ENERGY STAR®
Products Partner Meeting
2020

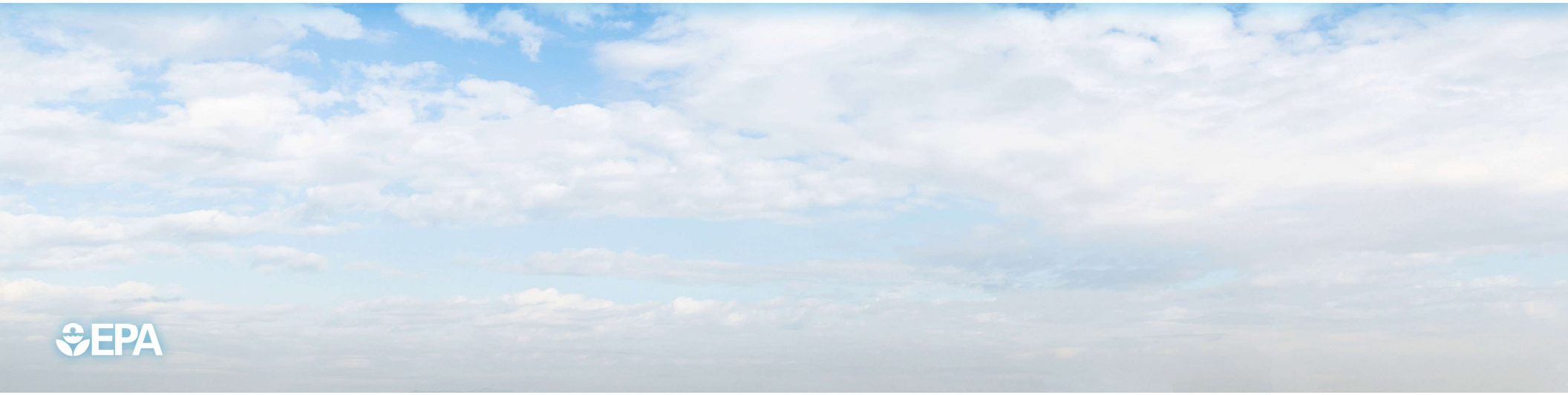
New ENERGY STAR Initiatives in HVAC Markets

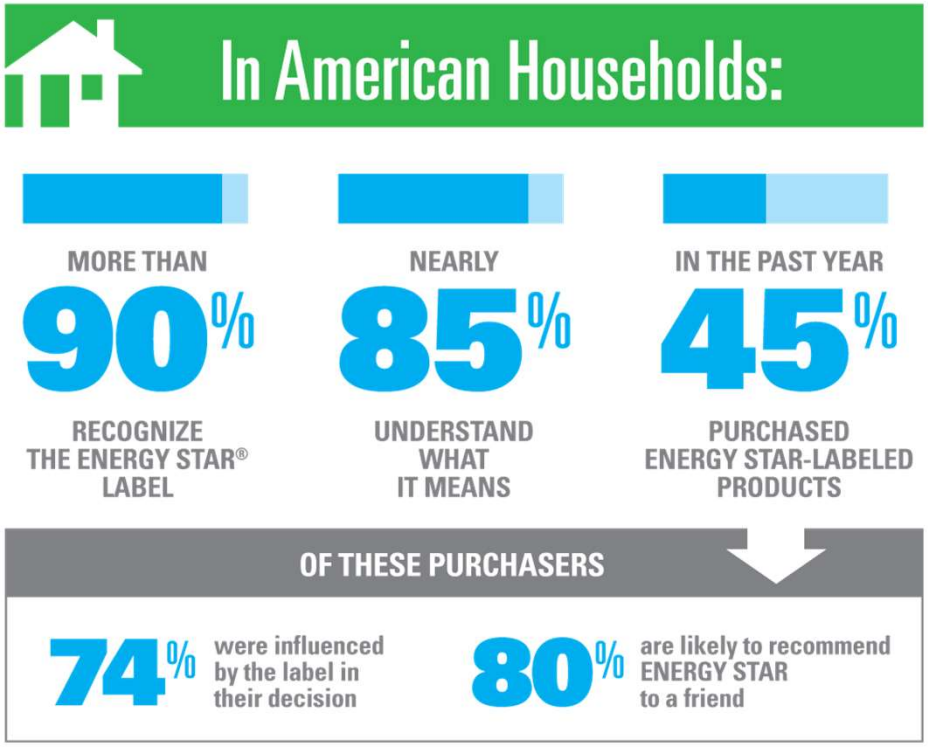
Dan Lawlor

Abigail Daken

U.S. Environmental Protection Agency

THE VALUE OF ENERGY STAR

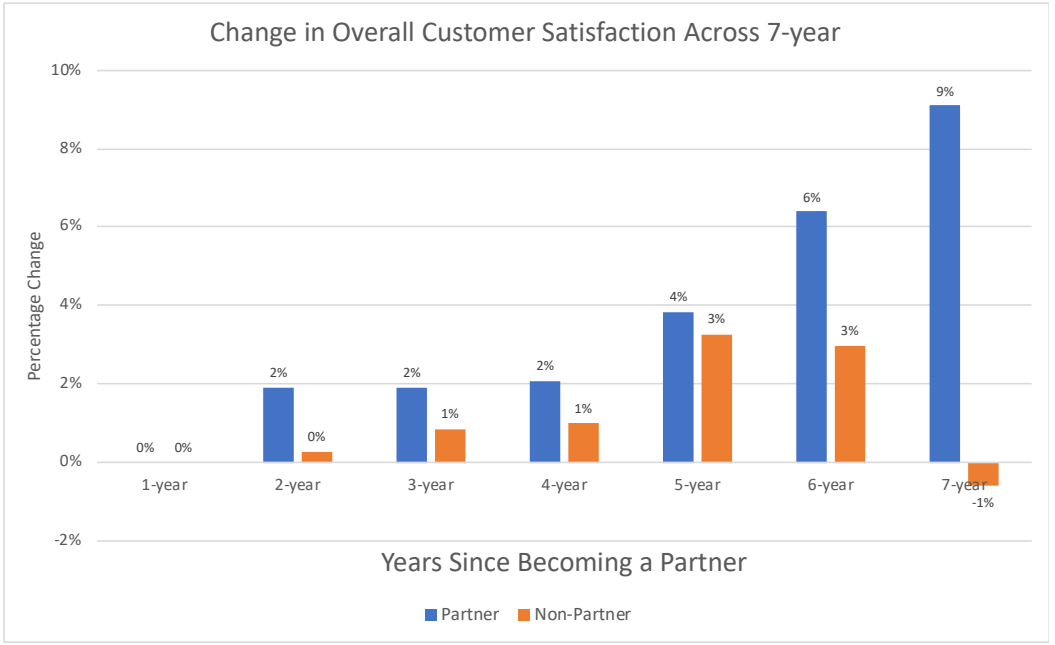




2019 CEE Survey Results Now In!

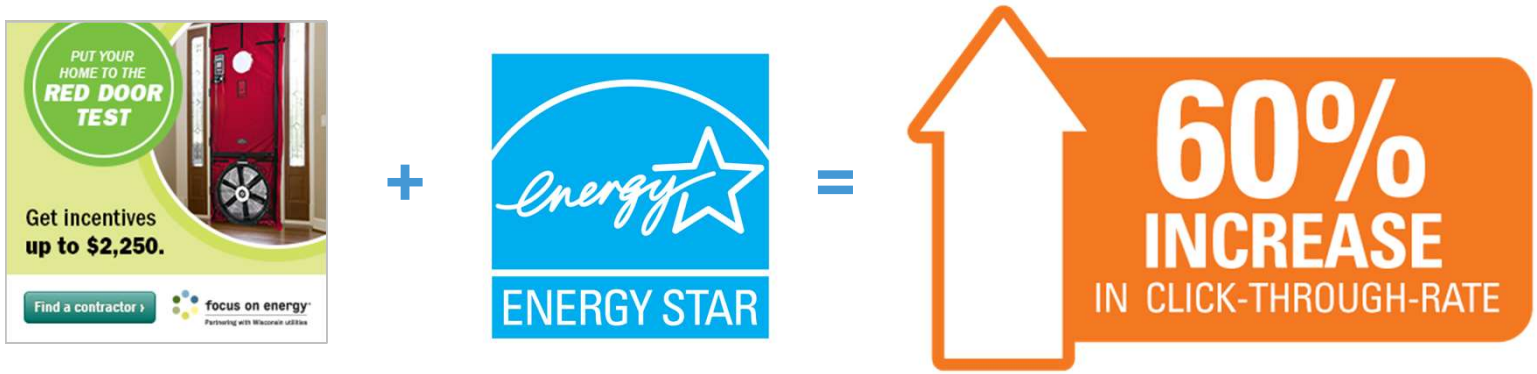
Significant Enhancement to Partner Brand

