



TRI-COUNTY
REGIONAL ENERGY NETWORK

SAN LUIS OBISPO • SANTA BARBARA • VENTURA

2025 Energy Code in Practice: Nonresidential

Jennifer Rennick & Grant Murphy – In Balance Green Consulting

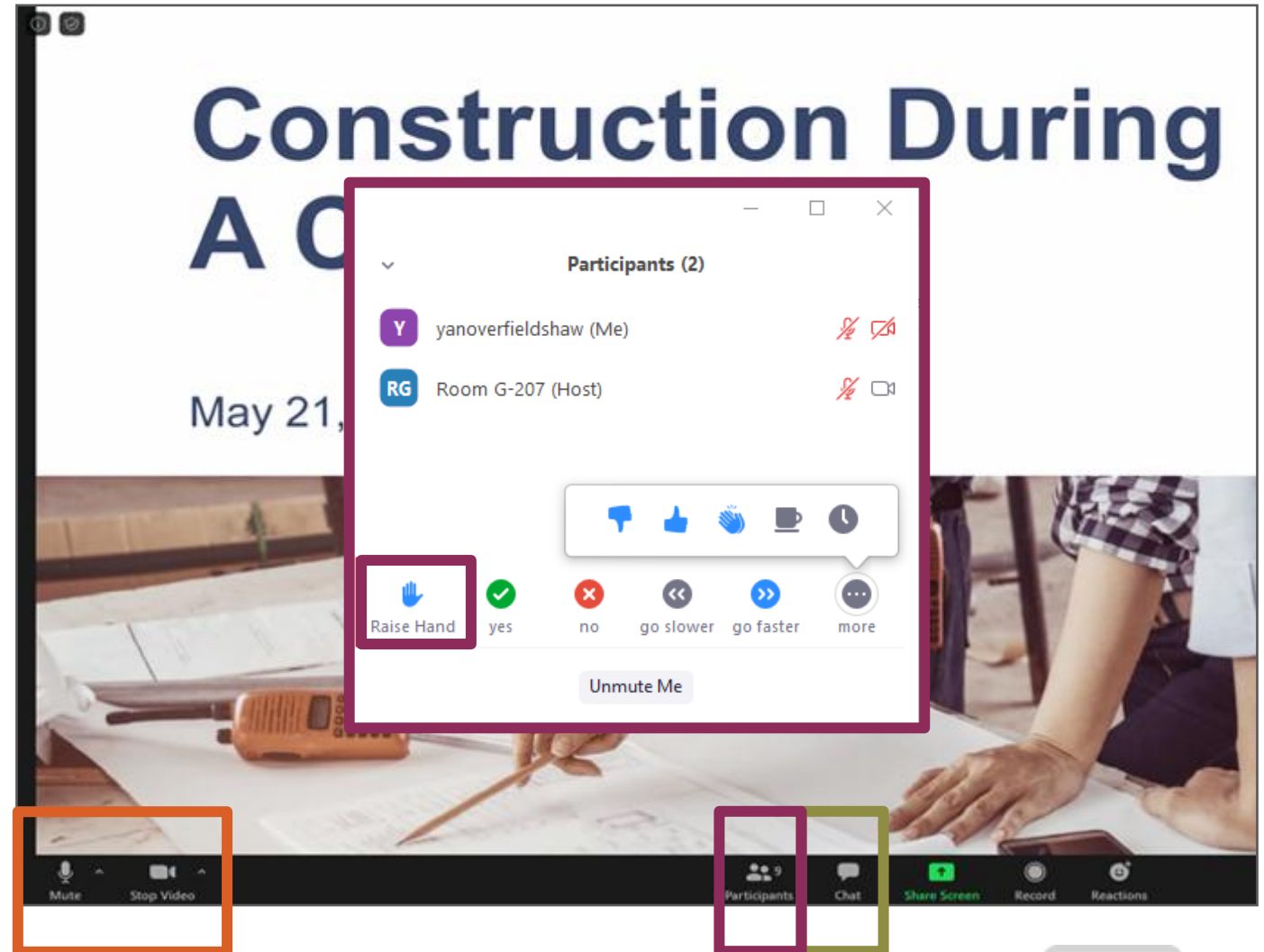
June 3, 2026

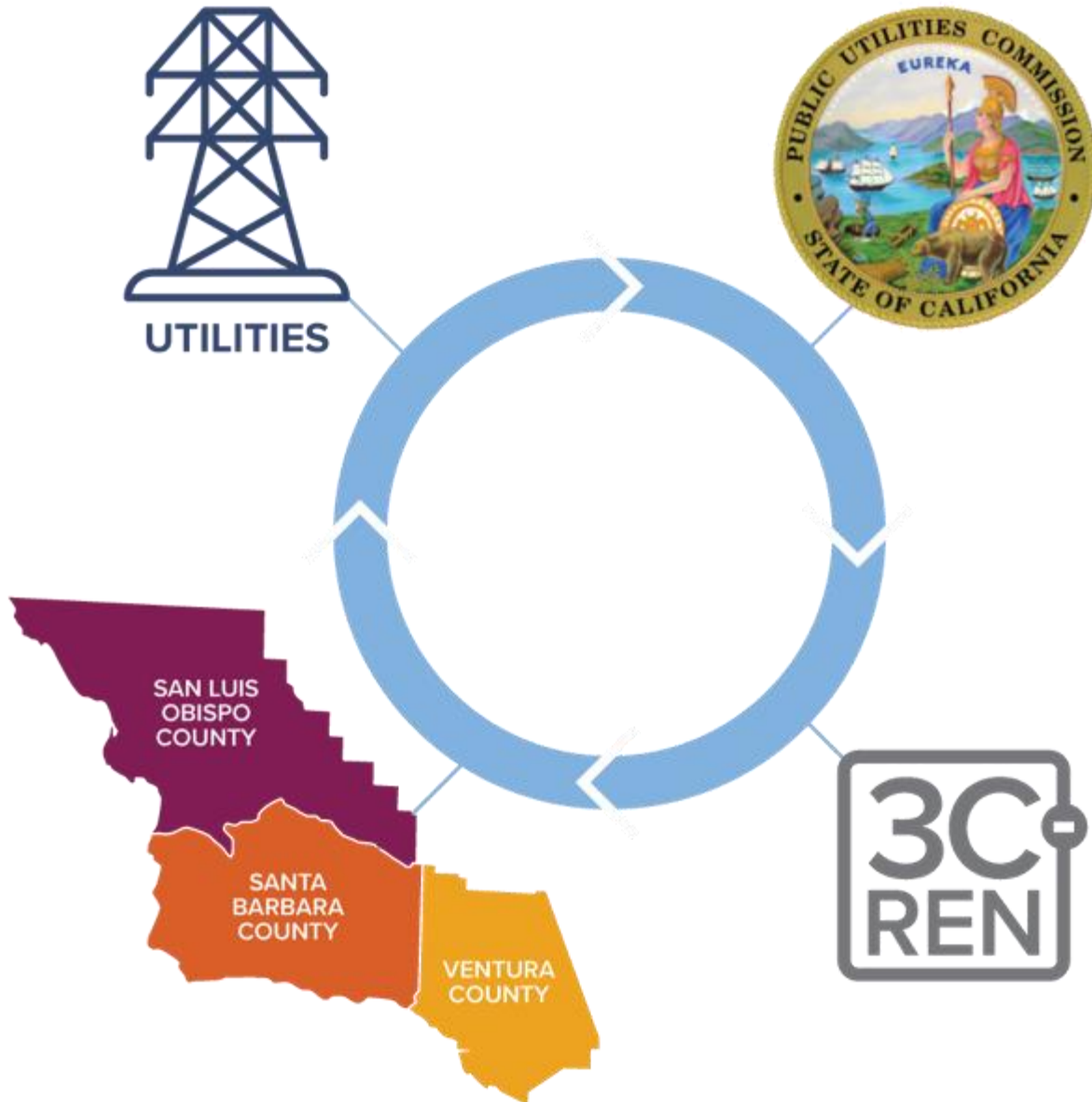


Before We Begin

Here are some quick reminders:

- Call in? Please **share** full name to confirm attendance
- To receive AIA LUs, you **must attend** at least 80% of the training. Attendance will be verified
- Use the "**Chat**" to share questions or comments
- Slides/recording are **shared** after most events and can be found on 3C-REN's on-demand page
- 3C-REN does **not** allow **AI notetakers**, unless used to accommodate a disability





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
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ENERGY CODE CONNECT

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View past trainings at
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Technical Assistance



AGRICULTURE ENERGY SOLUTIONS

3c-ren.org/agriculture



ENERGY ASSURANCE SERVICES

3c-ren.org/assurance



2025 Energy Code in Practice

In this series, we'll walk through key components for each building occupancy type, providing sample details, photos of installations and potential pitfalls to avoid. Highlighting 2025 changes throughout, this course is intended for designers, builders and building officials.

- 2025 Energy Code in Practice: Single Family Residential (SFR)
- 2025 Energy Code in Practice: Single Family Residential Additions and Alterations
- 2025 Energy Code in Practice : Accessory Dwelling Units (ADUs)
- 2025 Energy Code in Practice : Multi-Family Residential
- ***2025 Energy Code in Practice : Non-Residential***

<https://www.3c-ren.org/calendar-of-events-and-trainings/>



Today's Learning Objectives

- Understand the metrics and standards used in the energy code for evaluating energy performance and indoor air quality, and how choices for electric or gas equipment may impact compliance with those standards.
- Within each building type, review key mandatory measures related to energy performance, ventilation, refrigerants and insulation and review potential challenges for integration into design and construction.
- Review the prescriptive “recipe card” approach versus a building performance approach and discuss when to use each strategy to best incorporate energy efficiency and healthy interior environments into the specific project design.
- Recognize where barriers or stumbling blocks may occur within permitting and construction and tips for documentation to smooth out the process, ultimately increasing the energy efficiency, health and safety of our buildings.

Learning Units:

- 1.50 AIA LUs approved for this course
- 0.15 ICC CEUs approved for this course
- 1.50 CEA CEUs approved for this course



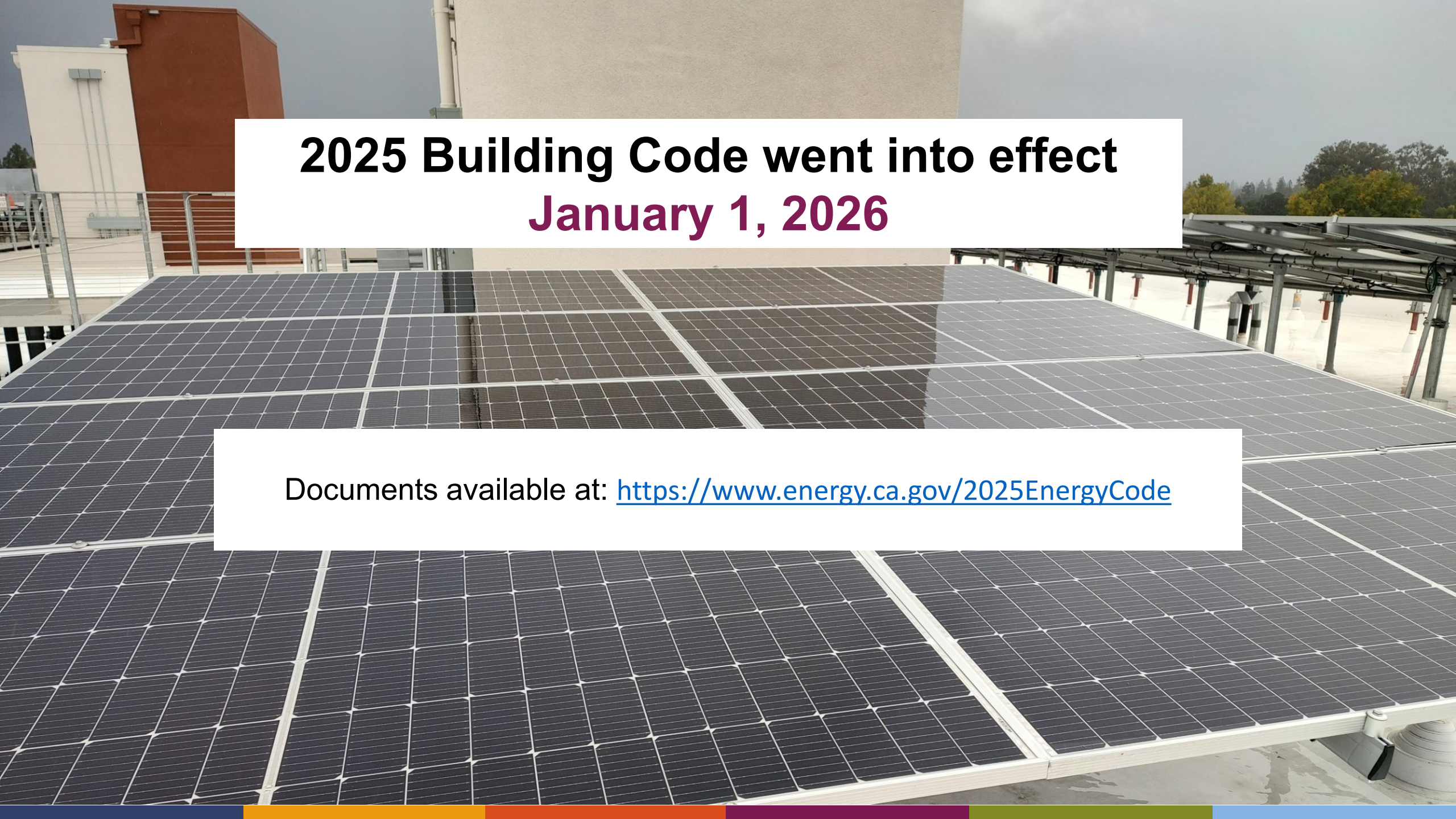
Agenda

1. Energy Code Overview and High Level 2025 Changes
2. Mandatory Measures
3. New Construction: Prescriptive and Performance Measures





Energy Code Overview and High Level 2025 Changes

A photograph of a rooftop solar panel array. The panels are dark blue with white grid lines, mounted on a metal frame. In the background, there is a building with a light-colored wall and a red structure. The sky is overcast.

