

Welcome!

HEAT PUMP SUMMIT

South Haven

September 9th, 2025



HOUSEKEEPING

Follow provided signs for Restrooms



WHAT IS THE MICHIGAN HEAT PUMP COLLABORATIVE?

- The Michigan Heat Pump Collaborative aims to remove barriers to increase the adoption of heat pumps in Michigan.
- It is designed to bring top tier heat pump education opportunities and resources to contractors supporting Michigan residents.
- We are here to support you!
- Sponsored by:

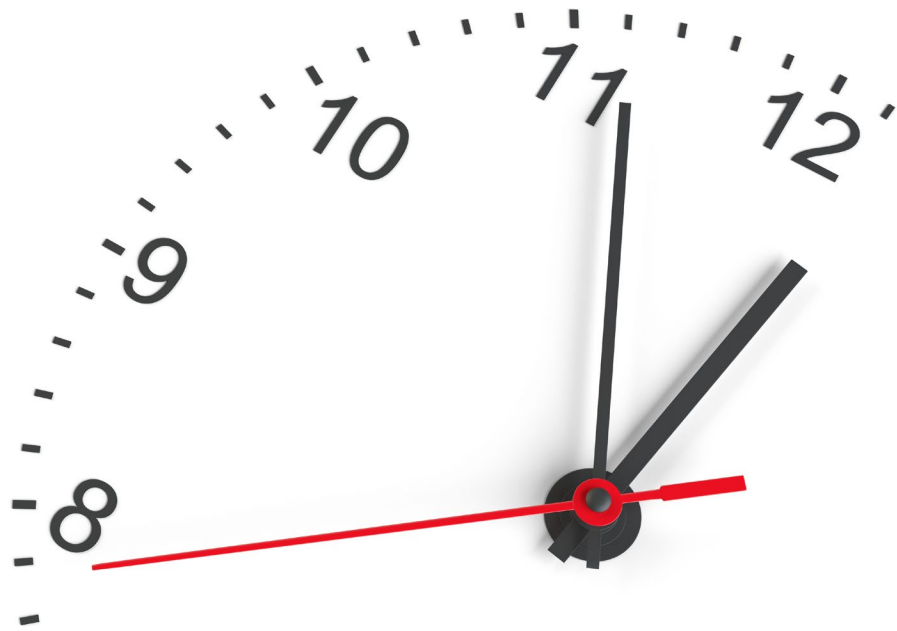


Climate + Clean Energy Solutions for everyone.

The knowledge, people, and
resources to solve our biggest
energy challenges.



MORNING AGENDA



Time	Session
9:30 – 9:45	Welcome & Event Overview
9:45 – 10:15	Incentives and Rebates
10:15 – 10:30	Break & Networking
10:30 – 11:00	Value of Heat Pump Discussion
11:00 – 11:30	Contractor Success Story w/ Bowen Heating & Cooling
11:30 – 12:30	Lunch and Networking

AFTERNOON AGENDA

Time	Session
12:30 - 1:30	Destination Training 1
1:30 – 2:30	Designation Training 2
2:30 – 3:30	Designation Training 3 + Closing



BENEFITS OF GRADUATE DESIGNATION

- Help connect you to customers looking to install heat pumps
- Promote the designation on your website/social/materials
- Listed on our contractor search tool
- Access to educational resources for your customers





WHAT IS A HEAT PUMP?

RESIDENTIAL ELECTRIC HEAT PUMPS

■ Air-to-air

- Minisplit heat pumps
- Centrally ducted heat pumps
- Dual-fuel heat pumps

■ Air-to-water heat pumps

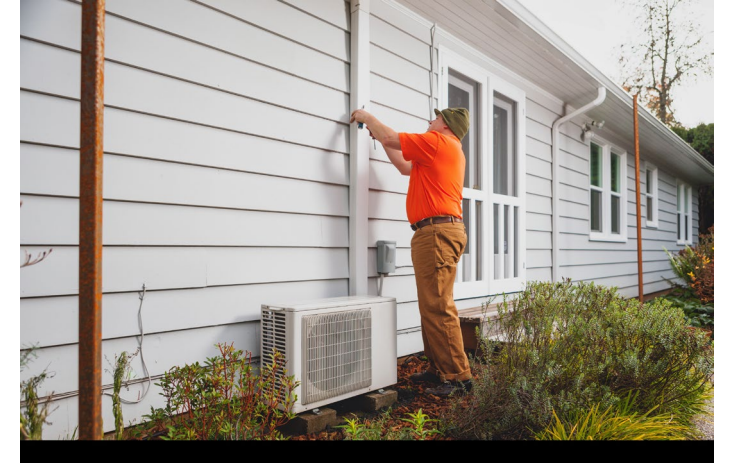
■ Ground source heat pumps

■ Heat pump water heaters

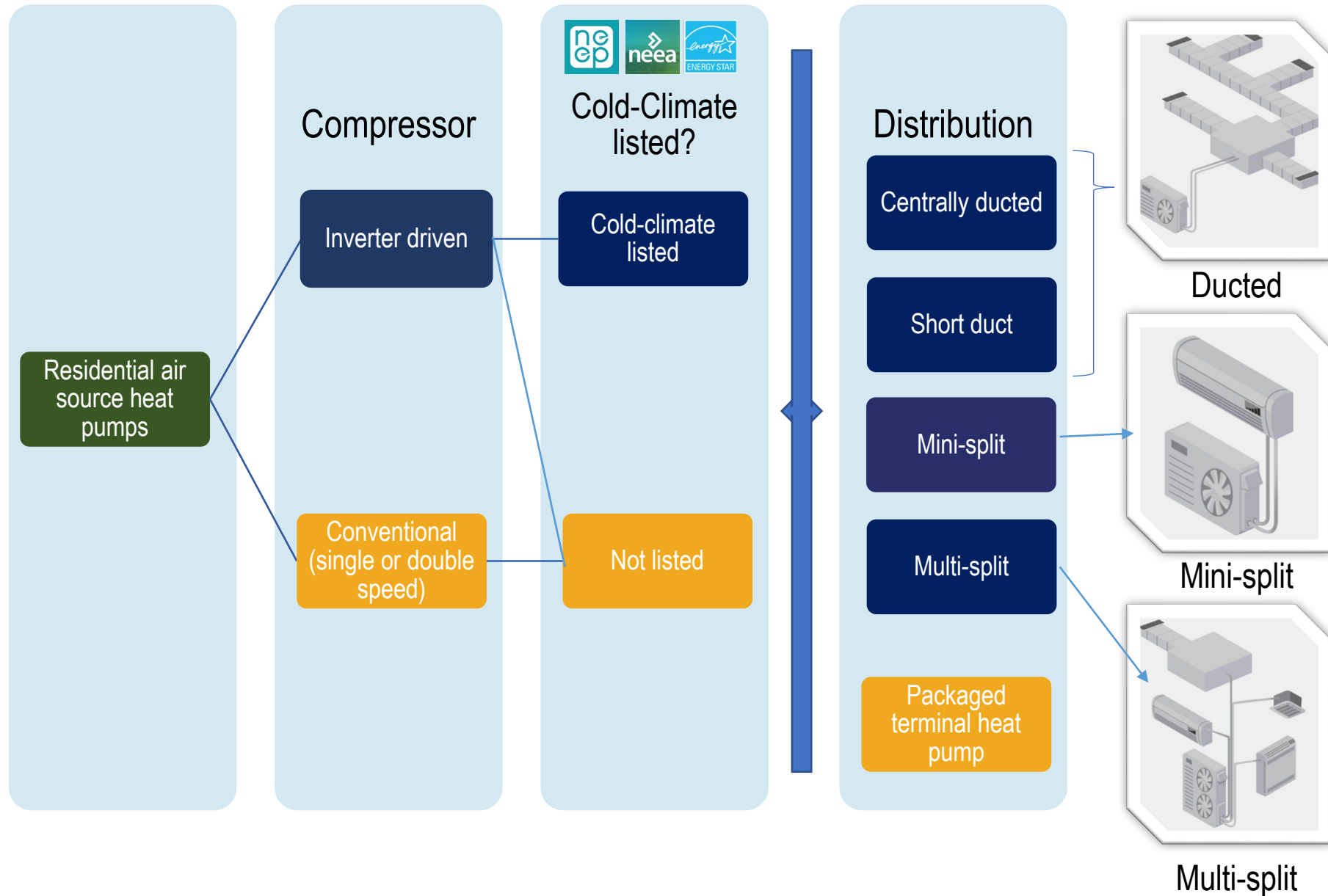
■ Commercial heat pumps

- VRF heat pumps
- RTU heat pumps
- Central heat pump water heaters

■ Industrial heat pumps



HEAT PUMP TAXONOMY



HEAT PUMP WATER HEATERS PERFORMANCE

- Available since 2009
- Great technology for replacing electric resistance water heaters in basements of single-family homes
- Advanced features that homeowners want
- No detectable space heating impact

Baseline	Operating Cost Savings	
	Heat Pump Mode	Hybrid Mode
Electric Resistance	\$304	\$274
Propane	\$213	\$182
Natural Gas	\$19	\$ -12

Source: Michigan HPWH field study (2022)

Heat pumps outsold gas furnaces by their biggest-ever margin in 2024



Takemura, A. F. (2025, February 20). *Heat pumps outsold gas furnaces by their biggest-ever margin in 2024*. Canary Media.
<https://www.canarymedia.com/articles/heat-pumps/heat-pumps-keep-widening-their-lead-on-gas-furnaces>
Both title and interactive graph pulled from article

Heat pumps continue to outsell gas furnaces in the U.S.

Units shipped per year



Source: Air-Conditioning, Heating, and Refrigeration Institute, Canary Media



HYBRID / DUAL FUEL FIELD PERFORMANCE

	Compressor Speed	Incremental cost	Propane reduction	Simple payback	Lockout (°F)
1	Variable	\$2,600	64%	4 years	20
2	Variable	\$3,200	50%	5 years	25
3*	Variable	\$2,400	41%	9 years	30
4	Variable	\$2,600	67%	3 years	None
5	Two	\$900	59%	2 years	None
6	Five	\$2,000	43%	7 years	28
7	One	\$700	34%	3 years	20
8	One	\$600	63%	1 year	25



*On NEEP cold-climate qualification list

Source: [MI Dual Fuel Heat Pump Field Study](#) (2020)

AIR SOURCE HEAT PUMPS IN COLD CLIMATES

**IN 2025, HEAT PUMPS CAN ABSOLUTELY WORK IN
COLD CLIMATES!**

- Cold Climate ASHPs offer promise for large site energy savings and emissions reductions
- Many models work at very cold design temperatures
- They still have capacity limitations compared to space heating needs

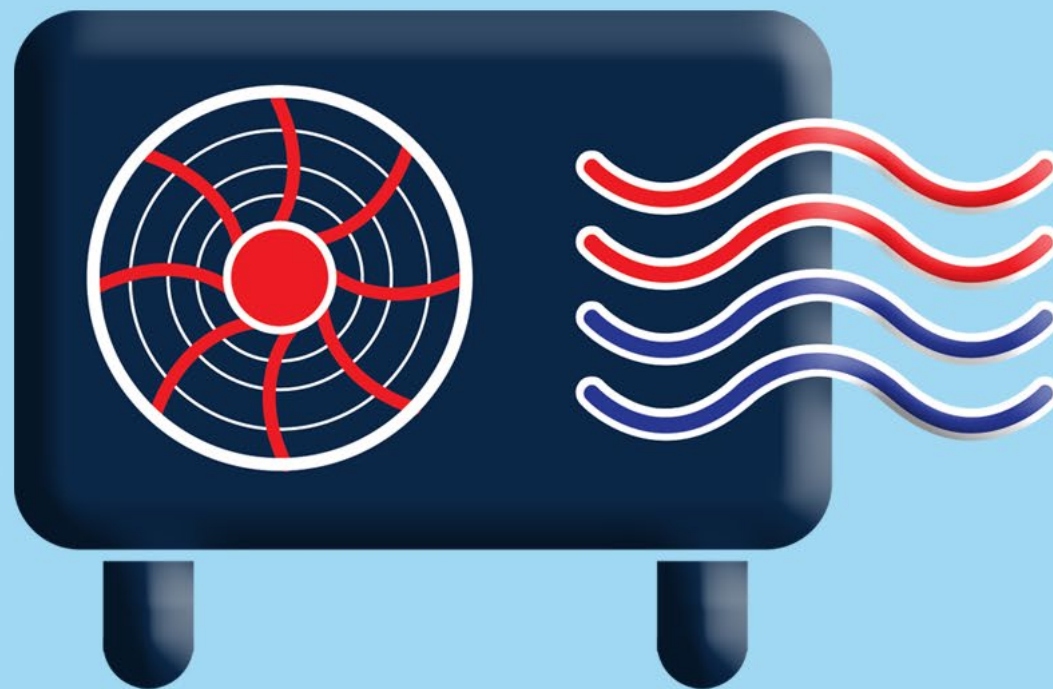
NEEP'S COLD CLIMATE AIR SOURCE
Heat Pump List

< 1 2 3 4 5 6 7 8 9 10 > (115754 Heat Pumps)

View	Brand Name	AHRI Reference #	Ducting Config
🔗	GREE	7425275	Multizone All Ducted
🔗	GREE	8654210	Multizone All Ducted
🔗	TOSOT	9128596	Multizone All Ducted
🔗	GREE	9410052	Multizone All Ducted
🔗	HAIER	10316372	Multizone All Ducted
🔗	HAIER	10316378	Multizone All Ducted
🔗	mitsubishi electric	201754441	Multizone All Ducted
🔗	mitsubishi electric	201754643	Multizone All Ducted
🔗	mitsubishi electric	201754906	Multizone All Ducted
🔗	mitsubishi electric	201754907	Multizone All Ducted
🔗	PAYNE	201847066	Multizone All Ducted
🔗	PAYNE	201847069	Multizone All Ducted
🔗	PAYNE	201847070	Multizone All Ducted
🔗	MIDEA	201847071	Multizone All Ducted
🔗	MIDEA	201847074	Multizone All Ducted
🔗	MIDEA	201847075	Multizone All Ducted
🔗	CARRIER	201863358	Multizone All Ducted
🔗	CARRIER	201863360	Multizone All Ducted
🔗	BRYANT	201863364	Multizone All Ducted
🔗	BRYANT	201863366	Multizone All Ducted

<https://ashp.neep.org/>

Heat Pumps 101





INCENTIVES, TAX CREDITS, FINANCING, & RESOURCES

AGENDA

- Indiana-Michigan Power
- Consumers Energy
- DTE
- Holland BPW
- Michigan Saves
- MiHER



An **AEP** Company

Indiana Michigan Power (I&M) **Midstream Incentives Program** for Residential & C&I

MI Heat Pump Summit – South Haven



An **AEP** Company

Agenda

- Program Overview
- Eligibility Requirements
- Incentive Structure
- Participation Process
- Contractor Resources



An **AEP** Company

Program Overview

Midstream Program Overview

The program is designed to promote the sale and installation of high-efficiency replacement **HVAC and Heat Pump Water Heating (HPWH) equipment** to drive energy savings and improve efficiency.

- **Energy Efficiency Impact**

Drives energy efficiency in the residential and commercial & industrial (C&I) sectors by offering accessible, incentivized HVAC and HPWH equipment options through distributors.

- **Distributor Collaboration**

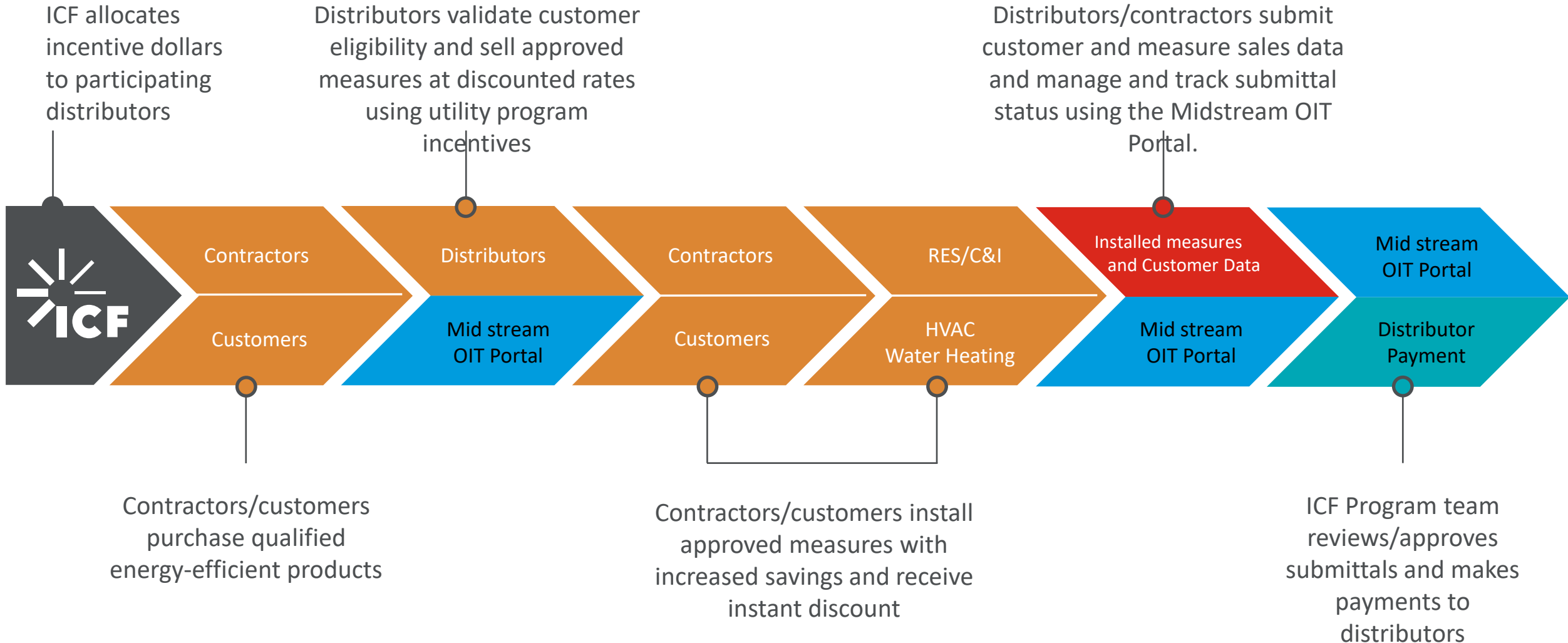
Partners with HVAC/ HPWH distributors to promote and deliver energy-efficient products, increasing market penetration.

Targeted Sectors

- **Residential:** Focuses on households seeking energy savings and improved comfort.
- **Commercial & Industrial (C&I):** Helps businesses lower operational energy costs while contributing to sustainability goals.



Midstream Workflow





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Eligibility Requirements



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Customer Eligibility



Residential and Commercial Indiana Michigan Power Customers

- The HVAC and Heat Pump Water Heating system must be installed within the Indiana Michigan Power distribution service territory.
- The fuel service must correspond with the fuel used by the installed equipment. A service territory map and steps for verifying customers are provided in the Program Guide.
- Distributors and Contractors will have access to ICF's Online Intake Tool (OIT) that will allow them to verify a customer's eligibility for Program participation.
- This excludes Commercial and Industrial customers who have opted out of eligibility for any Indiana Michigan Power efficiency programs.



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Building & Equipment Eligibility

Building Eligibility

- All building types and new home construction are eligible to participate in the program
- Incentive applications must include the building type.

Equipment Eligibility

- Only HVAC and HPWH systems that meet program requirements are eligible.
- Requirements differ for Residential vs. Commercial customers.
- Incentive amounts and criteria are outlined in the 2025 Incentive Structure.

The tables in that section provide the following information:

- Type of Equipment being purchased/installed. For example, *Air Source Heat Pump*
- Cooling efficiency rating. For example, *Seasonal Energy Efficiency Ratio 2, or SEER2*
- Heating efficiency rating. For example, *Heating Seasonal Performance Factor 2, or HSPF2*
- Cooling equipment efficiency. For example, *Energy Efficiency Ratio 2, or EER2*.



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Incentive Structure

Residential Measures | IN & MI

		Minimum Efficiency Requirements			
Eligible Equipment	Minimum Incentive per Unit	SEER2	HSPF2	EER2	COP
Air-Source Heat Pumps (Split and Packaged Ducted Systems)	\$195	15.2	7.8	9.8	N/A
	\$255	16	8	9.8	
	\$315	17	8	9.8	
	\$375	18	8.1	9.8	
	\$480	21	8.1	9.8	
Cold Climate Heat Pumps (Split, Packaged Ducted and Non-Ducted Systems)	\$540	15.2	8.4	9.8	2
	\$600	16	9.1	9.8	2.2
Central Air Conditioners (Split and Packaged Systems)	\$105	15.2	N/A	9.8	N/A
	\$135	16		9.8	
	\$180	17		9.8	
	\$300	18		9.8	
Ductless Heat Pumps	\$315	17	8.1	9.8	N/A
	\$420	19	8.4	9.8	
	\$480	21	8.4	9.8	
	\$600	23	8.4	9.8	
Equipment Type	Minimum Incentive per Water Heater	UEF			
Heat Pump Water Heaters	\$420	2.6			
Equipment Type	Minimum Incentive per Thermostat				
Wi-Fi-Enabled Thermostat	\$30	N/A			
Smart Thermostat ENERGY STAR® Rated	\$45	ENERGY STAR			



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C&I Measures | IN & MI

Equipment Type	Minimum Incentive per Ton	Minimum Efficiency Requirements			
		SEER2	HSPF2	EER2	
Air Conditioner - Split (< 5.4 Tons)	\$45	15.2	N/A	9.8	N/A
	\$60	16		9.8	
	\$75	17		9.8	
	\$90	18		9.8	
	\$120	21		9.8	
Air Conditioner - Packaged (< 5.4 Tons)	\$45	15.2	N/A	10.6	N/A
	\$60	16		10.6	
	\$75	17		10.6	
	\$90	18		10.6	
	\$120	21		10.6	
Heat Pump - Split (< 5.4 Tons)	\$60	15.2	7.8	9.4	N/A
	\$75	16	8	9.4	
	\$84	17	8	9.4	
	\$99	18	8.1	9.4	
	\$105	21	8.1	9.4	
Heat Pump - Packaged (< 5.4 Tons)	\$60	15.2	7.8	8.8	N/A
	\$75	16	8	8.8	
	\$84	17	8	8.8	
	\$99	18	8.1	8.8	
	\$105	21	8.1	8.8	

Equipment Type	Minimum Incentive per Unit	SEER2	HSPF2	EER2	COP
Cold Climate Heat Pump (< 5.4 Tons)	\$540	15.2	8.4	9.8	2
	\$600	16	9.1	9.8	2.2
Equipment Type	Minimum Incentive per Unit	EER	COP		
PTAC - < 7,000 Btu/h	\$30	12.7	N/A	N/A	N/A
PTAC - 7,000 to 15,000 Btu/h	\$30	12.7			
PTAC - > 15,000 Btu/h	\$30	11.2			
Equipment Type	Minimum Incentive per Unit	EER	COP		
PTHP - 7,000 to 15,000 Btu/h	\$45	12.6	3.5	N/A	N/A
PTHP - > 15,000 Btu/h	\$45	11.2	3.5		
Equipment Type	Minimum Incentive per Water Heater	UEF			
HPWH - 20 to 120 Gallon	\$360	2.6			
Equipment Type	Minimum Incentive per Ton	IEER	COP	EER	
Air Conditioner - (≥ 5.4 Tons and < 11.25 Tons) - Tier 1	\$27	15.3	N/A	11.3	N/A
Air Conditioner - (≥ 5.4 Tons and < 11.25 Tons) - Tier 2	\$30	15.8		11.8	
Air Conditioner - (≥ 11.25 Tons and < 20 Tons) - Tier 1	\$27	14.7		11.1	
Air Conditioner - (≥ 11.25 Tons and < 20 Tons) - Tier 2	\$30	15.1		11.6	
Air Conditioner - (≥ 20 Tons and < 63.3 Tons) - Tier 1	\$21	13.6		10.1	
Air Conditioner - (≥ 20 Tons and < 63.3 Tons) - Tier 2	\$24	14.1		10.6	
Heat Pump - (≥ 5.4 Tons and < 11.25 Tons)	\$75	15.1	3.5	11.6	N/A
Heat Pump - (≥ 11.25 Tons and < 20 Tons)	\$60	14.3	3.4	10.9	
Heat Pump - (≥ 20 Tons and < 63.3 Tons)	\$45	14.3	3.4	10.9	



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Participation Process

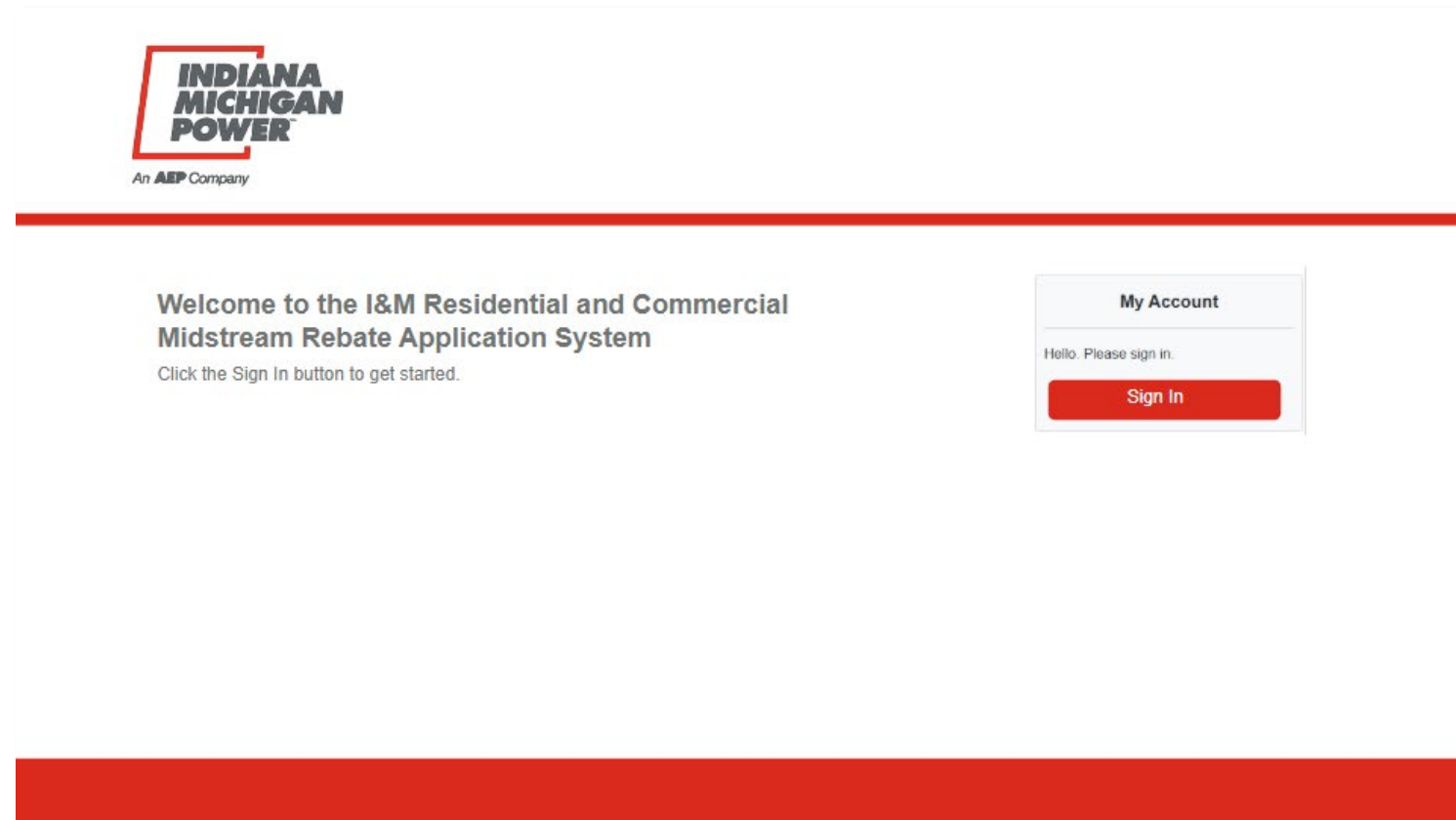


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Midstream Online Intake Tool (MOIT)



- Also allows contractors to submit and manage applications
- Supports verification of customer eligibility with built in look up feature



Marketing Materials

Distributor Marketing Materials

- Distributor Marketing Guidebook
- Contractor Recruitment Flyer
- Consumer Facing Flyer
- Distributor Point of Sale Materials
- Poster and Counter Mat
- Website Display

Contractor Marketing Materials

- Program Fact Sheet
- Recruitment One Pager
- Tailored Contractor Training
- Program Education
- E-Newsletters
- Window Clings



Midstream – HVAC Instant Discounts

Instant Discounts for HVAC Equipment

Welcome to the I&M HVAC Instant Discount Program, where upgrading your home's heating and cooling system goes beyond just temperature control—it's about enhancing your living space, reducing your environmental footprint, and making smart financial choices.

