TRI-COUNTY
REGIONAL ENERGY NETWORK
SAN LUIS OBISPO • SANTA BARBARA • VENTURA

2025 Energy Code Update for the Building Industry

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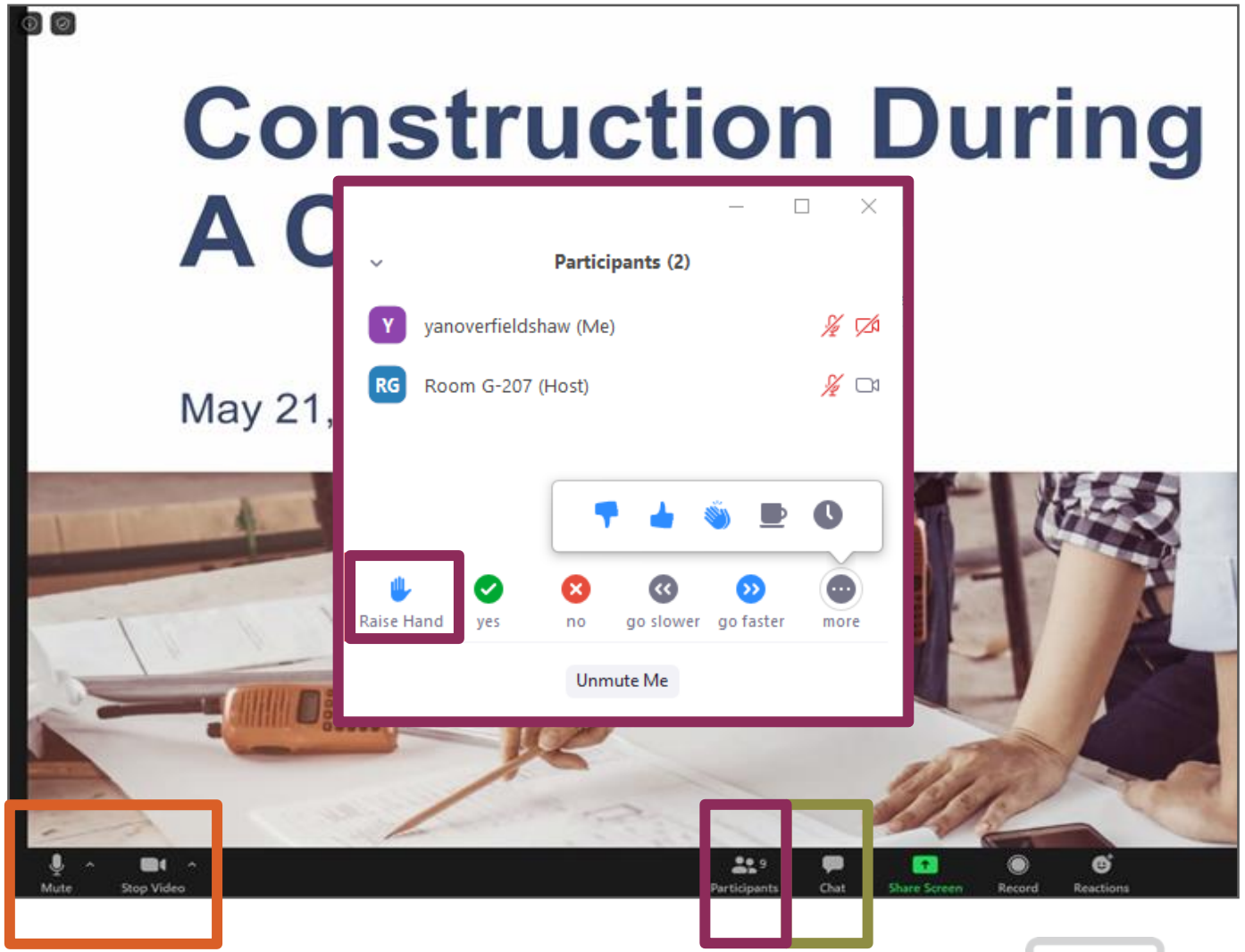
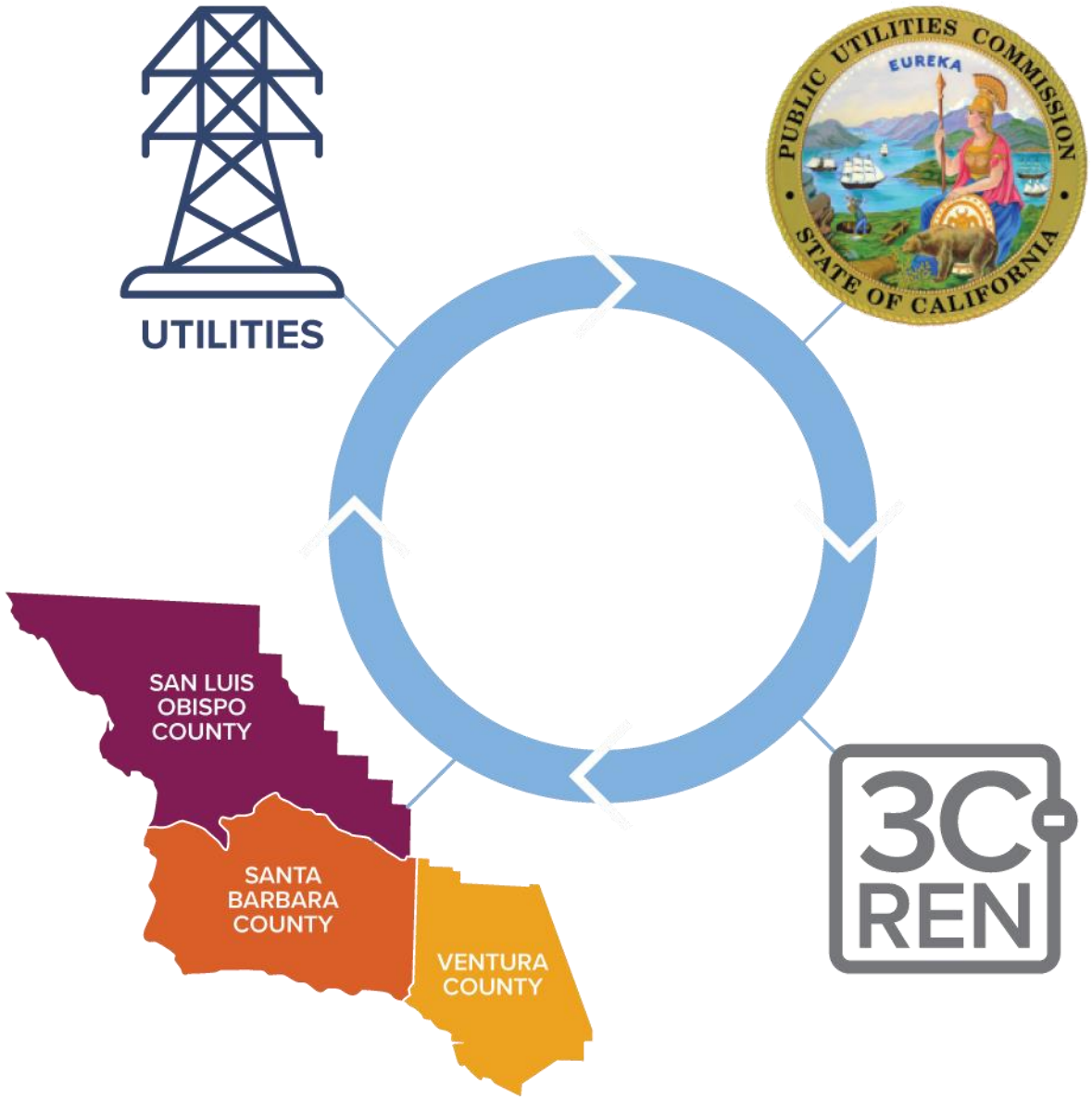
February 12, 2025

Zoom Orientation

- Add an **introduction** in the chat.
  Be sure **full name** is displayed.
- Did you call in? Please **share** first and last name with us.
- Please **mute** upon joining
- Use the "**Chat**“ to share questions or comments
- Under "**Participant**" select "**Raise Hand**" to share a question or comment verbally
- Session may be **recorded** and posted to 3C-REN's on-demand page
- Slides/recording are **shared** after most events





Tri-County Regional Energy Network

3C-REN is a collaboration between the tri-counties

Our programs reduce energy use for a more sustainable, equitable and economically vibrant Central Coast

Our free services are funded via the CPUC, bringing ratepayer dollars back to the region

Our Services

Incentives

HOME ENERGY SAVINGS

3c-ren.org/for-residents
3c-ren.org/multifamily

COMMERCIAL ENERGY SAVINGS

3c-ren.org/commercial

Contractors can enroll at
3c-ren.org/contractors

Training

BUILDING PERFORMANCE TRAINING

3c-ren.org/events
3c-ren.org/building

ENERGY CODE CONNECT

3c-ren.org/code

View past trainings at
3c-ren.org/on-demand

Technical Assistance

AGRICULTURE ENERGY SOLUTIONS

3c-ren.org/agriculture

ENERGY ASSURANCE SERVICES

3c-ren.org/assurance

3C REN

3C-REN Achievements

4,000+

Individuals Attended Training

1,374

Energy-Saving Projects Completed

334

Title 24/CalGreen Questions Answered

$155M

Secured for investment in the tri-county region through 2028

Data from 2019-2023 for three programs

Learning Objectives

- Understand the organizational changes to the 2025 Energy Code
- Identify Big Pictures Goals of the California Energy Commission and how those goals influence changes.
- Recognize key updates including building envelope, lighting, mechanical and DHW systems, renewable energy and storage and field verification.
- Understand the energy code's impact for energy performance and indoor air quality

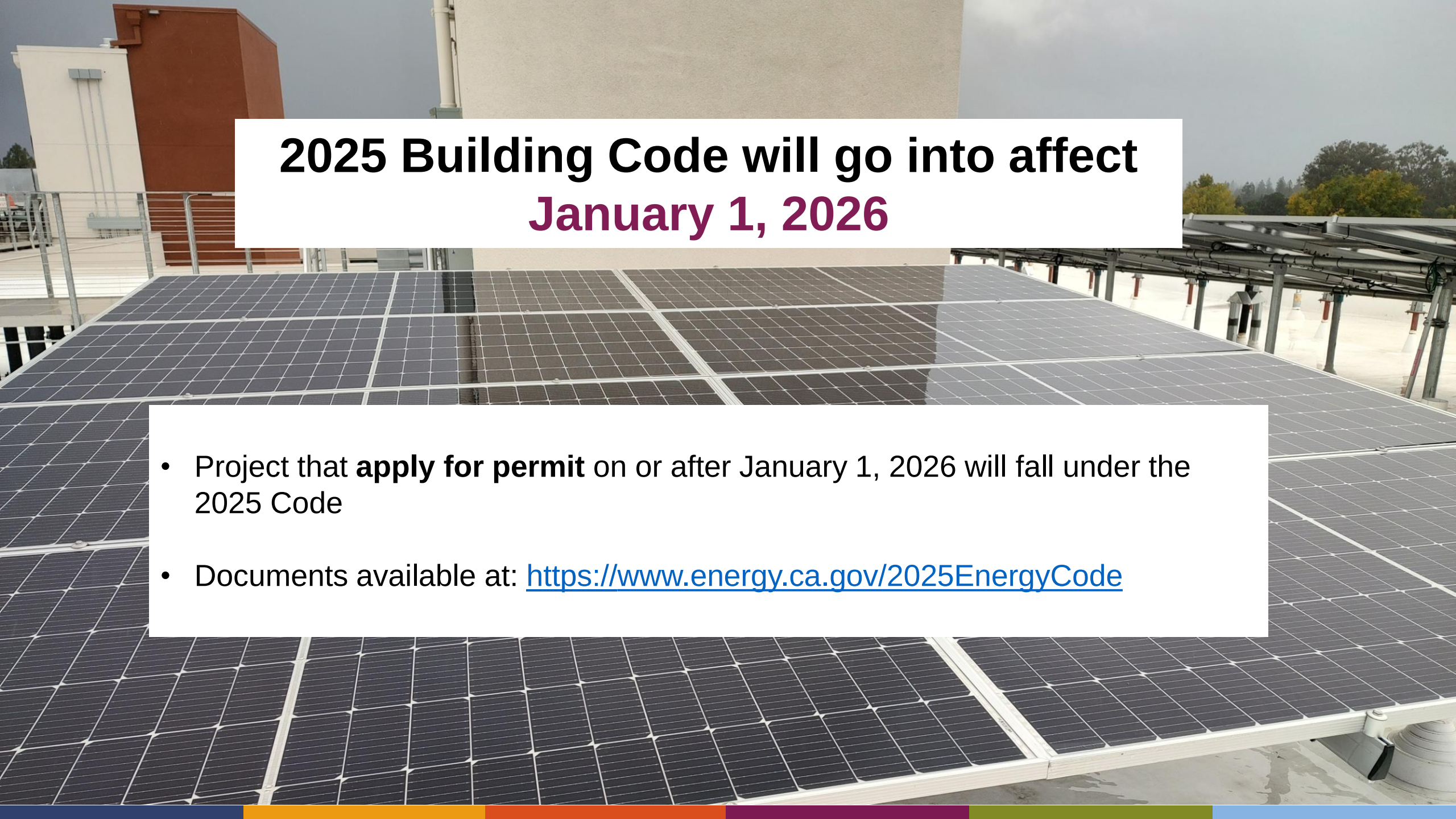
Learning Units

- 1.5 AIA HSW LUs approved for this course
- 0.15 ICC CEUs approved for this course

Agenda

1. Energy Code Triennial Cycle and California's Energy Goals
2. Energy Code Organization
3. New Terms and Metrics
4. New Scope, Definitions and Mandatory Measures
5. Highlights for Nonresidential, Single Family, and Multifamily Changes
6. Resources

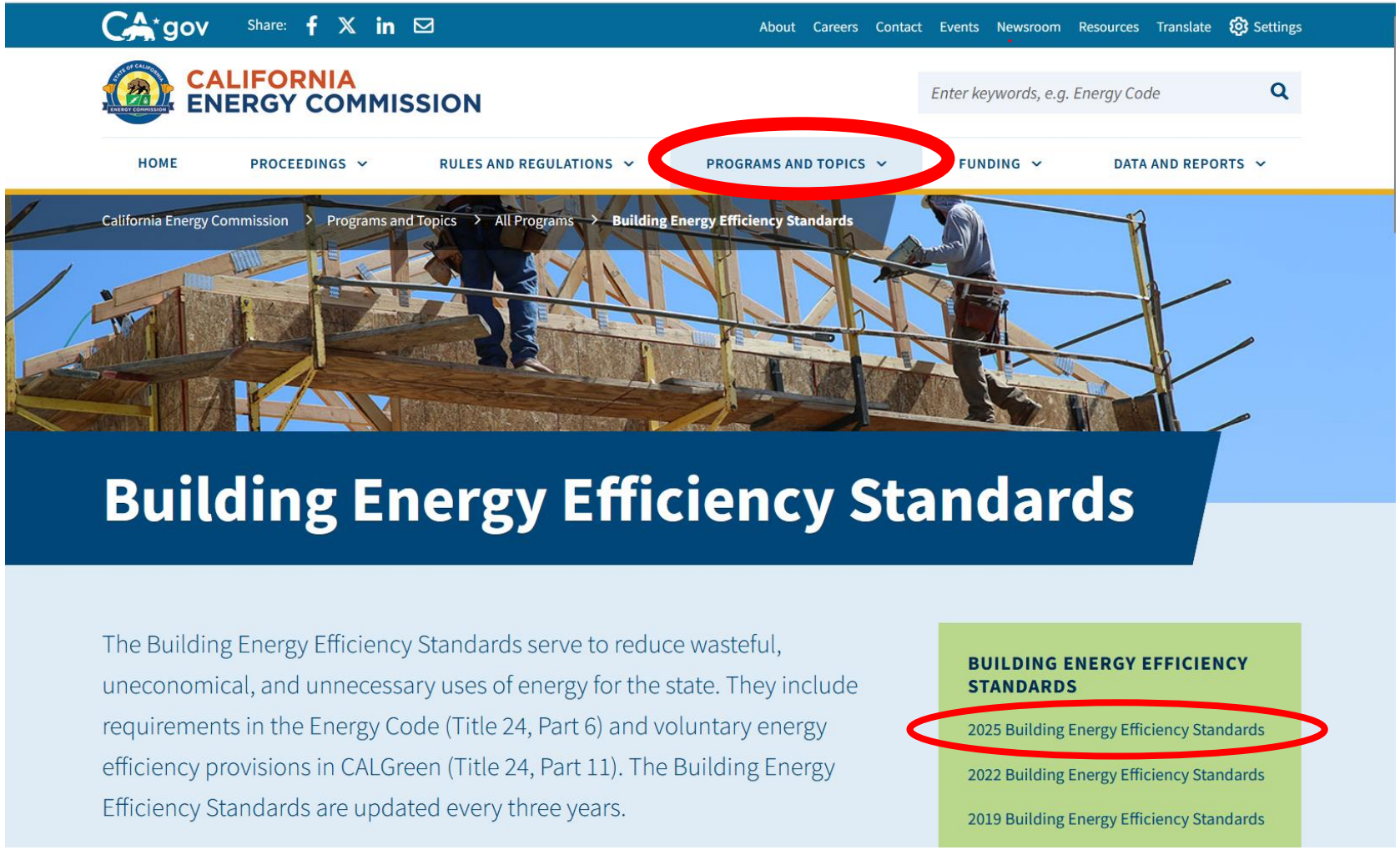
Energy Code Triennial Cycle



2025 Building Code will go into affect January 1, 2026

- Project that **apply for permit** on or after January 1, 2026 will fall under the 2025 Code
- Documents available at: https://www.energy.ca.gov/2025EnergyCode

