2025 CODE BREAKER

Solving the Energy Code Puzzle One Piece at a Time

2025 Multifamily Update Overview

Participant Handout

May 2025

Energy Code Ace™

SDGE™

Southern California Edison®
Energy for What's Ahead®

Pacific Gas and Electric Company®

This page intentionally blank

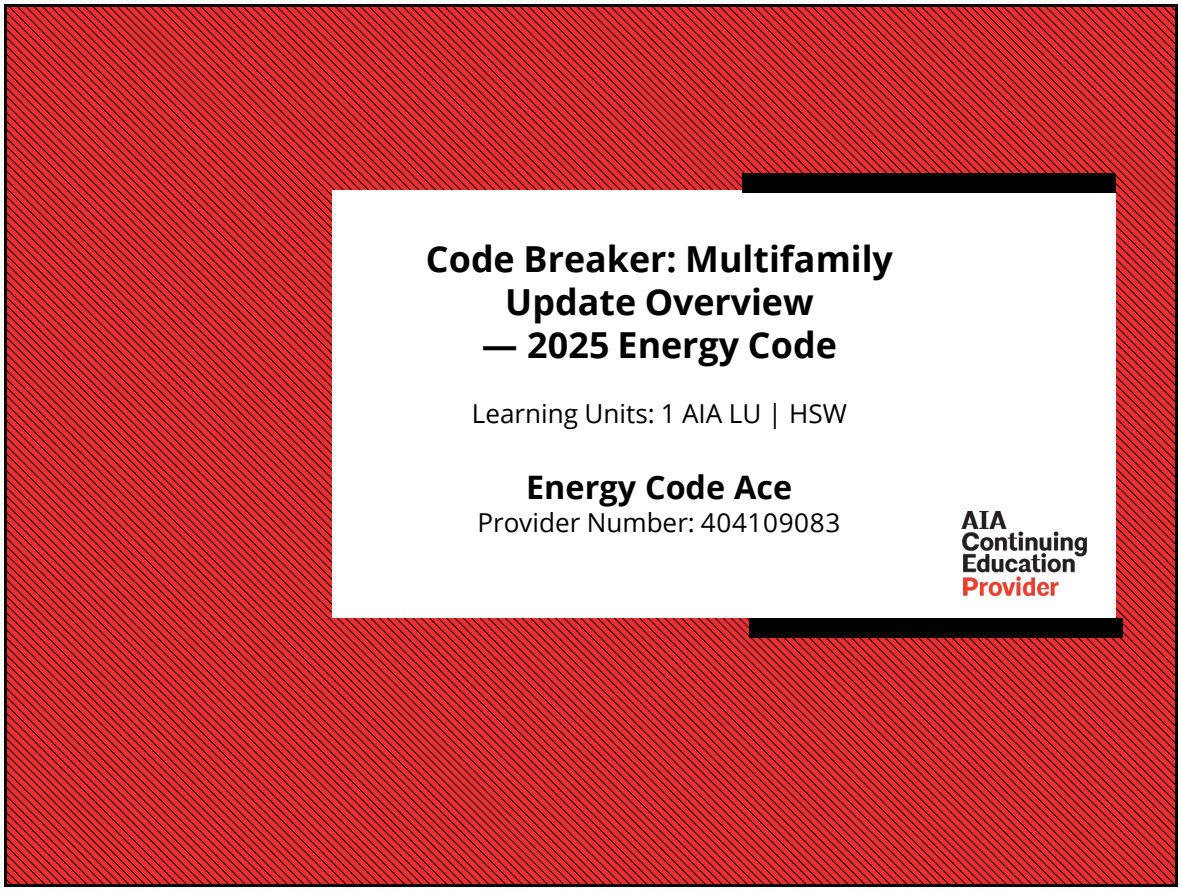
Table of Contents

ABOUT THE STATEWIDE CODES AND STANDARDS PROGRAM

The Statewide Codes and Standards Program (C&S Program) is jointly managed by the Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas and Electric Company. The C&S Program saves energy on behalf of ratepayers by directly influencing standards and code-setting bodies to strengthen energy efficiency regulations, by improving compliance with existing codes and standards, and working with local governments to develop ordinances that exceed statewide minimum requirements.

This class is one of many free courses, tools, and resources that the C&S Program offers. Please visit http://energycodeace.com/ or contact info@energycodeace.com to find out more about all program offerings.

AIA Information



Course Description

We will review the 2025 Energy Code Mandatory and Prescriptive requirements for Multifamily envelope, mechanical, photovoltaic and battery storage systems, in addition to the new electric-ready and performance compliance metrics introduced in the 2025 Energy Code.

Course Objectives

- Cite the date when 2025 Energy Code requirements will go into effect.
- Discuss updates to 2025 Mandatory and Prescriptive envelope, mechanical, photovoltaic and battery storage systems
- Recognize when electric-ready requirements will apply
- Identify online resources for more guidance on these topics.

AIA Continuing Education Provider

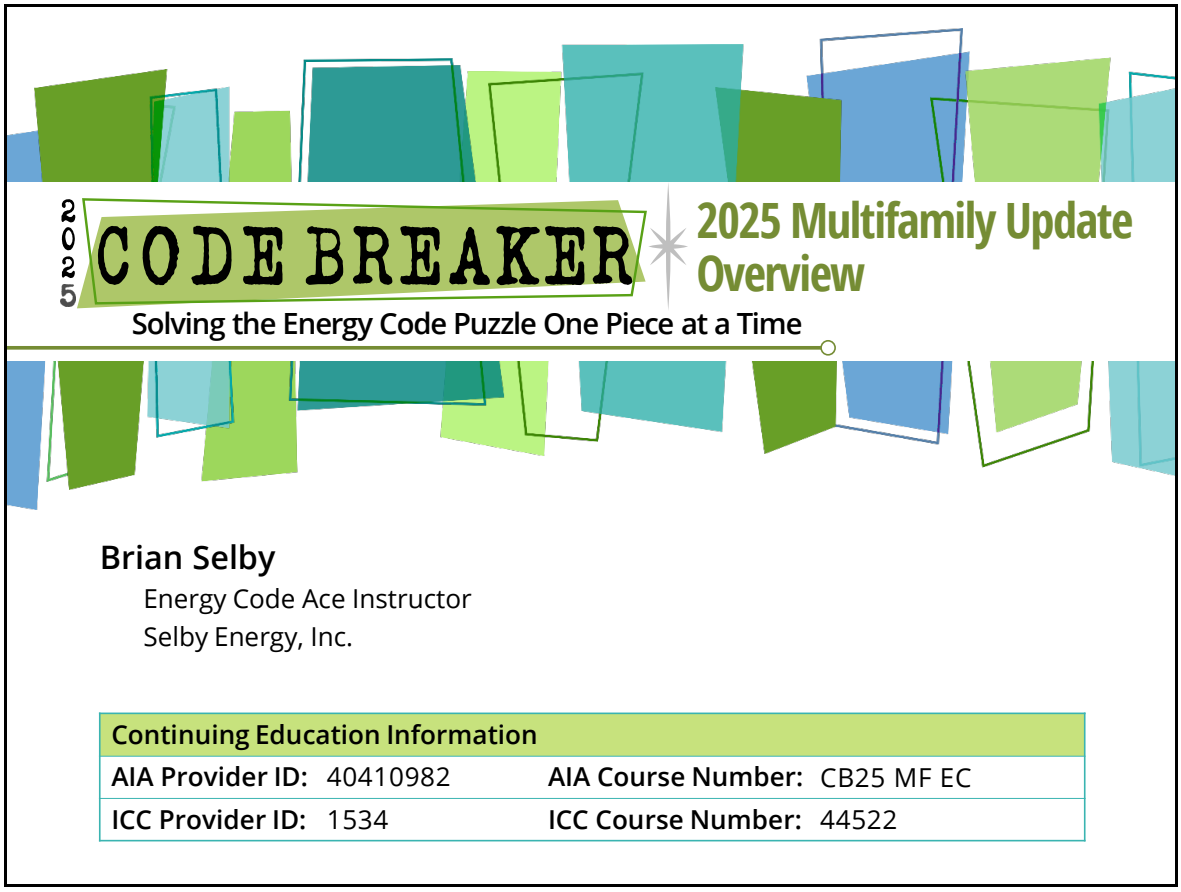
Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