- A 2017 study found partners' **JD Power** Customer Satisfaction indexes for ENERGY STAR partners increased significantly over time compared to non-partners, particularly in the areas of **Corporate Citizenship, Communications, and Customer Service.**



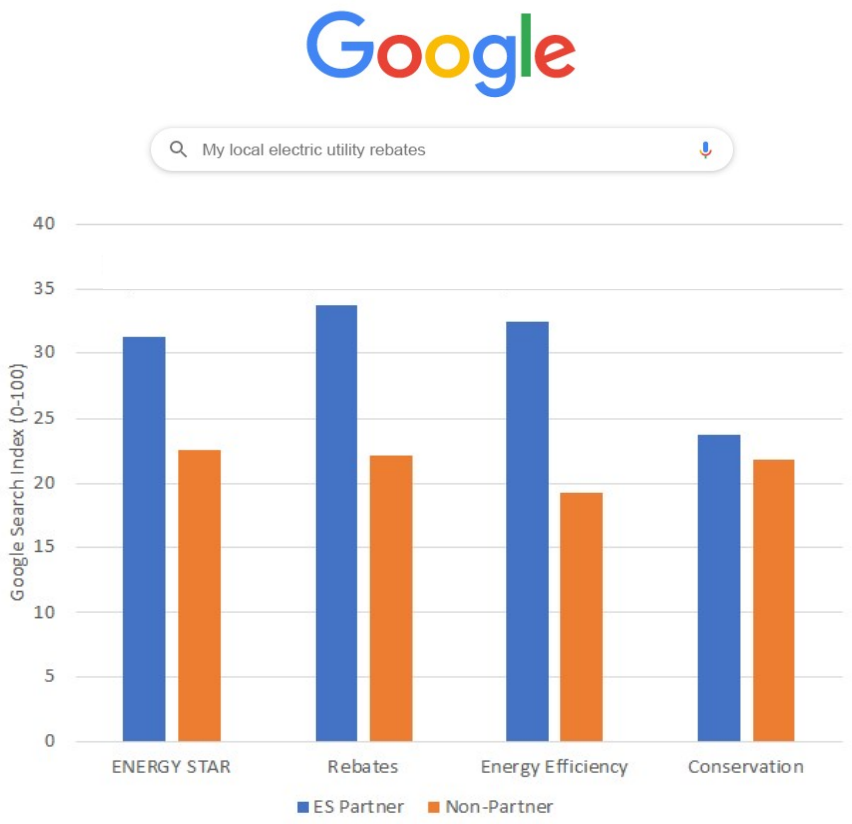
Significant Enhancement to Partner Brand

- Recent A/B testing conducted by Focus on Energy shows that using **ENERGY STAR logo** on ads drove a **60% increase in click-through-rate**.

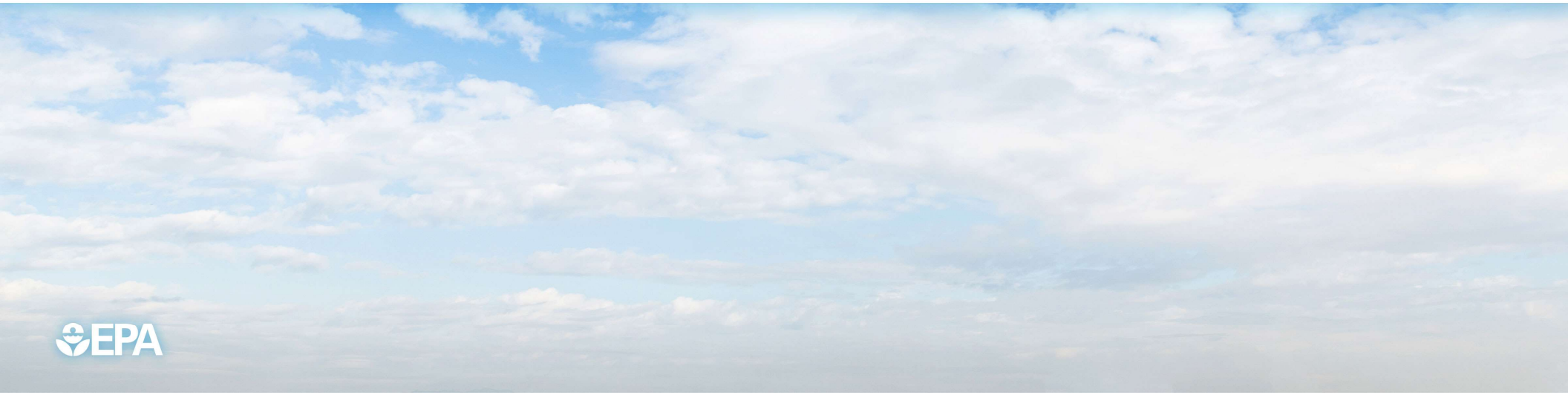


Mutually Beneficial Relationship

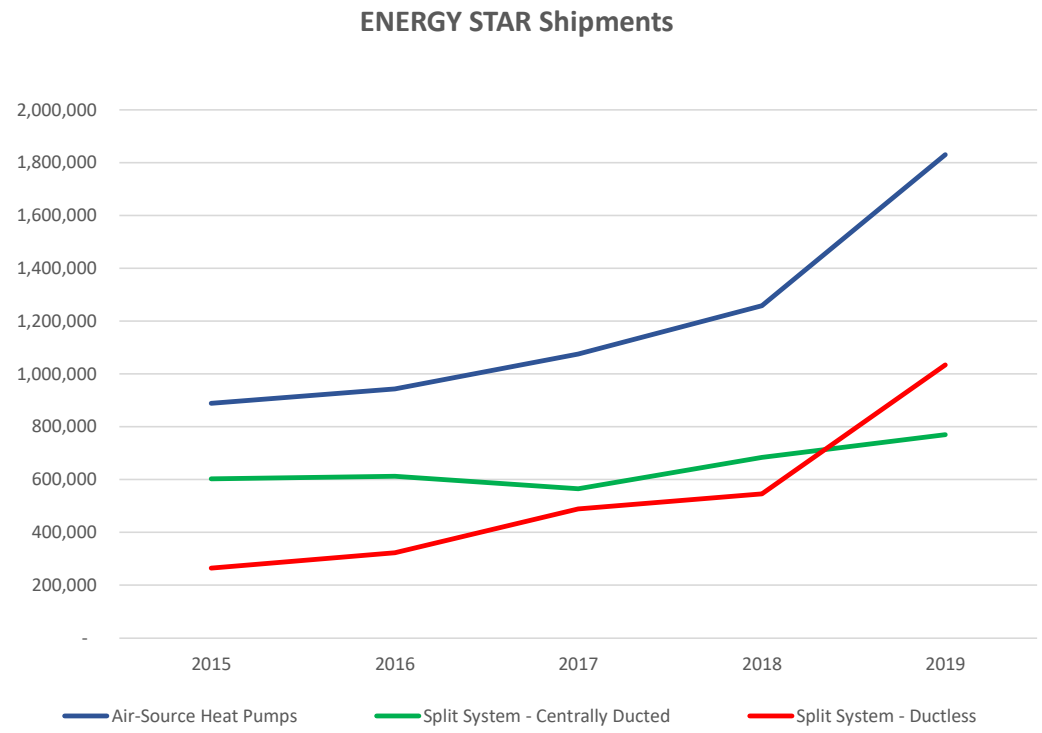
- 2017 study demonstrates that when a utility partners with **ENERGY STAR**, it results in **increases in Google searches** for related items.



