Fully louvered doors**  
(fixed louvres in single layer of fixed flat slats) and a min. total NFA of 250 in<sup>2</sup>
- 2. Two permanent openings** of equal area with a **minimum total NFA of 250 in<sup>2</sup>**, to be located **within 12"** from enclosure top and bottom

1. same
2. same

- 3. Two 8" ducts** to a communicating space

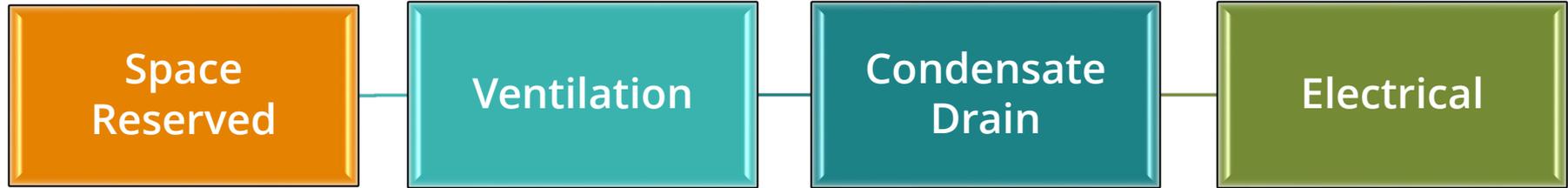
- 3. Two 8" capped ducts**  
(Additional **R-6 duct insulation** and **sealing** requirements apply)

Have a total combined volume **≤ 700 ft<sup>3</sup>**

No volume stipulated



## Central water heating systems using gas or propane to serve multiple new dwelling units shall meet these Mandatory Measures



<p>Design a space that can support a future heat pump system (condensers and tanks) that can meet the installed natural gas, or propane, total system load</p>	<p>Design to be <b>either</b>:</p> <ul style="list-style-type: none"><li>• <b>Outside</b> with space reserved for future heat pump system, <b>or</b></li><li>• <b>Indoors</b> with pathway designed and reserved for future ductwork, including penetrations to the outside</li></ul>	<p>Size to service future heat pump system with receptacle installed within 3 feet, or piping installed within 3 feet to a receptacle, of the future heat pump system location (as allowed by the <b>CA Plumbing Code</b>)</p>	<p>Design reserved space on bus of main switchboard or distribution board, in addition to the space needed to provide adequate power, to serve future heat pump system</p>
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Per Reference **Joint Appendix JA15.2** or be documented by a project Responsible Person based on total system load



## Mandatory Measure Updates

- ✦ Applies to:
  - ✧ Heating a **newly constructed** pool and/or spa
  - ✧ **Newly installed pool heaters** for an existing pool and/or spa
- ✦ Heating systems to meet one of **5 options**: 
  1. Solar pool heating system
    - ◆ Solar collector surface area  $\geq$  60% of pool and/or spa surface area
  2. Heat pump pool heater
    - ◆ **Primary** heating system that meets sizing requirements in Reference Joint Appendix **JA16.3**
    - ◆ **Supplementary** heater can be any energy source
      - ✧ Additional control requirements may apply
  3. Heating system that derives  $\geq$  60% annual heating energy from on-site renewable or recovered energy
  4. Combination of solar pool heating system and heat pump pool heater without a supplementary heater
  5. Pool heating system determined by Executive Director to use no more energy than systems above
- ✦ Exceptions may apply (portable spas are subject to Title 20)



## *More on Option 2:*

★ Heat pump pool heaters with **supplementary heaters** shall have **controls** installed to ensure:

New

- ✧ Supplementary heater does not operate when the heating load can be met by the heat pump alone
- ✧ The **cut-on temperature** for heat pump heating is **higher** than the cut-on temperature for supplementary heating
- ✧ The **cut-off temperature** for heat pump heating is **higher** than the cut-off temperature for supplementary heating

# 2025 Code Breaker: What's New for Multifamily

1. Overview

2. Mandatory Measures

**3. Prescriptive**

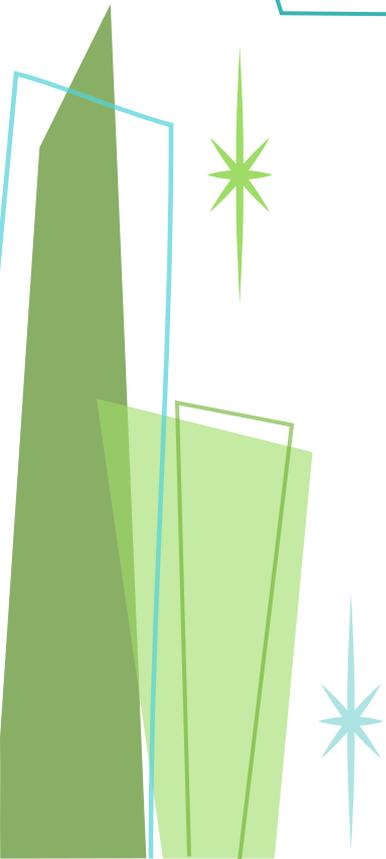
4. Next Steps

★ **Review what's new in 2025 Energy Code for:**

- ✧ Envelope
- ✧ Mechanical
- ✧ Lighting
- ✧ PV and Battery Storage



# Prescriptive Multifamily Envelope



# Table 170.2-A: Prescriptive Building Design

§170.2



## High-level Updates to Table 170.2-A

Changes to Cool Roof values

Steep-sloped roofs for Option B: "Attic – Below Roof Deck"