AIA Continuing Education Provider

Welcome


2025
CODE BREAKER
2025 Multifamily Update Overview
Solving the Energy Code Puzzle One Piece at a Time
Brian Selby
Energy Code Ace Instructor
Selby Energy, Inc.
Continuing Education Information
AIA Provider ID: 40410982
AIA Course Number: CB25 MF EC
ICC Provider ID: 1534
ICC Course Number: 44522

Documenting Continuing Education Units (CEUs)

- Attendees who meet the completion criteria receive "standard" certificates of completion:
  - Typically sent within two weeks of course delivery
  - Certificate includes:
    - Course IDs (AIA & ICC)
    - Energy Code Ace Provider info (AIA & ICC)
- You may use this certificate to "self-certify" with a number of organizations in addition to AIA & ICC
  - If you entered your AIA member number when you registered, we will submit your course-completion information to AIA for you

Ace Training™

Training Objectives

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

EnergyCodeAce
Comply With Me

Ace Tools™

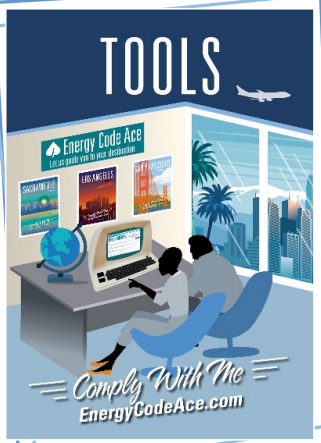
Ace Training™

Ace Resources™

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.

EnergyCodeAce
Comply With Me



Ace Training™

Ace Resources™

A suite of interactive tools to help you understand the compliance process, required forms, installation techniques and energy efficiency regulations applicable to building projects and appliances in California

Our Tools include:

- Energy Code Product Finder
- Forms Ace
- Image Ace
- Navigator Ace
- Nonres. Indoor Lighting Wheel
- Q&Ace
- Reference Ace
- Timeline Ace
- Virtual Compliance Assistant

EnergyCodeAce™
Comply With Me

Ace Tools™

Ace Resources™

A portfolio of on-demand and live online and in-person training alternatives on California's Energy Code and Title 20 regulations, tailored to a variety of industry professionals and addressing key measures

Our Training includes a variety of formats:

- In-person instructor-led
- Online instructor-led
- Online self-study
- Recorded webinars
- YouTube — live streaming & videos

EnergyCodeAce™
Comply With Me

Ace Tools™

Ace Training™

An array of downloadable materials providing practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards

Our Resources include:

- Application Guides
- Checklists
- Fact Sheets
- Submit a Question
- Trigger Sheets
- Useful Links

EnergyCodeAce™

Comply With Me

Join us at

www.EnergyCodeAce.com

Course Conventions

Mandatory

- Always required regardless of compliance approach used

Prescriptive

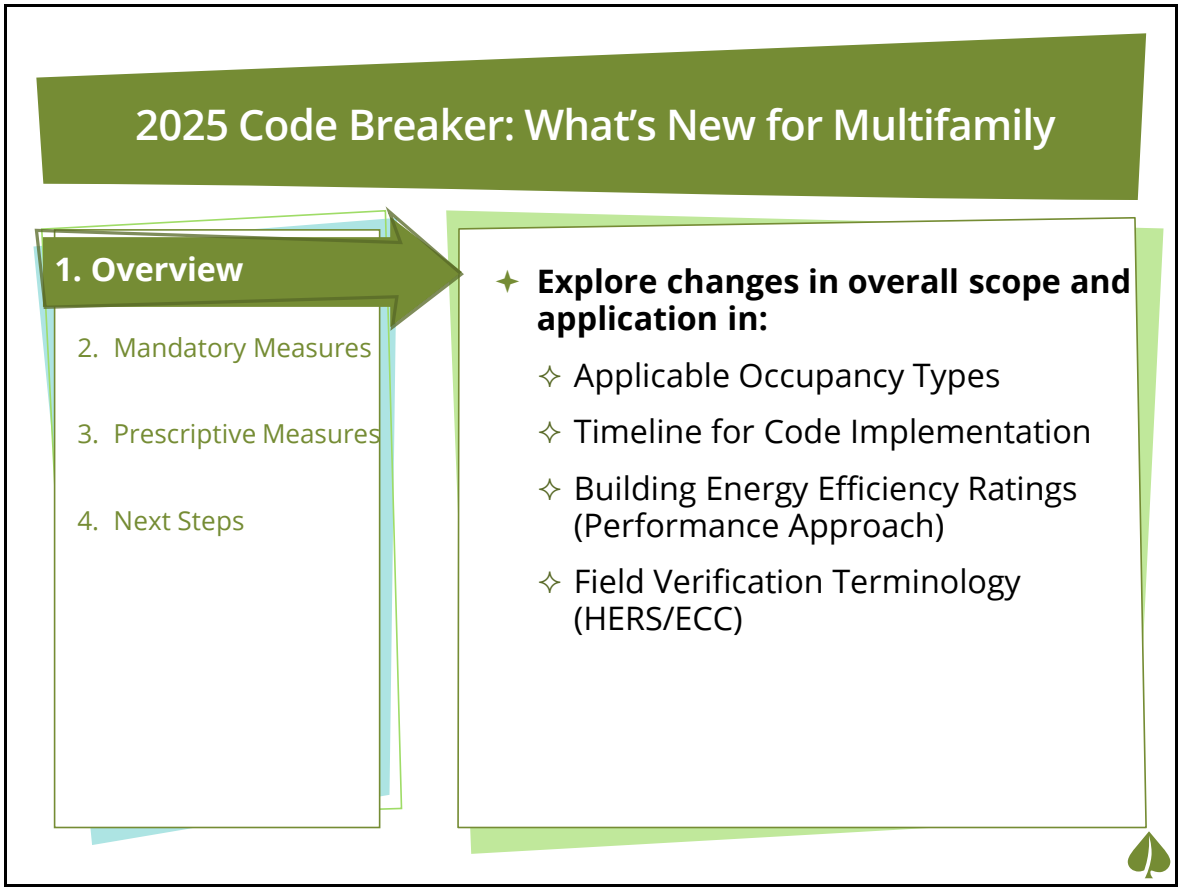
- Required when using the Prescriptive compliance approach

Performance

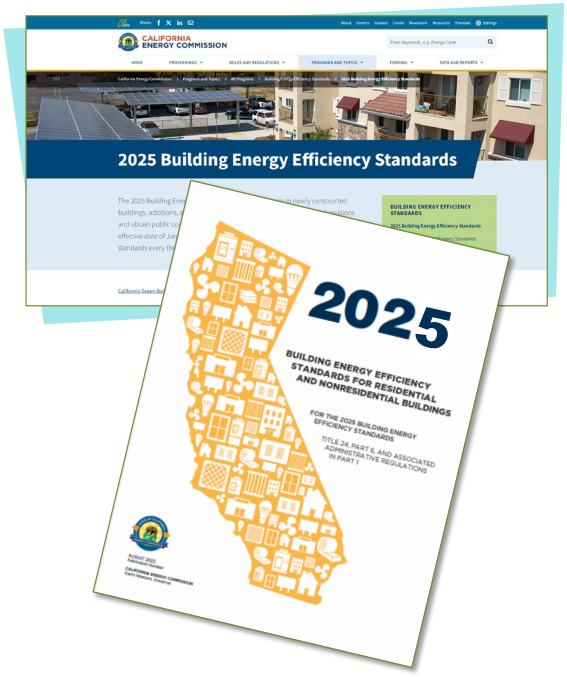
- Optional feature accounted for when doing Performance-based computer modeling