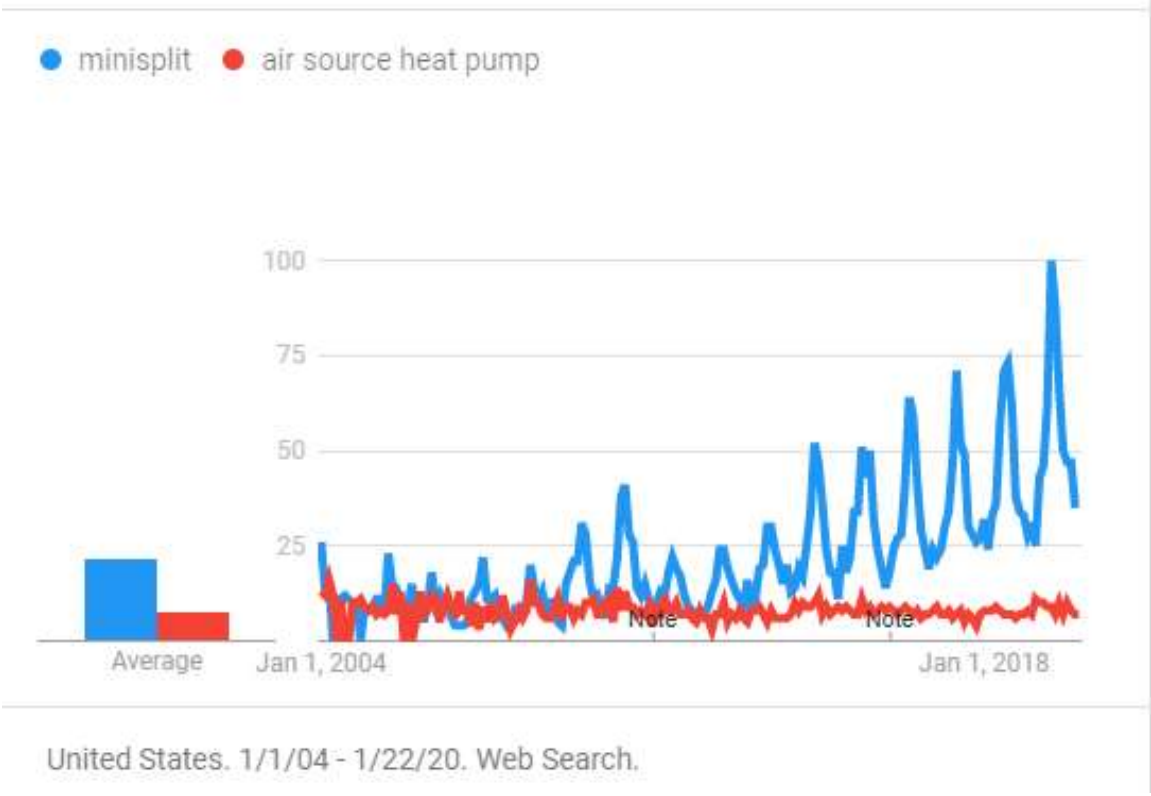
Increasing Demand: Why ENERGY STAR?



Market Overview



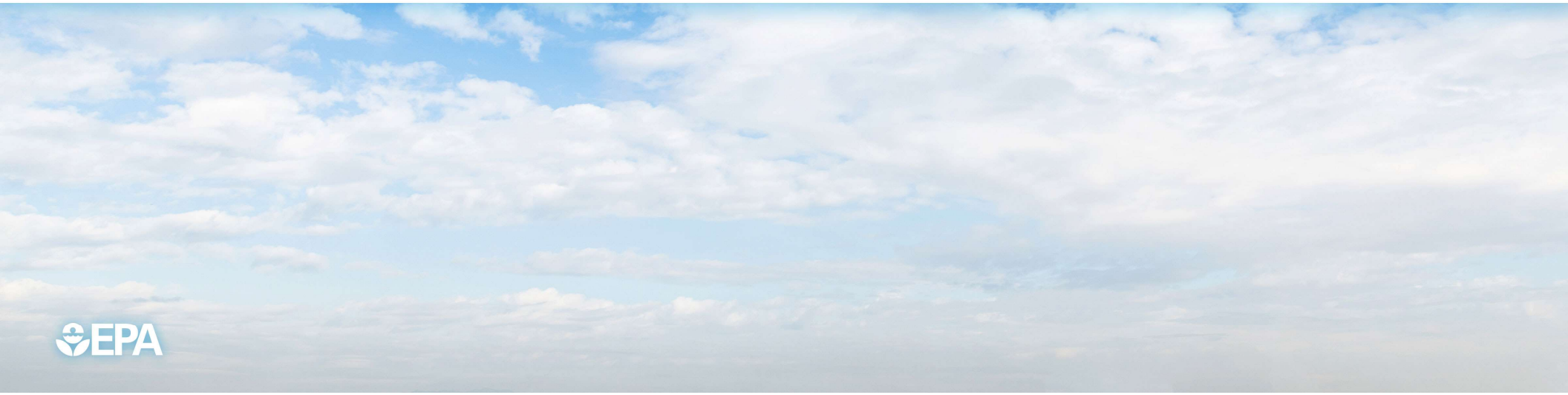
Market Overview



ENERGY STAR Heat Pump Benefits

- Heating and Cooling costs the average homeowner more than $900 a year –nearly half the home's total energy bill.
- An ENERGY STAR certified ASHP can provide heating for approximately 1/3 the cost of traditional electric baseboard heating, depending on where you live, and approximately 1/2 the cost of oil heat.
- ENERGY STAR certified mini splits use up to 60% less energy than standard home electric radiators.

Increasing Demand: Getting Consumers to Ask for ENERGY STAR HVAC



Address Barriers to Consumer Demand

1) **Complexity and Cost**

   Product/technology complexity and cost along with navigating the marketplace.

2) **Product/Contractor Information**

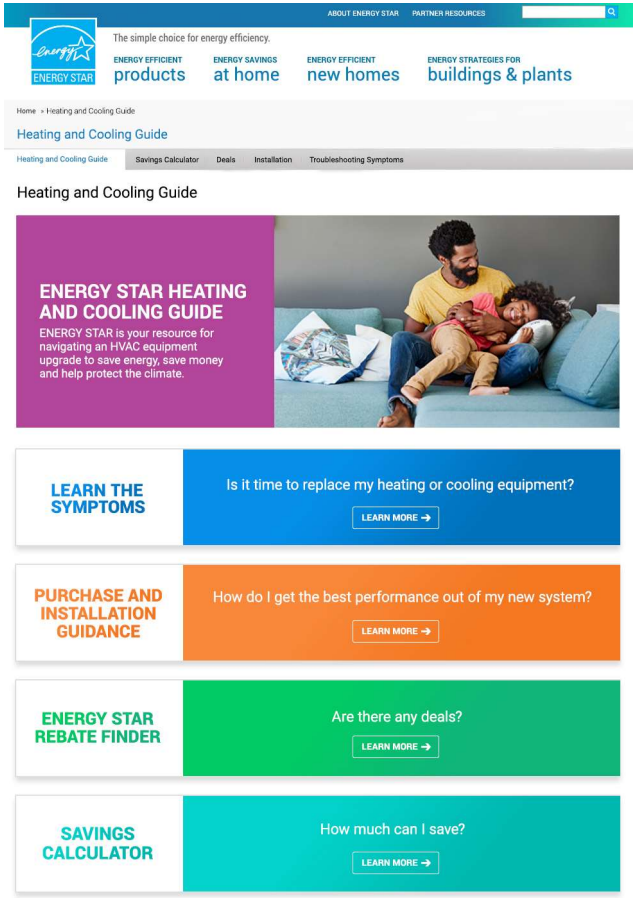
   Limited access to the right product and contractor information.