2025 Building Code went into effect **January 1, 2026**

Documents available at: <https://www.energy.ca.gov/2025EnergyCode>

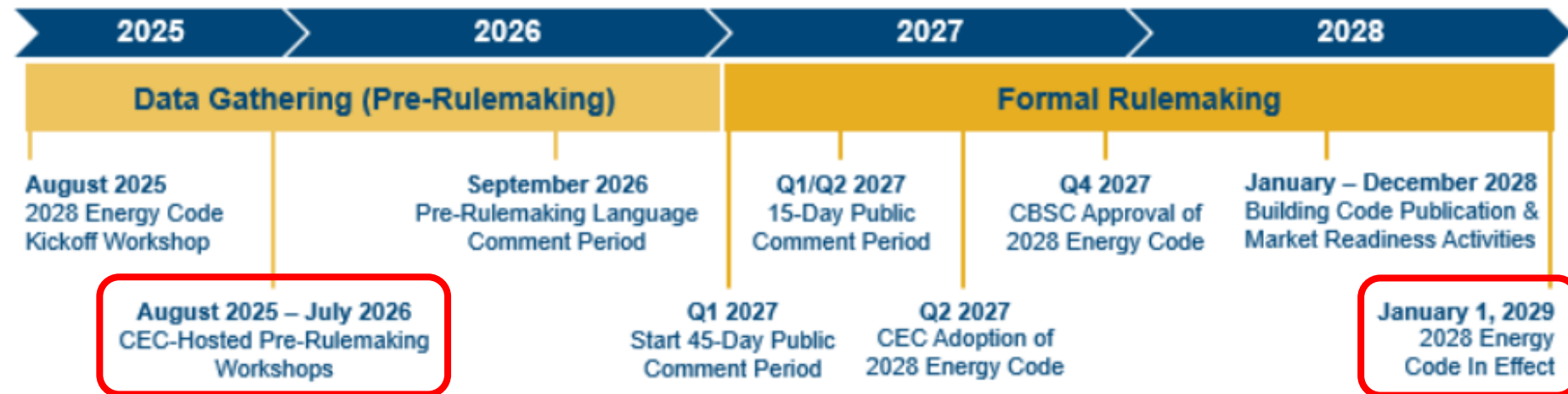
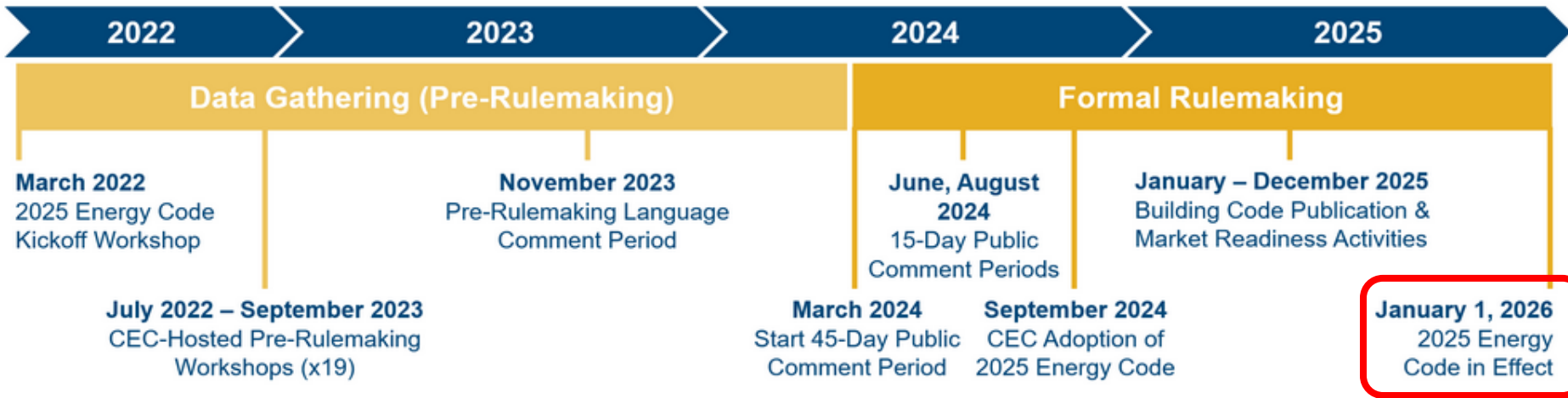
Big Picture Goals for the 2025 Code

THE PROPOSED
STANDARDS
FOR 2025 ARE
COST-EFFECTIVE
AND ARE ESTIMATED
TO PROVIDE **\$4.8**
BILLION
IN STATEWIDE
ENERGY COST
SAVINGS

- 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 to following Plumbing Code for pipe sizing
 - New Requirements for Chillers and Cooling Towers



Multi-year Adoption Cycle



For more information
visit energy.ca.gov

Except...

AB 130: Pause on parts of the 2028 Code Cycle

Residential Standards	2025 Code Effective 1/1/2026 (No 2028 Residential Code)		2031 Code Effective 1/1/2032
Nonresidential Standards	2025 Code Effective 1/1/2026	2028 Code Effective 1/1/2029	2031 Code Effective 1/1/2032

**2028 Code...? May depend on substance and breadth of allowed changes*



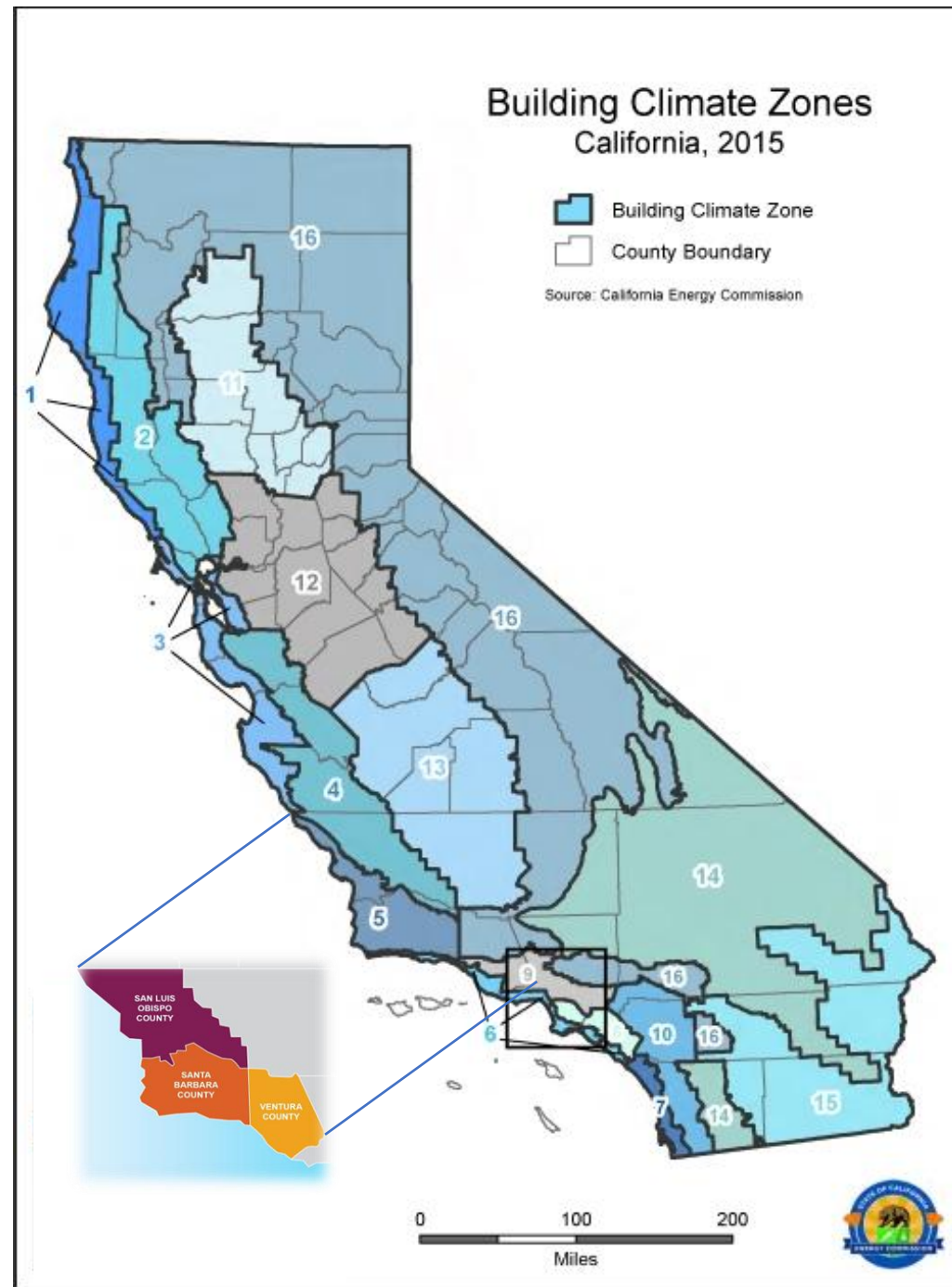
Focus on 3C-REN Tri-County Region

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)

To find yours search "California EZ
Building Climate Zone Search Tool"



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

Sec 100.0-100.3

Subchapter 2 –All Occupancies – Mandatory Requirements

&

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

Single Family, Duplex and Townhomes

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

Dwelling Units and Common Use Areas

Title 24 Part 6, 2025 Standards and Manuals

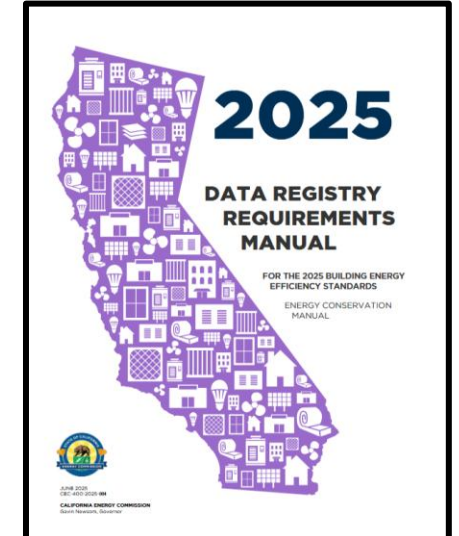
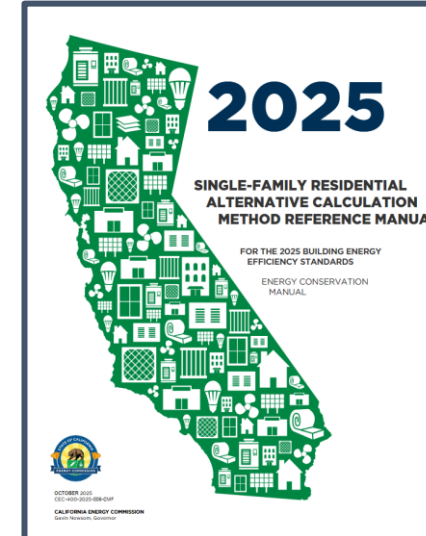
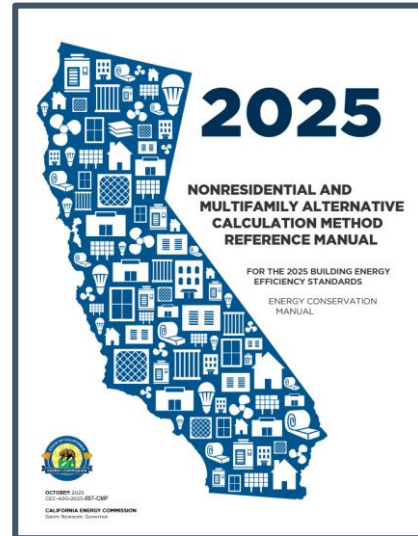
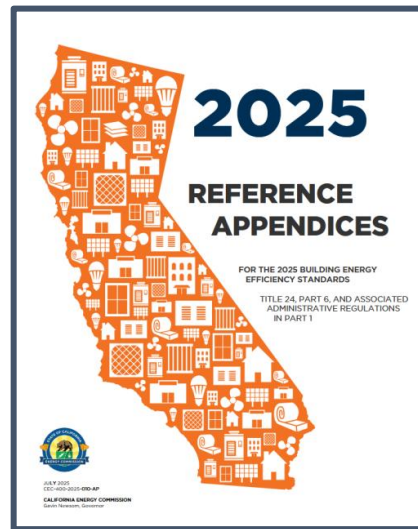
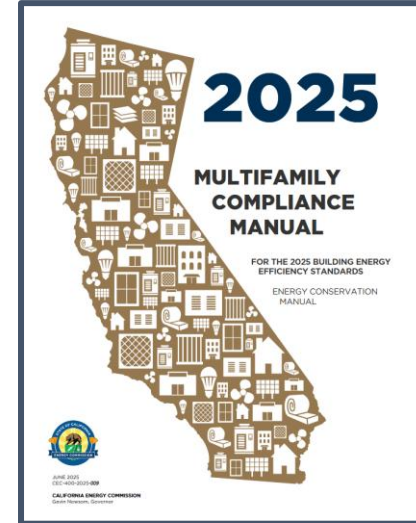
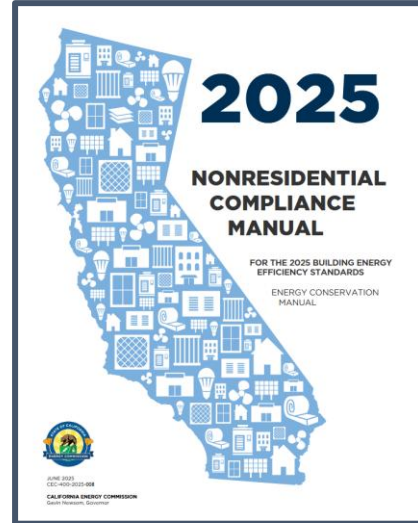


TABLE 100.0-A Application of Standards

2025 Building Energy Efficiency Standards

Page 125

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.