This page intentionally blank

Overview


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)

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 12th grade
C	Organized Camps	Outdoor group living experience **(exempt from Energy Code)**
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 **(exempt from Energy Code)**
	I-4	Daycare facilities **(exempt from Energy Code)**
L	Laboratories	Buildings with one or more lab suites
M	Mercantile	Grocery stores, department stores
R	Residential	Any building used for sleeping purposes:
	R-1	Hotels, motels and similar businesses
	R-2	Apartment buildings, dormitories and multi-user residences with more than 2 dwelling units
	R-3	Single-family homes and duplexes, as well as other permanent dwellings
	R-4	Care facilities and similar businesses
S	Storage	Home goods, tires, food products, parking garages
U	Miscellaneous	Agricultural, barns, greenhouses, carports

New

Energy Code now applies to labs

Uses NR code

Uses MF code

Uses SF or MF

Uses MF code

Evolving Building Energy Efficiency Ratings

For Multifamily Construction

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

e = "efficiency" TDV metric

t = "total" TDV metric (also factors in PV and flexibility)

Enables measure of emissions in some form

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, LSC**e, **LSC**t	**LSC**e	**LSC**e

New: "LSC"

e = "efficiency" LSC metric

t = "total" LSC metric (also factors in PV and flexibility)

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

Includes energy used by:
- Envelope
- Indoor Fans
- HVAC
- DHW
- Other loads (self-utilization credit and lighting when applicable)

Total LSC

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

Includes energy used by:
- Efficiency measures
- Indoor Fans
- Photovoltaics
- Batteries
- Precooling

Source

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

Includes energy used by:
- Envelope
- Indoor Fans
- HVAC
- DHW
- Photovoltaics
- Batteries
- Other loads

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

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

X ✓ ✓

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"

§10-102

Through 2022 Energy Code Cycle	Starting 2025 Energy Code Cycle	Definition

"HERS"	"ECC"	• ECC = **"Energy Code Compliance" Program**
		• Confirms compliance with Energy Code via field verification and diagnostic testing as applicable in **Residential** construction:
		  • New Construction
		  • Additions
		  • Alterations
		• Program requirements moved from T20 to T24

HERS Provider	ECC-Provider	• An **organization** approved by the CEC to administer the ECC program per Energy Code Section 10-103.3
HERS Rater Meets new requirements	ECC-Rater	• A **person** trained, tested, and certified by an ECC-Provider • Performs ECC field verification and diagnostic testing
	ECC-Rater Company	• An **organization** certified by an ECC-Provider • Offers field verification and diagnostic testing services by the ECC-Rater Company's ECC-Raters
HERS Measures	ECC Measures	• Building feature installations that must demonstrate compliance with Energy Code via field verification and diagnostic testing

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)

Check Your Understanding 1.2

What do you think?

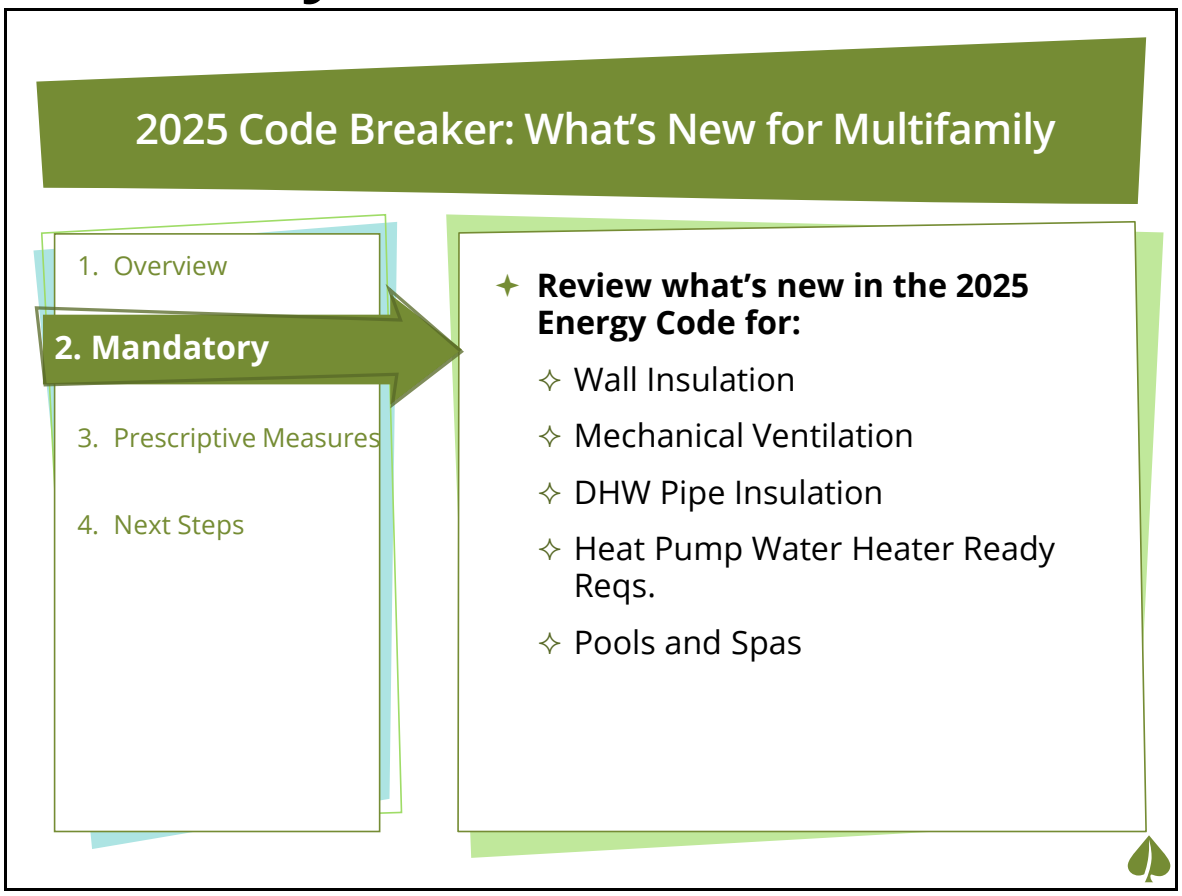
2. **A new low-rise multifamily building requires field verification and diagnostic testing for Quality Insulation Installation (QII). Under 2025 Energy Code, who must perform this work?**

   a) HERS-Rater

   b) Installing Contractor

   c) ECC-Rater

Mandatory


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 Ready 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

Multifamily Wall Insulation

§160.1(b)

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 — Increased from R-13
    - **R-21** in **2 x 6** assemblies — Increased from R-20
    - 16 inches on center spacing

Whole Dwelling Unit Mechanical Ventilation

§160.2(b)2Aivb

New Construction

- 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**

Additions & Alterations

- 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.

Mechanical Ventilation – Common Use Areas Only

§160.2(c)3

- **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**

New formula

Occupant-based Equation

$$V_z = R_p \times P_z$$

- Where:
  - R_p = 15 CFM of outdoor airflow per person
  - P_z = The expected number of occupants

Area-based Equation

$$V_z = R_a \times A_z$$

- 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 ft²

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 ft²)	Area-based Minimum Ventilation R_a (cfm/ft²)	Air Class
Bars, cocktail lounges	33	0.2	2
Break rooms	33	0.15	1

Updated Table Columns

Revised Ventilation Table 160.2-B – Common Use Areas Only

§160.2

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

Space Type	Minimum Occupant Load Density (p/1000 ft²)	Area-based Minimum Ventilation R_a (cfm/ft²)	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

Updated Table Columns

Revised Ventilation Table 160.2-B – Common Use Areas (cont.)

