State and Local Climate and Energy Program

Whole Building Approaches for Efficiency and Electrification

December 6, 2021 | 3 PM Eastern

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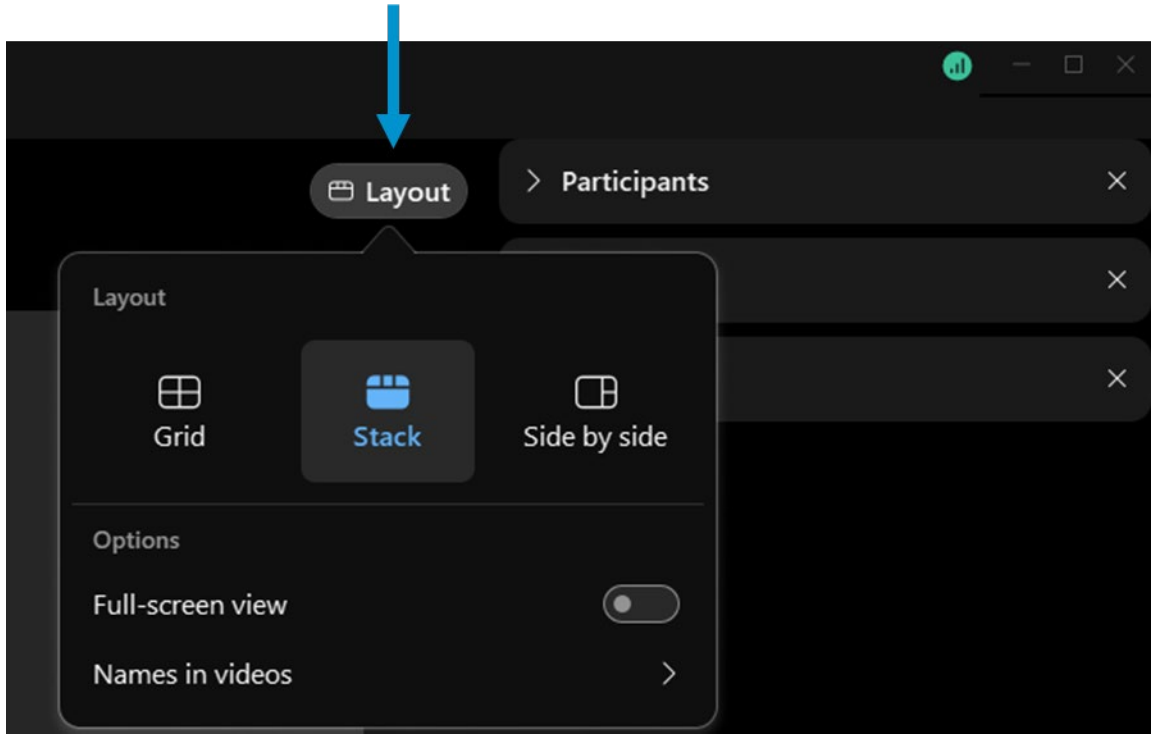

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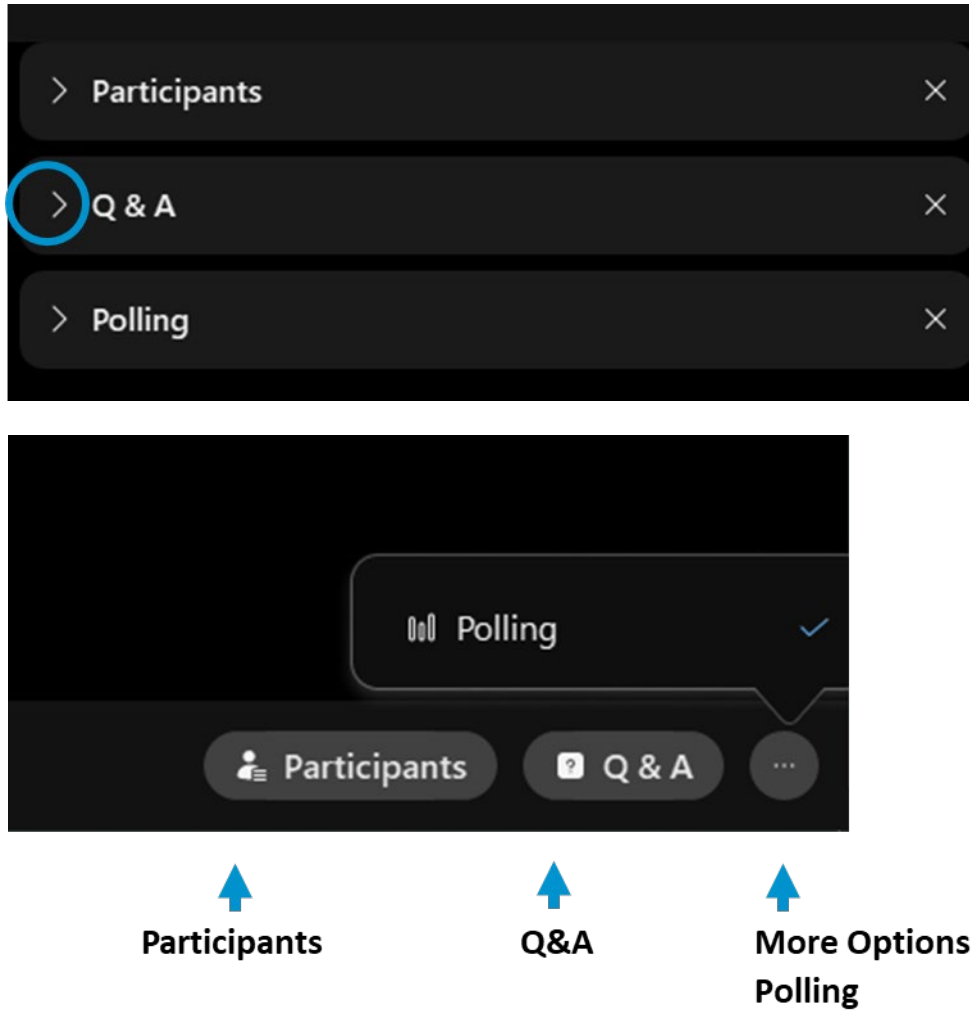