California Energy Commission
Energy.ca.gov



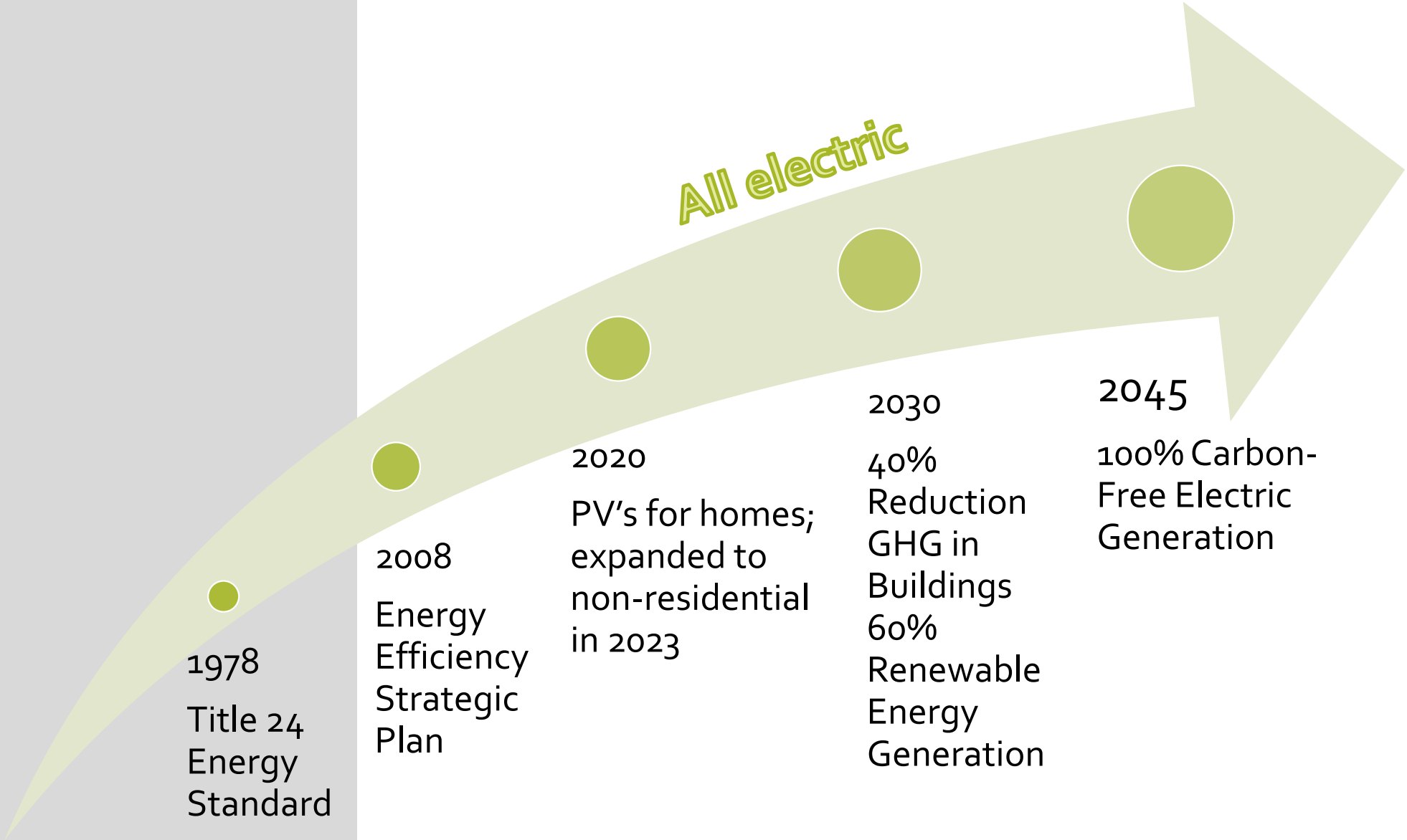
California's Building Energy Efficiency Standards (aka the Energy Code) is updated every three years the by CEC.

The process includes engagement with the public, industry experts, in-house expertise, and other stakeholders.

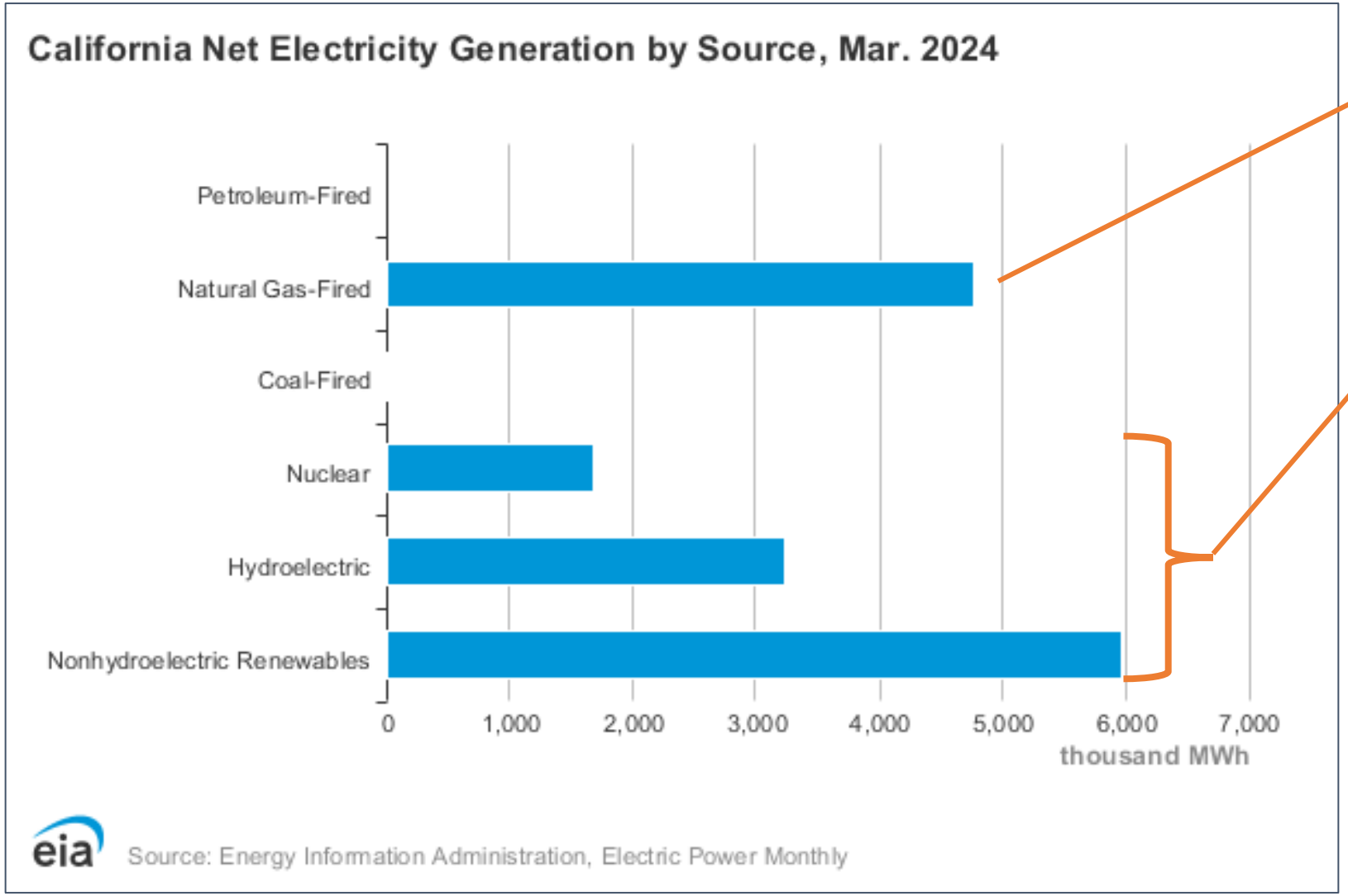
Multi-year Process –Adoption Timeline for the 2025 Energy Code

For more information visit
energy.ca.gov

Steady Progress in California



California's Electricity Generation is Becoming Cleaner



- Natural gas-fired fuel accounted for 31% of California's electricity generation
- Approx 69% came from non-fossil fuel sources

https://www.eia.gov/state/?sid=CA#tabs-4

Big Picture Goals for the 2025 Code

- Encourage energy efficient heat pump technology for space and water heating
- Expand PV systems and battery storage standards
- Improve indoor air quality by strengthening ventilation standards
- Save water and save energy by reducing water use in homes and nonresidential buildings
  - References following Plumbing Code for pipe sizing
  - New Requirements for Chillers and Cooling Towers

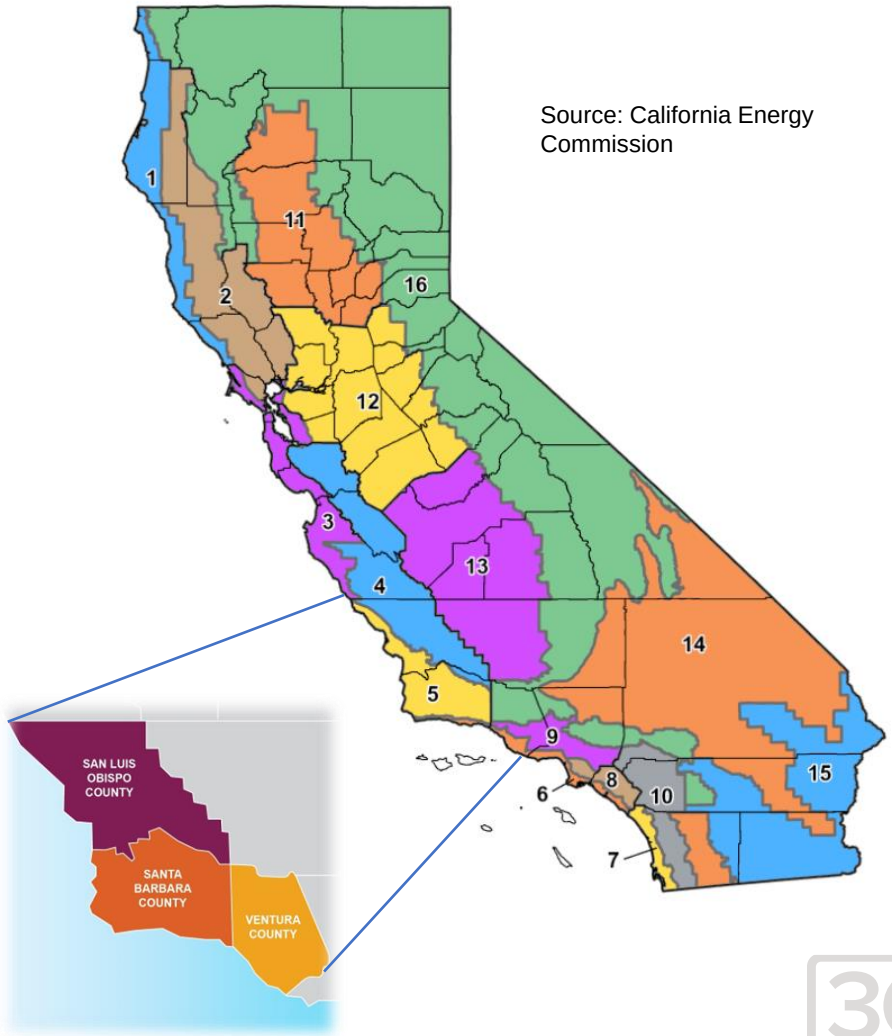
Focus on 3C-REN Tri-County Region

San Luis Obispo, Santa Barbara, and Ventura

CZ's: 4, 5, 6, 9, and 16

Under the Building Energy Efficiency Standards California has 16 defined Climate Zones (CZ)

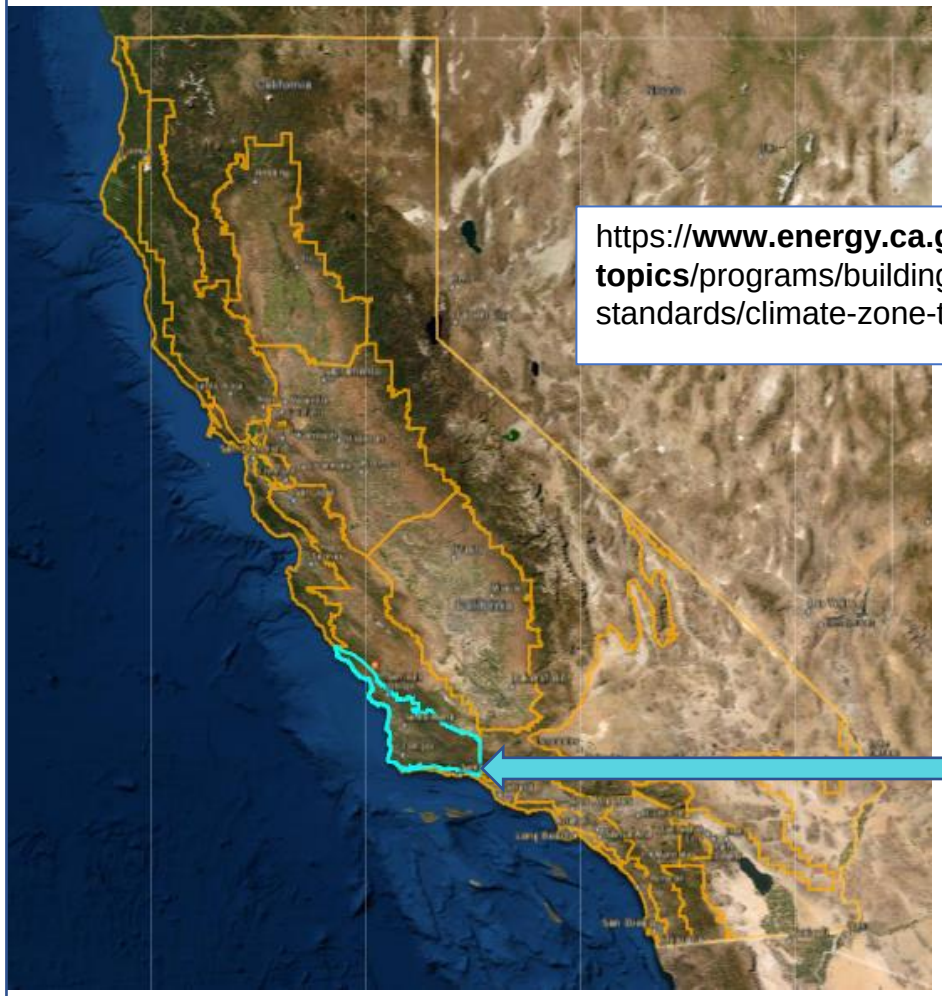
Search "California EZ Building Climate Zone Search Tool"



Source: California Energy Commission

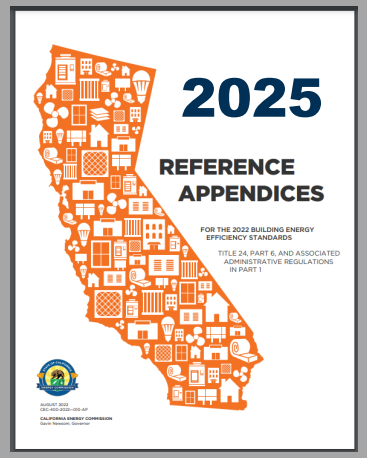
Energy Code is based on 16 Climate Zones (CZ)

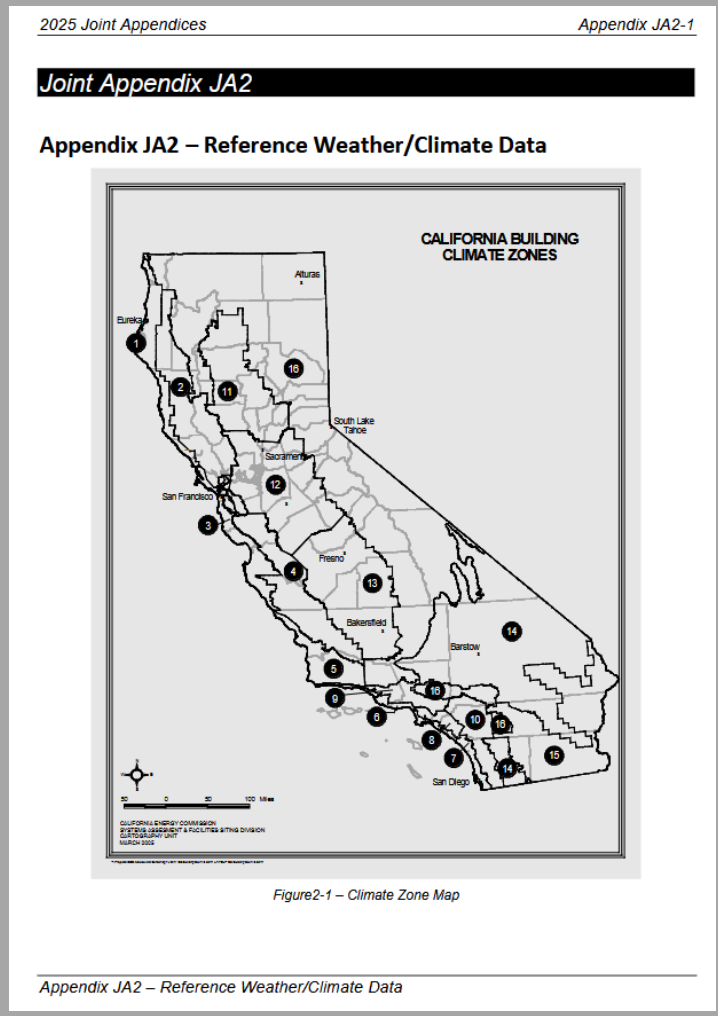
The California Energy Commission has an on-line tool:
EZ Building Climate Zone Finder



https://**www.energy.ca.gov/programs-and-topics**/programs/building-energy-efficiency-standards/climate-zone-tool-maps-and