§160.2

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

Space Type	Minimum Occupant Load Density (p/1000 ft²)	Area-based Minimum Ventilation R_a (cfm/ft²)	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
Spectator areas	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

"HPWH Ready" in Dwelling Units

§160.9(e)

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

"HPWH Ready" in Dwelling Units (cont.)

§160.9(e)

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"*

"HPWH Ready" in Dwelling Units (cont.)

§160.9(e)

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 ft³ 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 in²		1. same
2. **Two permanent openings** of equal area with a **minimum total NFA of 250 in²**, to be located **within 12"** from enclosure top and bottom		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 ft³**		No volume stipulated

Central Heat Pump Water Heater Ready

§160.9(f)

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

Space Reserved	Ventilation	Condensate Drain	Electrical
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	Design to be **either**: • **Outside** with space reserved for future heat pump system, ***or*** • **Indoors** with pathway designed and reserved for future ductwork, including penetrations to the outside	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 **CA Plumbing Code**)	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

Per Reference **Joint Appendix JA15.2** ***or***
be documented by a project Responsible Person based on total system load

Pool and Spa Heating Systems

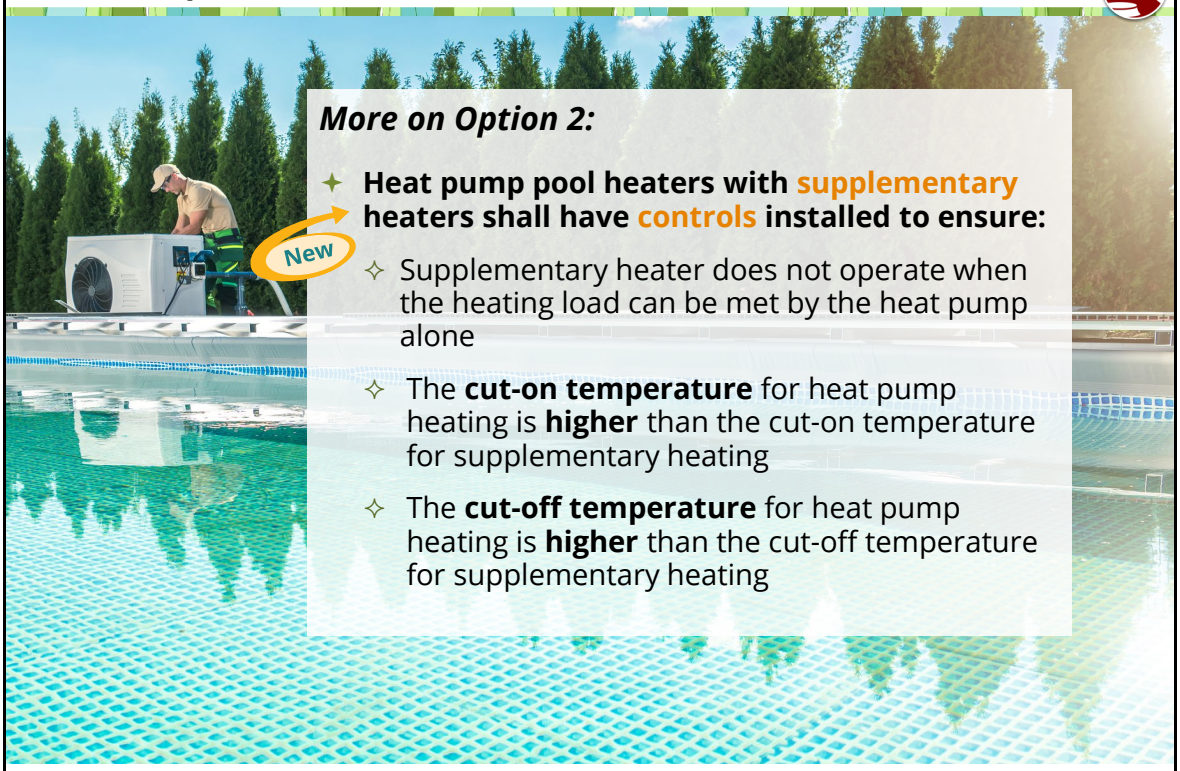
§110.4(c)

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**: New
  1. Solar pool heating system
     - Solar collector surface area ≥ 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 ≥ 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)

Heat Pump Pool Heaters

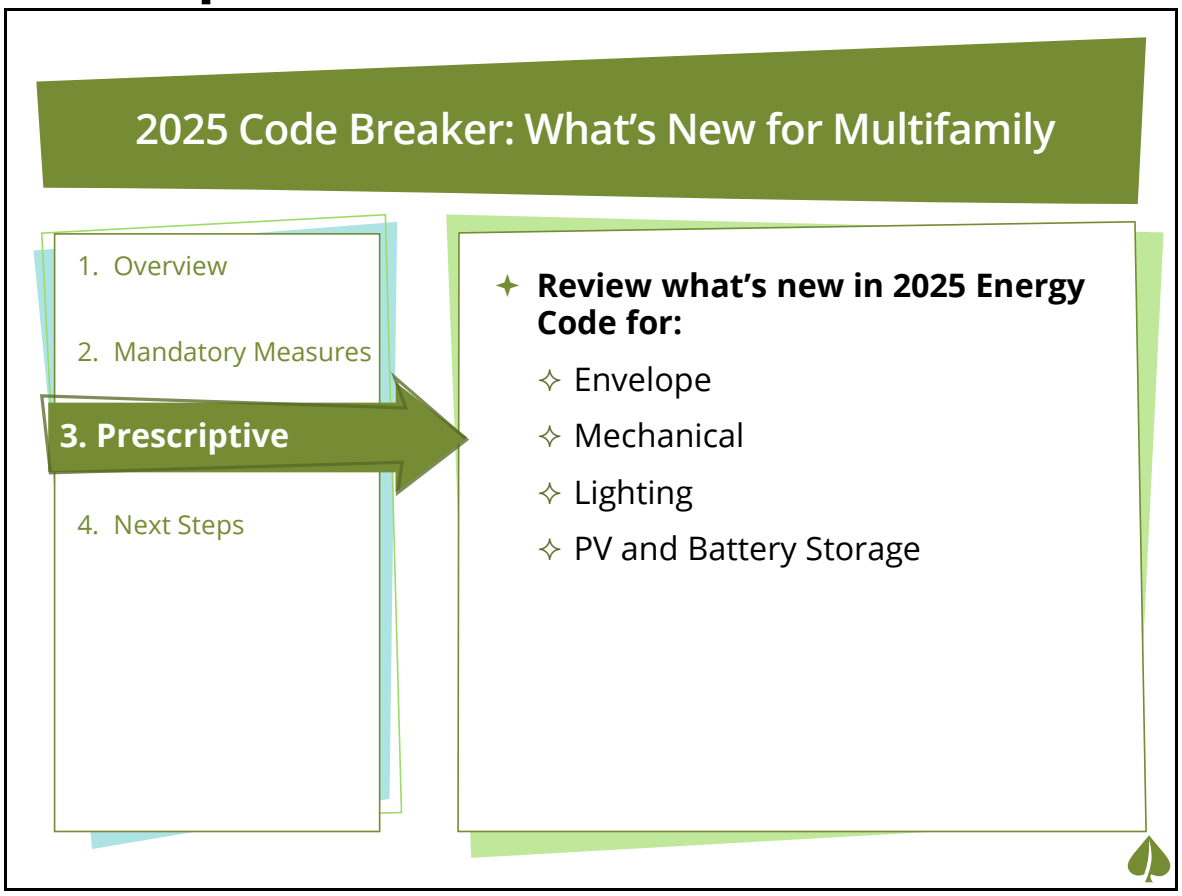
§110.4(d)



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

Prescriptive



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	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38
Radiant Barrier		NR	REQ	REQ	NR	REQ	REQ	REQ	NR	NR	NR	NR	NR	NR	NR	NR	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.)

