ENERGY STAR Residential New Construction: Proposed California Program Requirements

Single-Family New Homes (SFNH), v3.3

Multifamily New Construction (MFNC), v1.3

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Agenda

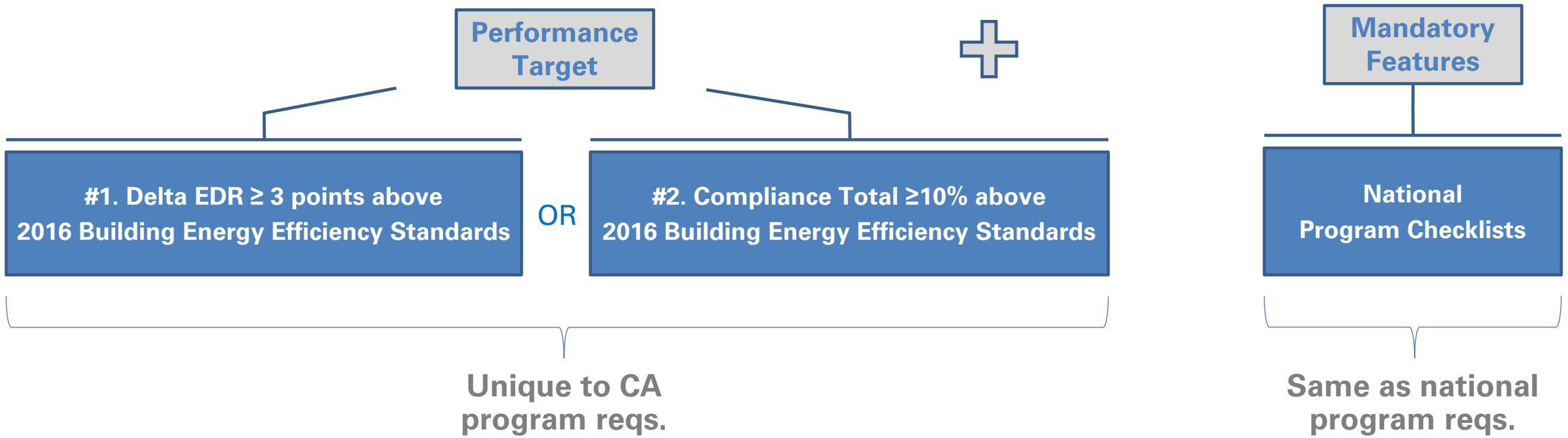
- Current ENERGY STAR program requirements in California
- California code updates
- ENERGY STAR response to California code updates
- Proposed next version of ENERGY STAR program requirements in California
- Extension of Home Certification Organizations (HCOs) to California
- Stakeholder Feedback Period
- Q&A

Current ENERGY STAR Program Requirements in CA

Current California Program Requirements

California Single-Family New Homes, Version 3.2

California Multifamily New Construction, Version 1.2



CA Code Updates

California Code Updates

- CA began implementing its latest code, the 2019 Building Energy Efficiency Standards on January 1st, 2020, based on permit application date.
- This new code is significantly more stringent than prior code.
- This new code introduces two types of Energy Design Rating (EDR) values:
  - Efficiency EDR – principally includes improvements to the envelope and more efficient equipment (but some credit is possible via PV and batteries).
  - Total EDR – includes both efficiency and measures like PV and batteries.