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- The polling panel will appear when we open the first poll
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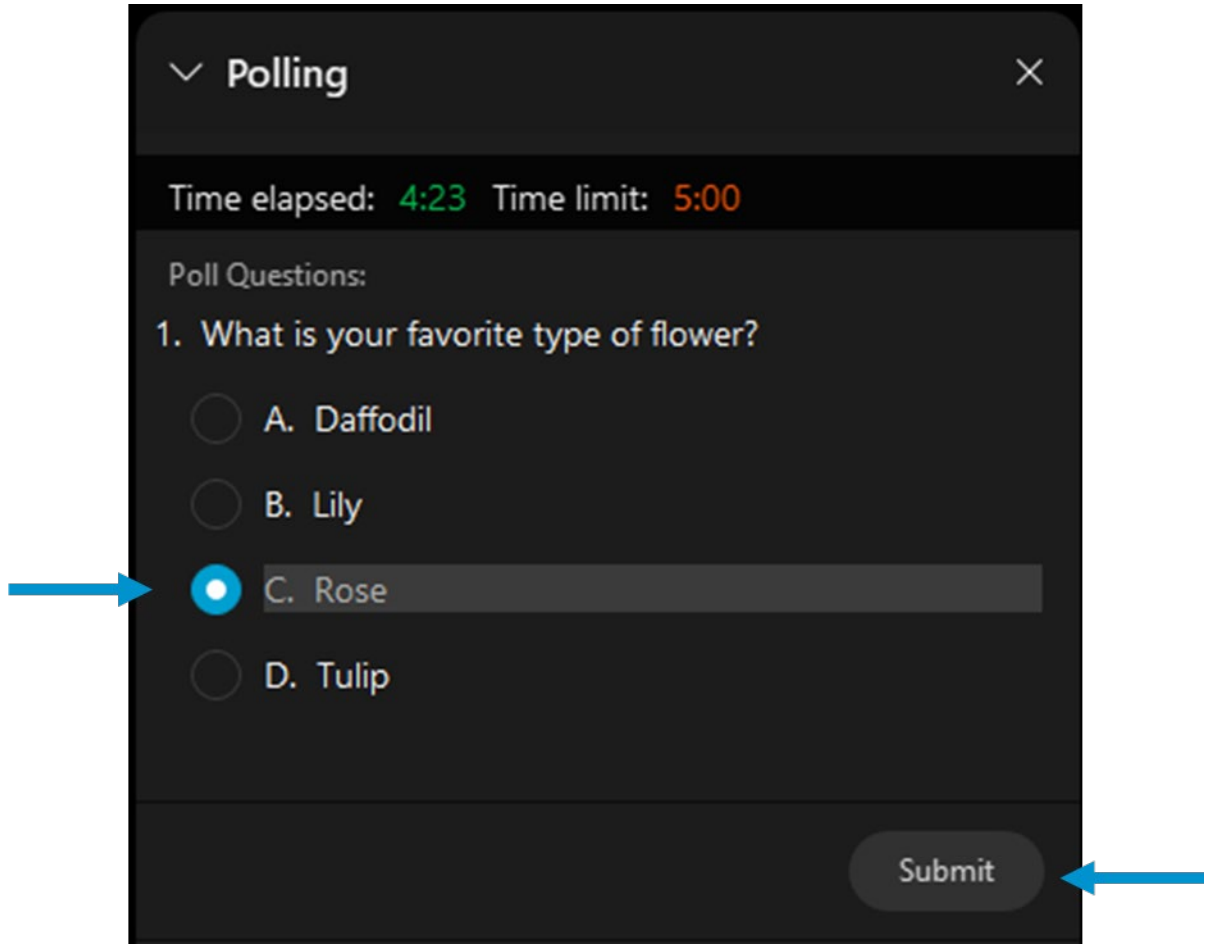

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- Participants are muted
- Questions will be moderated at the end
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  1. Select “All Panelists” from the drop-down menu
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  3. Hit “Enter”

- EPA will post responses on the Webinar Series page: www.epa.gov/statelocalenergy/state-local-and-tribal-webinar-series

Today's Agenda

- Andrea Denny – Local Climate and Energy Programs Manager, U.S. Environmental Protection Agency (EPA)
- Asa Foss – Program Development Analyst, ENERGY STAR Residential Branch, EPA
- Dan Lawlor – ENERGY STAR heating, ventilation, and air conditioning (HVAC) Program Lead, EPA
- Patti Boyd – Director for Technology & Innovation, District of Columbia Sustainability Energy Utility (DCSEU)
- Question and Answer Session

The views expressed by speakers on this webinar are solely those of the participants and EPA does not endorse any products or commercial services mentioned in this webinar.