§170.2

- **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	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	0.75	NR
	Solar Reflectance Index (SRI)	NR	75	NR	75	NR	75	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	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	0.75	NR
	Solar Reflectance Index (SRI)	NR	16	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.)

§170.2

- **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, **common use areas**	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 Perform-ance 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, **common use areas**	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
All Other Fenestra-tion	Maximum U-factor	0.28	0.30	0.28	0.28	0.28	0.34	0.34	0.30	0.30	0.30	0.28	0.30	0.28	0.28	0.28	0.28
	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

Reduced U-factors in orange

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

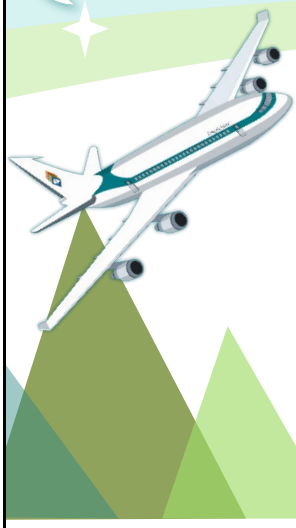
Table 180.2-B: *Multifamily Altered Fenestration*

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		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
	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	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	0.43
	Max. RSHGC	Fixed	NR	0.25	NR	0.25	NR	0.31	0.31	0.26	0.26	0.25	0.25	0.25	0.25	0.25	0.25	NR
		Operable	NR	0.24	NR	0.24	NR	0.31	0.31			.24	0.24	0.24	0.24	0.24	0.24	NR
	Min. VT *(MF 4 stories or more)*	Fixed	0.37	0.37	0.37	0.37	0.37	0.37	0.37				.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	.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
All Other Windows and Glazed Doors	Max. U-factor		0.28	0.30	0.28	0.28	0.28	0.30	0.34	0.30	0.30	0.3	0.28	0.30	0.28	0.28	0.30	0.28
	Max. 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
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	0.46
	Max. SHGC		NA	0.25	NA	0.25	NA	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	NA
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	0.49

SHGC changes in orange; U-factor changes in blue

NR *= No Requirement* ***NA*** *= Not Allowed*

Prescriptive Multifamily Mechanical



Cooling Tower Fan Efficiency

§170.2(c)4Fv

- **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 **≥ 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

Balanced Ventilation Systems for Dwelling Units

§170.2(c)3Biv

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 ≥ 67%**, rated at 32°F
  - Have a **fan efficacy ≤ 0.6 W/cfm**
  - Be confirmed by **field verification** in accordance with:
    - **RA3.7.4.4** (if MF ≤ 3 stories)
    - **NA2.2.4.1.5** (if MF ≥ 4 stories)

Serving Multiple Dwelling Units

- **Shall, when serving multiple dwelling units in MF ≥ 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 ≥ 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**

Balanced Ventilation Systems for Dwelling Units (cont.)

§170.2(c)3Biv

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 Heaters Serving New Individual Dwelling Units

§170.2(d)1

- **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 ≤ 200,000 Btu/hr)

There are no Prescriptive DHW requirements for Multifamily Common Areas

HPWH Ready reqs. would apply

Central Domestic Hot Water

§170.2(d)2

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

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

Prescriptive Lighting

Mandatory Indoor Lighting

§160.5(a-b)

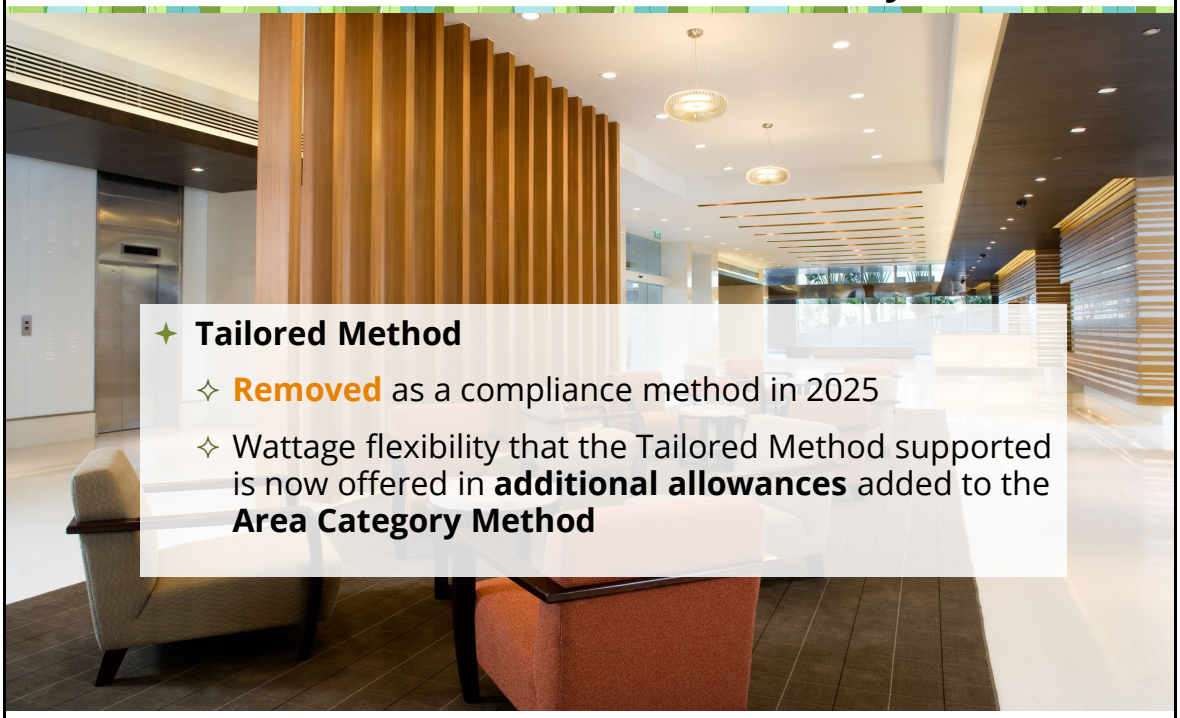
Dwelling Unit Requirements

- **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/Ft²)*

Primary Function Area	Allowed Lighting Power Density for General Lighting (W/ft²)	Additional Lighting Power	
		Qualified Lighting Systems	Additional Allowance (W/ft² 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

Area Category Allowances – Common Use Areas Only (cont.)

§170.2(e)

Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft²)

Primary Function Area		Allowed Lighting Power Density for General Lighting (W/ft²)	Additional Lighting Power	
			Qualified Lighting Systems	Additional Allowance (W/ft² unless noted otherwise)
Dining Area	Bar/Lounge and Fine Dining	0.45	Display~~/Decorative~~	0.35
		0.45	Wall Display MH ≤ 10'6"	**1.25 W/ft**
		0.45	Wall Display MH 10'7" – 14'	**1.5 W/ft**
		0.45	Wall Display MH > 14'	**1.7 W/ft**
		0.45	Floor Display & Task MH ≤ 10'6"	**0.45**
		0.45	Floor Display & Task MH 10'7" – 14'	**0.52**
		0.45	Floor Display & Task MH > 14'	**0.60**
		0.45	General Lighting in enclosed space of ceiling height > 10'	**0.25**
	Cafeteria/Fast Food	0.45	Display/Decorative	0.25
	Family and Leisure	0.40	Display/Decorative	0.25

New

Area Category Allowances – Common Use Areas Only (cont.)

