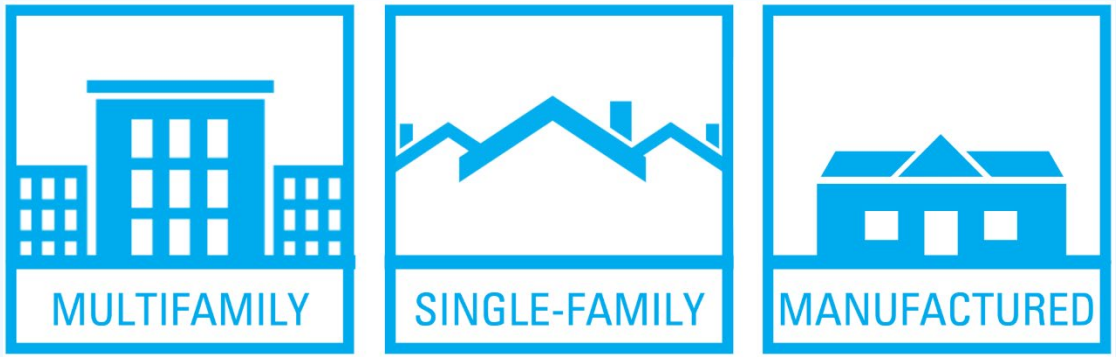
ENERGY STAR: The Decade Ahead Starts Now

A New Certification Program to Accelerate Decarbonization in the Residential Sector

Presented on September 29, 2021



EPA United States Environmental Protection Agency

Introduction

- Addressing the challenge of climate change will require commitment and action from every level of government and every sector of the economy.

- In the residential sector, this will require expanding beyond energy efficiency to make greater strides in the adoption of:
  - Strategic electrification
  - Connected equipment to aid in demand response

- While addressing new construction alone will not get us there, it is a critical component to success.
  - Lost opportunity cost
  - By 2050, 21% of homes will have been built after 2019

Program Vision

To help accelerate the needed transition, we are proposing to introduce a new whole-house certification program, above and beyond the ENERGY STAR new construction programs, to inspire the industry and demonstrate that it is possible to build the homes we need for tomorrow, today.

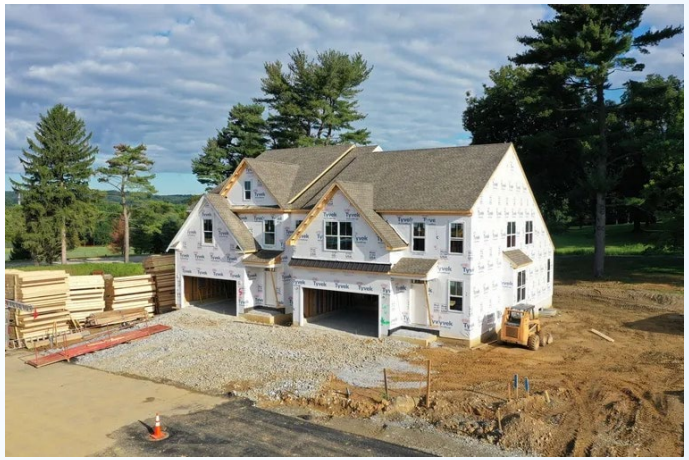
- This new program is an opportunity to:
  - Provide recognition for decarbonized homes & the builders that construct them
  - Create a national platform for training, tools, & support for decarbonization in homes
  - Provide state & local policymakers with a national reference for emerging policies
  - Provide a basis for incentives as utilities begin to develop more sophisticated residential demand response programs
  - Offer a new opportunity for builders to demonstrate progress towards their environmental, social, and governance (ESG) goals

Proposed Requirements for the New Certification Program

1. Highly energy-efficient construction
2. Multi-stage ENERGY STAR certified connected heat pump
3. ENERGY STAR certified connected heat pump water heater
4. Induction cooktop and electric oven
5. Electric vehicle charging capability