Imagine your home perfectly comfortable in every season, operating whisper quiet, and delivering cleaner air—all while your



Midstream – Distributor Incentives

Distributor Incentives for HVAC and Lighting Equipment

The Midstream program delivers discounts and incentives through distributors. It helps customers upgrade to energy-efficient HVAC and lighting equipment supplied by distributors at a more affordable price.

Distributors can become a Participating Partner if you purchase qualified products from or are a manufacturer of qualified



An **AEP** Company

Contractor Resources



Contractor Resources

Air-Source Heat Pumps

Heat Pump Water Heaters



Image credit: Trane

Origin Story-Air Source Heat Pumps (ASHP)

1992: ENERGY STAR® Program Launches

- Goal: Help consumers, businesses, and industry save money and protect the environment through the adoption of energy-efficient products and practices
 - Computers/monitors first rated products

1995: First HVAC Products Certified

- Highest energy user in home



2022: Heat pump sales eclipse gas furnace sales

- Trend continued in 2023



Heating and cooling can be **up to 50%** of a home's energy use.

For some households this can be **\$800/yr or more.**

Origin Story-Heat Pump Water Heaters (HPWH)

2009: Water heaters 1st rated

- 2nd highest energy user in home
- GE Geo Spring 1st certified electric heat pump water heater
- HPWH use 2,500+ fewer kWh/year than standard electric water heaters

Now: HPWHs now present the **largest single savings opportunity** of the nearly 70 ENERGY STAR product categories



Water heating is the **2ND LARGEST** expense in U.S. homes, accounting for 19% of homes utility bills

\$400-600
The amount of money the average household spends on water heating **EACH YEAR**



ICF Product Sales & Marketing Teams



Access to tools that increase education/awareness of HP/HPWH

- ✓ Product/Installer/Retailer Finder
- ✓ Data sheets/Selling and Purchasing Guides
- ✓ “Ask The Expert” Articles and Newsletters
- ✓ National Outreach and Media Options
- ✓ **Workforce Training** and Education Assets



Access to Industry Partnership Network

- ✓ ENERGY STAR
- ✓ Department of Energy (DOE)
- ✓ Manufacturers Action Councils
- ✓ Utilities and their third-party implementers
- ✓ Distributors
- ✓ Retailers (national/regional)
- ✓ Home Builders
- ✓ Advanced Water Heating Initiative (AWHI)

Meaningful tools for you-ASHP

Pre-sales cheat sheet



ENERGY STAR Certified
Air Source Heat Pumps
Contractor Guide and Sell Sheet



An ENERGY STAR certified heat pump offers efficient heating and cooling by transferring heat into the home in winter and out in summer. As this technology gains popularity, contractors should understand its benefits and incorporate it into their business models.

Benefits of Air-Source Heat Pump Technology

ENERGY STAR heat pumps cut heating costs by up to 60% compared to conventional systems by transferring heat instead of generating it. They provide efficient cooling with quiet operation and adjustable speeds to save energy and money, offering both heating and cooling in one device.

Get Ahead

Stocking HVAC heat pump equipment is a smart move as its popularity surges and upcoming legislation and electrification trends create a lucrative opportunity. By preparing now to sell and install these systems, you can stay ahead of the competition.

Lower First-Cost

ENERGY STAR heat pumps qualify for a 30% federal tax credit on unit and installation costs (up to \$2,000/year) plus utility rebates in many areas, offering a quick ROI. Visit www.energystar.gov/taxcredits for more info.

Trusted Technology:

Installers are now installing thousands of heat pump units nationwide, and many thousands more units are shipped monthly. Installers are achieving success in all climate zones, including cold climates.

Customer Demand

ENERGY STAR is leading a nationwide campaign to raise awareness and guide consumers toward certified installers.

Proper Installation Delivers Success

Following heat pump installation best practices ensures a high-quality customer experience and avoids callbacks. ENERGY STAR offers [free professional training and resources](#) so you can leverage expert insights, refresh your knowledge of best practices, and successfully navigate installation challenges.



United States
Environmental Protection
Agency

Air Source Heat Pumps: Contractor Guide | 1

[Link](#)

Product factsheet



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 \$1,900 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.

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 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 4,500lbs of greenhouse gas emissions, on average, over the course of their lifespan compared to standard systems.

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 putting 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.

WINTER

Heat from the outside air is absorbed by refrigerant in the outdoor unit.

SUMMER

Refrigerant is switched and releases heat into the air.

Heat from indoor air is carried to the unit and cooled, as indicated through outside ductwork.

Heat from indoor air is carried to the unit and cooled, as indicated through outside ductwork.

Figure 1. How an ASHP Works in Winter and Summer

ENERGY STAR® is the simple choice for energy efficiency. For more than 25 years, EPA's ENERGY STAR program has been America's resource for saving energy and protecting the environment. Learn more at energystar.gov/products/air_source_heat_pumps.



[Link](#)

Tax guidance sheet



Federal Tax Credits for Energy Efficient
Home Improvement Projects
Heat Pumps and Heat Pump Water Heaters

The Inflation Reduction Act provides federal income tax credits that are specially targeted to home owners that make energy efficient home improvements involving heat pump technology - 30% of project costs, up to \$2,000 annually. Lower the cost of home improvements with ENERGY STAR certified products that are designed to save money on utility bills each month.

Tax Credits for Energy Efficiency Improvements

- **Total Annual Limit:** The \$2,000 heat pump credit can be combined with credits up to \$1,200 for other qualified upgrades made in one tax year.
- **Effective Date:** Products purchased and installed between January 1, 2023, and December 31, 2032.
- **Tax Credit:** An amount taxpayers can claim on their federal tax return to reduce income tax owed.
- **Who Qualifies:** Must be an existing home (i) principal residence (owned or rented). Does not apply for new construction and rental properties.
- **What to Keep:** Customers should keep their receipts and any relevant materials, such as product labels, that identify the purchased product.



Get zip-code based information on utility and state rebates, to reduce project costs even further.

Upgrading to Heat Pump Technology

	Homeowner Can Claim	Maximum Credit Amount	What products are eligible?
Air Source Heat Pumps	30% of project costs	Up to \$2,000 per year on total heat pump upgrades	Ducted US Southern Tier: All that have earned the ENERGY STAR label US Northern Tier: ENERGY STAR Cold Climate that have an EER2 > 10
Heat Pump Water Heaters			Ductless (Mini-split) US Southern Tier: ENERGY STAR certified with SEER2 > 16, EER2 > 12, SCOP2 > 9 US Northern Tier: ENERGY STAR certified cold climate with SEER2 > 16, SEER2 > 9, SCOP2 > 9.5 Verify Product Eligibility at www.energystar.gov/about/federal-tax-credits/energy-efficient-home-improvements
Electric Panel Upgrade			Heat pump water heaters that have earned the ENERGY STAR are eligible for this credit. Verify Product Eligibility at www.energystar.gov/about/federal-tax-credits/heat-pump-water-heaters

Any improvement to, or replacement of, a panelboard, sub-panelboard, branch circuit, or feeders which (1) is installed in a manner consistent with the National Electric Code, (2) has a load capacity of not less than 200 amps, and (3) is installed in conjunction with, and enables the installation and use of a heat pump or heat pump water heater.

Heat pump HVAC and heat pump water heaters are key elements of an **ENERGY STAR Home Upgrade** - a set of six home improvements designed to work together to save energy, save you money and help protect the climate. Learn more at energystar.gov/homeupgrade.

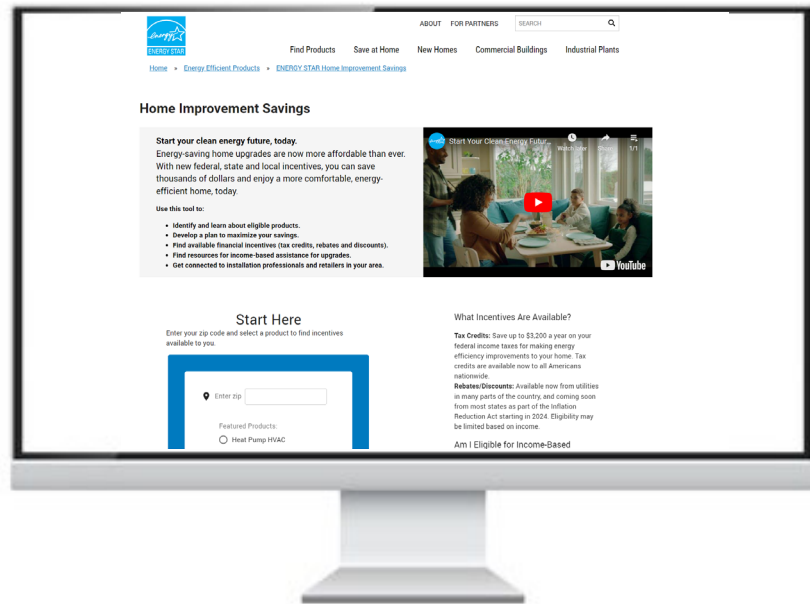


United States
Environmental Protection
Agency

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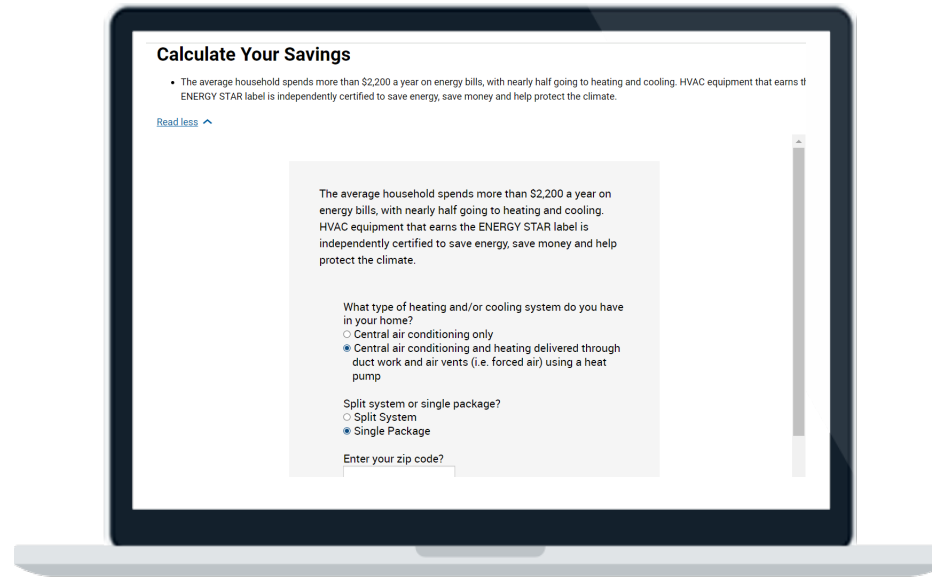
Online resources-ASHP

Home Improvement Savings Tool



[Link](#)

Savings estimate calculator



[Link](#)



[Link](#)

What's next-ASHP

- ✓ Heat Pump Sizing Calculator (launching soon)
- ✓ Heat Pump Installer Finder (launching soon)
- ✓ Contractor Sales and Training Materials Portal
- ✓ Cold Climate factsheet



Fact Sheets and Buying Guides-HPWH

- Overcome lack of consumer and trade ally awareness about the technology and its viability
- The ENERGY STAR certified HP/HPWH fact sheet and sales guide demystifies the technology for:
 - ✓ Installers and Product Advocates
 - ✓ Retail Sales Associates
 - ✓ Program Outreach Staff

Hot Water, Hotter Savings with ENERGY STAR® Certified Electric Water Heaters

Good for You, Good for the Climate
Super Efficient in All Climates: Electric water heaters that earn the ENERGY STAR are up to 4 times more efficient than conventional electric water heaters. Heat pump water heaters use a hybrid system that reliably and efficiently produces hot water in both warm and cold climates.

Reliable and Safe: Heat pump water heaters are a proven, reliable technology backed by decades of research and testing. They are healthier and safer for your home because they use 100% electricity instead of gas, oil, or propane.

Overcoming Common Objections
They will make my house cold.

Hot Water, Hotter Savings with ENERGY STAR® Certified Electric Water Heaters

Safety, Reliability, and Performance

- ENERGY STAR Heat Pump Water Heaters come with a standard 6-year manufacturer warranty.
- Heat pumps have been around for decades and are a proven, reliable technology.

An Eco-Friendly Option

- ENERGY STAR Heat Pump Water Heaters reduce greenhouse gas emissions and are among the most environmentally friendly options for water heating.
- Heat Pump Water Heaters are 100% electric. They make hot water safely without burning fuel.

Rebates and Tax Credits

- ENERGY STAR certified Heat Pump Water Heaters are eligible for a \$300 federal tax credit, as well as generous utility rebates in many parts of the country. Combined with the energy savings, this means they quickly pay for themselves.

Connectivity and Smart Controls

- Heat Pump Water Heaters include amenities which make ownership easy and rewarding.

ENERGY STAR Certified Electric Water Heaters

Save Now with ENERGY STAR Certified Electric Water Heaters!
Water heaters use about 20% of a home's energy—more than your refrigerator, clothes washer, dishwasher, and dryer combined. ENERGY STAR certified electric water heaters use proven advanced technology to do the job with significantly less energy than standard models, making them the best choice for your home.

Get Convenience, Insight, and Control with ENERGY STAR.
Electric water heaters that earn the ENERGY STAR label (also known as heat pump water heaters) are independently certified to meet strict energy efficiency criteria set by the U.S. Environmental Protection Agency, saving you energy and money, and protecting the climate. ENERGY STAR certified heat pump water heaters:

- Are up to four times more efficient than conventional water heaters.
- Can save a family of four approximately \$470 in annual energy savings and more than \$4,500 over the product's lifetime. (See Table 1.)
- Come with a minimum 6-year warranty and last a long time.
- Feature user controls for comfort and convenience.

Table 1. ENERGY STAR Certified Water Heater Savings based on Size of Household

Household Size (people)	Annual Savings	Payback (years)	Lifetime Savings
2	\$230	5.4	\$1,530
3	\$350	4.2	\$3,050
4	\$470	3.5	\$4,570

The investment in a super-efficient electric water heater, can quickly pay for itself with the savings on your energy bill. What's more, homeowners can take advantage of a \$300 federal tax credit and many utilities offer big rebates for purchasing ENERGY STAR certified water heaters. Check with your local utility for more details or go to energystar.gov/rebatefinder. Learn more about available tax credits at energystar.gov/taxcredits.

All these incentives, on top of 70% in reduced energy costs, add up to the hottest savings ever with ENERGY STAR certified electric water heaters.

What Makes ENERGY STAR Certified Electric Water Heaters So Efficient?
ENERGY STAR certified electric water heaters save energy by transferring heat from the surrounding air to the water in the storage tank—essentially a refrigerator on its reverse. It takes much less power to move heat from one place to another than to generate heat (like a typical electric water heater does via hot electric resistance coils).

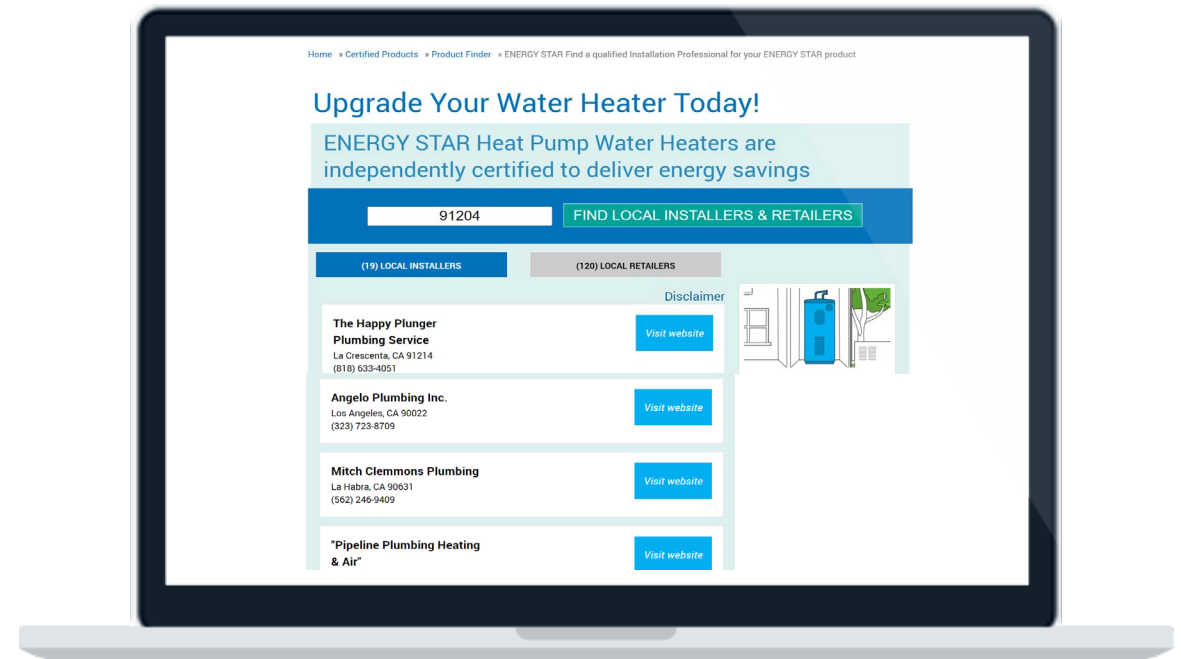
ENERGY STAR is the simple choice for energy efficiency. For more than 25 years, EPA's ENERGY STAR program has been America's resource for saving energy and protecting the environment. Learn more at energystar.gov/products/heat_pump_water_heaters.

Developed in collaboration with product manufacturers

www.energystar.gov/marketing_materials

Tools & Resources: HPWH Installer Finder

- Overcomes difficulty finding installers who carry and will install HPWHs
- The ENERGY STAR HPWH Installer Finder provides customers with nearby contractors who have completed manufacturer sales and product training
- The installer finder is supported by:

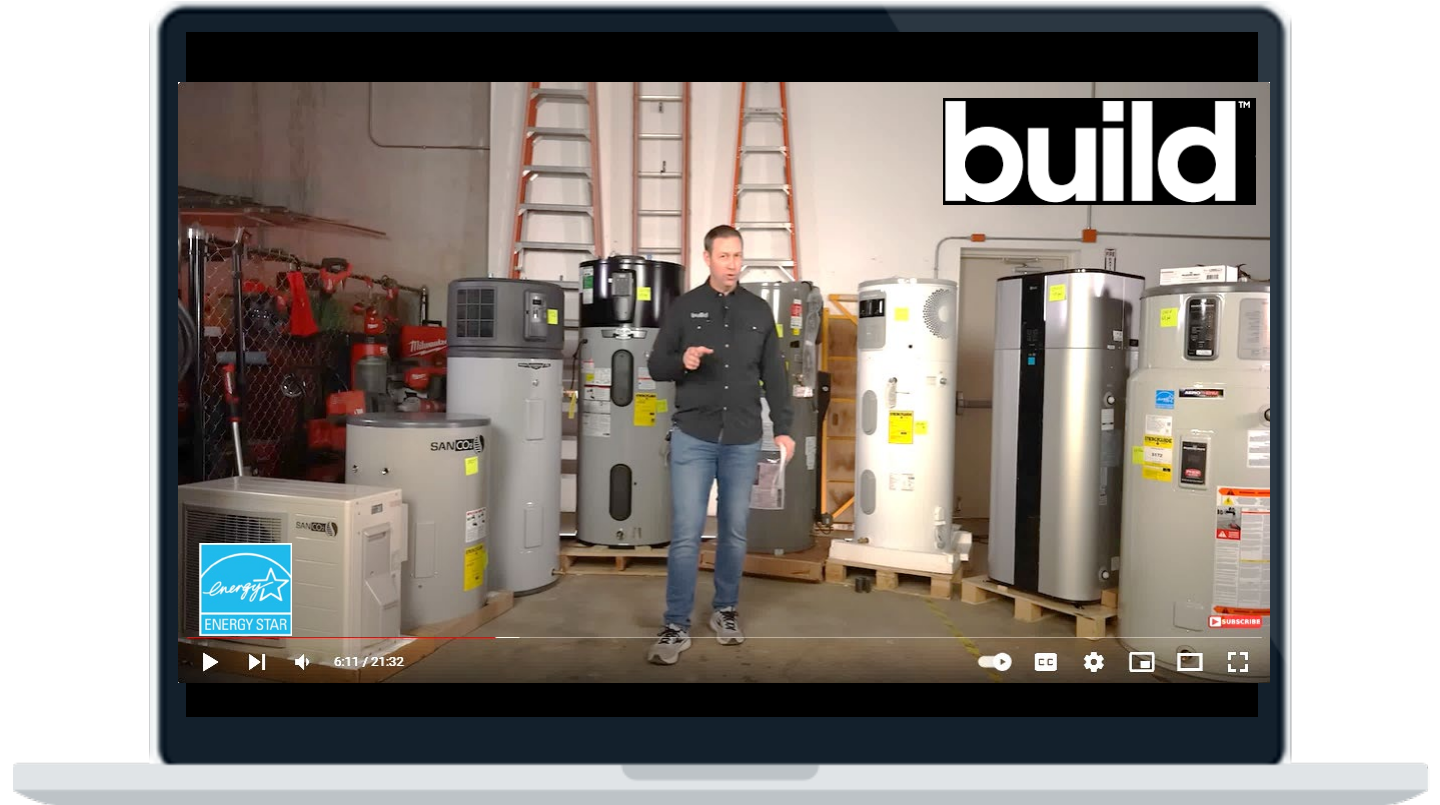


energystar.gov/productfinder/water-heater-installers/

The Build Show HPWH video w/ Matt Risinger

ENERGY STAR teamed up with Matt Risinger at **The Build Show** this year to compare different water heater types and explain how ENERGY STAR certified HPWHs can save households hundreds of dollars on energy costs each year.

[Find it here](#)



2M+ channel subscribers

ENERGY STAR Heat Pump Water Heater Manufacturer Action Council (ESMAC)



What can ESMAC do for you?

- Manufacturer product/sales **training** with facilitation support from ENERGY STAR
- Collaborative **marketing** – develop co-brand, multi-channel marketing collateral
- Sales **channel engagement** - access and support from retail and distribution partners
- Let's try new, creative things together – market priming
- Contact Paul Campbell (paul.campbell@icf.com) to start your journey



An **AEP** Company

Thank you!

Joy McNay, Senior Program Manager

Joy.mcnay@icf.com

Paul Campbell, Director-Energy & Sustainability Marketing

Paul.Campbell@icf.com

Consumers Energy Multifamily Program

Heat Pump Water Heaters Incentives

SECTION 4: IN-UNIT HEAT PUMP WATER HEATER TANKS

Specifications

- Heater must replace a standard efficiency electric resistance water heater.
- New heater must be ENERGY STAR® Qualified and meet the qualifying efficiency rating listed in the measure name.
- Storage capacity must be ≤55 gallons

ID		MEASURE	\$	QTY
WT401		ENERGY STAR® Heat Pump Water Heater, UEF ≥2.0	\$500.00 / Unit	
WT402		ENERGY STAR® Heat Pump Water Heater, UEF ≥2.5	\$550.00 / Unit	
WT403		ENERGY STAR® Heat Pump Water Heater, UEF ≥3.0	\$600.00 / Unit	
WT404		ENERGY STAR® Heat Pump Water Heater, UEF ≥3.5	\$650.00 / Unit	

Mark Rate

Income Qualified

SECTION 4: IN-UNIT HEAT PUMP WATER HEATER TANKS

Specifications

- Heater must replace a standard efficiency electric resistance water heater.
- New heater must meet the qualifying efficiency rating listed in the measure name.
- Storage capacity must be ≤55 gallons.

ID		MEASURE	\$
WT401		ENERGY STAR® Heat Pump Water Heater, UEF ≥2.0	\$1,700.00 / Unit
WT402		ENERGY STAR® Heat Pump Water Heater, UEF ≥2.5	\$1,900.00 / Unit
WT403		ENERGY STAR® Heat Pump Water Heater, UEF ≥3.0	\$2,100.00 / Unit
WT404		ENERGY STAR® Heat Pump Water Heater, UEF ≥3.5	\$2,200.00 / Unit

Air Source Heat Pump Incentives

Mark Rate

SECTION 4: AIR SOURCE HEAT PUMPS

Specifications

- Incentives are available to install replacement air source heat pumps that meet or exceed the SEER2 listed in the application. They can be either split system or single package units.
- In-unit installations require the completion of the "In-Unit Installations" sheet on Appendix B.
- Existing equipment efficiency must be less than or equal to 14.3 SEER 2 and 7.5 HSPF2.
- All packaged and split system cooling equipment must meet AHRI standards (210/240, 320, or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant. Split system efficiency must be for air handling and condensing unit combined. Incentives are per ton of refrigeration.

ID	MEASURE	\$	QTY	TOTAL
HV401	Air Source Heat Pump - No Cooling + Electric Heat	\$550.00 / Ton		
HV402	Air Source Heat Pump - Central Air + Electric Heat	\$600.00 / Ton		
HV403	Air Source Heat Pump - Room AC + Electric Heat	\$700.00 / Ton		
HV404	 Air Source Heat Pump - SEER2 15.2	\$20.00 / Ton		
HV405	 Air Source Heat Pump - SEER2 16	\$40.00 / Ton		
HV406	 Air Source Heat Pump - SEER2 17	\$60.00 / Ton		
HV407	 Air Source Heat Pump - SEER2 18	\$75.00 / Ton		
HV408	 Air Source Heat Pump - SEER2 19	\$90.00 / Ton		
HV409	 Air Source Heat Pump - SEER2 20	\$105.00 / Ton		
HV410	 Air Source Heat Pump - SEER2 21	\$120.00 / Ton		
HV411	 Air Source Heat Pump - SEER2 22	\$130.00 / Ton		
HV412	 Air Source Heat Pump - SEER2 23	\$135.00 / Ton		

Income Qualified

SECTION 4: AIR SOURCE HEAT PUMPS

Specifications

- Incentives are available to install replacement air source heat pumps that meet or exceed the SEER2 listed in the application. They can be either split system or single package units.
- In-unit installations require the completion of the "In-Unit Tally" sheet on Appendix B.
- Existing equipment efficiency must be less than or equal to 14.3 SEER 2 and 7.5 HSPF2.
- All packaged and split system cooling equipment must meet AHRI standards (210/240, 320, or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant. Split system efficiency must be for air handling and condensing unit combined. Incentives are per ton of refrigeration.

