# ENERGY STAR<sup>®</sup> Residential New Construction Programs

# **Historical Document**

This document is provided for reference because it has been superseded by a more recent Version or Revision. Please find current program documents on the <u>Program</u> <u>Requirements</u> webpage.

Use of older Versions and Revisions, such as this document, are typically limited to homes and buildings with a permit date (or, for manufactured homes, a production date) prior to a specified date. Consult the <u>Implementation Timeline</u> table to assess whether a home or apartment is still eligible to be certified using this document.

For questions or more information, contact us at <u>energystarhome@energystar.gov</u>.



### **Eligibility Requirements**

Site-built or modular <sup>1</sup> Dwellings <sup>2</sup> (e.g., single-family homes and duplexes) and Townhouses <sup>3</sup> are eligible to participate in the ENERGY STAR Single-Family New Homes (SFNH) program.

Dwelling Units in certain low-rise multifamily buildings are also eligible to participate in the ENERGY STAR SFNH program if permitted prior to July 1, 2021. See Footnote 4 for details.<sup>4</sup>

While primarily intended for new construction, existing homes (e.g., undergoing a gut rehabilitation) are also eligible to participate in the ENERGY STAR SFNH program, with guidance available at: <u>www.energystar.gov/GutRehabGuidance</u>.

For information about other ENERGY STAR residential new construction programs, visit <u>www.energystar.gov/newhomesrequirements</u>.

Note that compliance with these requirements is not intended to imply compliance with all local code requirements.<sup>5</sup>

#### Partnership, Training, and Credentialing Requirements

The following requirements must be met prior to certifying homes:

- Builders are required to sign an ENERGY STAR Partnership Agreement and complete the online Version 3 Builder Orientation, which can be found at <u>www.energystar.gov/homesPA</u>.
- HVAC installing contractors are required to be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO) for homes certified using Track B in Exhibit 2. An explanation of this process can be found at www.energystar.gov/newhomesHVAC.
- Energy Rating Companies (e.g., rater companies and Providers <sup>6</sup>) are required to sign an ENERGY STAR Partnership Agreement, which can be found at <u>www.energystar.gov/homesPA</u>, and operate under a Home Certification Organization (HCO). <sup>7</sup> Learn more and find a current list of HCOs at <u>www.energystar.gov/hco</u>.
- Raters <sup>8</sup> are required to complete EPA-recognized training, which can be found at <u>www.energystar.gov/newhomestraining</u>.

#### **ENERGY STAR Certification Process**

- The certification process provides flexibility to select a custom combination of measures for each home that is equivalent in performance to the minimum requirements of the ENERGY STAR Reference Design Home, Exhibit 1, as assessed through energy modeling. An EPA-recognized HCO's Approved Software Rating Tool shall automatically determine the ENERGY STAR ERI Target, which is the highest ERI value that each rated home may achieve to earn the ENERGY STAR.<sup>9</sup>
- 2. Using the same software program, configure the preferred set of efficiency measures for the home to be certified and verify that the resulting ERI meets or exceeds the ENERGY STAR ERI Target, as determined in Step 1.

Note that, regardless of the measures selected, the Mandatory Requirements for All Certified Homes in Exhibit 2 are also required and impose certain constraints on the efficiency measures selected (e.g., insulation levels, insulation installation quality, window performance, duct leakage). Furthermore, on-site power generation may only be used to meet the ENERGY STAR ERI Target for homes that are larger than the Benchmark Home and only for the incremental change in the ENERGY STAR ERI Target caused by the Size Adjustment Factor.<sup>10</sup>

- 3. Construct the home using the measures selected in Step 2 and the Mandatory Requirements for All Certified Homes, Exhibit 2.
- 4. Using a Rater, verify that all requirements have been met in accordance with the Mandatory Requirements for All Certified Homes and with the inspection procedures for minimum rated features in ANSI / RESNET / ICC 301, Appendix B.<sup>8, 11</sup> For modular homes, a Rater must verify any requirement in the plant not able to be verified on-site because a feature will be concealed prior to shipment. Finally, submit the home to the HCO for final certification and follow the HCO's certification and oversight procedures (e.g., quality assurance, recordkeeping, and reporting). The Rater is required to keep electronic or hard copies of the completed and signed National Rater checklists and either an HVAC design report compliant with ANSI / RESNET / ACCA / ICC 310, and the National HVAC Design Supplement to Std. 310 for Dwellings & Units, for homes using Track A, or the National HVAC Design Report for homes using Track B.