State and Local Climate and Energy Program

INTRODUCTION

Andrea Denny
Local Climate and Energy Program Lead
U.S. EPA

U.S. EPA's State and Local Climate and Energy Program

- We offer free tools, data and technical expertise about energy strategies, including energy efficiency, renewable energy and other emerging technologies, to help state, local and tribal governments achieve their environmental, energy and economic objectives

- Access these resources at: www.epa.gov/statelocalenergy

- Electrification Webinar Series
  - Get notifications by subscribing to our newsletter:
    - www.epa.gov/statelocalenergy/state-and-local-energy-newsletters
  - Past Webinars:
    - www.epa.gov/statelocalenergy/state-local-and-tribal-webinar-series

Select State and Local Resources

- **Electrification Toolfinder:** screen tools and resources to evaluate environmental and economic benefits of electrification programs
  www.epa.gov/statelocalenergy/tool-finder-local-government-clean-energy-initiatives
- **Avoided Emissions and geneRation Tool (AVERT):** quantifies the emissions benefits of energy efficiency and renewables
  www.epa.gov/avert
- **Co-Benefits Risk Assessment Health Impacts Screening and MappingTool (COBRA):** calculates health impacts of emissions changes and their economic value
  www.epa.gov/cobra
- **Benchmarking and Building Performance Standards Policy Toolkit:** informs policies for commercial and multifamily buildings
  www.epa.gov/statelocalenergy/benchmarking-and-building-performance-standards-policy-toolkit

Upcoming Webinar

December 8, 2021

Introducing EPA's Energy Savings and Impacts Scenario Tool

Register Today!

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What best describes your organization's experience with building electrification programs?

- We have building electrification requirements for government buildings
- We have building electrification requirements or incentives for non-government buildings
- We are launching a building electrification program
- We are considering a building electrification program in the future
- We are not considering a building electrification program

Poll 1

State and Local Climate and Energy Program

A New Home Certification Program from EPA's ENERGY STAR

Asa Foss

Program Development Analyst, ENERGY STAR Residential Branch, U.S. Environmental Protection Agency

A New Home Certification Program from EPA's ENERGY STAR to recognize the next generation of homes and apartments

EPA United States Environmental Protection Agency

Why Introduce a New Certification Program?

- To further reduce greenhouse gas emissions in the residential sector by accelerating the adoption of key efficient electric technologies
- To build on the foundation of the core ENERGY STAR program to provide an additional (optional) level recognition for leading builders
- To provide a model/reference for state & local policy makers and utility programs
- To address the critical role of new construction in transforming the U.S. housing stock
  - 20% of the homes that will be in the ground in 2050 have not yet been built

Primer on ENERGY STAR Residential New Construction Programs

- EPA partners with thousands of home builders and developers, manufactured housing plants, home energy rating companies, and utilities across the U.S. who construct, verify, promote, and incentivize ENERGY STAR certified homes and apartments.
  - All of the nation's twenty largest home builders construct ENERGY STAR certified homes
- ENERGY STAR certified homes and apartments are at least 10% more efficient than homes built to code
  - Single-family homes, multifamily buildings, and manufactured (factory-built) homes can all earn ENERGY STAR
  - Program requirements are customized for each housing type and tailored to the specific climate where the home is built
  - Mandatory measures ensure that, in the pursuit of greater levels of efficiency, cost-effectiveness, quality, and performance are not compromised
  - Independent, third-party inspections and testing required
- Over 2 million ENERGY STAR certified homes built to-date, and more than 120K last year alone

New Certification Program: Summary of Proposed Requirements

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

- Certification to EPA's most rigorous ENERGY STAR New Construction program requirements (National v3.2/Multifamily v1.2)
  - 10% more efficient than 2021 International Energy Conservation Code (IECC) (or California Title 24)
  - Requirement would 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 American National Standards Institute (ANSI) / Residential Energy Services Network (RESNET) / Air Conditioning Contractors of America (ACCA) Standard 310

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

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 (decibels) dBA

4. Induction/Electric Cooking

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

Footnote:

- 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:
  - Electric vehicle (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

- 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

Special Considerations for Affordable Housing

Induction Cooking

- The proposed program requirements would allow affordable housing to install conventional electric cooktops, rather than requiring induction

EV Charging

- The proposed program requirements do NOT include alternate EV charging requirements for affordable housing

Next Steps and Timeline

- Stakeholder Feedback
- Final specification release (Expected: Quarter 1 2022)
- Full deployment (Expected: January 1, 2023)

Relationship to DOE's Zero Energy Ready Home (ZERH) Program

- EPA and Department of Energy (DOE) have been working closely as both Agencies consider the future of their residential new construction programs
- We are committed to ensuring that our programs continue to work well together to provide value for both builders and homebuyers
- DOE recently proposed 'Version 2' of the ZERH program
  - Will be 20% more stringent than code (versus 10% for ENERGY STAR v3.2), with additional requirements

Asa Foss

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Which elements of building electrification are generating the most interest in your state/community (select up to three)?