### Option B Excerpt of Table 170.2-A: Envelope Component Package – Multifamily Building Design

Multifamily Option B		Climate Zone															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Below Roof Deck Insulation (with Air Space)		NR	NR	NR	R-19	NR	NR	NR	R-19	R-19	R-13	R-19	R-19	R-19	R-19	R-19	R-13
Ceiling Insulation		R-38	R-38	R-30	R-38	R-30	R-30	R-30	R-38								
Radiant Barrier		NR	REQ	REQ	NR	REQ	REQ	REQ	NR								
Low-sloped	Aged Solar Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.63	NR	0.63	NR
	Thermal Emittance	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.75	NR	0.75	NR
	Solar Reflectance Index (SRI)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	75	NR	75	NR
Steep-sloped	Aged Solar Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.25	0.25	0.20	0.25	0.20	0.25	NR
	Thermal Emittance	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.75	0.75	0.75	0.75	0.75	0.75	NR
	Solar Reflectance Index (SRI)	NR	NR	NR	NR	NR	NR	NR	NR	NR	23	23	16	23	16	23	NR

All values in orange increased

NR = No Requirement  
REQ = Required

# Table 170.2-A: Prescriptive Building Design (cont.)



## ✦ High-level Updates to Table 170.2-A

- ✦ Changes to Cool Roof values
  - ◆ Low-sloped roofs for Option D: “Non-attic roof”



### Option D Excerpt of Table 170.2-A: Envelope Component Package – Multifamily Building Design

Multifamily Option D	Climate Zone															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Metal Building U-factor	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041
Wood-framed and Other U-factor	0.028	0.028	0.034	0.028	0.034	0.034	0.039	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
Low-sloped	Aged Solar Reflectance	NR	0.63	NR	0.63	NR	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	NR
	Thermal Emittance	NR	0.75	NR	0.75	NR	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	NR
	Solar Reflectance Index (SRI)	NR	75	NR	75	NR	75	75	75	75	75	75	75	75	75	NR
Steep-sloped	Aged Solar Reflectance	NR	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	NR
	Thermal Emittance	NR	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	NR
	Solar Reflectance Index (SRI)	NR	16	16	16	16	16	16	16	16	16	16	16	16	16	NR

All orange values formerly "No Requirement"

NR = No Requirement

# Table 170.2-A: Prescriptive Building Design (cont.)



## High-level Updates to Table 170.2-A

- Removed distinctions of “3 or fewer stories” and “4 or more stories”
- Fenestration U-Factor changes



### Fenestration Excerpt of Table 170.2-A: Multifamily Building Design

Multifamily		Climate Zone															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Curtain Wall/ Storefront	Maximum U-factor	0.38	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.38
	Maximum RSHGC	NR	0.26	NR	0.26	NR	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.26	NR
	Minimum VT, <b>common use areas</b>	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
NAFS 2017 Performance Class AW	Maximum U-factor	0.38	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.38
	Maximum RSHGC	NR	0.24	NR	0.24	NR	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	NR
	Minimum VT, <b>common use areas</b>	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
All Other Fenestration	Maximum U-factor	<b>0.28</b>	0.30	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>	0.34	0.34	<b>0.30</b>	0.30	0.30	<b>0.28</b>	0.30	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>
	Maximum RSHGC	NR	0.23	NR	0.23	NR	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	NR



NR = No Requirement

# Table 180.2-B: Fenestration Alterations

§180.2(b)1c



## ✦ High-level Updates to Table 180.2-B

- ✦ **SHGC changed** for CZ 1, 3, 5, & 16
- ✦ **U-factors reduced** for "all other windows" in some CZs
- ✦ Skylight section reorganized; SHGC changes



**Table 180.2-B: Multifamily Altered Fenestration**

Multifamily		Climate Zone															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Curtain Wall/Storefront/Window Wall	Max. U-factor	0.38	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.38
	Max. RSHGC	<b>NR</b>	0.26	<b>NR</b>	0.26	<b>NR</b>	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.26	<b>NR</b>
	Min. VT (MF 4 stories or more)	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
NAFS 2017 Performance Class AW Window	Max. U-factor	Fixed	0.38	0.38	0.38	0.38	0.38	0.47	0.47	0.41	0.41	0.38	0.38	0.38	0.38	0.38	0.38
		Operable	0.43	0.43	0.43	0.43	0.43	0.47	0.47	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
	Max. RSHGC	Fixed	<b>NR</b>	0.25	<b>NR</b>	0.25	<b>NR</b>	0.31	0.31	0.26	0.26	0.25	0.25	0.25	0.25	0.25	<b>NR</b>
		Operable	<b>NR</b>	0.24	<b>NR</b>	0.24	<b>NR</b>	0.31	0.31	0.24	0.24	0.24	0.24	0.24	0.24	0.24	<b>NR</b>
	Min. VT (MF 4 stories or more)	Fixed	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
		Operable	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
All Other Windows and Glazed Doors	Max. U-factor	<b>0.28</b>	0.30	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>	0.30	0.34	0.30	0.30	0.30	0.30	0.30	<b>0.28</b>	0.30	<b>0.28</b>	<b>0.28</b>
	Max. RSHGC	<b>NR</b>	0.23	<b>NR</b>	0.23	<b>NR</b>	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	<b>NR</b>
Skylights	Max. U-factor	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
	Max. SHGC	<b>NA</b>	0.25	<b>NA</b>	0.25	<b>NA</b>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	<b>NA</b>
Skylights, Serving Common Areas	Min. VT (low & high-rise)	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49

SHGC changes in orange; U-factor changes in blue



# Prescriptive Multifamily Mechanical



# Cooling Tower Fan Efficiency



- ✦ **Mandatory** requirements of §110.2(e) cycles of concentration have been revised
- ✦ **Per Table 170.2-I-2, which outlines Prescriptive cooling tower requirements by climate zone:**
  - ✦ **Axial fan, open-circuit cooling towers** serving condenser water loops for chilled water plants  $\geq 900$  gpm to have **minimum rated fan efficiency** below
  - ✦ **Exception**
    - ◆ Replacement of existing cooling tower:
      - ◇ Inside an existing building
      - ◇ On an existing roof

