Mini-split Heat Pumps for Cooling and Heating

- ▶ Remarkably Efficient
- ▶ Increasingly Popular
- ▶ Still Misunderstood

What is an Inverter Compressor (Mini-split) Heat Pump

- Single Device to Provide Cooling & Heating

- Components
  - Outdoor Unit
  - Indoor Unit
  - Refrigerant Lines
  - Controls

Indoor Unit Options (Not Everything is “Ductless”)

- Offer flexible designs to suit any space
- Feature a return air sensor that constantly monitors and maintains room temperature
- Provide continuous fan operation, IAQ
- As quiet as 19 dB(A) (Whisper)

Wall-mounted Model:

Ceiling-recessed, Cassette Model:

Floor Mounted

Horizontal-ducted Model:

Air Handler

Indoor Unit Style/Applications

Horizontal Ducted

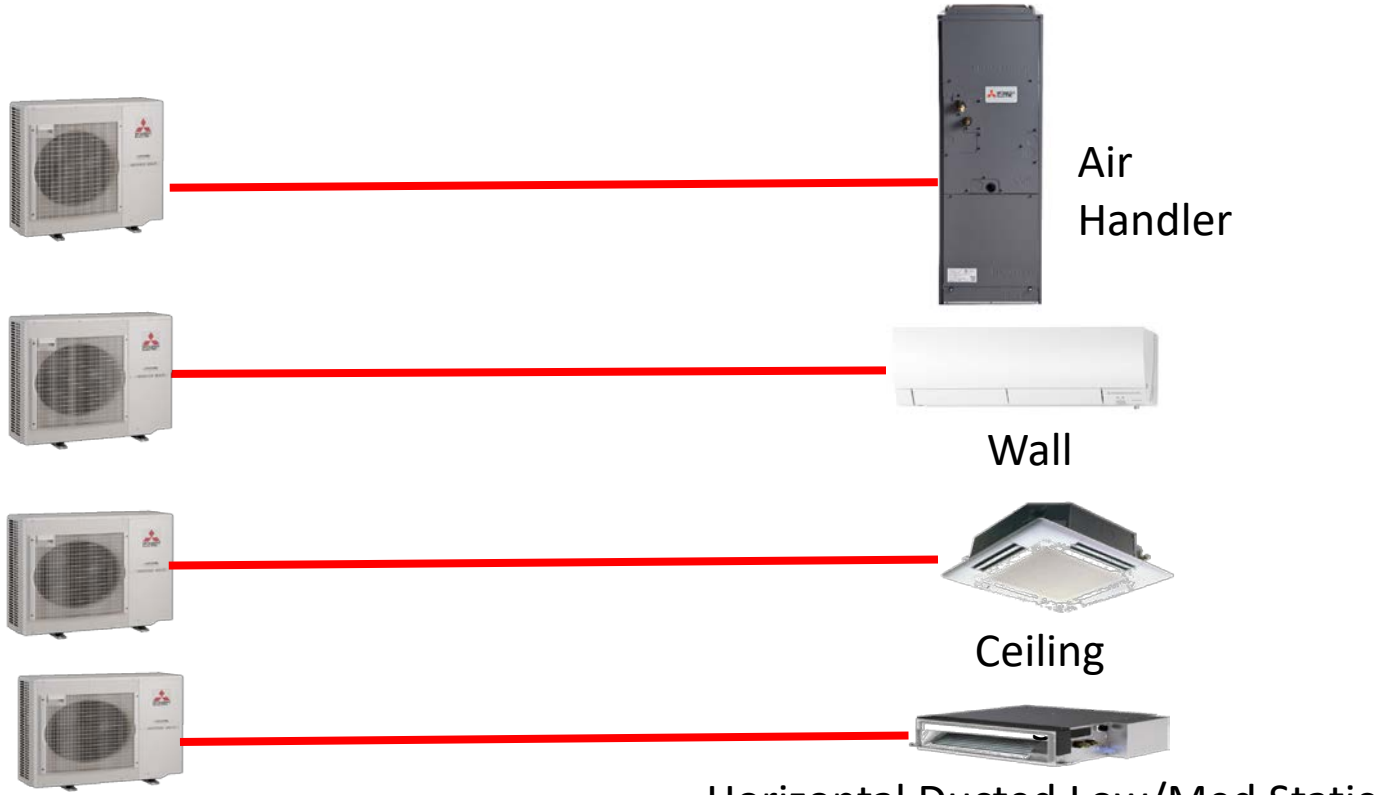
Ceiling-recessed

Floor-mounted

Wall-mounted

Multi-position air handler

Single Zone (Capacity ½ to 3½ tons)

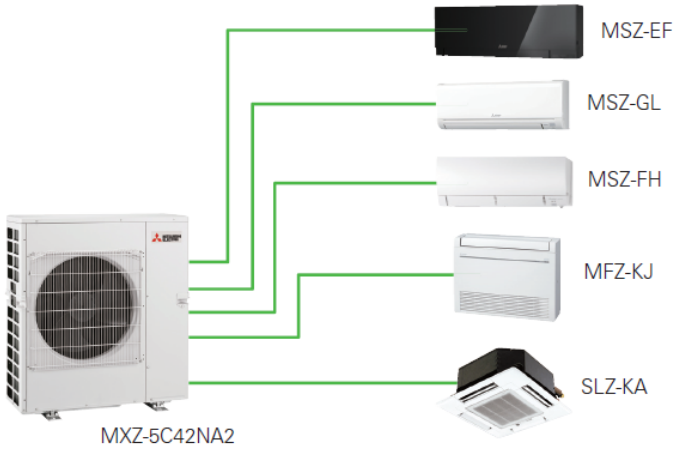


Multi-Zone Systems MXZ Series* (Capacity 1½ to 5 tons)

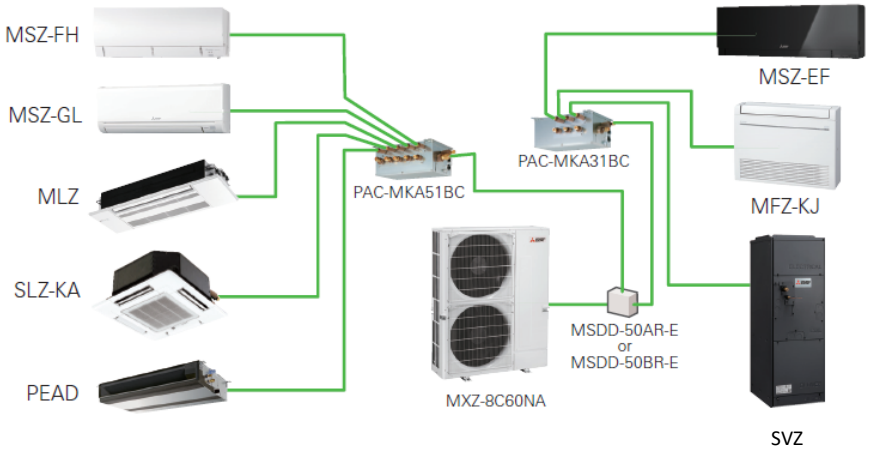
Up to 8 Zones

EXAMPLE SYSTEM

Smaller MXZ 2, 3, 4 and 5 ports
(example of MXZ-5C42NA2 system)