ID	MEASURE	\$	QTY	TOTAL
HV401	Air Source Heat Pump - No Cooling Electric Heat	\$1800.00 / Ton		
HV402	Air Source Heat Pump - Central Air Electric Heat	\$2000.00 / Ton		
HV403	Air Source Heat Pump - Room AC Electric Heat	\$2200.00 / Ton		
HV404	 Air Source Heat Pump - SEER2 15.2	\$65.00 / Ton		
HV405	 Air Source Heat Pump - SEER2 16	\$135.00 / Ton		
HV406	 Air Source Heat Pump - SEER2 17	\$200.00 / Ton		
HV407	 Air Source Heat Pump - SEER2 18	\$250.00 / Ton		
HV408	 Air Source Heat Pump - SEER2 19	\$300.00 / Ton		
HV409	 Air Source Heat Pump - SEER2 20	\$350.00 / Ton		
HV410	 Air Source Heat Pump - SEER2 21	\$400.00 / Ton		
HV411	 Air Source Heat Pump - SEER2 22	\$450.00 / Ton		
HV412	 Air Source Heat Pump - SEER2 23	\$480.00 / Ton		

Cold Climate Heat Pump Incentives

Mark Rate

SECTION 5: COLD CLIMATE HEAT PUMPS

Specifications

- Existing equipment efficiency must be less than or equal to 14 SEER2 and 8.2 HSPF2.
- All packaged and split system cooling equipment must meet AHRI standards (210/240, 320, or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant. Split system efficiency must be for air handling and condensing unit combined. Incentives are per ton of refrigeration.
- In-unit installations require the completion of the "In-Unit Installations" sheet on Appendix B.
- Heat Pumps must be NEEP qualified
- Cold Climate Air Source Heat Pumps must maintain COP of 1.5 at 5 degrees F

ID	MEASURE	\$	QTY	TOTAL
HV501	Cold Climate Air Source Heat Pump - No Cooling Electric Heat	\$250.00 / Ton		
HV502	Cold Climate Air Source Heat Pump - AC Electric Heat	\$290.00 / Ton		
HV503	Cold Climate Air Source Heat Pump - Central Air Electric Heat	\$335.00 / Ton		
HV504	 (Model SEER2 - 14.3) x Tonnage	\$13.00 / (Diff x Ton)		
HV505	 (Model HSPF2 - 7.5) x Tonnage	\$35.00 / (Diff x Ton)		

Income Qualified

SECTION 5: COLD CLIMATE HEAT PUMPS

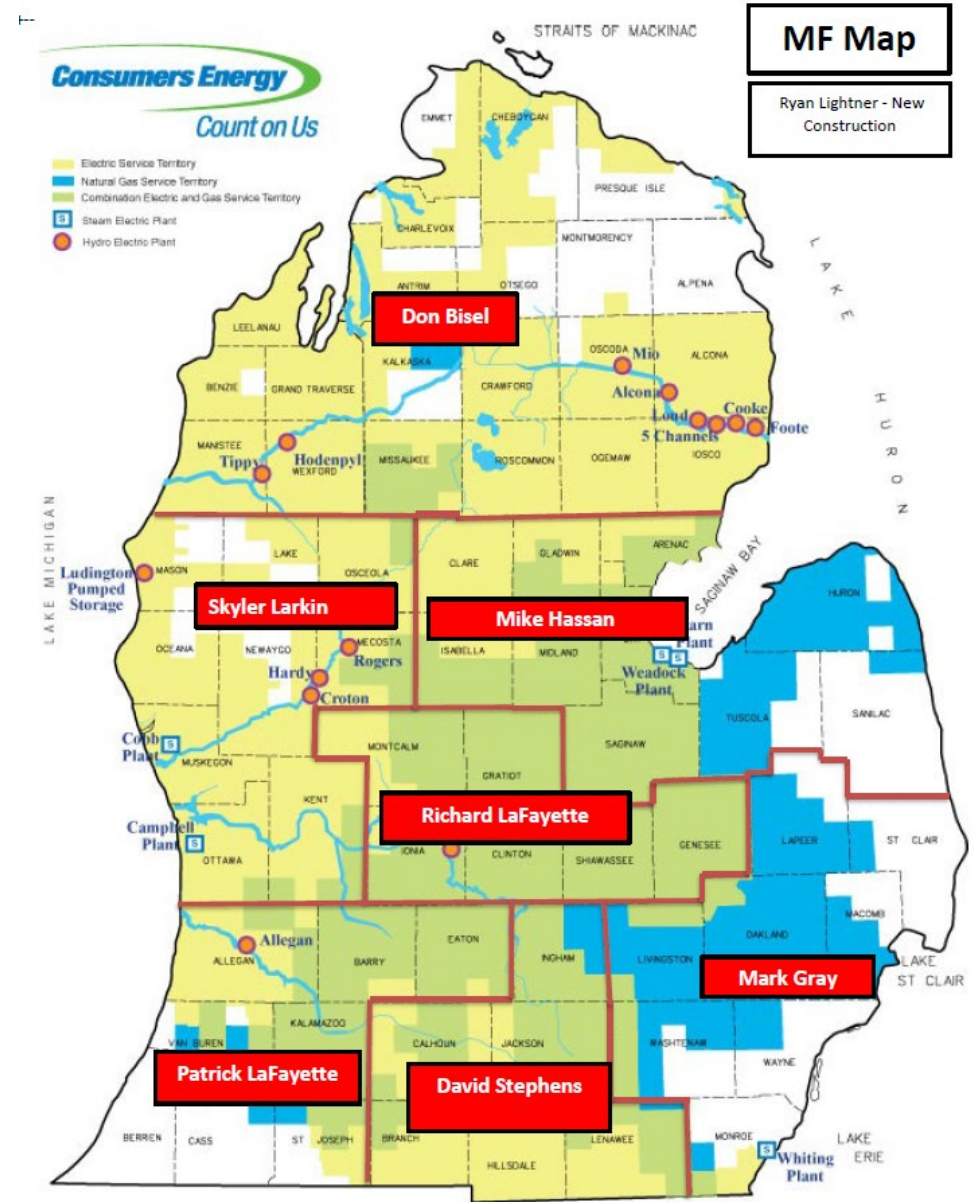
Specifications

- Existing equipment efficiency must be less than or equal to 14 SEER2 and 8.2 HSPF2..
- All packaged and split system cooling equipment must meet AHRI standards (210/240, 320, or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant. Split system efficiency must be for air handling and condensing unit combined. Incentives are per ton of refrigeration.
- In-unit installations require the completion of the "In-Unit Tally" sheet on Appendix B.
- Heat Pumps must be NEEP qualified
- Cold Climate Air Source Heat Pumps must maintain COP of 1.5 at 5 degrees F

ID	MEASURE	\$	QTY	TOTAL
HV501	Cold Climate Air Source Heat Pump - No Cooling Electric Heat	\$950.00 / Ton		
HV502	Cold Climate Air Source Heat Pump - AC Electric Heat	\$1075.00 / Ton		
HV503	Cold Climate Air Source Heat Pump - Central Air Electric Heat	\$1150.00 / Ton		
HV504	 (Model SEER2 - 14.3) x Tonnage	\$40.00 / (Diff x Ton)		
HV505	 (Model HSPF2 - 7.5) x Tonnage	\$125.00 / (Diff x Ton)		

OUTREACH TEAM

Name	Title	Phone	Email
Alex Ovenhouse	Outreach Manager	517-489-9468	aovenhouse@franklinenergy.com
Ryan Lightner	Energy Advisor II – Statewide (New Construction Specialist)	517-230-1970	rlightner@franklinenergy.com
Patrick LaFayette	Energy Advisor I - Southwest	517-294-5466	plafayette@franklinenergy.com
Skyler Larkin	Energy Advisor II – Northwest (Healthcare/Skilled Nursing Specialist)	517-455-4334	slarkin@franklinenergy.com
Mark Gray	Energy Advisor II - East	517-775-4656	mgray@franklinenergy.com
Mike Hassan	Energy Advisor I – Northeast	989-385-6243	mike.hassan@franklinenergy.com
David Stephens	Energy Advisor I – South Central	517-290-0493	dstephens@franklinenergy.com
Richard Lafayette	Energy Advisor I – Central	517-294-5118	richard.lafayette@franklinenergy.com
Don Bisel	Energy Advisor I – North Central (University/Dormitory Specialist)	616-485-1954	don.bisel@franklinenergy.com



THANK YOU!



2025 Energy Efficiency Programs

MI Heat Pump Collaborative Summit

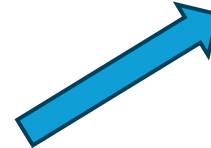
September 2025

2025 Multifamily Energy Efficiency Program Rebates



Eligibility

- Multifamily property must have DTE service
 - Rebate is paid to property owner, but can be reassigned to contractor, upon request
- 3 or more units under one roof (high or low rise)
- Both new construction and existing buildings are eligible
 - Existing buildings: heat pump and heat pump water heater installations must replace existing electric heating
- Income-Qualified
 - Eligibility must meet at least 1 of the 4 requirements
 - Enhanced rebates offered
- Market-rate
 - Standard rebates offered



Income-Qualified Customers

DTE offers an Income-Qualified (IQ) component as part of the Multifamily Program. The Income-Qualified program is focused on energy savings for both subsidized and income-qualified public housing multifamily properties by offering enhanced rebates and specialized services for this segment. An Income-Qualified Multifamily property may be eligible to participate if they meet any of the following requirements:

1. Participation in an affordable housing program

Automatic qualification for any property that can provide evidence of participation in a federal, state or local affordable housing program, for example: Low-Income Housing Tax Credit (LIHTC), U.S. Department of Housing and Urban Development (HUD), U.S. Department of Agriculture (USDA), Michigan State Housing Development Authority (MSHDA), local tax abatement for income-qualified properties and so on.

2. Location in an income-qualified Census Tract

Location within HUD's annually published "Qualified Census Tracts." More information can be found at huduser.gov/portal/sadda/sadda_qct.html.

3. Rent roll documentation

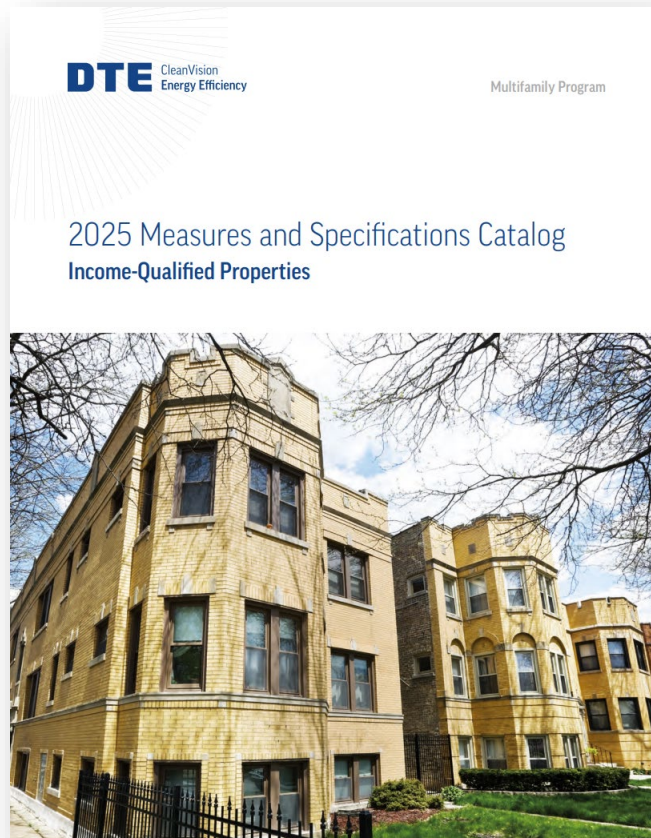
Submission of rent rolls documenting that the average rents charged by a particular property are affordable to households meeting HUD's definition of Income-Qualified. Properties with average rental rates at or below 80% of local "Fair Market Rent" as published annually by HUD will be eligible to participate in the Income-Qualified rebates.

4. Resident income information

Submission of resident income information showing that at least 50% of apartment units are rented to households meeting one of the following criteria:

- A. At or below 250% of the Federal Poverty Level
- B. At or below 80% of Area Median Income

2025 Income-Qualified Rebates

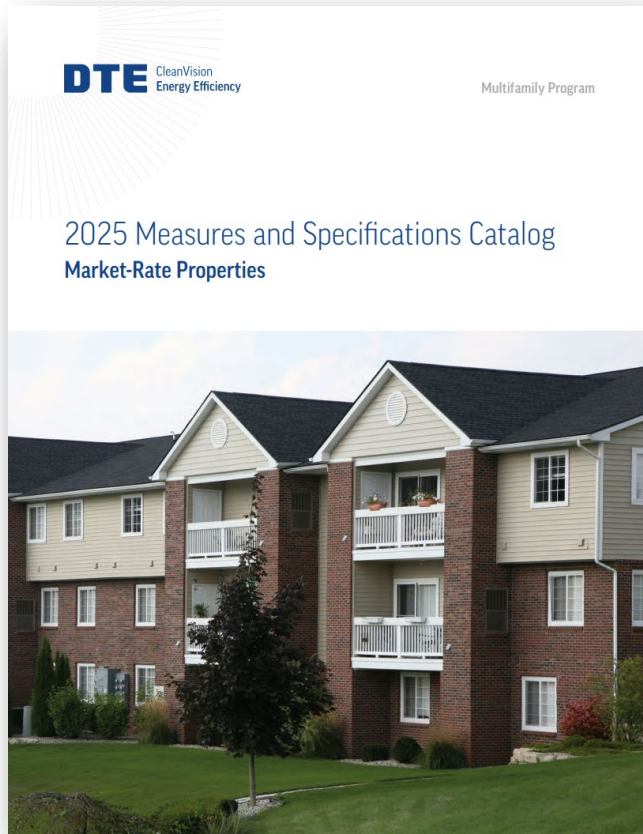


*Heat Pump rebates are limited to \$450,000 per property per year, unless approved by the Program Team

Measure	Incentive	Requirements*
Cold-Climate Heat Pump (1.5 tons or less)	\$5,000/Heat Pump	• 16 SEER2 or higher • 8.4 HSPF2 or higher • COP at 5°F must be 1.75 or higher at maximum capacity operation
Cold-Climate Heat Pump (greater than 1.5 tons)	\$6,000/Heat Pump	• 16 SEER2 or higher • 8.4 HSPF2 or higher • COP at 5°F must be 1.75 or higher at maximum capacity operation
Heat Pump Water Heater	\$2,000/Heater	• 3.0 UEF or higher

*Note: Heat pump and heat pump water heater installations must be made in buildings with existing electric heating

2025 Market Rate Rebates



*Heat Pump rebates are limited to \$50,000 per property per year, unless approved by the Program Team



Measure	Incentive	Requirements*
Cold-Climate Heat Pump (1.5 tons or less)	\$1,400/Heat Pump	• 16 SEER2 or higher • 8.4 HSPF2 or higher • COP at 5°F must be 1.75 or higher at maximum capacity operation
Cold-Climate Heat Pump (greater than 1.5 tons)	\$1,700/Heat Pump	• 16 SEER2 or higher • 8.4 HSPF2 or higher • COP at 5°F must be 1.75 or higher at maximum capacity operation
Heat Pump Water Heater	\$500/Heater	• 3.0 UEF or higher

*Note: Heat pump and heat pump water heater installations must be made in buildings with existing electric heating

DTE Multifamily Program Contact Information

DTE Website and Catalog

[The DTE Energy Multifamily Program | DTE Energy](#)

Contractor Website

www.DTEMultifamily.com

Program Phone and Email

(866) 796-0512 (option 2)
dtemultifamily@michiganefficiency.com

Program Manager Contacts

Sereen Dababneh – sereen.dababneh@dteenergy.com

2025 Residential HVAC Energy Efficiency Program Rebates – Heat Pumps

DTE

Consumers Energy

Count on Us®

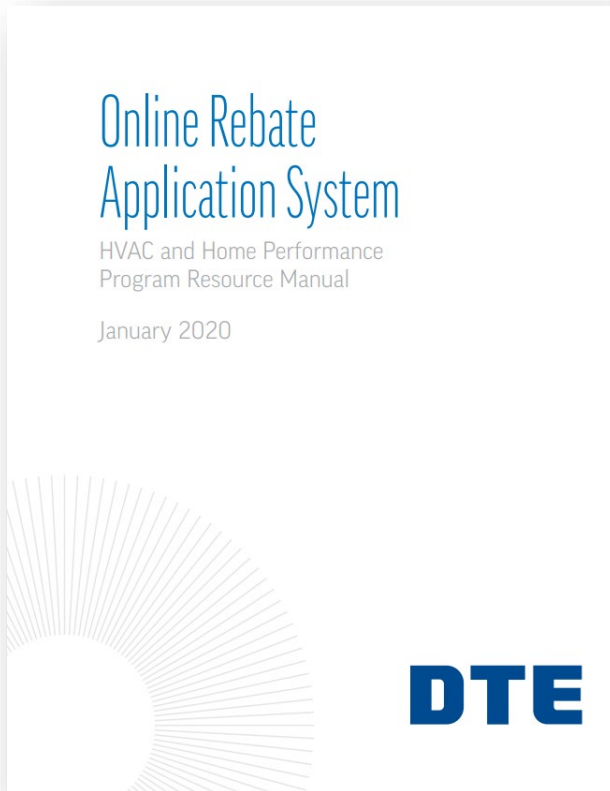
Eligibility

- Premise must have DTE Energy electric service *with existing electric heating*
- Premise eligibility is limited to single family homes. Single family homes are defined as 2 or less connected units, individually metered, with individual HVAC equipment.
- Existing retrofit only, new construction is not eligible under the DTE HVAC program

Payment

Rebate is paid to Account Holder but can be reassigned to contractor to allow for an instant markdown on the invoice at the time of sale. Contractor must complete the rebate reassignment form.

2025 DTE Rebates



Heat Pump Type	Efficiency Criteria	DTE Rebate
Cold Climate Air Source	16+ SEER2, 9.1+ HSPF2, EER2 $\geq$ 10.0	\$1,200
	16+ SEER2, 8.4+ HSPF2, EER2 $\geq$ 10.0	\$1,000
	15.2-15.99 SEER2, 8.4+ HSPF2, EER2 $\geq$ 10.0	\$900
Ground Source	20+ EER2	\$800
	17-19.99 EER2	\$600
Ductless Mini-Split	>31.5 SEER2 and HSPF2 10	\$1,000
	17-31.5 SEER2 and HSPF2 8	\$700
Air Source	18+ SEER2 AHRI rated	\$500
	15.2-17.99 SEER2 AHRI rated	\$150

Cold Climate ASHP \$250 Bonus!



Customer must meet program eligibility requirements

Installs completed prior to December 31, 2025

Cold Climate Air Source Heat Pump Specifications	Incentive	Bonus	Total Incentive
15.2-15.99 SEER2 with 8.1+ HSPF2	\$800	\$250	\$1,050
15.2-15.99 SEER2 with 8.4+ HSPF2	\$900	\$250	\$1,150
16+ SEER2 with 8.4+ HSPF2	\$1,000	\$250	\$1,250
16+ SEER2 with 9.1+ HSPF2	\$1,200	\$250	\$1,450

DTE HVAC Program Contact Information

HVAC Program Website

www.michiganrebates.com

Contractor Website

<https://mydteprogram.com>

Program Phone and Email

855-539-1906 - mydteprogram@icf.com

Account Manager Contact

Jacob Sebrell – Jacob.Sebrell@icf.com

Consumers Energy Eligibility

- Premise must have Consumers Energy electric service **with existing electric heating**
- Premise eligibility is limited to single family homes. Single family homes are defined as 2 or less connected units, individually metered, with individual HVAC equipment.
- Existing retrofit only, new construction is not eligible under the Consumers HVAC program

Payment

Rebate is paid to Account Holder but can be reassigned to contractor to allow for an instant markdown on the invoice at the time of sale. Contractor must complete the rebate reassignment form.

2025 Consumers Energy Rebates

Residential Heating, Cooling and Water Heating Program 2024 Qualifying Measures and Incentive Levels



Product	Qualifying Minimum AHRI-Rated Efficiency for Measure (Available at www.ahrlab.org)	Eligibility	Incentive Payment*
Split System Central AC	15 SEER, AHRI rated†	Consumers Energy Electric Customers	\$75
Split System Central AC	16 SEER, AHRI rated†	Consumers Energy Electric Customers	\$150
Split System Central AC	17 SEER, AHRI rated†	Consumers Energy Electric Customers	\$300
Split System Central AC	18 SEER, AHRI rated†	Consumers Energy Electric Customers	\$500
Air-Source Heat Pump	15.0-15.99 SEER†	Consumers Energy Electric Customers (Replacement for Existing Heat Pump Only)	\$150
Air-Source Heat Pump	16.0 SEER†	Consumers Energy Electric Customers (Replacement for Existing Heat Pump Only)	\$250
Ground-Source Heat Pump	17.0-18.99 SEER	Consumers Energy Electric Customers (Replacement for Existing Heat Pump Only)	\$200
Ground-Source Heat Pump	19.0+ SEER	Consumers Energy Electric Customers (Replacement for Existing Heat Pump Only)	\$300
Ductless Mini-Split Heat Pump	18-20.99 SEER	Consumers Energy Electric Customers (Replacement for Any Primary Electric Heat System)	\$250
Ductless Mini-Split Heat Pump	21.0 SEER	Consumers Energy Electric Customers (Replacement for Any Primary Electric Heat System)	\$350
Natural Gas Furnace	95%-95.99% AFUE, AHRI Rated	Consumers Energy Natural Gas Customers	\$100
Natural Gas Furnace	96%-96.99% AFUE, AHRI Rated	Consumers Energy Natural Gas Customers	\$200
Natural Gas Furnace	97% AFUE or Higher, AHRI Rated	Consumers Energy Natural Gas Customers	\$500
Thermostat	Programmable (Must Replace an Existing Nonprogrammable Thermostat)	Consumers Energy Natural Gas or Electric Customers	\$10†
Thermostat	Wi-Fi Enabled (Must Replace an Existing Nonprogrammable Thermostat)	Consumers Energy Natural Gas or Electric Customers	\$50*
Thermostat	Wi-Fi Enabled (Must Replace an Existing Nonprogrammable Thermostat)	Consumers Energy Combination Customers (Account Must Have Both Electric and Natural Gas Service)	\$100†
Furnace and Boiler Comprehensive Tune-Up With Combustion Analysis	Natural Gas Units	Consumers Energy Natural Gas Customers	\$65
Central Air Conditioner Comprehensive Tune-Up‡	Electric Units	Consumers Energy Electric Customers	\$65
Total Possible Rebates			\$

* Rebates are valid for installation dates from Jan. 1 to Dec. 31, 2024.
† AHRI eligibility for split system central air conditioners and heat pumps is based on installation of matched outdoor unit and indoor coil and furnace. Participating contractors should verify AHRI eligibility for all purchased equipment.
‡ Maximum incentive of one per system regardless of energy service type. Customers are only eligible for one (1) Consumers Energy rebate for each qualifying thermostat purchased and installed.
§ The rebate for eligible air conditioner comprehensive tune-ups is available during the season the equipment is in use (April 1 through Sept. 30). See program terms and conditions for complete details.

Looking for information on water heater rebates? Visit ConsumersEnergy.com/waterheating or ask your contractor about upfront discounts on high efficiency water heating equipment.

Heat Pump Type	Efficiency Criteria	CE Rebate
Ground Source	EER 19 or Higher	\$300
	EER 17 to 18.99 EER	\$200
Mini-Split	SEER2 17 to 25+, 8.0 to 12.5+ HSPF2	\$350
Air-Source Heat Pump	SEER2 15.2 to 15.99 or Higher	\$300

Consumers Energy HVAC Program Contact Information

HVAC Program Website

www.michiganrebates.com

Contractor Website

<https://myceprogram.com>

Program Phone and Email

855-263-5390 - consumershvac@icfi.com

Account Manager Contact

Monte Stanloski – Monte.Stanloski@icf.com



2025 Energy Efficiency Assistance (EEA) Program Information

Program Purpose

To increase the energy efficiency of Single-Family Income Qualified households.

- Providing Income Qualified households with no-cost energy efficiency upgrades through Program Partners
 - Program Partners include non-profit and community-based organizations
- Conducting comprehensive quality assurance
- Driving increased consumer awareness of for energy-efficient measures

Customer Eligibility Requirements

- Income-Qualified Single-Family homes receiving DTE electric, gas, or both)
- Heat pump installations must be made in homes with existing electric heating
- EEA Installations can not be submitted separately to market rate programs (e.g., HVAC or INWIN)
- Both Homeowners and Renters eligible for EEA Program

Key Difference between EEA and other DTE programs



EEA Rebates are paid to Program Partners, not directly to Contractors

- Program Partners are nonprofit organizations both large and small across DTE service territory
- Contractor relationship is maintained by Program Partners



DTE Program Contact Information

DTE Website and Catalog

[Limited Income Assistance - EEA | DTE Energy](#)

Program Phone and Email

(866) 796-0512

energy_savings@dte.com

Contacts

Program Manager: Noah Purcell – noah.purcell@icf.com

Deputy Program Manager: Cara Freitag – cfreitag@seellc.com

Contractor Management: Smith Her – smith.her@icf.com

Holland BPW Heat Pump Rebates

- The heat pump must be the main heating and cooling system in your home.
- Pre-approval is recommended.
- AHRI certificate or number is required.
- Customers purchasing a new furnace in addition to the heat pump or using the heat pump in a limited/zoned setup are only eligible for the non-cold-climate amount.
- Rebate is capped at \$4,000 from BPW, but customers within the City of Holland who have completed Home Energy 101 (free) can access matching funds up to \$4,000.
- BPW's Income-Qualified Energy Efficiency Program can provide up to \$5,000 for energy efficiency upgrades and weatherization (can coordinate with MiHER)

Measure	Specifications	Rebate Amount
Cold Climate Air Source Heat Pump - Ducted Systems	HSPF2 $\geq$ 8.1, SEER2 $\geq$ 15.2, and COP $\geq$ 1.75 at 5° F	\$1,000 per ton
Cold Climate Air Source Heat Pump - Non-ducted/Ductless Systems	HSPF2 $\geq$ 8.5, SEER2 $\geq$ 15.2, and COP $\geq$ 1.75 at 5° F	\$1,000 per ton
Heat Pump (all other non-cold-climate)	HSPF2 $\geq$ 7.8, SEER2 $\geq$ 15.2	\$500 per ton

Michigan Saves Financing and Electrification

Mac McCabe

248-249-3775

MichiganSaves.org



Michigan Saves®
The Nation's First Nonprofit Green Bank



What Makes Michigan Saves Different?

- Nonprofit green bank, we are local
- Loss reserve for lenders
- Oversight of authorized contractors
- Program guidelines and
- quality assurance
- Excellent customer service, you can talk to a person
- Special programs (Oakland Saves, Go Green, Access Energy)

Why Michigan Saves?

- Low contractor fee- 2.49%
- Low interest rate- as low as 6.5%
- Long terms (15 years on loans over \$15K)
- High approval rate- 65% (credit challenged program starts at 600)
- Leads from our contractor locator
- Easy-to-use software (immediate decision)



Electrification Program

- Provides leads for contractors.
- Teaches contractors electrification basics.
- For energy auditors and contractors that install heat pumps (water heater, air source, geothermal), solar, electrical panel upgrades and induction stoves.
- It breaks down the myths about electrification. For example: heat pumps don't work in cold weather, Michigan doesn't have enough sun for solar and the grid can't handle electrification.



Electrification Program

- There are 5 videos and 5 tests. Score 80% or higher to get a passing grade.
- Earn a badge that is displayed on our contractor locator. The contractor can also use the badge in any marketing materials.
- Leads from around Michigan will be funneled to the Michigan Saves contractor locator. Leads will come from our partners, like Ann Arbor, but also from direct marketing efforts such as Google Ads.
- Badged contractors have access to exclusive resources.

Kelley Brothers LC	• Heating, Ventilation, and Air Conditioning (HVAC) • Geothermal • Duct Sealing • Boilers • Water Heaters • Generators • Heat Pumps/Mini-splits	Contact Kelley Brothers LC 37100 Amrhein Rd, Livonia, MI 48150-1107 734-462-6266 www.kelleybrotherslc.com 26.85 miles away	★★★★★ 4.7 3 Reviews
Expert Heating & Cooling 	• Heating, Ventilation, and Air Conditioning (HVAC) • Heat Pumps/Mini-splits • Electrification	Contact Expert Heating & Cooling 24400 Northline Rd, Taylor, MI 48180-4588 734-676-4488 expertheatcool.com 37 miles away	★★★★★ 5 22 Reviews

Thank you.

MichiganSaves.org

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 [@MichiganSaves](https://twitter.com/MichiganSaves)

 Linkedin.com/company/Michigan-Saves/

517-484-6474

outreach@michigansaves.org

Subscribe to our newsletter:
MichiganSaves.org/smartenergy



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The Nation's First Nonprofit Green Bank





MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Michigan Home Energy Rebate Program: Overview

JOSEPH CASTELLANOS, WALKER-MILLER ENERGY SERVICES,
JCASTELLANOS@WMENERGY.COM

MiHER Program Goals

EGLE has identified the following guiding principles to shape the design, structure, implementation, and desired outcomes of Michigan's Home Energy Rebate (MiHER) Programs:



The program is committed to servicing households with <80% Area Median Income (AMI) located in disadvantaged communities.