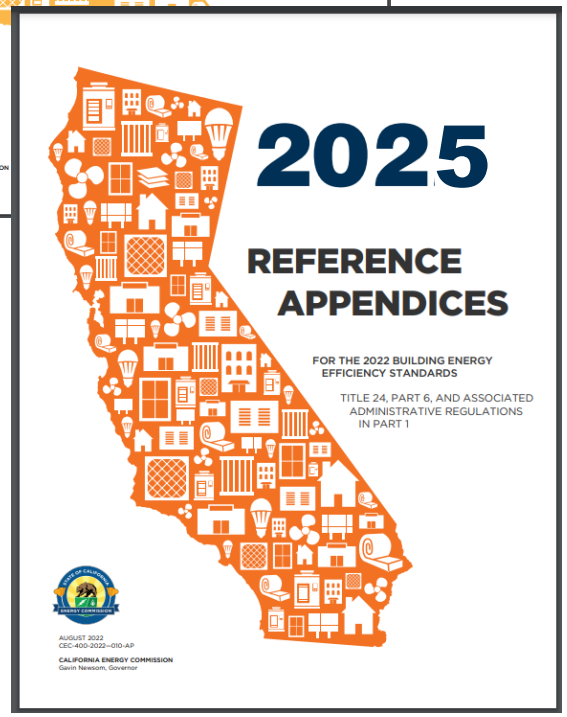
Example of CZ 5

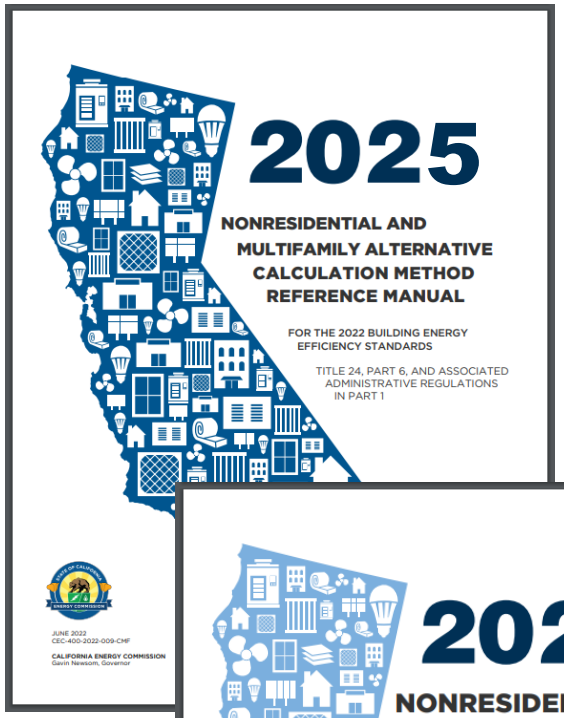


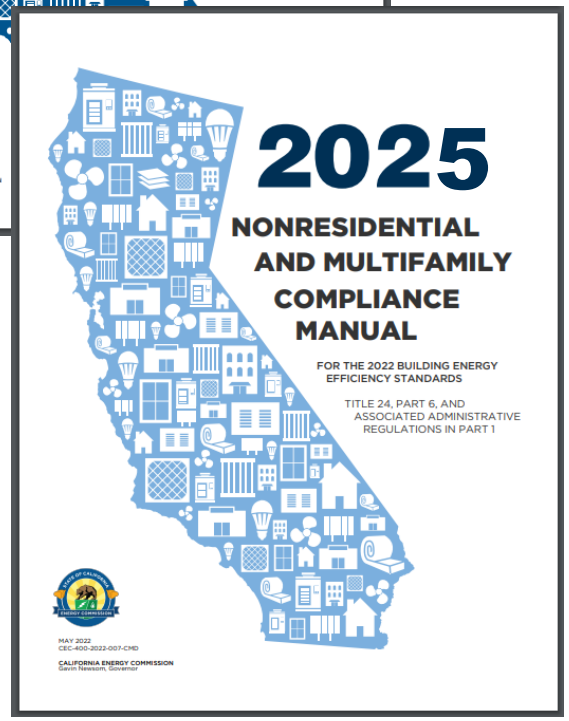


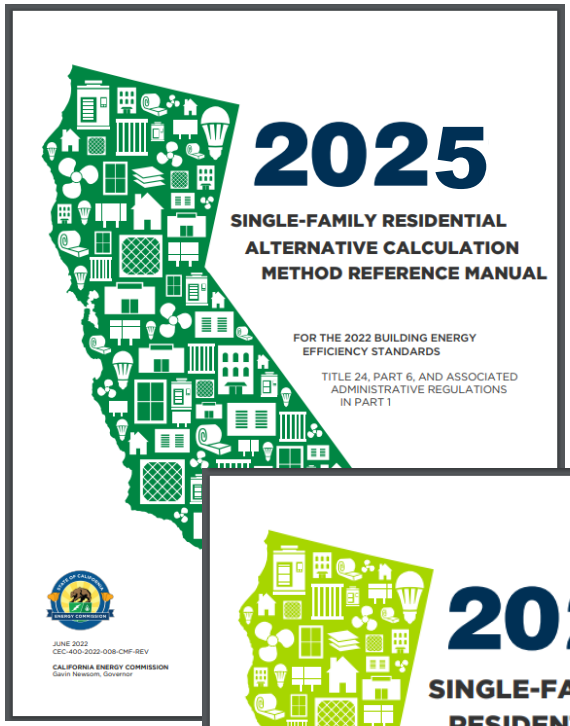
Energy Code Organization

Title 24 Part 6, 2025 Standards and Manuals

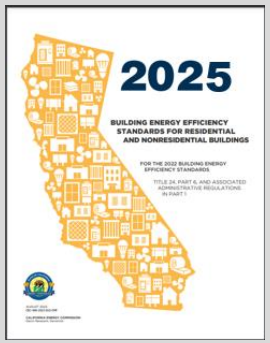








T24 Part 6 Energy Code – Subchapter Organization



All [*regulated*] *Occupancies*

(A, B, E, F, H, I, L, M, R, S, or U, except I-3 and I-4)

Subchapter 1 –All Occupancy –Scope, Definitions

Subchapter 2 –All Occupancies – Mandatory Requirements

Sec 100.0-100.3 & Sec 110.0-110.12

Non-Residential

Subchapter 3 – Nonresidential, Hotel/Motel, Covered Process –Mandatory Requirements

[*HVAC and Ventilation*]

Sec 120.0-120.9

Subchapter 4 – Nonresidential, Hotel/Motel –Mandatory Requirements

[*Lighting and Power*]

Sec 130.0-130.5

Subchapter 5 –Performance and Prescriptive

[*New Construction*]

Sec 140.0-140.9

Subchapter 6 – Additions and Alterations

Sec 141.0-141.1

Single Family Res

Subchapter 7 –Single Family Residential Mandatory Measures

Sec 150.0

Subchapter 8 – Performance and Prescriptive

[*New Construction*]

Sec 150.1

Subchapter 9 – Additions and Alterations

Sec 150.2

Multifamily Res

Subchapter 10 – Multifamily Residential Mandatory Measures

Sec 160.0-160.9

Subchapter 11 – Performance and Prescriptive

[*New Construction]*

Sec 170.0-170.2

Subchapter 12 – Additions and Alterations

Sec 180.0-180.4

TABLE 100.0-A Application of Standards

Occupancies	Application	Mandatory	Prescriptive	Performance	Additions Alterations
All Buildings	General	100.0, 100.1, 100.2, 110.0	100.0, 100.1, 100.2, 110.0	100.0, 100.1, 100.2, 110.0	100.0, 100.1, 100.2, 110.0
Nonresidential, And Hotels/Motels	General	120.0	140.0, 140.2	140.0, 140.1	141.0
Nonresidential, And Hotels/Motels	Envelope (conditioned)	110.6, 110.7, 110.8,120.7	140.3	140.0, 140.1	141.0
Nonresidential, And Hotels/Motels	Envelope (unconditioned process spaces)	N.A.	140.3(c)	140.0, 140.1	141.0
Nonresidential, And Hotels/Motels	HVAC (conditioned)	110.2, 110.5, 120.1, 120.2, 120.3, 120.4, 120.5, 120.8, 120.10	140.4	140.0, 140.1	141.0
Nonresidential, And Hotels/Motels	Water Heating	110.3, 120.3, 120.8, 120.9	140.5	140.0, 140.1	141.0
Nonresidential, And Hotels/Motels	Indoor Lighting (conditioned, process spaces)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6	140.0, 140.1	141.0
Nonresidential, And Hotels/Motels	Indoor Lighting (unconditioned and parking garages)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6	N.A.	141.0

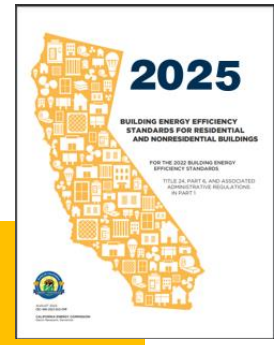


Table 100.0 – A is a means to navigate the Energy Code.

Under 2025 Code cycle new sections/occupancy categories have been added and/or expanded.

TABLE 100.0-A continued

Nonresidential, And Hotels/Motels	Outdoor Lighting	110.9, 130.0, 130.2, 130.4	140.7	N.A.	141.0
Nonresidential, And Hotels/Motels	Electrical Power Distribution	110.11, 130.5	N.A.	N.A.	141.0
Nonresidential, And Hotels/Motels	Pool and Spa Systems	110.4, 110.5, 150.0(p)	N. A.	N.A.	141.0
Nonresidential, And Hotels/Motels	Solar Ready Buildings	110.10	N.A.	N.A.	141.0(a)
Nonresidential, And Hotels/Motels	Solar PV and Battery Energy Storage Systems	N.A.	140.10	140.0, 140.1	N.A.
Covered Processes[1]	Envelope, Ventilation, Process Loads	110.2, 120.3, 120.6	140.9	140.1	110.2, 120.3, 120.6, 140.9, 141.1
Demand Responsive (DR) Controls	DR control thermostats	JA5; Exception 5 to Section 110.10(b)1A; Exception 4 to Section 110.10(b)1B.	NA	NA	NA
Demand Responsive (DR) Controls	DR Zonal HVAC Controls	110.12	NA	NA	NA

New:
Demand Responsive (DR) Controls is now included for ease of look-up.

TABLE 100.0-A continued

Occupancies	Application	Mandatory	Prescriptive	Performance	Additions Alterations
Demand Responsive (DR) Controls	DR Lighting Controls	110.12	140.6(a)2K; 170.2(e=)2Bxi	N.A.	Table 141.0-F; Table 180.2-E
Demand Responsive (DR) Controls	DR Electronic Message Center Control	110.12, 130.3(a)3	NA	NA	NA
Demand Responsive (DR) Controls	DR Controlled Receptacles	110.12, 130.5(e), 160.6(e)	NA	NA	NA
Signs	Indoor and Outdoor	110.9, 130.0, 130.3, 160.5(d)	140.8, 170.2(e)7	N.A.	141.0, 141.0(b)2H, 180.2(b)4Bvi

New:
Demand Responsive (DR) Controls is now included for ease of look-up.

TABLE 100.0-A Single Family

TABLE 100.0-A APPLICATION OF STANDARDS (continued)

Occupancies	*Application*	*Mandatory*	*Prescriptive*	*Performance*	*Additions Alterations*
Single-Family	General	150.0	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
Single-Family	Envelope (conditioned)	110.6, 110.7, 110.8, 150(a), 150.0(b), 150.0(c), 150.0(d), 150.0(e), 150.0(g), 150.0(q)	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
Single-Family	HVAC (conditioned)	110.2, 110.5, 150.0(h), 150.0(i), 150.0(j), 150.0(m), 150.0(o)	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
Single-Family	Water Heating	110.3, 150.0(j, n)	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
Single-Family	Indoor Lighting (conditioned, unconditioned and parking garages)	110.9, 130.0, 150.0(k)	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
Single-Family	Outdoor Lighting	110.9, 130.0,150.0(k)	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
Single-Family	Pool and Spa Systems	110.4, 150.0(p)	N. A.	N.A.	150.2(a), 150.2(b)
Single-Family	Solar Ready Buildings	110.10	N. A.	N.A.	N.A.
Single-Family	Electric Ready	150.0(s), 150.0(t), 150.0(u), 150.0(v)	N.A.	N.A.	N.A.
Single-Family	Solar PV Systems	N.A.	150.1(c)14	150.1(a), 150.1(b)	N.A.

Single Family:
No change

TABLE 100.0-A Multifamily

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

[1] Nonresidential and hotel/motel buildings that contain covered processes may conform to the applicable requirements of both occupancy types listed in this table.

Multifamily:
No change

New Terms and Metrics

The Energy Code –Three Compliance Terms

Mandatory Requirements

Energy efficiency measures that are applicable to all projects.

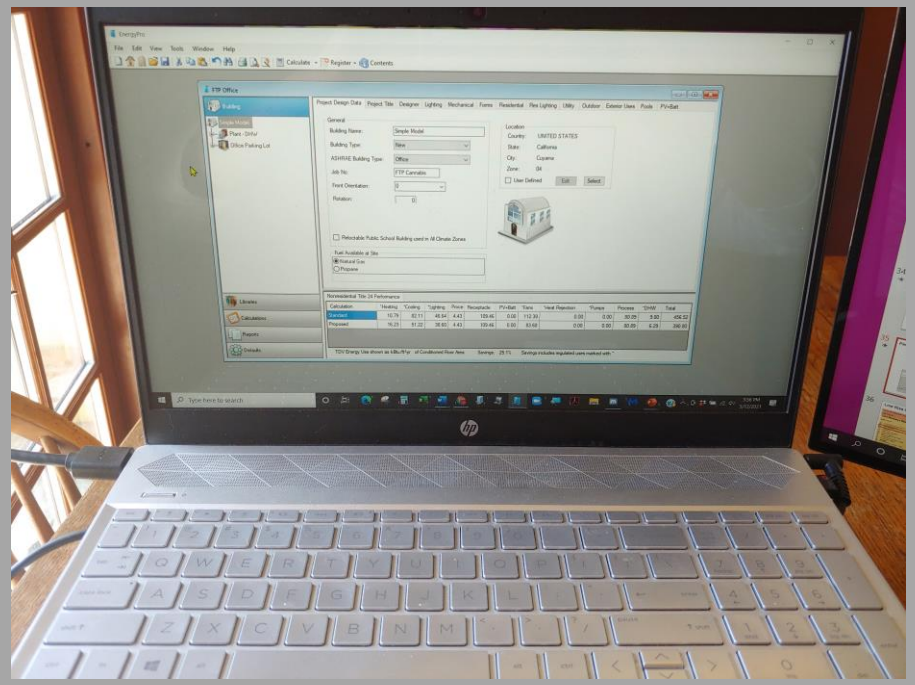
Prescriptive Component Package	Performance Method
Mandatory Requirements are applicable	Mandatory Requirements are applicable
Follow all the parts of the prescriptive package	Other components or measures can be traded-off as long as the Proposed Design Building can be shown to be more energy efficiency than a similar sized Standard Design Building (baseline building)
Note: used to determine the Standard Design Building	
Essentially a **checklist** approach	**Energy modeling** approach

Long-Term System Cost (LSC) –*The New Metric*

- **Long-term system cost (LSC)** -– All electricity, gas or propane used within the modeled buildings shall be converted to LSC. LSC includes the efficiency LSC, which is the sum of LSC energy for space-conditioning, water heating, and mechanical ventilation, and total LSC, which includes efficiency LSC and LSC energy from photovoltaic, energy storage systems, lighting, demand flexibility, and other plug loads.
- **Source energy** – The energy used within the modeled buildings shall be represented as long-run marginal, hourly source energy.

- DEMAND FLEXIBILITY MEASURE is a measure that reduces TDV LSC and/or source energy consumption using communication and control technology to shift electricity use across hours of the day to decrease energy use on-peak or increase energy use off-peak, including but not limited to battery energy storage, or HVAC or water heating load shifting.

Performance Method Metric –*LSC* replaces *TDV*



Long-Term System Cost (LSC) is the CEC-projected present value of costs to the California's energy systems over a period of 30 years.
Note: LSC does ***not*** represent a prediction of individual utility bills.

