



# U.S. DOE Zero Energy Ready Home Program Single Family Homes California Rater Checklist Version 2 (Rev. 1)

This Checklist is only for use in the State of California.

The program requirements in this checklist must be verified based on as-built conditions unless noted otherwise. Project teams are strongly encouraged to use this checklist during the project design phase as well. Raters are reminded that these checklist items must be completed in addition to the items required by ENERGY STAR Single Family New Homes California Version 3.4 and Indoor airPLUS. Overlapping requirements are not repeated in this checklist. Throughout these requirements there are references to various standards, including the California 2022 Title 24, Building Energy Efficiency Standards (BEES), which may be accessed at [energy.ca.gov](http://energy.ca.gov).

DOE Zero Energy Ready Home – Single Family Homes California Rater Checklist Version 2 (Rev. 1)				
Home Address:	City:	Must Correct	Rater <sup>1</sup> Verified	Exception or Alternate Used <sup>2</sup> (Enter endnote #)
	Permit Date <sup>3</sup> :			
<b>1. Partnership Status</b>				
1.1 Rater has verified that builder is a registered DOE ZERH Builder Partner and identified the builder's Partner ID. <sup>4</sup>				
1.2 Rater has verified and documented that their company has a ZERH partnership agreement using the <a href="#">ZERH Partner Locator</a> . <sup>5</sup>				
1.3 Rater(s) signing checklists attest that they have completed DOE-recognized training (according to the timeline posted on the ZERH website) and are credentialed by a Home Certification Organization for ZERH (HCO for ZERH).				
<b>2. ENERGY STAR Single Family New Homes Baseline</b>				
2.1 The home is certified under ENERGY STAR Single Family New Homes California Version 3.4. <sup>6</sup>				
<b>3. Building Envelope</b>				
3.1 Windows meet high performance requirements based on climate zone. <sup>7</sup>				
<b>4. Duct System</b>				
4.1 All heating and cooling distribution ducts and heating and cooling air-handling equipment are located within the thermal and air barrier boundary. <sup>8</sup>				
<b>5. Water Heating Efficiency (comply with either 5.1, 5.2, or 5.3)</b>				
5.1 Hot water distribution system (HWDS) qualifies as a HERS-Verified Compact HWDS as specified in the BEES Reference Appendix RA3.6.5 <sup>9</sup>				
5.2 Water heaters and fixtures meet efficiency criteria. <sup>10</sup>				
5.3 Home is certified under WaterSense Labeled Homes Version 2.0.				
<b>6. Lighting &amp; Appliances <sup>11</sup></b>				
6.1 All builder-supplied and builder-installed refrigerators, <sup>12</sup> dishwashers, clothes washers, and clothes dryers are ENERGY STAR certified. <sup>13</sup>				
6.2 100% of builder-installed lighting fixtures and lamps (bulbs) are LEDs. <sup>14, 15</sup>				
6.3 All installed bathroom ventilation fans are ENERGY STAR certified. <sup>16</sup>				
<b>7. Indoor Air Quality</b>				
7.1 The home is certified under EPA Indoor AirPlus. <sup>17</sup>				



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7.2 Energy efficient balanced ventilation (HRV or ERV) is provided in 2021 International Energy Conservation Code (IECC) Climate Zones 6 – 8. <sup>18, 19</sup>			
<b>8. Renewable Ready</b>			
8.1 Provisions of the DOE Zero Energy Ready Home Single Family Homes PV-Ready Checklist Version 2 (most recent revision) are completed. <sup>20</sup>			
<b>9. Electric Vehicle Ready</b>			
9.1 One parking space is provided per dwelling unit that includes a powered 208/240V, 30A receptacle installed in dwelling unit's garage or within 6 feet of the dwelling unit's private driveway. The electric service panel identifies the branch circuit as "Electric Vehicle Charging". <sup>21</sup> For other parking configurations, see endnote. <sup>22</sup>			
<b>10. Heat Pump Water Heating Ready</b>			
10.1 Homes using gas or propane water heating systems to serve individual dwelling units comply with 2022 California Building Energy Efficiency Standards Section 150.0(n)1.			
<b>11. Heat Pump Space Heating Ready</b>			
11.1 Homes using gas or propane furnaces to serve individual dwelling units comply with 2022 California Building Energy Efficiency Standards Section 150.0(t).			
<b>12. Energy Efficiency Threshold</b>			
12.1 The Efficiency Energy Design Rating (EDR2 Efficiency) is $\geq 7$ points better than that of the Standard Design corresponding to the home, as defined by the 2022 Building Energy Efficiency Standards (BEES) and determined by a CEC-approved software program. <sup>23</sup> <b>OR</b> 12.2 The Compliance Margin (EDR2) is $\geq 15\%$ compared to the Compliance Total of the Standard Design TDV Energy corresponding to the home, as defined by the 2022 Building Energy Efficiency Standards (BEES) and determined by a CEC-approved software program.			