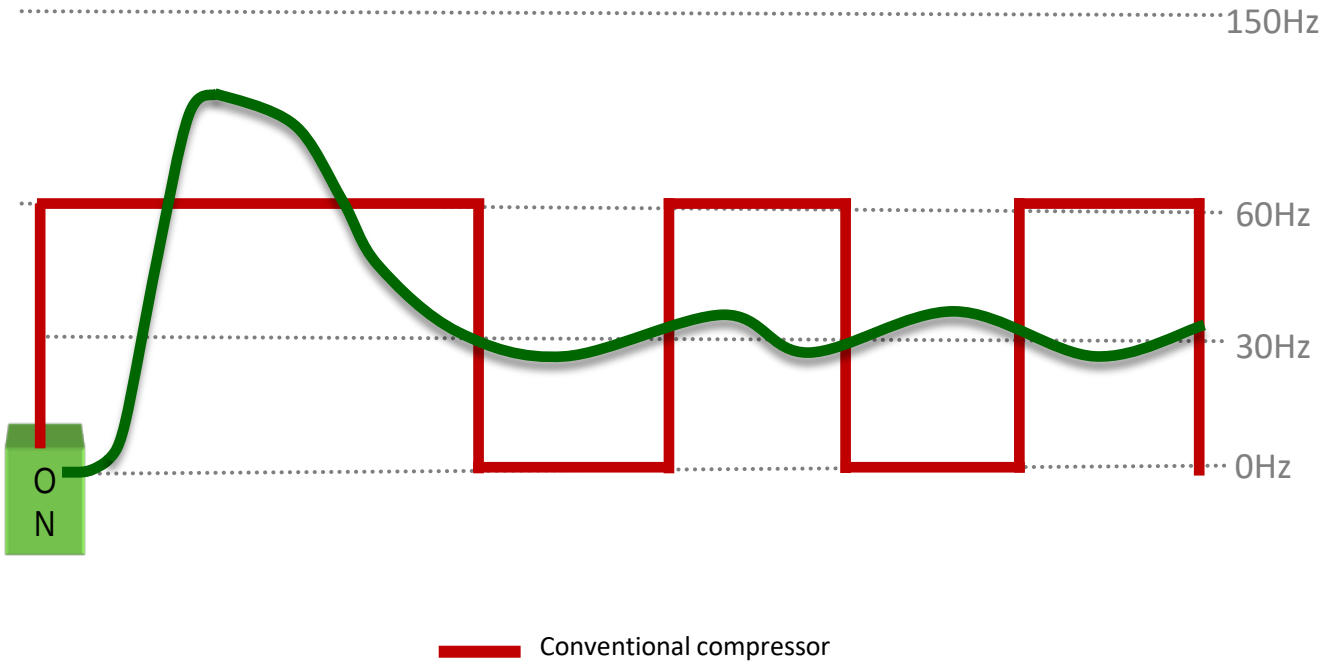
Power Multi MXZ-8C48/60NA



*Compatible with M-Series & P-Series Indoor Units
(Check compatibility table for details.)

Why Are they So Efficient?

INVERTER Technology



Energy Efficiency – Heat Pumps Not Created Equal

Energy Star Requirements (15 SEER, 12.5 EER, 8.5 HSPF)

VS.

Heat Pumps AHRI 477,712 Listed.

- Energy Star - 200,101 – (42%)
- Increase to 16 SEER – 91,298 (19%)
- Increase to 18 SEER – 12,034 (<3%)

Variable Speed Heat Pumps AHRI 8,240

- Energy Star - 3,292 – (40%)
- Increase to 16 SEER – 3,287 (40%)
- Increase to 18 SEER – 3,224 (39%)

Energy Efficiency – Heat Pumps Not Created Equal

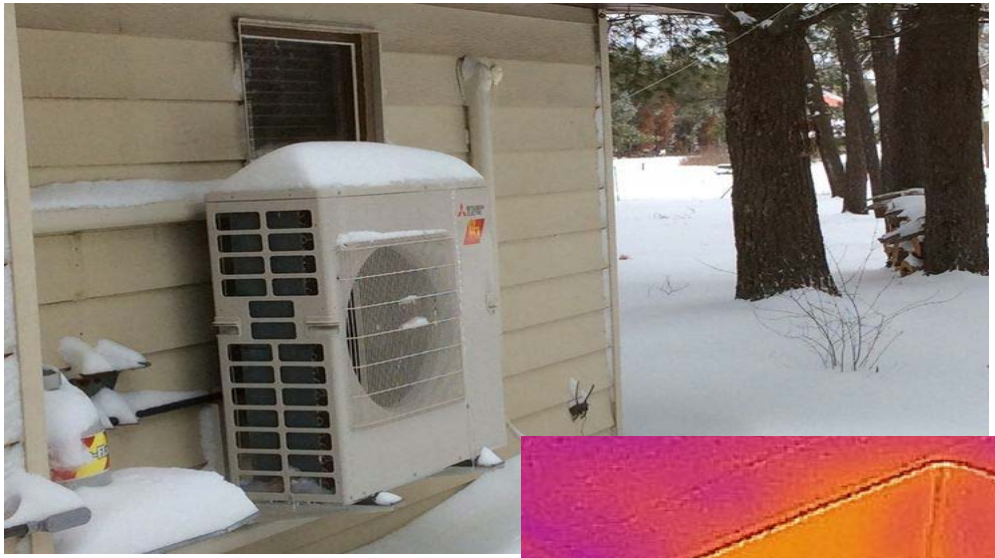
Utility Program Reality

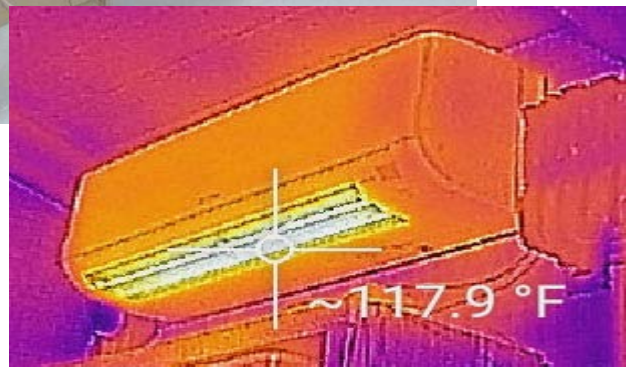
VS.