Source Energy is defined as the long run marginal source energy of ***fossil fuels*** that are combusted as a result of the building energy consumed either directly at the building site or caused to be consumed to meet the electrical demand of the building…

Small Office Building Example in CBECC-Com

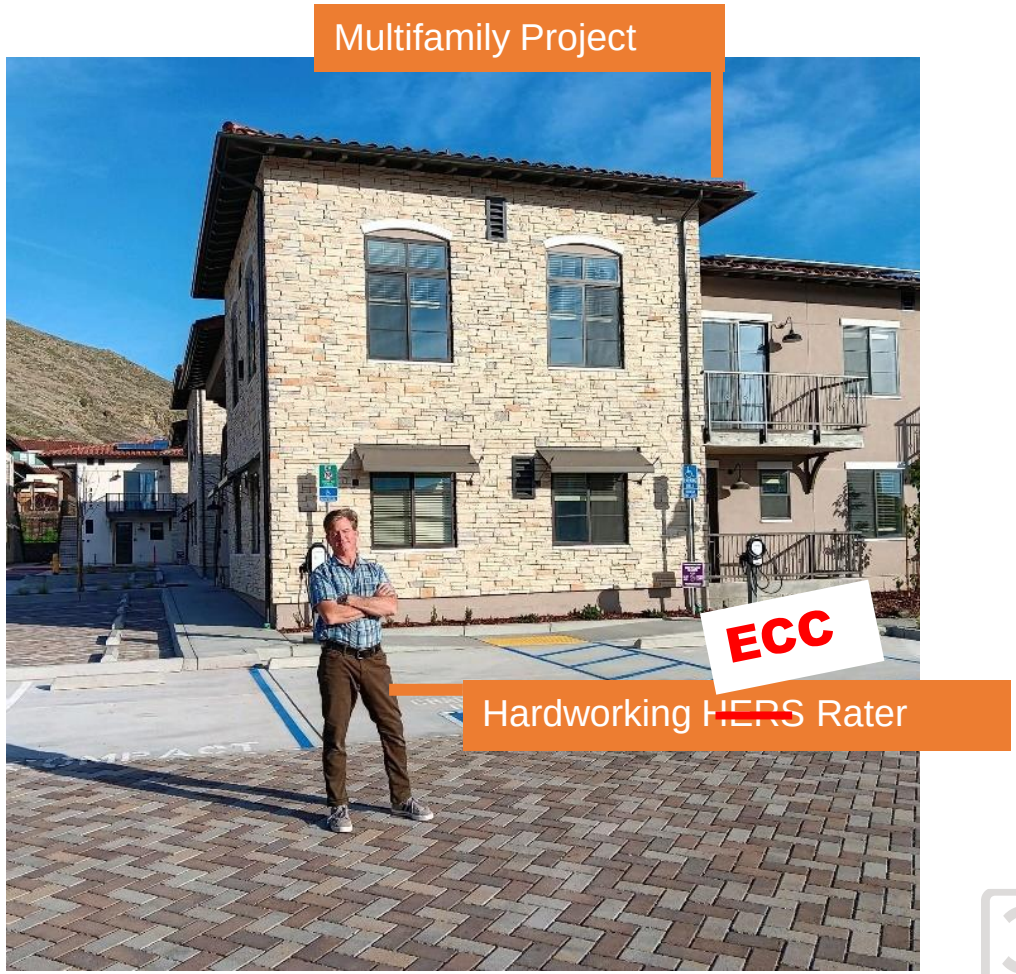
Overall Result[3]: **COMPLIES**

	LSC*e*	LSC*t*	Source Energy
Standard Design	134.03	12.73	6.13
Proposed Design	131.10	1.06	5.66
Compliance Margins	**2.93**	**11.67**	**0.47**
	Pass	Pass	Pass

HERS —Gets a New Name

HERS Rater:

- Duct Leakage Testing
- Blower Door / Envelope Leakage Testing
- Field Verifications:
  - Refrigerant Charge
  - Exhaust Fan and Kit Hood Fans
  - HVAC Efficiency and Capacity
- Assist/Complete: CF-2R and CF-3R, etc



Residential and Multifamily – *HERS* will be replaced by *ECC*

OLD

HERS

- Title 20 (Ch 4, Art 8, Sec 1670)
- 2022 and Prior Code Cycles
- HERS –Home Energy Rating System
- HERS Rater
  - HERS Field Verification and Diagnostic Testing

NEW

ECC Program

- Title 24, Art 1, Sec 10-103.3
- 2025 Code
- ECC –Energy Code Compliance
- ECC-Rater
  - Field Verification and Diagnostic Testing (FV&DT)

- Includes a **Quality Assurance Review** and audit process for the ECC-Rater.
- The ECC-Rater can achieve an ***Exemplary*** status.

New Scope, Definitions, and Mandatory Measures

Laboratory (L) Added to the Scope of the Energy Code

SECTION 100.0 – SCOPE

The provisions of Part 6 apply to all buildings that are of Occupancy Group A, B, E, F, H, I, L, M, R, S, or U

Key take-away: Many of the 2025 Energy Code updates are intended to add consistency with the other parts of the Building Code, Title 24.

Laboratory Occupancy –Found Under ‘*Nonresidential Function Areas’*

Clarified/Expanded Definition:

- Laboratory is a space or room where hazardous materials are used for activities such as testing, analysis, instruction, research, or developmental activities.
- Laboratory Suite is a Group L occupancy space within a building or structure, which may include multiple laboratories, offices, storage, equipment rooms or similar support functions.
- Laboratory, Scientific Area is a room or area where research, experiments, and measurement in medical and physical sciences are performed requiring examination of fine details. The area may include workbenches, countertops, scientific instruments, and associated floor spaces. Scientific laboratory does not refer to film, computer, and other laboratories where scientific experiments are not performed.

Heat Pump Water Heater Types Defined

WATER HEATER definitions include the following:

- **CONSUMER WATER HEATER** is a water heater that meets the definition of a consumer product under USDOE 10 CFR 430.
- **HEAT PUMP WATER HEATER (HPWH)** is a water heater that transfers thermal energy from one temperature level to another temperature level for the purpose of heating water, including all ancillary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function.
    - **INTEGRATED** HEAT PUMP WATER HEATER is a HPWH which has all components, including fans, storage tanks, pumps, or controls necessary for the device to perform its function contained in a single factory-made assembly.
    - **SPLIT-REFRIGERANT** HEAT PUMP WATER HEATER is a HPWH which has a single outdoor section and one or more indoor sections connected to the outdoor section via a refrigerant circuit.
    - **SPLIT-HYDRONIC** HEAT PUMP WATER HEATER is a HPWH that consists of multiple separate sections. One section houses all the refrigerant components, while one or more additional sections are designated for water storage. These sections are interconnected through a hydronic circuit.
- **MULTI-PASS** WATER HEATER is a water heater which the cold water passes through multiple times. The water temperature increases with each pass, until the storage tank reaches the intended storage temperature.
- **SINGLE-PASS** WATER HEATER is a water heater which the cold water passes through once and is heated to the intended use temperature.

Integrated

A. O. Smith - Residential

AO Smith –Small Commercial

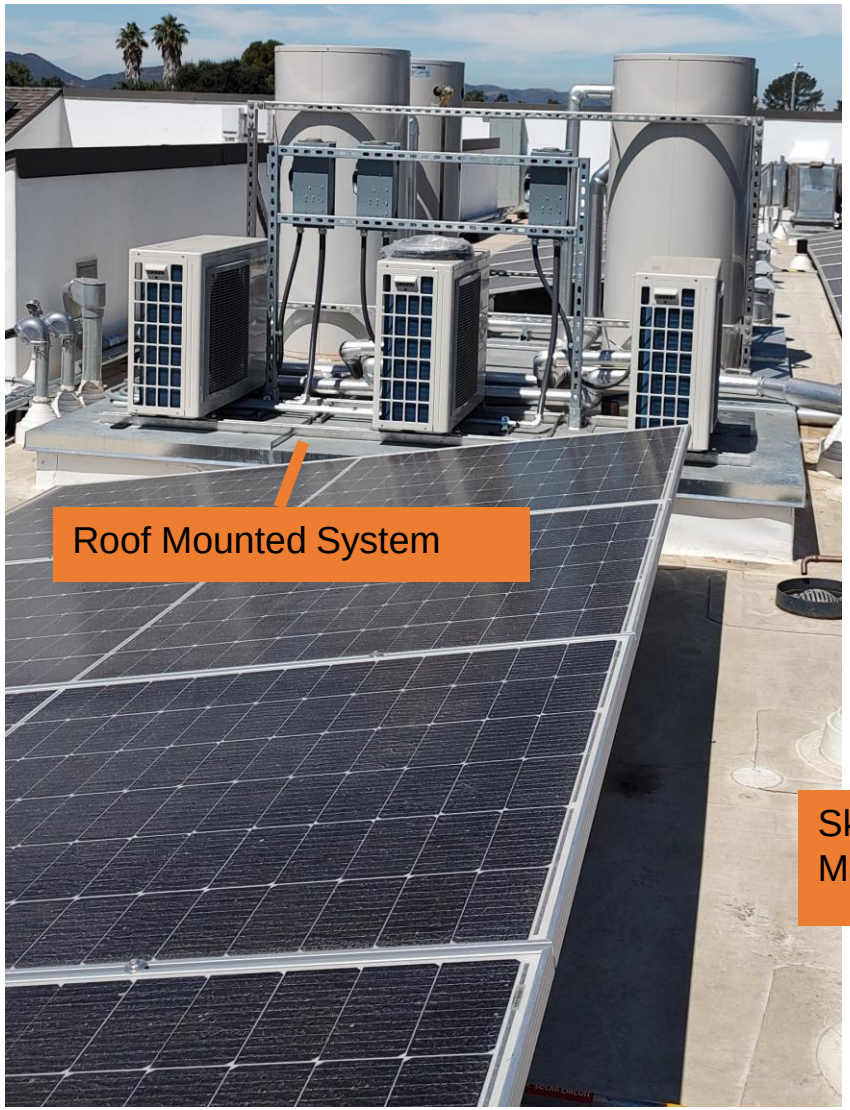
Aegis A -- Lync by Watts Large-Scale Commercial

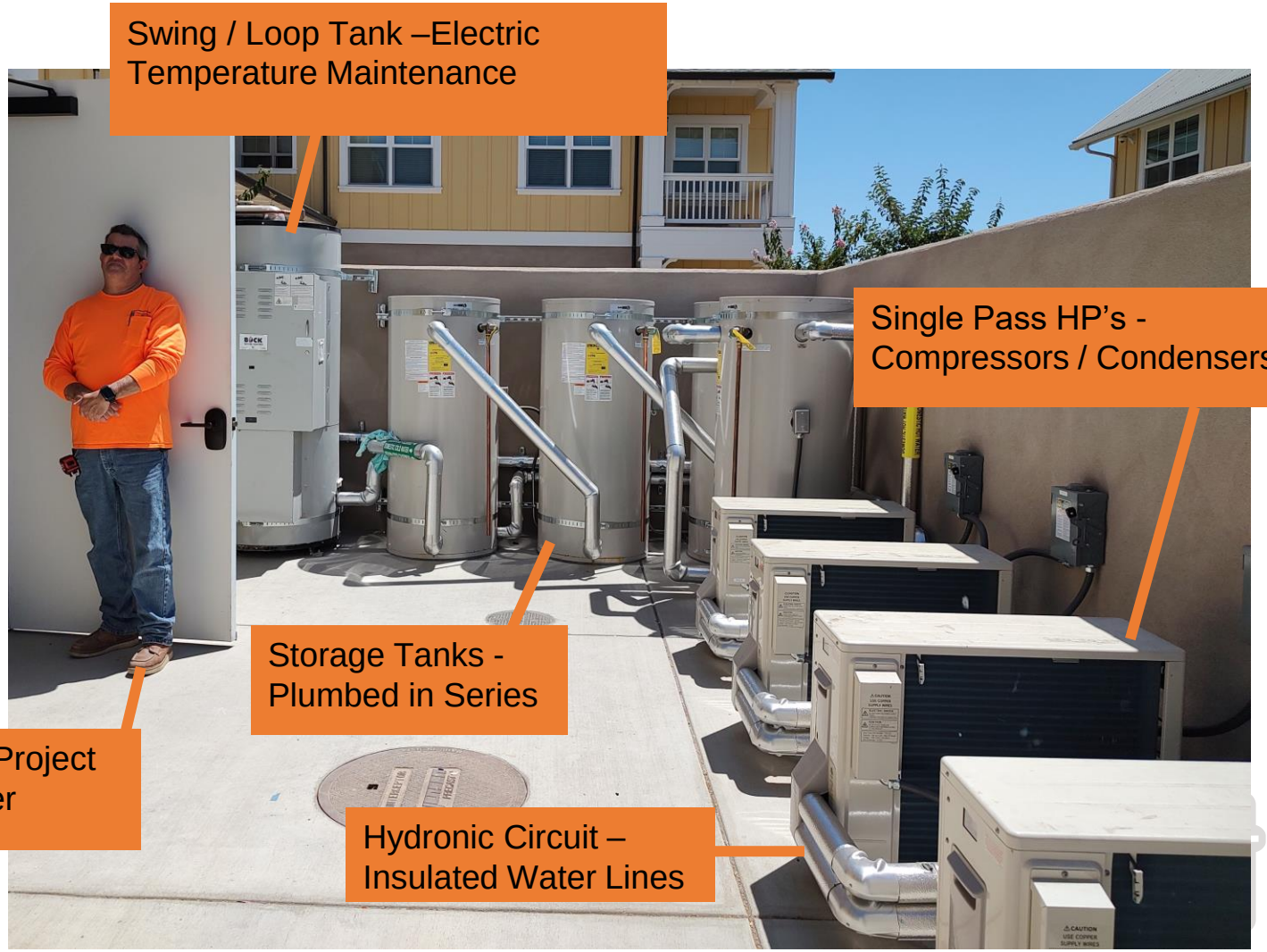
Sanden – Multifamily – Grouped or Single Split System

Lochinvar Commercial Scale

Nyle –Industrial or Large Central Systems

Example of Split-Hydronic Heat Pump Water Heater System



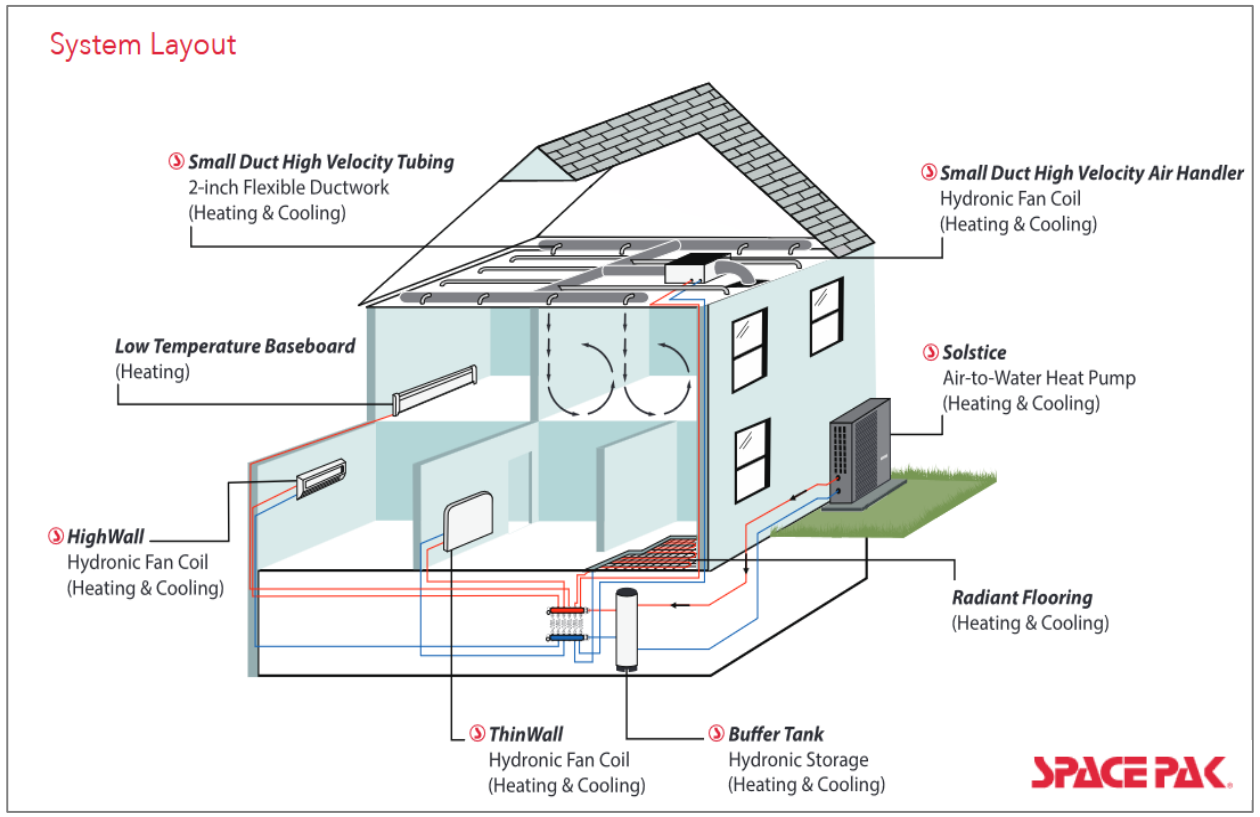


Project: Harry's House – Santa Barbara County

Air-to-Water Heat Pump (AWHP)

Added Definition:

AIR-TO-WATER HEAT PUMP (AWHP) is a factory-made packaged heat pump system containing one or more compressors, and heat exchangers for transferring heat between refrigerant and air, as well as between refrigerant and water, and various other components. Its primary purpose is to generate heated or cooled water to meet space conditioning loads, and/or and domestic hot water loads, or both.



Solstice® Inverter Monobloc

Air-to-Water Heat Pump

- Hot or Cold water circulates within the house –not refrigerant
- Uses a ducted system to deliver cooling
- Uses Mitsubishi Inverter for high performance

New Mandatory Measures –All Occupancies

110.2 Space-Conditioning Equipment

- Some Appliance Tables Removed;
- Tables updated to meet the Federal Minimum Efficiencies;
- New Table for Heat Pump and Heat Recovery Chillers
- Updated Cooling Tower Water Quality/Properties

110.3 Service Water Heating

- Installation of Heat Pump Water Heater

110.4 Pool and Spa Systems and Equipment Installation

- Sizing
- Efficiency
- Supplementary heater and cut-on/cut-off controls

Key Take-Away:

As part of the water-energy nexus, many of these changes improve water and energy efficiency.