Inspection Signoffs		
Rater Name: _____ Rater Company Name: _____	Rater Pre-Drywall Inspection <sup>24</sup> Date(s): _____	Rater Initials: _____
Rater Name: _____ Rater Company Name: _____	Rater Final Inspection <sup>25</sup> Date(s): _____	Rater Initials: _____



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## Endnotes:

The following endnotes are intended to relate the same exemptions and clarifications as noted in the ZERH Single Family Version 2 California Program Requirements. However, if there are any inconsistencies the end notes in the ZERH Single Family Version 2 California Program Requirements shall take precedence.

<sup>1</sup> A Rater is defined as the person(s) completing the third-party verification required for certification. The person(s) shall be a Certified Rater, which is defined as an individual who has become qualified to conduct California HERS Ratings through certification under a "Home Certification Organization for ZERH" recognized by DOE to implement a ZERH certification program in California. A list of DOE-recognized "HCOs for ZERH" is posted here: <https://www.energy.gov/eere/buildings/doe-recognized-zerh-certification-organizations>.

<sup>2</sup> If an exception for a program requirement or an alternate compliance method is used, enter the number of the corresponding End Note from this document that lists the exception or alternate.

<sup>3</sup> The 'permit date' is the date on which the permit authorizing construction of the building was issued. In cases where multiple permits are issued for a project (e.g., footing permits, building permits), the 'permit date' is the date on which the permit authorizing construction of the building, including the building features affecting energy use (e.g., insulation levels, window U/SHGC specifications, mechanical equipment efficiency), was issued. Alternatively, the date of the Rater's first site visit or the date of the contract on the home is allowed to be used as the 'permit date.' The permit application date is not allowed to be used.

<sup>4</sup> The DOE ZERH Partner ID number for the builder may be obtained from the builder or found on the [Partner Locator tool](#) on the DOE ZERH program website.

<sup>5</sup> Raters are only required to document the partnership status of their company once, for the first home that the Rater certifies for them.

<sup>6</sup> Regardless of the ENERGY STAR program version required for ENERGY STAR certification, ZERH Single Family California requires certification to ENERGY STAR Single Family New Homes California Version 3.4.

<sup>7</sup> Windows shall meet the U factor and SHGC specifications of 2022 BEES, Table 150.1-A Component Package – Single-Family Standard Building Design.

The following exceptions apply:

- a. An area-weighted average of windows shall be permitted to satisfy the U-factor requirements;
- b. An area-weighted average of windows shall be permitted to satisfy the SHGC requirements;
- c. Windows utilized as part of a passive solar design shall be exempt from the U-factor and SHGC requirements and shall be excluded from area-weighted averages calculated using a) and b), above. Exempt windows shall be facing within 45 degrees of true South and directly coupled to thermal storage mass that has a heat capacity  $> 20 \text{ btu} / \text{ft}^3 \times ^\circ\text{F}$  and provided in a ratio of at least 3 sq. ft. per sq. ft. of South facing fenestration. Generally, thermal mass materials will be at least 2 in. thick.

<sup>8</sup> Exceptions and alternative compliance paths:

- a. Ducts and/or the space-conditioning system air handler may be located in ventilated attic spaces if the roof and ceiling insulation level from 2022 BEES Table 150.1-A, Option B are met. Duct insulation levels must also meet the requirements in Table 150.1-A.
- b. Ducts and/or the space-conditioning air handler may be located within an unvented, insulated attic assembly.



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- c. Jump ducts which do not directly deliver conditioned air from the heating/cooling equipment may be located in attics if all joints, including boot-to-drywall, are air sealed and the jump duct is fully buried under the attic insulation
- d. Ducts and air-handling equipment associated with rooftop make-up air units or dedicated outdoor air systems (DOAS) that provide ventilation, and may also provide supplemental heating and cooling, are permitted to be outside of the building's thermal and air barrier boundary.

This provision does not apply to equipment or ductwork that only provides ventilation.