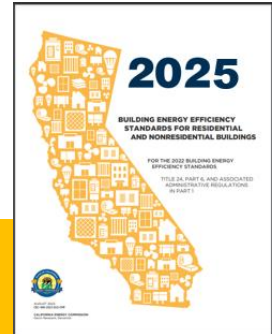


TABLE 100.0-A continued

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, <u>120.3</u> , 120.6	140.9	140.1	<u>110.2, 120.3,</u> 120.6, 140.9, 141.1
<u>Demand Responsive (DR) Controls</u>	<u>DR control thermostats</u>	<u>JA5; Exception 5 to Section 110.10(b)1A; Exception 4 to Section 110.10(b)1B.</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Demand Responsive (DR) Controls</u>	<u>DR Zonal HVAC Controls</u>	<u>110.12</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

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



TABLE 100.0-A continued

Page 126

2025 Building Energy Efficiency Standards

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

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



The Energy Code –Three Compliance Terms

Mandatory Requirements

Energy efficiency measures that are applicable to all projects.

Prescriptive Component Package

Mandatory Requirements are applicable

Follow all the parts of the prescriptive package

Note: used to determine the Standard Design Building

Essentially a **checklist** approach

Performance Method

Mandatory Requirements are applicable

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)

Energy modeling approach

2025 Non-Residential High-Level Changes

- New Performance-Method Metric
- Electric-readiness for commercial kitchens
- HVAC –Heating Types and Ventilation/DOAS – Outdoor Air (OA)
- Exhaust Systems –Added Animal/Veterinary
- Envelope –Vestibules, Walls and Roofs/Ceilings Insulation
- Photovoltaic (PV) and Battery Systems





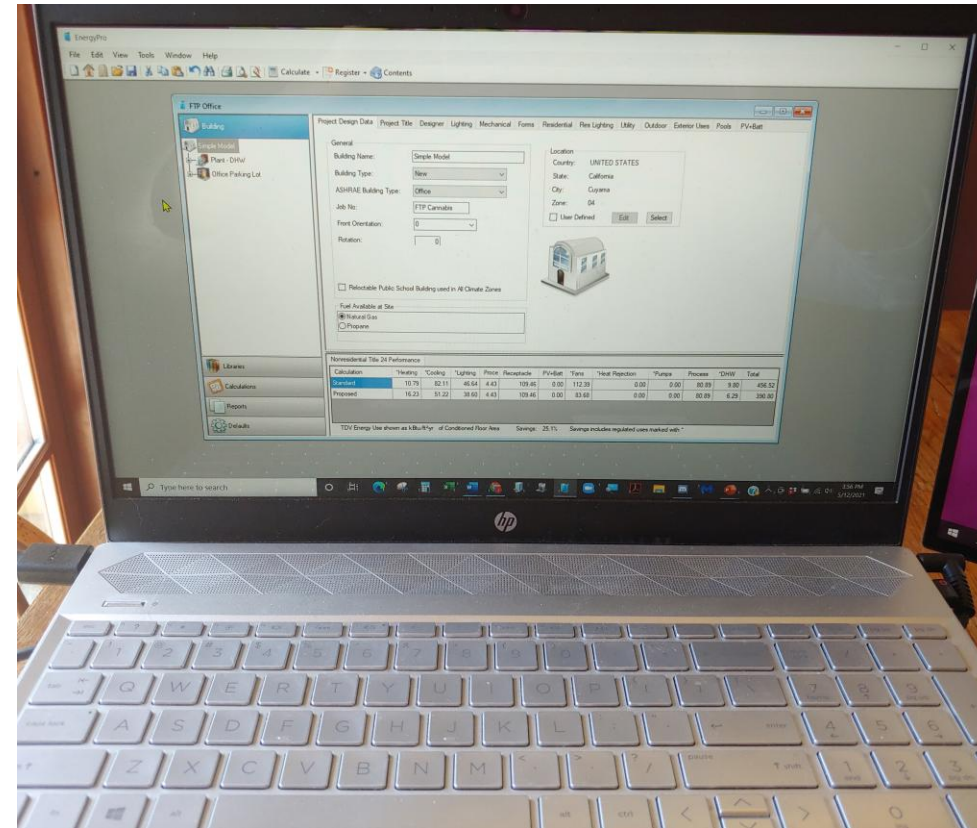
New Metric and Mandatory Measures

Performance Method (i.e. Computer Modeling)

Regulated Energy-Use:

- Space Heating and Cooling
- Ventilation
- Water Heating
- Indoor Lighting
- Solar PV and Battery Storage
- Covered Process Loads

Community shared solar or battery system is allowable with specific requirements. See EXCEPTION Section 140.1(b)



Long-Term System Cost (LSC) – *The New Metric for 2025 Code Cycle*

- **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.



Example Office Building Project Results

CBECC-com

		Standard Design	Proposed Design	Compliance Margin(s)	
Long-term System Cost ¹					
LSCe	Efficiency ² (\$/ft ² -yr)	32.76	20.08	12.68	Pass
LSCt	Total ³ (\$/ft ² -yr)	14.51	0.33	14.18	Pass
Source Energy					
Source	Total ³ (kBtu/ft ² -yr)	5.89	4.31	1.58	Pass
Result*: COMPLIES					
(not current)					
¹ Long-term system Cost (LSC) is a predicted long-term dollar cost to California's energy system. LSC is not a predicted utility bill.					
² Efficiency measures include energy efficiency improvements such as better building envelope and more efficient mechanical equipment.					
³ Total includes the sum of efficiency measures, solar photovoltaic (PV) measures and battery storage measures.					
* Building complies when the Proposed Design is equal to or less than the Standard Design in all the compliance categories and unmet load hours are not exceeded					
Standard Design PV Capacity: 17.2 kWdc / Battery System Capacity: 30.5 kWh (power 7.62 kW)					



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 Takeaway: 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.



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.



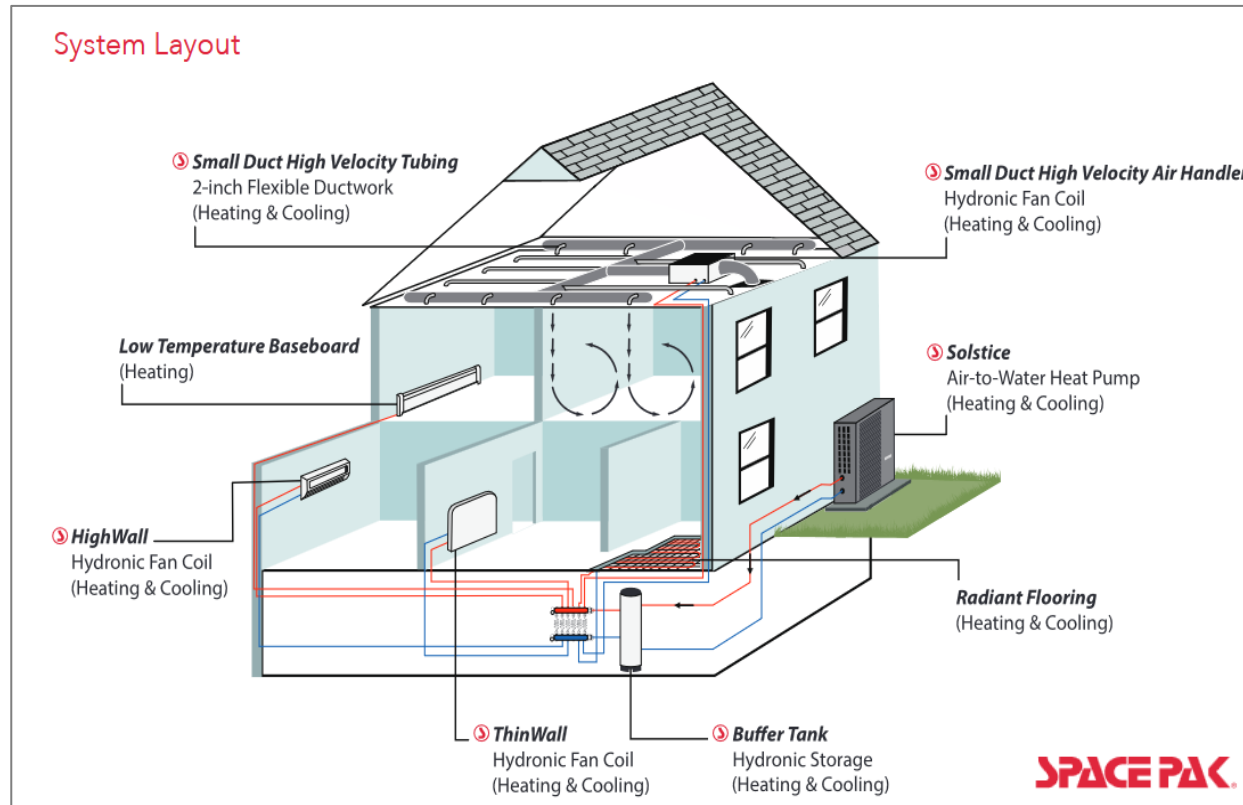
Institutional Kitchen –Senior Living



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



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



Single Pass HP's -
Compressors / Condensers

Storage Tanks -
Plumbed in Series

Hydronic Circuit –
Insulated Water Lines



Project: Harry's House – Santa Barbara County

Many Brands of Integrated HPWHs are Available



All Occupancies –Equipment and Building Components

Increased HVAC Efficiencies:

- Various cooling systems
- Cooling towers
- Furnaces
- Boilers

New Tables for:

- Dedicated Outdoor Air Systems (DOAS)
- Computer room units
- Heat pump and heat recovery chillers

110.1 Appliances

110.2 Space Conditioning Equipment

110.3 Water Heating

110.4 Pool and Spa

110.5 Pilot Lights

110.6 Fenestration and Doors

110.7 Air Leakage

110.8 Roofing

110.9 Lighting Controls

110.10 Solar Readiness

110.11 Power Distribution

110.12 Demand Management



Dedicated Outdoor Air System (DOAS)



Heat Pump with Waste Heat Recovery

2025 Updates Mandatory Measures

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
- Added: Joint Appendix JA16 –Criteria for Pool and/or Spa Heating See JA16.3 for Heat Pump Pool Heater Sizing



Marina Shores, Long Beach --Onni Group

Key Takeaway:

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)



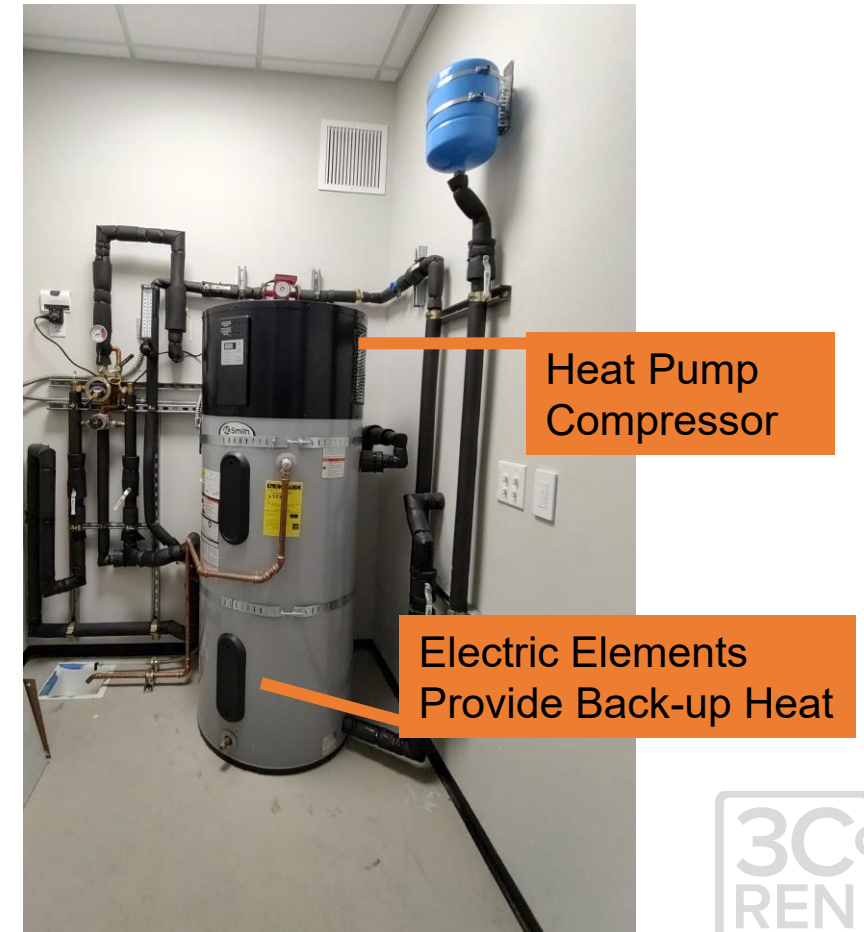
New Mandatory Requirements for HPWH

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

Note:

4200 Btu/h or 4.2 kBtu/h compressor capacity is common for many residential units, i.e. 40-80 gal.



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

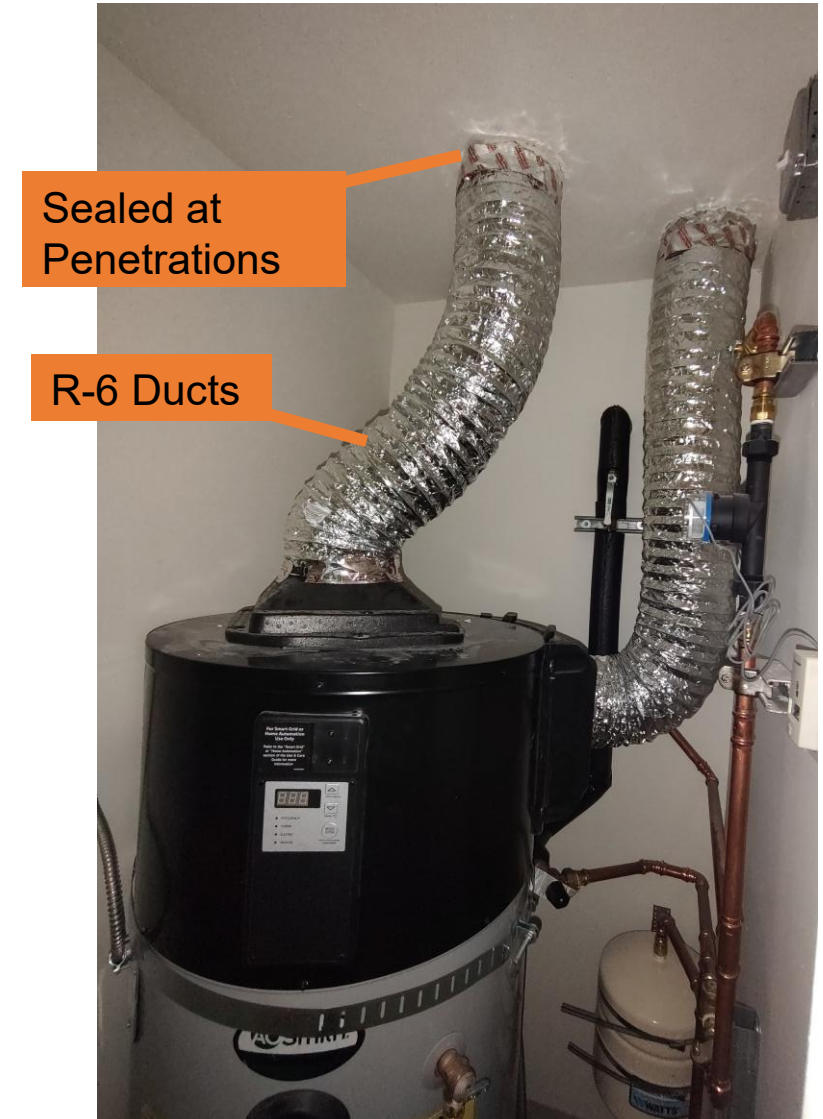


New Mandatory Requirements for HPWH *with Ducts*

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.



Example of Undersized Closet w/ Solid Door



- Each HPWH requires 420 cu ft volume
 $(2)420 = 840$ cu ft needed
- Room Dimensions are approx. 5.25' x 8.5' x 15.5'
 $= 692$ cu ft provided

Potential Solutions:

- Replace solid door with louvered door – opens to a much larger space
- Add duct kits:
 - Duct to an adjacent space
 - Duct to the exterior



Fenestration

- Section 110.6 lists the max air-leakage
- NFRC certification of fenestration products and exterior doors other than field-fabricated is required
- Field-fabricated units shall use Default Table values
- Field verification acceptance triggered:
 - Site-built fenestration
 - Window film, and
 - Dynamic glazing
 - Reference Appendices NA7.4
 - Forms on CEC website



Under the 2025 Code:

- The maximum weighted average U-factor now under **Section 120.7**.
- Wildlands Urban Interface (WUI) Fire Area Exception



Fenestration Acceptance - Field Verification - NRCA-ENV-02-F

INSTALLER AND INSPECTOR QUICK-REFERENCE: 2025 NRCA-ENV-02-F Fenestration Acceptance
Purpose and Scope of the Test
This test is to verify that an NFRC Label Certificate or the California Energy Commission (CEC) Fenestration Certificate (NRCC-ENV-E) is provided for each site-built fenestration product being installed. The Fenestration Certificate of Compliance is used to document Fenestration products not certified or rated by the NFRC by using the Commission's Default Table values in Section 110.6-A and Table 110.6-B or the calculated values as indicated in Reference Nonresidential Appendix NA6. These certificates identify the thermal performance of the fenestration product (e.g., U-factor, SHGC, and VT). This test also verifies that the thermal performance of installed fenestration products matches the label certificate, energy compliance documentation, and plan specifications.
Test trigger
This test is required for newly installed site-built fenestration, window film, and dynamic glazing in new construction, additions, and alterations for nonresidential, high-rise residential, and hotel/motel buildings. This test is NOT required if the window in question is NFRC Labeled.
Relevant Energy Code References and Required Compliance Documents
When completing the Fenestration Certificate, the Responsible Person must have access to an enforcement agency approved Fenestration Certificate of Compliance (NRCC-ENV-E or NRCC-PRF-E) and a completed Certificate of Installation (NRCI-ENV-01-E).
Title 24, Part 6 of the California Building Code, Building Energy Efficiency Standards (Energy Code) sections 110.6, 140.3(a)5, 141.0(b)2A, Reference Appendices NA7.4.1, NA7.4.2, NA7.4.3 , Default Table values in Section 110.6-A and Table 110.6-B
Who Can Perform the Test
There are no restrictions . If the Fenestration Certificate is required to be completed , it must be completed by the Responsible Person , who must verify the thermal performance of each specified fenestration product being installed matches the label certificate, energy compliance documentation, and building plans.
Required Tools
This test visually verifies products are installed correctly, and according to specifications, and does not require special instrumentation.

Form Fillable PDF - Energy.ca.gov

	CALIFORNIA ENERGY COMMISSION	FENESTRATION ACCEPTANCE	2025-CEC-NRCA-ENV-02-F
Project Name and Address		Authority Having Jurisdiction	
Name:		Enforcement Agency:	
Address:		Permit Number:	
City, Zip code:		Permit Application Date:	
Building:	Floor:	Room:	Control/tag:
☐ Construction inspection complies ☐ Does not comply		Date Submitted to AHJ:	
Intent:	Each fenestration product must provide an NFRC Label Certificate or the California Energy Commission's Fenestration Certificate to identify the thermal performance of each fenestration product being installed (NA7.4.1) and Section 10-111. All site-built fenestration must include the California Energy Commission's Fenestration Certificate. The labels must be located at the job site for verification by the enforcement agency. In addition, the responsible party must fill out the Fenestration Acceptance Certificate. The responsible party must verify the thermal performance of each specified fenestration product being installed matches the label certificate, energy compliance documentation and building plans. A copy of the certificate and any associated documentation must be given to the building owner and the enforcement agency for their records. The Fenestration Certificate of Compliance is used to document Fenestration products not certified or rated by NFRC by using the Commission's Default Table values in Section 110.6-A and Table 110.6-B or the calculated values as indicated Nonresidential Appendix NA6.		
Responsible Party	The responsible party must verify the following (NA7.4.1.1 and Section 10-103(a)):		
Responsible Person is defined under Business and Profession Code, Div 3, i.e. Licensed Contractor, Architect, Engineer, etc.			
c) For rated fenestration, record the installed fenestration product(s) NFRC's Certified Product Directory (CPD) number or Certificate Number when the Component Modeling Approach Label is submitted; and			

3C
REN

All Occupancies –Equipment and Building Components

Reminders:

- Insulation requirements for Refrigerated Warehouses
- Envelope, HVAC, lighting for Controlled Environment Horticulture

See 120.6 Covered Processes

New for 2025:

- Section 120.1 –Updated
- Section 120.2 –Updated
- Section 120.6 –Added ‘Electric Ready’ for Commercial Kitchens
- Section 120.7 –Added Scope and renamed to ‘Building Envelope’

120.1 Ventilation and Indoor Air Quality

120.2 Controls for Space Conditioning

120.3 Pipe Insulation

120.4 Air Distribution Ducts

120.5 Mechanical Systems Acceptance

120.6 Covered Processes

120.7 ~~Insulation Requirements~~ **Building Envelope**

120.8 Building Commissioning

120.9 Commercial Boilers

120.10 Solar Readiness



2025 Energy Code: Increases the minimum PPE from 1.9 to 2.3 micromoles per joule.

Section 120.1 – Ventilation and Indoor Air Quality

- Exhaust Ventilation Rates –New categories added for Veterinarian facilities
- Outside Air (OA) Ventilation Rates –Minor variation in the way OA is calculated
- Airstream/Sources Classification –Two added categories:
 - Paint spray booths - Class 4
 - Refrigerating machinery rooms - Class 3



Small Animal Holding

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)	-	<u>0.9</u>	<u>3</u>	-
Animal operating rooms	-	<u>3.00</u>	<u>3</u>	-
Animal postoperative recovery room	-	<u>1.5</u>	<u>3</u>	-
Animal preparation rooms	-	<u>1.5</u>	<u>3</u>	-
Animal procedure room	-	<u>2.25</u>	<u>3</u>	-
Animal surgery scrub	-	<u>1.50</u>	<u>3</u>	-
Large-animal holding room	-	<u>2.25</u>	<u>3</u>	-
Animal Necropsy	-	<u>2.25</u>	<u>3</u>	-
Small-animal-cage room (static cages)	-	<u>2.25</u>	<u>3</u>	-
Small-animal-cage room (ventilated cages)	-	<u>1.50</u>	<u>3</u>	-

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



Updated Ventilation Rates –Outdoor Air (OA)

Updated Ventilation Zone (Vz) Formula:

$V_z \text{ (cfm)} = \text{larger of } R_p \times P_z \text{ or } R_a \times A_z$

Where:

- R_p = 15 cfm of OA per person
- P_z = Expected number of people*
- R_a = Area-based Min Ventilation (Table.1-A)
- A_z = 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 Rate¹ R_t cfm/ft²	Area-based Minimum Ventilation Min Ventilation-Air Rate for DCV R_a (cfm/ft²)	Air Class	Notes
Common corridors	0.155	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

$V_z = R_p \times P_z = 15\text{cfm} (5/1000\text{sf}) (2000\text{sf}) = 150\text{cfm}$

or

$V_z = R_a \times A_z = 0.15\text{cfm/sf} (2000\text{sf}) = 300\text{cfm}$

Duct Leakage Testing

New duct systems meeting the following must be ~~“HERS”~~^{acceptance} tested to verify no more than **6% leakage per NA7.5.3**:

- Provides conditioned air to an occupiable space for a constant volume, single zone space conditioning system
- Serves <5,000 ft² of CFA
- Have more than 25% of ducts in unconditioned space or outdoors

Exemptions:

- Healthcare facilities
- New duct systems not subject to testing under Section 120.4(g)1 shall instead meet the duct leakage testing requirements of CMC 603.10.1

Under 2025 Code - Reference Appendices:

- Section NA7.5.3 has been updated.
- NA7.5.3 procedures shall be used by installers, **ATTs**, and others who are required to perform acceptance testing of air distribution systems



Duct Leakage Verification – New ATT Requirement – HERS/ECC Removed

2022 Code

STATE OF CALIFORNIA

DUCT LEAKAGE DIAGNOSTIC TEST

CEC-NRCV-MCH-04-H (Revised 01/19)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF VERIFICATION

NRCV-MCH-04-H

Duct Leakage Diagnostic Test

(Page 1 of 2)

Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

A. System Information

01	Space Conditioning System Identification or Name	
02	Space Conditioning System Location or Area Served	
03	Indoor Unit Name	
04	Verified Low Leakage Air-Handling Unit Credit from NRCC-PRF-01-E	
05	Duct System Compliance Category	

B. Duct Leakage Diagnostic Test - MCH-04a - Completely New Duct System

01	Condenser Nominal Cooling Capacity (ton)	
02	Heating Capacity (kBtu/h)	
03	Leakage Factor	
04	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
05	Calculated Target Allowable Duct Leakage Rate (cfm25)	
06	Actual Duct Leakage Rate from Leakage Test Measurement (cfm25)	
07	Compliance Statement:	

C. Additional Requirements for Compliance

01	System was tested in its normal operation condition.	
02	All supply and return register boots sealed to the surrounding material.	
03	Cloth backed rubber adhesive duct tape may not be used as the primary air sealing method for duct connections.	
04	All connection points between the air handler and the supply and return plenums are completely sealed.	
05	Verification Status:	☐ <u>Pass</u> - all applicable requirements are met; or ☐ <u>Fail</u> - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ <u>All N/A</u> - This entire table is not applicable



Duct
Leakage
Testing
Equipment:
Calibrated
Fan
Flowmeter



NRCA-MCH-04-A Requires Acceptance Test Technician (ATT)

INSTALLER and INSPECTOR QUICK-REFERENCE: 2025 NRCA-MCH-04-A Air Distribution Systems

Purpose and Scope of the Test

This test verifies all duct work associated with all nonexempt constant volume, single-zone HVAC units (i.e., air conditioners, heat pumps, and furnaces) meet the material, installation, insulation R-values, and leakage requirements specified by the Energy Code.

Test trigger

This test is only for single-zone units serving less than 5,000 ft² of floor area where 25 percent or more of the duct surface area is in one of the following spaces:

- Outdoors.
- In a space directly under a roof where the U-factor of the roof is greater than the U-factor of the ceiling.
- In a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces.
- In an unconditioned crawlspace.
- In other unconditioned spaces.

Within these criteria, this test applies to both new duct systems and existing duct systems that are either being extended, or the space conditioning system is altered by the installation or replacement of space conditioning equipment. This includes the replacement of the air handler, outdoor condensing unit of a split-system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger.