Heat Pumps AHRI 477,712 Listed.

		SEER	Variable Speed Heat Pumps AHRI 8,240	
319,637	67%	15	98%	8,095
127,272	27%	16	96%	7,926
16,092	3%	18	67%	5,555

Mini-Splits Great For Cold Weather Performance





COMMERCE DEPARTMENT
ENERGY RESOURCES

Cold Climate Air Source Heat Pump

11/1/2017

Contract # 86417

Conservation Applied Research and Development (CARD) FINAL Report

Prepared for: Minnesota Department of Commerce, Division of Energy Resources

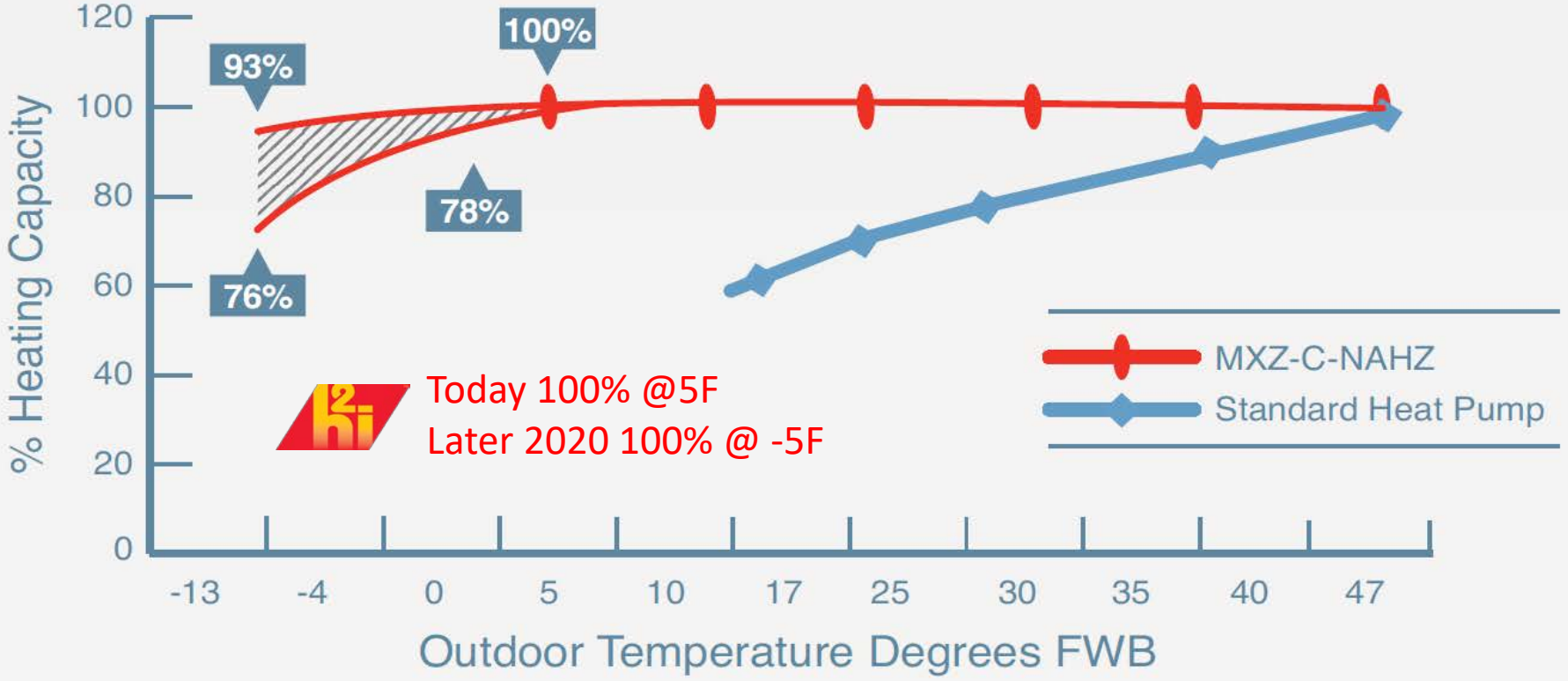
Prepared by:

Ben Schoenbauer, Center for Energy and Environment

Nicole Kessler, Center for Energy and Environment

Marty Kushler, ACEEE

H2i MXZ HEATING CAPACITY AT LOW TEMPERATURES*



Cold Climate Heat Pump Specifications

Northeast Energy Efficiency Partnerships

Cold Climate Air-Source Heat Pump Specification (Version 3.0)

As facilitated by Northeast Energy Efficiency Partnerships (NEEP)

EFFECTIVE JANUARY 1, 2019

The following specification defines a set of performance requirements and reporting requirements to meet the voluntary "Cold-climate Air-Source Heat Pump Specification" (ccASHP Specification). The specification was designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher). The specification is intended as a model equipment specification to be used broadly by energy efficiency program administrators in cold climates as a minimum requirement for program qualification. It also is intended for engineers, contractors, and other practitioners who need assurance that the equipment they select will have the required heating capacity at design temperature without unnecessary oversizing, and will serve the load efficiently throughout the ambient temperature range.

Stakeholders should be aware that simply meeting the performance requirements does not necessarily mean a product is appropriate for all cold climate applications. Consumers, contractors, and designers should review building loads, equipment capacities at design temperatures, and other important factors before selecting equipment.

Scope

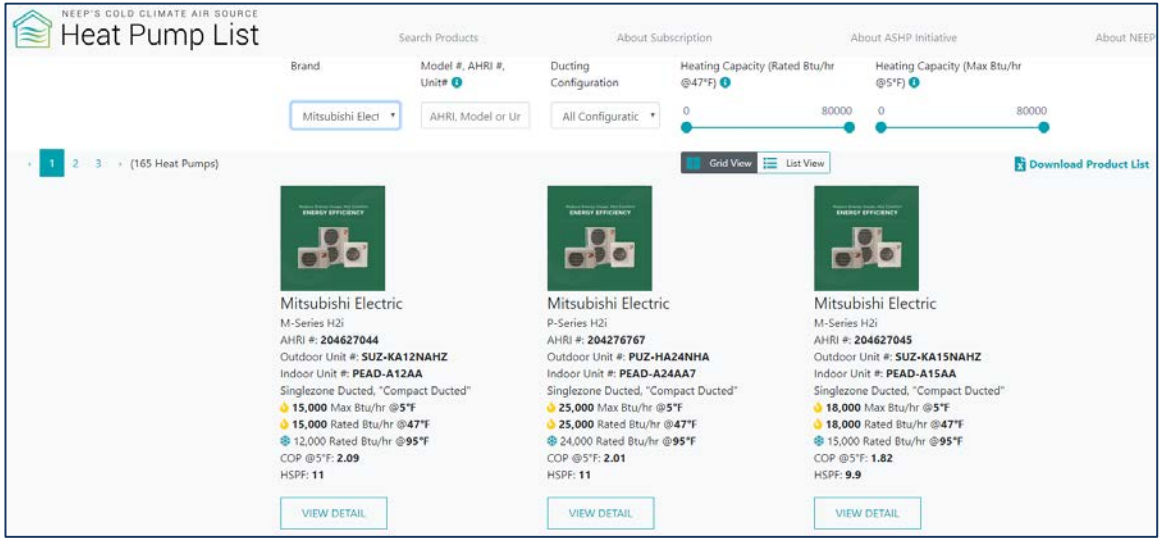
- Air-to-air, split system heat pumps
- Indoor and outdoor units must be part of an AHRI matched system, defined by federal regulation 10CFR §430.2 as a *central air conditioning heat pump*
- Compressor must be variable capacity (three or more distinct operating speeds, or continuously variable)
- Non-ducted ASHP systems[1]
  - Single-zone ASHP systems with non-ducted indoor units (i.e. wall, ceiling, floor, etc.)
  - Multi-zone systems rated with non-ducted indoor units
- Ducted ASHP systems[2]
  - Centrally ducted
  - Single-zone systems with compact-ducted indoor unit
  - Multi-zone systems rated with all ducted or mixed (ducted and non-ducted) indoor units
- Does NOT include ground-source, water-source, or air-to-water heat pump systems