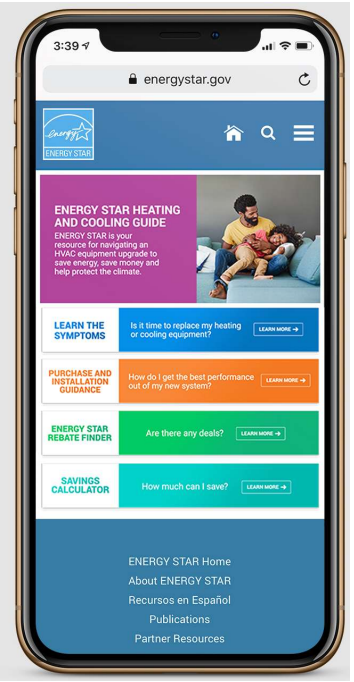
3) **Consumer Awareness**

   Lack of general awareness among consumers around the benefits of ASHPs vs traditional HVAC.

1. Complexity and Cost Barrier

- Develop an ENERGY STAR Heating & Cooling Guide to give consumers access to the replacement guidance they need:
  - Information on equipment replacement
  - Purchase and installation guidance
  - Available Rebates
  - Replacement savings calculator





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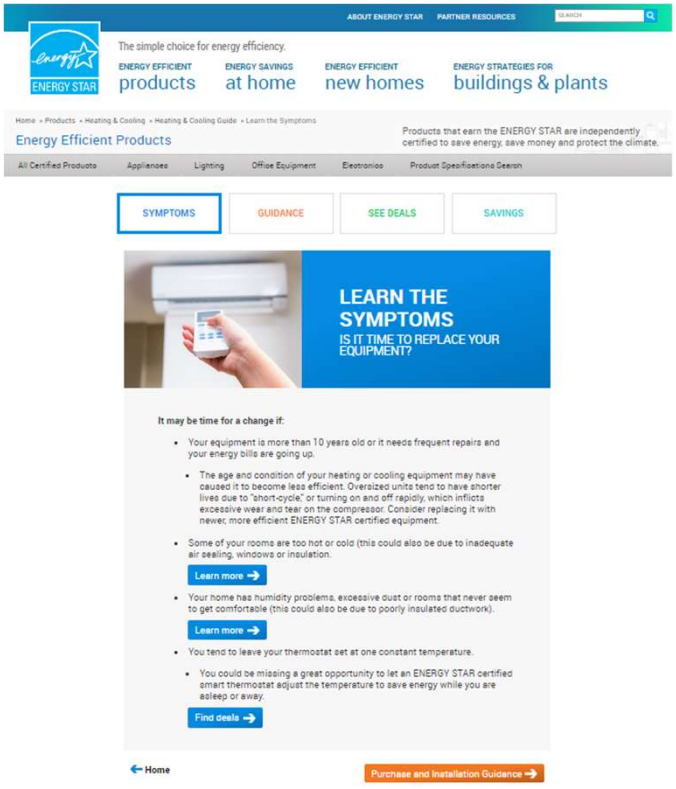
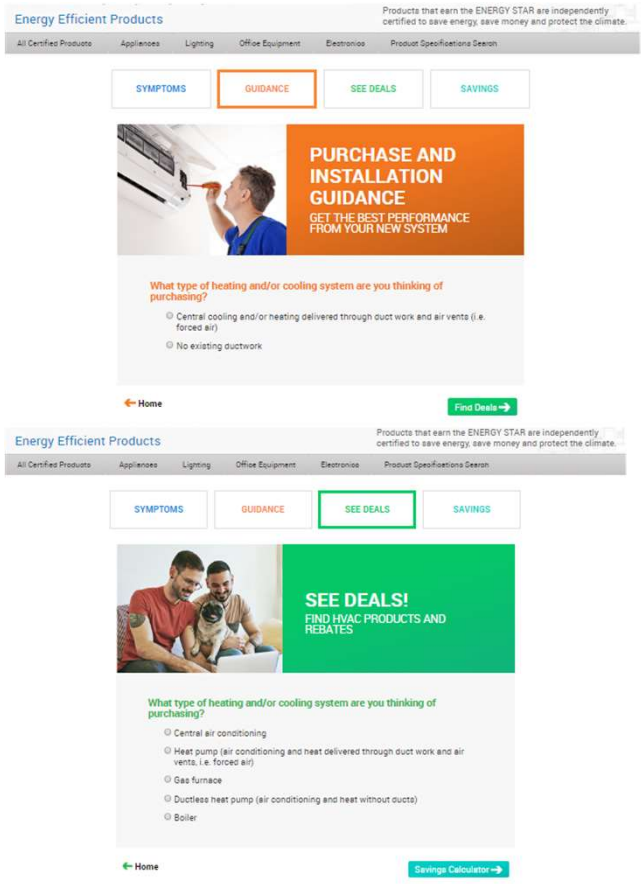
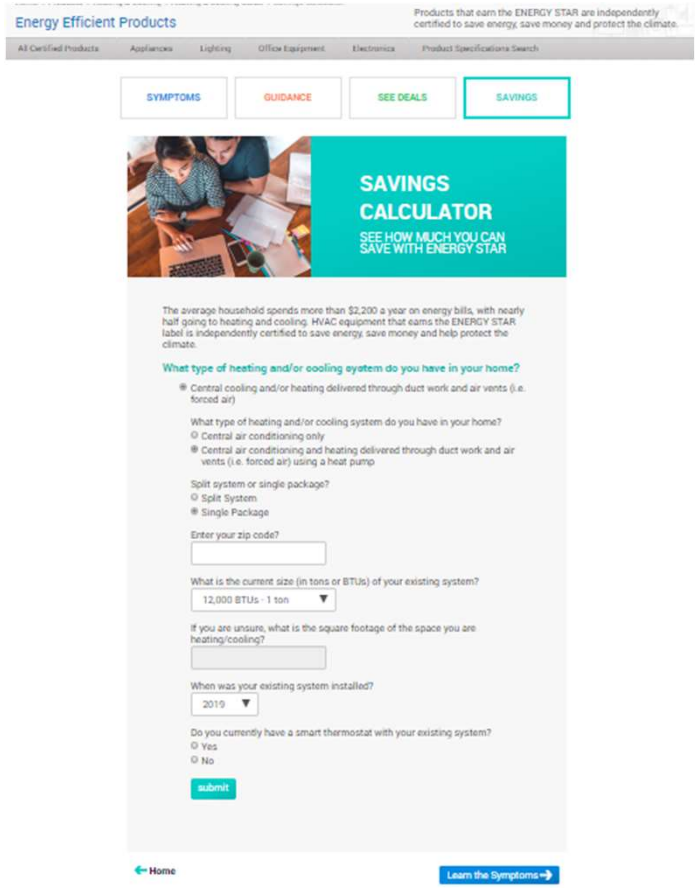
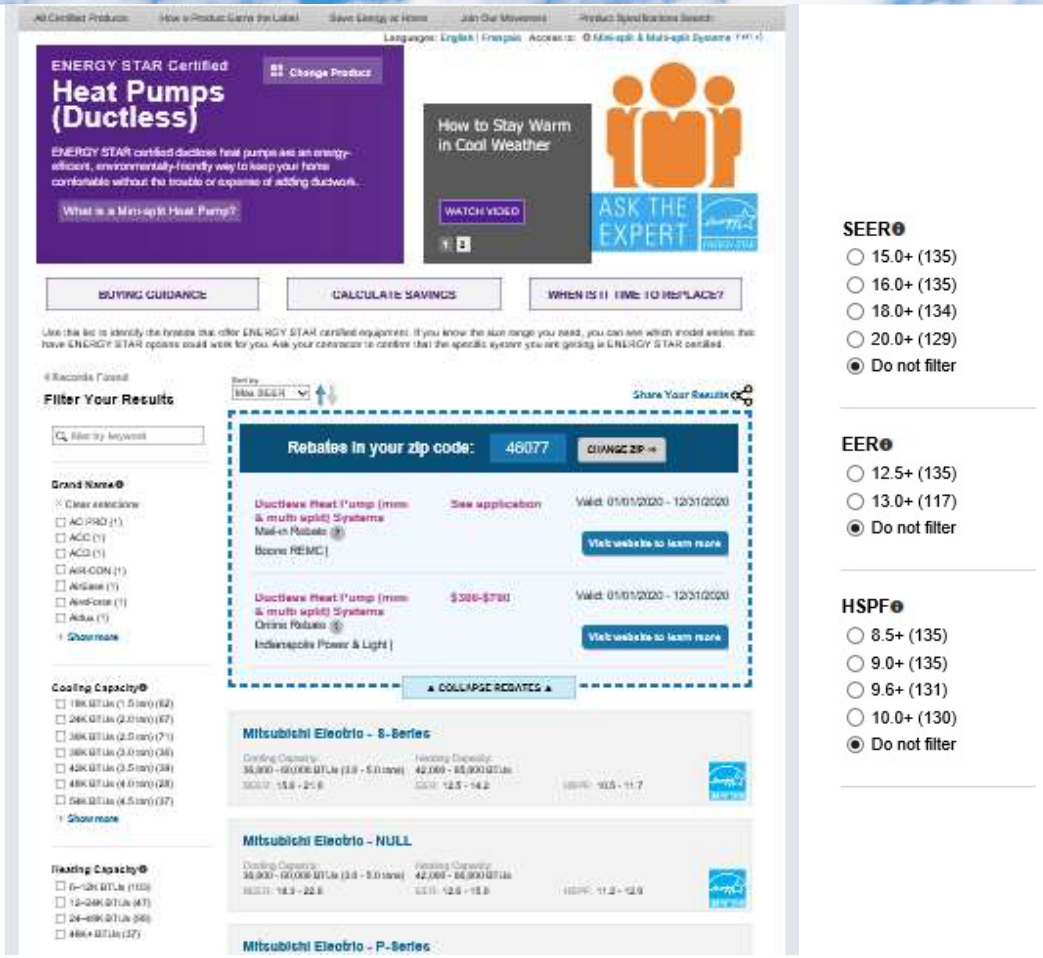