1. Energy Efficiency Prerequisite

- Home or building certified to the most rigorous ENERGY STAR New Construction program requirement (10% above 2021 IECC/California Title 24)
  - National v3.2/Multifamily v1.2, or California v3.3/Multifamily v1.3
  - This requirement would also apply in states that would not otherwise be subject to these versions of the program requirements due to code adoption



2. ENERGY STAR Certified Connected Heat Pumps

- ENERGY STAR certified two-speed or variable-speed heat pump installed that serves the design load of each heated zone
  - In Climate Zones 5-8, installed heat pumps are ENERGY STAR Cold Climate certified
  - Blower fan volumetric airflow, blower fan watt draw, and refrigerant charge are Grade I per ANSI / RESNET / ACCA Std. 310

- Each heat pump must also meet EPA's 'connected' criteria or be controlled by an ENERGY STAR certified smart thermostat

2. ENERGY STAR Certified Connected Heat Pumps

Footnotes:

- EPA intends to allow dual-fuel heat pumps and will provide guidance on heat pump sizing, selection, and allowable backup systems through existing program documents and additional resources.
- For this new certification program, the home is not permitted to be certified with a default refrigerant charge designation of Grade III. If the non-invasive procedure cannot be performed during the final inspection of a home, the weigh-in method procedure in ANSI / RESNET / ACCA Std. 310 may still be used to pursue a Grade I designation.

3. ENERGY STAR Certified Heat Pump Water Heaters

- ENERGY STAR certified heat pump water heater that meets EPA's 'connected' criteria

- Each heat pump water heater is 240 volts, with minimum tank capacity as follows:

Bedrooms	1	2	3	4+
Tank Capacity	40	50	65	80

- Each heat pump water heater located within occupiable space has a sone rating ≤ 55 dBA

3. ENERGY STAR Certified Heat Pump Water Heaters

Footnotes:

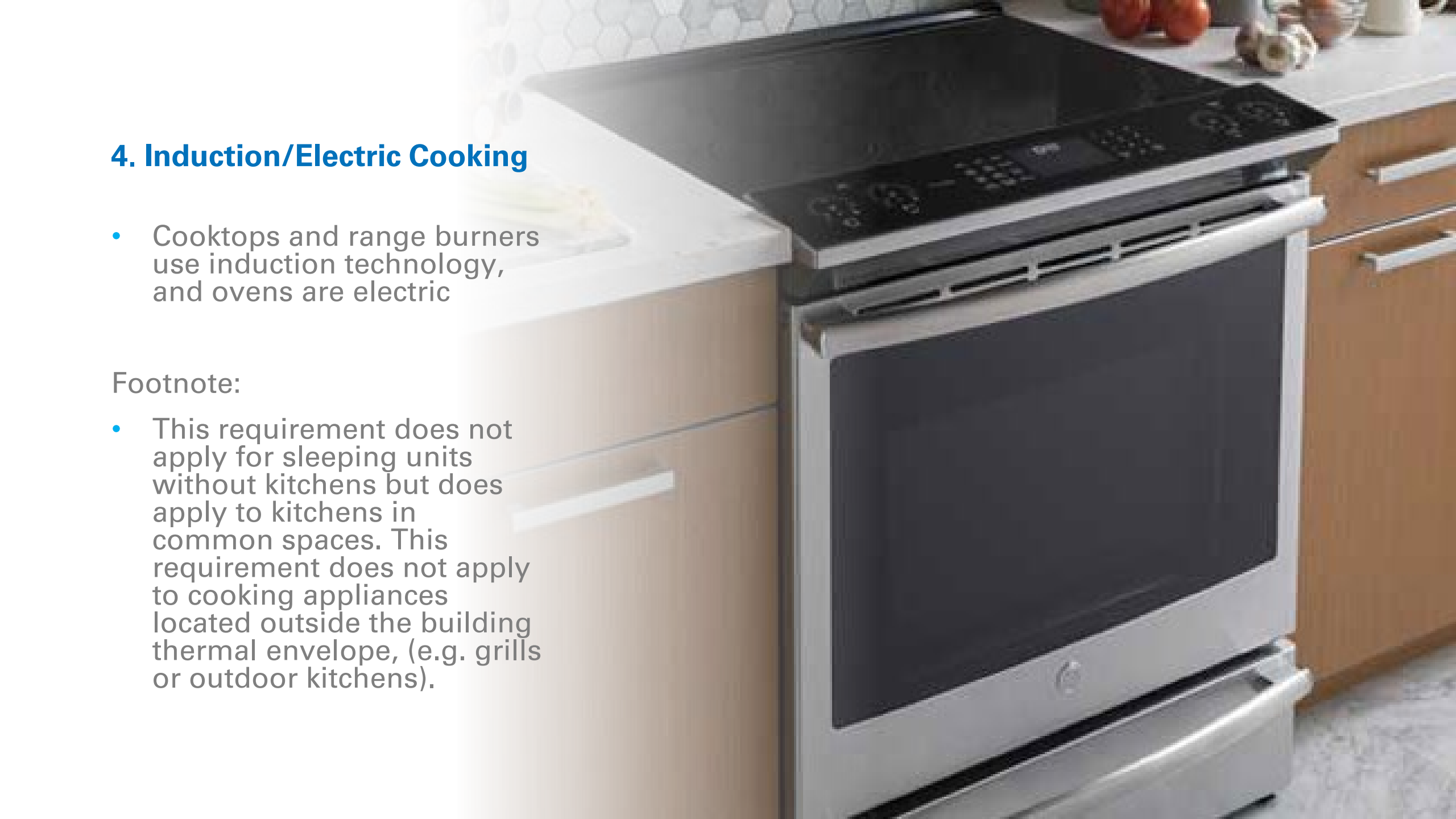
- A single supplemental electric spot water heating system that serves one appliance or bathroom is allowed.
- Per ASHRAE 62.2-2010, the term “occupiable space” is defined as any enclosed space inside the pressure boundary and intended for human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas.

4. Induction/Electric Cooking

- Cooktops and range burners use induction technology, and ovens are electric

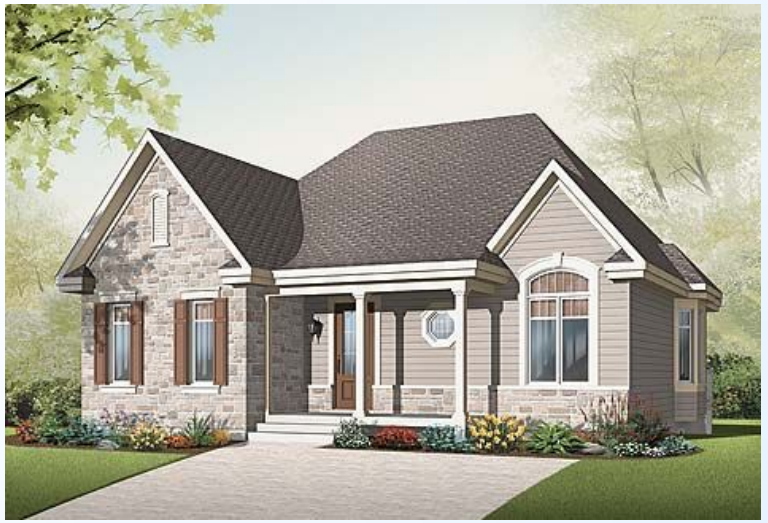
Footnote:

- This requirement does not apply for sleeping units without kitchens but does apply to kitchens in common spaces. This requirement does not apply to cooking appliances located outside the building thermal envelope, (e.g. grills or outdoor kitchens).