The Rater must review all items on the National Rater checklists. Raters are expected to use their experience and discretion to verify that the overall intent of each inspection checklist item has been met (i.e., identifying major defects that undermine the intent of the checklist item versus identifying minor defects that the Rater may deem acceptable).

In the event that a Rater finds an item that is inconsistent with the intent of the checklists, the home cannot earn the ENERGY STAR until the item is corrected. If correction is not possible, the home cannot earn the ENERGY STAR. In the event that an item on a National Rater checklist cannot be inspected by the Rater, the home also cannot earn the ENERGY STAR. The only exceptions are in the Thermal Enclosure System Section of the National Rater Field Checklist, where the builder may assume responsibility for verifying a maximum of eight items. This option shall only be used at the discretion of the Rater. When exercised, the builder's responsibility will be formally acknowledged by the builder signing the checklist for the item(s) that they verified.

In the event that a Rater is not able to determine whether an item is consistent with the intent (e.g., an alternative method of meeting a checklist requirement has been proposed), then the Rater shall consult their Provider. If the Provider also cannot make this determination, then the Rater or Provider shall report the issue to EPA prior to project completion at: <u>energystarhomes@energystar.gov</u> and will receive an initial response within 5 business days. If EPA believes the current program requirements are sufficiently clear to determine whether the intent has been met, then this guidance will be provided to the partner and enforced beginning with the house in question. In contrast, if EPA believes the program requirements require revisions to make the intent clear, then this guidance will be provided to the partner but only enforced for homes permitted after a specified transition period after the release of the revised program requirements, typically 60 days in length.

This will allow EPA to make formal policy decisions as partner questions arise and to disseminate these policy decisions through the <u>Policy Record</u> and the periodic release of revised program documents to ensure consistent application of the program requirements.



## Exhibit 1: ENERGY STAR Reference Design Home <sup>12</sup>

The ENERGY STAR Reference Design Home is the set of efficiency features modeled to determine the ENERGY STAR ERI Target for each home pursuing certification. Therefore, while the features below are not mandatory, if they are not used then other measures will be needed to achieve the ENERGY STAR ERI Target. In addition, note that the Mandatory Requirements for All Certified Homes, Exhibit 2, contain additional requirements such as total duct leakage limits, minimum allowed insulation levels, and minimum allowed fenestration performance. Therefore, EPA recommends that partners review the documents in Exhibit 2 prior to selecting measures.