<sup>9</sup> To meet the Compact Hot Water Distribution System credit requirements, the system's Weighted Distance must be less than the Qualification Distance based on the calculation procedures in RA4.4.6 of the 2022 Building Energy Efficiency Standards Reference Appendices. In addition, these HERS field verifications are required:

- a. No hot water piping larger than 1 inch diameter is allowed.
- b. Length of 1 inch diameter piping is limited to 8 ft or less.
- c. Two and three story buildings do not have hot water distribution piping in the attic, unless the water heater is also located in the attic.
- d. Eligible recirculating systems must be HERS-Verified Demand Recirculation: Manual Control conforming to RA4.4.17

<sup>10</sup> Water heaters and fixtures meet the following efficiency criteria:

- a. Gas water heaters, if present, shall have a Uniform Energy Factor  $\geq 0.87$ .
- b. Electric water heaters, if present, shall have a Uniform Energy Factor  $\geq 2.2$
- c. Solar water heating systems, if present, shall have a minimum solar fraction, as follows:

2021 IECC Climate Zone	1, 2	3, 4A, 4B	4C, 5, 6	7, 8
Minimum Solar Fraction (SF)	0.80	0.64	0.47	0.28

- i. The solar water heating system's Solar Fraction (SF) must be documented by an OG-300 certification. Alternatively, projects may find an equivalent system in the [OG-300 directory](#) which contains the same OG-100 elements as the chosen system and meets or exceeds the minimum required solar fraction. In this situation, documentation of the OG-100 elements and the comparable OG-300 system must be provided. All systems must be made up of OG-100 tested components.
- ii. When a solar water heating system meeting these specifications is used, gas and electric water heaters used for backup are exempt from the Uniform Energy Factor (in the two prior sub-items) requirements of 0.87 and 2.2, respectively.
- d. All showerheads and bathroom sink faucets and/or faucet accessories shall be WaterSense labeled. WaterSense label may be verified in one of two ways:
  - A cut sheet for the installed product indicates that it is WaterSense labeled and field verification shows that the installed product is the one described on the cut sheet.
  - The installed product can be found in the most recent WaterSense Product Search tool (<https://lookforwatersense.epa.gov/products/>) and field verification shows that the installed product matches the product described in the search tool
- e. The hot water distribution system shall store no more than 1.8 gallons between the hot water source and the furthest fixture. In the case of on-demand recirculation systems, the hot water source is considered as the point at which the branch feeding the fixture branches off the recirculation loop. Recirculation systems must be based on an occupant-controlled switch or an occupancy sensor. A sensor or switch must be installed for each fixture or set of fixtures within a room (e.g., a bathroom with multiple fixtures) located beyond a 1.8-gallon stored volume range from the water heater. This storage limit shall be verified by either (1) a calculation using the piping or tubing interior diameter and the system length based on plans, or (2) by a field verification test, which demonstrates a minimum temperature rise of 10 °F by the time 2.0



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gallons of water is delivered to the furthest hot water fixture. Fixtures in bathrooms without a shower or bathtub are exempt from the system storage limit requirement.

In the calculation method, the Rater shall calculate the stored volume between the hot water source and the furthest fixture using the piping or tubing inside diameter and the length of the piping/tubing. In the case of on-demand recirculation systems, the 1.8-gallon storage limit shall be measured from the point where the branch feeding the furthest fixture branches off the recirculation loop, to the fixture itself. An Excel-based tool is available on the DOE ZERH website for this calculation.

Using the field verification method, no more than 2.0 gallons of water shall be collected from the hot water fixture before hot water is delivered. Only the fixture with the greatest stored volume between the fixture and the hot water source (or recirculation loop) needs to be tested. To field-verify that the system meets the 2.0-gallon limit, Raters shall first initiate operation of on-demand recirculation systems, if present, and let such systems run for at least 40 seconds. Next, a bucket or flow measuring bag (pre-marked for 2.0 gallons) shall be placed under the hot water fixture. The hot water shall be turned on completely and a digital temperature sensor used to record the initial temperature of the water flow. Once the water reaches the pre-marked line at 2.0 gallons the water shall be turned off and the ending temperature of the water flow (not the collection bucket) shall be recorded. The temperature of the water flow must increase by  $\geq 10$  °F in comparing the final to the initial temperature reading. The Rater must confirm compliance with these requirements.

Projects using this compliance option are not permitted to use hot water recirculation systems which operate continuously or operate based solely on a timer or temperature sensor.

<sup>11</sup> ENERGY STAR product certification must be verified with a visual confirmation that installed product is listed in the online ENERGY STAR product registry.

<sup>12</sup> Due to industry supply chain challenges, DOE is temporarily allowing the use of non-ENERGY STAR certified refrigerators. DOE advises partners that this alternative may be rescinded in a future program update.

<sup>13</sup> Products in categories which are not covered by ENERGY STAR product criteria are exempt.

<sup>14</sup> Up to 5% of lighting, for task or decorative lighting, may be exempt from this provision.

<sup>15</sup> Builder-installed lighting does not include lighting inside appliances (e.g., refrigerator, laundry, microwave, cooking equipment).