§170.2(e)

Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft²)

Primary Function Area		Allowed Lighting Power Density for General Lighting (W/ft²)	Additional Lighting Power	
			Qualified Lighting Systems	Additional Allowance (W/ft² unless noted otherwise)
Health Care/ Assisted Living	Nurse's Station	**0.85**	Tunable white or dim-to-warm[8]	0.10
	Physical Therapy Room	**0.75**	Tunable white or dim-to-warm[8]	0.10
Kitchen/Food Preparation Area		0.95	–	–
Electrical, Mechanical, Telephone Rooms		0.40	Detailed Task Work[1]	0.20
Exercise/Fitness Center & Gym Area		0.50	–	–
Lobby, Main Entry		0.70	Display~~/Decorative~~	0.25
		0.70	Wall Display MH ≤ 10'6"	**3 W/ft**
		0.70	Wall Display MH 10'7" – 14'	**3.5 W/ft**
		0.70	Wall Display MH > 14'	**4 W/ft**
Locker Room		0.45	–	–
Lounge, Breakroom or Waiting Area		0.55	Display/Decorative	0.25

Increased from 0.75

Reduced from 0.85

New

Area Category Allowances – Common Use Areas Only (cont.) §170.2(e)

Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft²)

Primary Function Area		Allowed Lighting Power Density for General Lighting (W/ft²)	Additional Lighting Power	
			Qualified Lighting Systems	Additional Allowance (W/ft² 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[5]	0.20
	≤ 250 square feet	0.65	Decorative/Display & Portable lighting for office areas[5]	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[3]	1.00	–	–
Laundry Area		0.45	–	–
Restrooms		0.65	Decorative/Display	0.35

No changes

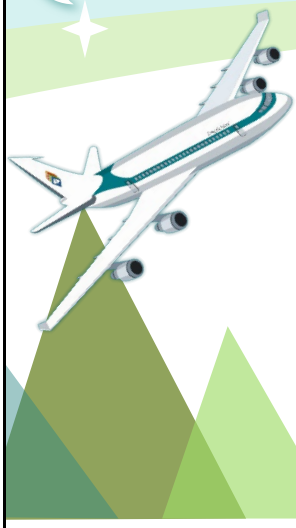
Area Category Allowances – Common Use Areas Only (cont.) §170.2(e)

Table 170.2-M: Area Category Method – Lighting Power Density Values (Watts/Ft²)

Primary Function Area		Allowed Lighting Power Density for General Lighting (W/ft²)	Additional Lighting Power	
			Qualified Lighting Systems	Additional Allowance (W/ft² unless noted otherwise)
Stairwell		0.60	Decorative/Display	0.35
All other		0.40	–	–
Aging Eye/ Low-vision[6]	Lobby, Main Entry	0.85	Display/Decorative	0.30
	Lobby, Main Entry	0.85	Transition Lighting OFF at night[7]	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

No changes

Prescriptive Multifamily PV and Battery Storage



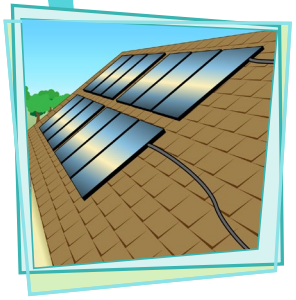
Multifamily Solar PV & Battery Storage

§170.2(f-h)

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

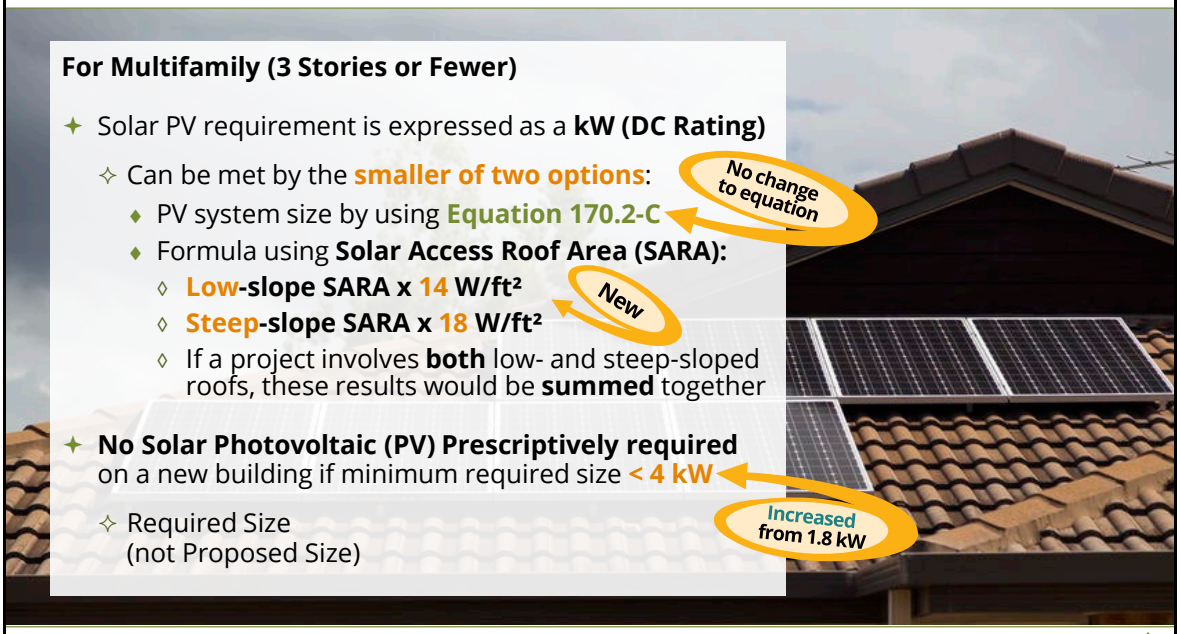


Energy Code Requirements	Low-rise Multifamily (3 stories or fewer, New Construction)	High-rise Multifamily (4 stories or more, New Construction)
Solar PV	✓	✓
Solar Ready	✓ (When exempt from PV)	✓ (When exempt from PV)
Battery Storage		✓ (If no exemption taken for PV)

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** — *No change to equation*
    - Formula using **Solar Access Roof Area (SARA):**
      - **Low-slope SARA x 14 W/ft²** — *New*
      - **Steep-slope SARA x 18 W/ft²** — *New*
      - 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** — *Increased from 1.8 kW*
  - Required Size (not Proposed Size)

PV System Size – 3 Stories or Fewer

§170.2(f)