	nates (2009 IECC Zones 1,2	,3) <sup>13</sup>	Mixed and Cold Climates (2009 IECC Zones 4,5,6,7,8) <sup>13</sup>					
Cooling Equipm	ent (Where Provided)	• •						
Cooling equip	oment modeled at the applica	able efficiency lev	els below:					
• 14.5 SEER / 12 EER AC,			• 13 SEER AC,					
<ul> <li>Heat pump (S</li> </ul>	See Heating Equipment)	•	Heat pump (See He	ating Equipment)				
Heating Equipm	ient							
<ul> <li>Heating equi</li> </ul>	ipment modeled at the applic	able efficiency lev	vels below, dependent	on fuel and system typ	be:			
<ul> <li>80 AFUE gas furnace,</li> <li>80 AFUE oil furnace,</li> <li>80 AFUE boiler,</li> <li>8.2 HSPF / 14.5 SEER / 12 EER air-source heat pump with electric or dual-fuel backup</li> </ul>		• • • •	<ul> <li>90 AFUE gas furnace,</li> <li>85 AFUE ENERGY STAR oil furnace,</li> <li>85 AFUE ENERGY STAR boiler,</li> <li>Heat pump, with efficiency as follows:</li> <li>CZ 4: 8.5 HSPF / 14.5 SEER / 12 EER air-source w/ electric or dual-fuel backup,</li> <li>CZ 5: 9.25 HSPF / 14.5 SEER / 12 EER air-source w/ electric or dual-fuel backup,</li> <li>CZ 6: 9.5 HSPF / 14.5 SEER / 12 EER air-source w/ electric or dual-fuel backup,</li> <li>CZ 7-8: 3.5 COP / 16.1 EER ground-source w/ electric or dual-fuel backup</li> </ul>					
Envelope, Wind	ows, & Doors					•		
	rier modeled if more than 10 located in an unconditioned		No radiant barrier m	odeled.				
Infiltration rate	els modeled to 2009 IECC le es modeled as follows: 6 ACH50 in CZs 1,2 d doors modeled, as illustrate	5 ACH50 in (	·	H50 in CZs 5,6,7	3 ACH50 in CZ 8	3		
Window U-V	/alue: 0.60 in CZs	1,2	0.35 in CZ 3	0.32 in CZ 4	0.30 in 0	CZs 4 C,5,6,7,8		
Window SH	GC: 0.27 in CZs	1,2	0.30 in CZ 3	0.40 in CZ 4	Any in C	Zs 4 C,5,6,7,8		
Door U-valu	ue: Opaque	: 0 21	<1⁄2 lit	e: 0.27	>1/2 lite:	0.32		
_	Door SHGC: Opaque: Any		≤½ lite: 0.30		>½ lite: 0.30			
Water Heater		-						
	nent modeled with the followir	na efficiency level	s as applicable:					
Gas:		40 Gal = 0.61 EF	50 Gal = 0.59 EF	60 Gal = 0.57 EF	70 Gal = 0.55 EF	80 Gal = 0.53 EF		
Electric:	30 Gal = 0.94 EF	40 Gal = 0.93 EF	50 Gal = 0.92 EF	60 Gal = 0.91 EF	70 Gal = 0.90 EF	80 Gal = 0.89 EF		
Oil:	30 Gal = 0.55 EF	40 Gal = 0.53 EF	50 Gal = 0.51 EF	60 Gal = 0.49 EF	70 Gal = 0.47 EF	80 Gal = 0.45 EF		
Thermostat & D	uctwork							
	le thermostat modeled.	eled with R-8 insu	lation; all other ducts ir	n unconditioned space	modeled with R-6 ins	ulation.		
Supply ducts	e to outdoors modeled at the	greater of ≤ 4 CF	M25 per 100 sq. ft. of c	conditioned floor area o	or ≤ 40 CFM25.			

ENERGY STAR light bulbs modeled in 80% of ANSI / RESNET / ICC 301-defined Qualifying Light Fixture Locations.



Two tracks are provided for satisfying the mandatory requirements for all certified homes, Exhibit 2. Track A - HVAC Grading utilizes ANSI / RESNET / ACCA / ICC 310<sup>14</sup>, a standard for grading the installation of HVAC systems. Track B - HVAC Credential utilizes an HVAC contractor credentialed by an EPA-recognized H-QUITO. Either track may be selected, but all requirements within that track must be satisfied for the home to be certified.

Party Responsible	Mandatory Requirements					
Requirements Applicable to Track A & B						
Rater	<ul> <li>Completion of SFNH National Rater Design Review Checklist, Version 3 / 3.1 / 3.2</li> <li>Completion of SFNH National Rater Field Checklist, Version 3 / 3.1 / 3.2</li> </ul>					
Builder	Completion of SFNH National Water Mgmt. System Builder Reqs., Version 3 / 3.1 / 3.2					
Requirements Only Applicable to Track A - HVAC Grading <sup>14</sup>						
HVAC System Designer	<ul> <li>Completion of an HVAC design report compliant with ANSI / RESNET / ACCA / ICC 310, plus the SFNH / MFNC National HVAC Design Supplement to Std. 310 for Dwellings &amp; Units, All Versions.</li> </ul>					
HVAC Installing Contractor	<ul> <li>None. While the HVAC contractor plays a critical role in properly installing and commissioning a system, the Rater is the party responsible for assessing its installation quality in accordance with ANSI / RESNET / ACCA / ICC 310.</li> </ul>					
Requirements Only Applicable to Track B HVAC Credential						
HVAC System Designer	Completion of SFNH National HVAC Design Report, Version 3 / 3.1 / 3.2					
HVAC Installing Contractor	Completion of SFNH National HVAC Commissioning Checklist, Version 3 / 3.1 / 3.2					

