ENERGY STAR Residential New Construction: Proposed California Program Requirements
Single-Family New Homes (SFNH), v3.3
Multifamily New Construction (MFNC), v1.3

Presented on April 18, 2022
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

#1. Delta EDR ≥ 3 points above 2016 Building Energy Efficiency Standards

#2. Compliance Total ≥10% above 2016 Building Energy Efficiency Standards

Unique to CA program reqs.

OR

Mandatory Features

National Program Checklists

Same as national program reqs.
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

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

- 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.
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.

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
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:

<table>
<thead>
<tr>
<th>Compliance Margin Metric</th>
<th>Delta Efficiency EDR Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENERGY USE SUMMARY</strong></td>
<td><strong>ENERGY DESIGN RATING</strong></td>
</tr>
<tr>
<td>Energy Use [kBTU/ft^2yr]</td>
<td>Energy Design Ratings</td>
</tr>
<tr>
<td>Standard Design</td>
<td>Efficiency (EDR)</td>
</tr>
<tr>
<td>Proposed Design</td>
<td>Total (EDR)</td>
</tr>
<tr>
<td>Compliance Margin</td>
<td>Efficiency (EDR)</td>
</tr>
<tr>
<td>Percent Improvement</td>
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</tr>
<tr>
<td>Space Heating</td>
<td>Standard Design</td>
</tr>
<tr>
<td>12.02</td>
<td>20.8</td>
</tr>
<tr>
<td>Space Cooling</td>
<td>Proposed Designs</td>
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<td>25.03</td>
<td>24.1</td>
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<tr>
<td>HVAC Ventilation</td>
<td>North Facing</td>
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<td>9.39</td>
<td>48.1</td>
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<tr>
<td>Water Heating</td>
<td>East Facing</td>
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<tr>
<td>10.89</td>
<td>50.9</td>
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<td>Self Utilization Credit</td>
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<tr>
<td>North Facing Compliance Total</td>
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<td>West Facing</td>
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<td>Space Cooling</td>
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<td>26.03</td>
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<td></td>
</tr>
<tr>
<td>East Facing Compliance Total</td>
<td>58.27</td>
</tr>
</tbody>
</table>

**RESULT:** COMPLIES

* Efficiency EDR includes improvements to the building envelope and more efficient equipment
* Total EDR includes efficiency and demand response measures such as photovoltaic (PV) systems and batteries
* 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.
ENERGY STAR Residential New Construction

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