- Whole building new construction
- Whole building retrofits
- Electric heating and cooling
- Electric water heaters
- Induction/electric cooking
- Electric-vehicle ready buildings
- Other (enter in Q&A box)

Poll 2

State and Local Climate and Energy Program

ENERGY STAR Home Upgrade (ESHU)

Dan Lawlor
ENERGY STAR
Heating Ventilation, and Air Conditioning Program Lead
U.S. EPA

ENERGY STAR Home Upgrade

EPA

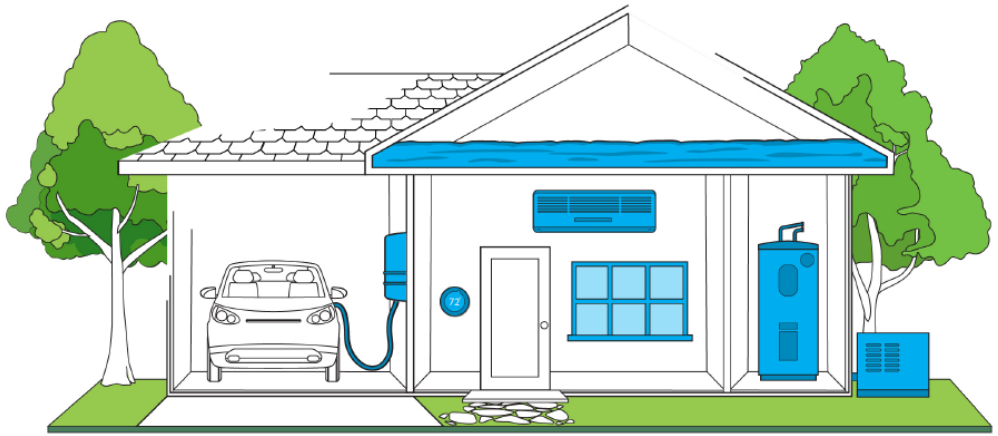
Agenda

- Defining ENERGY STAR Home Upgrade
- Deployment Approach
- Equity as a Priority
- Consumer Engagement Strategy

What is the ENERGY STAR Home Upgrade?

- The ENERGY STAR Home Upgrade involves a set of six generally applicable, high-impact energy-efficiency improvements that can be made as equipment is replaced.

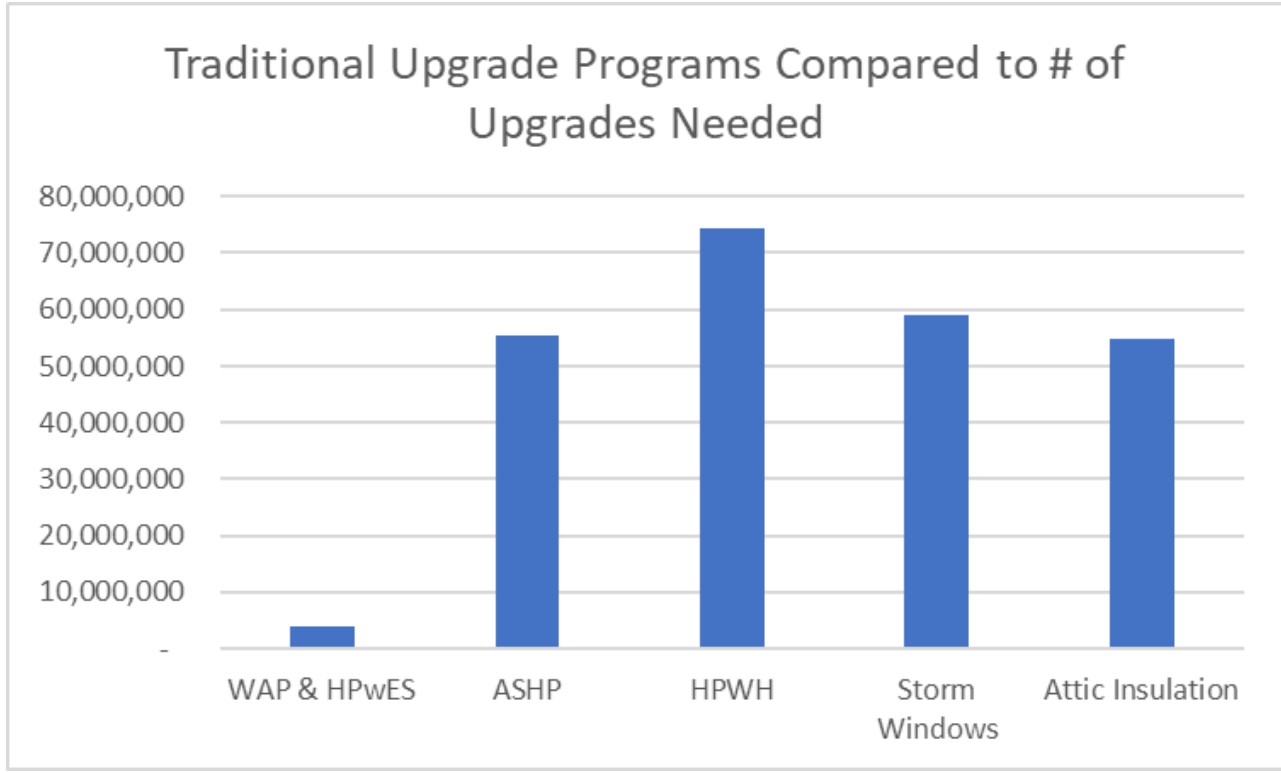
- The measures in the ENERGY STAR Home Upgrade include:
  - Clean Heat (plus efficient cooling)
  - Super-Efficient Hot Water
  - Smart Climate Controls
  - High-Performing Windows or Storm Windows
  - Well-Insulated Attic
  - Electric Vehicle Charger Ready