2022 Exception removed for CZ 1 & 16

**Table 170.2-I: Minimum Efficiency for Propeller or Axial Fan Open-circuit Cooling Towers**

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Rated Fan Efficiency																
gpm/hp	42.1	70	60	70	70	80	80	80	80	80	60	70	80	60	80	42.1

New Table

Formerly 60 for CZ 1-15

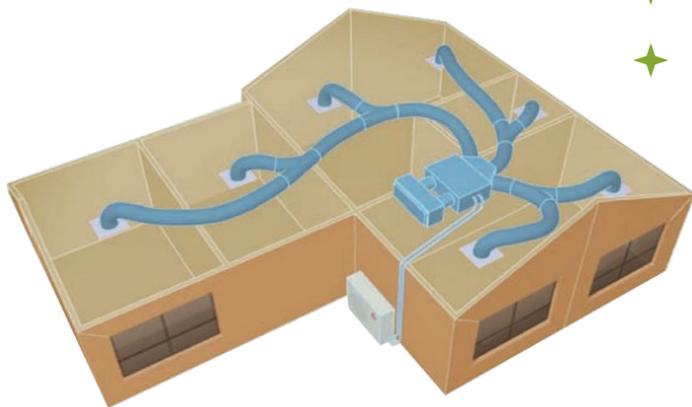
# Compliance Credit Available for Efficient Heat Pumps



Using the performance approach, projects can generate significant compliance credit by specifying heat pumps with high SEER2, EER2, and HSPF2

In the 2025 performance software, you will be able to take credit for a wider range of heat pumps:

- ✦ Ducted mini-split heat pumps
- ✦ Ductless mini-split heat pumps
- ✦ Ducted & ductless multi-split heat pumps
- ✦ Single speed central heat pumps



This modeling approach replaces the VCHP credit used in the 2022 code

**Prescriptive Approach** requires a **balanced ventilation system** to meet Mandatory Measures for whole-dwelling unit ventilation in §160.2(b)2Aivb1, **as well as** the following:

Supply Ventilation can only be done via Performance Approach

## Serving Individual Dwelling Units

- ✦ Shall, when serving **individual** dwelling units in **any Multifamily building** in **CZ 1, 2, 4, 11-14, & 16**:
  - ✦ Be an **ERV** (energy recovery ventilator) **or HRV** (heat recovery ventilator)
  - ✦ Have a sensible recovery **efficiency**  $\geq 67\%$ , rated at 32°F
  - ✦ Have a **fan efficacy**  $\leq 0.6$  W/cfm
  - ✦ Be confirmed by **field verification** in accordance with:
    - ◆ **RA3.7.4.4** (if MF  $\leq 3$  stories)
    - ◆ **NA2.2.4.1.5** (if MF  $\geq 4$  stories)



## Serving Multiple Dwelling Units

- ✦ Shall, when serving **multiple** dwelling units in **MF  $\geq 4$  stories** in **CZ 1, 2, 4, 11-14, & 16**:
  - ✦ Be an **ERV** (energy recovery ventilator) **or HRV** (heat recovery ventilator)
  - ✦ Have a sensible recovery **efficiency**  $\geq 67\%$ , rated at 32°F
  - ✦ Meet **fan power** requirements of **§170.2(c)4A**
  - ✦ Have a **recovery bypass or control** to directly economize with ventilation air based on outdoor air temp. limits in **Table 170.2-G**
  - ✦ Be confirmed by **field verification** in accordance with **NA7.18.4**



## Heat Pump Space-Conditioning System

- ✦ **For MF ≤ 3 stories in CZ 5-10, & 15:**
  - ✧ When a **heat pump** space-conditioning system is installed to meet the requirements of §170.2(c)3Ai, **balanced** ventilation systems **without** an ERV or HRV shall have a **fan efficacy ≤ 0.4 W/cfm**



# Fault Indicator Displays

§170.2(c)3Bv



✦ All **HRV/ERV** systems serving **individual dwelling units** shall have:

✦ A **Fault Indicator Display (FID)** that is **manufacturer certified** per requirements in Joint Appendix **JA17.4**

✦ **FID certification** shall be **verified** by an **ECC-Rater**





## ★ Water Heater Prescriptive Requirements Serving New Individual Dwelling Units:

### 1. A single 240 volt Heat Pump Water Heater (HPWH):

- ◆ **Climate Zones 1 and 16:**  
With compact hot water distribution system
- ◆ **Climate Zone 16:**  
With drain water heat recovery system
- ◆ **If Dwelling Unit Has 1 Bedroom or Less:**  
A single 120 volt HPWH may be installed

New

OR

### 2. A single NEEA-rated Tier 3 Heat Pump Water Heater with:

- ◆ **Climate Zone 16:**  
With drain water heat recovery system

New



## ★ **Removed option** for gas or propane instantaneous in 2025 for **low-rise Multifamily** (3 stories or fewer)

- ✧ New exception allows it in **Multifamily 4 stories or more** (tankless with input of  $\leq 200,000$  Btu/hr)

There are **no Prescriptive** DHW requirements for Multifamily **Common Areas**

HPWH Ready reqs. would apply



If a water heater system serves **more than one** dwelling unit:

## ★ System type

- ✧ Heat pump system **NEEA Tier 2** or higher **or**
- ✧ A **single-pass\*** heat pump system  
*(meeting additional design criteria that has not changed)* **or**
- ✧ Gas/propane system served by solar thermal system *(no change)*

## ★ Hot water piping

- ✧ Sized according to **Appendix M** of **CA Plumbing Code**

## ★ Recirculation system

- ✧ When system serving **9 or more** dwelling units, then **mechanical or digital thermostatic master mixing valve** on each distribution supply/return loop meeting **RA4.4.19** required

\* *Single-pass water heater is a water heater in which the cold water passes through once and is heated to the intended use temperature*



## Check Your Understanding 4.1

### What do you think?

1. What is a valid IAQ ventilation design configuration under the 2025 Energy Code for Multifamily dwelling units?

Select all that apply.