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

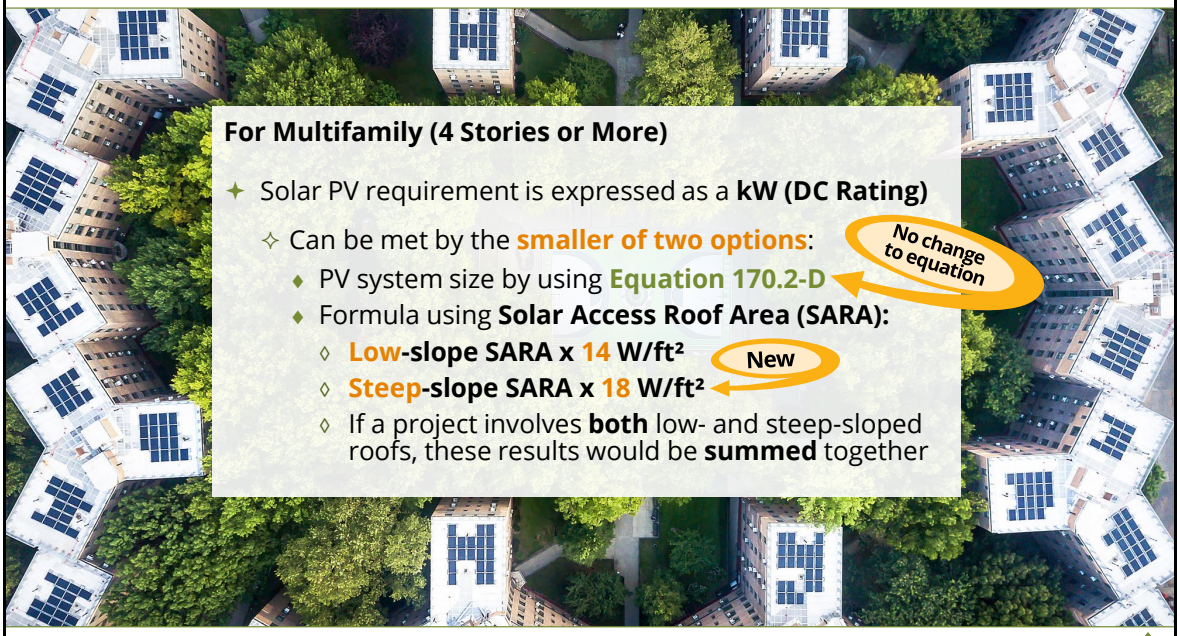
No change to table in 2025

- **Prescriptive** requirement is expressed as a kW (DC Rating)
- **Equation 170.2-C:**
  DC Rating = (CFA x A) / 1000 + (N_{DU} x B)
  - **CFA** = Conditioned floor area
  - **N_{DU}** = Number of dwelling units
  - **A** = CFA adjustment factor from **Table 170.2-T**
  - **B** = Dwelling unit adjustment factor from **Table 170.2-T**

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** — No change to equation
    - Formula using **Solar Access Roof Area (SARA):**
      - **Low-slope SARA x 14 W/ft²** — New
      - **Steep-slope SARA x 18 W/ft²**
      - If a project involves **both** low- and steep-sloped roofs, these results would be **summed** together

An Example: PV Method 1

§170.2(g)

- **For a Multifamily Building:**
  - 4 Stories in Climate Zone 3
  - CFA of **100,000 ft²**
  - SARA of **25,000 ft²**
  - **Steep-sloped** roof
  - Minimum PV Capacity of **1.82**
    *(**Factor A** per table below)*

- **Method 1:** Use DC Rating Formula
  - **DC Rating = (CFA x A) / 1000**
  - **DC Rating = (100,000 ft² x 1.82 W/ft²) / 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/ft² of conditioned floor area)															
Multifamily > 3 Stories	1.82	2.21	**1.82**	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

CZ 3

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 ft²**
  - SARA of **25,000 ft²**
  - **Steep-sloped** roof
  - Minimum PV Capacity of **1.82**

- **Method 1:** Use DC Rating Formula
  - **DC Rating = (CFA x A) / 1000**
  - **DC Rating = (100,000 ft² x 1.82 W/ft²) / 1000**
  - **DC Rating = 182 kW**

Method 1 Answer

- **Method 2:** SARA Method
  - **DC Rating = Total SARA x 18 W/ft²**
  - **DC Rating = 25,000 ft² x 18 W/ft²**
  - **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:

Steep-slope

- 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**

Increased from 1.8 kW

- 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

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 ft²**
  - 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

New

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**
  - 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

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

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 Capacity Formula

§170.2(h)

Minimum Rated Usable Energy Capacity (Equation 170.2-E)

- **kWh = (CFA x B) / (1000 x $C^{0.5}$)**
  - **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^2
  - **B** = Battery **capacity factor** specified in **Table 170.2-V** for the building type, in Wh/ft^2
  - **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^2 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^2**
  - Battery Capacity Factor = **1.88** *(per table above)*
  - Round trip battery efficiency = **95%**

Min. Rated Usable Energy Capacity is:

kWh = (CFA x B) / (1000 x $C^{0.5}$)

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

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

kWh ≈ 188,000 / 974.68

kWh ≈ 192.9 kWh Answer

Battery Capacity Formula (SARA)

§170.2(h)

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

New

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

- **kWh = ((CFA x B) / (1000 x $C^{0.5}$)) x ($kW_{PVdc,SARA}$ / kW_{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^2
  - **B** = Battery **capacity factor** specified in **Table 170.2-V** for the building type, in Wh/ft^2
  - **C** = Rated single charge-discharge cycle AC to AC (round-trip) efficiency of the Battery
  - **$kW_{PVdc,SARA}$** = Minimum Rated PV System Capacity from the SARA calculation, in kW
  - **kW_{PVdc}** = Minimum Rated PV System Capacity in kW from **Equation 170.2-D**

We'll look at an example of this SARA-adjusted equation next

Sample Calculation

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

To demonstrate this calculation, let's use a **new "SARA-driven" example** where:
- **SARA is 3,000 ft²** and required SARA-method calculated **Solar PV is 54 kW**

- **kWh = ((CFA x B) / (1000 x $C^{0.5}$)) x ($kW_{PVdc,SARA}$ / kW_{PVdc})**

From Battery Energy Capacity calculation

Min. Rated Usable Energy Capacity is:
kWh = (CFA x B) / (1000 x $C^{0.5}$)
kWh = (100,000 x 1.88) / (1000 x $0.95^{0.5}$)
kWh = 188,000 / (1000 x $\sqrt{0.95}$)
kWh ≈ 188,000 / 974.68
kWh ≈ 192.9 kWh

x (Min. PV Capacity from our prior SARA Method calculation, in kW: 54 kW / PV Capacity from our prior solved Equation 170.2-D, in kW: 182 kW)

kWh ≈ 192.9 kWh x (54 kW / 182 kW)
kWh ≈ 192.9 kWh x 0.30
kWh ≈ 57.87 kWh

Answer

Battery Power Capacity Formula

§170.2(h)

- **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_{batt}** = 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)*

- **Minimum rated power capacity is:**
  - **kW = kWh_{batt} / 4**
  - **kW = 192.9 / 4**
  - **kW ≈ 48.2 kWh**

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 = 57.87 / 4**
  - **kW ≈ 14.47 kWh**

Exceptions

§170.2(h)

No substantive changes

- **Battery Storage Exceptions (4 Stories or More)**
  - **No battery storage system** is required:
    - If the installed PV system capacity is **< 15%** of the capacity determined by **Equation 170.2-D**
    - In buildings with battery storage system requirements with **< 10 kWh** minimum rated usable energy capacity

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

Check Your Understanding 5.2

What do you think?