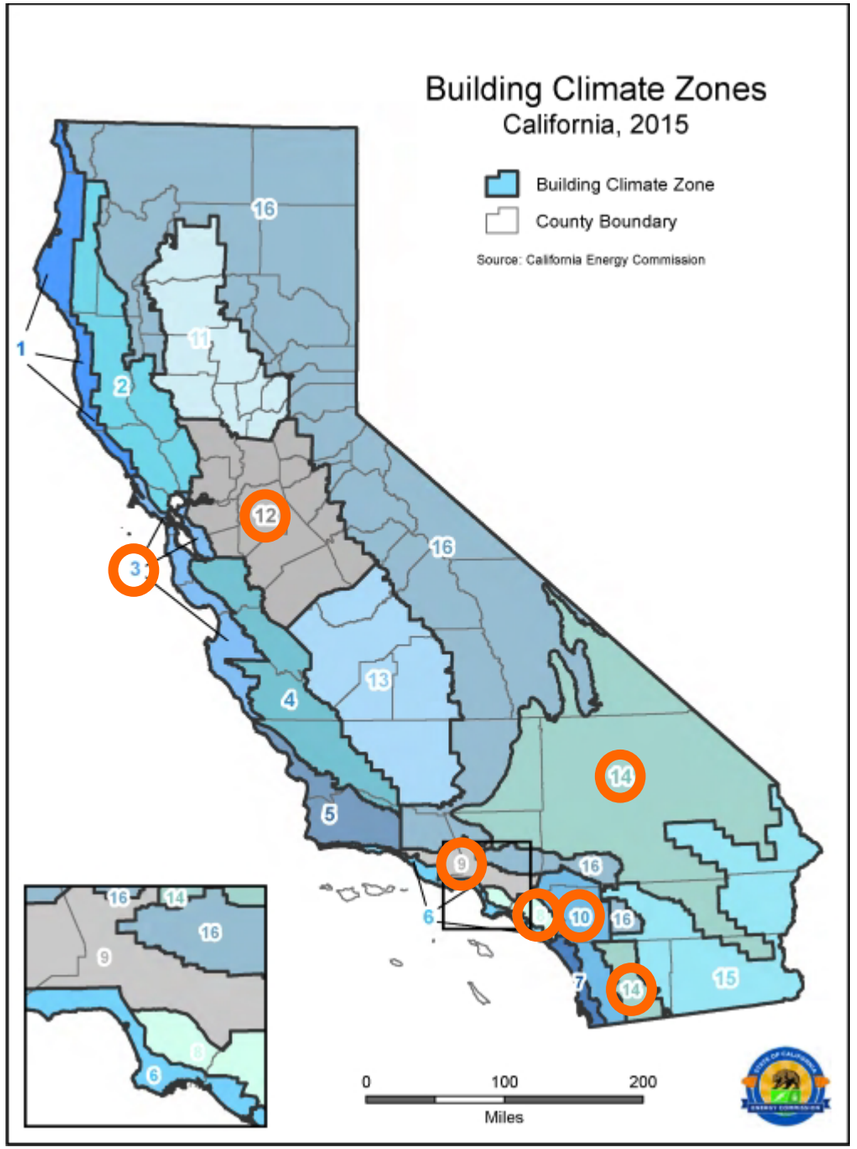
ENERGY STAR Response to CA Code Updates

ENERGY STAR Response to CA Code Activity

- EPA needs to define and implement new ENERGY STAR Versions for California in response to the 2019 Standards.
- Goal was to maintain savings target of at least 10% for consistency with:
  - Prior versions
  - National brand promise
- Complicating factors:
  - Stringency of new code
  - Compliance software was revised in late 2021, producing different results.

ENERGY STAR Response to CA: Efficiency Target

- To assess the feasibility of maintaining a 10% savings target, EPA modeled six commonly built plans from several participating builders in various California CZ's.
  - ~95% of ES certifications in CA used the SFNH program
  - >95% of ES SFNH certifications in CA were by these builders
  - ~90% of certified homes were within the CZ's analyzed
- From this analysis, we found that 10% savings were achievable using off-the-shelf technologies.