- a) Exhaust fan system
- b) Supply fan system
- c) Balanced ventilation system using a combination of Supply and Exhaust
- d) Exhaust fan system with blower door testing

**Mandatory Measures require balanced or supply ventilation. All dwelling units within the building must use the same system type.**





## Check Your Understanding 4.2

### What do you think?

2. Which of these water heaters can be used Prescriptively to serve a new **dwelling unit** for a **3-story Multifamily building**?  
Select all that apply.

a) Heat Pump Water Heater  
(50 gallons or less)

b) Heat Pump Water Heater  
(Any size)

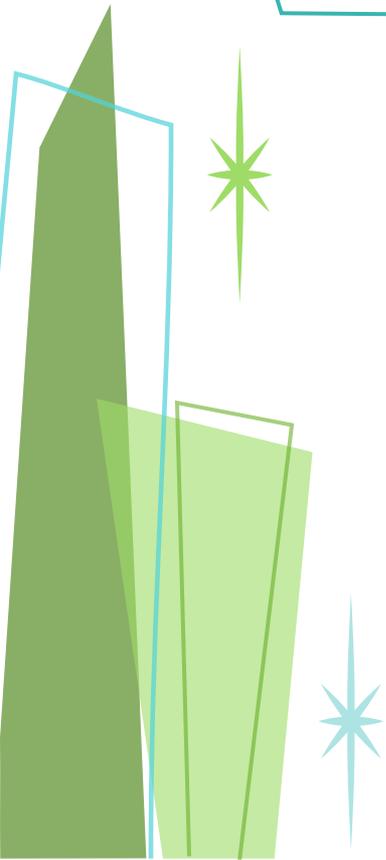
c) Gas Tankless Water Heater

d) Electric Tankless Water Heater

**One HPWH may be used, with or without a NEEA Tier 3 rating.  
Tank volume does not matter.**



# Prescriptive Lighting



# Mandatory Indoor Lighting

§160.5(a-b)



## Dwelling Unit Requirements

- ✦ **Matches Single-family** changes



## Common Services Area Requirements

- ✦ **Matches Nonresidential** changes (mostly)



# Tailored Method – Common Use Areas Only

§170.2(e)



## ✦ Tailored Method

✦ **Removed** as a compliance method in 2025

✦ Wattage flexibility that the Tailored Method supported is now offered in **additional allowances** added to the **Area Category Method**



# Area Category Allowances – Common Use Areas Only

§170.2(e)



Excerpt of Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft<sup>2</sup>)

Primary Function Area	Allowed Lighting Power Density for General Lighting (W/ft <sup>2</sup> )	Additional Lighting Power	
		Qualified Lighting Systems	Additional Allowance (W/ft <sup>2</sup> unless noted otherwise)
Storage	0.40	-	-
Conference, Multipurpose and Meeting Area	0.75	Decorative/Display	0.25
	0.75	Wall Display MH ≤ 10'6"	2 W/ft
	0.75	Wall Display MH 10'7" – 14'	2.35 W/ft
	0.75	Wall Display MH > 14'	2.66 W/ft
	0.75	Floor Display & Task MH ≤ 10'6"	0.30
	0.75	Floor Display & Task MH 10'7" – 14'	0.35
	0.75	Floor Display & Task MH > 14'	0.40
Copy Room	0.50	-	-
Corridor Area	0.40	Decorative/Display	0.25

Reduced from 0.45

Reduced from 0.30

**New**  
More display categories added per luminaire's MH = "mounting height" (distance from finished floor to bottom of luminaire)

Similar 2025 updates will appear in the rest of this table for:

- Dining Areas
- Lobby/Main Entry



**Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft<sup>2</sup>)**

Primary Function Area		Allowed Lighting Power Density for General Lighting (W/ft <sup>2</sup> )	Additional Lighting Power	
			Qualified Lighting Systems	Additional Allowance (W/ft <sup>2</sup> unless noted otherwise)
Dining Area	Bar/Lounge and Fine Dining	0.45	Display/ <del>Decorative</del>	0.35
		<b>0.45</b>	Wall Display MH ≤ 10'6"	<b>1.25 W/ft</b>
		<b>0.45</b>	Wall Display MH 10'7" – 14'	<b>1.5 W/ft</b>
		<b>0.45</b>	Wall Display MH > 14'	<b>1.7 W/ft</b>
		<b>0.45</b>	Floor Display & Task MH ≤ 10'6"	<b>0.45</b>
		<b>0.45</b>	Floor Display & Task MH 10'7" – 14'	<b>0.52</b>
		<b>0.45</b>	Floor Display & Task MH > 14'	<b>0.60</b>
		<b>0.45</b>	General Lighting in enclosed space of ceiling height > 10'	<b>0.25</b>
			Cafeteria/Fast Food	0.45
	Family and Leisure	0.40	Display/Decorative	0.25





**Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft<sup>2</sup>)**

Primary Function Area	Allowed Lighting Power Density for General Lighting (W/ft <sup>2</sup> )	Additional Lighting Power		
		Qualified Lighting Systems	Additional Allowance (W/ft <sup>2</sup> unless noted otherwise)	
Health Care/ Assisted Living	Nurse's Station	<b>0.85</b>	Tunable white or dim-to-warm <sup>8</sup>	0.10
	Physical Therapy Room	<b>0.75</b>	Tunable white or dim-to-warm <sup>8</sup>	0.10
Kitchen/Food Preparation Area		0.95	–	–
Electrical, Mechanical, Telephone Rooms		0.40	Detailed Task Work <sup>1</sup>	0.20
Exercise/Fitness Center & Gym Area		0.50	–	–
Lobby, Main Entry		0.70	Display/ <del>Decorative</del>	0.25
		<b>0.70</b>	Wall Display MH ≤ 10'6"	<b>3 W/ft</b>
		<b>0.70</b>	Wall Display MH 10'7" – 14'	<b>3.5 W/ft</b>
		<b>0.70</b>	Wall Display MH > 14'	<b>4 W/ft</b>
Locker Room		0.45	–	–
Lounge, Breakroom or Waiting Area		0.55	Display/Decorative	0.25