What Homes Qualify for MiHER?

Primary Homes:

A homeowner can only apply for their primary homes only. Secondary homes do not qualify.

Condos:

Qualify for the program. There may be additional permission from the HOA if work is going to be performed to the outside of building or to the outside appliances (A/C and or Heat Pumps)

Renters:

Qualified renters may participate in the program and will have to agree to the landlord/tenant agreement



MiHER Program: Two Rebates Pathways

HOMES rebates are primarily focused on home weatherization measures. HEAR rebates are primarily focused on electrification measures. Rebates cannot be used from both HOMES and HEAR for the same measure.

50121

Home Efficiency Rebates Program (HOMES)

Total allocation	\$105,696,321		
Who is eligible?	Low to moderate income households, defined as: 80% area median income (AMI) or less = 100% of project cost covered 80+% area median income = 50% of project cost covered		
What is eligible?	- Insulation, Air Sealing - Windows, Doors, Skylights - Furnaces, Boilers, Central A/C - Heat Pump - Water Heaters - Wood Pellet/Stove - Pool Pump - ENERGY STAR Appliances		

Max rebate amounts	Modeled Energy Savings	<80% AMI	80+%
	20-34%	\$12,000	\$2,000
	35+%	\$20,000	\$4,000

50122

Home Electrification and Appliance Rebates (HEAR)

Total allocation	\$105,291,160		
Who is eligible?	Low to moderate income households, defined as: 80% area median income (AMI) or less = 100% of project cost covered 80-150% area median income = 50% of project cost covered		
What is eligible?	Max Rebates per Measure: - Heat pump HVAC - \$8,000 - Heat pump water heater - \$1,750 - Heat pump clothes dryer - \$840	- Electric stove/cooktop - \$840 - Breaker box - \$4,000 - Electric wiring - \$2,500 - Weatherization - \$1,600	

Max rebate amounts	- Max Consumer Rebate: \$14,000 - Max Contractor Rebate: \$500 - Max multi-family rebate: up to \$14,000 a unit
--------------------	---



HOMES Measures

Air Conditioning – Central	Clothes Dryer
Air Sealing	Dishwasher
Clothes Washer	Duct Sealing
Doors	EPA Certified Wood Stove
Energy Star Boiler	Furnace
Freezer	Heat Pump – Geothermal
Heat Pump – Central	Insulation
Heat Pump – Variable Speed Mini Split	Refrigerator
Pool Pump	Stove Range
Skylights/Windows	Water Heater
Ventilation Fans	Additional Project Costs

HEAR Measures

Measure	Low Income Rebate (<80% AMI)	Moderate Income Rebate (>=80% AMI)
Heat Pump – Central/Geothermal/Mini Split	\$8,000	\$4,000
Air Sealing/Insulation/Ventilation	\$1,600	\$800
Heat Pump Water Heater	\$1,750	\$875
Electric Stove/Cooktop/Oven	\$840	\$420
Heat Pump Clothes Dryer	\$840	\$420
Electric Panel	\$4,000	\$2,000
Electrical Wiring	\$2,500	\$1,250

MiHER Program: Contractor Overview

Due to requirements set by the Department of Energy requiring one set of project data and one invoice to be submitted per project (even if the project included multiple trades / contractors), the MiHER Program will delineate contractors participating in MiHER into the two following categories:

Primary Contractor*

A Primary Contractor (PC) will be responsible for submitting documentation required to claim the rebate for a home including the energy assessment data and energy model. If energy upgrades in a home involve multiple trades and multiple contractors (e.g. HVAC and Air Sealing), the MiHER program requires that a single invoice is submitted by the PC which incorporates all trades. The PC can subcontract any of the work to ensure the project will be completed successfully and holistically.

Supporting Contractor*

Supporting Contractor (SC) participates in the program in their specific field, such as Energy Audits, insulation and air sealing or HVAC. The SC will be responsible for working with/under a PC and will provide documentation of their work which is required for the rebate capture.

*The Primary Contractor may also act as a Supporting Contractor on projects, based on need



Contractor Requirements: General

The following series of general requirements safeguard consumer protection and program quality, ensuring a straightforward process for registered contractors.

Proof of Business and Payment

- Provide your businesses federal unique entity identifier (UEI) – **Primary Contractor Only**
- Provide your MI Statewide Integrated Governmental Management Applications (SIGMA) Vendor Account Number – **Primary Contractor Only**
- Agree to provide a one-year warranty on all work performed
- Provide copies of business license(s) and applicable Michigan contractor's licenses. Contractors cannot have any pending actions against them and must not be debarred or noncompliant with HUD or MSHDA.
- Proof of liability, automobile and workers compensation insurance.
- Provide financial information; W-9 form (signed and dated) or EIN/tax documents, and banking information (voided check or direct deposit)

Consumer Protection and Program T&C

- Documentation of criminal background checks for all employees who will be entering homes.
- Sign and agree to the program's terms and conditions.
- Contractors accepted to the program must commit to have a minimum of one employee complete a yearly virtual training on the program. The training will cover topics like invoicing, quality assurance documentation and other program requirements.
- **OPTIONAL:** Certification of an apprenticeship program

Contractor Certifications

The following trade specific licenses and certifications are required. These requirements were collated based on standing contractor requirements from MI Saves and Weatherization Assistance Program.

Boilers:

- Boiler Install License
- Master Plumber license or Plumbing Contractor
- Mechanic Contractor License with the following classifications, Hydronic heating, cooling and process piping, HVAC equipment

Electrical:

- Masters' electrician or electric contractor licenses

Energy Auditors:

- BPI Building Analyst Professional, RESNET, LIUNA Auditor or WAP Level 1 or 2 Inspector

HVAC/R:

- Mechanic Contractor License with the following classifications, Hydronic heating, cooling and process piping, HVAC equipment. For Geothermal heat pumps also need limited heat service, limited refrigeration and AC service.
- Demonstration of the ability to secure an extended manufacturer warranty for the product(s) being installed

Water Heaters:

- Mechanic Contractor License with the following classifications, Hydronic heating, cooling and process piping, HVAC equipment
- Master plumber licenses or Plumbing Contractor License
- Demonstration of the ability to secure an extended manufacturer warranty for the product(s) being installed

Windows/Doors, Insulation and Air Sealing:

- Residential builders or Residential Maintenance and Alteration licenses
- Where applicable (ex. Air Sealing work or spray foam insulation) provide a third-party certification demonstrating a contractor's ability to perform diagnostic testing

LEAD Paint Work:

- LEAD Safe Certification

Home Assessment Requirements

A home assessment is required for all MIHER projects. Depending on the pathway, the assessment has different requirements.

All **HOMES** Modeled Assessments shall require:

- A BPI-2400 Calibrated Energy Assessment: MIHER BPI-2400 Calibrated Energy Assessment Checklist.
 - DOE-Approved Software: Snugg Pro, OptiMiser & PSD
- 12 months utility data
- \$400 compensation

All **HEAR** Assessments shall require:

- An Uncalibrated Energy Assessment: MIHER Uncalibrated Energy Assessment Checklist
- 12 months utility data
- A Utility Impact Bill Analysis (Only if a Heat Pump or Heat Pump Water Heater is Installed)
- \$250 compensation

All **Walk-Away** assessments shall require:

- MiHER Contractor Walk Away Evaluation
- \$125 compensation



Materials Recycling Commitment

The MiHER program also provides an opportunity to support an advanced circular economy to create new companies and jobs in the state and divert 45% of our current waste stream from landfills.

All Contractors participating in the program are required to sign a Recycling Pledge as part of the MiHER program.

Pledge Commitments:

- Make waste reduction and recycling a part of our daily professional work routine.
- Educate staff, colleagues, vendors, and clients on the importance of waste reduction and recycling.
- Recycle or donate appliances with refrigerants removed and disposed of appropriately.
- Work with clients to use their available municipal recycling programs to keep materials out of landfills.
- Put the right materials in client curbside Recycling carts or community drop off centers.



Disadvantaged Communities Contractor Incentive

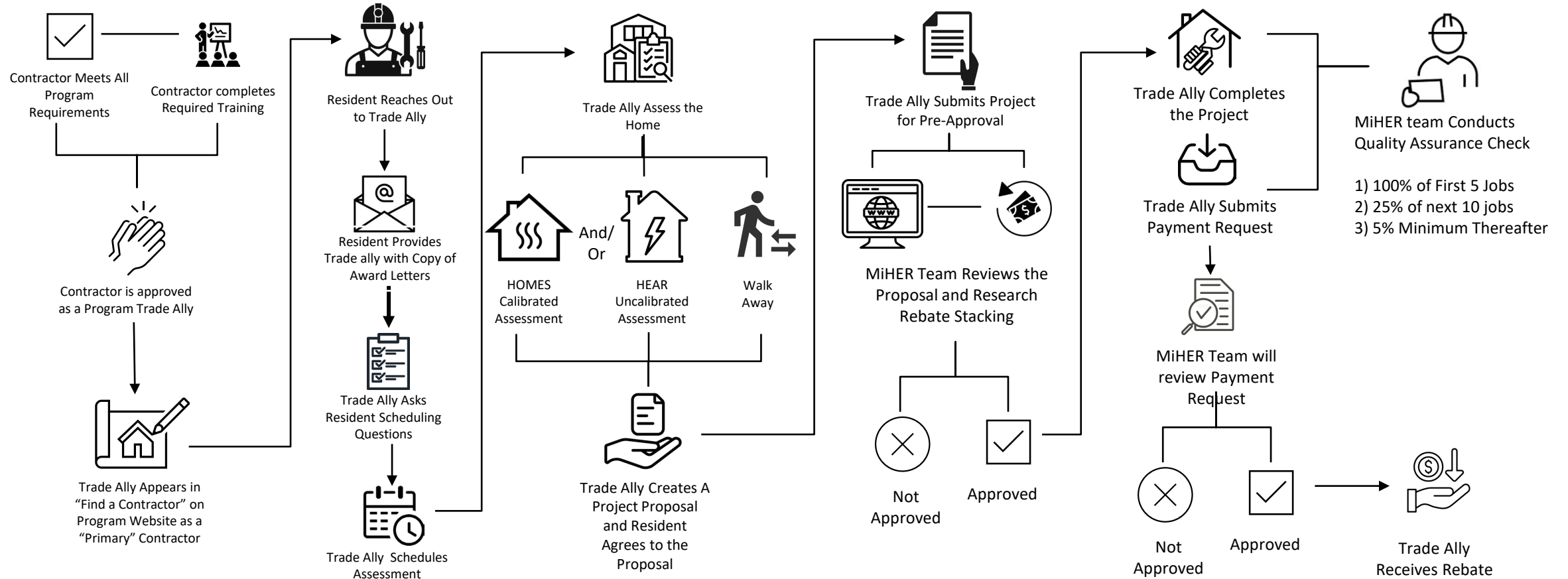
Qualifying Activity	HEAR Incentives	HOMES Incentives
Substantial installation located within a disadvantaged community (excludes installations of electric stoves and electric heat pump dryers) per dwelling unit	\$150	\$200
Installation of one or more electric heat pump water heaters	\$150	\$0
Installation of one or more electric heat pumps for space heating and cooling per dwelling unit – ducted	\$150	\$0
Installation of one more electric heat pumps for space heating and cooling per dwelling unit – unducted	\$150	\$0
Installation of one electric stove, cooktop, range, or oven	\$0	\$0
Installation of one electric heat pump clothes dryer	\$0	\$0
Installation of one or more electric load service center	\$150	\$0
Installation of insulation per dwelling unit	\$150	\$0
Installation of air sealing and materials to improve ventilation per dwelling unit	\$150	\$0
Installation of electric wiring per dwelling unit	\$150	\$0
Total maximum incentive per dwelling unit	\$500	\$200

Contractors will receive an incentive for servicing households located in "disadvantaged communities" as defined by HUD.

Maximum Project Incentive: \$500



Contractor Journey



QUESTIONS





BREAK

Check out the vendors!



VALUE OF HEAT PUMPS



CONTRACTOR SUCCESS STORY: Bowen Heating & Cooling



LUNCH

Visit our wonderful vendors!



We want your feedback!

**Please follow this QR
code to the event
evaluation to help us
improve future events!**



AFTERNOON AGENDA

Time	Session
12:30 - 1:30	Why Offer Heat Pumps?
1:30 – 2:30	Design Principles
2:30 – 3:30	The Art of Balance + closing



Why Offer Heat Pumps?

(Designation Training #1)



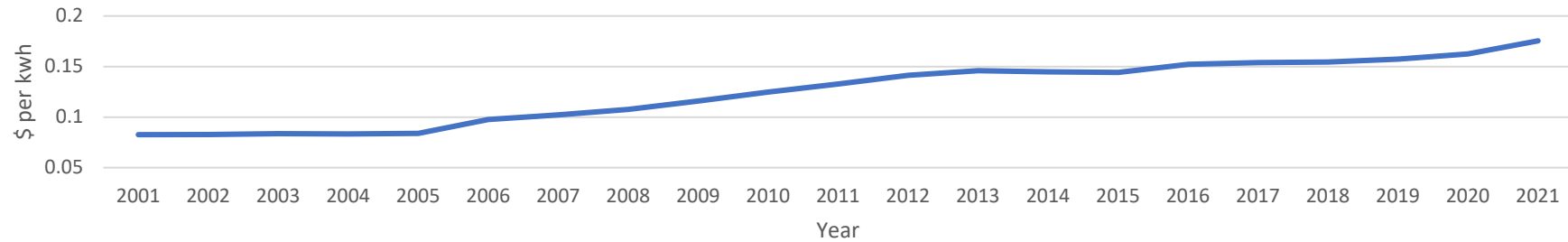
Overview of Market Opportunities

- Electric heat displacement
 - Electric furnaces
 - Electric baseboard
 - Space heaters
- Propane displacement
- Wood heat displacement
- AC add on or replacement
 - ASHP economic
 - VCHP comfort and carbon emissions

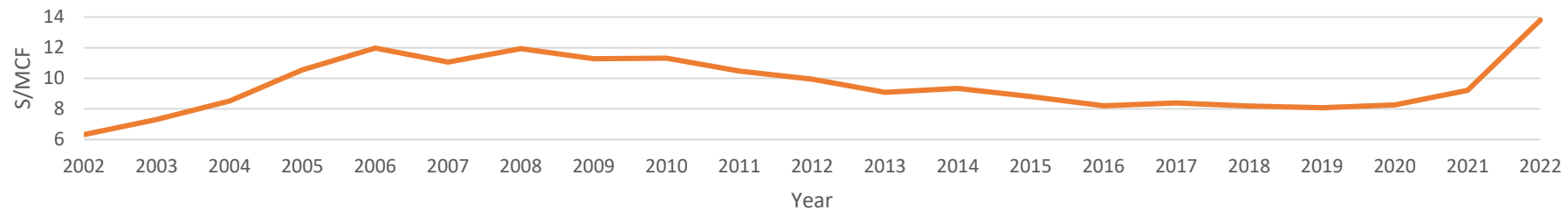


Heating Fuel Costs

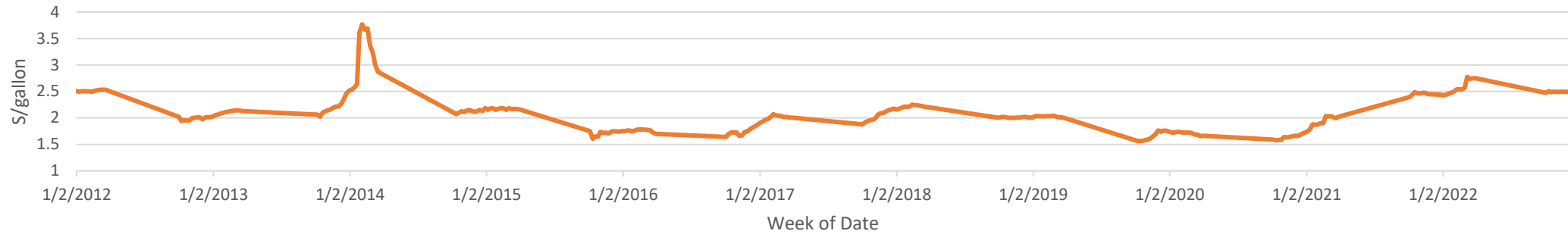
Michigan Annual Residential Electric Price



Michigan Annual Residential Natural Gas Price



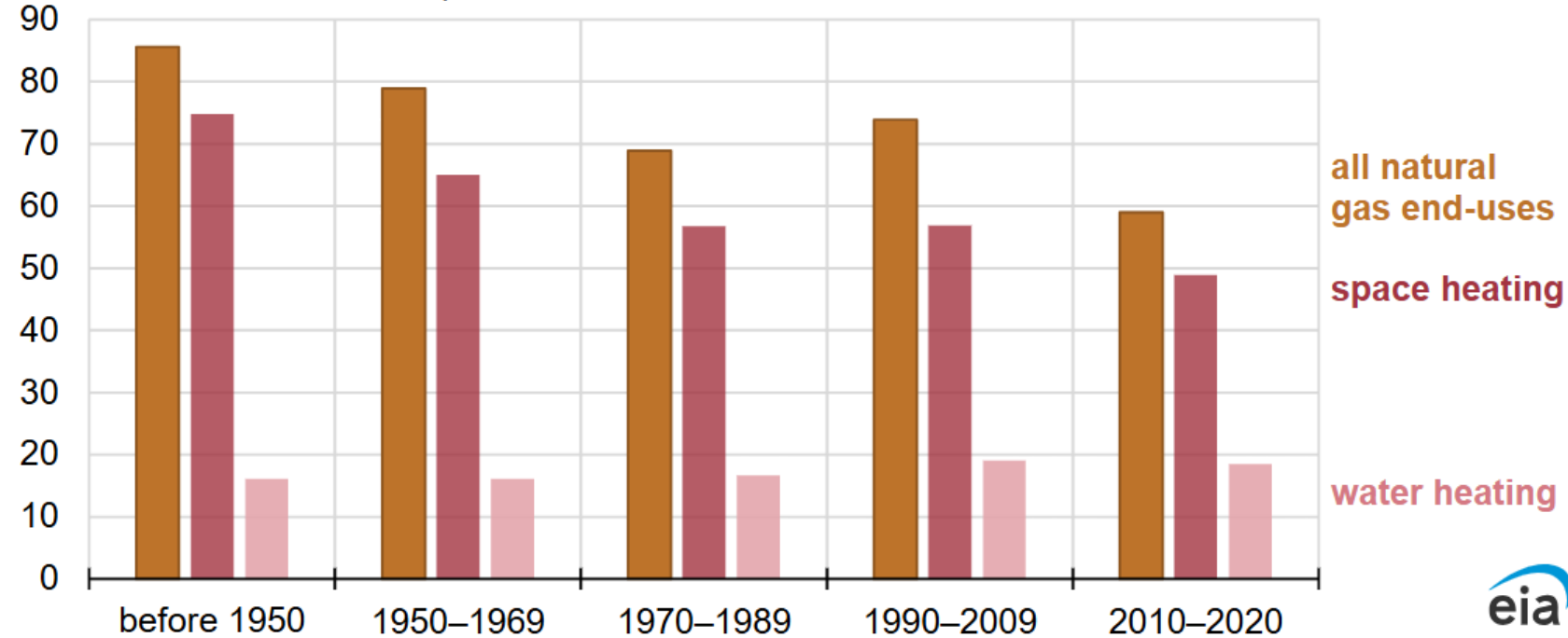
Michigan Weekly Propane Price



Midwest homes, notably older homes, consume more natural gas than most other U.S. homes

Residential natural gas consumption, U.S. Midwest region (2020)

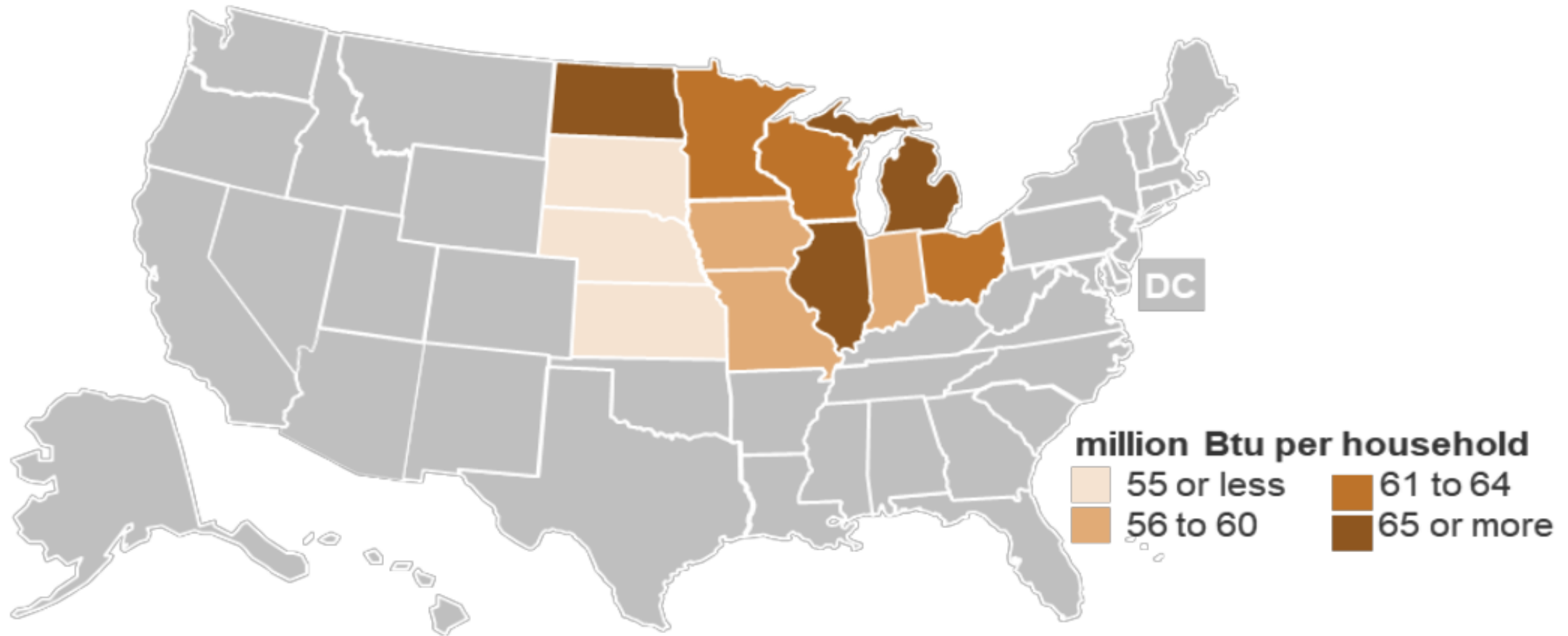
million British thermal units per household



Data source: U.S. Energy Information Administration, [2020 Residential Energy Consumption Survey](#)

Note: Average consumption for homes that use natural gas for the specified end use.

Natural gas consumption for space heating, U.S. Midwest (2020)



Data source: U.S. Energy Information Administration, [2020 Residential Energy Consumption Survey](#)

Note: Average consumption for homes that use natural gas for space heating. Btu=British thermal units.

Heat pump options by home type

Large Home or Large Lot:
**Geothermal or Multi-zone
heat pump**

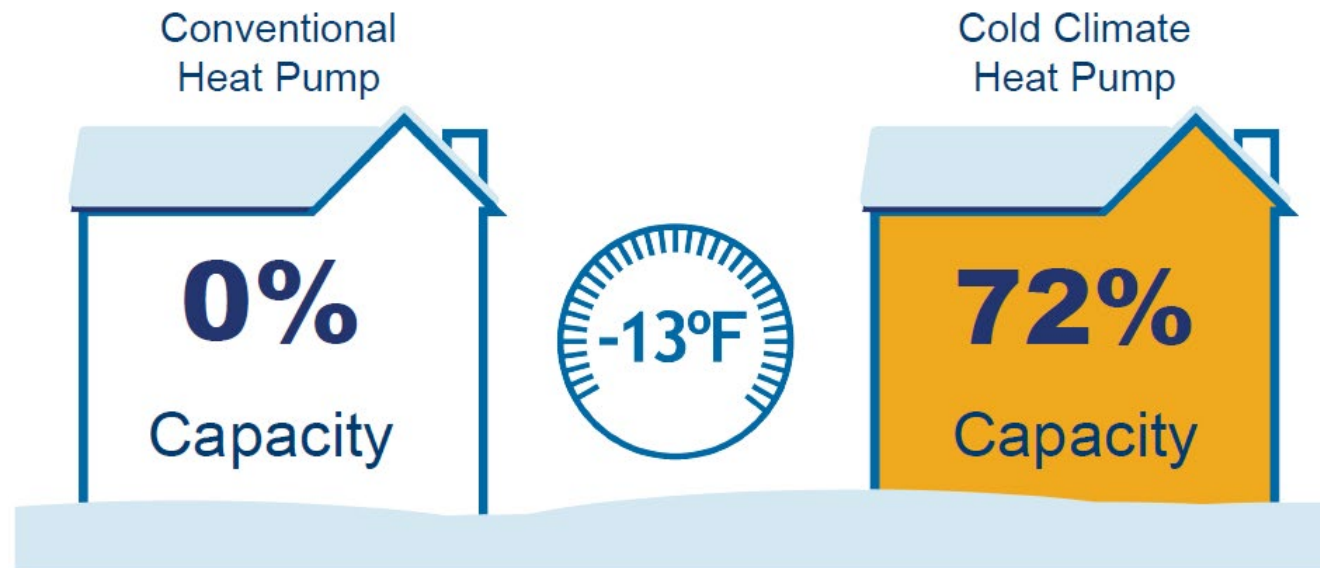
Average Size Home *well insulated*:
Air Source heat pump / Air to water
heat pump

**Adding Cooling and displacement of
Baseboard heating:**
Mini-Split / Multi-Split solutions

Replacing Gas Furnace and AC
Dual fuel Applications

How Modulation Helps – Capacity

- Traditional heat pumps cannot perform at low temperatures and therefore require supplemental heat
- Cold climate heat pumps require less supplemental heat



Replacements are Opportunities for Change

67%

Are unsatisfied or somewhat unsatisfied
with their **current** heating system

source: 6th annual NW DHP Project Market Progress Report

Building a replacement culture increases business profits

- Repair yields are 20-40% net profit
- Replacement yields are average 20% net profit of higher total
- Heat pumps increase the ticket total
- Rebates and tax credits **reduce consumer cost**
- Heat pumps can **solve larger comfort issues**
- Quality replacements will increase **Customer Referrals**



Repair VS Replace

- Contactor
- Capacitor
- Condenser fan motor
- Low refrigerant
- \$1,000

- AC Condenser
- Indoor Coil
- Installation costs
- \$5,000

- HP Condenser
- Indoor Coil
- Installation costs
- \$7,500

Good/Better/Best Sales

- Single or 2 Stage HP
- Standard air handler / furnace and coil
- Controls package
- Minimum to meet needs and existing system set up

- Variable speed heat pump
- Matching air handler/ Furnace and coil
- Control package
- Minimum to hit rebate requirements

- Cold climate Variable speed heat pump
- Matching air handler / Furnace and Coil
- Control package
- Advanced comfort performance and higher rebate/tax credit tier

Heat Pump Benefits – Big Picture



Heating and cooling
all in one system



Heating and cooling
operational cost
savings



Improved comfort



Air filtration



Reduced carbon
emissions

Set Homeowner Expectations



Benefits and Challenges of HP Adaptation

- Increased Customer satisfaction
 - Comfort improvements
 - Consumer savings
- More customers making referrals
 - Reduced advertising costs
- Need for sizing, sales, and product training
 - Low-cost training is available through distributors, online from manufactures, utilities

Poll 2: Customer Demand

When thinking about incoming calls for estimates over the last few years have customer inquiries for heat pumps?

- A. Increased
- B. Decreased
- C. Stayed the same
- D. Unknown



**“People purchase
based on emotion
but want to justify
the purchase based
on facts.”**

Suzanne Shelton, The Shelton Group

Now What?