5. Electric Vehicle Charging Capability

- For one- and two-family dwellings with dedicated parking:
  - EV-Ready: One parking space is provided per dwelling unit that includes all of the items below.
    - A powered 208/240 receptacle is installed in garage or within 3 feet of driveway or dedicated parking space
    - The electric service panel includes a 40-amp breaker and panel directory identifies the branch circuit as “Electric vehicle charging”



5. Electric Vehicle Charging Capability

Footnotes

- When there are fewer parking spaces than dwelling units, meet EV-Ready for 100% of units with parking spaces.
- If the addition of the 40-amp Electric Vehicle Charging branch circuit increases the electrical service to the next nominal size (i.e., from 200-amp to 400-amp service), connecting the circuit to the electrical panel is not required. 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 to certify the home.

5. Electric Vehicle Charging Capability

- For all other dwellings, comply with either EV-Ready or both of the below:
  - EV Charger: Install (at a minimum) the following number of ENERGY STAR certified EV-Chargers that meet EPA's 'connected' criteria as follows:

Parking Spaces:	1-10	11-20	21-30	31-40	41+
EV Chargers:	1	2	3	4	5

  - EV-Capable: Conduit is installed that runs continuously from the electrical panel to a junction box that terminates within 3 feet of at least 20% of the development's parking spaces

5. Electric Vehicle Charging Capability

Footnotes:

- When calculating the number of EV chargers and EV-Capable spaces required, include all parking spaces in the development except for one and two-family dwellings' private driveways or garages that must comply with EV-Ready requirements. For this purpose, the "development" includes the combined areas covered by the project's site permit and zoning permit. The number of required compliant spaces should be rounded up to the nearest whole number.
- EV chargers that contain two charging ports may be counted as two chargers, so long as the connectors can reach and charge EVs in two parking spaces simultaneously.
- An EV-Ready parking space qualifies as EV-Capable. EV chargers also qualify as EV-Capable, except those required to meet the 10% requirement.
- Projects with a common area electrical room may have the conduit terminate anywhere within the electrical room. Parking spots in a covered garages are deemed EV-Capable if the conduit terminates anywhere within the garage on that parking level.

Special Considerations for Affordable Housing

Induction Cooking

- We are planning to propose allowing affordable housing to install conventional electric cooktops, rather than requiring induction

EV Charging

- We are not planning to propose alternate EV charging requirements for affordable housing