*Increased from 0.75*

*Reduced from 0.85*

*New*





**Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft<sup>2</sup>)**

Primary Function Area		Allowed Lighting Power Density for General Lighting (W/ft <sup>2</sup> )	Additional Lighting Power	
			Qualified Lighting Systems	Additional Allowance (W/ft <sup>2</sup> unless noted otherwise)
Concourse and Atria Area		0.60	Display/Decorative	0.25
Office Area	> 250 square feet	0.60	Decorative/Display & Portable lighting for office areas <sup>5</sup>	0.20
	≤ 250 square feet	0.65	Decorative/Display & Portable lighting for office areas <sup>5</sup>	0.20
Parking Garage Area	Parking Zone and Ramps	0.10	First ATM or Ticket machine	100 W
		0.10	Additional ATM or Ticket machine	50 W each
	Daylight Adaptation Zones <sup>3</sup>	1.00	–	–
Laundry Area		0.45	–	–
Restrooms		0.65	Decorative/Display	0.35

**No changes**



**Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft<sup>2</sup>)**

Primary Function Area	Allowed Lighting Power Density for General Lighting (W/ft <sup>2</sup> )	Additional Lighting Power		
		Qualified Lighting Systems	Additional Allowance (W/ft <sup>2</sup> unless noted otherwise)	
Stairwell	0.60	Decorative/Display	0.35	
All other	0.40	–	–	
Aging Eye/ Low-vision <sup>6</sup>	Lobby, Main Entry	0.85	Display/Decorative	0.30
	Lobby, Main Entry	0.85	Transition Lighting OFF at night <sup>7</sup>	0.95
	Stairwell	0.80	Display/Decorative	0.30
	Corridor Area	0.70	Display/Decorative	0.30
	Lounge/Waiting Area	0.80	Display/Decorative	0.30
	Multipurpose Room	0.85	Display/Decorative	0.30
	Dining	0.80	Display/Decorative	0.30
	Restroom	1.00	Display/Decorative	0.20



# Prescriptive Multifamily PV and Battery Storage





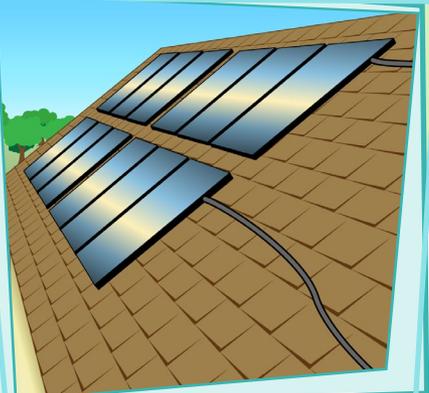
## Multifamily at a glance

### New Construction:

- ✦ **Solar PV** applies to **all Multifamily buildings**
- ✦ **Battery Storage** requirements **ONLY** apply to **Multifamily buildings 4 stories or higher**
- ✦ If a project is exempt from Solar PV, then it is also exempt from Battery Storage
  - ✧ Solar Ready still applies



Energy Code Requirements	Low-rise Multifamily (3 stories or fewer, New Construction)	High-rise Multifamily (4 stories or more, New Construction)
<b>Solar PV</b>	✓	✓
<b>Solar Ready</b>	✓ (When exempt from PV)	✓ (When exempt from PV)
<b>Battery Storage</b>		✓ (If no exemption taken for PV)



# Solar Photovoltaic (PV): Multifamily – 3 Stories or Fewer



§170.2(f)



## Prescriptive PV Sizing Using SARA

### For Multifamily (3 Stories or Fewer)

✦ Solar PV requirement is expressed as a **kW (DC Rating)**

✧ Can be met by the **smaller of two options:**

◆ PV system size by using **Equation 170.2-C**

◆ Formula using **Solar Access Roof Area (SARA):**

◆ **Low-slope SARA x 14 W/ft<sup>2</sup>**

◆ **Steep-slope SARA x 18 W/ft<sup>2</sup>**

◆ If a project involves **both** low- and steep-sloped roofs, these results would be **summed** together

✦ **No Solar Photovoltaic (PV) Prescriptively required** on a new building if minimum required size **< 4 kW**

✧ Required Size  
(not Proposed Size)

No change  
to equation

New

Increased  
from 1.8 kW



**Table 170.2-T: CFA and Dwelling Unit Adjustment Factors**

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

✦ **Prescriptive** requirement is expressed as a kW (DC Rating)

✦ **Equation 170.2-C:**  
**DC Rating = (CFA x A) / 1000 + (N<sub>DU</sub> x B)**

✦ **CFA** = Conditioned floor area

✦ **N<sub>DU</sub>** = Number of dwelling units

✦ **A** = CFA adjustment factor from **Table 170.2-T**

✦ **B** = Dwelling unit adjustment factor from **Table 170.2-T**

No change to table in 2025



# Solar Photovoltaic (PV): Multifamily – 4 Stories or More



§170.2(g)