1

Identify the
benefits that
resonate

2

Recognize the
emotional ties

3

Support with
features and
facts

Heat Pump Categories

Air Source
Heat Pumps

Air to Water
Heat Pumps

Ground Source
Heat Pumps

Heat Pump
Water Heaters

Air Source Heat Pumps

- Non-Ducted
 - Mini/Multi Splits
- Short Ducted Mini-Split
- Ducted systems
 - Central all electric
 - Central dual fuel
- Cross over solutions
 - Dual fuel with mini/multi outdoor unit
- Air to Water Heat Pumps
 - Boiler replacements
 - Forced air hydronic systems
- Additional Heat Pumps
 - Packaged terminal
 - Window units

Non-Ducted Air Source Heat Pumps

Customer need: Increase comfort, reduce costs

1:1 Mini-Split Units

- Excellent for open spaces
- No thermal loss to duct work or unconditioned space

1:2-4 Multi-head Units

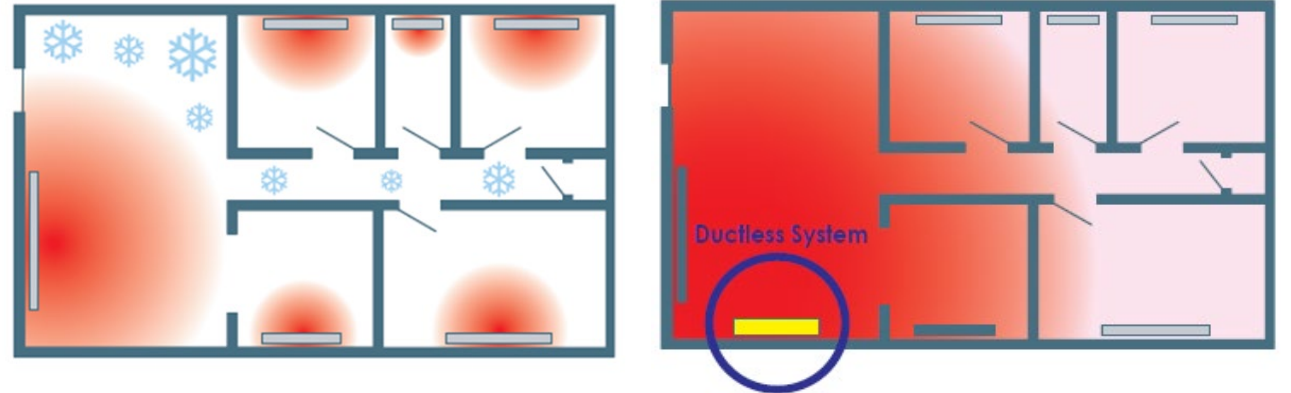
- Not optimal for highest efficiency
- Helpful under limited conditions

PTHP

- Fits in an existing PTAC sleeve

Best Uses

- Small weatherized homes
- Uncomfortable rooms
- Seasonal use cabins



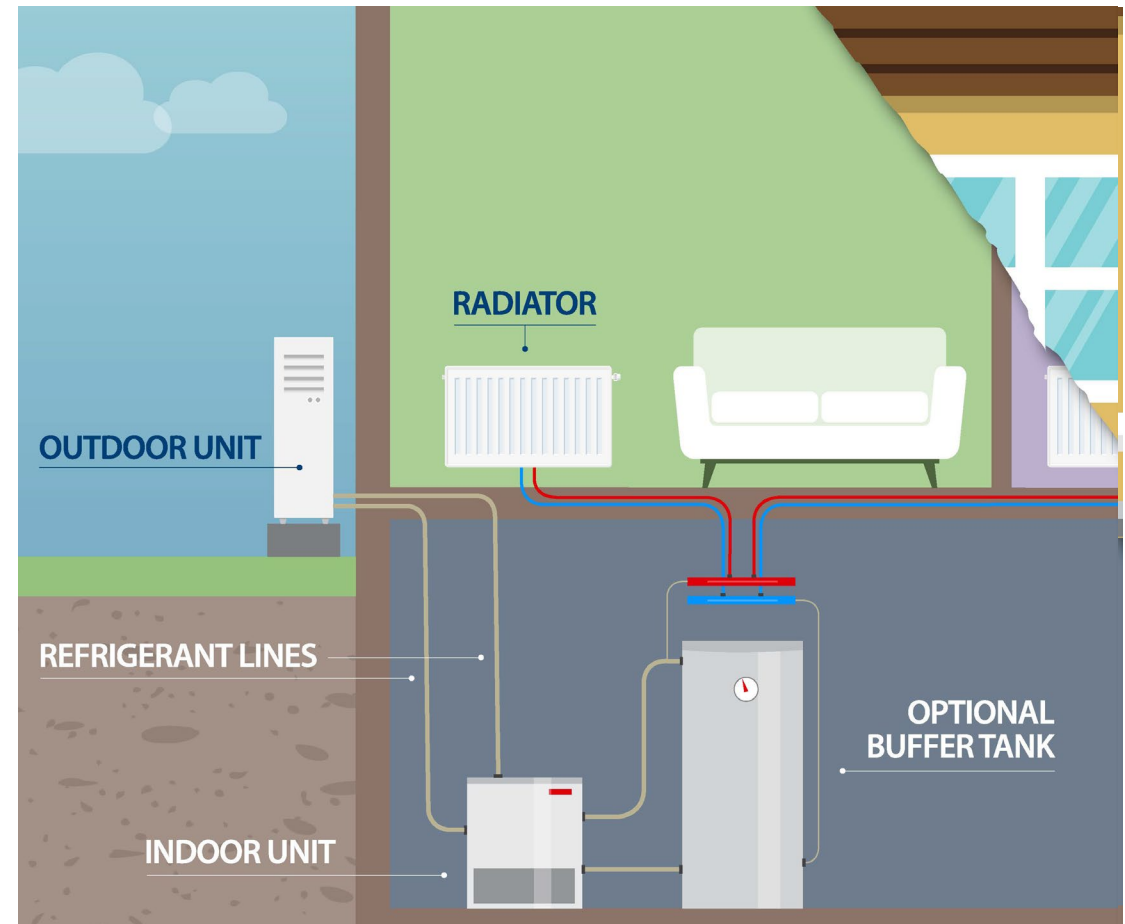
Centrally-Ducted Air Source Heat Pumps

- Standalone: air source heat pump + new coil, existing furnace kept.
 - Caution: there are only a few products that meet eligibility for rebates in this category
 - The eligible models in this category are inverter based
- Single Stage
- Two/Three Stage
- Variable Capacity (Inverter Compressors)
 - May or may not be cold climate rated by NEEP
 - Can include cross over solutions from Bryant/Carrier and Mitsubishi

Air- to- Water Heat Pumps

Air to Water Heat Pumps

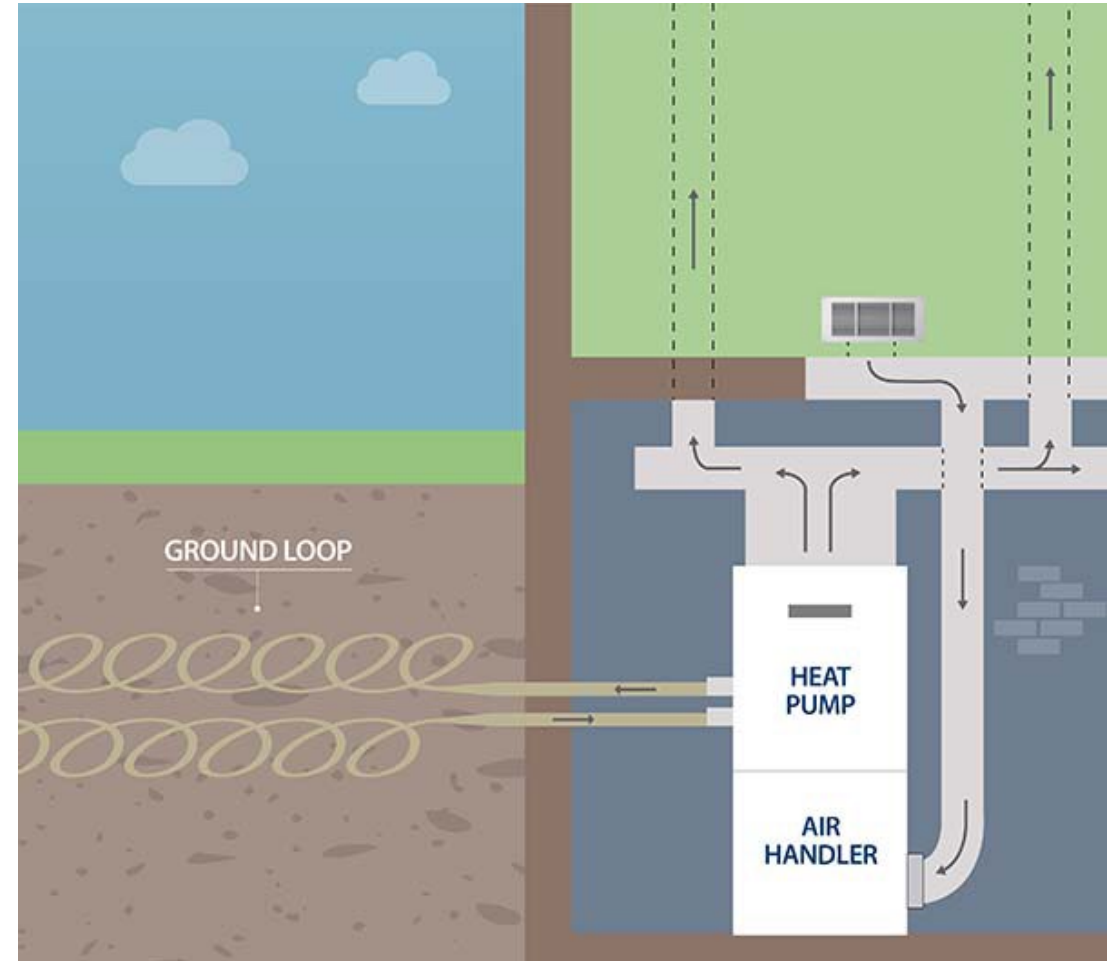
- No ground loop
- More efficient than Air to Air
- Multiple distribution options
 - In floor
 - Radiators
- Smaller distribution lines than forced air
- Optional
 - Forced air cooling
 - Domestic hot water
- Best uses
 - Small homes with lower loads
 - Existing low temperature radiant heat
 - Outdoor wood boiler replacement
 - New construction



Ground Source Heat Pumps

Ground Source Heat Pumps

- Closed loop
 - Higher upfront cost for loop installation
 - Horizontal straight
 - Horizontal Slinky (shown)
 - Vertical
 - Lake loops
 - Lower operation cost
 - Water quality issues not a problem
 - Uses significantly less backup heat
 - More stable ground temperature

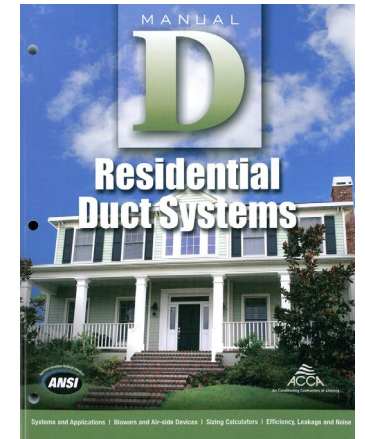
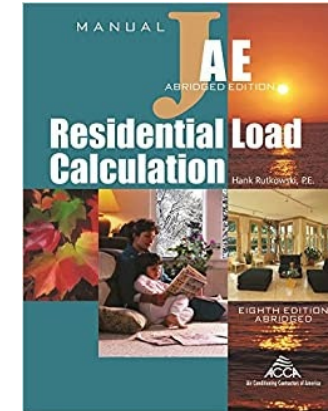




APPLICATION CONSIDERATIONS

Challenges

- Collecting enough information for accurate load calculations
- Determining when to size for heating vs. cooling
- Distribution (ductwork) not properly designed for variable speed equipment
- Belief that heat pumps aren't a viable year-round heating technology in cold climates
- Inaccurate expectations of how heat pumps should operate, leading them to not use them/overuse them, or request unnecessary service calls
- Selecting the right heat pump for the use case
- Selecting the best control strategy for the customer and equipment
- For more resources visit: www.acca.org/standards/approved-software



Features to Help Rationalize the Best Option

Provides both heating and air conditioning

- Capacity varies with heating and cooling needs

Advanced heat pump technology

- Inverter driven compressor
- Low ambient noise
- Works well when it is cold outside

Highest efficiency

- Heating Seasonal Performance Factor (HSPF)
- Seasonal Energy Efficiency Ratio (SEER)

Emotional Ties

- Cool new technology
- Ultra comfort
- Easy new home improvement
- No more propane delivery
- Look good/smart



*And it saves money!
(easy to rationalize)*

Facts to Back it Up



Up to **55%** annual savings on electric bills

Possible upfront savings through utility incentives

Multiple **price options**



Cooling! High efficiency, high quality



Ductless means **simple install**

Central ducted means **reliable fuel source**



APPLICATIONS



Ducted Fossil Fuel Furnace and A/C

ASHP Use Case: Existing Furnace and AC

Typical home attributes

- 80%-95% efficient furnace
- 2-ton AC ≤ 13 SEER
- Existing heating fuel natural gas or propane

Questions to answer/consider

- Is existing furnace oversized?
- Are there comfort complaints and where?
- Does the ductwork need modification?
- How much time is spent at home vs. away?
- What is the heating fuel?
- Do they have climate concerns?



Dual-Fuel – Multistage ASHP and Furnace

How to achieve best cost efficiency for multistage systems

- **Size at the high end of the cooling load**
 - Minimal oversizing a ½-1 ton more than cooling need
 - Use maximum capacity at 17°F
 - Specify heat pump with ≥16 SEER efficiency
- **Furnace replacement or integrate with existing?**
 - Unless using Bosch or Mitsubishi the furnace must match manufacture compatibly
 - Replace if near end of life, or
 - If inefficient <95 AFUE without ECM blower
- **Thermostat and other controls**
 - Wherever possible, use the manufacturers' suggested thermostat
 - Customized temperature-based switchover from customer discussion

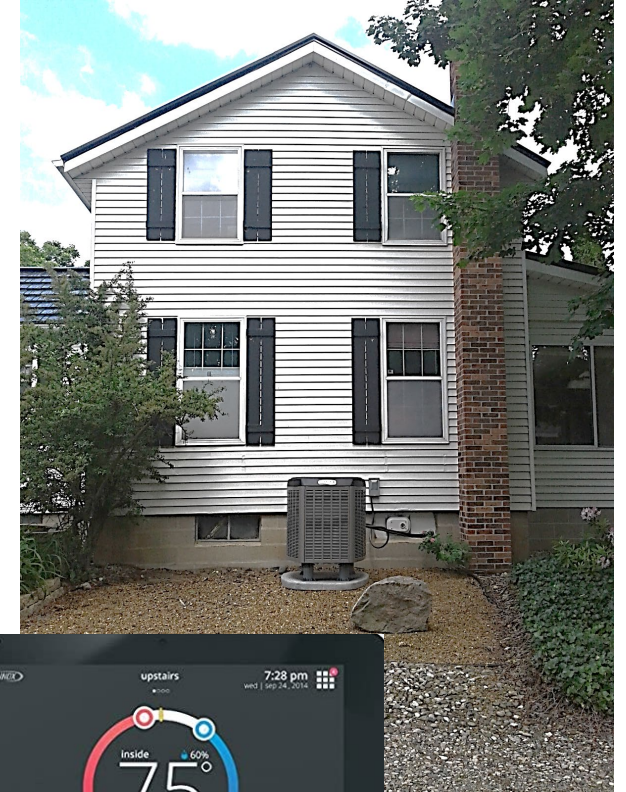


Dual Fuel: ccASHP and Furnace

Achieving the best efficiency, first cost and operation cost

- **Size for heating load**
 - Up to 115% of cooling load
 - Use max capacity at 17°F or 5°F
- **Furnace replacement or integrate with existing?**
 - Furnace must match manufacturer compatibly unless standalone
 - Variable speed blowers typically needed
- **Backup heat/controls**
 - Thermostat – temperature-based switchover*
 - Integrated load-based backup heat

*use balance point or economic switchover temperature





All Electric Furnace

Replacing Electric Furnace with ccASHP,
Beneficial Electrification

All Electric ccASHP Ducted

Achieving the best operational efficiency with all electric systems

- **Start with building inspection and owner interview**
 - Air infiltration, insulation levels and quality
- **Size for heating load**
 - Maximum capacity at 5°F reported by manufacturer
 - Up North and UP use manufacturer reported maximum capacity @ outdoor design condition
- **Backup heat/controls**
 - Plenum heat sized for capacity difference between heat pump and load of home at design conditions
 - Back up for heat pump failure - you must stage electric heat to prevent overuse for supplemental heat
- **Caution:** Are there roadblocks on the path?
 - Possible panel capacity - consult envelope improvements
 - Limited room to expand supply and returns for greater air volume - ductless for some locations



Ducted ASHP Summary

- **Suggested solutions for AC replacement:** Single/two stage $\approx$ 16 SEER heat pump for cost-conscious customers, ccASHP $\approx$ 18 SEER for those seeking to reduce electric heat and propane, or eco-minded.
- **Advanced solution for comfort concerns:** Add a ductless single zone system to address basement comfort or upstairs bedroom comfort issues or offer a central system that can integrate with a ductless unit. (Mitsubishi Intelli-Heat, Carrier/Bryant Crossover Solutions)
- **Existing system treatment:** Pre-existing system is kept or upgraded to matched furnace or AC. Ducts used when in conditioned space and adequately sized for required heat pump air flow. Existing ducts in unconditioned spaces that remain in use should be sealed and insulated.
- **Sizing strategy:** Single/two stage need to size toward cooling load, variable capacity can size for heating if ductwork adequate but still not more than 115% over cooling size.
- **Equipment selection considerations:** Use manufacturer published performance at design conditions for heat pump operation to identify systems with adequate heating and cooling capacity.
- **Oversizing concerns/tradeoffs:** When minimum speed cooling capacity is over 115% of design cooling load, look for equipment with a higher ratio of heating to cooling capacity, a lower minimum capacity, or both. **Consider the existing furnace and AC size may be incorrect to start with.**



Ductless Mini and Multi-Splits

Ontonagon, Michigan

ONTONAGON VILLAGE HOUSING



CHALLENGE

Local housing commission needed an all-electric heating and cooling solution to provide year-round comfort in a climate subject to extreme cold

SOLUTION

M-Series Systems from Mitsubishi Electric

RESULT

Housing commission saves \$30,000 per year and offers residents energy-efficient comfort in all seasons

Nestled in a remote part of Michigan, Ontonagon is a village sitting on the edge of Lake Superior. With a population of about 1,500, Ontonagon residents are used to beautiful but humid summers on the lake and bitter cold winters. After years of enduring expensive and uncomfortable electric-resistance heat, Ontonagon Village Housing, a subsidized housing facility, decided to consider alternative HVAC options.

"The electric bills kept getting higher, and we decided to price out bringing in natural gas lines," explained Karen Jackson, executive director, Ontonagon Village Housing. With a projected cost of nearly a million dollars, local utility provider [Upper Peninsula Power Company](#) (UPPCO) swiftly proposed a solution.

"I looked at them and said, 'Why would you want to introduce that infrastructure? That cost?'" said Andrew McNeally, energy-efficiency program administrator, UPPCO. "My experience being from New England says cold-climate heat pumps will take care of your problem without

negatively impacting your tenants." UPPCO's heating and cooling selection for Ontonagon Village Housing: [M-Series mini-split heat pumps](#) from Mitsubishi Electric.

A MODERN-DAY ALTERNATIVE TO BASEBOARD HEAT

UPPCO has been working on energy-efficiency programs since 2009, when Michigan law went into effect, incentivizing utilities to help customers move beyond fossil fuels. A 60-unit, all-electric, 15-building property, Ontonagon Village Housing had always used electric resistance for heating. Unfortunately, the electric-resistance systems struggled to keep up with the freezing temperatures. "Electric resistance can be quite expensive, especially now, and heat pumps do a phenomenal job," noted Mike Duquaine, warehouse manager, [Stop's Heating and Cooling](#). Additionally, heat pumps solve comfort challenges year-round. With no central air conditioning in the summers, Ontonagon residents depended on box fans and inefficient

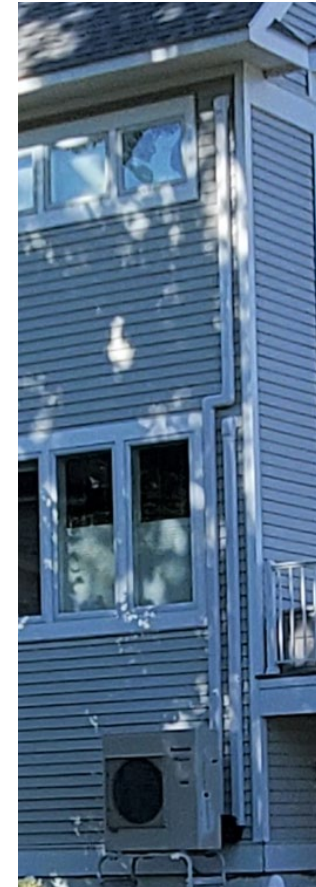
Ductless Mini- and Multi-Splits

- No ductwork
- Comfort and energy savings
- Superior performance
- Cooling and heating where you want it
- Quieter and greater comfort than window AC

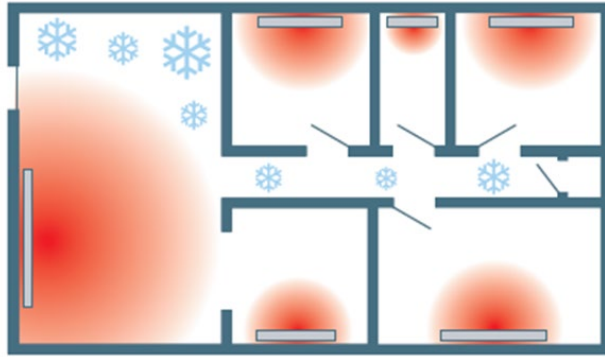


Ductless Displacement

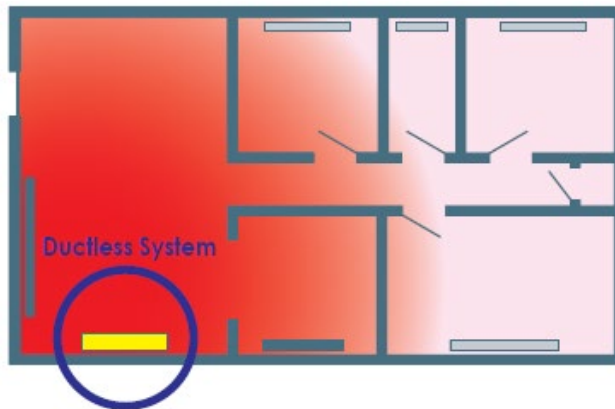
ASHP Use Case: Adding Mini-Splits to Homes with Electric Heat



Ductless Solution Selection



Customer need: Increase comfort, reduce costs



- **Simple solution:** Single zone ductless unit or 1-3 room compact-ducted
 - If compact-ducted, set static pressure
- **Advanced solution:** 2-5 zone ductless/compact-ducted multi-split or multiple single-zone systems if simultaneous cooling/heating desired
 - Turn down ratios limited to % of outdoor unit capacity on multi-zone, not indoor unit
- **Sizing strategy:** Locate first/single zone where it will cover most of central living area, establish additional zones as needed, based on customer use
 - Block loads, when combined, are likely to be less than whole-home load
 - Bedrooms are often too small for their own indoor unit
 - Compact-ducted or transfer grills and thermostat
- **Equipment selection considerations:** In much of the cold-climate U.S., a ccASHP that covers only 60% of the design load will fulfill over 90% of the home's annual heating load

Expectations Ductless ccASHP

What the heat pump will do:

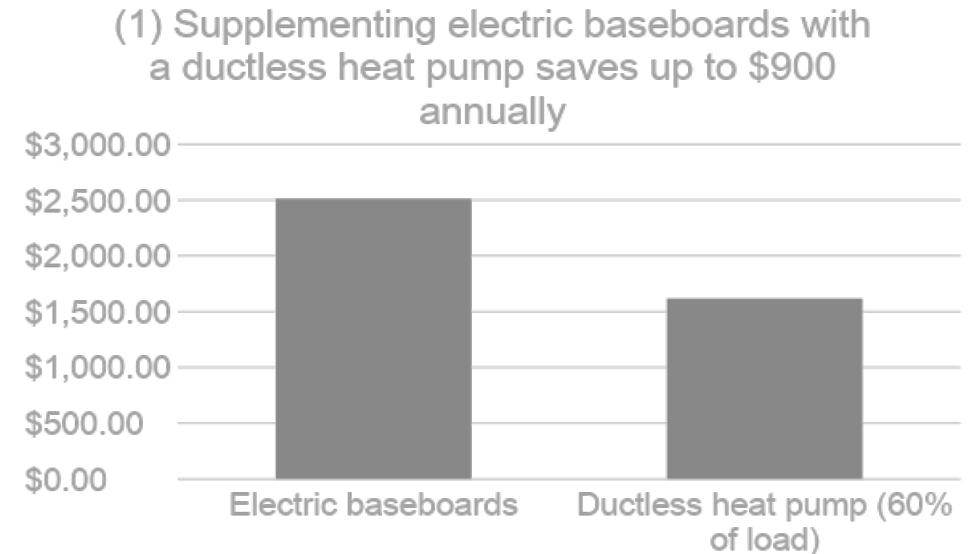
- **Sized for most of the heating load and could be running as low as -14°F**
 - Make quote standout - include temperature where capacity stops meeting load
- **Acts as the primary heat source**
 - Based on hours of operation
 - Not based on maximum heating load at design condition
- **Constantly adjusts supply to meet:**
 - Standard cooling load
 - Extreme cooling needs
 - Nearly all heating needs.
- **Provides efficient cooling and help with humidity**
- **Provides consistent warm comfy heat, not hot blasts for short times**
 - Some call this cozy heat Hygge

What the homeowner should do:

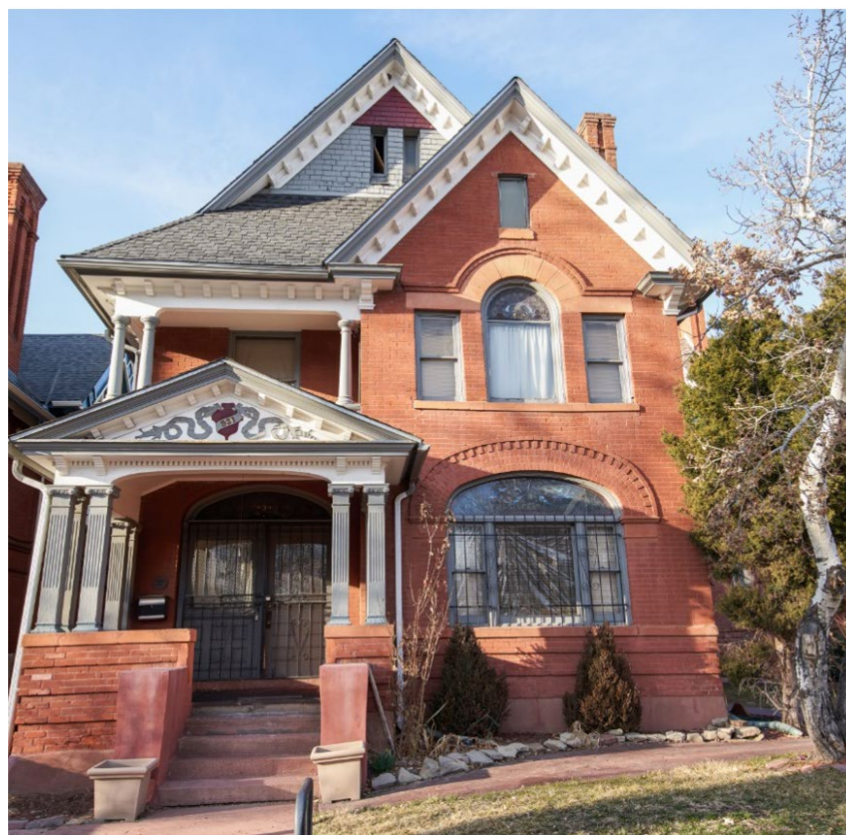
- **Set remote or wall thermostat for heat pump to the desired comfort temp**
 - Adjust mode of operation as needed when seasons change
 - Stop the use of setbacks or system shut down when away for a few hours
- **Will clear snow from around the heat pump**
 - If unable consider wall mount out of snow depth
- **Existing baseboards**
 - Turn down 5 degrees or turn off in rooms that have indoor units
 - For best savings use only when heat pump isn't providing enough comfort
- **Managing electric bills**
 - DTE Energy has Cool Currents
 - Requires second meter
 - DTE Energy time of use limit operation from 3-7pm weekdays
 - UPPCO has electric heat rate - submit verification of electric space heat

Economics Ductless ccASHP

- First costs could be reduced
- Sized for 60% of the load, up to 55% reduction in space heating costs
- Switching from electric space heater to a mini-split in one example
 - Saves up to 611 kWh per month
 - 63% savings
- Switching from the standard rate to the electric heat rate for UPPCO saves
- Switching from the DTE Energy standard electric rate to CoolCurrents saves
 - December 2021 2002 KWH consumed cost \$383.21
 - December 2022 2017 KWH consumed cost \$285.34
 - 1,719 KWH were for space heating in 2022
 - \$97.87 savings as rate is ≈\$0.1301



ASHP Use Case: Adding Mini-Splits to Homes with Boilers



Expectations Ductless ASHP for Cooling

What the heat pump will do:

- Provide cooling, dehumidification, and heating at mild temps
 - Make quote standout - include temperature where capacity stops meeting heat load
- Acts as the primary heat source
 - Based on hours of operation
 - Not based on maximum heating load at design condition
- Constantly adjusts supply to keep:
 - Indoor temperature consist
 - Reduce humidity

What the homeowner should do:

- Set remote or wall thermostat for heat pump to the desired comfort temp
 - Adjust mode of operation as needed when seasons change
 - Stop the use of setbacks or system shut down when away for a few hours
- Existing boiler
 - Turn down thermostat 5-10 degrees for zones with indoor units
 - Boiler will likely be source of heat starting at 20 degrees
- Managing electric bills
 - When using to displace propane or fuel oil boilers use heat pumps until comfort no longer maintained
 - For natural gas provide outdoor temperature where the boiler may cost less to run

Ductless Solution Placement



■ Indoor unit placement:

- Floor or wall units should be specified based on customer preference
- Wall units should be a minimum of 6 inches below ceiling and no more than 8 feet up
- Be sure that return and supply are not impeded by shelves or other objects below
- For zones with smaller loads consider compact-ducted units or use of transfer grills

■ Outdoor unit placement:

- Elevate out of potential snow fall depth
- Stand vs. wall mount. Stands reduce noise transfer
- Wind baffles, drip caps or custom-made solutions to protect from snow and ice

■ Existing system treatment:

- Evaluate controls for reuse
- Boiler or baseboard thermostats should be set back four degrees below setpoint of heat pump
 - Use a centrally-located thermostat, rather than remote, for heat pump
 - Customer education is the most important step to ensure comfort and savings

Technical Considerations

■ Code Requirements

- Specifications on type of connections used
- High voltage wiring in conduit

■ Location Consideration

- Wind + Snow = Ice build up on fan got Wind Baffles?
 - Improves low ambient operation
 - Locate to an area with less driving wind
- Stand or Mounting
 - Wall mounting could be noisy
- Theft protection

■ Power

- Surge protection for outdoor and indoor units if prone to voltage spikes or brown outs
- Single zone and small capacity multi-zone may not require panel upgrade - some only require 20amps.
 - Where hardwired baseboard exists, some can come offline

Result of Adding Ductless Mini-Splits



Design Principles for Air Source Heat Pumps

(Designation Training #2)





Sizing, design, and selection is often done based solely on rules of thumb and based on previous sized systems.