We will be explicitly seeking stakeholder feedback on both of these items

Rater Field Checklist

DRAFT ENERGY STAR *New Certification Program*
National Rater Field Checklist

Home/Building Address: _____ City: _____ State: _____ Permit Date: _____

1. ENERGY STAR Certification Baseline	Must Correct	Rater Verified [1]	N/A [2]
1.1 Home or building certified under one of the following ENERGY STAR New Construction programs (check box): Single Family New Homes (SFNH) — Multifamily New Construction (MFNC) ☐ SFNH National Version 3.2 — ☐ MFNC National Version 1.2 *California Projects Only:* ☐ SFNH California Version 3.3 — ☐ MFNC California Version 1.3	☐	☐	-
2. Dwelling Unit Space Heating			
2.1 ENERGY STAR certified two-speed or variable-speed heat pump(s) installed and sized in accordance with the HVAC Design Report [3]	☐	☐	-
2.1.1 Blower fan volumetric airflow, blower fan watt draw, and refrigerant charge are Grade I per ANSI / RESNET / ACCA Std. 310 [4]	☐	☐	☐
2.1.2 In CZ 5-8, installed heat pumps are ENERGY STAR Cold Climate certified	☐	☐	☐
2.2 Each heat pump meets EPA's 'connected' criteria or is controlled by an ENERGY STAR certified smart thermostat	☐	☐	-
3. Dwelling Unit Water Heating			
3.1 ENERGY STAR certified heat pump water heater that meets EPA's 'connected' criteria is installed [5]	☐	☐	☐
3.2 Each heat pump water heater is 240 volts, with minimum tank capacity as follows: **Bedrooms:** 1 — 2 — 3 — 4+ **Minimum Tank Capacity:** 40 — 50 — 65 — 80	☐	☐	☐
3.3 Each heat pump water heater located within occupiable space has a sone rating ≤ 55 dBA [6]	☐	☐	☐
4. Cooking			
4.1 Cooktops and range elements/burners use induction technology, and ovens are electric [7, 8]	☐	☐	☐
5. Electric Vehicle Charging Infrastructure - For one and two-family dwellings with a private driveway or garage, comply with Item 5.1 For all other dwellings and dwelling units, comply with either Item 5.1 or 5.2			
5.1 EV-Ready: One parking space is provided per dwelling unit that includes all of the items below: [9]	-	-	☐
5.1.1 A powered 208/240 receptacle is installed in garage or within 3 feet of driveway or dedicated parking space [10]	☐	☐	-
5.1.2 The electric service panel includes a 40-amp breaker and panel directory identifies the branch circuit as "Electric vehicle charging"	☐	☐	-
5.2 EV-Chargers and EV-Capable parking spaces are installed, including all of the items below:	-	-	☐
5.2.1 EV-Charger: Install (at a minimum) the following number of ENERGY STAR certified EV-Chargers that meet EPA's 'connected' criteria as follows: [11, 12] **Parking Spaces:** 1-10 spaces — 11-20 spaces — 21-30 spaces — 31-40 spaces — 41+ spaces **EV Chargers:** 1 — 2 — 3 — 4 — 5	☐	☐	-
5.2.2 EV-Capable: Conduit is installed that runs continuously from the electrical panel to a junction box that terminates within 3 feet of at least 20% of the development's parking spaces [11, 13, 14]	☐	☐	-

Rater Name: _____ Rater Inspection Date: _____ Rater Initials: _____

What We Are NOT Proposing to Require

- All-electric construction
  - Natural gas (or other fuel) could still be used for space heating backup; indoor fireplaces; outdoor uses; pool heaters; backup generators; preheating outdoor ventilation supply air in large multifamily; and commercial kitchens in mixed-use buildings
- On-site solar
- Batteries/Storage

Branding and Market Positioning

- Branding solution needs to work across ENERGY STAR, not just for residential

- DOE's Zero Energy Ready Home (ZERH) Program
    - DOE is currently developing a 'Version 2' of the ZERH program
    - Will be 20% more stringent than code (versus 10%), with additional requirements
    - Agencies are working closely to ensure that the programs work together

Next Steps and Timeline

Stakeholder Feedback

Final specification release
(Expected: Q1 2022)

Full deployment
(Expected: January 1, 2023)

- Branding
- Supplemental Materials
- Training

Program Development

- Methodologies that quantify hourly carbon emissions
  - RESNET's Carbon Rating Index
- Quantifying passive survivability benefits of highly efficient buildings
  - "Hours of Safety" methodology
- Installed costs and market readiness of:
  - Battery storage
  - Bi-directional EV charging
  - Other efficient technologies that provide emergency power generation
- Tracking Renewable Energy Credits (RECs)
- Embodied carbon tools
- Low- and no-GWP refrigerants for heat pumps and blowing agents for foam insulation

Partner Meeting Webinar Series Sessions

- **ENERGY STAR Marketing & Communications**

  Thursday, September 23, 2021

- **Raising the Bar: Advancing the Versions of ENERGY STAR Residential New Construction**

  Monday, September 27, 2021

- **ENERGY STAR: The Decade Ahead Starts Now**

  Wednesday, September 29, 2021

- **A New Day for Building ENERGY STAR**

  Thursday, September 30, 2021

- **Office Hours**

  Tuesday, October 5, 2021

- **DOE Zero Energy Ready Homes and the Year Ahead**

  Thursday, October 7, 2021 (DOE presenting)

Q&A