## Prescriptive PV Sizing Using SARA

### For Multifamily (4 Stories or More)

- ✦ Solar PV requirement is expressed as a **kW (DC Rating)**
- ✦ Can be met by the **smaller of two options**:
  - ◆ PV system size by using **Equation 170.2-D**
  - ◆ Formula using **Solar Access Roof Area (SARA)**:
    - ◆ **Low-slope SARA x 14 W/ft<sup>2</sup>** **New**
    - ◆ **Steep-slope SARA x 18 W/ft<sup>2</sup>**
  - ◆ If a project involves **both** low- and steep-sloped roofs, these results would be **summed** together

No change  
to equation

New



# An Example: PV Method 1



## ★ For a Multifamily Building:

- ✧ 4 Stories in Climate Zone 3
- ✧ CFA of **100,000 ft<sup>2</sup>**
- ✧ SARA of **25,000 ft<sup>2</sup>**
- ✧ **Steep-sloped** roof
- ✧ Minimum PV Capacity of **1.82**  
(**Factor A** per table below)

## ★ CFA Method: Use DC Rating Formula



- ✧ **DC Rating = (CFA x A) / 1000**
- ✧ **DC Rating = (100,000 ft<sup>2</sup> x 1.82 W/ft<sup>2</sup>) / 1000**
- ✧ **DC Rating = 182 kW**

Method 1 Answer

Table 170.2-U: PV Capacity Factors

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
"Factor A" – PV Capacity Factors (W/ft <sup>2</sup> of conditioned floor area)																
<b>Multifamily &gt; 3 Stories</b>	1.82	2.21	<b>1.82</b>	2.21	1.82	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.77	1.82

CZ3

# An Example: PV Method 1 vs. Method 2

§170.2(g)



## ★ For a Multifamily Building:

- ✧ 4 Stories in Climate Zone 3
- ✧ CFA of **100,000 ft<sup>2</sup>**
- ✧ SARA of **25,000 ft<sup>2</sup>**
- ✧ **Steep-sloped** roof
- ✧ Minimum PV Capacity of **1.82**

## ★ CFA Method: Use DC Rating Formula



- ✧ **DC Rating = (CFA x A) / 1000**
- ✧ **DC Rating = (100,000 ft<sup>2</sup> x 1.82 W/ft<sup>2</sup>) / 1000**
- ✧ **DC Rating = 182 kW**

Method 1 Answer

## ★ SARA Method

- ✧ **DC Rating = Total SARA x 18 W/ft<sup>2</sup>**
- ✧ **DC Rating = 25,000 ft<sup>2</sup> x 18 W/ft<sup>2</sup>**
- ✧ **DC Rating = 450,000 W**
- ✧ **DC Rating = 450 kW**

Method 2 Answer

Then  
pick the

smaller value

**182 kW** (Method 1)

# PV Exceptions – 3 Stories or Fewer

§170.2(f)



## No PV system is required if:

- ✦ The **SARA is < 80 contiguous square feet**
  - ✧ For **steep-slope** roofs, SARA shall not consider roof areas with a northerly azimuth that lies between 300 degrees and 90 degrees from true north
- ✦ The minimum PV system size specified by §170.2(f) is **< 4 kWdc**
- ✦ The building has an enforcement-authority-approved roof design, and the enforcement authority determines it is **not possible** for the PV system to meet **ASCE 7-16, Chapter 7, Snow Loads**
  - ✧ “PV System” includes panels, modules, components, supports and attachments to the roof structure
- ✦ The building is approved by the local planning department **prior to January 1, 2020** with mandatory conditions for approval

Steep-slope



Increased from 1.8 kW



## Required minimum PV system **may be reduced by 25%** if:

- ✦ Installed in conjunction with a **battery energy storage system (BESS)**
  - ✧ Battery energy storage system shall meet Joint Appendix JA12 qualification requirements and have a minimum **cycling capacity of 7.5 kWh**

# PV Exceptions – 4 Stories or More

§170.2(g)



## Exceptions

- ✦ **No PV system** is required when:
  - ✦ The total of all available Solar Access Roof Area (**SARA**) is **< 3%** of the conditioned floor area
  - ✦ The required PV system capacity is **< 4 kWdc**
  - ✦ The SARA contains **< 80 contiguous ft<sup>2</sup>**
  - ✦ The building has an enforcement-authority-approved roof design, and the enforcement authority determines it is **not possible** for the PV system to meet **ASCE 7-16, Chapter 7, Snow Loads**
    - ◆ “PV System” includes panels, modules, components, supports and attachments to the roof structure
  - ✦ In an area where a load serving entity does not provide a program where PV generation is compensated through virtual energy bill credits
    - ◆ **This exception does NOT apply where:**
      - ◆ CEC has approved a community solar program as specified in Title 24, Part 1, Section 10-115 **OR**
      - ◆ Program is provided to compensate PV generation through virtual energy bill credits for occupants of nonresidential and hotel/motel tenant spaces to receive energy bill benefits from netting of energy generation and consumption
        - This is a replacement of the Virtual Net Energy Metering (VNEM) exception



# Battery Energy Storage Systems (BESS)

§170.2(h)



✦ All buildings **4 stories or more** required by §170.2(g) to have a **PV system** shall also have a **battery energy storage system (BESS)**

- ✦ **Minimum rated energy capacity** to be determined by:
  - ◆ **Equation 170.2-E OR**
  - ◆ **Equation 170.2-F** (if SARA method was used to determine PV capacity)
- ✦ **Minimum rated power capacity** to be determined by:
  - ◆ **Equation 170.2-G**

Updated equations in 2025. We'll look at these next.