On average, a homeowner could save approximately $500 a year on utility bills if installing all measures in the ENERGY STAR Home Upgrade.

ENERGY STAR Home Upgrade: Strategically Designed to Deliver

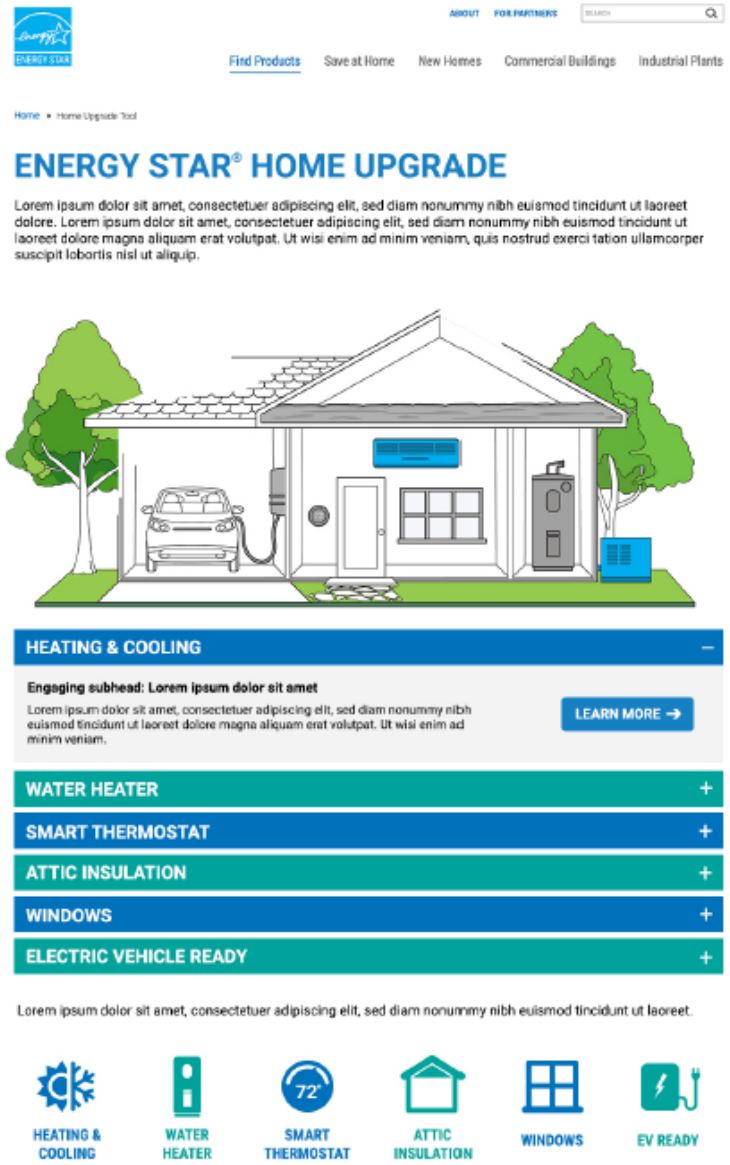
- Transactions facilitated through direct linkages to equipment options, relevant retailers and service providers
- Leverages ENERGY STAR third-party certification of products to ensure confidence in delivered savings
- Designed to capitalize on targeted incentives and supplemented with strategic outreach and financing for underserved audiences
- Leverages ENERGY STAR brand and extensive partner network to raise awareness and prompt action