New Mandatory Requirements for HPWH Installations

Section 110.3 Service Hot Water

110.3 (c) Installation:

1. Outlet temperature controls
2. Control for hot water distribution systems
3. Insulation
4. Water heating recirculation loops serving multiple dwelling units
5. Service water heaters in state buildings
6. Isolation valves
7. Air-Source Heat Pump Water Heaters (HPWHs)

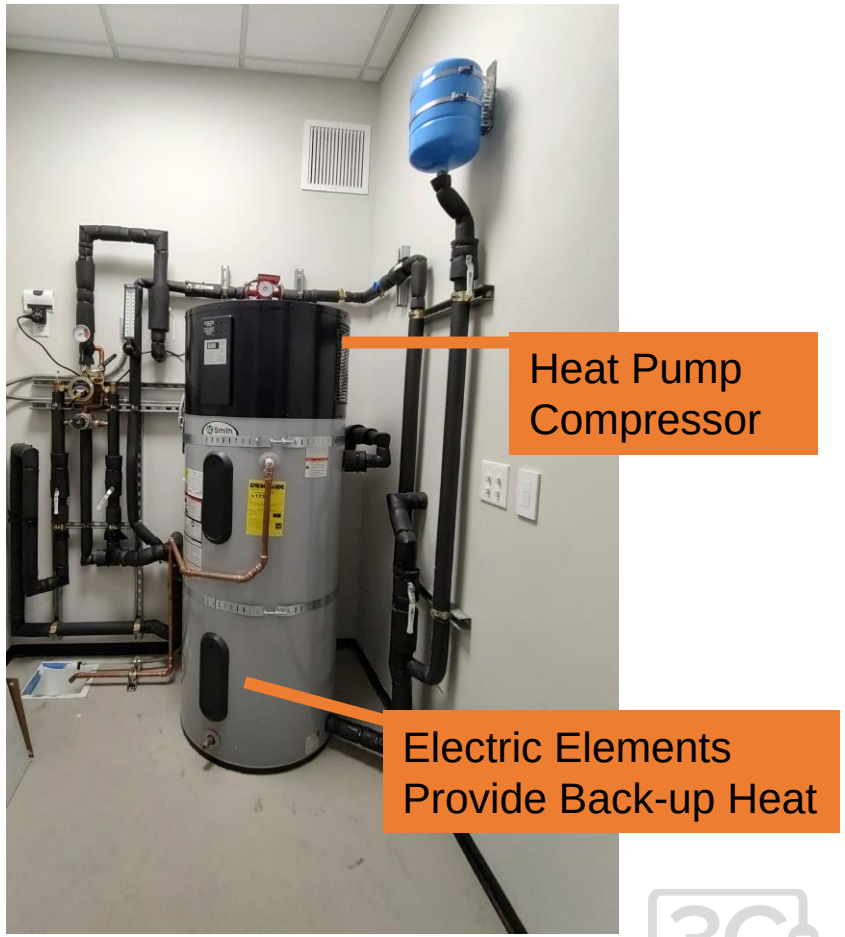
New Mandatory Requirements for HPWH

7. Air-Source Heat Pump Water Heaters (HPWHs). HPWH shall meet the following requirements:

A. Backup Heat. Backup heat is required for systems when inlet air is unconditioned, unless the compressor cut-off temperature is below the Heating Winter Median of Extremes for the closest location listed in Table 2-3 from Reference Joint Appendix JA2. Backup heat may be internal or external to the HPWH.

B. Ventilation. Consumer integrated HPWHs shall meet one of the ventilation requirements below. Minimum volume and opening size requirements shall be the sum of all HPWHs installed within the same space. Compressor capacity shall be determined using AHRI 540 Table 4 reference conditions for refrigeration with the “High” rating test point:

1. Installed using a method provided by the manufacturer to meet or exceed the level of performance provided by the ventilation requirements of Section 110.3(c)7B2 through Section 110.3(c)B4.



New Mandatory Requirements for HPWH *no Ducts*

2. For HPWH installation without ducts, the installation space shall have a volume not less than the greater of 100 cubic feet per kBtu per hour of compressor capacity, or the minimum volume provided by the manufacturer for this method; or

3. For HPWH installation without ducts, the installation space shall be vented to a communicating space via permanent openings, according to the following requirements:

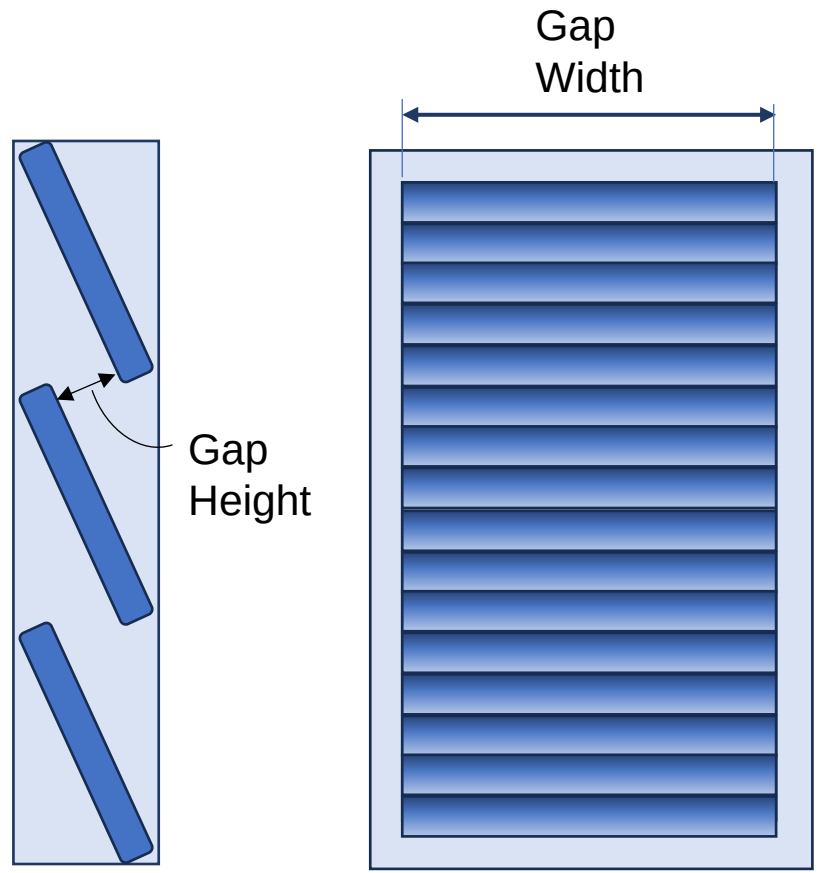
i. Communicating space shall meet the minimum volume of section 110.3(c)7B2 above, minus the volume of the HPWH installation space; and

ii. Permanent openings shall consist of a single layer of fixed flat slat louvers or grilles, with a total minimum **Net Free Area (NFA)** the larger of 125 square inches plus 25 square inches per kBtu per hour of compressor capacity, or the minimum provided by the manufacturer for this method. The permanent openings shall be fully louvered doors or two openings of equal area, one in the upper half of the enclosure and one in the bottom half of the enclosure. The top of the upper opening must be 12 inches or less from the enclosure top and the bottom of the lower vent must be 12 inches or less from the enclosure bottom; or

NFA = 125 sq in + 25 sq in per kBtu/h of compressor capacity or manufacturer specifications, whichever is larger

Sidebar: New Definition –Net Free Area (NFA)

- NET FREE AREA (NFA) is the total unobstructed area within the air gaps between louver and grille slats in a vent, allowing the passage of air. The narrowest distance between two slats, perpendicular to the surface of both slats is the air gap height. The narrowest width of the gap is the air gap width.
- The NFA is the air gap height multiplied by the air gap width multiplied by the total number of air gaps between slats in the vent.



New Mandatory Requirements for HPWH *with Ducts*

4. **For HPWH installations with ducts**, the following requirements shall be met:

   i. The space joined to the installation space via ducts shall meet the minimum volume of section 110.3(c)7B2 above, minus the volume of the HPWH installation space; and

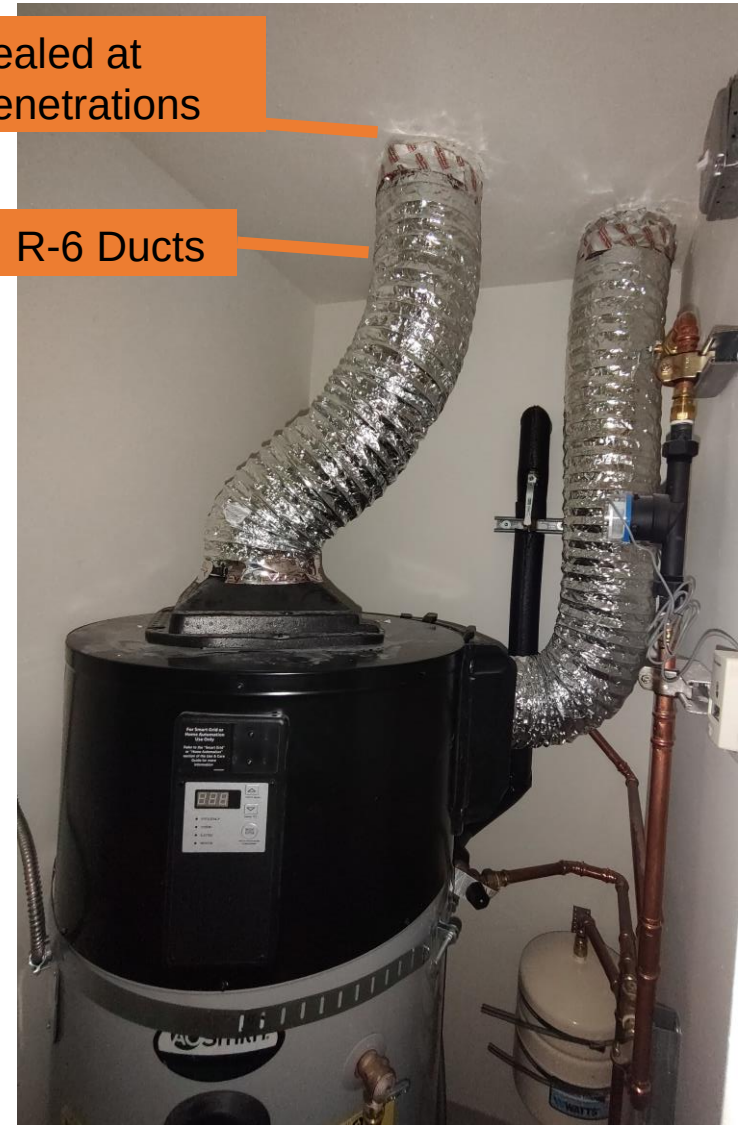
   ii. All duct connections and building penetrations shall be sealed; and

   iii. Exhaust air ducts and all ducts which cross pressure boundaries shall be insulated to minimum of R-6; and

   iv. Where only the HPWH inlet or outlet is ducted, installation space shall include permanent openings which consist of a single layer of fixed flat slat louvers or grilles in the bottom half of the room, and/or a door undercut. With a ducted inlet, the minimum NFA shall be equal to the cross-sectional area of the duct. With a ducted exhaust, the minimum NFA shall be the larger of 20 square inches or the minimum NFA provided by the manufacturer for this method; and

   v. Where the inlet and outlet ducts both terminate within the same pressure boundary, airflow from the termination points shall be diverted away from each other;

Note: Ducting only the inlet or the exhaust across the pressure boundary could interfere with balanced ventilation systems. This should be considered when specifying HPWH location and ventilation method.



Highlights of Non-Residential Changes

Non-Residential High-Level Changes

- Electric-readiness for commercial kitchens
- Ventilation –Outdoor Air (OA)
- Exhaust Systems –Added Animal/Veterinary
- Lighting Controls Updates
- Envelope –Walls and Roofs/Ceilings
- Photovoltaic (PV) and Battery Systems

Commercial Kitchen Defined

- KITCHEN, FULL-SERVICE COMMERCIAL is a kitchen dedicated to an establishment that offers table service by waitstaff.
- KITCHEN, INSTITUTIONAL COMMERCIAL is a kitchen dedicated to a foodservice establishment that provides meals at institutions including schools, colleges and universities, hospitals, correctional facilities, private cafeterias, nursing homes, and other buildings or structures in which care or supervision is provided to occupants.
- KITCHEN, QUICK-SERVICE COMMERCIAL is a kitchen dedicated to an establishment primarily engaged in providing fast food, fast casual, or limited services. Food and drink may be consumed on premises, taken out, or delivered to the customer’s location.

Institutional Kitchen –Senior Living

Electric Ready for Commercial Kitchens

Mandatory requirements for commercial kitchens. Electric Readiness for Newly Constructed

Commercial Kitchens shall meet the following requirements:

1. *Quick-service commercial kitchens* and *institutional commercial kitchens* shall include a dedicated branch circuit wiring and outlet that would be accessible to cookline appliances and shall meet all of the following requirements:

a. The branch circuit conductors shall be rated at 50 amps minimum.

b. The electrical service panel shall have a minimum capacity of 800 connected amps.

2. The electrical service panel shall be sized to accommodate an additional either 208v or 240v 50-amp breaker.

EXCEPTION 1 to Section 120.6(k): healthcare facilities.

EXCEPTION 2 to Section 120.6(k): all-electric commercial kitchens.

Southbend

Model P36T-III shown

For use with induction safe cookware ONLY.

Induction Electrical Data	Amps*	
Elements	1 Phase	3 Phase
(6) 3.5 KW Heating Elements Total 21 KW	88	51
P36N-III with TVES/10SC	*Reference Electric TruVection Spec Sheet	

Updated Ventilation Rates –Outdoor Air (OA)

Updated Ventilation Zone (Vz) Formula:

Vz (cfm) = larger of **Rp x Pz** or **Ra x Az**

Where:

Rp = 15 cfm of OA per person

Pz = Expected number of people*

Ra = Area-based Min Ventilation (Table.1-A)

Az = Net occupiable floor area

*__For spaces without fixed seating__, the expected number of occupants shall be the expected number specified by the building designer or the default occupancy density in Table 120.1-A times the occupiable floor area of the zone, whichever is greater.

*__For spaces with fixed seating__, the expected number of occupants shall be determined in accordance with the California Building Code Section 1004.6.

TABLE 120.1-A– Continued Minimum Ventilation Rates

Occupancy Category - *Residential*	Minimum Occupant Load Density (persons / 1000 ft²) ~~Total Outdoor Airflow Rate[1] R_t cfm/ft²~~	Area-based Minimum Ventilation ~~Min Ventilation Air Rate for DCV~~ R_a (cfm/ft²)	Air Class	Notes
Common corridors	~~0.15~~5	0.15	1	F

Note: The minimum occupant density is one half of the maximum occupant load assumed for egress purposes in the CBC.

Example: 2000 sf of Res Common Corridor

Vz = **Rp x Pz** =15cfm (5/1000sf) (2000sf)
= 150cfm

or

Vz= **Ra x Az =**0.15cfm/sf (2000sf) = 300cfm

New Veterinary Categories for Required Exhaust Rates

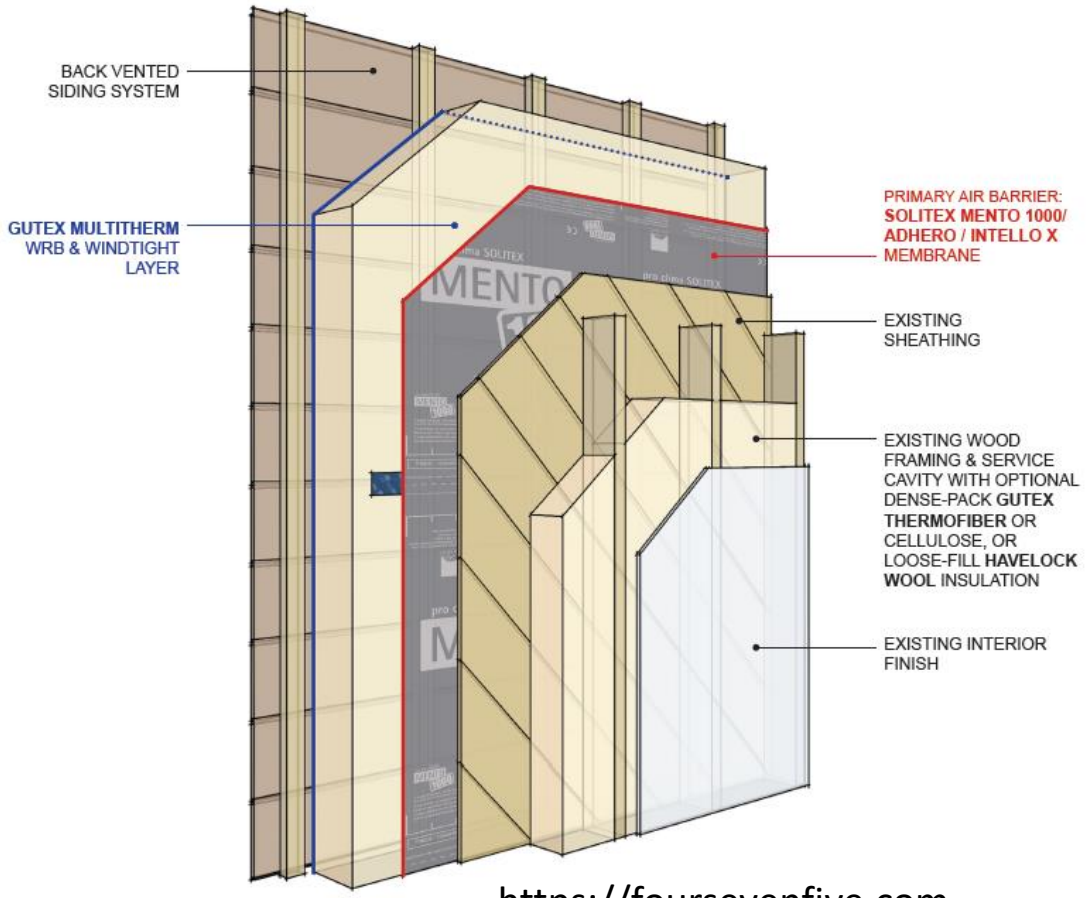
Excerpt:

Table 120.1-B – Minimum Exhaust Rates [ASHRAE 62.1: Table 6.-25]

Occupancy Category	Exhaust Rate, cfm/unit	Exhaust Rate, cfm/ft^2	Air Class	Notes
Animal imaging(MRI/CT/PET)	-	0.9	3	-
Animal operating rooms	-	3.00	3	-
Animal postoperative recovery room	-	1.5	3	-
Animal preparation rooms	-	1.5	3	-
Animal procedure room	-	2.25	3	-
Animal surgery scrub	-	1.50	3	-
Large-animal holding room	-	2.25	3	-
Animal Necropsy	-	2.25	3	-
Small-animal-cage room (static cages)	-	2.25	3	-
Small-animal-cage room (ventilated cages)	-	1.50	3	-

Under 2025 Code, Animal occupancy types were added, other occupancies remained relatively unchanged.