“Variable Capacity Air Source Heat Pumps perform best and meet savings goals when sized appropriately for system type, application, and supplemental fuel type.”

Current Common Approaches to Load Calcs: What People are Putting in it Most Often



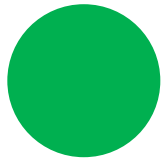
“Shoot from the hip”



Sized off existing equipment size



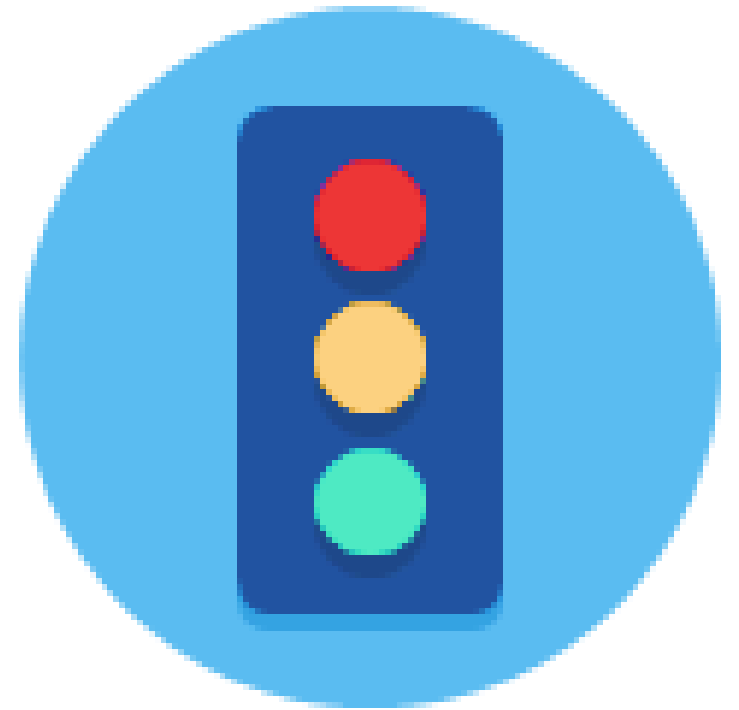
Using rules of thumb



Utility bill analysis



Block load calculation



(Please understand that this is meant as humor,
however it is just as accurate as "x" number of square feet per ton!)

Sizing – Rules of Thumb

- One thousand BTU per 100 sq ft
- One cfm per sq. ft. of house
- 35 btu per sq ft
- Tonnage = half the number of cylinders in the customer's biggest car/truck
- What's in the shop today
- ½ ton bigger than their neighbor



1 1/2 to 2 ton



2 1/2 to 3 1/2 ton



4 to 5 ton

Does Sizing Impact Energy Use and Utility Bills?

What's Wrong with Inaccurate Load Calculations?

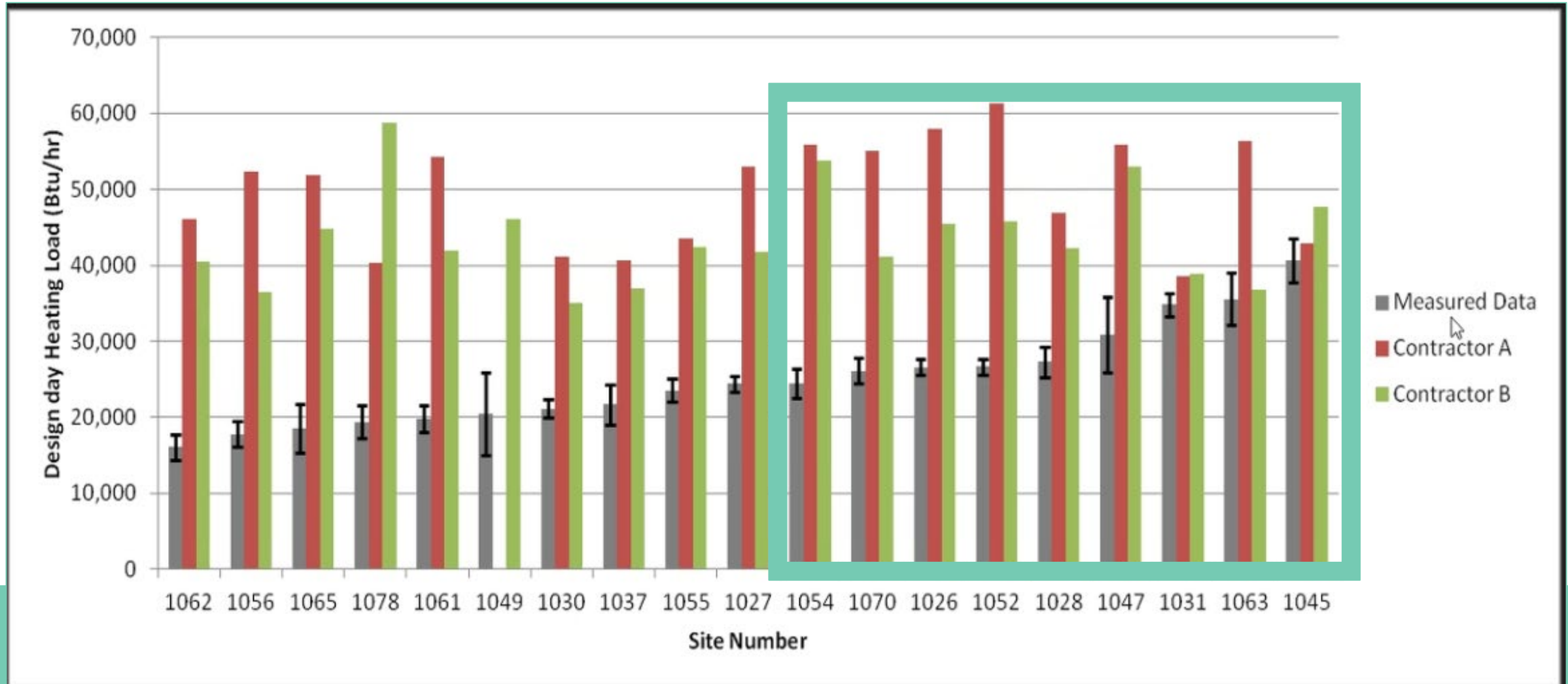
For single and two speed systems, maximum efficiency happens during long run times, not starts and stops. **This LIKELY has energy penalties for over-sized systems oversized by more than 25%.**

For variable capacity equipment, longer run times may mean more time spent at medium and low heat/fan speed. This **LIKELY has energy penalties for systems oversized by more than 40% as they potentially will not have shorter run times and at higher heat/fan speed.**

Wrong sized for the ductwork can lead to much higher fan watt draw. An AHRI report showed that adding static pressure to Electrically Commutated Motors only reduced flow from 1 to 3% with increased fan power draw up to 48%!

NIST, NREL, Proctor Engineering, Illinois Institute of Technology

Concerned that Manual J Won't Size Large Enough?



Accuracy is Necessary for Developing Your Business Case and Unique Value Propositions

Investments

- Load calc training, software, and time per job to generate
- Sizing and selecting with online tools requires training and time per job
- Performing duct evaluations takes training, equipment, and time per job
- It takes a lot of time to invest and risk if we don't succeed in adding to service contracts

When developing a business case for adding new work into your process, don't just list the “costs” or “investments” with a single end benefit.

For each investment, your business case should be balanced with correlating benefits.

For the rest of this presentation, when you see this icon, we've hit on a solid business case point.



How Should We Perform Load Calculations

- ✓ Determine type of load calc you'll perform
- ✓ Collect data by phone, online, and on site
- ✓ Understand physical location and design temperatures
- ✓ Use tools that you are comfortable with
- ✓ Develop results to be used in sizing and selection process
- ✓ If need be, compare against enhanced rules of thumb for comparison



MI grand rapids demo house			
Site ID: 19308		Heating: 64,400 BTU/hr	
Area: 1,856 ft ²		Cooling: 34,000 BTU/hr	
Climate: Grand Rapids AP		Latent: 3,500 BTU/hr	

MI demo house Marquette			
Site ID: 19306		Heating: 31,800 BTU/hr	
Area: 2,000 ft ²		Cooling: 22,200 BTU/hr	
Climate: Marquette CO		Latent: 1,600 BTU/hr	

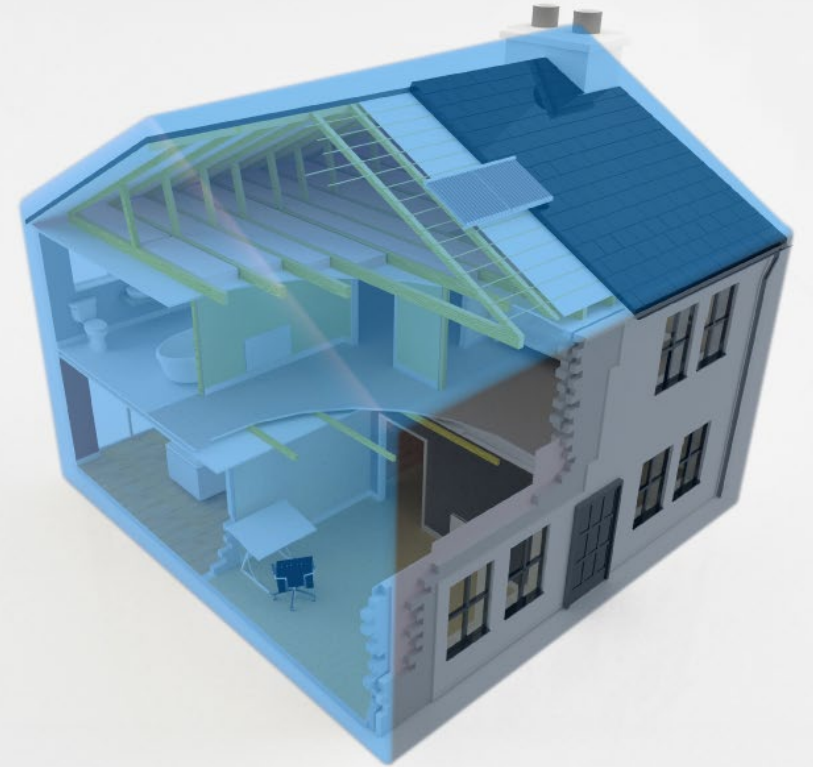
Low quality methods

- Duplicating existing equipment size
- A rule of thumb
- The Heating Load Estimator



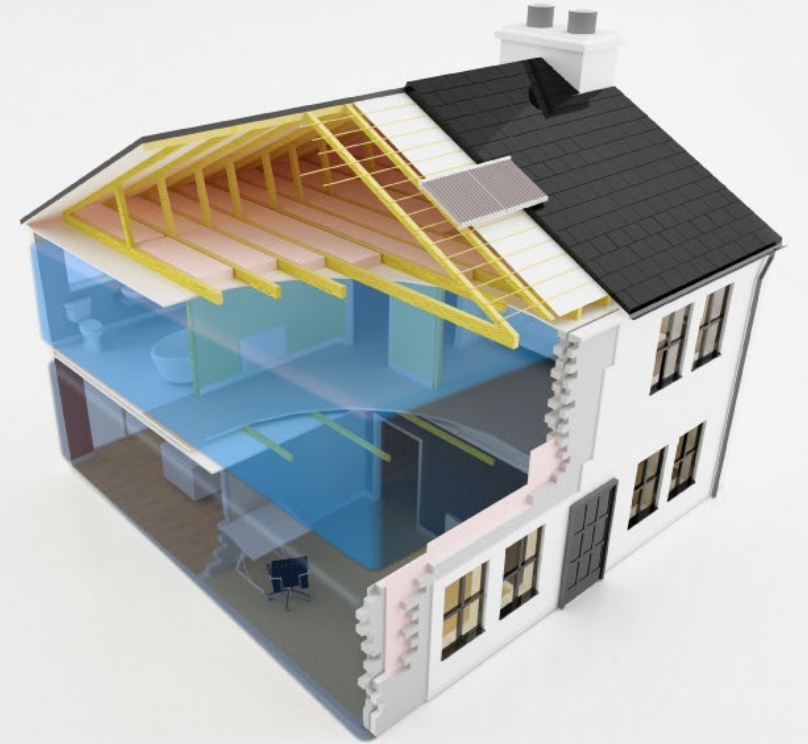
Medium quality methods

- Comfort consultation
- Block load calculation
(Manual J or equivalent)
- Account for detailed building
envelope information
- Factor in design temperatures



High quality methods

- Comfort consultation
- Room-by-room Manual J or equivalent
- Account for detailed building envelope information
- Factoring in existing equipment's run time or customer's utility bills
- Factor in design temperatures



Right Sizing Journey

Evaluate equipment that can meet goals.
Determine how far residents wish to go.

Identify homes loads.
Identify resident wants and needs.

Install properly.
Educate residents to operation.
Set controls.

Recognize applications and limitations.
Identify fuel types.

When you see this icon, you have landed on a key milestone.

Data Collection: Three Primary Steps

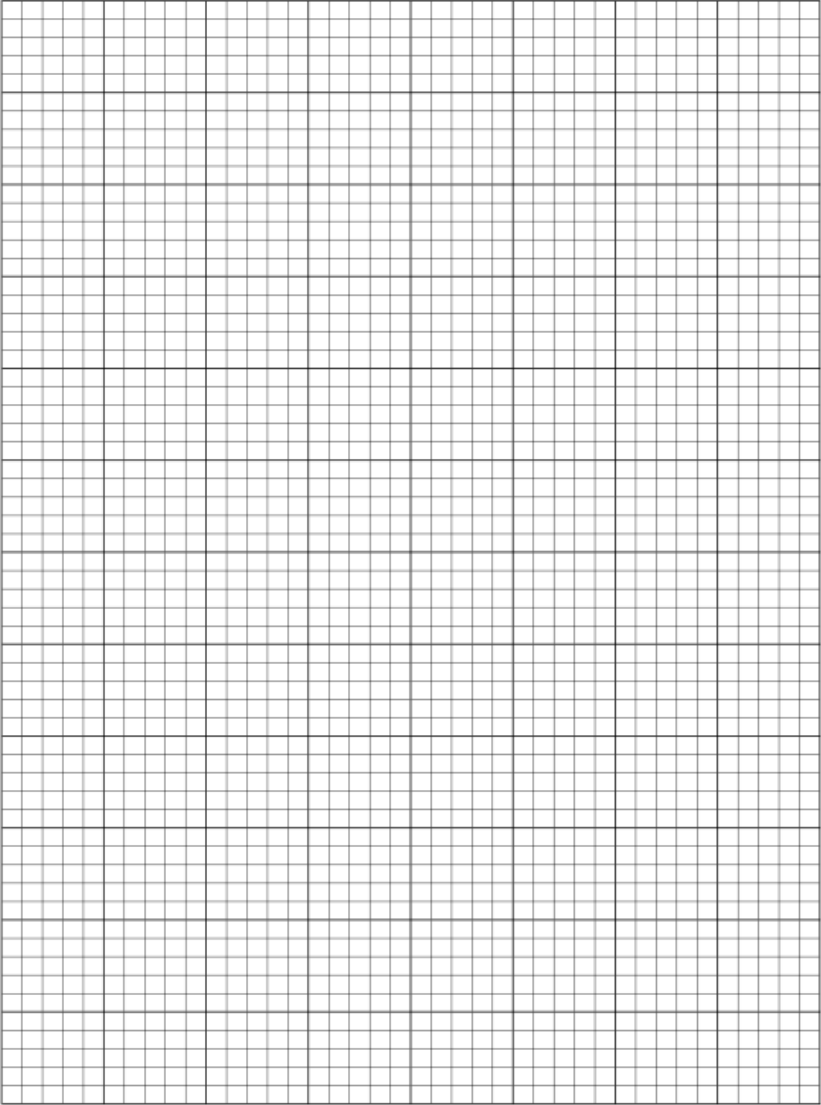
From Energy Vanguard Available to download from their website

1. Start with house drawing, then
2. Move on to home data collection, then
3. Move on to system data collection

<https://www.energyvanguard.com/hvac-design/data-collection/>

House Floor Plan
Show rooms, exterior doors, windows, register, duct and air handler locations.

Circle Orientation: N S E W



Energy Vanguard Data Collection Form

ROOF
4/12 w 12" OH

24'x6'
Revised

EXT DOORS
3-0 STEEL
INSUL

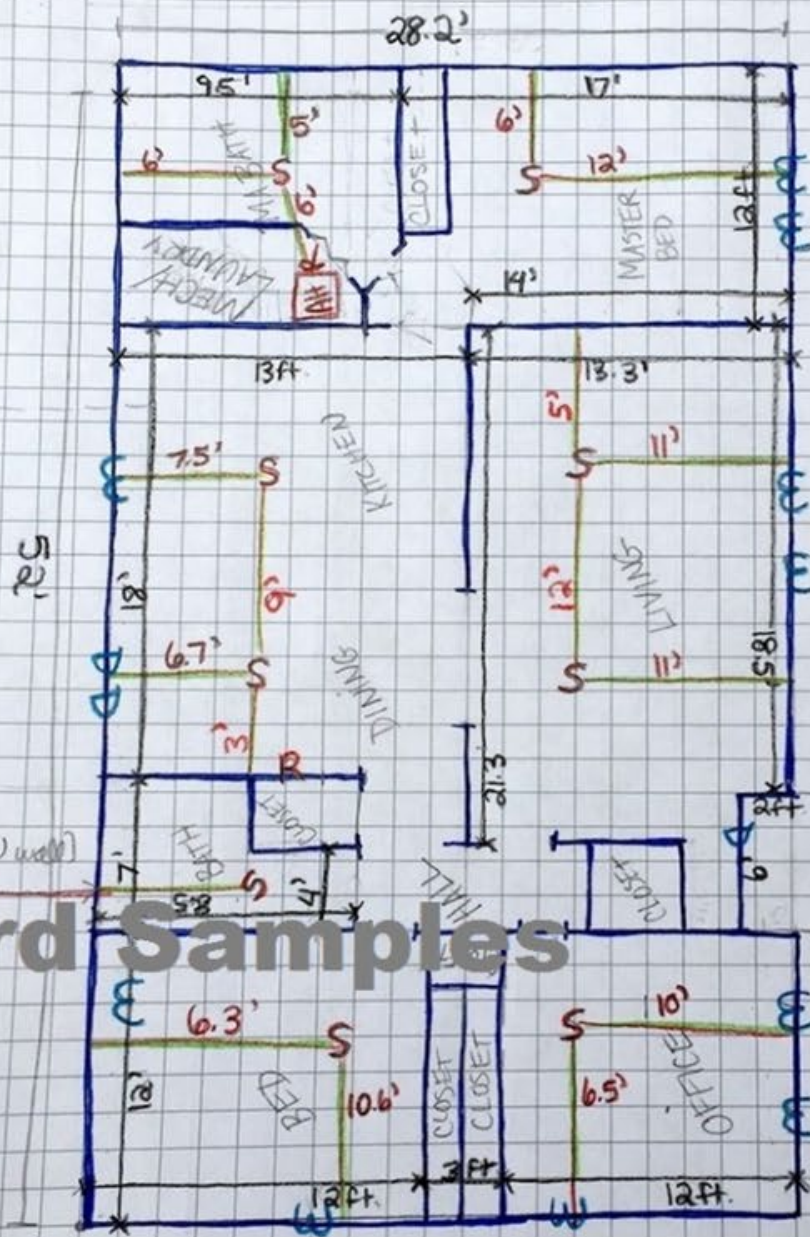
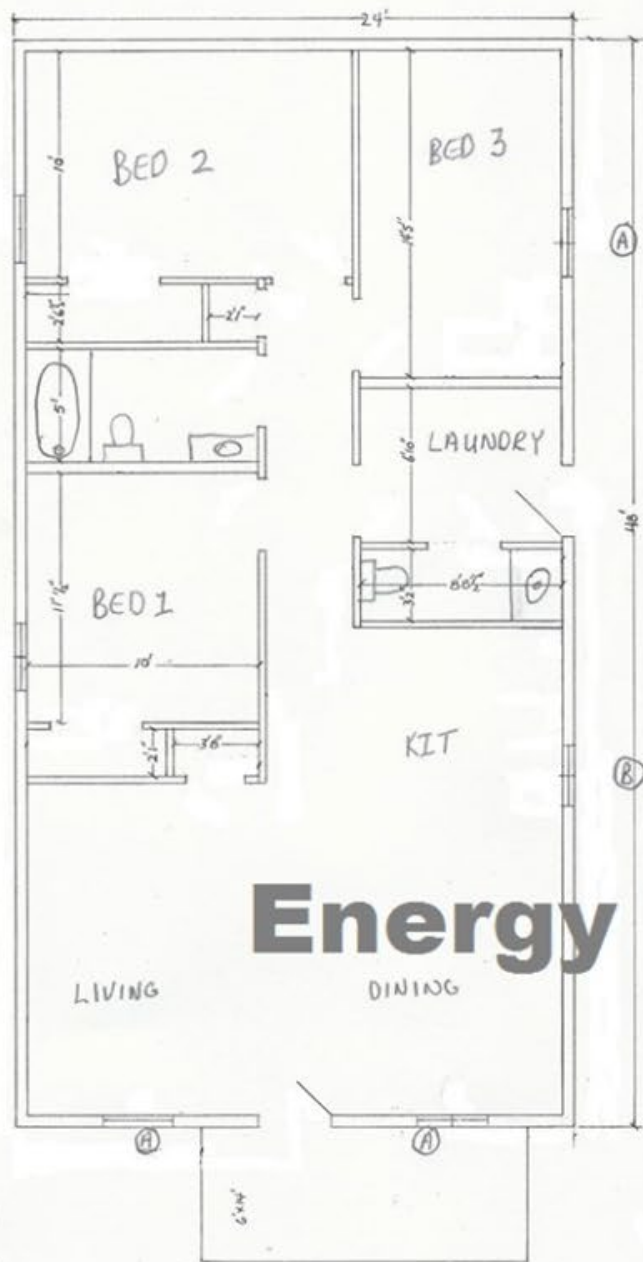
WINDOWS

(A) 3-0 X
5-2

(B) 2-8 X
3-0

SINGLE HUNG
LOW E

Energy Vanguard Samples



S=supply
R=Return
AH=Air Handler

W=Window
D=Door

Ma Bed ceiling = 9.3 ft

Ma Bath ceiling = 8.75 ft

All other ceiling = 8 ft.

Ma Bed & Bath have slab.
All other crawl.

All supplies are = 6 in
except guest bath = 4 in

Return in kitchen = 12 x 24

Return in HVAC closet =
10 x 20

Wall lengths are black

Supply distances are red

Walls are blue



Date			
Data Collector		Contact #	
Homeowner / Builder		Contact #	
Property Street Address		Code Year	
City, State & Zip Code			

N	NE	E	SE	S	SW	W	NW
---	----	---	----	---	----	---	----

--

Blower Door @ cfm50 or ☐ Tight ☐ Semi-Tight ☐ Average

Diagram of a house showing various rooms and their dimensions. The house has a gabled roof. Rooms are labeled A through M. Dimensions are given in feet and inches.

- Room A:** Living room, 12' x 16'.
- Room B:** Kitchen, 10' x 12'.
- Room C:** Dining room, 12' x 14'.
- Room D:** Bedroom, 12' x 14'.
- Room E:** Bathroom, 6' x 8'.
- Room F:** Hallway, 6' x 8'.
- Room G:** Attic, 12' x 16'.
- Room H:** Bedroom, 12' x 14'.
- Room I:** Bathroom, 6' x 8'.
- Room J:** Hallway, 6' x 8'.
- Room K:** Living room, 12' x 16'.
- Room L:** Kitchen, 10' x 12'.
- Room M:** Dining room, 12' x 14'.
- Room N:** Bedroom, 12' x 14'.