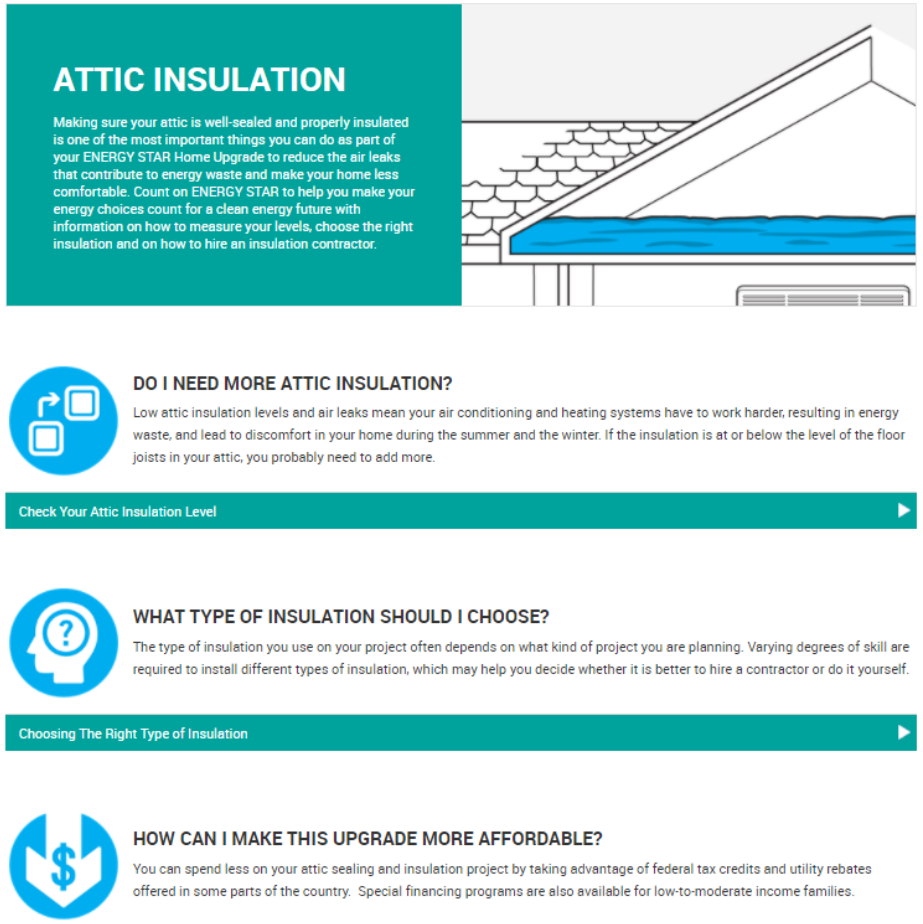
WAP: Weatherization Assistance Program
HPwES: Home Performance with ENERGY STAR
ASHP: Air source heat pump
HPWH: Heat pump water heater

ENERGY STAR Home Upgrade Tool

- The ENERGY STAR Home Upgrade Tool helps consumers navigate the upgrade process
  - Provides information about each potential upgrade
  - Allows consumer to navigate based on needs
  - Acts as a central resource for widely used ENERGY STAR resources



ENERGY STAR Home Upgrade Tool

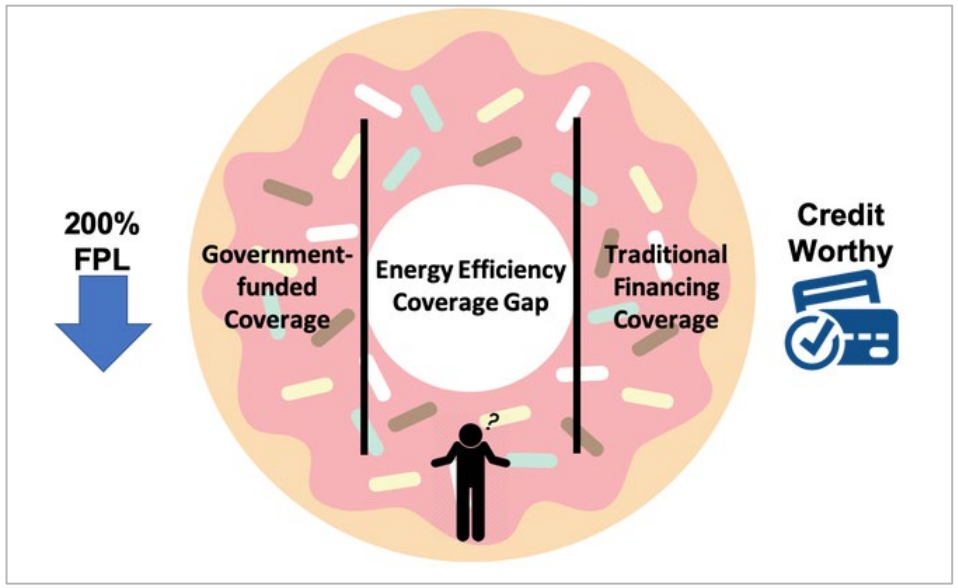


- The ENERGY STAR Home Upgrade Tool can be used to
  - Tailor energy efficient upgrades to a home
  - Identify certified models
  - Calculate potential savings
  - Learn more about equipment manufacturers and service providers in an area

How will ENERGY STAR Home Upgrade be leveraged?

- **Framework for Tax Incentives**
  - Federal income tax incentives could leveraged around the elements of the ESHU
- **Framework for Utility Incentive Programs**
  - Offers a mechanism around which utility programs can bundle incentives (either traditional rebates or midstream incentives)
- **Mechanism for Addressing Energy Inequity in Existing Homes**
  - Efforts to expand targeted support through site-specific utility investments (i.e., on-bill tariffs) could be aided by the availability of a defined bundle backed by the credibility of ENERGY STAR
- **Marketing Platform**
  - Supported by a comprehensive set of materials, messaging and national program outreach, the ENERGY STAR Home Upgrade will allow HVAC contractors, plumbers, and insulation contractors to promote their energy saving services in the context of a larger, value-added opportunity for their customers

Addressing Homes with Greatest Need and Potential



Millions of households are trapped in a "donut hole" of coverage between funding and financing for energy efficiency upgrades

- Utilities have the unique opportunity to use their extensive borrowing capacity to scale upgrades for the homes of even the most energy-burdened Americans.
- Inclusive Utility Investment (IUI) programs enable a utility to pay for cost-effective upgrades on the customer's side of the meter and to recover those costs through a fixed site-specific charge on the bill.
- ENERGY STAR will leverage our vast network of partners and supporting utilities in developing and deploying IUI programs with robust consumer protection.