ENERGY STAR Response to CA: Efficiency Target

Representative Package for CA CZ 10

Package Name	Standard Design	Upgrade Package
Enclosure		
Radiant Barrier	Not Included	Not Included
Attic Insulation at Ceiling + Below Roof Deck	R-38 + R-19	R-49 + R-21
Predominant Wall Type, Cavity Ins + Ext Ins	2x6, R-21+R-5	2x4, R-15+R-4
Slab Insulation	Not Included	Not Included
Window U-factor / SHGC	0.30 / 0.23	0.29 / 0.22
Blower Door (ACH50)	5	4
Roofing Products		
Aged Solar Reflectance	0.20	0.17
Aged Solar Emittance	0.85	0.93
HVAC		
HSPF (Heat Pump) or AFUE (Furnace)	8.2 / 80	9.2
SEER	14	16
EER	11.7	13
Low Leakage Air Handler	Not Included	Included
Verified Refrigerant Charge	Yes	Yes
Duct Insulation	R-8	R-6
Ducts in Conditioned Space	Not Included	Not Included
Whole House Cooling Fan	Included	Not Included
Mechanical Ventilation: Type	Same as Proposed	Balanced
Mechanical Ventilation: Fan Eff (W/CFM)	Balanced: 0.70	0.51
Mechanical Ventilation: Recovery Eff (SRE / ASRE)	Not Included	63 / 66
DHW		
Water Heater Energy Factor (UEF)	Gas: 0.81 UEF	Gas: 0.93 UEF
Distribution	Gas: Standard	Gas: Standard

- Many of these measures are already being used today. Key upgrades from current practice included:
  - Higher-efficiency heat pump, and,
  - Good HRV
- Representative packages for other climate zones varied a bit but the two features above were constants.

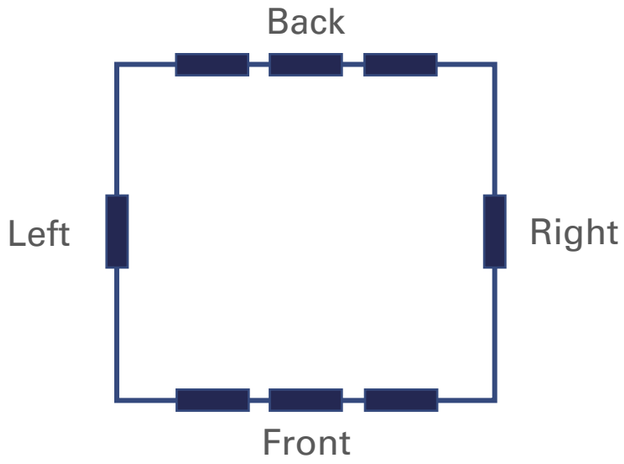
Downgrade from Standard Design Upgrade from Standard Design

ENERGY STAR Response to CA: Efficiency Target

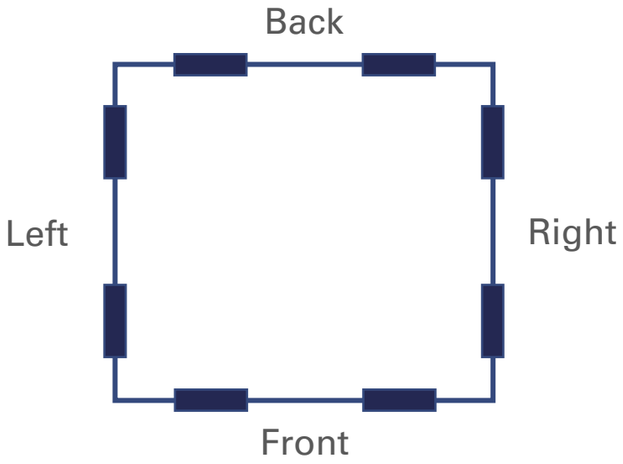
- **One measure that was key to reaching the savings target was a good HRV.**
- CEC recently imposed new requirements for balanced ventilation systems to get full credit. Without them, credit is marginal at best:
  1. IAQ system Fault Indicator Display (FID) requirements
     a) Fault indication for filter maintenance, low supply / exhaust airflow, & sensor failure
     b) Reporting of airflow and fan power
     c) Manufacturer-certified to CEC that requirements have been met
  2. IAQ system component accessibility criteria (these are the additional requirements, above and beyond a system with an FID)
     a) Intake louvers, grilles, or screens must have >3/8-inch openings
     b) If the outdoor air intake or heat exchanger is on the roof, then it must meet CA Mechanical Code Section 304.3.1

ENERGY STAR Response to CA: Efficiency Target

- **Be aware of how sensitive the savings are to window distribution.**



Percent of Windows on:	
Front + Back	Left + Right
75%	25%



Percent of Windows on:	
Front + Back	Left + Right
50%	50%

Real-Life Example
for One House Plan

Percent of Windows on:		
Front + Back	Left + Right	% Savings
77%	23%	8.7%
68%	32%	10.5%

Two homes with the same window area can have very different savings based on their distribution.