[1] Often referred to as "ductless" ASHP system. These systems do not utilize any air-ducts for distribution.
[2] System utilizes some form of air ducts for distribution.

Northeast Energy Efficiency Partnerships 91 Hartwell Avenue Lexington, MA 02421 P: 781.860.9177 www.neep.org

Performance Requirements

- *For Non-Ducted systems:* HSPF ≥10
- *For Ducted systems:* HSPF ≥9
- COP @5°F ≥1.75 (at maximum capacity operation)
- SEER ≥ 15



Cold Climate Heat Pump Specifications (Future)

Energy Star

DRAFT 6.0

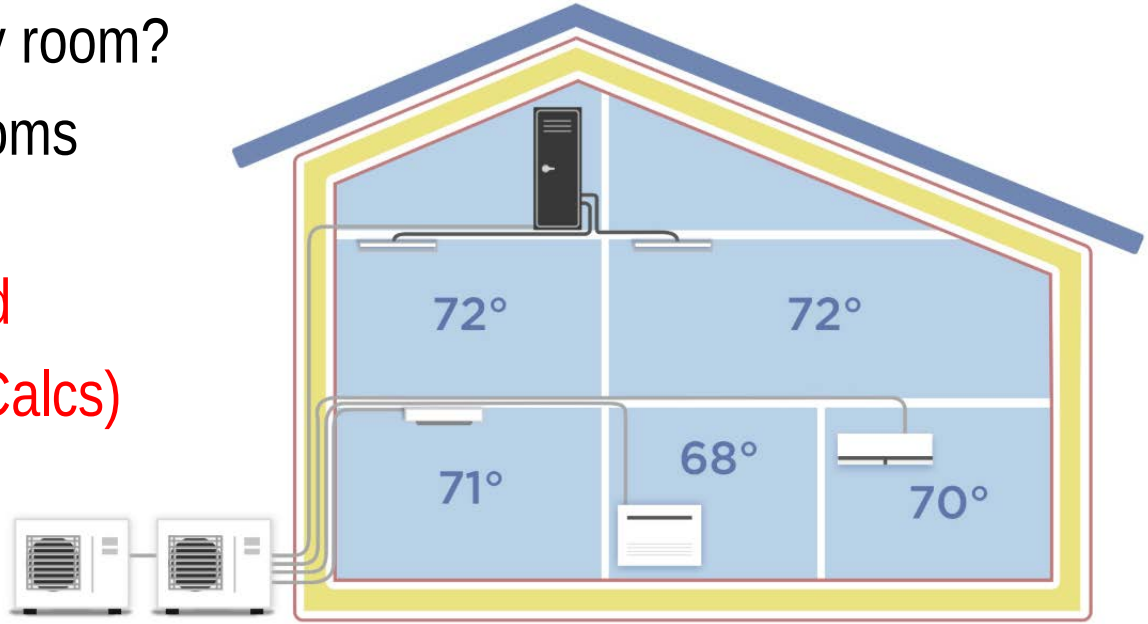
Table 3: Energy-Efficiency Criteria for Certified Residential ASHPs

For purposes of ENERGY STAR certification, an ASHP model must be designated as either Moderate and Hot Climate or Cold Climate and meet the associated requirements in Table 3.

Product Type	Moderate and Hot Climate			Cold Climate				
	SEER	EER	HSPF	SEER	EER	HSPF	COP @ 5°F	Percentage of Heating Capacity @ 5°F
ASHP Split Systems	≥ 16.00	≥ 12.50	≥ 8.50	≥ 16.00	≥ 11.50	≥ 9.00	1.75	80%
ASHP Single Package Equipment[1]	≥ 16.00	≥ 12.00	≥ 8.20	≥ 16.00	≥ 11.00	≥ 9.00	1.75	80%

Designing with Mini-Split Heat Pumps

- Creating comfort zones
- Do we need one in every room?
- What about small bedrooms and bathrooms?
- Heating vs. Cooling Load
- Sizing is Critical! (Load Calcs)



Beneficial Electrification (80% x 2050)

+

Two Primary Solutions to Meet Goals

Best Practice

To Support our increasing Program Development requests:

Best practices Manual

Lays out recommendations on successful Heat Pump program design

Questions?

Kevin DeMaster

Mitsubishi Electric Trane HVAC

Manager, Utility & Efficiency Programs

kdemaster@hvac.mea.com

ENERGY STAR®

HVAC Promotions


ENERGY STAR
THE VALUE OF ENERGY STAR
EPA

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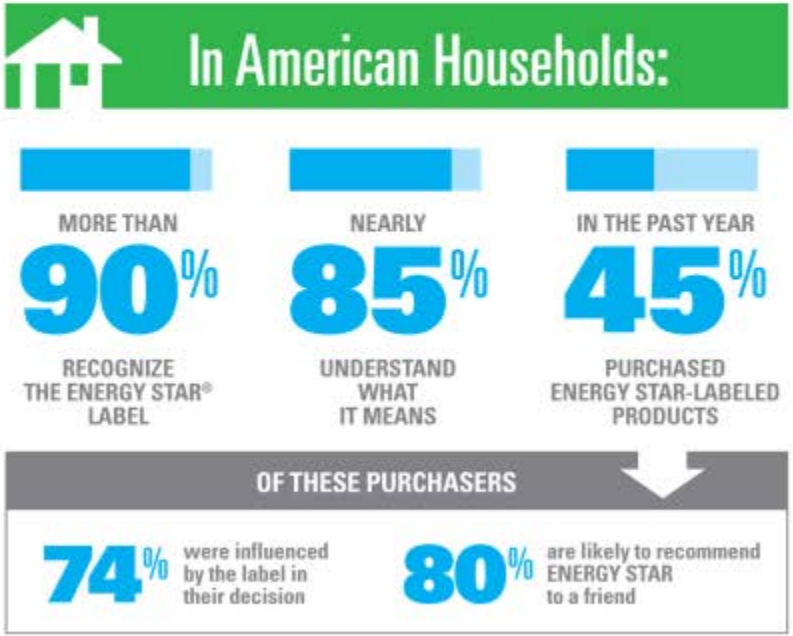
Strong Brand Identity & Awareness