FPL: Federal Poverty Level

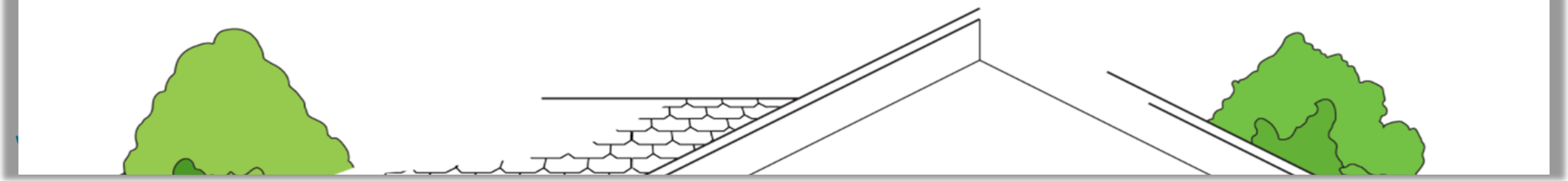
What We Learned

- The ENERGY STAR Home Upgrade was attractive across all target audiences in connection to a clean energy future because it answers the question “What does this mean for me?” in a way that comes with benefits that are attractive to them (energy efficiency, money savings, increased comfort, personal environmental impact)

ENERGY STAR HOME UPGRADE

The ENERGY STAR Home Upgrade is a carefully crafted set of six high impact, energy-efficiency improvements for your home. Designed to work together to deliver significant energy and cost savings, these upgrades can also help you transition from fossil fuels for a cleaner, healthier and more comfortable home. You can choose the improvements that make the most sense for your home and implement them at your own pace.

Our energy supply is getting cleaner and more renewable every day. Taking action now can help you prepare for a clean energy future, while enjoying energy savings and a more comfortable home today. Count on ENERGY STAR to help you navigate the process.



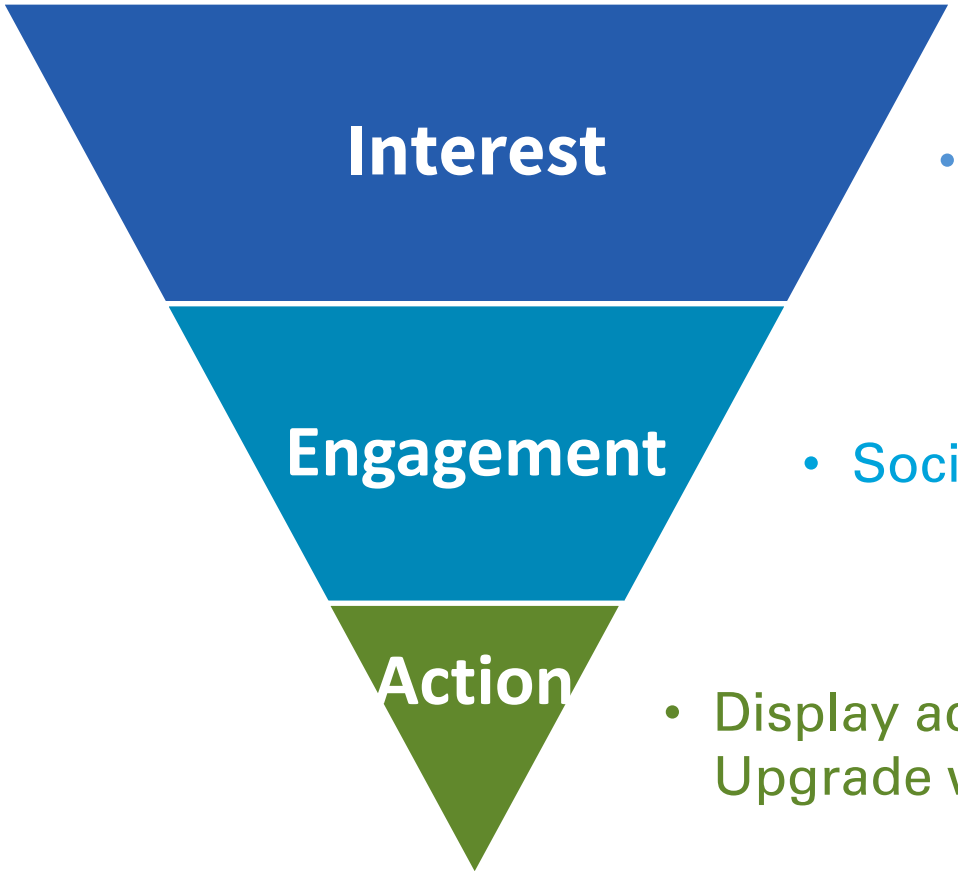
Consumer Outreach Plan

- Objective: Drive audiences to learn more about the opportunity and benefits of upgrading your home with the measures included in the ENERGY STAR Home Upgrade.