Non-Res Wall Assembly Example



https://foursevenfive.com

Mandatory Min —Wall
No change:
R-11 for 2x4 Wood Stud
R-13 w/ CI R-2 for 2x4 Metal Framed

Non-Res –Wall insulation increased for nearly all climate zones

Hotel/Motel –no change

Prescriptive Code and Mandatory Min Metal Framed Walls includes a layer of continuous insulation (CI).

Prescriptive Envelope –Table 140.0-B

Envelope Feature	CZ 1	CZ 2	CZ3	CZ 4	CZ 5	CZ 6	CZ 7	CZ 8	CZ 9	CZ 10	CZ 11	CZ 12	CZ 13	CZ 14	CZ 15	CZ 16
Roofs and Ceilings - Metal Building Max U-Factor	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038	~~0.041~~ 0.038
Roofs and Ceilings - Wood Framed and Other Max U-Factor	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.049~~ 0.047	~~0.049~~ 0.047	~~0.049~~ 0.047	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028	~~0.034~~ 0.028
Walls - Metal Building Max U-Factor	~~0.113~~ 0.098	~~0.061~~ 0.053	~~0.113~~ 0.098	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.113~~ 0.098	~~0.113~~ 0.098	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.061~~ 0.053	~~0.057~~ 0.050	~~0.061~~ 0.053
Walls - Metal-framed Max U-Factor	0.060	0.055	0.071	0.055	0.055	0.060	0.060	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
Walls - Mass, Light[1] Max U-Factor	~~0.196~~ 0.170	~~0.170~~ 0.138	~~0.278~~ 0.227	~~0.227~~ 0.196	~~0.440~~ 0.364	~~0.440~~ 0.364	~~0.440~~ 0.364	~~0.440~~ 0.364	~~0.440~~ 0.364	~~0.170~~ 0.138	~~0.170~~ 0.138	~~0.170~~ 0.138	~~0.170~~ 0.138	~~0.170~~ 0.138	~~0.170~~ 0.138	~~0.170~~ 0.138
Walls - Mass, Heavy[1] Max U-Factor	~~0.253~~ 0.211	0.650	0.650	0.650	0.650	0.690	0.690	0.690	0.690	0.650	~~0.184~~ 0.160	~~0.253~~ 0.211	~~0.211~~ 0.184	~~0.184~~ 0.160	~~0.184~~ 0.160	~~0.160~~ 0.153
Walls - Wood-framed and Other Max U-Factor	~~0.095~~ 0.078	~~0.059~~ 0.053	~~0.110~~ 0.102	~~0.059~~ 0.053	~~0.102~~ 0.095	~~0.110~~ 0.102	~~0.110~~ 0.102	~~0.102~~ 0.095	~~0.059~~ 0.053	~~0.059~~ 0.053	~~0.045~~ 0.042	~~0.059~~ 0.053	~~0.059~~ 0.053	~~0.059~~ 0.053	~~0.042~~ 0.038	~~0.059~~ 0.053

Key Take Away: Roofs/Ceilings and all but Metal-framed Walls have higher insulation levels under the 2025 Code

U-factors –Wood Wall Example

Table 4.3.1(a) – U-factors of Wood Framed Walls with installed 5/8-inch Gypsum Board[1] – 16 in. OC

		Rated R-value of Continuous Insulation[3]							
Cavity Insulation	**Nominal Framing Size**	**R-0**	**R-2**	**R-4**	**R-5**	**R-6**	**R-7**	**R-8**	**R-10**
None	Any	0.343	0.208	0.145	0.126	0.112	0.100	0.091	0.077
R-11	2x4	0.109	0.087	0.073	0.067	0.063	0.059	0.055	0.050
R-13	2x4	0.101	0.081	0.068	0.063	0.059	0.056	0.052	0.047
R-15 [2]	2x4	0.094	0.076	0.064	0.059	0.055	0.052	0.049	0.045
R-19	2x6	0.073	0.062	0.054	0.050	0.048	0.045	0.043	0.040
R-21[2]	2x6	0.068	0.058	0.050	0.047	0.045	0.041	0.040	0.038
R-22	2x6	0.071	0.061	0.053	0.050	0.047	0.044	0.042	0.039
R-19	2x8	0.064	0.056	0.050	0.047	0.044	0.042	0.040	0.038
R-22	2x8	0.060	0.052	0.046	0.044	0.042	0.040	0.038	0.036
R-25	2x8	0.056	0.049	0.043	0.041	0.039	0.037	0.036	0.034
R-30[2]	2x8	0.055	0.048	0.043	0.040	0.039	0.037	0.035	0.033

Solar and Battery – Highrise and Non-Res

Applicable Occupancy Types:

- High-Rise Residential
- Grocery, Retail
- Restaurants
- School
- Library
- Warehouse
- Religious Worship
- Sports and Recreation
- Events and Exhibits
- Hotel-Motel
- Office, Financial Institution, Unleased Tenant Space, Medical Office Building/Clinic

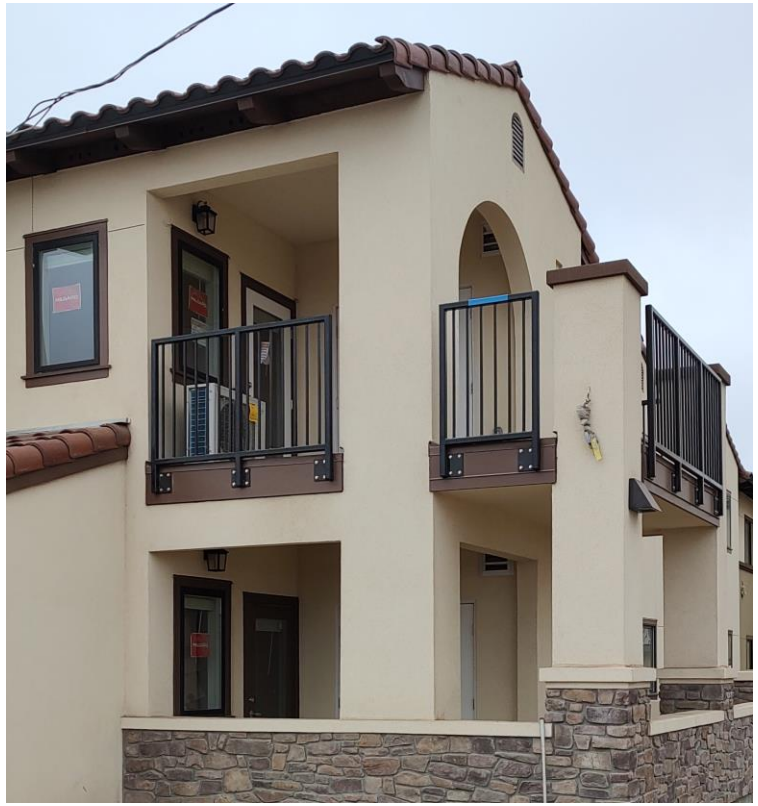
Under the 2025 Code some occupancies types were added and some will have increased Solar PV and Battery requirements. Restaurants, for example, had a dramatic increase and Libraries were added.

- **Solar PV System size will depend on Occupancy Type, Conditioned Floor Area, etc.**
- **Battery System size will depend on Solar System Size.**

Highlights of Single-Family Changes

Residential High-Level Changes

- EDR Metric is Replaced
- Revised IAQ Ventilation
- Prescriptive requirements expanded
  - Fenestration
  - Heat Pumps
  - ERV/HRV
- Roof/Attic Insulation Increased for some climate zones



Single Family Metrics for Performance Method

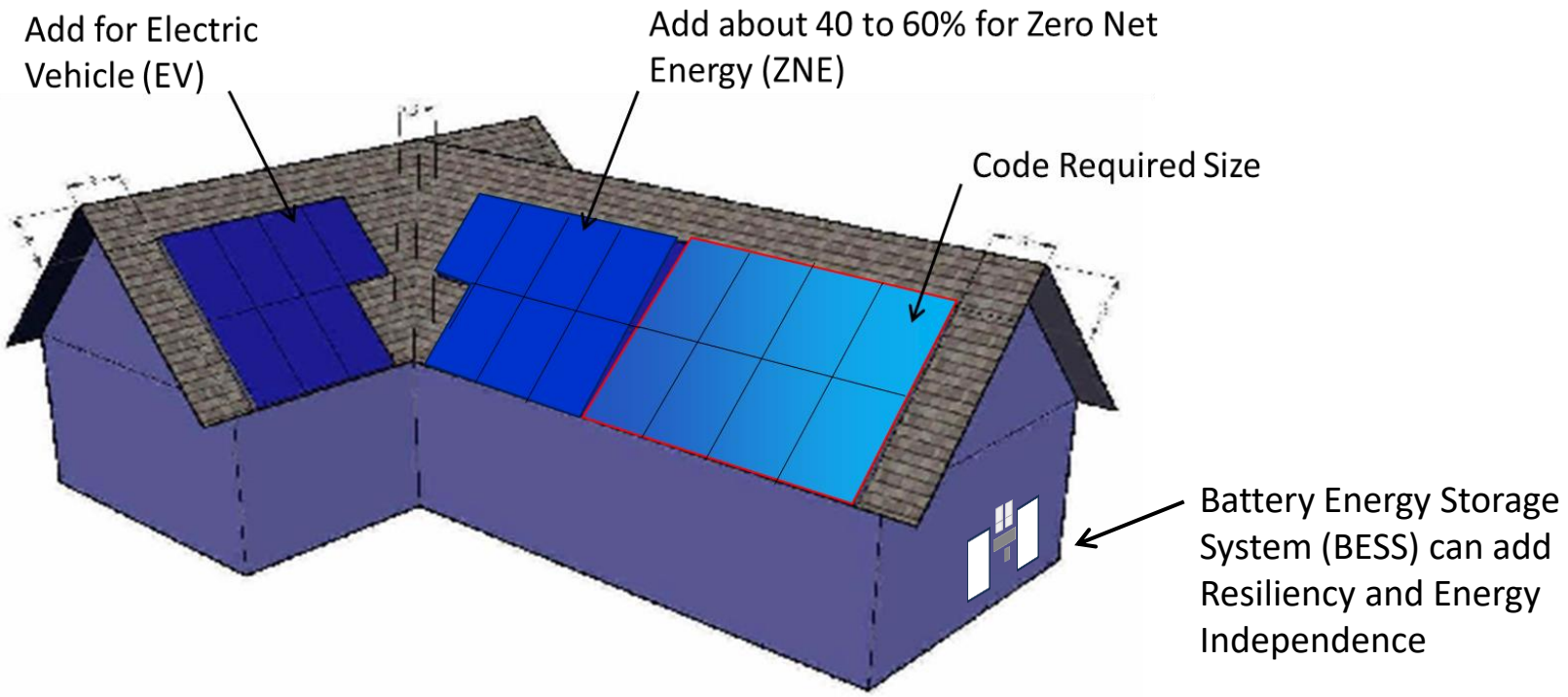
Code Cycle	New Construction (Includes Stand-Alone ADU's)			Additions &/or Alterations
2022	EDRe	EDRt	EDRs	TDV
2025	LSCe	LSCt	Source	LSCe

TDV = Time Dependent Valuation (kbtu/ft2-yr)
EDR*e* = Energy Design Rating -*efficiency* (Score 0-100)
EDR*t* = Energy Design Rating -*total* (Score 0-100)
EDR*s* = Source Energy Design Rating (kbtu/ft2-yr as a proxy for carbon)

LSC*e* = Long-term System Cost -*efficiency* ($/ft2)
LSC*t* = Long-term System Cost -*total* ($/ft2)
Source = Total Annual Source Energy

Source Energy is based on the impacts of fossil fuel combustion, both at the site and as a source of creating electricity.

2025 Energy Code –BESS and Self-Utilization Credit



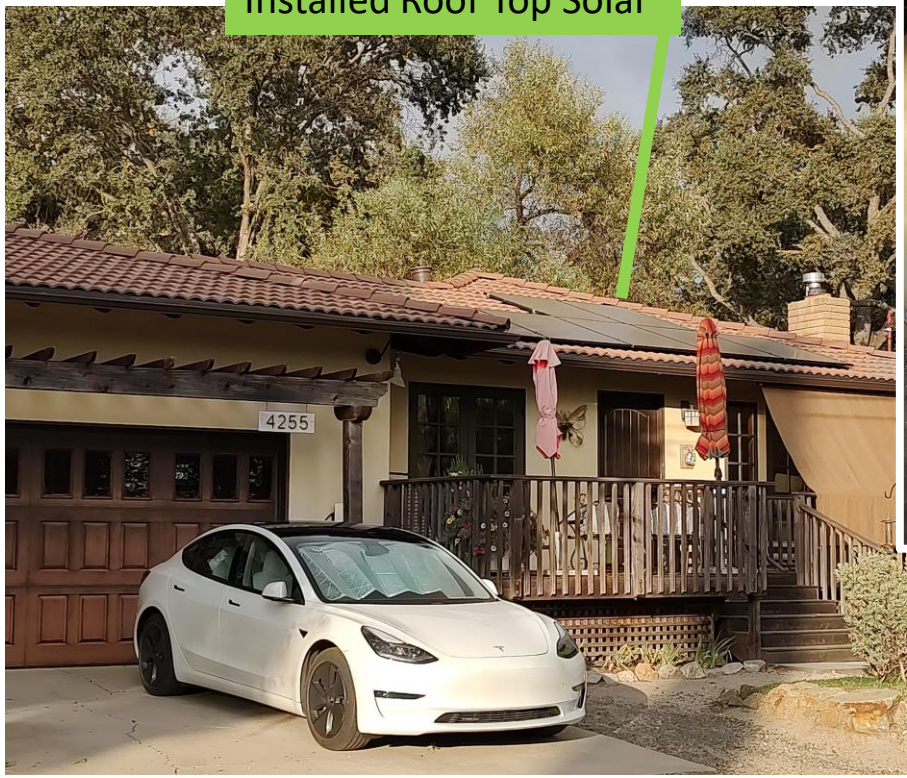
For Example: New Construction 2000 SF home in Atascadero (climate zone 4) a 2.38 kW system would be required.
Santa Barbara and Ventura coastal areas would be slightly less.

Definition Updated:

SELF-UTILIZATION CREDIT is the limited Efficiency LSC energy budget compliance credit available for combined PV and battery energy storage systems for single-family, as specified by the Residential ACM Reference Manual, and low-rise multifamily, as specified by the Nonresidential and Multifamily ACM Reference Manual.

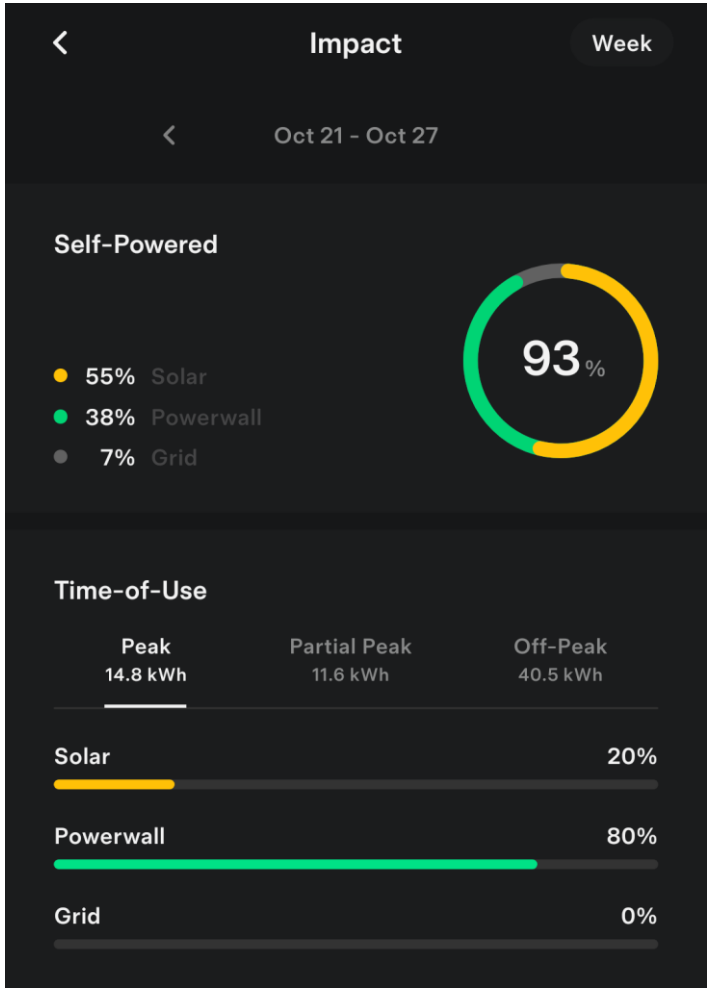
New Construction Solar Required, Battery Storage Optional

Installed Roof Top Solar



Battery Storage: Two batteries are providing whole home back-up – for the most part…

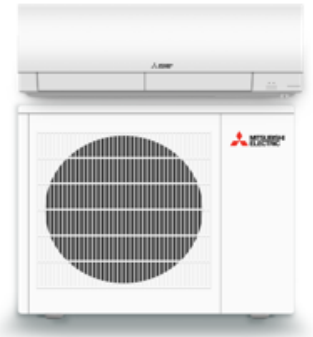
Depending on one's driving milage, electric cars can add significant loads.