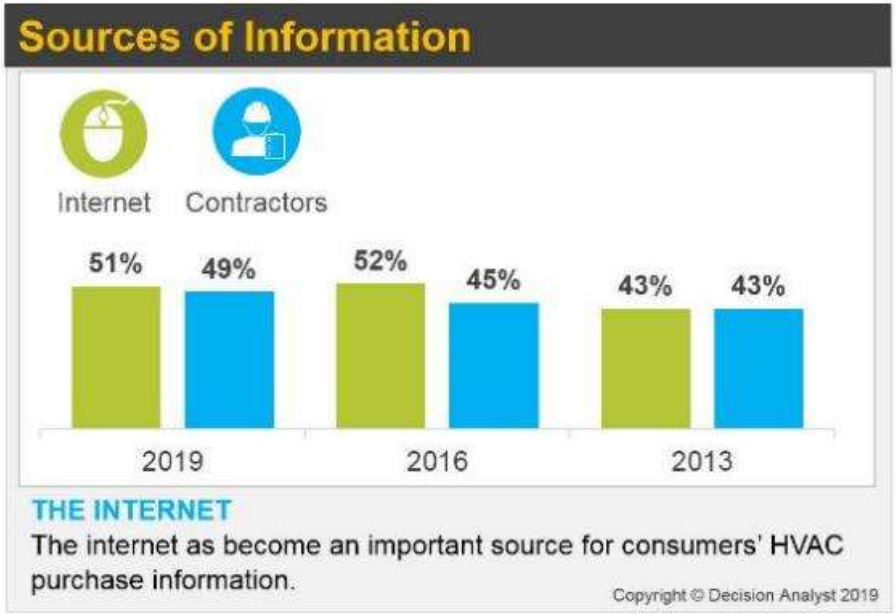


2. Product/Contractor Information Barrier
   - Developed a Product Finder that connects customers to brands and ENERGY STAR certified product lines that facilitate contractor support.
   - Updated CEE/AHRI links on existing product finder with an ENERGY STAR-focused experience that caters more to the end-use consumer.



3. Consumer Awareness Barrier

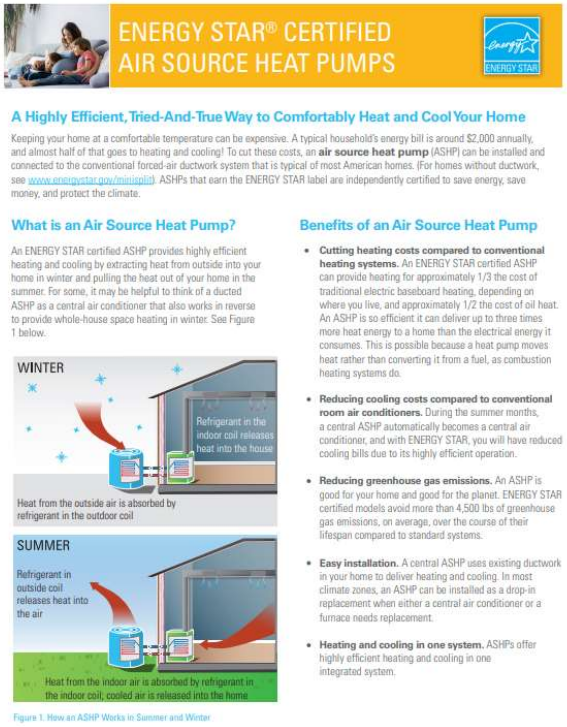
- Implement awareness campaign that drives traffic to the HVAC Guide
- Connect consumer to rebates and contractor in their area.
  - Campaign highlights benefits of ENERGY STAR certified HVAC:
    - Energy bill savings
    - Comfort
    - Rebates & Tax Credits
    - Environmental benefits



ENERGY STAR HVAC Campaign

- **Goal:** Overcome barriers to generate consumer demand and adoption of ENERGY STAR certified HVAC systems, with a focus on ducted air source heat pumps and mini splits.

Air Source Heat Pump and Mini Split Heat Pump Fact Sheets



ENERGY STAR® CERTIFIED
AIR SOURCE HEAT PUMPS

A Highly Efficient, Tried-And-True Way to Comfortably Heat and Cool Your Home

Keeping your home at a comfortable temperature can be expensive. A typical household's energy bill is around $2,000 annually, and almost half of that goes to heating and cooling! To cut these costs, an **air source heat pump** (ASHP) can be installed and connected to the conventional forced-air ductwork system that is typical of most American homes. (For homes without ductwork, see www.energystar.gov/minisplit). ASHPs that earn the ENERGY STAR label are independently certified to save energy, save money, and protect the climate.

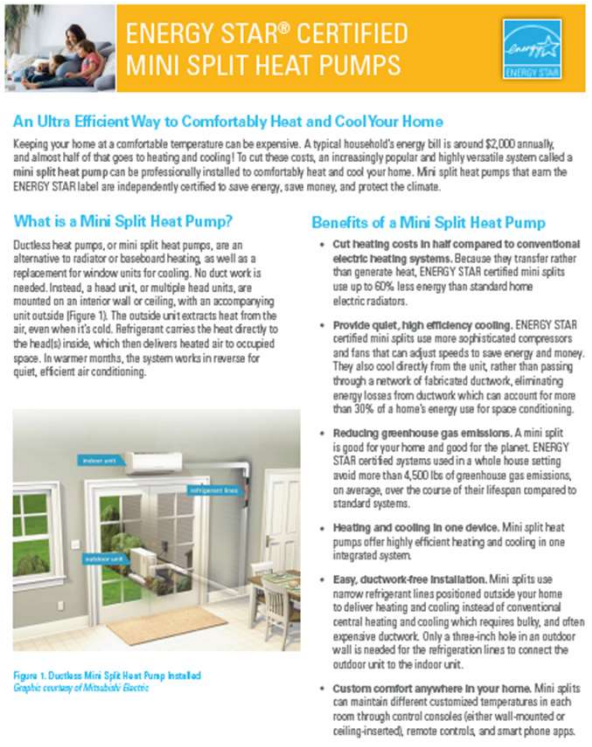
What is an Air Source Heat Pump?