- ✦ If the building includes **more than one of the space types** listed below:
  - ◆ The total battery system capacity for the building shall be the **sum** of the Minimum Rated Usable Energy Capacity for *each* of the listed building types together

*Excerpt from Table 170.2-V: Battery Storage Capacity Factors*

Building Type
Events & Exhibits
Library
Hotel/Motel
Office, Financial Institution, Unleased Tenant Space, Medical Office Building/Clinic
Restaurants
Retail, Grocery
School
Warehouse
Religious Worship
Sports & Recreation
Multifamily > 3 stories

Battery Storage **ONLY** required in MF buildings **4 stories or more**





## ✦ Minimum Rated Usable Energy Capacity (Equation 170.2-E)

$$\text{kWh} = (\text{CFA} \times \text{B}) / (1000 \times \text{C}^{0.5})$$

- ◆ kWh = Minimum Rated Usable Energy Capacity of the Battery, in kWh
- ◆ CFA = Conditioned floor area subject to PV system reqs. in Section 170.2(g), in ft<sup>2</sup>
- ◆ B = Battery capacity factor specified in Table 170.2-V for the building type, in Wh/ft<sup>2</sup>
- ◆ C = Rated single charge-discharge cycle AC to AC (round-trip) efficiency of the Battery

Excerpt of Table 170.2-V: BESS Capacity Factors

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
BESS Capacity Factors (Wh/ft <sup>2</sup> of conditioned floor area)																
Multifamily > 3 Stories	1.88	2.27	1.88	2.27	1.88	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.85	1.88

### ✦ Example:

- ✦ 4 Stories in Climate Zone 3
- ✦ CFA of 100,000 ft<sup>2</sup>
- ✦ Battery Capacity Factor = 1.88 (per table above)
- ✦ Round trip battery efficiency = 95%

Min. Rated Usable Energy Capacity is:

$$\text{kWh} = (\text{CFA} \times \text{B}) / (1000 \times \text{C}^{0.5})$$

$$\text{kWh} = (100,000 \times 1.88) / (1000 \times 0.95^{0.5})$$

$$\text{kWh} = 188,000 / (1000 \times \sqrt{0.95})$$

$$\text{kWh} \approx 188,000 / 974.68$$

$$\text{kWh} \approx 192.9 \text{ kWh}$$

Answer



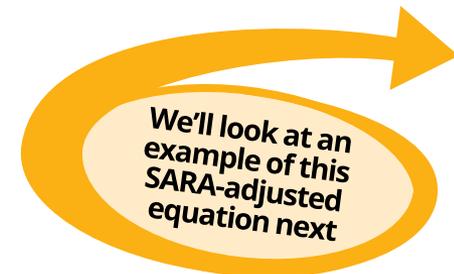
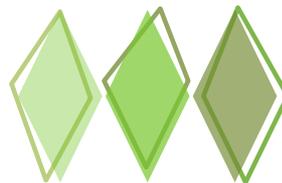
## ✦ **Alternate Method** – *if SARA method was used to determine PV capacity:* **Min. Rated Usable Energy Capacity, SARA-Adjusted (Equation 170.2-F)**



✦ **Takes the equation we just used and tweaks it a bit to adjust for SARA** (equation adjustments highlighted in orange below)

$$\text{kWh} = ((\text{CFA} \times \text{B}) / (1000 \times \text{C}^{0.5})) \times (\text{kW}_{\text{PVdc,SARA}} / \text{kW}_{\text{PVdc}})$$

- ◆ **kWh** = Minimum Rated Usable Energy Capacity of the Battery, in kWh
- ◆ **CFA** = Conditioned floor area subject to PV system reqs. in Section 170.2(g), in ft<sup>2</sup>
- ◆ **B** = Battery **capacity factor** specified in **Table 170.2-V** for the building type, in Wh/ft<sup>2</sup>
- ◆ **C** = Rated single charge-discharge cycle AC to AC (round-trip) efficiency of the Battery
- ◆ **kW<sub>PVdc,SARA</sub>** = Minimum Rated PV System Capacity from the SARA calculation, in kW
- ◆ **kW<sub>PVdc</sub>** = Minimum Rated PV System Capacity in kW from **Equation 170.2-D**







## ★ Minimum Rated **Power** Capacity (Equation 170.2-G)

✧  $kW = kWh_{batt} / 4$

Revised Equation

- ◆ kW = Minimum Rated Power Capacity of the Battery, in kWdc
- ◆ kWh<sub>batt</sub> = Minimum Rated Usable Energy Capacity of the Battery, in kWh

## Example Calculation

### ★ For our Original **CFA-driven** example:

- ✧ Minimum Rated Usable Energy Capacity of Battery **Equation 170.2-E = 192.9 kWh**  
(calculated in earlier slide)

OR

### ★ For **SARA-driven** example used for PV:

- ✧ Minimum Rated Usable Energy Capacity of Battery **Equation 170.2-F = 57.87 kWh**  
(calculated in earlier slide)

### ★ Minimum rated **power** capacity is:

- ✧  $kW = kWh_{batt} / 4$
- ✧  $kW = 192.9 / 4$
- ✧  $kW \approx 48.2 \text{ kW}$

### ★ Minimum rated **power** capacity is:

- ✧  $kW = kWh_{batt} / 4$
- ✧  $kW = 57.87 / 4$
- ✧  $kW \approx 14.47 \text{ kW}$





## Battery Storage Exceptions (4 Stories or More)

No substantive changes

✧ **No battery energy storage system** is required:

- ◆ When Solar PV is also not required by Energy Code
  - Exception used for PV
  - Project has no applicable building types subject to PV
  - PV “traded” away via the Performance Approach
- ◆ If the installed PV system capacity is < **15%** of the capacity determined by **Equation 170.2-E** (CFA Method)
- ◆ In buildings with battery storage system requirements with < **10 kWh** minimum rated usable energy capacity
- ◆ In these building types in **Climate Zone 1**:
  - ◇ Office, financial institution, unleased tenant space, medical office building/clinic, warehouse, and school



## Check Your Understanding 5.1

### What do you think?

1. Which Prescriptive compliance method was **removed** from 2025 Energy Code for lighting in Multifamily **Common Use Areas**?

- a) Complete Building Method
- b) Area Category Method
- c) Tailored Method

Wattage flexibility formerly provided in the Tailored Method is now supported via additional allowances in the Area Category Method.