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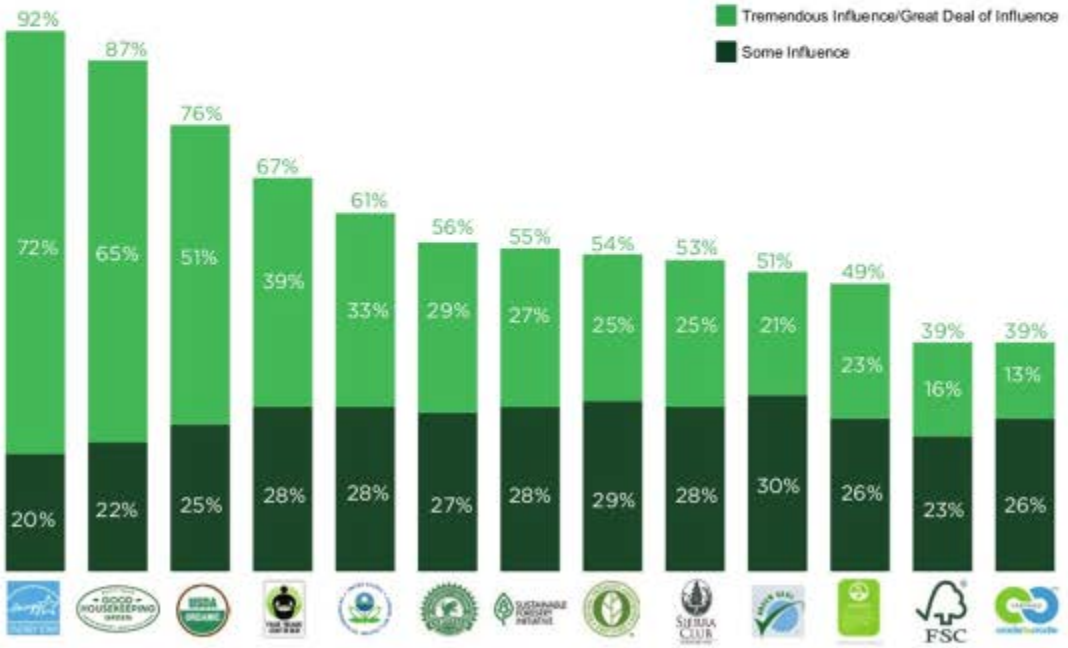
Clear, Functional Benefit



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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**.

+

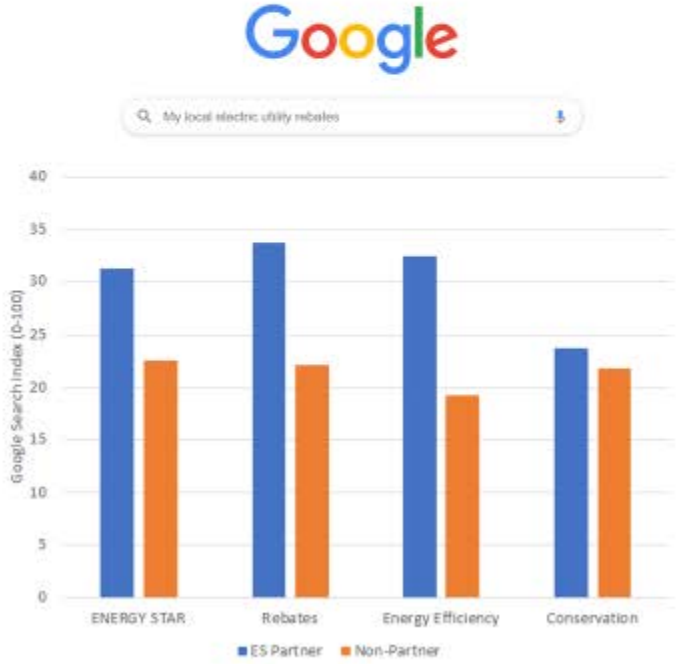
ENERGY STAR

=

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: Getting Consumers to Ask for ENERGY STAR HVAC

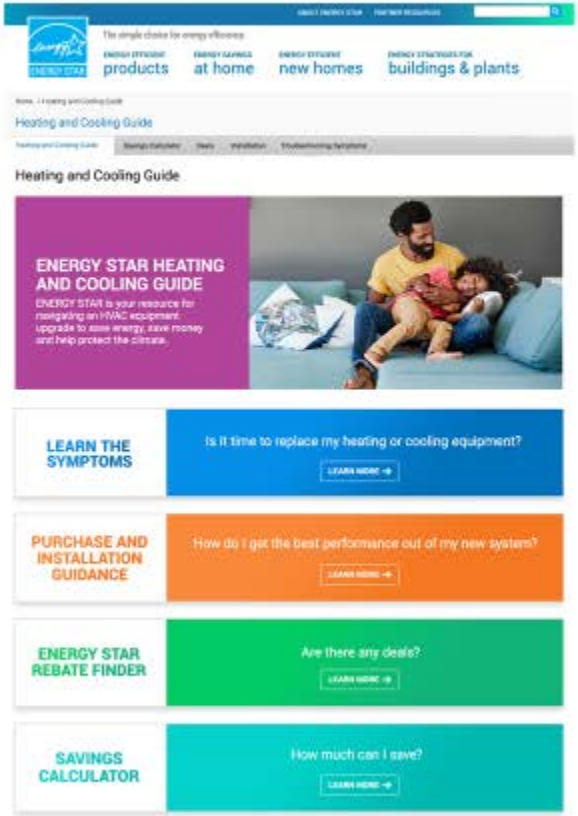
Address Barriers to Consumer Demand

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.