<sup>16</sup> This provision does not apply to H/ERVs that are used to provide exhaust ventilation for bathrooms.

<sup>17</sup> Homes permitted on or before 12/31/2025 must certify under either Indoor airPLUS (IAP) Version 1 (Rev. 4 or 5) or the IAP Version 2 Certified (or Gold) tier. Homes permitted on or after 1/1/2026 must certify under the IAP Version 2 Certified (or Gold) tier. See the Indoor AirPlus program site for Version 2 program documents: <https://epa.gov/indoorairplus/indoor-airplus-program-documents>

<sup>18</sup> Alpine and Mono Counties in California are classified as 2021 IECC Climate Zone 6, and no California counties are classified as being in IECC Climate Zones 7 or 8. The HRV or ERV must meet or exceed the following specifications:  $\geq 65\%$  SRE (@ 32 °F) and  $\geq 1.2$  CFM/Watt.



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<sup>19</sup> Advisory: DOE encourages, but does not require, that partners use equipment listed in the Home Ventilating Institute (HVI) Certified Products Directory (CPD) to comply with this requirement. The listing may be used to demonstrate compliance with this program requirement.

<sup>20</sup> Homes must complete the provisions of the PV-Ready Version 2 Checklist, unless one or more of the exceptions below applies in which case the PV-Ready features in the Checklist are not required. The exceptions are:

- a. The home already includes an on-site PV system.
- b. The home receives renewable energy from a community solar system, and there is a legally binding agreement in place for the provision of this energy to the home with a duration  $\geq 15$  years and written to survive a full or partial transfer of ownership of the property.
- c. The location has significant natural shading (e.g., trees, tall buildings impacting the south-facing roof).
- d. The home as designed does not have at least 500 square feet of roof area oriented in between 110 degrees to 270 degrees of true north. The Rater shall document which, if any, exceptions apply.

<sup>21</sup> The following exceptions apply:

- a. If the addition of the 30-amp Electric Vehicle Charging branch circuit increases the electrical service to the next nominal size (e.g., from 200-amp to 400-amp service), connecting the circuit to the electrical panel is not required. The conductor shall be labeled as "electrical vehicle charging." The Rater shall retain a copy of the electrical sizing calculations or statement from the electrical designer for their records but need not evaluate the documentation.
- b. In model homes with the garage temporarily converted to a sales or construction office, connecting the 30-amp Electric Vehicle Charging branch circuit to the electric panel is not required if the intended breaker is servicing a temporary electric load in the garage/office space. The conductor shall be labeled as "electrical vehicle charging."
- c. Where the local electric distribution entity has certified in writing that it is not able to provide 100% of the necessary distribution capacity that would be needed according to this requirement within 2 years after the estimated date of the certificate of occupancy, the required EV charging infrastructure shall be reduced based on the available existing electric distribution capacity. The Rater must include the utility's written explanation in the project records.
- d. Where meeting the capacity requirements to satisfy this requirement will alter the local utility infrastructure design requirements on the utility side of the meter so as to increase the utility side cost to the builder or developer by more than \$450 per dwelling unit, the required EV charging infrastructure shall be reduced based on the available existing electric distribution capacity. The Rater must include documentation from the utility regarding added costs in the project records.
- e. Dwelling units for which no parking is provided by the builder are exempt from this requirement.

<sup>22</sup> Dwelling units in communities that include parking for the dwelling unit (assigned or non-assigned) but do not include a private driveway or garage for the individual dwelling unit must comply with the ZERH Multifamily Version 2 EV-Ready Checklist (most recent revision) for the parking area(s) intended for use by the residents of the ZERH-certified dwelling units. A copy of the completed checklist must be included in the documentation record for each certified dwelling unit.

<sup>23</sup> CEC-approved computer programs can be found at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-1>. Any measure that contributes to the Efficiency EDR (EDR2 Efficiency) or Compliance Margin (EDR2), as recognized by CEC-approved computer programs, is permitted to be used to meet these performance targets.





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<sup>24</sup> Any Item that will be concealed by drywall (e.g., wall insulation) must be verified during the pre-drywall inspection. If drywall is installed prior to the inspection, then it must be entirely removed to fully verify all Items. It is not sufficient to remove only portions of drywall to inspect a subset of areas. Furthermore, it is not acceptable to complete a Sampled Rating on a home that has missed the pre-drywall inspection. Additional information is available in the ENERGY STAR Technical Bulletin: Pre-Drywall Inspection Is Always Required.

<sup>25</sup> Some Items can typically only be verified at a later stage of construction than when the pre-drywall inspection occurs (e.g., bath fan airflow). Any Item that has not been verified during the pre-drywall inspection must be verified prior to or during the final inspection.