New Prescriptive Requirements –Applies to CZ 1-16

- **Heat Pump Space Conditioning**; Gas no longer applicable for Prescriptive compliance
- Heat Pumps **Refrigerant Charge Verification**; ECC-Rater to verify –formerly a HERS Rater
- **Fault Indicator Display** (FID) required, if ERV/HRV is installed –ECC field verified.
- **Heat Pump Water Heaters**; Gas water heaters allowed only under the Performance method.

Ducted Heat Pump



Ductless Mini-Split Heat Pump

ERV/HRV

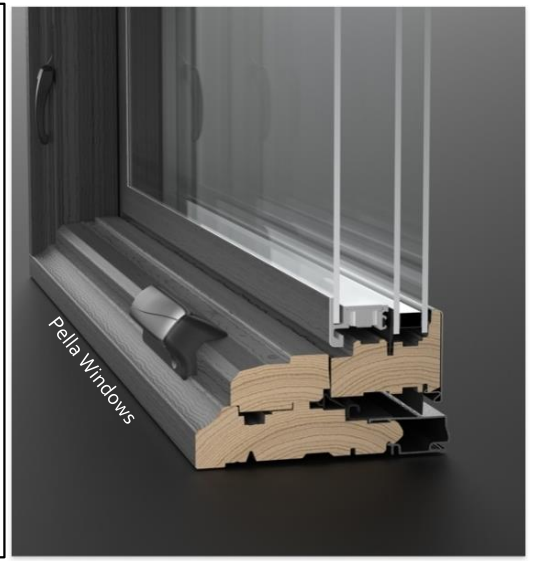
HPWH

Window Performance Prescriptive Change

Just about all brands of windows offer dual or triple paned options

Options:

- Dual Paned Low-e
- Triple paned Low-e
- Air/Argon/Krypton
- Thermally Broken
- Visible Transmittance
- Sound Transfer



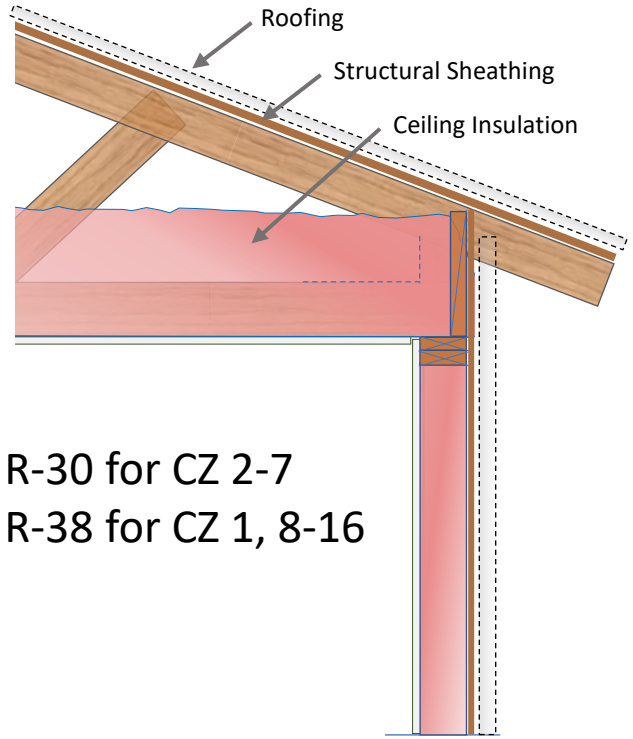
	Panes	U-Factor	Delivered Cost
Alpen			
	Double	0.15	$75,878.51
	Double	0.16	$85,311.14
Andersen			
A-Series	Triple	0.23	$135,873.69
Loewen			
Alum Clad	Double	0.25	$152,826.18
Marvin			
Essential & Ultimate Drs	Double	0.29	$118,620.61
SeemRay			
	Double	0.21	$64,000.00

Prescriptive:

- **U-0.27** decreased for CZ 1-5, 11-14, and 16
- **U-0.30** no change for CZ 6-10 and 15

Vented Attics and Cathedral Roof Assemblies with *Ducts in Conditioned Space*

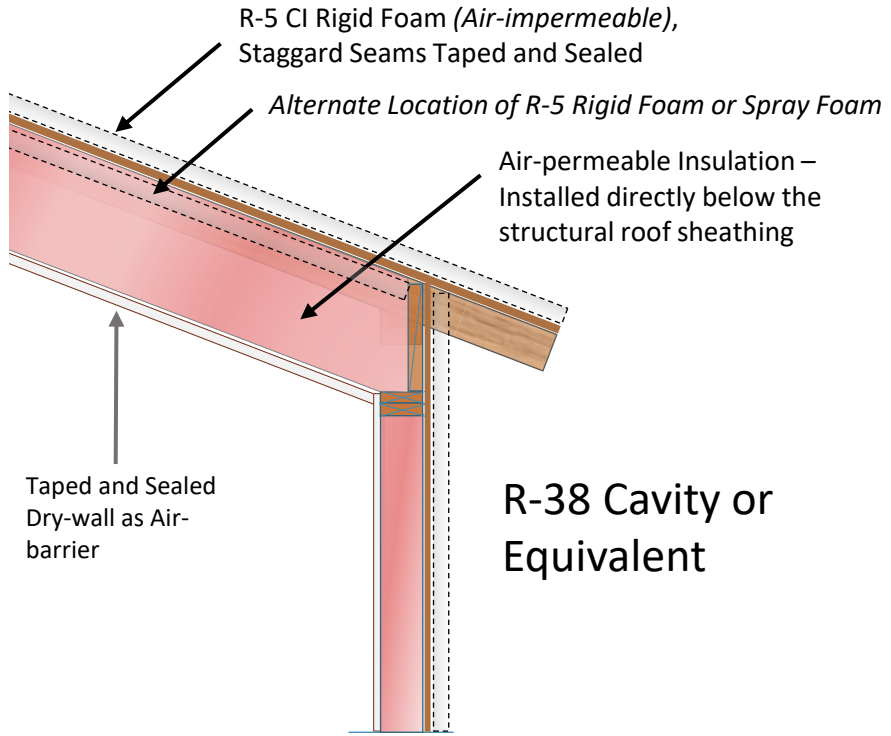
Climate Zones (CZ) 8, 9, and 10 got an upgrade to R-38



R-30 for CZ 2-7
R-38 for CZ 1, 8-16

Vented Attic with Ceiling Insulation (Option C)

New Prescriptive Option:
All Climate Zones are R-38



R-38 Cavity or Equivalent

Unvented Cathedral / Rafter Roof (Option B)

Highlights of Multifamily Changes

Multifamily High-Level Changes

- Envelope: Fenestration
- HVAC –Heating, Cooling, and Fans
- Outside Air Ventilation Updates
- Compartmentalization Testing, i.e. Blower Door
- Water Heating –HPWH Electric-Readiness Updates

Window Performance Values –Multifamily

Mandatory Minimums:

Allowable U-factor **maximum** is **U-0.58** per Sec 160.1(e)*

Prescriptive:

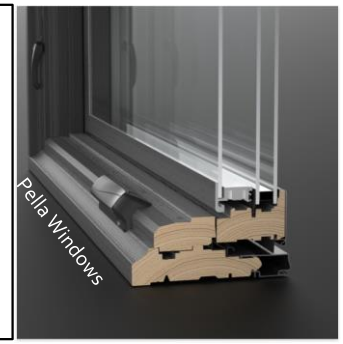
Curtain wall minor change, i.e. combined low-rise and high-rise.

Other Windows:

- **U-0.28** decrease for CZ 1, 3-5, 11, and 13-16.
- **U-0.30** no change for CZ 2, 8-10, and 12
- **U-0.34** no change for CZ 6 and 7

Some exceptions apply.

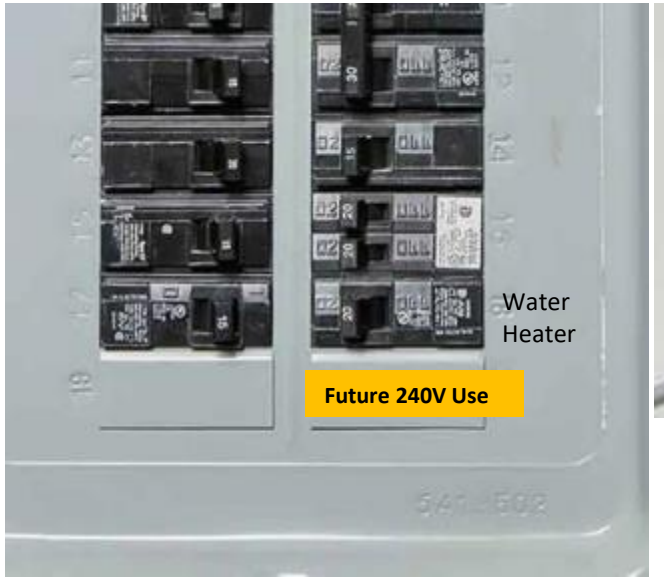
Non-Res –no change



Exception to Section 160.1(e):** Fenestration installed in buildings meeting Part 7 of the California Building Code, California Wildland-Urban Interface Code, where the building is located in *Fire Hazard Severity Zones or Wildland-Urban Interface* ***(WUI) *Fire Areas* as designated by the local enforcement agency.

Title 24 Energy Code –Gas use is allowable, but code requires ‘Electric Ready’ in New Construction

- Most of the ‘Electric Ready’ requirements are the same as the 2022 Code…i.e. physical space, breaker, electrical feeds, etc
  - Furnaces
  - Water Heaters
  - Cooktops
  - Dryers
- Multi-family Update:
  - Water Heating for Individual Dwelling Units specify 39”x39”x96 for future HPWH, and
  - Ventilation strategies are described in detail
  - Electric panel, breaker space, electrical feed prepared and labeled



Key Concept:
Intent is to remove known cost barriers that prevent house holds from transitioning to energy efficient electric appliances

Central Heat Pump Water Heater “Ready” for Multifamily

Added electric-HPWH “Ready” requirements to Multifamily projects installing central gas water heating systems:

- Allocation of physical space for HPWH/Tanks, etc
- Provide for ventilation path/strategy
- Provide condensate drainage piping/receptacle
- Reserve physical space for electrical power and bus system of the main/distribution electrical switchboard

Gas Water Heating is Allowable, but …

New –Balanced Ventilation Requirements

Balanced and supply ventilation component accessibility. Balanced and supply ventilation systems shall meet the following requirements for accessibility:

a. IAQ filter and HRV/ERV accessibility. System air filters and HRV/ERV heat/energy recovery cores shall be located such that they are accessible for service from within occupiable spaces, basements, garages, balconies, mechanical closets or accessible rooftops. Filters and heat/energy recovery cores behind access panels, access doors, or grilles located no more than 10 feet above a walking surface inside a space specified above comply with this requirement.

Exception to Section 160.2(b)2Axia: Systems that require servicing from inside the attic shall have the following:

1. A Fault Indicator Display (FID) meeting the requirements of Reference Appendix JA 17; and

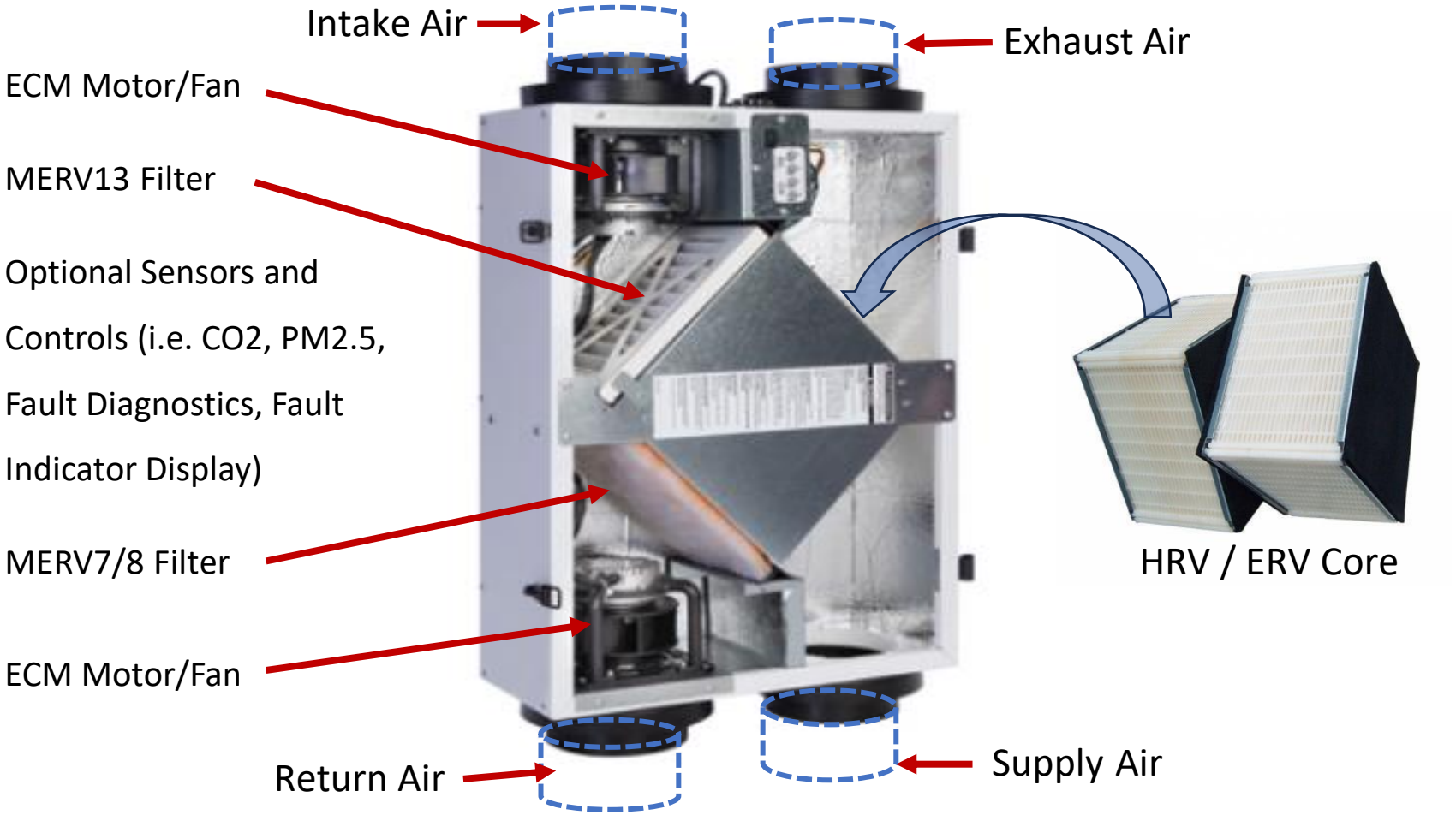
2. An attic access door located in a wall or, where attic access is provided through a ceiling, an attic access hatch that includes an integrated ladder; and

3. A walkway from the attic access door to the HRV/ERV.

b. IAQ system component accessibility. Fans, motors, heat exchangers, filters and recovery cores shall meet all applicable requirements of California Mechanical Code 304.0 accessibility of service

ERV unit is accessible via a louvered closet door

Balanced Ventilation –Components of a Ducted ERV / HRV



Key Take-away:

Units need to be accessible and need to have the filters changed.

Frequency can depend on the local air quality, including dust, lint, pet hair, other debris, etc.

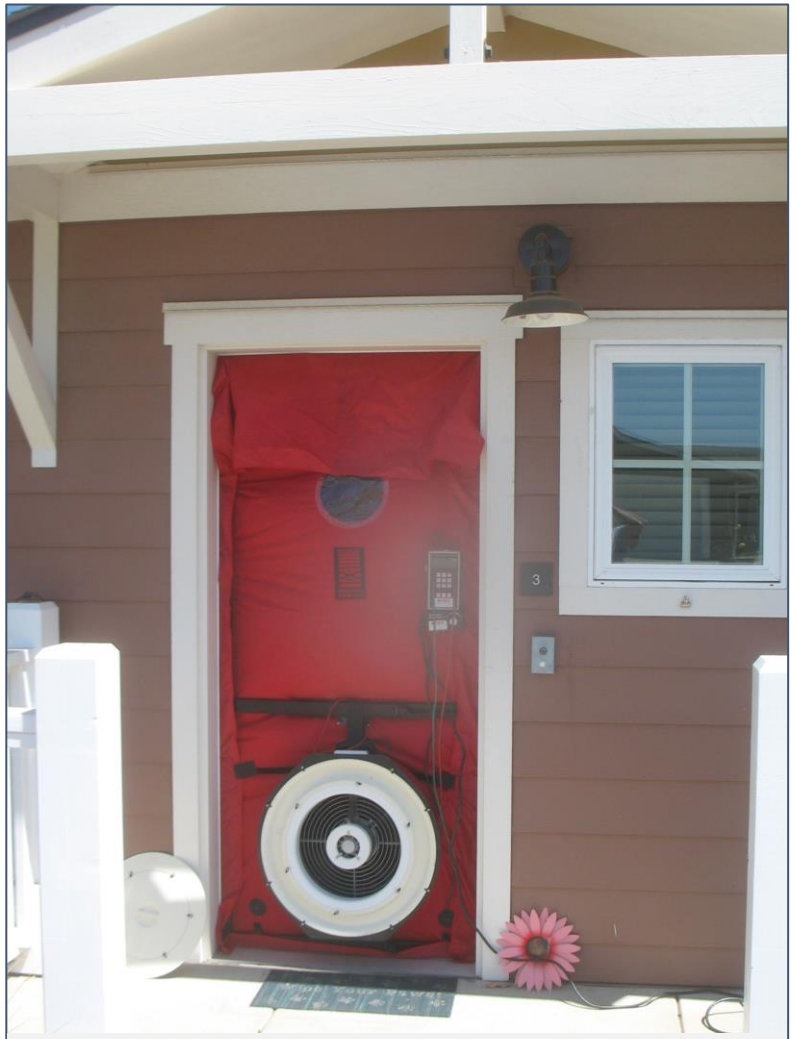
Mechanical IAQ Ventilation for Multifamily –New Construction

Added new outside air (OA) ventilation requirements for dwelling units:

- Balanced Ventilation or Supply Only Ventilation for Indoor Air Quality (IAQ)
- ECC Compartmentalization Testing required for all OA ventilation strategies

Note:
For ***new construction***, exhaust only IAQ ventilation is **no longer an option**.