HVAC Campaign

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

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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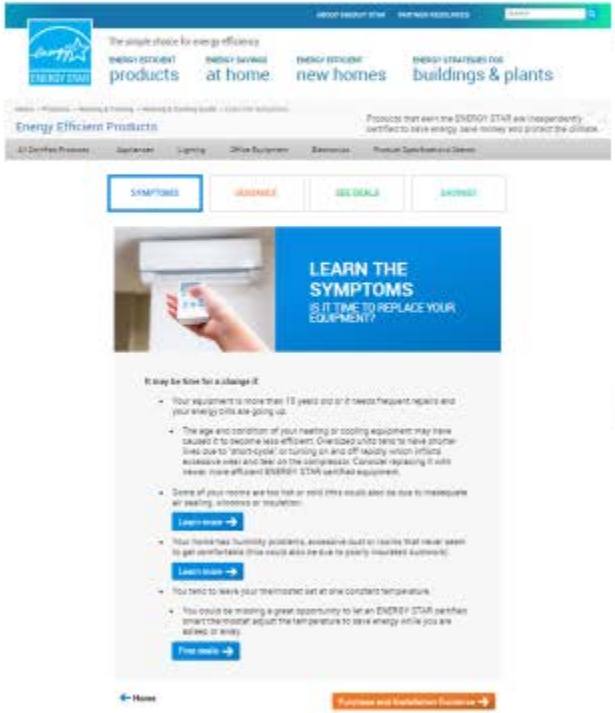

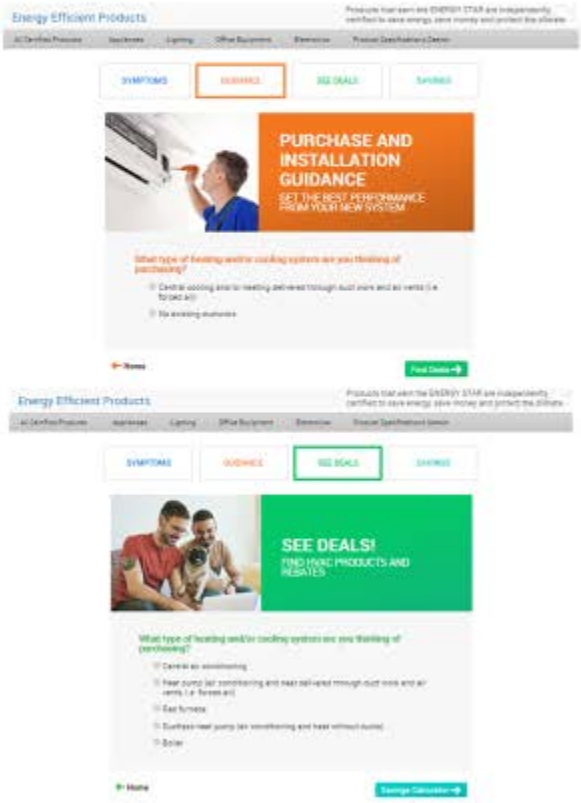

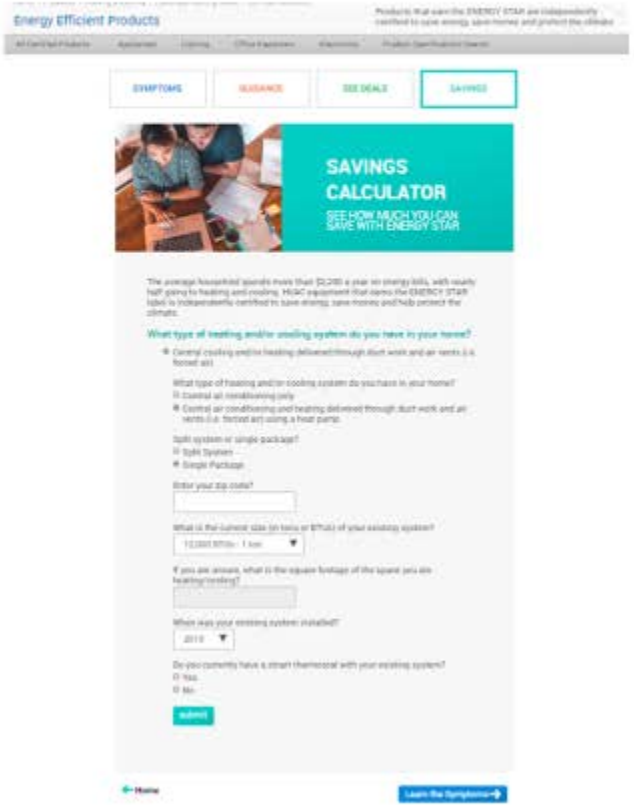

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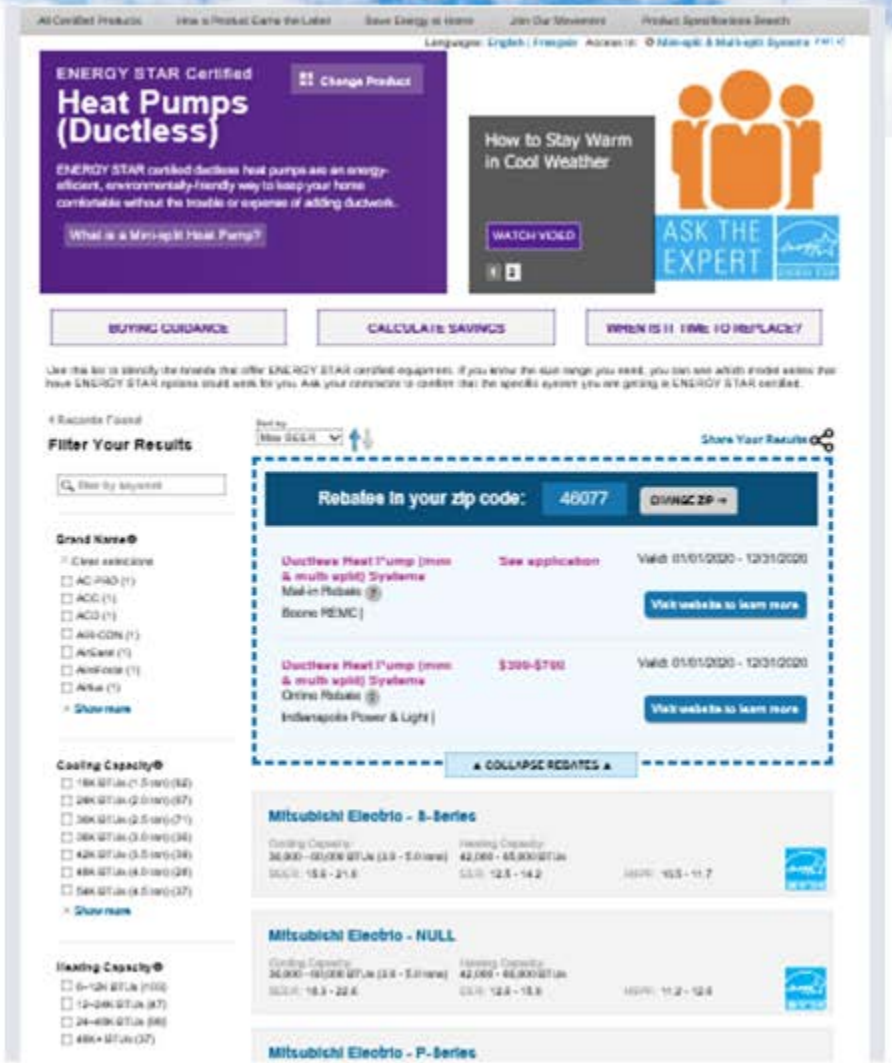
HVAC Campaign