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

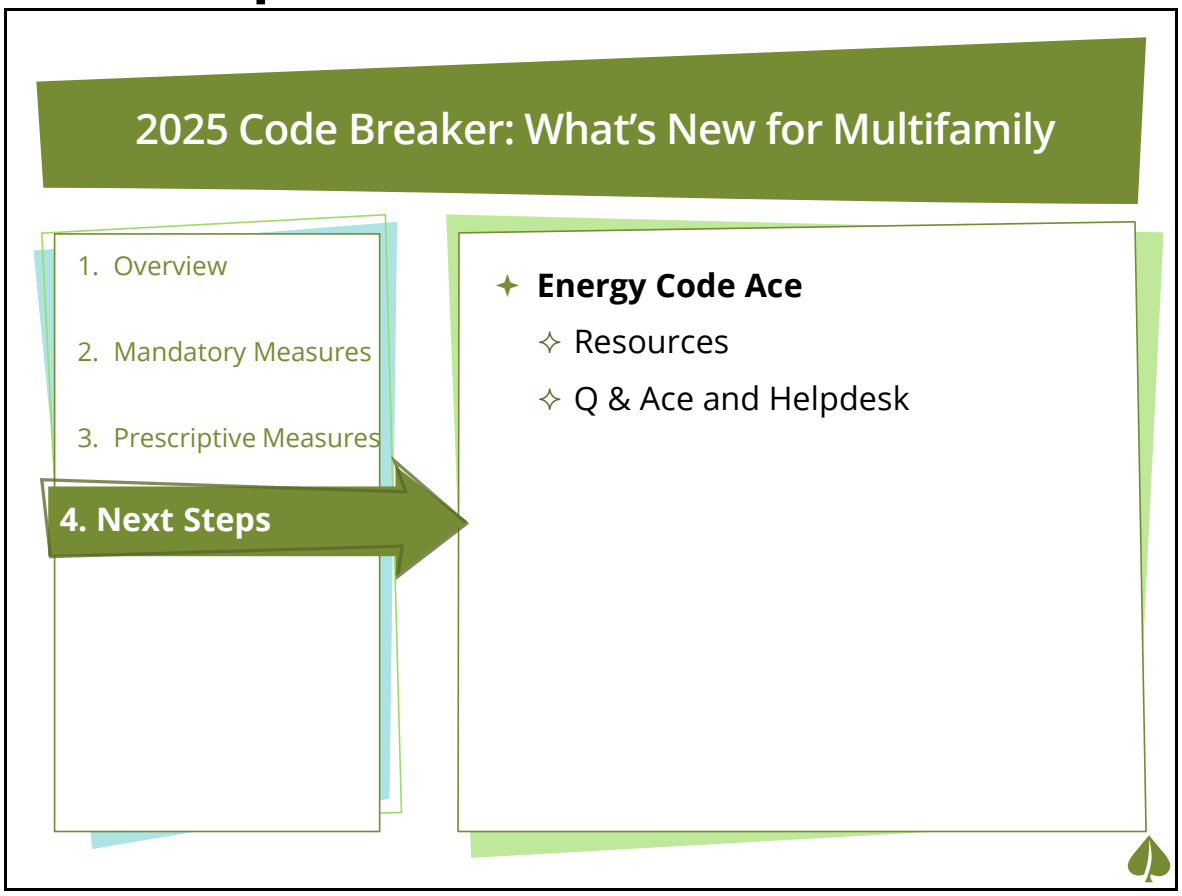
a) Mixed use building

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

Next Steps

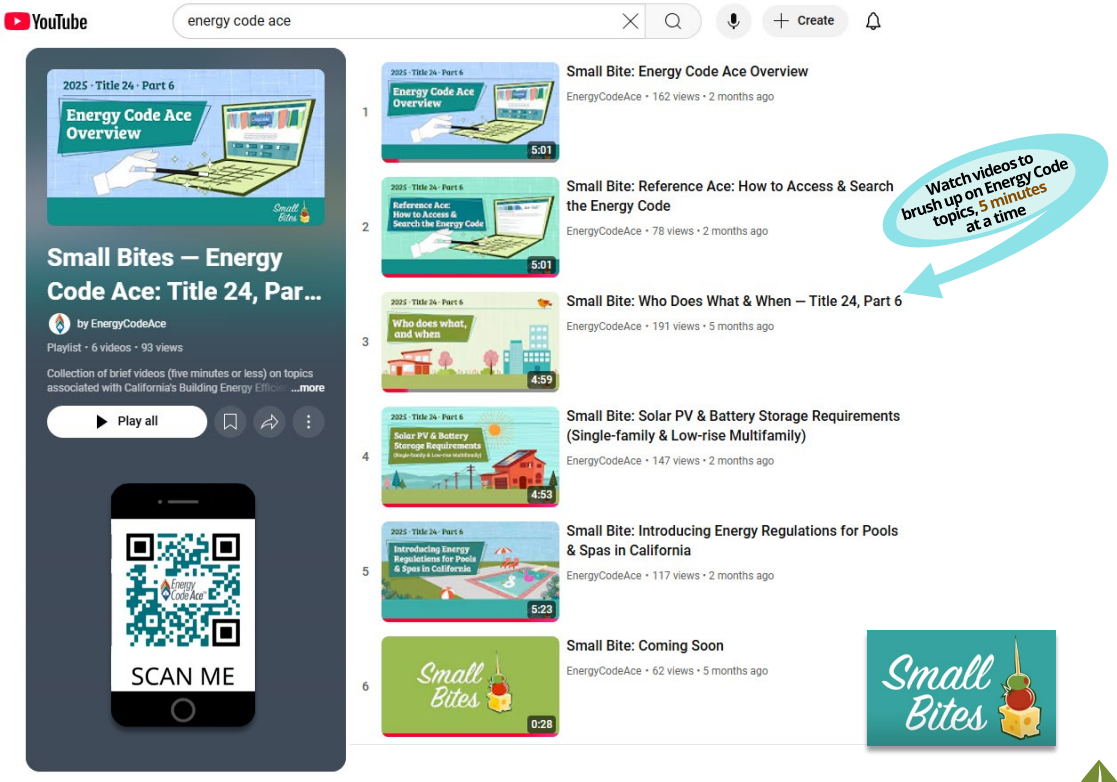

2025 Code Breaker: What's New for Multifamily
1. Overview
2. Mandatory Measures
3. Prescriptive Measures
4. Next Steps
Energy Code Ace
Resources
Q & Ace and Helpdesk

Virtual Classes

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

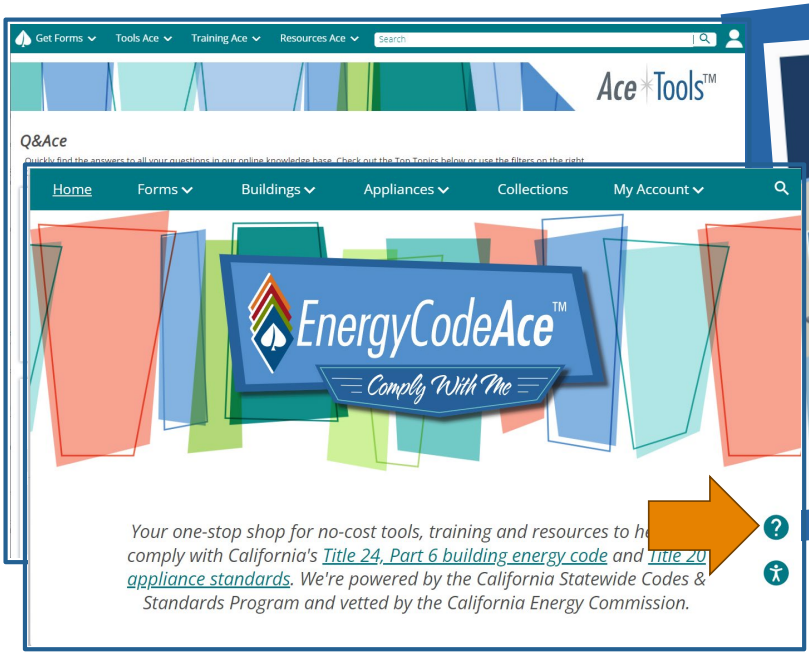
What's New in 2025 Residential Energy Code
Online Live Event

Now on YouTube: Small Bites from Energy Code Ace



2025 Fact Sheets on Energy Code Ace

Q & Ace and Helpdesk



This page intentionally blank

Contacts and Course Evaluation

Thank you

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

Contact	Role	Email	Phone
Brian Selby	Instructor	Use the Energy Code Ace Helpdesk!	
Dave Intner	Senior Advisor | Building Decarbonization and Energy Codes & Standards	dave.intner@sce.com	(626) 995-7431
Jill Marver	Energy Code Ace Program Manager	Jill.Marver@PGE.com	(925) 788-6312
Energy Code Ace	Multiple	http://energycodeace.com/content/contact	

This program is funded by California utility customers and administered by Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E®), and Southern California Edison Company (SCE) under the auspices of the California Public Utilities Commission.

Please complete our course evaluation: https://www.surveymonkey.com/r/cb-2025-mf-overview