- Primary Target Audience
  - Emerging and Engaged Savers/Intenders and Advocates with old electric heating
  - Emerging and Engaged Savers/Intenders and Advocates in gas/oil markets where fuel switching makes financial sense
- Secondary Target Audience
  - Engaged Savers/Intenders and Advocates in active fuel-switching markets

Segment C: **EMERGING ENERGY INTENDERS**	Segment D: **ENGAGED ENERGY INTENDERS**	Segment E: **ENERGY SAVING ADVOCATES**
25 – 34	35 – 44	55+, within 5 – 10 years of retirement
$75K+ Income	$100K+ Income	$100K+ Income
Homeowner	Homeowner	Homeowner
1+ Children at home	1+ Children at home	1+ Children at home
Black, Asian, Hispanic, and Caucasian	Caucasian, Hispanic, Asian	Caucasian

Consumer Outreach Approach



- Media (native and press) to raise awareness
- Social media to engage and educate on benefits
- Display ads to drive visits to the ENERGY STAR Home Upgrade web resource

Marketing Materials

- Provide homeowners information about the benefits of an ENERGY STAR Home Upgrade and the web resource where they can learn more and get started.
- Social and Web assets
  - **Feature all six upgrade opportunities:** For partners that want to promote the bundle with links to tool landing page.
  - **Feature individual upgrade opportunities:** For partners with an interest in a specific product with links to relevant tool sub pages

THANK YOU

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State and Local Climate and Energy Program

DCSEU's Decarbonization Efforts

Patti Boyd

Director for Technology & Innovation, District of Columbia Sustainability Energy Utility

Patti Boyd
Director, Technology and Innovation

DCSEU's Decarbonization Efforts

DC
SUSTAINABLE ENERGY
UTILITY

DC Sustainable Energy Utility

- Performance-based contract operated by Vermont Energy Investment Corporation (VEIC)
- Administered by District's Department of Energy and Environment (DOEE)
- Base contract funding is ~$20M/annually through Sustainable Energy Trust Fund (SETF)

DCSEU, Fiscal Year (FY)22-FY26

DC SUSTAINABLE ENERGY UTILITY

- Updated goals to align with DC's decarbonization policy
- Limitations on gas measure support
- Electrification offerings (existing and planned)

DCSEU, FY22-FY26

DC SUSTAINABLE ENERGY UTILITY

Combined Source Energy Savings, million British Thermal Units (MMBtu)

Greenhouse Gas Savings, metric tons of carbon dioxide equivalent ($MTCO_2e$)

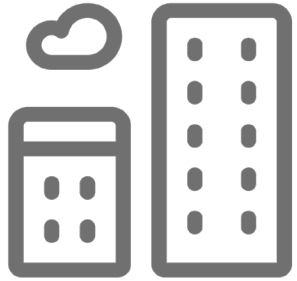
Green Jobs

Local Economic Development

Low-Income Spending

Renewables with Energy Efficiency

Deep Energy Retrofits



DCSEU Efforts to Support Decarbonization

- Code Compliance Support (since FY2014, codes, commissioning)
  - https://buildinginnovationhub.org/resource/regulation-basics/dc-building-codes-updates/
  - https://buildinginnovationhub.org/resource/improve-building-operations/building-commissioning-guidelines/
- Department of Consumer and Regulatory Affairs (DCRA)/DCSEU Net-Zero Energy: Residential Program (since FY19)
  - https://dcra.dc.gov/page/zero-energy-zero-carbon
- Low Income Residential Decarbonization Pilot (LIDP) (FY20)
- Low Income Residential HVAC/domestic hot water (DHW) Electrification (FY22-26)
- Affordable Housing Retrofit Accelerator (FY22-26)
- Market Rate Decarbonization/Fuel Switching Support (FY22-26)

Residential Electrification Transition

LIDP FY20

- Blower door testing
- Weatherization
- HVAC, Appliance and DHW Replacements
- Solar for All: On-site or enrollment in community renewable energy facility (CREF)
- 10 homes completed

LI HVAC/DHW Electrification FY22-26

- HVAC and DHW Replacements
- Expect to complete 20+ homes annually
- Solar for All: On-site or enrollment in CREF

www.dcseu.com/solar-for-all

Market Rate Decarbonization – Fuel Switching

- Market expects higher incentives for heat pump installations
- Under current Societal Cost Test (SCT) framework and expected energy pricing, fuel switching is not cost-effective (negative net present value)
- Customer economics are likely to be a challenge
- Higher incentives [yields, $/megawatt-hour (MWh)] detract from goal achievement

What Gives?

- Forego SCT altogether for funding allocated to fuel switching?
- Select to use a societal cost of carbon that allows projects to screen?
- Ask for relief on aggressive savings goals?
- All of the above?

- Switch to a Jurisdictional Specific Test? National Energy Screening Project (NESP)/National Standards Practice Manual (NSPM)
  - www.nationalenergyscreeningproject.org/national-standard-practice-manual/

DC
SUSTAINABLE ENERGY
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