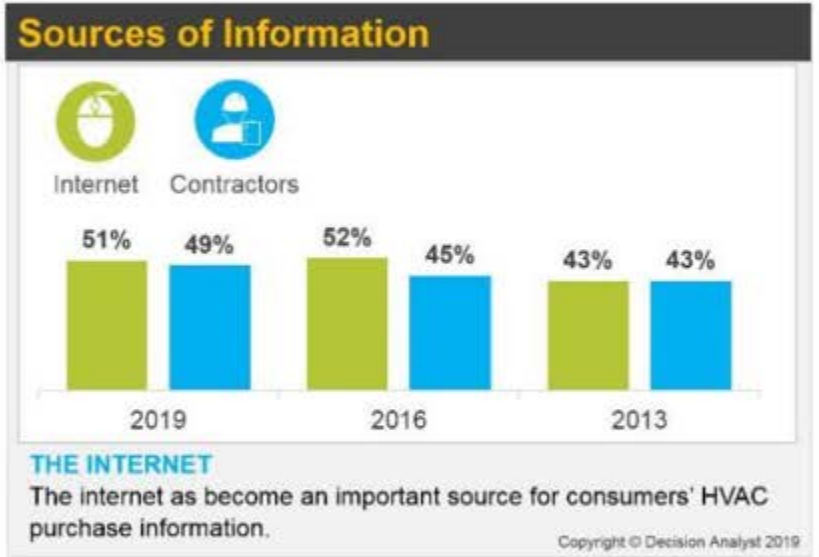
2. Product/Contractor Information Barrier
   - Developed a Product Finder that connects customers to brands and ENERGY STAR certified product lines that facilitate contractor support.
   - Updated CEE/AHRI links on existing product finder with an ENERGY STAR-focused experience that caters more to the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



HVAC Campaign

3. Consumer Awareness Barrier

– Implement awareness campaign that drives traffic to the HVAC Guide and Product Finder.
  - Campaign highlights benefits of ENERGY STAR certified HVAC:
    - Energy bill savings
    - Comfort
    - Rebates & Tax Credits
    - Environmental benefits



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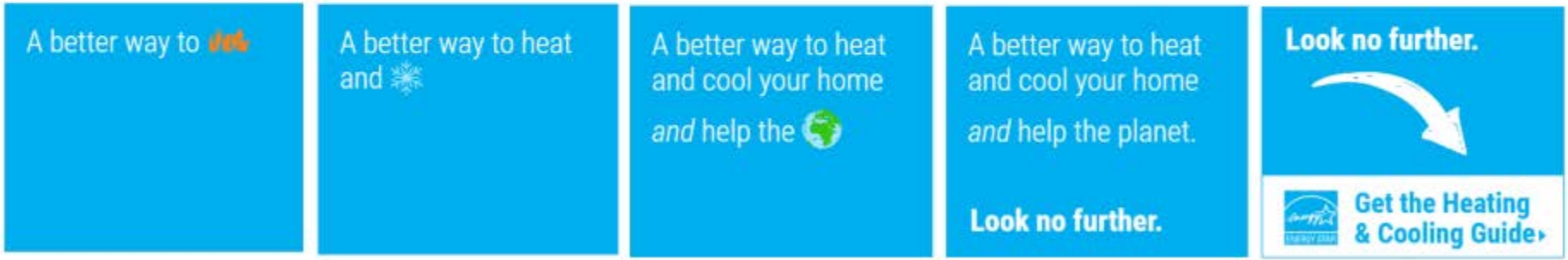
Spring 2020 HVAC Promotion Plan

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

EPA

Summer 2020 HVAC Promotion Plan

Goal

- Educate consumers about ENERGY STAR certified cooling options.
  - Includes RAC, smart thermostats and NEW! HVAC

Call to Action

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

Media Mix

- Social - Facebook
- :15 video and digital banners on Google Display Network

Fall 2020 Product Promotion Plans

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What Are the Annual Product Promotions?

- Bring together partner efforts across the country in united, product-focused, co-branded, campaigns – timed with product seasonality.
  - ✓ Reward ENERGY STAR partners by promoting their ENERGY STAR programs among our key audiences to drive mutual customer engagement and loyalty.

Co-Marketing Opportunities

- Facilitate and leverage promotional support from manufacturing and retail partners.
  - ✓ Point-of-sale, social media, and other co-marketing efforts.

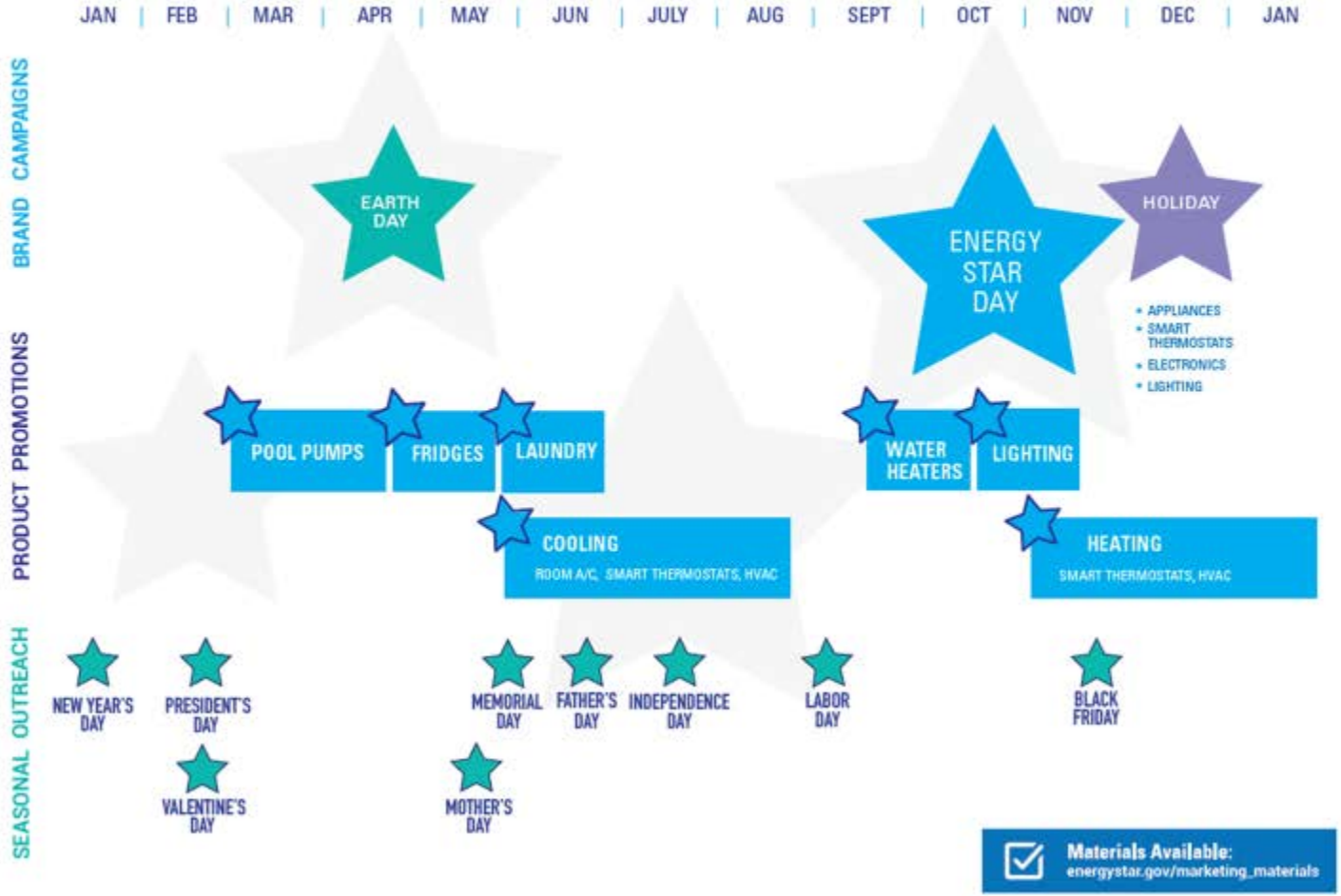
Resource Leveraging and Co-branding Opportunities