### Exhibit 2: Mandatory Requirements for All Certified Homes

### Exhibit 3: Benchmark Home<sup>10</sup>

Bedrooms in Home to be Built	0	1	2	3	4	5	6	7	8
Conditioned Floor Area Benchmark Home	1,000	1,000	1,600	2,200	2,800	3,400	4,000	4,600	5,200



#### **Effective Date**

To determine the program Version and Revision that a home is required to be certified under, look up the location and permit date of the home in Exhibit 4. Program requirements for other locations can be found at <a href="http://www.energystar.gov/newhomesrequirements">www.energystar.gov/newhomesrequirements</a>.

This Exhibit contains all implementation timelines applicable on or after October 1, 2020. Implementation timelines applicable prior to this date can be obtained by contacting <u>energystarhomes@energystar.gov</u>.

State / Territory	Homes Permitted <sup>15</sup> On or After This Date Must Meet the Adjacent Version & Revision	Version	Revision <sup>16</sup>
AL, AK, AZ, AR, CO, IN, ID, KS, KY, LA, MS, MO, NH, NC, ND,	10-01-2020	National v3	Rev. 10
OH, OK, SC, SD, TN, VA, WV,	01-01-2022	National v3	Rev. 11
WI, WY	01-01-2023	National v3.1	Rev. 11
	01-01-2024	National v3.1	Rev. 12
PA	10-01-2020	National v3	Rev. 10
	04-01-2021	National v3.1	Rev. 10
	01-01-2022	National v3.1	Rev. 11
	01-01-2024	National v3.1	Rev. 12
NE	10-01-2020	National v3	Rev. 10
	07-01-2021	National v3.1	Rev. 10
	01-01-2022	National v3.1	Rev. 11
	01-01-2024	National v3.1	Rev. 12
GA, NM, UT	10-01-2020	National v3	Rev. 10
	01-01-2022	National v3	Rev. 11
	07-01-2022	National v3.1	Rev. 11
	01-01-2024	National v3.1	Rev. 12
ME	10-01-2020	National v3	Rev. 10
	01-01-2022	National v3	Rev. 11
	10-01-2022	National v3.1	Rev. 11
	01-01-2024	National v3.1	Rev. 12

### **Exhibit 4: ENERGY STAR Single-Family New Homes Implementation Timeline**

#### Footnotes:

- 1. A modular home is a prefabricated home that is made of multiple modules or sections that are manufactured and substantially assembled in a manufacturing plant. These pre-built sections are transported to the building site and constructed by a builder to meet all applicable building codes for site-built homes.
- A Dwelling, as defined by ANSI / RESNET / ICC 301, is any building that contains one or two Dwelling Units used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or that are occupied for living purposes. ANSI / RESNET / ICC 301 defines a Dwelling Unit as a single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.
- 3. A Townhouse, as defined by ANSI / RESNET / ICC 301, is a single-family Dwelling Unit constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides. Townhouses are also eligible to participate in the ENERGY STAR Multifamily New Construction Program.
- 4. If permitted prior to July 1, 2021, the following are also eligible to participate in the ENERGY STAR SFNH program:
  - Dwelling units <sup>2</sup> in any multifamily building with 4 units or fewer; OR
  - Dwelling units in multifamily buildings with 3 stories or fewer above-grade; OR
  - Dwelling units in multifamily buildings with 4 or 5 stories above-grade where dwelling units occupy 80% or more of the occupiable square footage of the building. When evaluating mixed–use buildings for eligibility, exclude commercial / retail space when assessing whether the 80% threshold has been met.

Any above-grade story with 20% or more occupiable space, including commercial space, shall be counted towards the total number of stories for the purpose of determining eligibility to participate in the program. The definition of an 'above-grade story' is one for which



more than half of the gross surface area of the exterior walls is above-grade. All below-grade stories, regardless of type, shall not be included when evaluating eligibility.