Relevant Energy Code References and Required Compliance Documents

Title 24, Part 6 of the California Building Standards Code, Building Energy Efficiency Standards (Energy Code) sections 120.4(g), 120.5(a)3 141.0(b)2D, 141.0(b)2E, 141.0(b)2D, 141.0(b)2E, 160.3(c)2Hi, 160.3(b)5K, 160.3(c)2Ciid, 160.3(c)2A-E, 160.3(d)1C, 180.2(b)2Bii, 180.2(b)2Biii; NA7.5.3 and NRCC-MCH-E Table L.

Who Can Perform the Test

This test must be performed by an acceptance test technician certified by a CEC-approved Acceptance Test Technician Certification Provider, using compliance document NRCA-MCH-04-A.

Required Tools

- Performance of this test will require measuring duct leakage equipment:
 - Fan flowmeter (a fan with a calibrated orifice used to pressurize the ducts)



CALIFORNIA ENERGY COMMISSION

DUCT LEAKAGE

2025-CEC-NRCA-MCH-04-A

Project Name and Address	Authority Having Jurisdiction
Name: Project Name	Enforcement Agency: Agency
Address: Project Address	Permit Number: Permit Number
City, Zip: City, Zip Code	Permit Application Date: Date

Building: Enter Value	Floor: Enter Value	Room: Enter Value	Control/tag: Value
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☐ Construction inspection and functional testing comply	Date Submitted to AHJ: Date
☐ Does not comply	

Intent:	Submit one Certificate of Acceptance testing duct leakage rate for each newly installed, repaired, or altered heating, ventilating or air conditioning (HVAC) duct system. Either an NRCC-MCH-E for nonresidential construction that is completed and approved by the authority having jurisdiction or an LMCC-MCH-E for multifamily construction that is registered with a CEC approved ECC data registry is required prior to beginning this acceptance test. Submit one Certificate of Acceptance for each system that must demonstrate compliance. Reference: §120.4(g), §120.5(a)3, §141.0(b)2D, §141.0(b)2E, §160.3(c)2Hi, §160.3(b)5K, §160.3(c)2Ciid, §160.3(c)2A-E, §160.3(d)1C, §180.2(b)2Bii, §180.2(b)2Biii, and NA7.5.3. NOTE: Only ATT certified technicians can perform this acceptance test.
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Table A: Construction Inspection

Prior to functional testing, verify and document all of the following:

Step	Entry	Item	Code Reference
1.0	☐ Pass ☐ Fail	Confirm access to design drawings, cut-sheets, NRCC-MCH-E or LMCC-MCH-E, approved by the authority having jurisdiction.	§10-103(a)2A
2.0	No Entry	System installation type (Select one of Steps 2.1, 2.2 or 2.3).	N/A
2.1, or	☐	Qualifying newly constructed system.	§120.4(g)1, §160.3(c)2Hi
2.2, or	☐	Qualifying altered duct systems.	§141.0(b)2D, §180.2(b)2Bii
2.3	☐	Qualifying altered space-conditioning systems.	§141.0(b)2E, §180.2(b)2Biii
3.0	No Entry	System operational capacity.	N/A
3.1, or	Enter Value	Condenser nominal cooling capacity (ton).	NA7.5.3.2.3.1
3.2	Enter Value	If heating only; heating capacity (kBtu/h).	NA7.5.3.2.3.1
		The apparatus for duct system pressurization and duct system leakage measurements must consist	



ATT – Acceptance Testing Technician

2025-NRCA-MCH-03-A: Cont Volume Single Zone HVAC

ATT Required

2025-NRCA-MCH-04-A: Duct Leakage

ATT Required

2025-NRCA-MCH-05-A: Economizer DOAS HRV ERV

ATT Required

2025-NRCA-MCH-06-A: Demand Control Ventilation

ATT Required

2025-NRCA-MCH-07-A: Supply Fan Variable Flow Controls

ATT Required

2025-NRCA-MCH-08-A: Valve Leakage Test

ATT Required

2025-NRCA-MCH-09-A: Water Temp Reset

ATT Required

2025-NRCA-MCH-10-A: Hydronic System Variable Flow Control

ATT Required

2025-NRCA-MCH-11-A: Auto Demand Shed Control

ATT Required

2025-NRCA-MCH-12-A: FDD Packaged Units

ATT Required

2025-NRCA-MCH-13-A: FDD AHU and Zone Terminal Units

ATT Required

2025-NRCA-MCH-14-A: Distributed Energy Storage

ATT Required

2025-NRCA-MCH-15-A: Thermal Energy Storage

ATT Required

2025-NRCA-MCH-16-A: Supply Air Temp Reset

ATT Required

2025-NRCA-MCH-17-A: Condenser Water Temp Reset

ATT Required

2025-NRCA-MCH-18-A: EMS Acceptance

ATT Required

2025-NRCA-MCH-19-A: Occupied Standby

ATT Required

2025-NRCA-MCH-20-A: Multifamily Ventilation Exhaust

ATT Required

2025-NRCA-MCH-21-A: Multifamily Leakage

ATT Required

2025-NRCA-MCH-22-A: Duct Leakage

ATT Required

2025-NRCA-MCH-23-A HRV and ERV

ATT Required

2025-NRCA-MCH-24-A Cooling Tower Conductivity Controls

ATT Required

As listed on
EnergyCodeAce.com



New Section –Electric Ready for Commercial Kitchens

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*	
	1 PHASE	3 PHASE
ELEMENTS		
(6) 3.5 KW Heating Elements Total 21 KW	88	51
P36N-III with TVES/10SC	*Reference Electric TruVection Spec Sheet	

Section 120.7 –Mandatory Measures for Building Envelopes

- (a) Roof/Ceiling Insulation
- (b) Wall Insulation
- (c) Floor and Soffit Insulation
- (d) Exterior Windows
- (e) Vestibules

Exception to Section 120.7: A dedicated building used solely as a data center that has a total covered process load exceeding 750 kW.

Key Takeaway:

- (a)-(c) Minimum Insulation values (U-factors) did not change
- (d) Vertical fenestration assemblies: Weighted average U-factor 0.47 or less
- (e) Public entrance vestibules required for new construction –exceptions and qualifiers apply

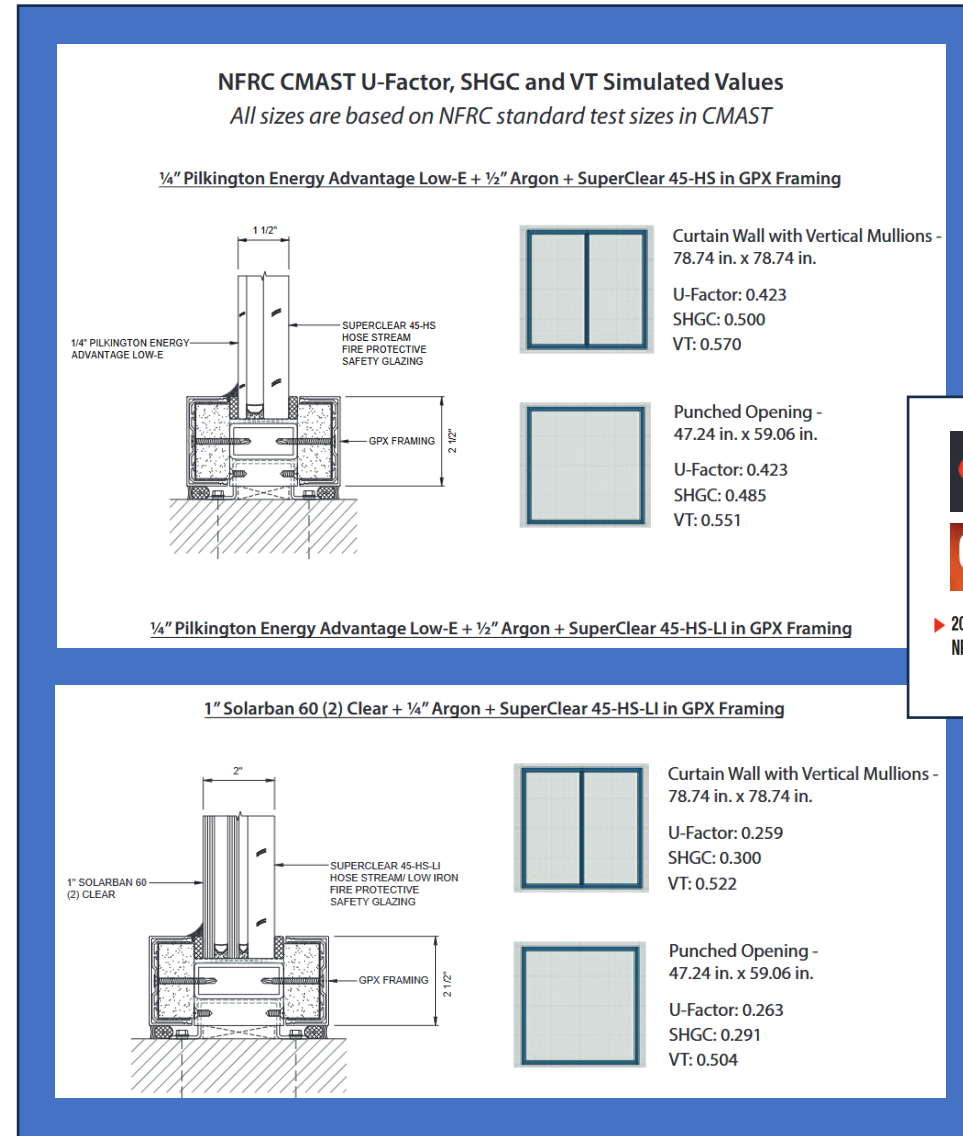


(d) Exterior Windows

Code Language:

(d) Exterior Windows. Vertical fenestration assemblies shall have an area weighted average U-factor no greater than 0.47.

Exception to Section 120.7(d): Fenestration installed in buildings meeting Part 7 of the California Building Code, California Wildland-Urban Interface Code, and where the building is located in Fire Hazard Severity Zones or Wildland-Urban Interface (WUI) Fire Areas as designated by the local enforcement agency.



▶ 20-45 minute fire protective openings and doors tested to NFPA 252 / NFPA 257 / UL 10C.

www.safti.com



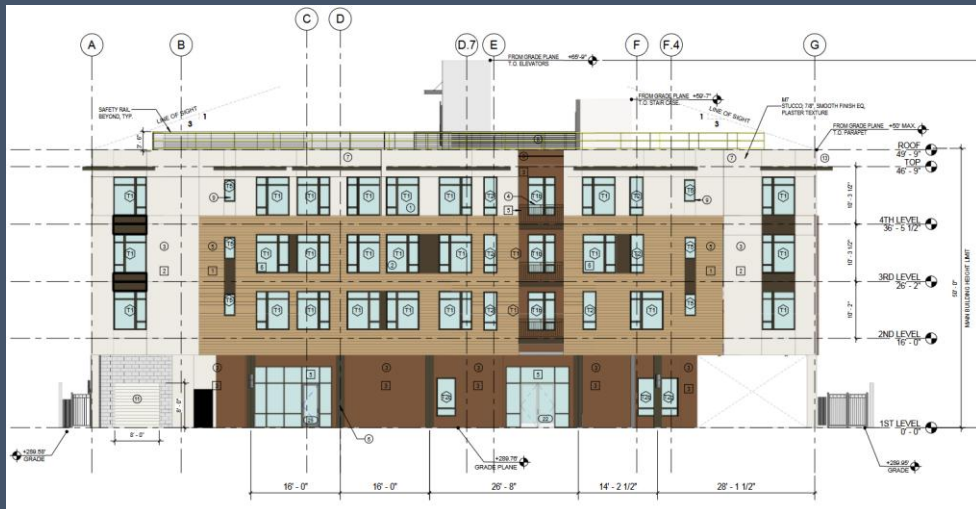
New Construction Public Entrances–Vestibules Required for Assembly, Business, Educational, Institutional, and Mercantile

Code Language:

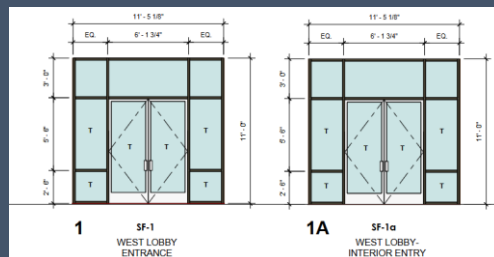
(e) Vestibules. Public entrances in newly constructed buildings of occupancy types A, B, E, I, and M **shall include an enclosed vestibule** meeting the applicable requirements of Items 1 and 2 below:

1. All doors opening into and out of the vestibule shall be equipped with self-closing devices. Vestibules shall be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. The installation of one or more revolving doors in the building entrance shall not eliminate the requirement that a vestibule be provided on any main entrance doors adjacent to revolving doors.

2. Where provided, the heating system for heated vestibules and air curtains with integral heating shall be provided with controls configured to shut off the source of heating when the outdoor air temperature is greater than 45°F. Vestibules heating and cooling systems shall be controlled by a thermostat located in the vestibule configured to limit heating to a temperature not greater than 60°F and cooling to a temperature not less than 85°F.



Mixed Use Building



Vestibule entry is equipped with self-closing doors opening into and out of the vestibule.