An ENERGY STAR certified ASHP provides highly efficient heating and cooling by extracting heat from outside into your home in winter and pulling the heat out of your home in the summer. For some, it may be helpful to think of a ducted ASHP as a central air conditioner that also works in reverse to provide whole-house space heating in winter. See Figure 1 below.

Figure 1. How an ASHP Works in Summer and Winter

Benefits of an Air Source Heat Pump

- **Cutting heating costs compared to conventional heating systems.** An ENERGY STAR certified ASHP can provide heating for approximately 1/3 the cost of traditional electric baseboard heating, depending on where you live, and approximately 1/2 the cost of oil heat. An ASHP is so efficient it can deliver up to three times more heat energy to a home than the electrical energy it consumes. This is possible because a heat pump moves heat rather than converting it from a fuel, as combustion heating systems do.
- **Reducing cooling costs compared to conventional room air conditioners.** During the summer months, a central ASHP automatically becomes a central air conditioner, and with ENERGY STAR, you will have reduced cooling bills due to its highly efficient operation.
- **Reducing greenhouse gas emissions.** An ASHP is good for your home and good for the planet. ENERGY STAR certified models avoid more than 4,500 lbs of greenhouse gas emissions, on average, over the course of their lifespan compared to standard systems.
- **Easy installation.** A central ASHP uses existing ductwork in your home to deliver heating and cooling. In most climate zones, an ASHP can be installed as a drop-in replacement when either a central air conditioner or a furnace needs replacement.
- **Heating and cooling in one system.** ASHPs offer highly efficient heating and cooling in one integrated system.



ENERGY STAR® CERTIFIED
MINI SPLIT HEAT PUMPS

An Ultra Efficient Way to Comfortably Heat and Cool Your Home

Keeping your home at a comfortable temperature can be expensive. A typical household's energy bill is around $2,000 annually, and almost half of that goes to heating and cooling! To cut these costs, an increasingly popular and highly versatile system called a **mini split heat pump** can be professionally installed to comfortably heat and cool your home. Mini split heat pumps that earn the ENERGY STAR label are independently certified to save energy, save money, and protect the climate.

What is a Mini Split Heat Pump?

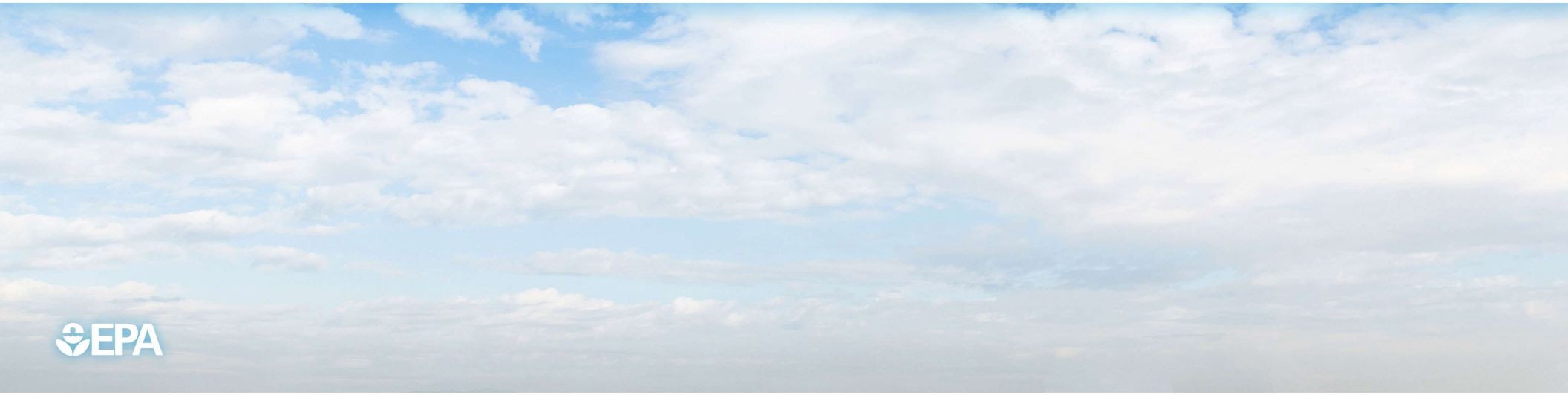
Ductless heat pumps, or mini split heat pumps, are an alternative to radiator or baseboard heating, as well as a replacement for window units for cooling. No duct work is needed. Instead, a head unit, or multiple head units, are mounted on an interior wall or ceiling, with an accompanying unit outside (Figure 1). The outside unit extracts heat from the air, even when it's cold. Refrigerant carries the heat directly to the head(s) inside, which then delivers heated air to occupied space. In warmer months, the system works in reverse for quiet, efficient air conditioning.

Figure 1. Ductless Mini Split Heat Pump Installed
Graphic courtesy of Mitsubishi Electric

Benefits of a Mini Split Heat Pump

- **Cut heating costs in half compared to conventional electric heating systems.** Because they transfer rather than generate heat, ENERGY STAR certified mini splits use up to 60% less energy than standard home electric radiators.
- **Provide quiet, high efficiency cooling.** ENERGY STAR certified mini splits use more sophisticated compressors and fans that can adjust speeds to save energy and money. They also cool directly from the unit, rather than passing through a network of fabricated ductwork, eliminating energy losses from ductwork which can account for more than 30% of a home's energy use for space conditioning.
- **Reducing greenhouse gas emissions.** A mini split is good for your home and good for the planet. ENERGY STAR certified systems used in a whole house setting avoid more than 4,500 lbs of greenhouse gas emissions, on average, over the course of their lifespan compared to standard systems.
- **Heating and cooling in one device.** Mini split heat pumps offer highly efficient heating and cooling in one integrated system.
- **Easy, ductwork-free installation.** Mini splits use narrow refrigerant lines positioned outside your home to deliver heating and cooling instead of conventional central heating and cooling which requires bulky, and often expensive ductwork. Only a three-inch hole in an outdoor wall is needed for the refrigeration lines to connect the outdoor unit to the indoor unit.
- **Custom comfort anywhere in your home.** Mini splits can maintain different customized temperatures in each room through control consoles (either wall-mounted or ceiling-inserted), remote controls, and smart phone apps.

2020 Product Promotions



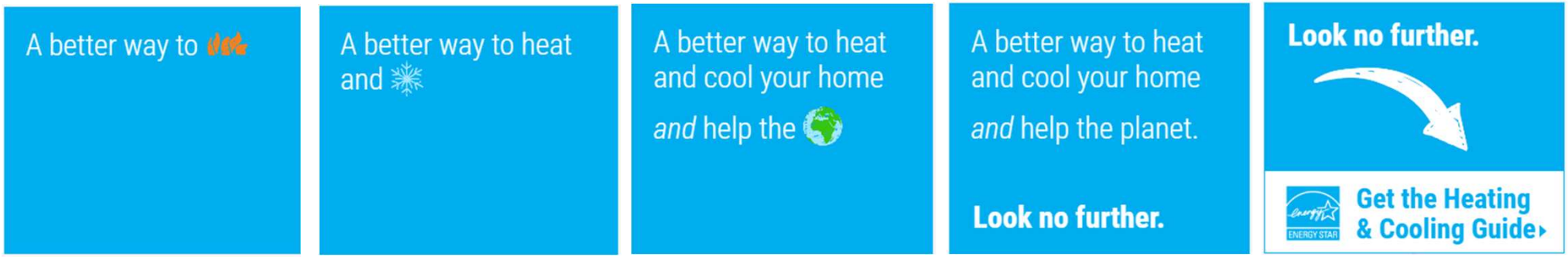
Spring 2020 HVAC Promotion Plan

Goal

- Educate and encourage consumers in the market for HVAC to choose ENERGY STAR certified models for energy-savings, increased comfort, and environmental benefits.