Per ASHRAE 62.2-2010, occupiable space is any enclosed space inside the pressure boundary and intended for human activities or continual human occupancy, including, but not limited to, areas used for living, sleeping, dining, and cooking, toilets, closets, halls, storage and utility areas, and laundry areas.

- 5. While certification will result in compliance with many code requirements, a Rater is not responsible for ensuring that all code requirements have been met prior to certification. For more information about how these program requirements help satisfy code requirements, visit: <u>www.energystar.gov/newhomesguidance</u>. In the event that a code requirement, a manufacturer's installation instructions, or an engineering document conflicts with a requirement of the ENERGY STAR program (e.g., slab insulation is prohibited to allow visual access for termite inspections), then the conflicting requirement within these program requirements shall not be met. Certification shall only be allowed if the Rater has determined that no equivalent option is available that could meet the intent of the conflicting requirement (e.g., switching from exterior to interior slab edge insulation). Note that a home must still meet its ENERGY STAR ERI Target. Therefore, other efficiency measures may be needed to compensate for the omission of the conflicting requirement.
- 6. The term 'Provider' refers to an Approved Rating Provider, as defined by ANSI / RESNET / ICC 301, that is approved by an HCO.
- 7. HCOs are independent organizations recognized by EPA to implement an ENERGY STAR certification program for single-family and multifamily homes and apartments using an Energy Rating Index (ERI) compliance path. Learn more and find a current list of HCOs at <a href="https://www.energystar.gov/partner\_resources/residential\_new/working/other\_participants/hco">www.energystar.gov/partner\_resources/residential\_new/working/other\_participants/hco</a>.
- 8. The term 'Rater' refers to the person(s) completing the third-party verification required for certification. The person(s) shall: a) be a Certified Rater or Approved Inspector, as defined by ANSI / RESNET / ICC 301, or an equivalent designation as determined by an HCO; and, b) have attended and successfully completed an EPA-recognized training class. See <a href="http://www.energystar.gov/newhomestraining">www.energystar.gov/newhomestraining</a>.
- 9. The software program shall automatically determine (i.e., without relying on a user-configured ENERGY STAR Reference Design) this target for each rated home by following the National ERI Target Procedure, Version 3 (Rev. 12), available at www.energystar.gov/newhomesrequirements.
- 10. The average-size home with a specific number of bedrooms is termed the "Benchmark Home". The conditioned floor area of a Benchmark Home (CFA Benchmark Home) is determined by selecting the appropriate value from Exhibit 3. For homes with more than 8 bedrooms, the CFA Benchmark Home shall be determined by multiplying 600 sq. ft. by the total number of bedrooms & adding 400 sq. ft.

A bedroom is defined by ANSI / RESNET / ICC 301-2014 as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

- have a sill height of not more than 44 in. above the floor; AND
- have a minimum net clear opening of 5.7 sq. ft.; AND
- have a minimum net clear opening height of 24 in.; AND
- have a minimum net clear opening width of 20 in.; AND
- be operational from the inside of the room without the use of keys, tools or special knowledge.
- 11. Raters who operate under an HCO with a Sampling Protocol are permitted to verify the Minimum Rated Features of the home and to verify any Checklist Item designated "Rater Verified" using an HCO-approved Sampling Protocol. No parties other than Raters are permitted to use sampling. All other items shall be verified for each certified home. For example, no items on the HVAC Commissioning Checklist are permitted to be verified using a Sampling Protocol.
- 12. Note that the efficiency levels of ENERGY STAR certified products aligned with these product specifications when this Version was first released. These efficiency features form the basis of the ENERGY STAR ERI target, regardless of any subsequent revisions to ENERGY STAR certified product specifications. EPA recommends, but does not require, that current ENERGY STAR products be included in ENERGY STAR homes. For current ENERGY STAR products, visit www.energystar.gov/products.
- 13. 2009 IECC Climate Zone designations, as defined and illustrated in <u>Section 301</u> of the code, are used to configure the ENERGY STAR Reference Design Home.
- 14. Track A HVAC Grading shall use ANSI / RESNET / ACCA / ICC 310 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under.
- 15. The Rater may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.
- 16. Homes certified under Rev. 12 of the program requirements are permitted to use either Rev. 08, 09, 10, 11, or 12 of the National HVAC Design Report.