EXCEPTIONS to Section 120.7(e): Vestibules are not required for the following:

1. Doors **not intended to be used by the public**, such as doors to mechanical or electrical equipment rooms, or intended solely for employee use.
2. Doors opening directly from a **sleeping unit or dwelling unit**.
3. Doors that **open directly from a space less than 3,000 square feet** in area.
4. **Revolving doors** installed where a public entrance to a newly constructed building is required.
5. Doors used primarily to facilitate **vehicular movement** or material handling and adjacent personnel doors.
6. Doors that have an **air curtain** with a velocity of not less than 6.56 feet per second at the floor that have been tested in accordance with ANSI/AMCA 220 and installed in accordance with the manufacturer's instructions. Manual or automatic controls shall be provided that operate the air curtain with the opening and closing of the door.
7. Public entrances in buildings that are located in **Climate Zones 2 through 13 where the building is less than four stories above grade and less than 10,000 square feet** in of gross conditioned floor area.
8. Buildings with building plans that have been submitted to the local planning department before the effective date of the 2025 Building Energy Efficiency Standards, where compliance with the vestibules requirements of Section 120.7(e) would require a resubmittal for approval.

Recommendation:

Read the Exemptions to 120.7(e) first, especially no. 7 concerning our 3C-REN region.



Excerpt of Compliance Report NRCC-PRF-E

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD				NRCC-PRF-E
Nonresidential Performance Compliance Method				(Page 9 of 192)
C8. ENERGY USE INTENSITY (EUI)				
	Standard Design (kBtu/ft ² / yr)	Proposed Design (kBtu/ft ² / yr)	Margin (kBtu/ft ² / yr)	Margin Percentage
GROSS EUI ¹	23.95	23.27	0.68	2.84
NET EUI ¹	20.06	19.93	0.13	0.65
¹ Notes: Gross EUI is Energy Use Total (not including PV)/Total Building Area. Net EUI is Energy Use Total (including PV)/Total Building Area.				
D1. EXCEPTIONAL CONDITIONS				
• Required minimum PV capacity limited by SARA. • PV/Battery Building Type has been modified from software defaults for one or more spaces. Review project's PV/Battery Building Type(s) with documentation author. Refer to Energy Code section 140.10 for Nonresidential or 170.2(g) for more information. • Project claiming exception to Section 120.7(e) Vestibules requirements.				

D1. EXCEPTIONAL CONDITIONS:
Project claiming exception to Section 120.7(e)
Vestibules requirements



Commissioning of Energy Systems and Components Required for:

- Non-Residential Occupancies
 - Including Non-Res portions of Hotel/Motel and Highrise Multifamily
 - Except Healthcare which must comply with Title 24, Part 1 Chapter 7.
- New Construction
 - Includes INITIAL interiors build-out of shell construction
- 10,000 SF Trigger:
 - **“Full” commissioning** is required for conditioned floor area (CFA) of **10,000 SF or greater**
 - **“Cx-lite”** is required for CFA of **less than 10,000 SF**



Note:

This is in addition to any CALGreen commissioning requirements under Title 24, Part 11, Section 5.410.2, 5.410.4, and subsections.

Forms are Located:

2025 Code On-Line Interview – EnergyCodeAce.com

Building Commissioning

Okay, let's get started documenting mandatory commissioning requirements. Completing this document may require coordination with other project team members such as the Owner or Owner's Representative, Architect, Mechanical Engineer, Lighting Designer, Plumbing Engineer, Commissioning Provider and Energy Analyst.

Which of the following occupancy types are included in your project? (Select all that apply) [?]

Choose all that apply

Which of the following describes your project's scope? [?]

Select one

Does this project include any of the following?

Select one

Is the building electric only? [?]

Select one

Select which fuel is available at site: [?]

Select one

STOP! Occupancy types that are not nonresidential, hotel/motel with nonresidential occupancies, or mixed-use, and project types which are additions or alterations, are not

2025 NRCC-CXR-E pdf for Reference – Energy.ca.gov



NONRESIDENTIAL BUILDING COMMISSIONING

CEC-NRCC-CXR-E

B. PROJECT SCOPE

Based on project information provided in Table A, Table B indicates which commissioning related requirements apply per §120.8. Table B is not editable by the user.

Commissioning Requirements per §120.8

01	Table F: Design Review Kickoff	§120.8(d)1 and §120.8(d)2	The design review kickoff meeting establishes who will play the role of the design reviewer, the project schedule and identify owner's requirements. This meeting should be conducted during schematic design.
02	Table G: Owner's Project Requirements (OPR)	§120.8(b)	The owner's project requirements establish the owner's goals, requirements, and expectations for everything related to energy consumption and operation. This should be completed during schematic design.
03	Table H: Basis of Design (BOD)	§120.8(c)	The basis of design documents the design elements such as calculations and product selections that meet the owner's project requirements and applicable regulatory requirements. This should be completed during schematic design.
04	Table I: Design Review	§120.8(d) and §120.8(e)	The design reviewer(s) reviews the construction documents for clarity, completeness, and adherence to the owner's goals. Commissioning measures must be included in the construction documents to facilitate the design review and commissioning process. For projects with $\geq 10,000$ ft ² of nonresidential conditioned floor area, the design review is for adherence with the Owner's Project Requirements (OPR) and Basis of Design (BOD). This should be conducted during design.
05	Table J: Commissioning Plan	§120.8(f)	The commissioning plan is developed by the commissioning provider with input from the designer and defines the scope of commissioning the project. This should be drafted during design and completed during early construction.
06	Table K: Functional Performance Testing	§120.8(g)	Functional performance testing is conducted on building systems to demonstrate correct installation and operation.
07	Table L: Documentation and Training	§120.8(h)	Documentation of the operational aspects of the building shall be completed within the Systems Manual and delivered to the building owner or representative and facilities operator.
08	Table M: Commissioning Report	§120.8(i)	A complete report of commissioning process activities undertaken through the design, construction, and reporting recommendations for post-construction phases of the building project shall be completed and provided to the owner or representative.

Takeaway:

- Use the CEC pdfs for an overview and guide; and
- Use the EnergyCodeAce interview portal to produce forms used for permitting.





New Construction Prescriptive and Performance

Section 140.0

- Section 140.0 –General
- Section 140.1 –Performance Approach
- Section 140.2 –Prescriptive Approach
- Nonresidential occupancies in a mixed occupancy building shall comply with nonresidential requirements in Sections 120.0 through 141.1.

140.3 Building Envelope

140.4 Space Conditioning Systems

140.5 Service Water Heating Systems

140.6 Indoor Lighting

140.7 Outdoor Lighting

140.8 Signs

140.9 Covered Processes

140.10 Photovoltaic and Battery Storage Systems



2025 Code Prescriptive Envelope –Table 140.0-B

Envelope Feature	CZ 1	CZ 2	CZ 3	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

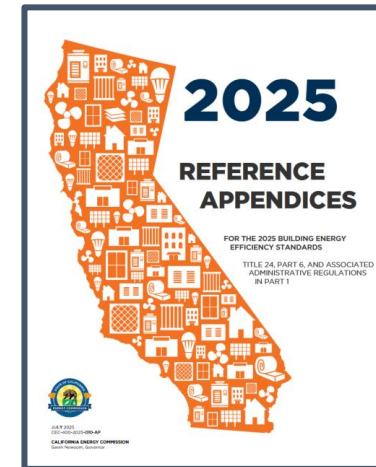
2025 Joint Appendices

Appendix JA4-19

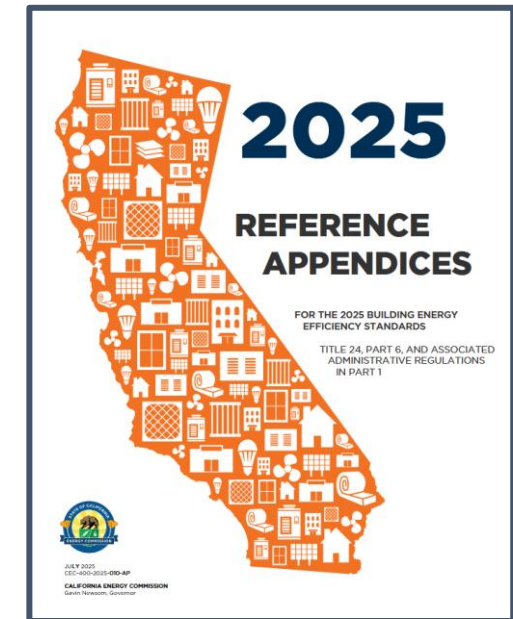
Table 4.3.1(a) – U-factors of Wood Framed Walls with installed 5/8-inch Gypsum Board¹
– 16 in. OC

Rated R-value of Continuous Insulation³

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



Metal Stud	Cavity Insulation	Exterior Insulation	U-Factor	Climate Zone
2x4 @ 16" o.c.	R-13 -high density batt	R-10	0.068	3
	R-13 or R-15 batt or cellulose	R-12	0.060	1, 3, 6, 7
	R-11 –batt or cellulose	R-14	0.054	All CZ's
2x6 @ 16" o.c.	R-19 -low density batt	R-10	0.065	3
	R-21 - high density batt or dense-packed cellulose	R-10	0.064	3
2x4 @ 24" o.c.	R-13 -high density batt	R-14	0.053	All CZ
2x6 @ 24" o.c.	R-19 -low density batt	R-8	0.071	3
	R-19 -low density batt	R-12	0.055	All CZ



Reminder:

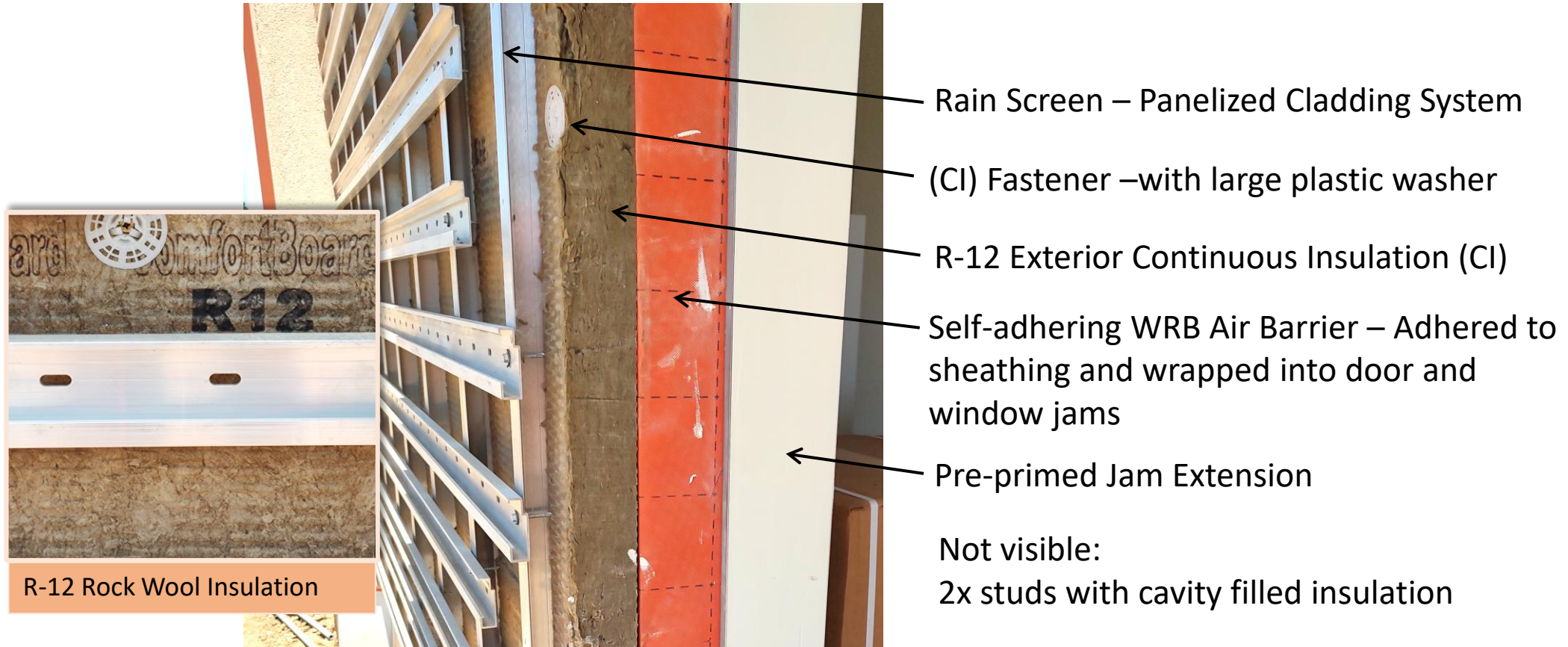
See Section 120.7 Mandatory Requirements for Building Envelopes for minimum weight average insulation levels.

Example:

Nonresidential metal-framed wall weighted average U-factor of U-0.151, i.e. No cavity with R-5 continuous or 2x4 R-13 with R-2 continuous.

Prescriptive Metal Framed Wall Example

Allowable Component in Climate Zones 1, 3, 6, 7
(For the other climate zones, increase the CI to R-14)



Prescriptive Mass Heavy Wall (8" NW CMU Solid Grout) Example

An allowable assembly in all Climate Zones.

- R-5 CI, U-0.155 covers all CZ.
- For CZ 2-5 and 10, add a layer of sheetrock with or without furring strips.
- For CZ 6-9, CMU wall can be painted –2 coats of paint meet air-barrier requirements.