Call to Action

- Drive consumers to the new Heating and Cooling Guide on energystar.gov.



To Date: 5,717,678 Impressions, $.38 CTC

ENERGY STAR Product Promotions = Formula for Success

Manufacturers

- Top EE Products
- Promotions driving demand

Retailers/Marketplaces

- POS driving traffic/conversion
- ENERGY STAR mark provides easy identification

Utilities

- Consumer connection
- Incentives driving demand/conversion

EPA ENERGY STAR

- Facilitation/coordination
- Informative, expert, credible content
- Engaging messaging/creative
- Curate/build effective marcomm strategies

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2019 Campaign Impacts:

energystar.gov

Product Finder pages had more than

1.3 MILLION PAGEVIEWS

MORE THAN

732 MILLION

IMPRESSIONS in print, social, and online media in 2019

7320000000

MORE THAN

17,900

PLACEMENTS through NAPS and Brandpoint

NEARLY

150 UTILITIES serving

43 MILLION HOUSEHOLDS

5 MILLION VIDEO VIEWS

6.2 MILLION newsletters delivered

Oath: A Verizon company

Brandpoint

NAPS NORTH AMERICAN PRECIS SYNDICATE

bob vila™

GroundTruth.

YouTube

SHARETHROUGH

Google Display Network

SAVE TODAY. SAVE TOMORROW.
SAVE FOR GOOD.

ENERGY STAR®
Central Air Conditioners & Heat Pumps
Version 6.0: A New Vision

ESPPM 2020

EPA

Why Revise Now?

- Time: Version 5.0 effective 2015
- Increased interest in electrification & cold climate optimized heat pumps
- Developing consensus around grid services for CAC/ASHP

Estimated Market Share of ENERGY STAR Certified CAC/HPs		
	2018	2019
Overall	33%	41%
CACs	28%	30%
ASHPs	43%	59%

2018 ENERGY STAR Unit Shipment and Market Penetration Report

2019 ENERGY STAR Unit Shipment and Market Penetration Report

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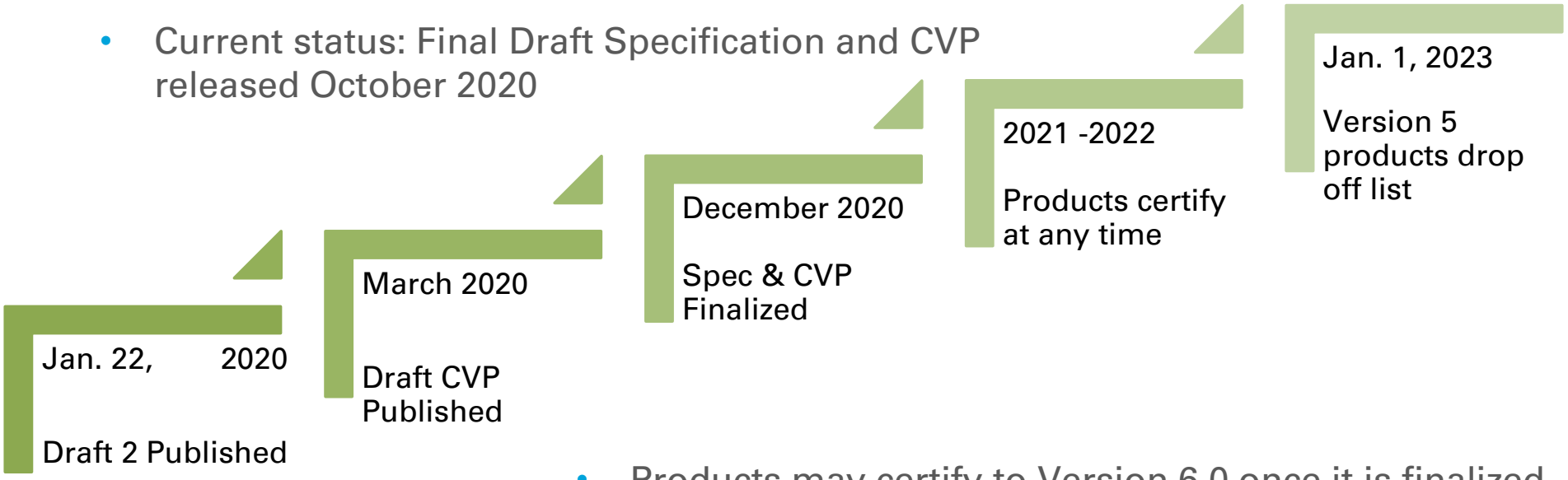
Status and Timeline

- Current status: Final Draft Specification and CVP released October 2020



- Products may certify to Version 6.0 once it is finalized
- Early certification may get additional recognition
- Specification allows for path using current test method
- Expect bulk of V6.0 certification in 2022

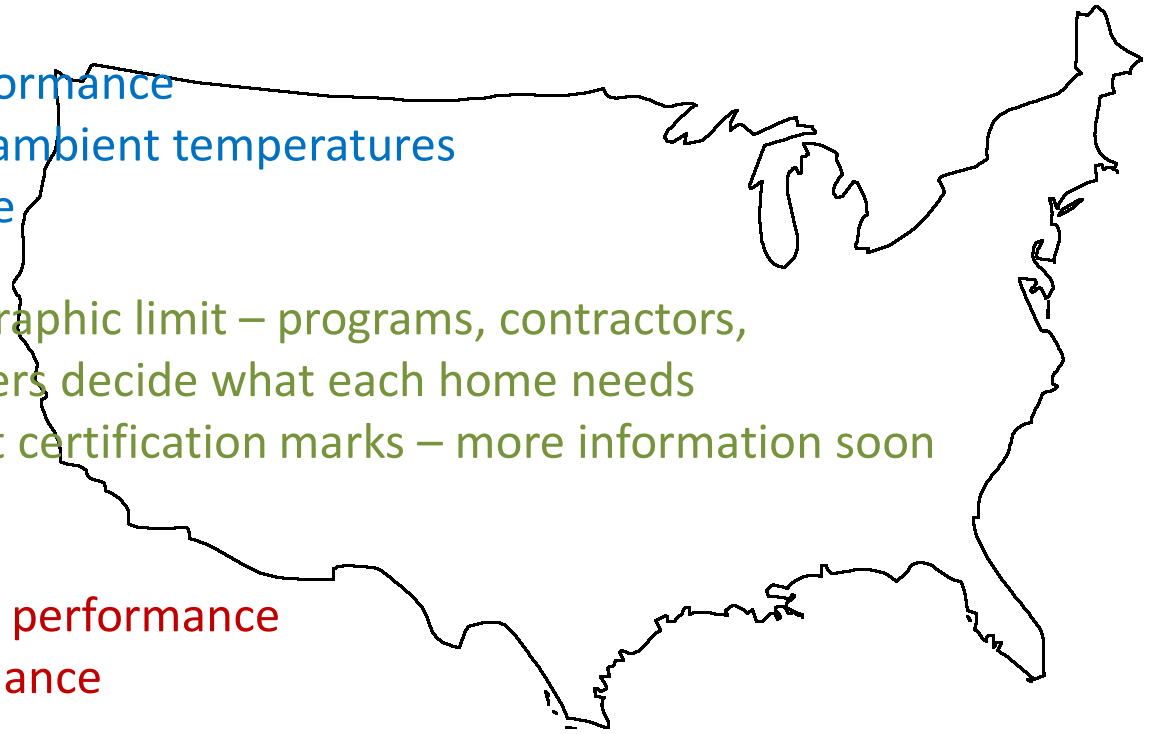
New Initiatives Reflected in V6.0 Specification