The more even the distribution, the better the savings.

ENERGY STAR Response to CA: Mandatory Measures

- Currently, homes and apartments in CA are required to use the checklists from the national program:
  - National Rater Design Review Checklist
  - National Rater Field Checklist
  - National Water Management System Builder Requirements
  - National HVAC Design Report
  - National HVAC Commissioning or Functional Testing Checklist

- For next *National* version of the MFNC program, more stringent common space efficiency measures are proposed
  - For the next *California* MFNC version, EPA is proposing to require these as well

- For next National version of both SFNH and MFNC: A more stringent thermal backstop is proposed
  - We're soliciting partner feedback on whether to enforce this for California

ENERGY STAR Response to CA: Mandatory Measures

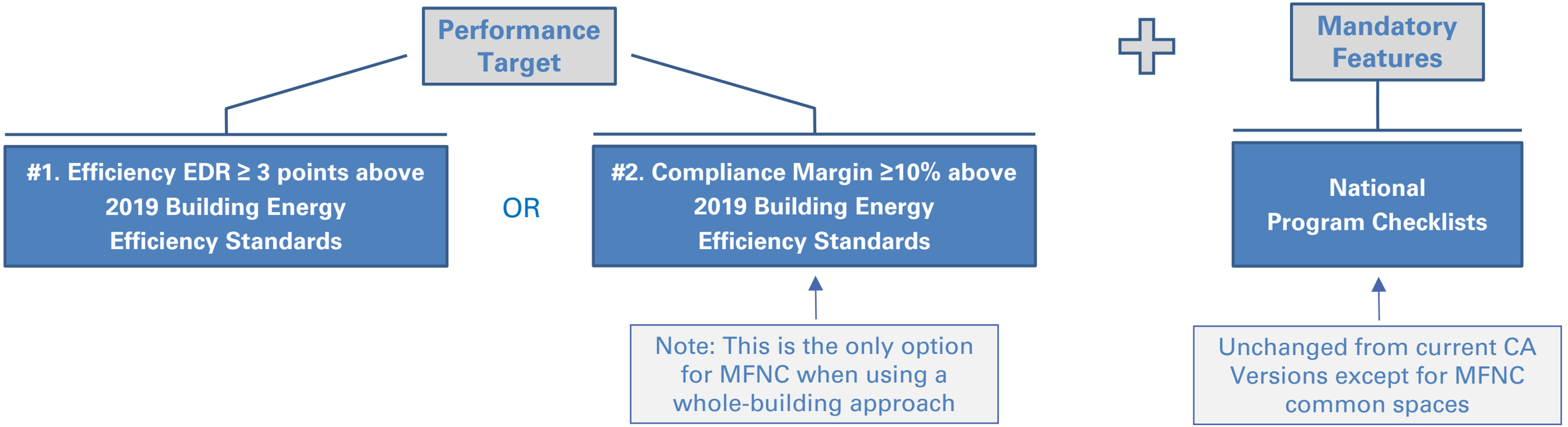
- Regarding the thermal backstop:
  - CA compliance software does not calculate total UA values, which are used to define the backstop in the national program requirements.
    - Further, there is no existing methodology to calculate UA that addresses unique CA features
    - EPA could create and maintain a CA-specific calculator, but this would be costly and likely to be error-prone due to manual inputs required
    - Additional issues with quality assurance and oversight
  - Enforcing the backstop in CA may not provide significant value:
    - Stringent efficiency requirements already built in
    - Common use of stucco finishes, which incorporate continuous wall insulation
    - Common use of 'hybrid' attics, with insulation both at the ceiling and roof deck
    - Most of CA designated as "very heavy" termite infestation zone
- As a result, we're proposing to exempt homes/apartments certified in CA from demonstrating compliance with this requirement, but are soliciting partner feedback.