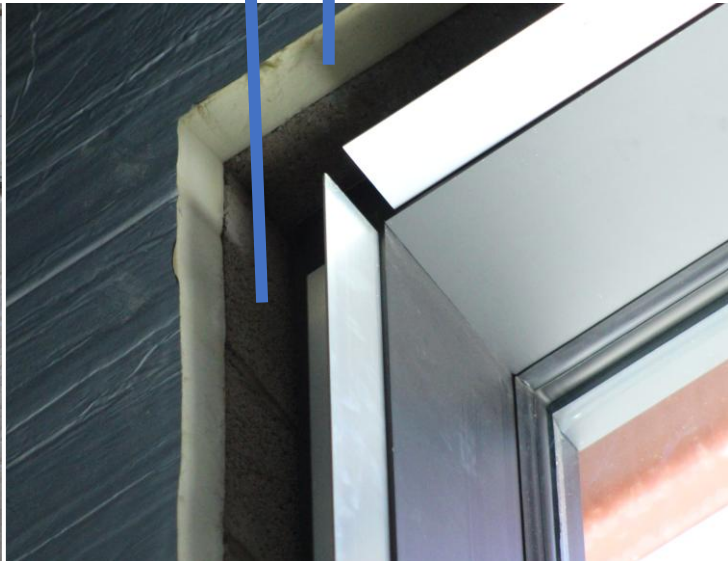
Envelope Feature	CZ 1	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7	CZ 8	CZ 9	CZ 10	CZ 11	CZ 12	CZ 13	CZ 14	CZ 15	CZ 16
Walls - Mass, Heavy ¹ Max U-Factor	0.211	0.650	0.650	0.650	0.650	0.690	0.690	0.690	0.690	0.650	0.160	0.211	0.184	0.160	0.160	0.153

CMU with Interior Metal Stud

R-10 CI – Held in place with CI masonry fasteners

CMU Solid Grout

R-10 Continuous Insulation (CI)



Key Takeaway: R-10 CI gave this project a needed Performance Credit; Metal stud cavity left open for easy electrical installation.



Section 140.4 Space Conditioning Systems

- (a) Sizing, Equipment Selection and Type
- (b) Calculations (*Rules for Sizing*)
- (c) Fan Systems (*Power Allowances*)
- (d) Space-Conditioning Zone Controls
- (e) Economizers
- (f) Supply Air Temp Reset Controls
- (g) Elec Resistance Heating
- (h) Heat Rejection Systems
- (i) Min Chiller Efficiency
- (j) Limitation of Air-Cooled Chillers
- (k) Hydronic System Measures
- (l) Reserved
- (m) Fan Control
- (n) Mechanical System Shut-off
- (o) Exhaust System Transfer Air
- (p) Dedicated Outside Air System (DOAS)
- (q) Exhaust Air Heat Recovery
- (r) DDC Controller Logic - ASHRAE Guideline 36
- (s) Mechanical Heat Recovery

Under the 2025 Code:

- Section (a) System Types has expanded
- Section (r) Direct Digital Control (DDC) is new
- Section (s) Mechanical Heat Recovery is new
 - Cooling 300 Tons or greater and heating 700 kBtuh or greater
- Greater alliance with ASHRAE, for example, references to ASHRAE Guideline 36



Space Conditioning

140.4(a)2 For Single zone systems with direct expansion (dx) cooling $\leq 240,000$ Btu/hr (i.e. 20 tons):

- School building spaces:
 - CZ 2-15: Heat pump
 - CZ 1 and 16: Dual-fuel heat pump
- Retail and Grocery building spaces
 - CZ 2-15: Heat pump
 - CZ 1 and 16: cooling capacity $< 65,000$ Btu/hr: Furnace A/C; cooling capacity $\leq 65,000$ Btu/hr: Dual-fuel heat pump
- Office, Financial Institutions and Library building spaces:
 - CZ 1-15: Heat pump
 - CZ 16: cooling capacity $< 65,000$ Btu/hr: Furnace A/C; cooling capacity $\geq 65,000$ Btu/hr: Dual-fuel heat pump
- Office Spaces within the Warehouses
 - CZ 1-16: heat pump



Key Takeaway:
Where demonstrated to be cost effective, the baseline is a heat pump.

EXCEPTION to Section 140.4(a)2: Systems utilizing recovered heat for space heating.



VRF, VAV, AWHP, DFDD Systems can be used Prescriptively with DOAS

140.4(a)3 Multi-zone space-conditioning system types.

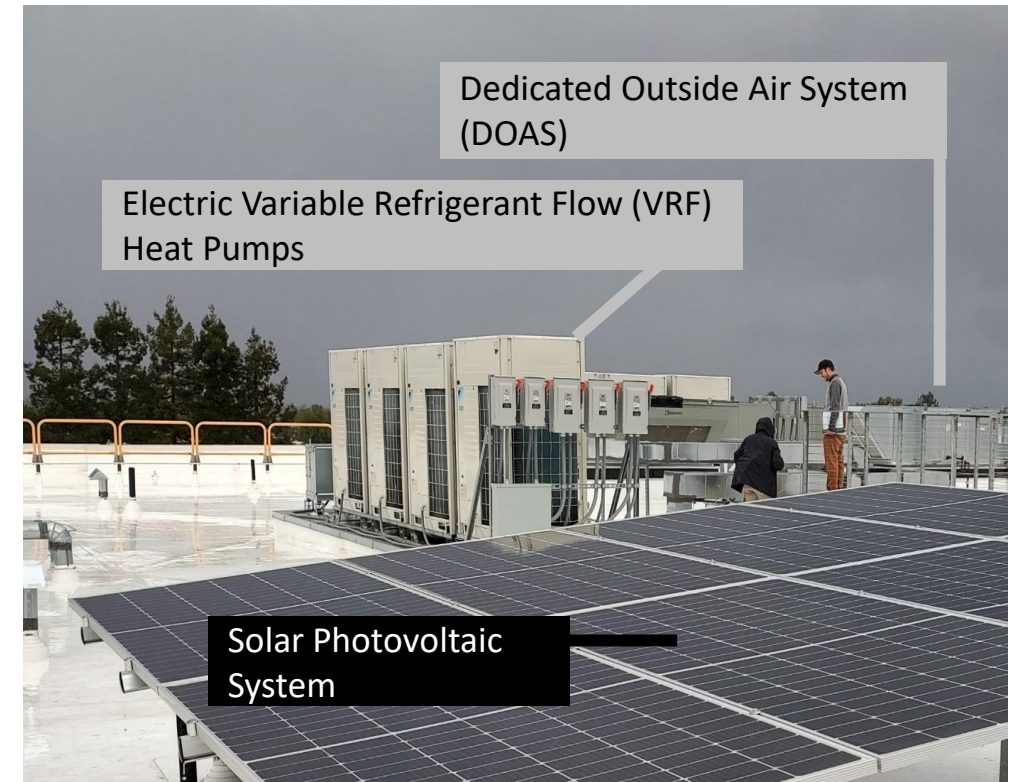
Office in all CZs and school buildings in CZ 1-5 and 8-16

Exception: > 150,000 sq ft *or* > 5 habitable stories

A. Equip Type

- i. **Variable refrigerant flow** (VRF) heat pump with heat recovery loop and dedicated outdoor air system (DOAS)
- ii. **Four-pipe fan coil** (FPFC) terminal units with air-to-water heat pump (AWHP) space-heating loop and a DOAS
- iii. **Variable air volume** (VAV) system supplied by air-to-water heat pump (AWHP) hot water loop. Terminal unit and ventilation parameters are detailed per CZ and occupancy.
- iv. **Dual fan dual duct** (DFDD) system with hot and cold decks with separate fan systems. Control sequences for terminal units comply with ASHRAE 36.

Sections C – F define and list the parameters of the AWHP with space-heating loop; indoor fans; DOAS; parallel fan-powered boxes.



Morning Star Senior Living, San Jose, CA

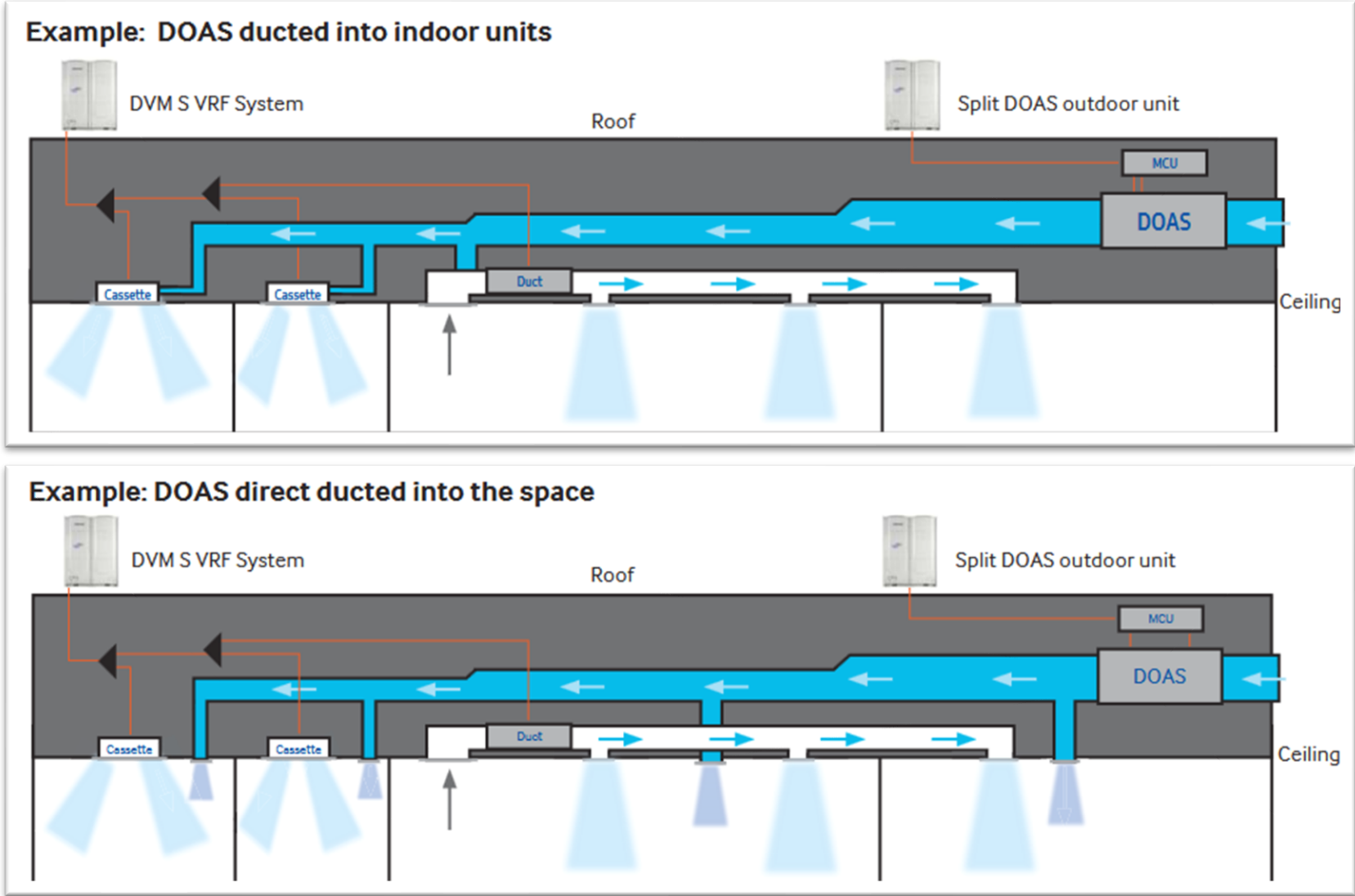


Schematic of DOAS with VRF



"Back" of the outdoor unit

Winery Laboratory and Office – multi-zone VRF with ducted fan coil units



<https://www.samsunghvac.com/Fresh-Access-Ventilation-Products/FA-ERV>

Domestic Hot Water

Hotel/Motel

- Same requirements as multifamily Section 170.2(d) for individual or central system

Other Occupancies

- Any water heater that meets the Mandatory requirements of Sections 110.1, 110.3, 120.3
- Thermal efficiency of 90% required when a combined input rate is $\geq 1,000,000$ Btu/hr, with some exceptions
- Exception: A water heating system serving an individual bathroom space may be an instantaneous electric water heater

School Buildings less than 25,000 ft² and under 4 stories

- CZ 2-15: a HPWH system

2025 Code language is unchanged, but...

- Referenced Mandatory requirements have changed
- Hotel/Motel follows the new multifamily requirements



Residential – Single and Multifamily



Commercial – Hospitality, Retail, Schools

Solar and Battery Energy Storage

Occupancy Types:

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



Under the 2025 Code some occupancies will have increased Solar PV and Battery requirements.