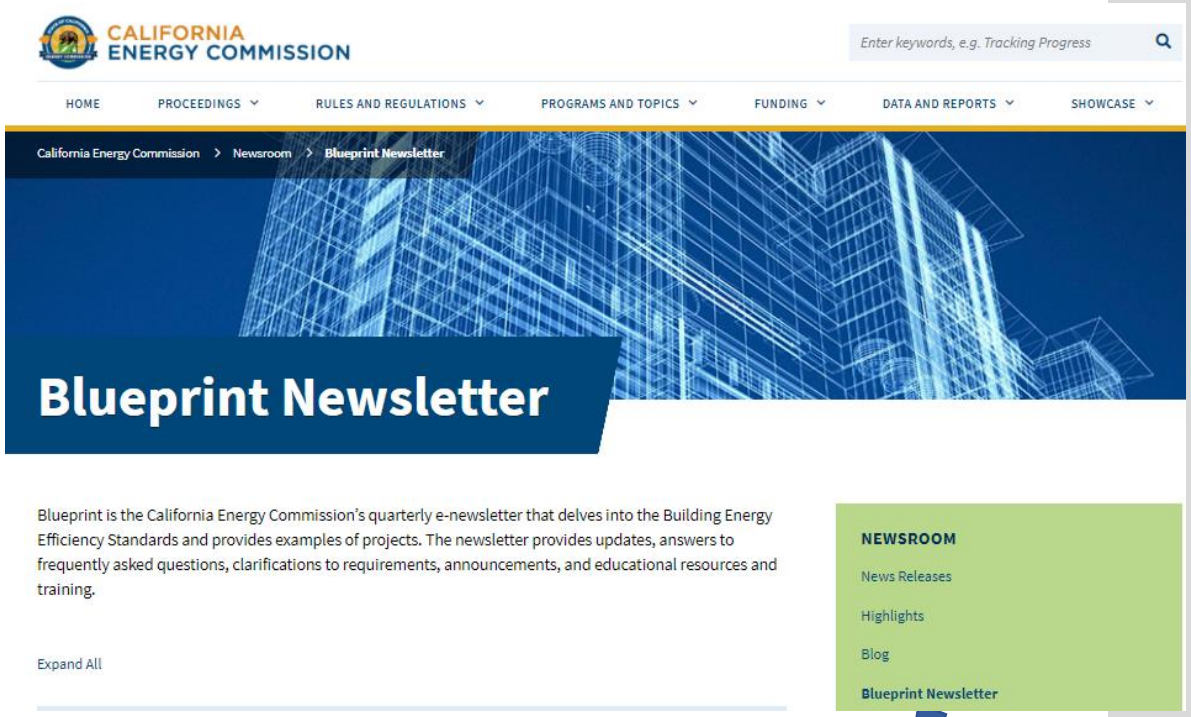
For **additions**, balanced, supply or exhaust only IAQ ventilation remains **allowable**.



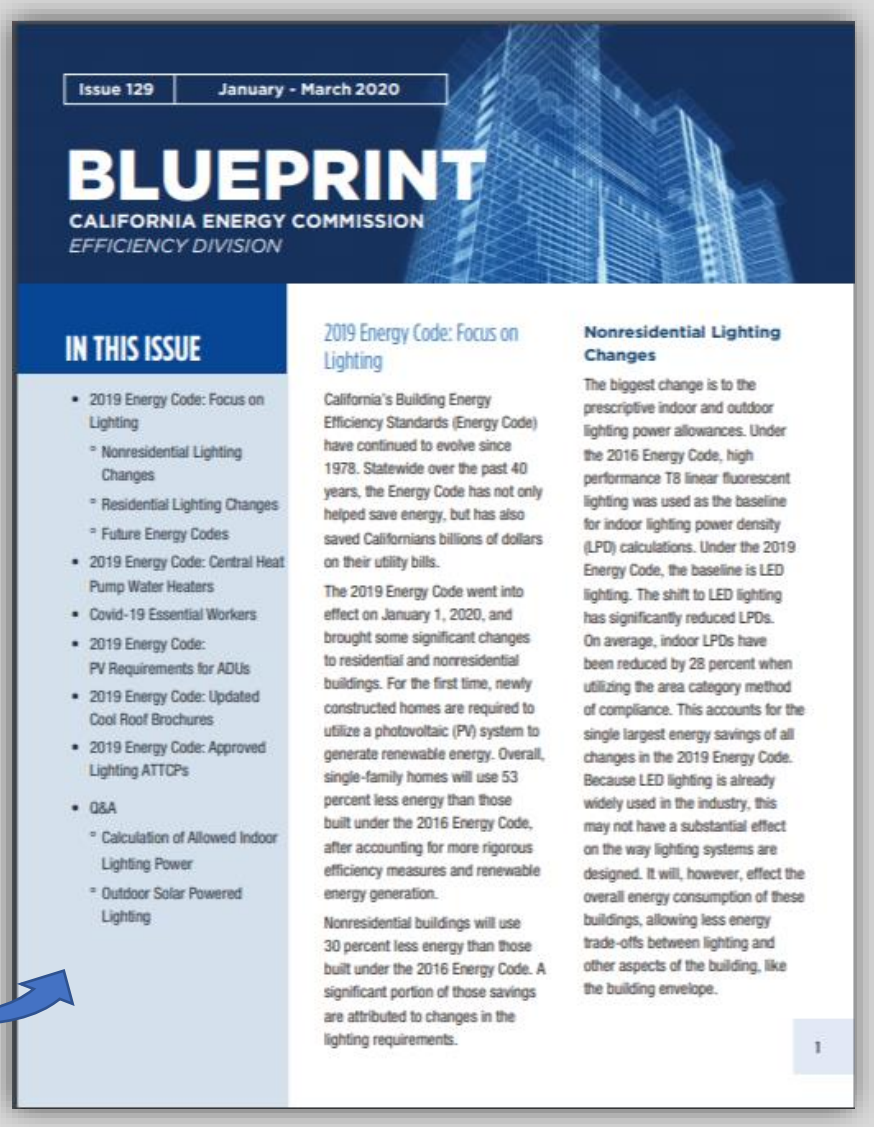
Compartmentalization Testing, i.e. Blower Door Testing

Resources

More from the CEC... Energy.ca.gov

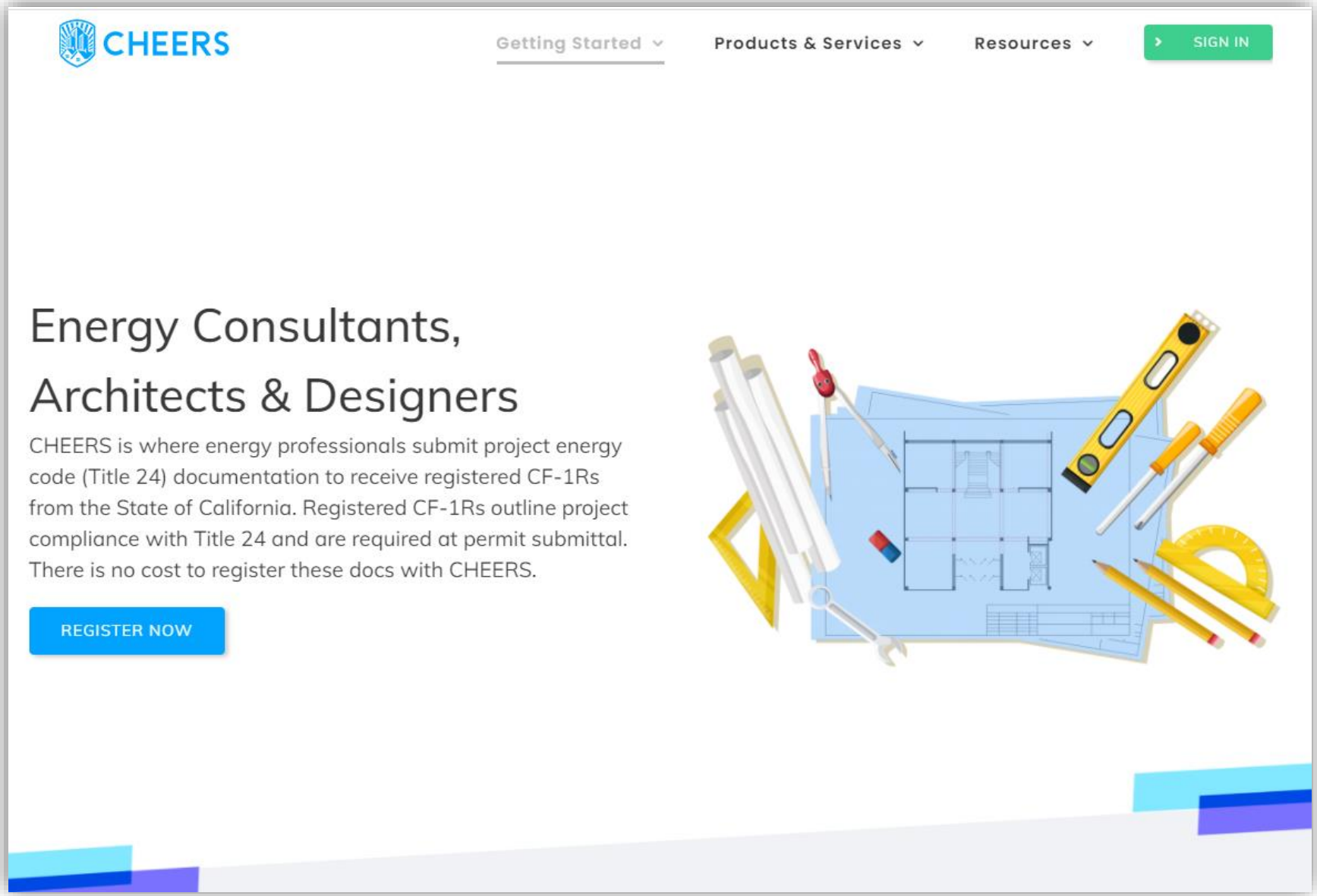


- Published quarterly
- Short –quick read with packed info
- Common Q and A for code enforcement /interpretations
- Offers clarifications on code issues
- Keeps readers up to date on latest code concerns



https://www.energy.ca.gov/newsroom/blueprint-newsletter

Low-Rise Residential –Title 24 Energy Documentation Registry

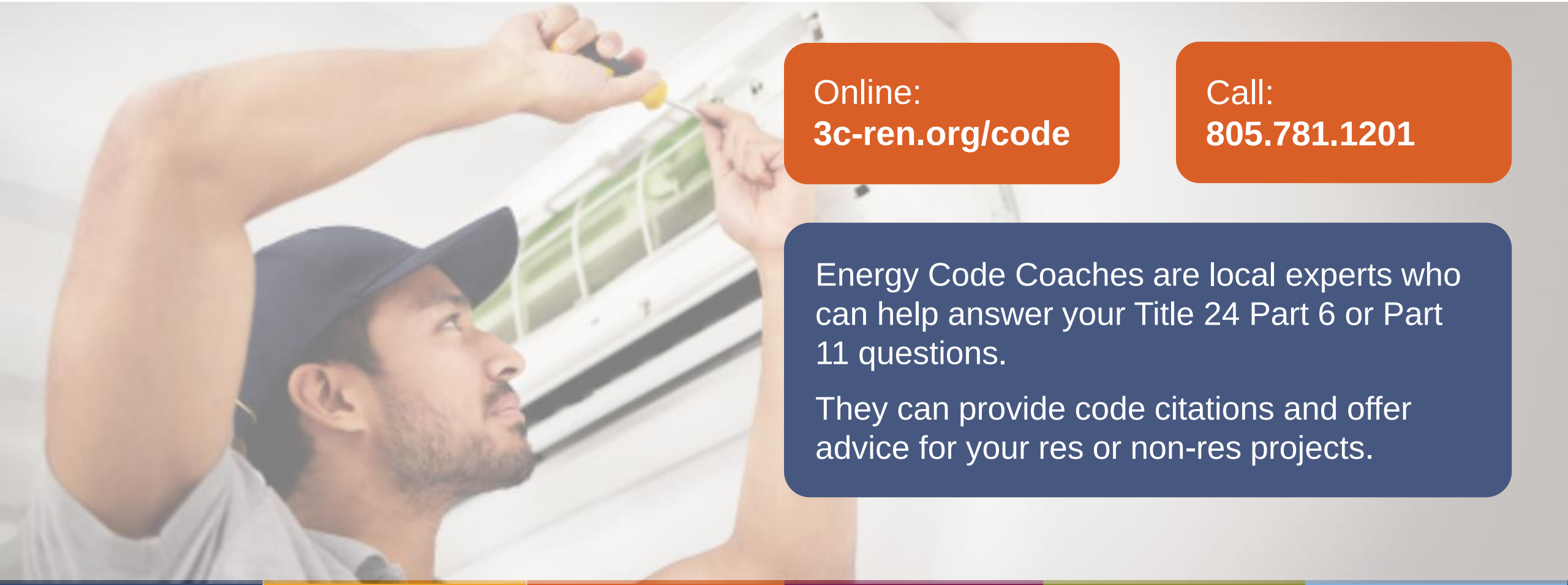


CHEERS
www.cheers.org

CHEERS is a **HERS Provider** (training programs and certification)
and **Registry** for residential Energy Compliance Documentation

Questions about Title 24?

3C-REN offers a *free* Code Coach Service



Online:
3c-ren.org/code

Call:
805.781.1201

Energy Code Coaches are local experts who can help answer your Title 24 Part 6 or Part 11 questions.

They can provide code citations and offer advice for your res or non-res projects.

Closing

Continuing Education Units Available

- Contact **chloe.swick@ventura.org** for AIA HSW & ICC LUs

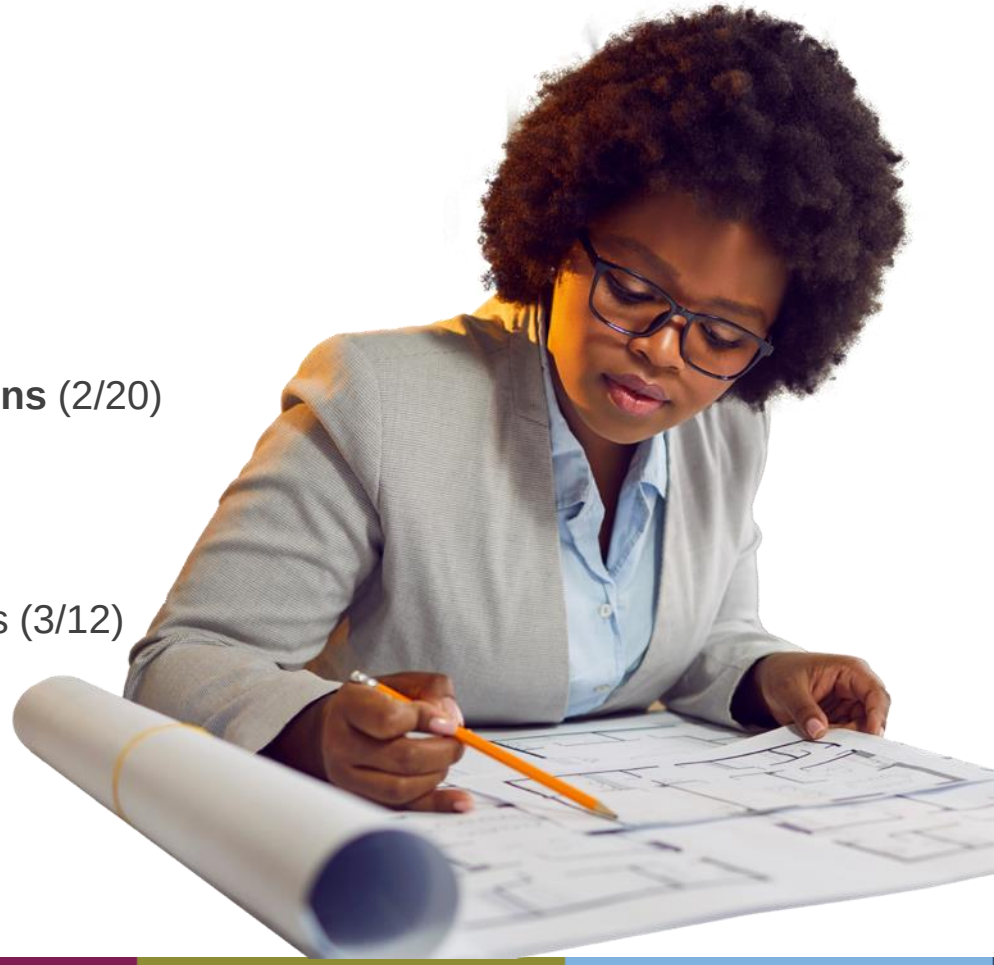
Coming to Your Inbox Soon!

- Slides, Recording, & **Survey** – Please Take It and Help Us Out!

Upcoming Courses:

- What Energy Consultants Need To Know About **HERS Measures** (2/19)
- High Performance Buidlings: Designing for **Utility Costs** & **Carbon Emissions** (2/20)
- Crafting **High Performance Enclosures**: Roofs, Walls, & Floors (3/4)
- 3C-REN **Contractor Connection Hub** at Beacon Building Products (3/5)
- **Nonresidential**: Energy Code Implementation Series, w/2025 Code Updates (3/12)

Any phone numbers who joined? Please share your name!



Thank you!

More info: **3c-ren.org**

Questions: **info@3c-ren.org**

Email updates: **3c-ren.org/newsletter**

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