1. **Climate differentiated AHSP criteria and marks** help consumers and contractors easily identify units optimized for cold climates
2. **Installation capabilities** help ensure that excellent equipment will be installed well
3. **Optional connected criteria** focus on harnessing the potential of staged and variable capacity units to balance grid needs and consumer comfort

Air Source Heat Pumps: Different Climates, Different Needs

Cold Climate

- Excellent seasonal heating performance
- Maintains performance at low ambient temperatures
- Good peak cooling performance



- No geographic limit – programs, contractors, purchasers decide what each home needs
- Different certification marks – more information soon

Moderate and Hot Climate

- Excellent seasonal peak cooling performance
- Good seasonal heating performance

CAC Certification Criteria

Product Type	2023 Test Method		Current Test Method	
	SEER2	EER2	SEER	EER
CAC Split Systems	15.2	12.0	16.0	12.5
CAC Single Package Equipment	15.2	11.5	16.0	12.0

HP Criteria – Moderate & Hot Climate

- Maintain high SEER and EER levels, moderate HSPF

Product Type	2023 Test Method			Current Test Method		
	SEER2	EER2	HSPF2	SEER	EER	HSPF
HP Split Systems	15.2	12.0	7.8	16.0	12.5	9.2
HP Single Package Equipment	15.2	11.5	7.2	16.0	12.0	8.5

HP Criteria – Cold Climate

- Reduced EER requirements, but higher HSPF than M&H climate

Product Type	2023 Test Method			Current Test Method		
	SEER2	EER2	HSPF2	SEER	EER	HSPF
HP Split Systems	15.2	11.0	8.5	16.0	11.5	10.0
HP Single Package Equipment	15.2	10.6	8.1	16.0	11.0	9.5

HP Criteria – Cold Climate Low ambient performance

- COP @ 5 °F: Harmonized with NEEP ccASHP Specification
- Percentage of Heating Capacity: Minimize use of electric resistance backup
- Also must demonstrate COP and heating capacity achieved under native controls using a new Controls Verification Procedure (CVP) by effective date
- EPA may add additional methods to demonstrate low ambient performance in the future

Product Type	2023 Test Method		Current Test Method	
	COP @ 5°F	Percentage of Heating Capacity @ 5°F	COP @ 5°F	Percentage of Heating Capacity @ 5°F
HP Split Systems	1.75	70%	1.75	70%
HP Single Package Equipment	1.75	70%	1.75	70%

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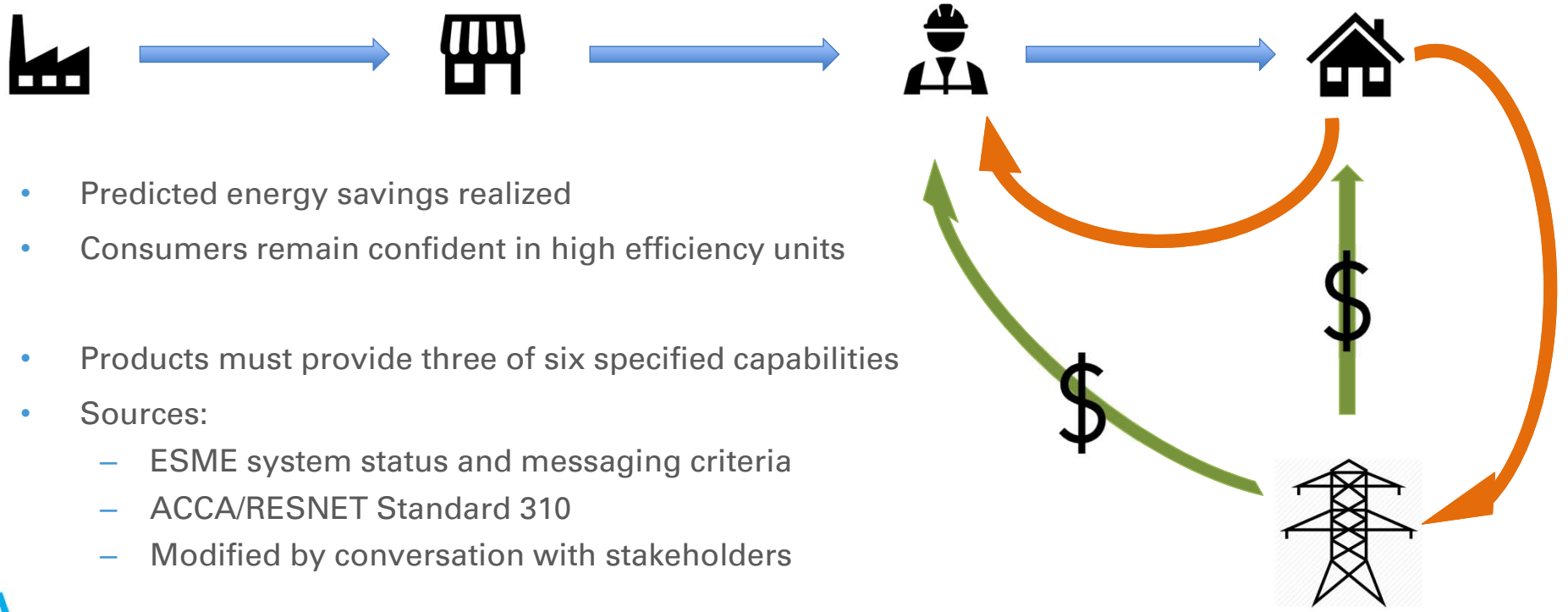
Immediate Feedback Facilitates Good Installations



- Predicted energy savings realized
- Consumers remain confident in high efficiency units

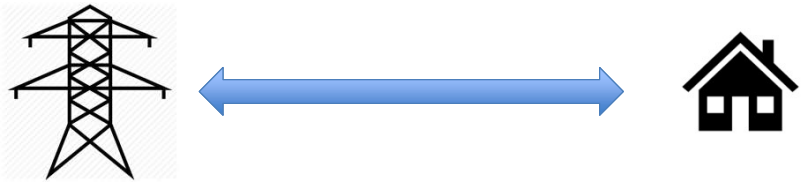
- Products must provide three of six specified capabilities
- Sources:
  - ESME system status and messaging criteria
  - ACCA/RESNET Standard 310
  - Modified by conversation with stakeholders

Optional Connected Criteria: The Why

- AC energy use is highly coincident with summer peaks
- As heating electrifies, heat pump energy use will be coincident with winter peaks
- Variable capacity – opportunity for higher value DR
  - Set the DR response by max energy use
  - Allows certainty for utilities
  - Allows HVAC system flexibility to deliver as much comfort as possible: about 85% of capacity with 75% of the energy use
- DR with 3rd party thermostats can't use these opportunities for variable capacity

Optional Connected Criteria: The What

- Demand response based on AHRI 1380
  - CTA-2045 and/or OpenADR (cloud implementation allowed)
  - General curtailment, Grid emergency, Load up
  - Optional: price response, etc.
  - Interoperability is key, so commands and responses defined for required and optional functions in each protocol
- User amenity - including energy reporting



The changing role of controllers

- Traditional thermostat not part of CAC/HP for testing/performance
- Market reality then: thermostats sold separately, mostly interchangeable (from the CAC/HP point of view)
- Market reality now:
  - Controls integrated into variable capacity ductless units are disabled for efficiency testing
  - Controllers for centrally ducted units critical to product performance
- In this spec: controls may be part of performance for connected and installation capabilities; must be included in low ambient performance

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SAVE FOR GOOD.

Questions

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Stakeholders are encouraged to provide written comments for EPA consideration to CAC-ASHP@energystar.gov by Feb. 28th, 2020.