PV System Size (kW_{dc}):

$$kW_{PV} = \frac{CFA \times A}{1000}$$

EQUATION 140.10-A

CFA: Conditioned Floor Area

A: Climate Zone Factor

OR

PV size = 14 W/sq ft x SARA for low-sloped

PV size = 18 W/sq ft x SARA for steep-sloped

No PV required if:

- PV size < 4 kW_{dc};
- SARA < 80 sq ft contiguous or < 3% of the CFA
- Snow loading parameters



VTA Housing Ohlone Station, San Jose, CA (CZ 4)

Restaurant -- 2,000 sf

SARA = 4,500 sf

Retail – 3,500 sf

Office and Unleased – 7,000 sf

2022 Code

$$kW_{PV} = (2000 \times 0.44) + (3500 \times 2.91) + (7000 \times 3.13) / 1000$$

$$kW_{PV} = 33 \text{ kW}$$

2025 Code

$$kW_{PV} = (2000 \times 9.65) + (3500 \times 3.61) + (7000 \times 3.13) / 1000$$

$$kW_{PV} = 53.8 \text{ kW}$$

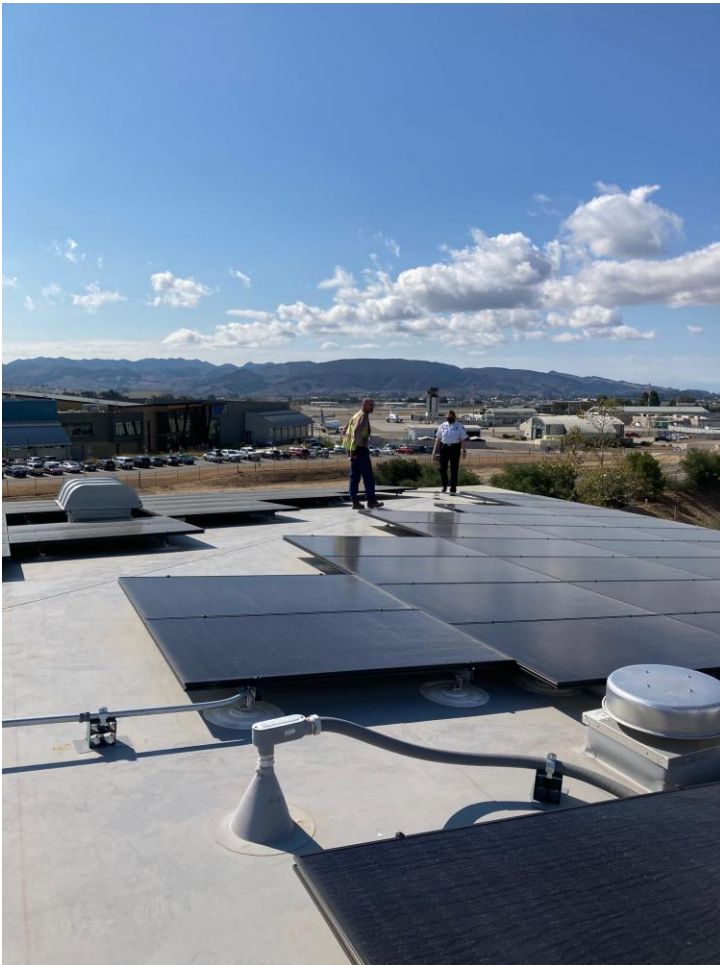
Table 140.10-A PV Capacity Factors (W/ft2 of CFA)

Building Type	CZ 1	CZ 2	CZ 3	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
Events & Exhibits	3.48	4.28	3.66	4.32	3.77	4.05	4.28	4.83	4.63	4.8	5.04	4.44	4.95	4.36	5.48	3.38
Library	0.39	3.23	2.59	3.25	2.48	2.74	3.04	3.49	3.32	3.69	3.79	3.32	3.79	3.37	4.49	2.84
Hotel/Motel	1.69	1.9	1.66	1.97	1.69	1.87	1.94	2.22	2.09	2.2	2.3	2.05	2.3	2.02	2.72	1.73
Office, Financial Institution, Unleased Tenant Space, Medical Office Building/Clinic	2.59	3.13	2.59	3.13	2.59	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.8	2.59
Restaurant	8.55	9.32	8.16	9.65	8.21	8.73	9.11	10.18	9.75	10.28	10.85	9.73	10.69	9.73	12.25	8.47
Retail, Grocery	3.14	3.49	3.01	3.61	3.05	3.27	3.45	3.83	3.65	3.81	4.09	3.64	3.99	3.71	4.6	3.21
School	1.27	1.43	1.27	1.47	1.27	1.43	1.47	1.63	1.53	1.58	1.63	1.63	1.63	1.63	2.46	1.32
Warehouse	0.39	0.44	0.39	0.44	0.39	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.58	0.39
Religious Worship	4.25	4.65	3.49	4.57	3.72	4.29	4.46	5.89	5.3	5.67	5.89	5.89	5.78	4.63	7.22	4.99
Sports & Recreation	2.47	1.97	1.54	2.03	1.6	1.84	1.98	2.63	2.47	2.6	2.75	2.2	2.72	2.15	4.03	1.81
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

Applies to new construction as **listed** in **Table 140.10-A** or mixed occupancy where one or more of these building types constitute at least 80% of the floor area of the building.



Solar Access Roof Area (SARA)



- Area of a buildings' roof space capable of supporting PV system
- Area of all roof space on covered parking areas, carports and other newly constructed structures onsite that are compatible with supporting a PV system per CBC 1511.2

Exceptions:

- Any roof area that has <70% annual solar access
- Occupied roof areas per CBC 503.1.4
- Roof area not otherwise available due to compliance with other State Building Code requirements, and local codes if confirmed by the Executive Director

Example Estimating Quantity of Panels

Prior Code, the PV System Size = 33 kW

$$\begin{aligned}\text{Panel Quantity} &= \text{PV System Size} / \text{Panel wattage} \\ &= 33 \text{ kW} / 0.420 \text{ kW} \\ &= 78.5\end{aligned}$$

or 79 Panels

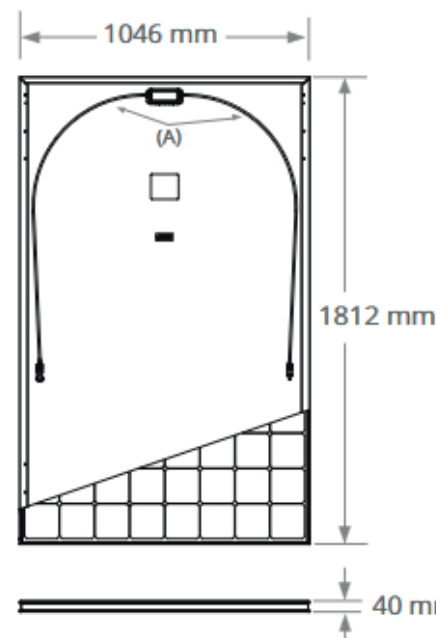
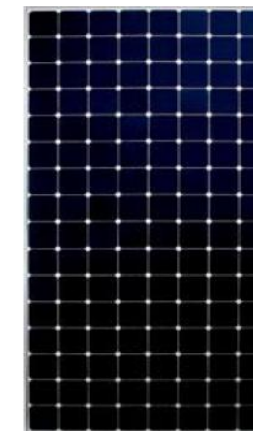
2025 Code:

PV System Size = **53.8 kW**

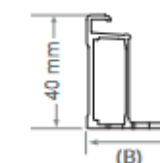
$$\begin{aligned}\text{Panel Quantity} &= \text{PV System Size} / \text{Panel wattage} \\ &= \text{53.8 kW} / 0.420 \text{ kW} \\ &= \text{128 Panels}\end{aligned}$$

MAXEON 3 POWER: 410–420 W |

Electrical Data	
	SPR-MAX3-420-BLK
Nominal Power (P _{nom}) ²	420 W
Power Tolerance	+5/0%
Panel Efficiency	22.2%
Rated Voltage (V _{mpp})	67.7 V
Rated Current (I _{mpp})	6.20 A
Open-Circuit Voltage (V _{oc})	80.5 V
Short-Circuit Current (I _{sc})	6.32 A



FRAME PROFILE



A. Cable Length:
1000 mm +/-10 mm

B. LONG SIDE: 32 mm
SHORT SIDE: 24 mm

For estimating a layout, use the outer panel dimensions and add 0.5" as an average value for spacing between panels to allow for some of the more common mounting hardware.



Battery Energy Storage System (BESS) – 2025 Code

All buildings **required** to have a **PV system** shall also have a **battery storage system**.

Reminder: Battery system must meet **both** rated **energy** capacity (kWh) and the rated **power** capacity (kW)
Calculate the energy and power capacities for each occupancy type in mixed use buildings, and sum the values.

New formulas

Rated Energy Capacity :

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

CFA: Conditioned Floor Area

B: BESS Capacity Factor in Wh/sf from Table 140.10-B

C is the rated single charge-discharge cycle AC to AC efficiency of the BESS

(Between 0.80 and 0.95 is common.)

SARA Adjusted Rated Energy Capacity :

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

kW_{PVdc} : From PV Capacity calculation

Rated Power capacity:

$$\text{kW}_{\text{batt}} = \text{kWh}_{\text{batt}} / 4$$



Table 140.10-B BESS Capacity Factors (W/ft2 of CFA)

Building Type	CZ 1	CZ 2	CZ 3	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
Event & Exhibit	1.82	1.95	1.74	2.12	1.91	2.13	2.24	2.3	2.36	2.47	2.62	2.16	2.64	2.68	3.22	1.89
Library	0.37	7.17	5.97	6.75	5.64	6.08	6.19	7.13	7.18	7.56	7.17	6.93	6.88	6.81	7.93	6.4
Hotel/Motel	0.86	0.84	0.77	0.92	0.81	0.89	0.9	1.01	1.00	1.11	1.14	0.96	1.18	1.18	1.49	0.85
Office, Financial Institution, Unleased Tenant Space, Medical Office Building/Clinic	NR	5.26	4.35	5.26	4.35	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	6.39	4.35
Restaurant	4.36	4.11	3.78	4.37	3.89	4.02	4.11	4.49	4.47	4.82	5.05	4.43	5.05	5.24	6.23	4.11
Retail, Grocery	1.89	1.82	1.71	1.82	1.72	1.8	1.76	1.92	1.97	2.05	2.22	1.95	2.16	2.29	2.66	1.91
School	NR	3.05	2.38	3.05	2.38	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	4.6	2.38
Warehouse	NR	0.41	0.37	0.41	0.37	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.54	0.37
Religious Worship	2.21	2.25	1.74	2.42	2.08	2.75	2.94	3.37	3.17	3.37	3.58	2.72	3.62	3.21	4.89	2.37
Sports & Recreation	1.26	0.98	0.76	1.14	0.86	1.2	1.23	1.57	1.53	1.65	1.83	1.27	1.86	1.57	3.02	1.13
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
NR - Not Required																



Battery Storage

Exceptions:

- If installed PV system size $< 15\%$ of the size determined by Equation 140.10-A
- Where determined rated usable capacity is less than 10 kWh
- ~~In climate zone 1, no battery storage system is required for offices, schools, and warehouses.~~

Exemption removed under 2025

Note: For multi-tenant buildings the energy and power capacities of the battery storage system shall be based on the tenant spaces with more than 5,000 ft² of conditioned floor area.

Example of a Commercial System

eSpire 280 Energy Storage System



Safe Technology & Multi-level Protection

The solution uses the best-in-class Tier 1 Lithium Iron Phosphate (LFP) chemistry for the highest level of safety, thermal stability, and reliability; An integrated, multi-level Battery Management System (BMS) monitors, optimizes, and balances the system.



Photovoltaic (PV) and Battery – NRCC-SAB-E

Sample form with instructions is available on the CEC’s website. Use the Energy Code Ace Forms Tool website for completing the NRCC-SAB-E form for permit.



CALIFORNIA ENERGY COMMISSION

SOLAR AND BATTERY

CEC-NRCC-SAB-E

² Solar access must be determined using CEC approved solar access calculation tools found at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/solar-assessment-tools>

³ As specified by CBC Section 503.1.4

Battery Energy Storage System

Installed battery energy storage systems must meet the minimum requirements in Joint Appendix JA12.

01	02	03	04	05
Building Type	Min Size of PV System Required (kW _{dc})	Rated Single Charge-Discharge AC Efficiency of Battery System ¹	Min Battery Rated Energy Capacity Required (kWh)	Min Power Capacity of Battery Required (kW _{dc})
Total Min Energy (kWh) and Power (kW) Capacity Required:				
Total Energy (kWh) and Power (kW) Capacity in Design:				

¹ FOOTNOTE: Rated single charge-discharge cycle AC to AC (round-trip) efficiency of the battery storage system

K. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online.

YES	NO	Form/Title	Field Inspector	
			Pass	Fail
☐	☐	NRCI-SAB-E - Must be submitted for all buildings that must comply with solar readiness or PV/Battery requirements.	☐	☐
☐	☐	NRCI-PLB-E - Must be submitted for all buildings that must comply with solar water heating requirements.	☐	☐

L. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no Certificates of Acceptance applicable to solar readiness or PV/battery requirements.

CA Building Energy Efficiency Standards - 2025 Nonresidential Compliance

January 1, 2026

Excerpt from the EnergyCodeAce interview portal:

Solar & Battery Scope

This form is used to demonstrate compliance with prescriptive PV and battery requirements in §140.10/§170.2 for nonresidential, multifamily and mixed-use buildings and prescriptive solar thermal requirements in §170.2(d)3C for multifamily and hotel/ motel occupancies.

Which of the following occupancy types are included in your project? (Select all that apply)

Gymnasium Building, High-Rise Residential, Office Building & 4 more

Which of the following choices best describes the scope of your roof project? 

§110.10

New construction

How many above grade stories are on this project?

Building 4-10 stories

Performance Method –Example of EnergyPro Input

Additional Credit can be used for reducing the “carbon” Source Metric

Control Options:

- **Basic** (Does not feed to the Grid)
- **Time of Use** [need ‘Start Month’ and ‘End Month’]
- **Advances DR Controls** [i.e., *Advanced Demand Response Controls / JA12 Advanced Demand Flexibility Control*]

Energy Capacity (kWh) is obtained from manufacture.

The screenshot shows the 'Battery Storage' input form in EnergyPro. It includes fields for Control, Capacity, Efficiency, Rate, Start Month, End Month, Charge, Discharge, and Battery Exception. Annotations with orange arrows point to specific fields: one points to the 'Control' dropdown (labeled 'Basic (Does not feed to the Grid)'), another points to the 'Capacity' input field (labeled '0 kWh'), a third points to the 'Charge' and 'Discharge' efficiency fields (labeled '95.0 %'), and a fourth points to the 'Rate' input field (labeled '0 kW').

Battery Storage	
Control:	Basic (Does not feed to the Grid)
Capacity:	0 kWh
Efficiency	Rate
Charge:	95.0 % 0 kW
Discharge:	95.0 % 0 kW
Battery Exception :	- select applicable reason for Battery reduction -

Battery Charge and Discharge Efficiency is a 95% default. [Equivalent to 90% round trip efficiency]

Rate of Charge and Discharge is obtained from manufacture.

Note: Battery Exceptions apply to Non-Res occupancies and Multi-Family high-rise buildings (greater than 3 stories).

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.





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Any phone numbers who joined? Please share your name!