## Check Your Understanding 5.2

### What do you think?

2. Which of these is a valid Solar Photovoltaic **exception** for a new Multifamily building?

- a) Mixed use building
- b) Required PV size < 4 kW (4 stories or more)
- c) Required PV size < 4 kW (3 stories or fewer)
- d) All of the above

2025 Energy Code increased the PV exception limit from 1.8 to **4 kw**. This exception only applies to **low-rise** Multifamily.



# 2025 Code Breaker: What's New for Multifamily

1. Overview

2. Mandatory Measures

3. Prescriptive Measures

**4. Next Steps**

## ✦ **Energy Code Ace**

✦ Resources

✦ Q & Ace and Helpdesk



# Virtual Classes

new in  
**2025**

**What's New in 2025  
Nonresidential Energy Code**  
Online Live Event

**What's New in 2025  
Residential Energy Code**  
Online Live Event

new in  
**2025**



# Now on YouTube: **Small Bites** from Energy Code Ace



energy code ace



+ Create



2025 · Title 24 · Part 6

## Energy Code Ace Overview

Small Bites

### Small Bites – Energy Code Ace: Title 24, Par...

by EnergyCodeAce

Playlist · 6 videos · 93 views

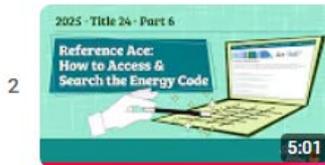
Collection of brief videos (five minutes or less) on topics associated with California's Building Energy Efficiency...

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#### Small Bite: Solar PV & Battery Storage Requirements (Single-family & Low-rise Multifamily)

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Watch videos to brush up on Energy Code topics, **5 minutes** at a time



# 2025 Fact Sheets on Energy Code Ace

**AVAILABLE NOW**  
What's New in 2025?  
What's Changed?

*Because everyone loves  
a good cheat sheet...*

2025 Title 24, Part 6 Fact Sheet

## Multifamily Buildings What's New in 2025?

2025 Title 24, Part 6 Fact Sheet

## Multifamily Buildings What's Changed in 2025?

### Using this Fact Sheet

Use this fact sheet if you need to examine the language of the 2025 California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) for multifamily buildings.

- + Energy Code changes are organized by building feature, such as envelope, electrical, etc.
- + Each building feature section includes explanatory notes on all applicable sections.
- + When language has been added or substantially revised, the intent of the language of the 2025 Energy Code is included.
- + If there are no changes, or minimal clean-up, those Energy Code sections are not included.
- + To review Energy Code updates incorporated into the 2025 Energy Code, see the 2025 Single-Family Buildings Fact Sheet.

### What's Included:

This fact sheet describes changes made to the 2022 Energy Code and incorporated in the 2025 Energy Code for multifamily residential buildings.

2025 Title 24, Part 6 Fact Sheet

## Nonresidential Buildings What's New in 2025?

Using this Fact Sheet

2025 Title 24, Part 6 Fact Sheet

## Nonresidential Buildings What's Changed in 2025?

### Using this Fact Sheet

Use this fact sheet if you need to examine the language of the California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) for nonresidential buildings.

- + Energy Code changes are organized by building feature, such as envelope, electrical, etc.
- + Each building feature section includes explanatory notes on all applicable sections.
- + When language has been added or substantially revised, the intent of the language of the 2025 Energy Code is included.
- + If there are no changes, or minimal clean-up, those Energy Code sections are not included.

### What's Included:

This fact sheet describes changes made to the 2022 Energy Code and incorporated in the 2025 Energy Code for nonresidential buildings. As in the 2022 Energy Code, the 2025 Energy Code includes hotels and motels in the nonresidential subchapters.

## Single-family Buildings What's New in 2025?

## Single-family Buildings What's Changed in 2025?

Using this Fact Sheet

Use this fact sheet if you need to examine the language of the 2025 California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) for single-family residential buildings.

Highlights are given in the fact sheet.

### Using this Fact Sheet

Use this fact sheet if you need to examine the language of the 2025 California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) for single-family residential buildings.

Highlights are given in the fact sheet.

### What's Included:

This fact sheet describes changes made to the 2022 Energy Code and incorporated in the 2025 Energy Code for single-family buildings.

- + Single-family dwellings
- + Single-family accessory dwelling units
- + Duplexes
- + Townhomes of any size

### Table of Contents

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Nonresidential  
Edition (including  
Hotel/Motel)

Multifamily  
Edition

Single-family  
Edition

# Q & Ace and Helpdesk



The screenshot shows the AceTools website interface. At the top, there is a navigation bar with links for "Get Forms", "Tools Ace", "Training Ace", and "Resources Ace", along with a search bar and a user profile icon. Below this is a banner for "AceTools™". The main content area is titled "Q&Ace" and includes a sub-header: "Quickly find the answers to all your questions in our online knowledge base. Check out the Top Topics below or use the filters on the right." A secondary navigation bar contains links for "Home", "Forms", "Buildings", "Appliances", "Collections", and "My Account". The central focus is a large graphic for "EnergyCodeAce™" with the slogan "Comply With Me". Below the graphic, a text box states: "Your one-stop shop for no-cost tools, training and resources to help you comply with California's [Title 24, Part 6 building energy code](#) and [Title 20 appliance standards](#). We're powered by the California Statewide Codes & Standards Program and vetted by the California Energy Commission." To the right of this text are two circular icons: a question mark and a person icon. An orange arrow points from the text box towards the right side of the slide.





# Thank you

Please feel free to reach out to us with your questions and comments!

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Energy Code Ace	Multiple	<a href="http://energycodeace.com/content/contact">http://energycodeace.com/content/contact</a>	



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Insert survey URL here and add/apply hyperlink to entire blue box



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