A: Slab Under
Slab Edge

C: Exterior Walls, above grade

D: Vaulted or Sloped Ceilings

E: Flat Ceilings (typical blown attic)

F: Attic Knee-walls

G: Roofline (typical spray foam)

H: Tray Ceiling Top/Side

K: Rim/Band Joists

L: Floor over Bsmt/Crawl/Garage

M: Poured Bsmt or Crawl Walls Cavity

Continuous ☐ Exterior ☐ Interior

N: Framed Bsmt Walls

[illegible]

XPS Extruded Polystyrene
EPS Expanded Polystyrene

ISO Polyisocyanurate

FGB Fiberglass Batts
BLN Blown Fiberglass/Cellulose

OC Open Cell Foam
CF Closed Cell Foam

Page 1 of 2

5. Mark additional energy saving features present: ☐ conditioned crawlspace, ☐ encapsulated attic, ☐ reflective shingles, ☐ attic radiant barrier, ☐ Energy Star home, ☐ other above code certification program, ☐ fireplace (sealed combustion), ☐ fireplace (vented w/ outside air), ☐ other: _____

6. Solid Doors (Only for information not on plans)

	Description	Location	Size (W x H x Thick)	☐ R or ☐ U-Value
Type 1				
Type 2				
Type 3				
Type 4				

7. Windows & Glazed Doors (>=50% glass) (Only for information not on plans)

	Description	Location	Size (W x H)	U-Value	SHGC
Type 1					
Type 2					
Type 3					
Type 4					
Type 5					
Type 6					
Glazed Doors					
Other					
Skylights					

8.HVAC System Preferences ☐ no preference

	Location	Manufacturer	Area Served	Efficiency	Heat-Pump	Gas	Duct Type
1							
2							
3							

RM	Round Metal	VF	Vinyl Flex
SQ	Square Metal	DB	Duct Board

9. Mechanical Ventilation Preferences ☐ no preference

On which system(s)? ☐ 1 ☐ 2 ☐ 3 ☐ separately ducted

Fresh Air Intake Type	☐ Vent. Dehumidifier	☐ Supply Only	☐ Exhaust Only	☐ Balanced
Manufacturer			Model	
Rate (CFM)		Notes		

New solutions to make high quality load calculations easier

Tablet-based room scanning software (LiDAR)

- Amply
- ConduitTech
- CoolCalc

Online tools

- NEEP Sizing for Heating tool



Free Online Sizing Tool – Using Today

HVAC
SIZING TOOL

back to
BetterBuilt^{NW}
site and resources

Register

Passwords are required to be a minimum of 6 characters in length.

Email

First Name

Last Name

Company

Password

Confirm Password

PRIVACY AND TERMS OF SERVICE

Brought to
you by 

<http://hvac.betterbuiltnw.com/Account/Register.aspx>

Example Houses

Older house (1950s)

- 1856 sq ft, 2 story home over a semi-conditioned basement.
- Heating load double the cooling load.

Newer house (2006)

- 2000 sq ft, 2 story home over a partial basement
- Heating and Cooling loads are much closer.

Example House – 1950's Home

HVAC
SIZING TOOL

HELLO ZAK PAINENEW SITE**SITES**REPORTSCONFIGUREHELPACCOUNT

SITEBUILDINGROOMSWINDOWSoverridesOPTIONSSYSTEMDUCT DESIGNDUCT RESULTSRESULTS**SUBMIT**

MI grand rapids demo house
Site ID: 19308Heating: 64,400 BTU/hr
Area: 1,856 ft²Cooling: 34,000 BTU/hr
Climate: Grand Rapids AP Latent: 3,500 BTU/hr

Building ⓘSave

Conditioned Floor Area1856Floors Above Grade2
Average Wall Height8.0Bedrooms3

Note: Default insulation level below is meant to provide a starting point for the house you are evaluating. You are able to override any specific items on later pages to override these default values. Please take care to override where necessary.

Default Insulation Level2x4 poorly insulated ☐ Show all
Foundation TypeConditioned Basement
Duct LocationConditioned Area
Direction Front Door (House Orientation)West
Year Built1949

Rule of Thumb vs Manual J for Older Home

- Was system oversized for heating?

- 35 btu per sq ft

- 1856 sq ft = 64,960

- Man J = 64,400

- No only off by 1%!!



Example House – Newer Home 2006

HVAC
SIZING TOOL

MI demo house Marquette

Site ID: 19306	Heating: 31,800 BTU/hr
Area: 2,000 ft ²	Cooling: 22,200 BTU/hr
Climate: Marquette CO	Latent: 1,600 BTU/hr

HELLO ZAK PAINENEW SITE**SITES**REPORTSCONFIGUREHELPACCOUNT

SITEBUILDINGROOMSWINDOWS**OVERRIDES**OPTIONSSYSTEMDUCT DESIGNDUCT RESULTSRESULTS**SUBMIT**

Building ⓘ

Save

✓ Values successfully saved.

Conditioned Floor Area2000

Floors Above Grade1

Average Wall Height8.0

Bedrooms3

Note: Default insulation level below is meant to provide a starting point for the house you are evaluating. You are able to override any specific items on later pages to override these default values. Please take care to override where necessary.

Default Insulation Level2x6 insulated w/vinyl windows

Foundation TypeConditioned Basement

Duct LocationCustom (enter details below)

☐ Show all

Custom Duct Location

Attic %30

Unconditioned Basement or Crawl Space %20

Conditioned Area %50

Direction Front Door (House Orientation)North

Year Built2006

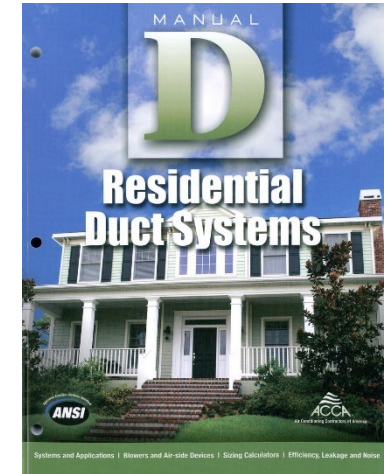
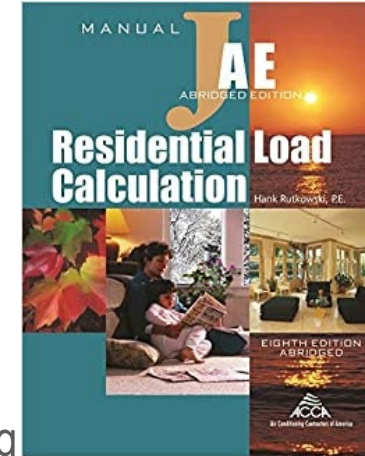
Rule of Thumb vs Manual J for Newer Home

- Was system oversized for heating?
- 35 btu per sq ft
- 2000 sq ft = 70,000 btu's
- Man J = 31,800 btu's
- YES, by ~55%!!



Design Challenges

- ✓ Accurate load calculations
- ✓ Determining when to size for heating vs cooling
 - ✓ AC replacement – always size for cooling
 - ✓ Cheap “backup or supplemental heat” – size for cooling
 - ✓ Expensive backup heat or carbon as driver – size for heating and cooling
- ✓ Distribution (ductwork) not properly designed for variable speed equipment
- ✓ Set expectations for performance with homeowners
- ✓ Selecting the right heat pump for the use case
- ✓ Selecting the best control strategy for the customer and equipment



General Design and Selection

Selection, often in the form of Manual S (but not always) **involves applying the results of heat and cool load sizing calcs to the selection of equipment** that will **deliver the necessary heating and cooling**, when and where it's wanted. Design and Selection needs to include existing conditions and the application type under consideration. The following is a summary from NEEP:

Manual S Summary	
Manual S directs, for central air conditioning and heating equipment selection:	
• The selected equipment will satisfy the building's total load requirements at design conditions • Manufacturer's product data is used to determine the loads are met • Total equipment capacity is limited to: - 95% of total cooling requirements (for air conditioners and heat pumps) - 95% and 12% of total heating requirements (for heat pumps in heating dominated climates). • It allows stepping up to the next nominal piece of equipment, per the desired product line, that is available to satisfy both the heating and cooling requirements.	

Updated Manual S sizing guidance

Equipment Type	Heating Size Limit*	Cooling Size Limit*
Single-speed AC	NA	120%
Two-speed AC	NA	125%
Single- and two-speed ASHP	120%	120%
Combustion system	140%	NA
Variable-speed ASHP	150%	130%
Auxiliary electric resistance	175%	NA

* Limits reference design loads

Sizing Guidance Resources

Sizing tools:

- ACCA Manual S
- Manufacturer sizing and selection tools
- **NEEP Cold Climate Product List and NEW Sizing Tool**

Resources

- [NEEP Installer Resources - Guide to Sizing and Selecting Heat Pumps](#)
- [Air-Source Heat Pump Sizing and Selection Guide NRCAN](#)
- [NY State Training Provider Resources](#)
- [NEEP Size for Heating Users Guide](#)



Guide To Sizing & Selecting Air-Source Heat Pumps in Cold Climates

A companion to NEEP's Guide to Installing Air-Source Heat Pumps in Cold Climates

Introduction

The use of air-source heat pumps (ASHPs) in cold climates is growing rapidly, but system sizing and selection practices have not always kept up with the wide range of applications commonly found in cold climates. System performance, comfort, and energy efficiency can be significantly impacted by poor sizing and system selection. The purpose of this guide is to assist installers in sizing and selecting ASHPs for residential cold climate applications, while maintaining high efficiency, performance, and customer satisfaction.

There are many types of equipment and a variety of common applications for ASHP installations in cold climates. Combinations of single and multi-zone, mini-split "ductless" and/or "compact-ducted" systems, and more conventional centrally ducted air-handler systems, may be installed in existing or new homes. When an ASHP is installed to reduce operating costs and/or emissions and existing heating equipment is left in place as a supplement, conventional approaches to sizing don't always apply, and controls can be important.

This guide is organized into four one-page application types so users can effectively match guidance to their specific installation. The applications are:

- Heating (or heating & cooling) displacement
- Full HVAC replacement
- Isolated zone
- New construction

Each category suggests the relevant information on sizing and equipment selection, system configurations, the optional use of pre-existing HVAC, and tips on key issues to look out for. Each application category includes a more detailed description of when that application would apply. Also, there is no cooling-only application type. In almost any circumstance, even if the client is initially interested in cooling, a cold-climate heat pump can provide cost-effective heating for at least some part of the winter. Thus all the applications considered assume intention to use the heat pump for at least some heating of the home.

For cold-climate applications, this guide is focused on products that appear on the [Cold Climate Air Source Heat Pump \(ccASHP\) Specification](#). Therefore, variable-speed systems are assumed in this guidance. Cold climates may be considered to be International Energy Conservation Code (IECC) climate zone 4 and higher, though interest in cold-weather performance may extend into some of the hottest climates in the U.S. The following section provides additional general guidance on building efficiency, load calculations, and equipment selection that apply to all the application types.

Note: Heat pumps should always be installed by licensed, trained professionals. Always follow manufacturer's specifications and installation instructions, and all applicable building codes and regulations.

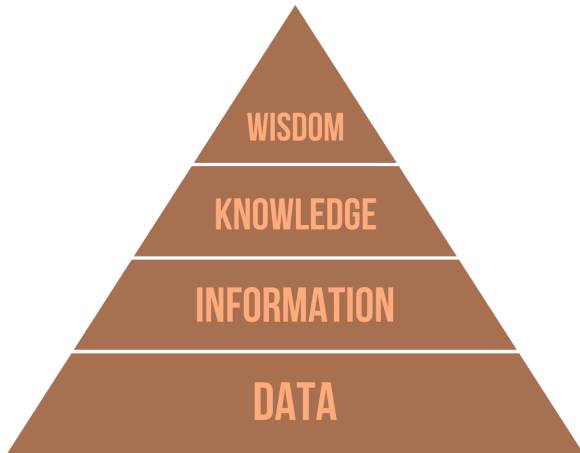
Ensure Building Efficiency

In existing buildings, always try to ensure that any building enclosure issues (insulation, air leaks/bypasses, existing duct disconnects/leaks, etc.) are addressed before installing new equipment. This reduces heating & cooling costs, improves comfort and heat pump performance, and reduces the size of equipment required. Enlist the help of a home performance professional if needed to diagnose these issues. Many electric and gas utility companies offer resources to support home performance upgrades. U.S. DOE's [Home Performance with ENERGY STAR](#) program also provides useful resources.

Size for Heating or Cooling

Old School

- Size for cooling and then go up a ton.
- Based on older single or two speed systems.
- Does not maximize heating potential of HPs and does not account for modulation capabilities of VSHPs!



This Photo by Unknown Author is licensed under [CC BY-SA](#)

New School

- Start by sizing to largest load for ER, old heat pumps, propane/home heating oil backup.
- For natural gas, size to cooling load unless the homeowner drive is carbon savings.
- Using Manufacturer data for Max and Min capacities, check to see if the smaller load is between the Max and Min at the design temp.
- Likely OK to be within a half ton!

Best Practices for Load Calculations

Key Takeaways

- Determine what tool or software you are going to use, Use tools you are comfortable with
- Decide how data collection is best done
 - Onsite - This is very beneficial and demonstrates confidence
 - Remote – Data collection will come from the homeowner and may need to be verified before installation
- Compare against enhanced rules of thumb to ensure accuracy
- Evaluate the duct work
 - Existing performance / location
 - Test total static pressure

Questions?



The Art of Balance

Balancing Capacity and Operation Cost, Air Flow, Customer Comfort

(Designation Training #3)



Ask yourself,

This house is old.

I'm anticipating installing 2025 high efficient, cold climate rated equipment.

Do you *really* think the house is ready?

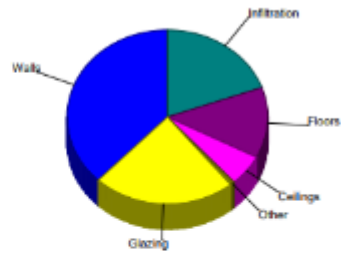
What should I consider to make address the home as a system?

Weatherization And Heat Pumps?



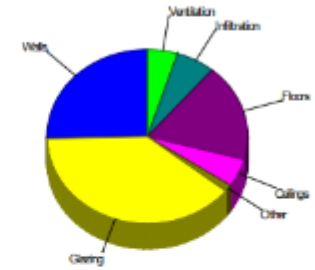
Heating

Component	Btuh/ft²	Btuh	% of load
Walls	10.2	19387	37.9
Glazing	37.9	11751	23.0
Doors	17.3	363	0.7
Ceilings	3.3	2972	5.8
Floors	7.4	6721	13.1
Infiltration	6.7	9978	19.5
Ducts		0	0
Piping		0	0
Humidification		0	0
Ventilation		0	0
Adjustments		0	0
Total		51171	100.0



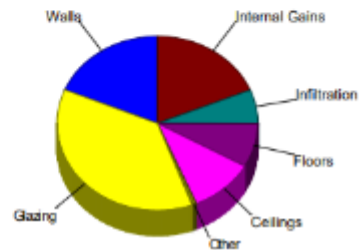
Heating

Component	Btuh/ft²	Btuh	% of load
Walls	5.0	9419	25.4
Glazing	46.5	14431	38.9
Doors	11.3	475	1.3
Ceilings	2.1	1941	5.2
Floors	7.4	6721	18.1
Infiltration	1.6	2332	6.3
Ducts		0	0
Piping		0	0
Humidification		0	0
Ventilation		1807	4.9
Adjustments		0	0
Total		37125	100.0



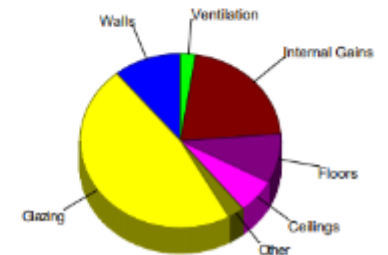
Cooling

Component	Btuh/ft²	Btuh	% of load
Walls	2.3	4312	18.7
Glazing	27.5	8515	36.9
Doors	8.0	168	0.7
Ceilings	2.7	2422	10.5
Floors	2.1	1880	8.1
Infiltration	1.0	1450	6.3
Ducts		0	0
Ventilation		0	0
Internal gains		4320	18.7
Blower		0	0
Adjustments		0	0
Total		23066	100.0



Cooling

Component	Btuh/ft²	Btuh	% of load
Walls	1.2	2229	10.9
Glazing	31.0	9597	47.1
Doors	5.2	219	1.1
Ceilings	1.4	1290	6.3
Floors	2.1	1880	9.2
Infiltration	0.2	326	1.6
Ducts		0	0
Ventilation		505	2.5
Internal gains		4320	21.2
Blower		0	0
Adjustments		0	0
Total		20366	100.0



Evaluating Existing Ductwork

1. Engaged discussion with homeowners and qualitative test - does the existing system and ductwork deliver hot/cold air to all rooms?
2. Visual inspection of the ductwork:
 - a) Is it located in attic and unconditioned basement?
 - b) Are the ducts visually damaged or leaking?
 - c) Are the ducts properly insulated?
3. Perform static pressure test(s)
4. Record static pressure and identify key components that will add to static pressure build up



Fan Watt Draw and Pressure

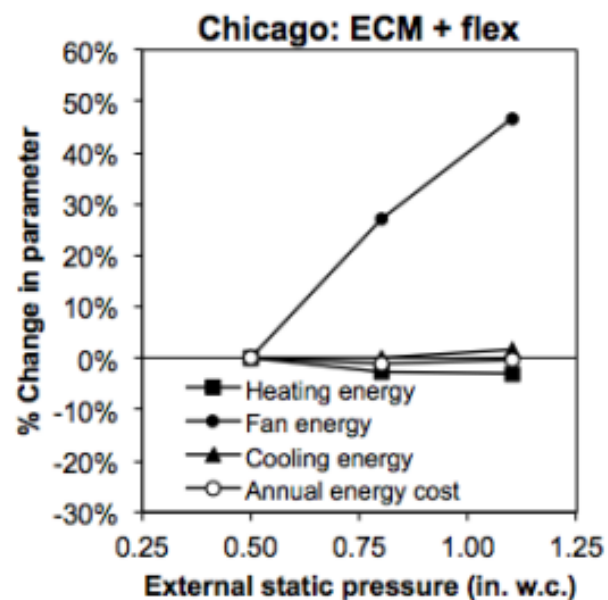


Figure 14. Estimated relative change in annual fan, cooling, and heating energy usage and total annual HVAC energy costs for the Chicago home with both types of AHU fans and both rigid and flex duct work at each duct design (using only the Chicago contractor's duct designs).

Table 10. Annual energy simulation results for both homes at baseline using the Austin contractor's designs

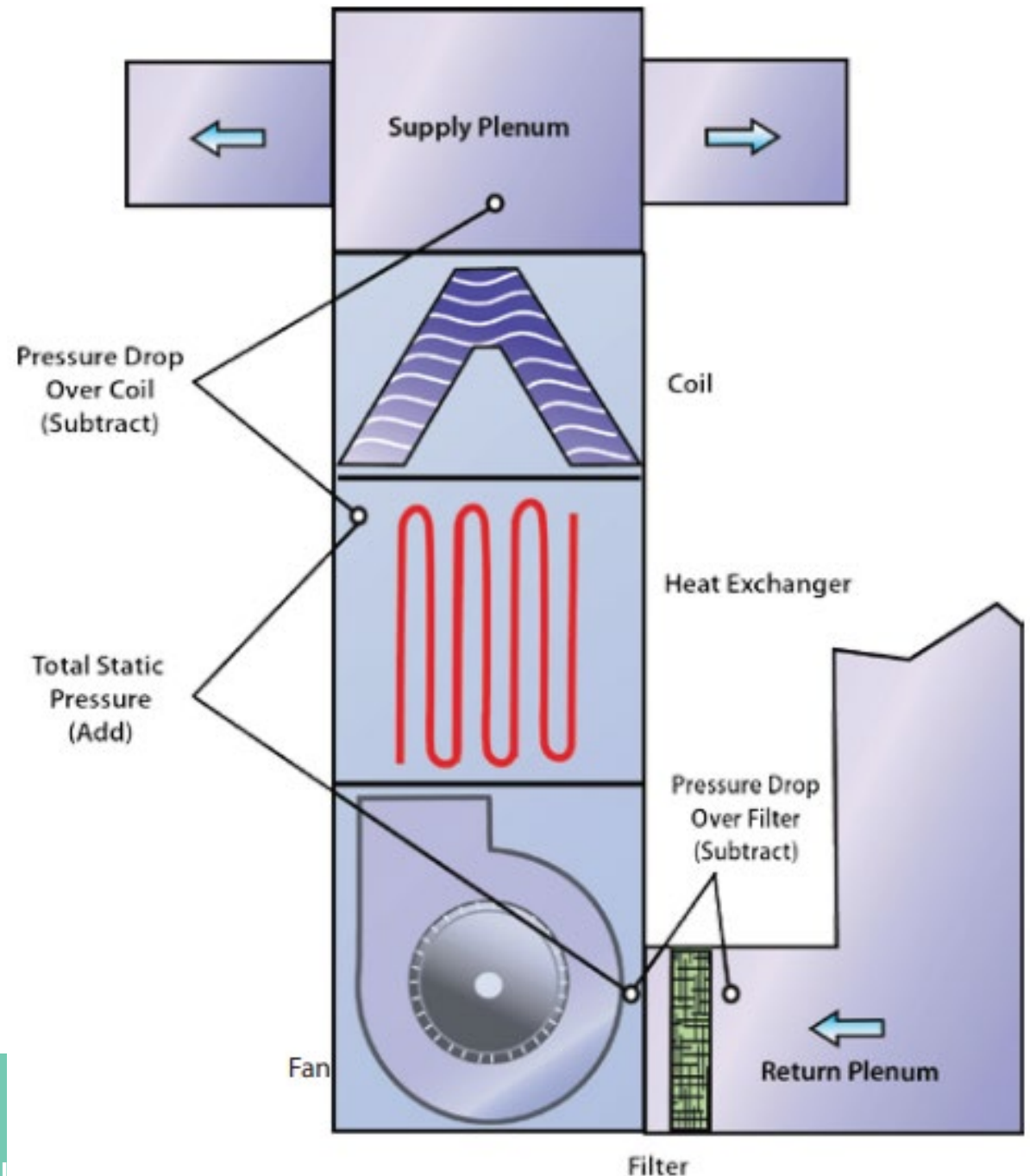
Home	Duct type	Blower type	Total Pressure (in. w.c.)	Airflow rate (CFM)	Cooling (kWh)	AHU Fans (kWh)	Total Electricity (kWh)	Heating ($\times 10^6$ Btu)	Total Gas Consumption ($\times 10^6$ Btu)
Chicago 3-ton AC Gas furnace 1200 CFM nominal	Flex	PSC	0.50"	1200	619	542	8108	60.95	88.88
			0.80"	964	661	531	8139	60.93	88.85
			1.10"	622	786	600	8331	63.71	91.70
		ECM	0.50"	1200	611	319	7878	61.55	89.51
			0.80"	1162	614	411	7972	60.47	88.39
			1.10"	1103	631	478	8056	60.86	88.78
	Metal	PSC	0.50"	1200	611	531	8086	59.52	87.41
			0.80"	964	656	525	8128	60.25	88.16
			1.10"	622	769	583	8300	62.17	90.12
			0.50"	1200	603	314	7861	60.10	88.02

TESP and Fan Tables and What is Meant by “External”

“External” designates how the unit was shipped:

- With a central heat pump utilizing auxiliary heat, the air handler and coil are shipped in one piece. The fan curves reflect this the resistance of the of the coil
- With gas furnaces with an AC or HP coil, the coil is not shipped with the air handler. The fan curves in this case, do not reflect the resistance of the coil. When testing these systems, the supply side measurement **MUST** be furnaces taken before the coil

<https://www.energystar.gov/sites/default/files/specs/National%20Comfort%20Institute%20-%20Measure%20and%20Interpret%20Static%20Pressures.pdf>



Quick Gut-Check for WFD

- Use the tally system!
 - Count registers
 - Count Returns
 - Find the size of the ductwork serving the supplies and returns
- Example:
 - Supplies IIII
 - Returns II
 - Supply duct 6" **hard pipe**
 - Returns (1) 12" and (1) 10" **hard pipe**
- Supply estimated max CFM = $10 \times 85 \text{ cfm} = 850 \text{ CFM}$
- Return estimated max CFM = $525 \text{ cfm} + 325 \text{ cfm} = 850 \text{ CFM}$

Comfort Balance Point

- Is air blowing directly on home inhabitants?
- Is air being distributed properly throughout the home?
- Hot/cold spots?



Adjusting air delivery



- Cooler delivered air temperatures means the air will travel further into the room
- Avoid blowing supply air directly on the occupants
- Direct air flow into open spaces
- Move toe kicks away from high use areas such as sinks
- Install indoor units away from sensitive areas

Definitions for Switchover Temperature / Balance Point

*The balance point is a **temperature** at which switchover happens*

Thermal balance point

- The outdoor temperature at which the heat pump can no longer produce the heat needed for the home.
- Also called Capacity Balance point.

Economic balance point

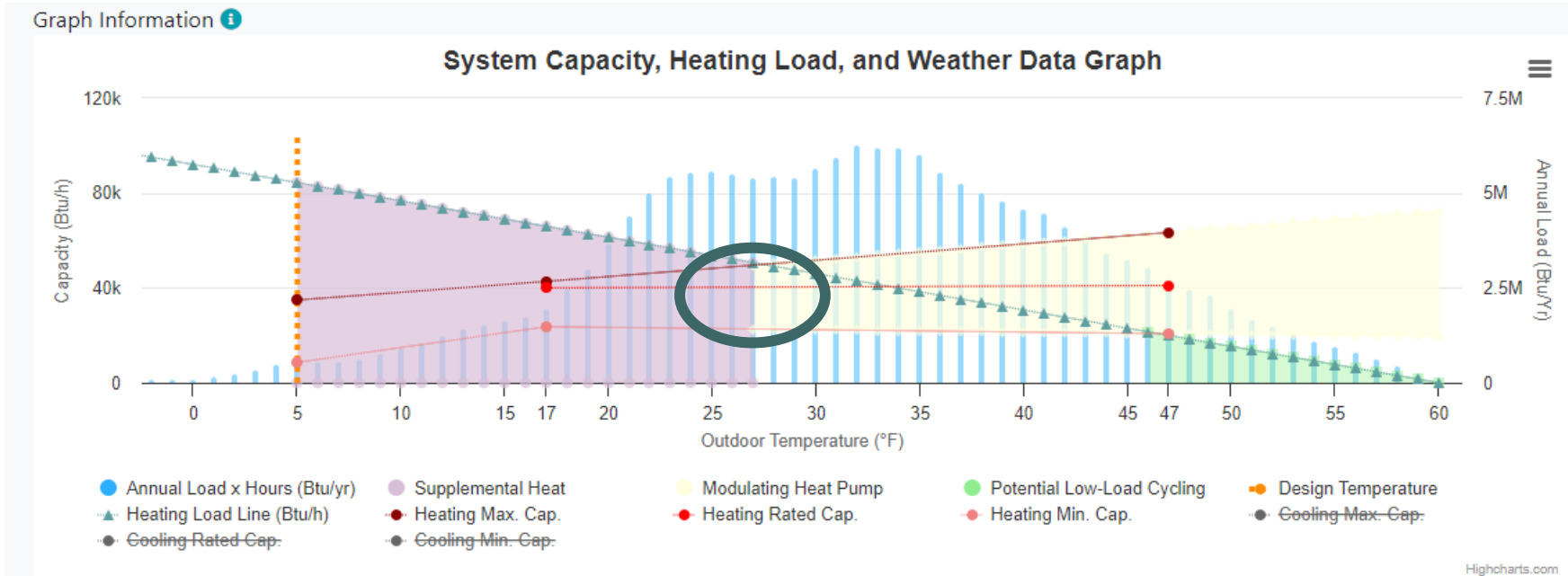
- The outdoor temperature at which the cost to heat the home with the HP is more expensive than the back up heat cost.
- Relies on the back up heat fuel cost.

Comfort balance point

- The outdoor temperature at which the homeowner experience discomfort when running the heat pump.

Determining the Thermal / Capacity Balance Point with the NEEP Tool

This is the best place to *guess* and check on capacity balance points your customer may not be as forgiving as this tool!



Product Sizing For Heating

Field Information ⓘ

Capacity Balance Point (°F)	27
Minimum Capacity Threshold (°F)	46
Maximum Capacity at Design Temp (Btu/h)	0
Percent Design Load Served	0.0%
Annual Heating Load (MMBtu)	175.5
Percent Annual Heating Load Served	67.5%

Field Information ⓘ

Annual Btu's Covered by Supplemental Heat (MMBtu)	57.1
Hours Requiring Supplemental Heat	930
Percent Hours Requiring Supplemental Heat	16.5%
Percent Annual Load Modulating	86.9%
Percent Annual Load with Low-Load Cycling	10.5%

Technical Sizing and Customer Confidence With Cool Tools!

- Reduce callbacks
- Your confidence in product selection
- Your customer's confidence in your proposal/bid
- Differentiating yourself in the market



Example House – 1950's Home

HVAC
SIZING TOOL

HELLO ZAK PAINENEW SITE**SITES**REPORTSCONFIGUREHELPACCOUNT

SITEBUILDINGROOMSWINDOWSOVERRIDESOPTIONSSYSTEMDUCT DESIGNDUCT RESULTSRESULTS**SUBMIT**

MI grand rapids demo house
Site ID: 19308Heating: 64,400 BTU/hr
Area: 1,856 ft²Cooling: 34,000 BTU/hr
Climate: Grand Rapids APLatent: 3,500 BTU/hr

Building ⓘSave

Conditioned Floor Area1856Floors Above Grade2
Average Wall Height8.0Bedrooms3

Note: Default insulation level below is meant to provide a starting point for the house you are evaluating. You are able to override any specific items on later pages to override these default values. Please take care to override where necessary.