Proposed Next Version of ENERGY STAR Program Requirements in CA

Proposed next version of ENERGY STAR program requirements in CA

California Single-Family New Homes, Version 3.3

California Multifamily New Construction, Version 1.3



- Proposed implementation date: homes or apartments with a Plan Approval Date and Permit Date on or after 1/1/2023 must meet the new versions.

Proposed next version of ENERGY STAR program requirements in California

- Two points about the performance metrics:
  1. Generally, Efficiency EDR metric is more stringent than Compliance Margin metric.
     - For plans analyzed, a 10% Compliance Margin equated on average to 1.4 Efficiency EDR points.
  2. Any measure that contributes to the Efficiency EDR and Compliance Margin metric can be used. For example, CA code allows some battery configurations to apply credit to the Efficiency EDR.

Demonstrating compliance with performance metrics

- Can be demonstrated using standard CA code compliance reports:

Compliance Margin Metric

ENERGY USE SUMMARY

Energy Use (kTDV/ft²-yr)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	12.02	8.57	3.45	28.7
Space Cooling	26.03	22.19	3.84	14.8
IAQ Ventilation	9.39	9.39	0	0
Water Heating	10.83	9.73	1.1	10.2
Self Utilization Credit	n/a	0	0	n/a
North Facing Compliance Total	**58.27**	**49.88**	**8.39**	**14.4**
Space Heating	12.02	7.01	5.01	41.7
Space Cooling	26.03	20.4	5.63	21.6
IAQ Ventilation	9.39	9.39	0	0
Water Heating	10.83	9.73	1.1	10.2
Self Utilization Credit	n/a	0	0	n/a
East Facing Compliance Total	**58.27**	**46.53**	**11.74**	**20.1**
Space Heating	12.02	7.47	4.55	37.9
Space Cooling	26.03	25.51	0.52	2
IAQ Ventilation	9.39	9.39	0	0
Water Heating	10.83	9.73	1.1	10.2
Self Utilization Credit	n/a	0	0	n/a
South Facing Compliance Total	**58.27**	**52.1**	**6.17**	**10.6**
Space Heating	12.02	8.53	3.49	29
Space Cooling	26.03	21.5	4.53	17.4
IAQ Ventilation	9.39	9.39	0	0
Water Heating	10.83	9.73	1.1	10.2
Self Utilization Credit	n/a	0	0	n/a
West Facing Compliance Total	**58.27**	**49.15**	**9.12**	**15.7**

Delta Efficiency EDR Metric

ENERGY DESIGN RATING

	Energy Design Ratings		
	Efficiency[1] (EDR)	**Total[2] (EDR)**	**Efficiency[1] (EDR)**
Standard Design	54.8	29.9	
Proposed Designs			
North Facing	48.1	22.4	6.7
East Facing	50.9	25.1	3.9
South Facing	48.9	23.1	5.9
West Facing	49	23.3	5.8

RESULT: [3] COMPLIES

[1] Efficiency EDR includes improvements to the building envelope and more efficient equipment
[2] Total EDR includes efficiency and demand response measures such as photovoltaic (PV) systems and batteries
[3] Building complies when efficiency and total compliance margins are greater than or equal to zero

- Standard Design PV Capacity: 3.25 kWdc

Proposed Extension of Home Certification Organizations (HCOs) to California

History of ENERGY STAR New Construction Oversight

- Since its inception, the ENERGY STAR New Construction Program has required third-party verification of homes and apartments that earn ENERGY STAR certification.
- In 2007, EPA implemented a structure to formally recognize the independent organizations that provide oversight, referred to as Verification Oversight Organizations (or VOOs).
- In 2018, EPA began a comprehensive update of the oversight recognition structure, including changing the terminology from VOO to Home Certification Organization (HCO). These changes were intended to better reflect the entire home certification process, rather than just verification oversight.
- Outside of California, all ERI-based ratings of homes and apartments since 2020 have been delivered through an HCO (and before that, starting in 2007, through a VOO).
- Within California, VOOs and HCOs have not been required historically.