- Provide promotional materials and tools with compelling look and feel for effective consumer engagement and, ultimately, adoption.
  - ✓ Resources to support multiple media channels from online and social to more traditional advertising.

What EPA Will Be Doing in the Market

- Push out through a variety of media channels that drive impressions and traffic to ENERGY STAR Product Finder featuring utility-branded program incentives.
  - ✓ Unites customer with products and deals to effect conversion.

2020 Outreach Plan: ENERGY STAR® PRODUCTS



Materials Available:
energystar.gov/marketing_materials

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	Planning to Participate (as of 12/12)		2018 (Reference)
	Number of EEPS	Households Served	Households Served in 2018
Total	**148**	**42,836,658**	**42,553,295**
Pool Pumps	48	21,278,947	12,173,158
Refrigerators	37	17,289,297	14,355,889
LED Lighting	55	25,311,185	27,093,740
Smart Thermostats	20	21,997,806	23,440,072
Room AC	16	13,159,659	12,311,218
Laundry	37	20,405,506	24,507,452
Water Heaters	16	17,342,749	24,083,007


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AEP OHIO
An AEP Company
SIMPLE +SMART
TAKE CHARGE
APPALACHIAN POWER
aps
People. Power. Possibilities.
Central Hudson
A FORTIS COMPANY
TID
WATER & POWER
ALAMEDA MUNICIPAL POWER
neea
Clark Public Utilities
Colorado Springs Utilities
it's how we're all connected
BURBANK Water and Power
Always There for You!
CenterPoint Energy
Always There.
efficiency MAINE
EnergyTrust of Oregon
DP&L
Efficiency Vermont
Inland Power and Light Company
ComEd
An Exelon Company
powering lives
conEdison
Consumers Energy
Count on Us®
The Electric Company
El Paso Electric
pepco
An Exelon Company
focus on energy
Partnering with Wisconsin utilities
KCP&L
UG
SAVE SMART
Ameren
Hawai'i Energy
EFFICIENCYSMART
delmarva power
An Exelon Company
IDAHO POWER
An IDACORP Company
RG&E
energize CT
CONNECTICUT
Empowering you to make smart energy choices
EVERSOURCE ENERGY
UI
Unitil
mass save
Savings through energy efficiency
SDGE
A Sempra Energy utility
ENTERGY SOLUTIONS
AN ENTERGY MISSISSIPPI PROGRAM
Entergy
ppl
PPL Electric Utilities
NYSEG
SMUD
ipl
an AES company
Liberty Utilities
New Hampshire Electric Co-op
PSEG LONG ISLAND
We make things work for you.
New Mexico GAS COMPANY
AN EMERA COMPANY
ROCKY MOUNTAIN POWER
SoCalGas
A Sempra Energy utility
DTE Energy
PACIFIC POWER
nationalgrid
HERE WITH YOU. HERE FOR YOU.
SCE&G
A SCANA COMPANY
EPA
BPU
New Jersey's cleanenergy program
Xcel Energy
Seattle City Light
SOUTHWEST GAS
smarter greener better


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AO Smith
Innovation has a name.
LOWE'S
BEST BUY
beko
ecobee
PENTAIR
SAMSUNG
sears
HAYWARD
GE
greenlite
Kenmore
LG
Life's Good
Nest
available at
amazon
DAB
WATER•TECHNOLOGY
MaxLiTe
A NEW WAVE OF LIGHT
THE HOME DEPOT
Rheem
The new degree of comfort.
FRIEDRICH
1883
Walmart
EPA

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2019 Campaign Impacts:

energystar.gov

Promotional pages had more than **325,100** pageviews

MORE THAN **732 MILLION** IMPRESSIONS in print, social, and online media in 2019

MORE THAN **17,900** PLACEMENTS through NAPS and Brandpoint

5 MILLION VIDEO VIEWS

6.2 MILLION newsletters delivered

GroundTruth. Oath: A Verizon company Brandpoint NAPS NORTH AMERICAN PRESS SYNDICATE bobvila

EPA YouTube SHARETHROUGH Google Display Network

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HVAC Promotion Plan

- Work with Nate to identify how all market players can come together to create synergies around increasing demand for ENERGY STAR certified HVAC: Get to the "Ask".
  - Utilities programs and rebates
  - Manufacturer marketing support
  - Distribution and contractor support
- Target combination of markets with active programs and homes with potential for mini splits.
- Drive traffic to Heating and Cooling Guide.

Questions?

- If you have not submitted questions for Jill or Kevin, please use the chat to do so now.

- If you would like to be connected to an ENERGY STAR Account Manager, please email eeaccountmanager@energystar.gov

- Thank you to our presenters:
  - Kevin DeMaster, Mitsubishi, kdemaster@hvac.mea.com
  - Jill Vohr, EPA, Vohr.Jill@epa.gov
  - Nate Jutras, EPA, Jutras.Nathaniel@epa.gov