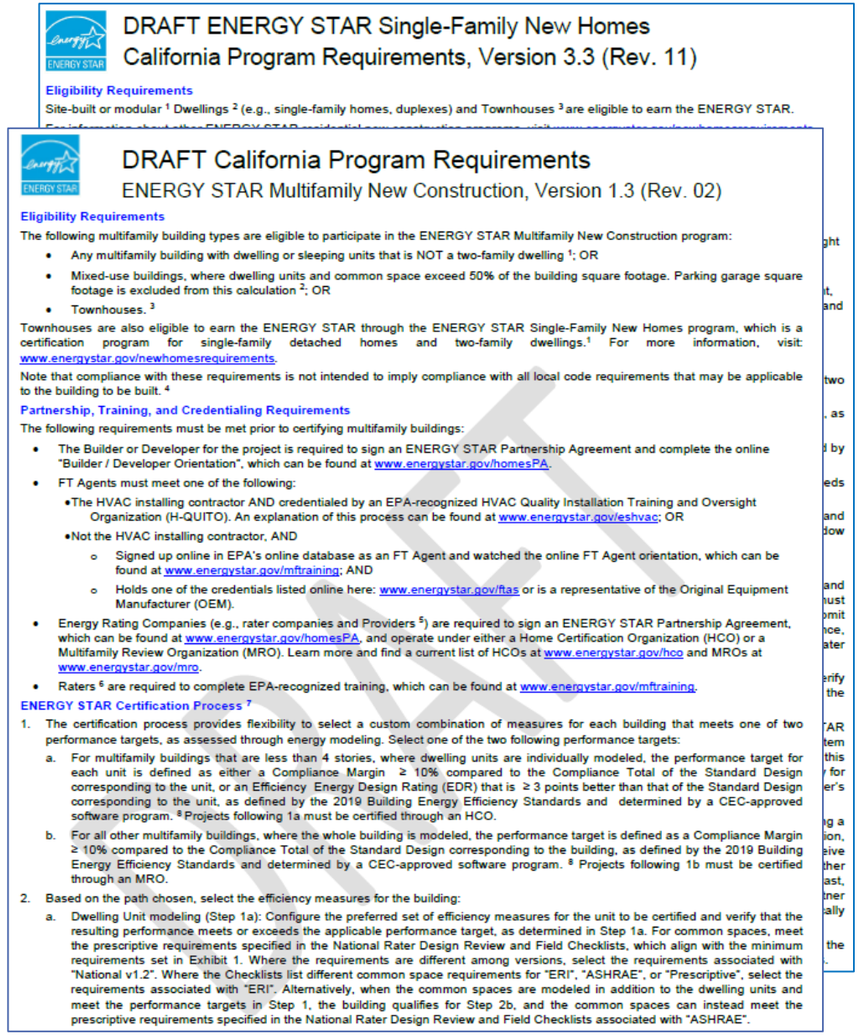
Proposed Extension of HCO Construct to California

- Modifications are proposed to the following HCO-defining documents to add applicable references to the California Building Energy Efficiency Standards, CEC-approved software, and California-specific metrics (EDR and Compliance Margin):
  - *ENERGY STAR Certification System*
  - *ENERGY STAR Certification Protocol*
- Organizations would be able to apply for HCO recognition at the national level, in California, or both.
- Requirement to be certified through an EPA-recognized HCO is proposed to go into effect for Homes and apartments certified using the ENERGY STAR SFNH v1.3 or MFNC v3.3 California Program Requirements.

Stakeholder Feedback Period

Stakeholder Feedback Period

- Two-week period: Monday, April 18th – Monday, May 2nd
- Visit www.energystar.gov/partner_resources/residential_new/stakeholder_feedback to view the draft program requirements, modified HCO docs, and this webinar.
- Submit written comments using the Stakeholder Comment Form to energystarhomes@energystar.gov.
  - Soliciting feedback on the program requirements (including thermal backstop) and the HCO.
- Barring substantial partner feedback, the final program requirements should be released in May.



DRAFT ENERGY STAR Single-Family New Homes
California Program Requirements, Version 3.3 (Rev. 11)

Eligibility Requirements

Site-built or modular [1] Dwellings [2] (e.g., single-family homes, duplexes) and Townhouses [3] are eligible to earn the ENERGY STAR.

DRAFT California Program Requirements
ENERGY STAR Multifamily New Construction, Version 1.3 (Rev. 02)

Eligibility Requirements

The following multifamily building types are eligible to participate in the ENERGY STAR Multifamily New Construction program:

- Any multifamily building with dwelling or sleeping units that is NOT a two-family dwelling [1]; OR
- Mixed-use buildings, where dwelling units and common space exceed 50% of the building square footage. Parking garage square footage is excluded from this calculation [2]; OR
- Townhouses. [3]

Townhouses are also eligible to earn the ENERGY STAR through the ENERGY STAR Single-Family New Homes program, which is a certification program for single-family detached homes and two-family dwellings.[1] For more information, visit: www.energystar.gov/newhomesrequirements.

Note that compliance with these requirements is not intended to imply compliance with all local code requirements that may be applicable to the building to be built. [4]

Partnership, Training, and Credentialing Requirements

The following requirements must be met prior to certifying multifamily buildings:

- The Builder or Developer for the project is required to sign an ENERGY STAR Partnership Agreement and complete the online "Builder / Developer Orientation", which can be found at www.energystar.gov/homesPA.
- FT Agents must meet one of the following:
  - The HVAC installing contractor AND credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO). An explanation of this process can be found at www.energystar.gov/eshvac; OR
  - Not the HVAC installing contractor, AND
    - Signed up online in EPA's online database as an FT Agent and watched the online FT Agent orientation, which can be found at www.energystar.gov/mftraining; AND
    - Holds one of the credentials listed online here: www.energystar.gov/ftas or is a representative of the Original Equipment Manufacturer (OEM).
- Energy Rating Companies (e.g., rater companies and Providers [5]) are required to sign an ENERGY STAR Partnership Agreement, which can be found at www.energystar.gov/homesPA, and operate under either a Home Certification Organization (HCO) or a Multifamily Review Organization (MRO). Learn more and find a current list of HCOs at www.energystar.gov/hco and MROs at www.energystar.gov/mro.
- Raters [6] are required to complete EPA-recognized training, which can be found at www.energystar.gov/mftraining.

ENERGY STAR Certification Process [7]

1. The certification process provides flexibility to select a custom combination of measures for each building that meets one of two performance targets, as assessed through energy modeling. Select one of the two following performance targets:
   a. For multifamily buildings that are less than 4 stories, where dwelling units are individually modeled, the performance target for each unit is defined as either a Compliance Margin ≥ 10% compared to the Compliance Total of the Standard Design corresponding to the unit, or an Efficiency Energy Design Rating (EDR) that is ≥ 3 points better than that of the Standard Design corresponding to the unit, as defined by the 2019 Building Energy Efficiency Standards and determined by a CEC-approved software program. [8] Projects following 1a must be certified through an HCO.
   b. For all other multifamily buildings, where the whole building is modeled, the performance target is defined as a Compliance Margin ≥ 10% compared to the Compliance Total of the Standard Design corresponding to the building, as defined by the 2019 Building Energy Efficiency Standards and determined by a CEC-approved software program. [8] Projects following 1b must be certified through an MRO.
2. Based on the path chosen, select the efficiency measures for the building:
   a. Dwelling Unit modeling (Step 1a): Configure the preferred set of efficiency measures for the unit to be certified and verify that the resulting performance meets or exceeds the applicable performance target, as determined in Step 1a. For common spaces, meet the prescriptive requirements specified in the National Rater Design Review and Field Checklists, which align with the minimum requirements set in Exhibit 1. Where the requirements are different among versions, select the requirements associated with "National v1.2". Where the Checklists list different common space requirements for "ERI", "ASHRAE", or "Prescriptive", select the requirements associated with "ERI". Alternatively, when the common spaces are modeled in addition to the dwelling units and meet the performance targets in Step 1, the building qualifies for Step 2b, and the common spaces can instead meet the prescriptive requirements specified in the National Rater Design Review and Field Checklists associated with "ASHRAE".

Q&A

ENERGY STAR Residential New Construction

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