Default Insulation Level2x4 poorly insulated ☐ Show all
Foundation TypeConditioned Basement
Duct LocationConditioned Area
Direction Front Door (House Orientation)West
Year Built1949

On behalf of clean energy and energy efficiency stakeholders, NEEP is pleased to host the Cold Climate Air Source Heat Pump (ccASHP) Product List. This Product List was originally launched in 2015; for more on the background, visit the [ASHP Initiative](#). The list includes ASHP systems that meet the latest version of the [ccASHP Specification](#). The voluntary specification includes requirements for both performance levels and a series of reported performance standards.

Please note that being listed 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. Visit NEEP's [Installer and Consumer Resources](#) for more information.

Ready to search the list?

Product Type ⓘ
All Product Type ▼

Ducting Configuration
All Ducting Co ▼

Brand
All Brands ▼

AHRI, Model, Unit ⓘ
AHRI, Model or Ur

Heating Capacity 47°F Rated Btu/h ⓘ
0 80000

Heating Capacity 5°F Max Btu/h ⓘ
0 80000

ENERGY STAR Certified ⓘ
☐ ENERGY STAR V6.1
☐ ENERGY STAR V6.1 Cold Clima

Eligible for Federal Tax Credit ⓘ
☐ North
☐ South

SEARCH THE LIST

Advanced Search - Sizing for Heating

Advanced Search - Sizing for Heating User Guide ⓘ

Design Load Calculators

https://ashp.neep.org/#!/product_list/

ZipCode 49503	Heating Design Temp. (°F) ⓘ 7	Cooling Design Temp. (°F) ⓘ 87
Weather Station ⓘ Gerald R Ford Intl, Winter Design Temp: ▼	Heating Design Load (Btu/h) ⓘ 64400	Cooling Design Load (Btu/h) ⓘ 34000

[Advanced Search](#) [Sizing for Heating and Cooling User Guide ⓘ](#) and [Design Load Calculators](#)

☐ Optional: Apply Compressor Lock-Out Temperature ⓘ

Derate (%)

☐ Optional: Manually Set Low Temperature Capacity Rating

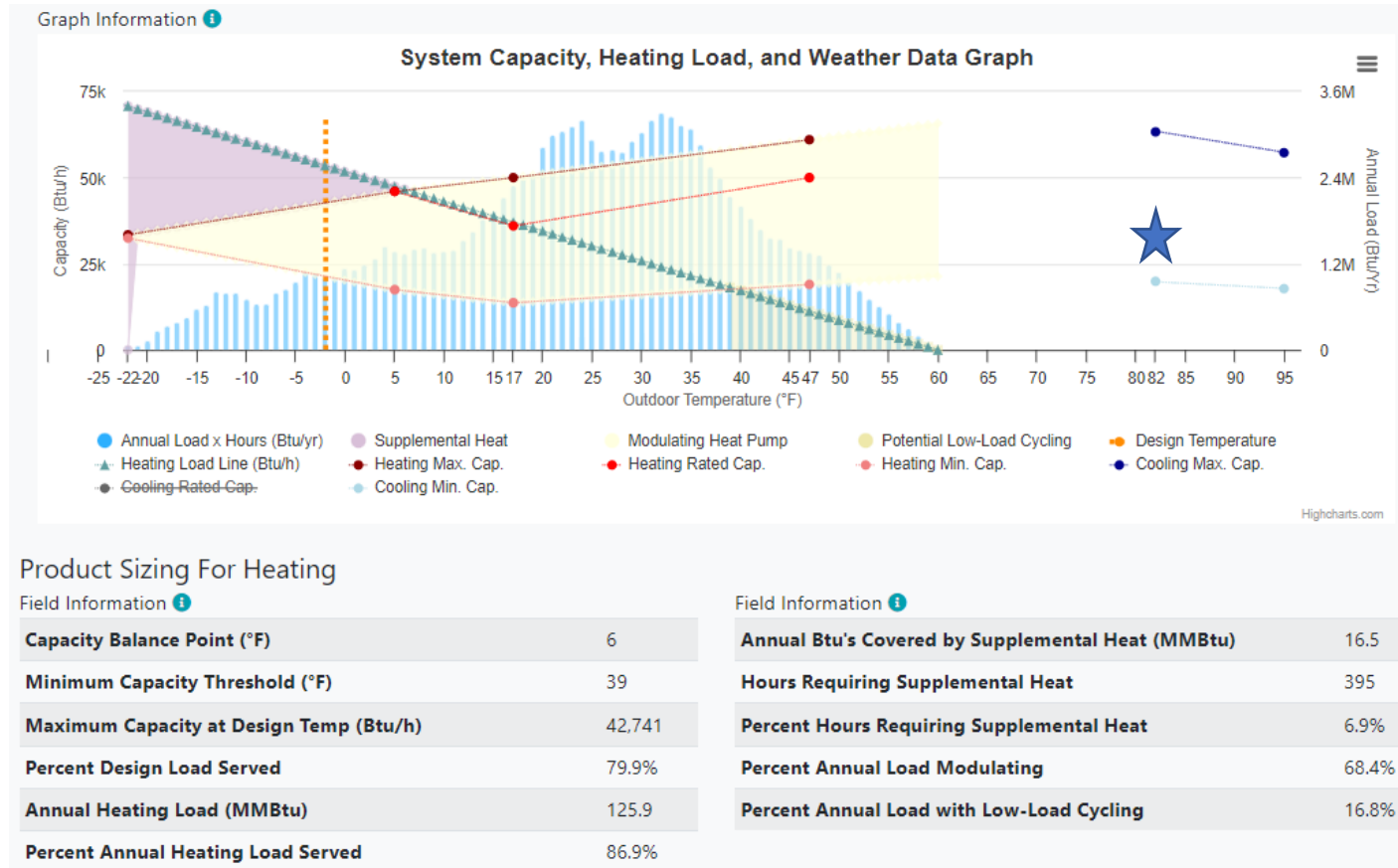
0

[Click here for Optional Settings](#)

[Run System Sizing](#)

https://ashp.neep.org/#!/product_list/

Example System



Remember our heating and cooling load for the older home?

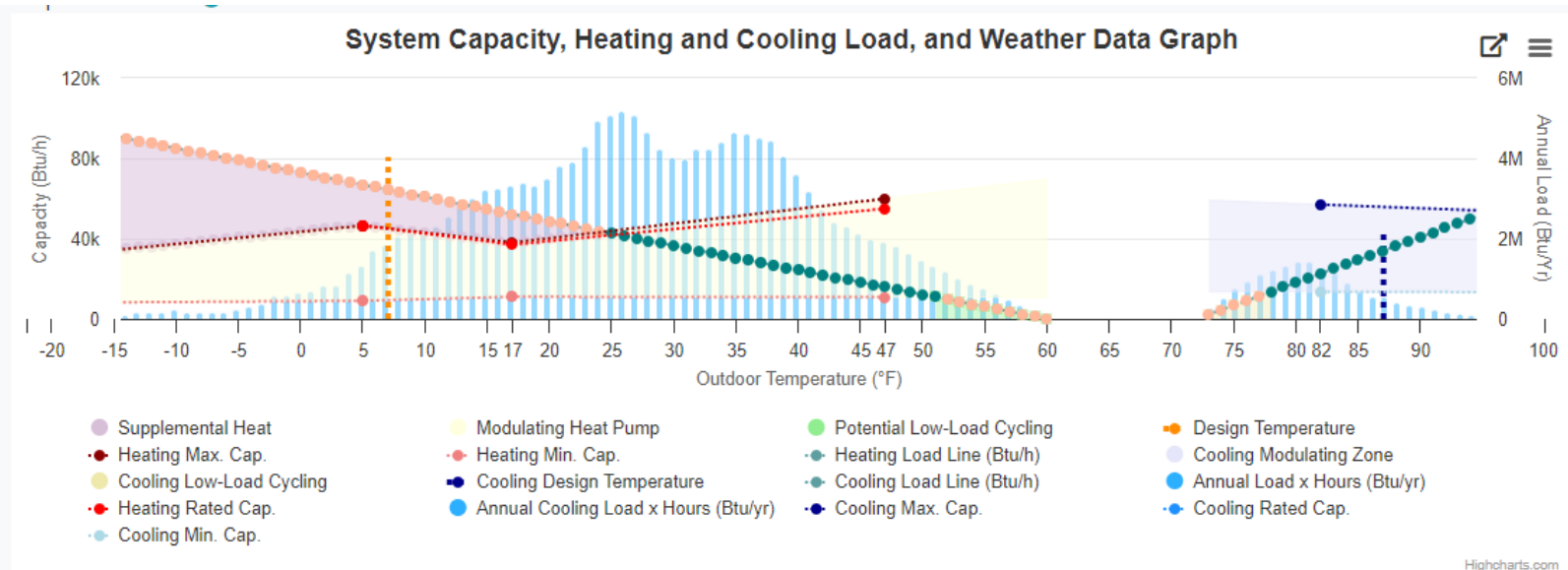
MI grand rapids demo house	
Site ID: 19308	Heating: 64,400 BTU/hr
Area: 1,856 ft ²	Cooling: 34,000 BTU/hr
Climate: Grand Rapids AP	Latent: 3,500 BTU/hr

<https://ashp.neep.org/>

5 Ton all electric example

- 🔥 Maximum Heating Capacity (Btu/h) @5°F: **46,500**
- 🔥 Rated Heating Capacity (Btu/h) @47°F: **55,000**
- ❄️ Rated Cooling Capacity (Btu/h) @95°F: **53,000**

MI grand rapids demo house	
Site ID: 19308	Heating: 64,400 BTU/hr
Area: 1,856 ft ²	Cooling: 34,000 BTU/hr
Climate: Grand Rapids AP	Latent: 3,500 BTU/hr



Product Sizing For Heating

View Oversizing Effects [i](#)

Definition/Use Cases [i](#)

Capacity Balance Point (°F)	24
Minimum Capacity Threshold (°F)	51
Maximum Capacity at Design Temp (Btu/h)	45,083
Percent Design Load Served	70.0%
Annual Heating Load (MMBtu)	166.8
Percent Annual Heating Load Served	72.2%

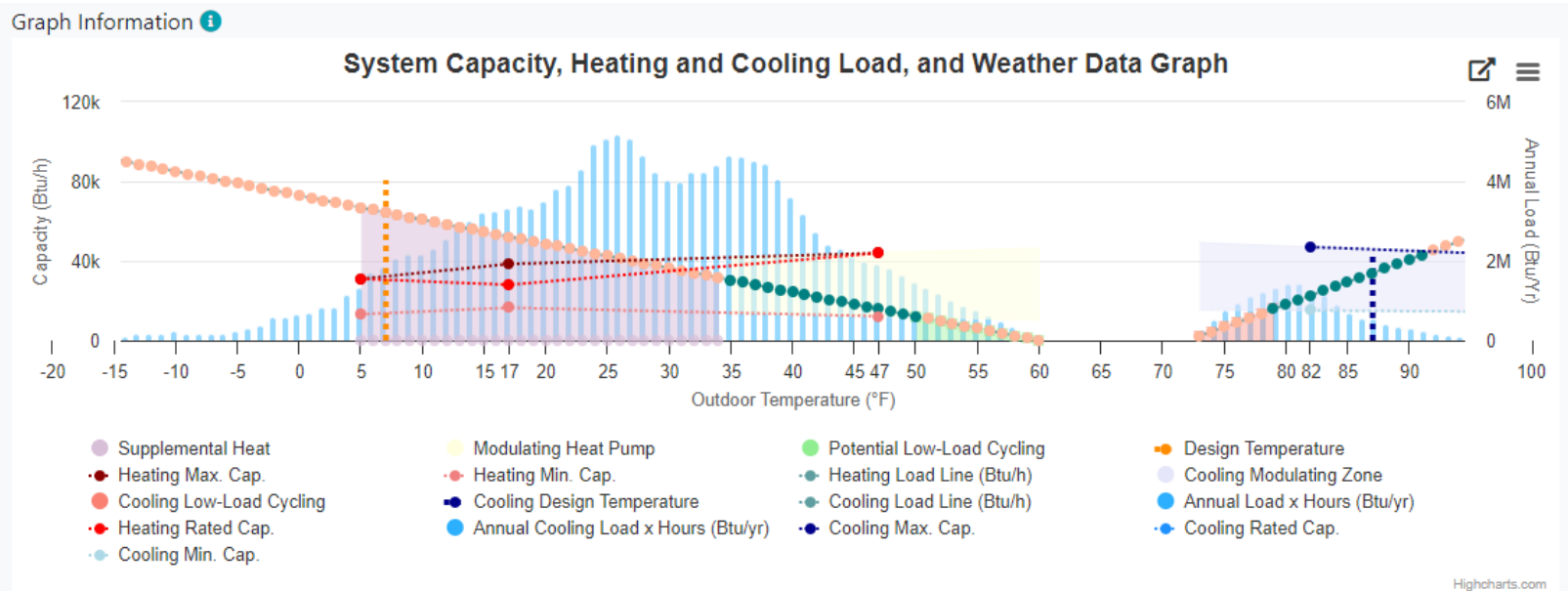
Definition/Use Cases [i](#)

Annual Btu's Covered by Supplemental Heat (MMBtu)	46.3
Hours Requiring Supplemental Heat	1,123
Percent Hours Requiring Supplemental Heat	18.9%
Percent Annual Load Modulating	68.1%
Percent Annual Load with Low-Load Cycling	3.3%

4-Ton Variable Capacity Heat Pump with Natural Gas Furnace

- 🔥 Maximum Heating Capacity (Btu/h) @5°F: **31,000**
- 🔥 Rated Heating Capacity (Btu/h) @47°F: **44,000**
- ❄️ Rated Cooling Capacity (Btu/h) @95°F: **44,000**

35°F Switchover Temperature



Product Sizing For Heating

View Oversizing Effects ⓘ

Definition/Use Cases ⓘ

Capacity Balance Point (°F)	27
Minimum Capacity Threshold (°F)	50
Maximum Capacity at Design Temp (Btu/h)	32,250
Percent Design Load Served	0.0%
Annual Heating Load (MMBtu)	166.8
Percent Annual Heating Load Served	32.7%

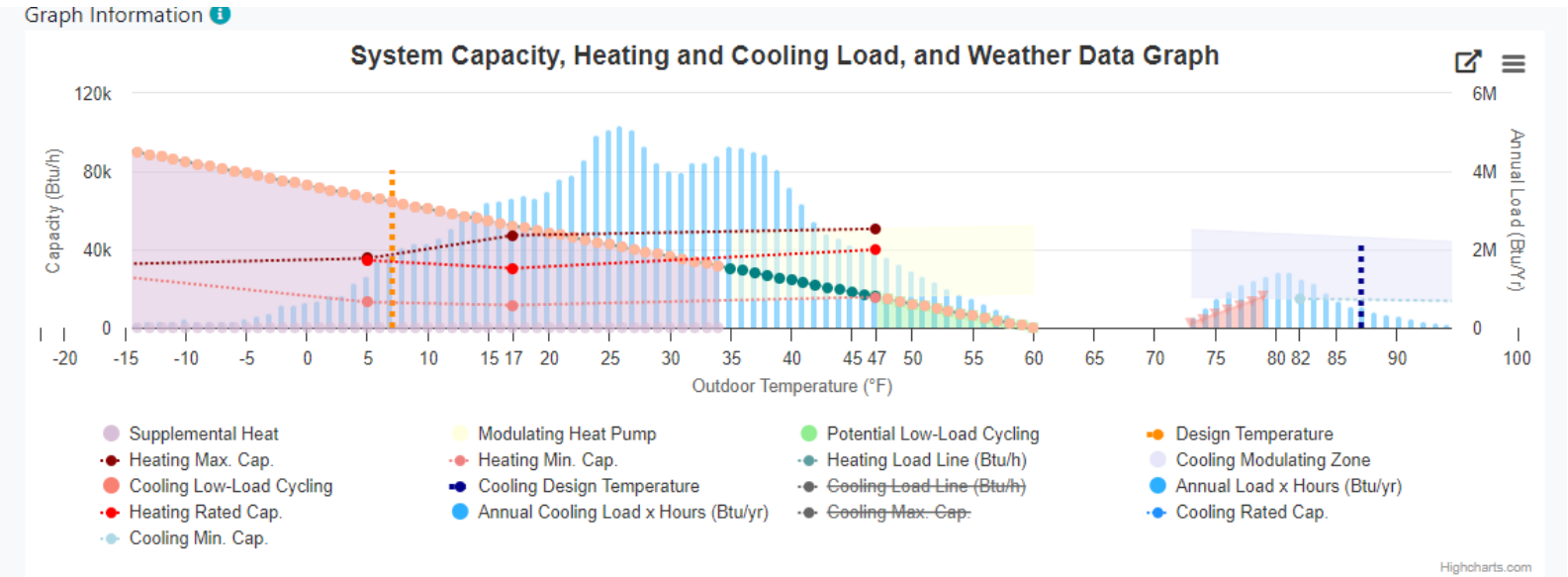
Definition/Use Cases ⓘ

Annual Btu's Covered by Supplemental Heat (MMBtu)	112.3
Hours Requiring Supplemental Heat	1,482
Percent Hours Requiring Supplemental Heat	24.9%
Percent Annual Load Modulating	90.3%
Percent Annual Load with Low-Load Cycling	4.1%

3-Ton Variable Capacity Heat Pump with Natural Gas Furnace

- Maximum Heating Capacity (Btu/h) @5°F: **35,500**
- Rated Heating Capacity (Btu/h) @47°F: **40,000**
- Rated Cooling Capacity (Btu/h) @95°F: **36,000**

35°F Switchover Temperature



Product Sizing For Heating

View Oversizing Effects ⓘ

Definition/Use Cases ⓘ

Capacity Balance Point (°F)	21
Minimum Capacity Threshold (°F)	47
Maximum Capacity at Design Temp (Btu/h)	37,467
Percent Design Load Served	0.0%
Annual Heating Load (MMBtu)	166.8
Percent Annual Heating Load Served	32.7%

Definition/Use Cases ⓘ

Annual Btu's Covered by Supplemental Heat (MMBtu)	112.3
Hours Requiring Supplemental Heat	861
Percent Hours Requiring Supplemental Heat	14.5%
Percent Annual Load Modulating	91.8%
Percent Annual Load with Low-Load Cycling	7.1%

Typical Switchover Temperatures by Application

Application	Typical switchover temp
ccDHP displacing baseboard heat or gas boiler	0-5° F (compressor lockout no higher than this)
ccASHP displacing propane furnace	Depends on cost of propane and sizing, including duct evaluation 5-25° F
ASHP displacing natural gas furnace	Depends on gas and electric rates & customer motivation: 25-45° F (ccASHP) 35-45° F (two stage HP)

What is COP?

- Coefficient of Performance is the measure of a heat pumps efficiency.
 - Higher COP = Better Performance
- Consider the similarity of how we can educate homeowners like we do with AFUE
 - If a furnace is 96% efficient, whats the dollar *usage* efficiency?
 - If a heat pump has a **rated** COP of 2.7, whats the dollar *invested* efficiency?
- This is a moving target due to ambient temp. How do we know when to switch?

Economic Switchover Temperature

Easy, it's just math!

It is a simple math problem The easiest way to solve it is to find your break-even COP and then look at your heat pump publications to see what temperature that occurs at. You can calculate your break-even COP by:

$BECOP = (E \times C \times e) / G$ where BECOP is your break-even COP

- E is \$/kWh (Take your power bill and divide by kWh = 0.132 average in Chicago)
- C is kWh/Therm which is 29.3
- e is the efficiency of your specific furnace (.92 average)
- G is \$/Therm (Take your gas bill \$/Therm and add factor for monthly rate and taxes = \$1.15 for Chicago on average)
- Then plug in the numbers and solve.

Economic Balance Point Calculation – Natural Gas

BeCOP = Breakeven Coefficient of Performance

$$\text{BeCOP} = \frac{(E \times C \times E_f)}{G}$$

$E = \$/\text{kWh}$

$C = \text{kWh/therm (constant)}$

$E_f = \text{Efficiency of furnace}$

$G = \$/\text{therm}$

1 gal propane = 27 kWh

1 therm natural gas = 29.3 kWh

Example House Calculation

$$\text{BeCOP} = \frac{(0.10 \times 29.3 \times 0.96)}{0.95}$$

$E = \$0.10/\text{kWh}$

$C = 29.3 \text{ kWh/gal propane}$

$E_f = 0.96 \text{ (96\% AFUE)}$

$G = \$0.95/\text{therm}$

BeCOP = 2.9

Use the Performance Specs chart and BeCOP to estimate the economic balance point

BeCOP = 2.9

- Find the **Rated COP** at different temps
- Depending on where the BeCOP falls, estimate the **economic balance point**

Our estimate: ~30°F

Heating/ Cooling	Outdoor Dry Bulb	Unit	Min	Rated	Max
Heating	47°F	Btu/h	11,500	27,400	35,000
		kW	0.91	2.47	3.73
		COP	3.7	3.25	2.75
Heating	17°F	Btu/h	6,400	19,400	25,500
		kW	0.82	2.23	3.31
		COP	2.25	2.55	2.26
Heating	5°F	Btu/h	5,400	20,800	20,800
		kW	0.83	3.1	3.1
		COP	1.91	1.97	1.97
Heating	-3°F	Btu/h	5,400	-	18,800
		kW	0.93	-	2.85
		COP	1.7	-	1.93

What if the customer has propane?

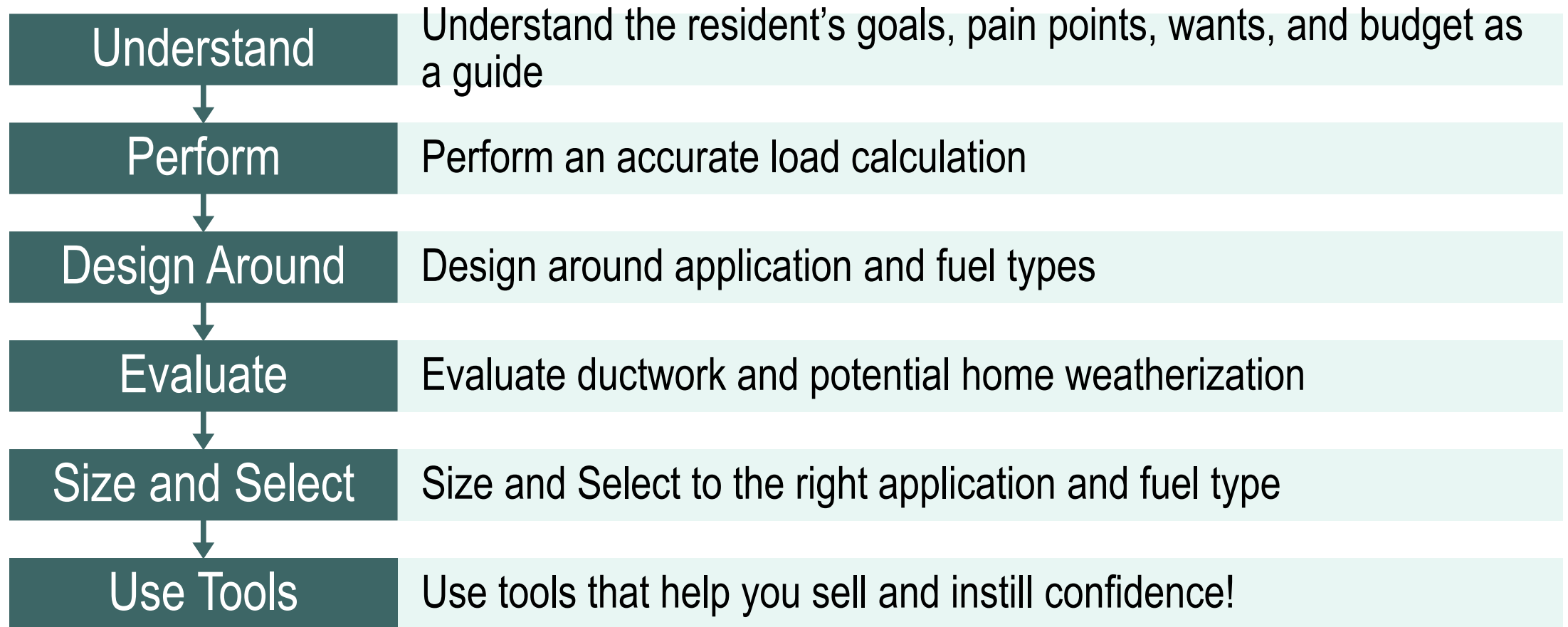
BeCOP = 1.3

- Find the **Rated COP** at different temps
- Depending on where the BeCOP falls, estimate the **economic balance point**

Our estimate: ~ 0°F

Heating/ Cooling	Outdoor Dry Bulb	Unit	Min	Rated	Max
Heating	47°F	Btu/h	11,500	27,400	35,000
		kW	0.91	2.47	3.73
		COP	3.7	3.25	2.75
Heating	17°F	Btu/h	8,400	19,400	25,500
		kW	0.82	2.23	3.31
		COP	2.25	2.55	2.26
Heating	5°F	Btu/h	5,400	20,800	20,800
		kW	0.83	3.1	3.1
		COP	1.91	1.97	1.97
Heating	-3°F	Btu/h	5,400	-	18,800
		kW	0.93	-	2.85
		COP	1.7	-	1.93

Summary of Key Milestones



Educate the homeowner about defrost!

- What does it look and sound like?
- When will it happen?
- How will my system handle it?

Best recommendation is to record a video and show the customer what a defrost system looks like. We do install heat pumps in the summer too.



What is comfort?

According to the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), thermal comfort is defined as “*a condition of mind which expresses satisfaction with the thermal environment and is assessed by subjective evaluation.*”

If comfort is subjective, it means we can change the perception.

How can we change customer perception?



- Understand the customer goals
- Adjust air delivery points
- Education and understanding
- Set expectations



Education through Communication.
You are the trusted partner in the home.
Build rapport with your homeowners.
"Arrive a stranger, leave as a friend"

Questions?

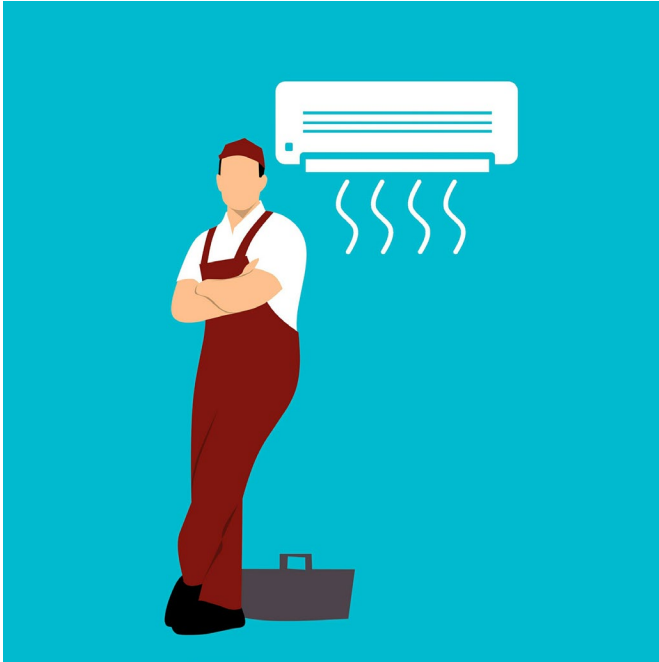


ARE YOU READY?

OUR APPROACH

- Be responsive to market actor needs
- Be adaptable to external forces
- Leverage distributor and manufacturer partnerships
- Employ flexibility and creativity in training delivery
- Provide information to supply chain that is grounded in research

CONSUMER DEMAND IS GROWING



- Homeowners want more efficient options and choices
- Rebates from utilities are attracting consumers
- Tax credits are here, and federal rebates are coming
- More products are coming to meet homes need for efficiency

CONSUMERS ARE BECOMING MORE AWARE

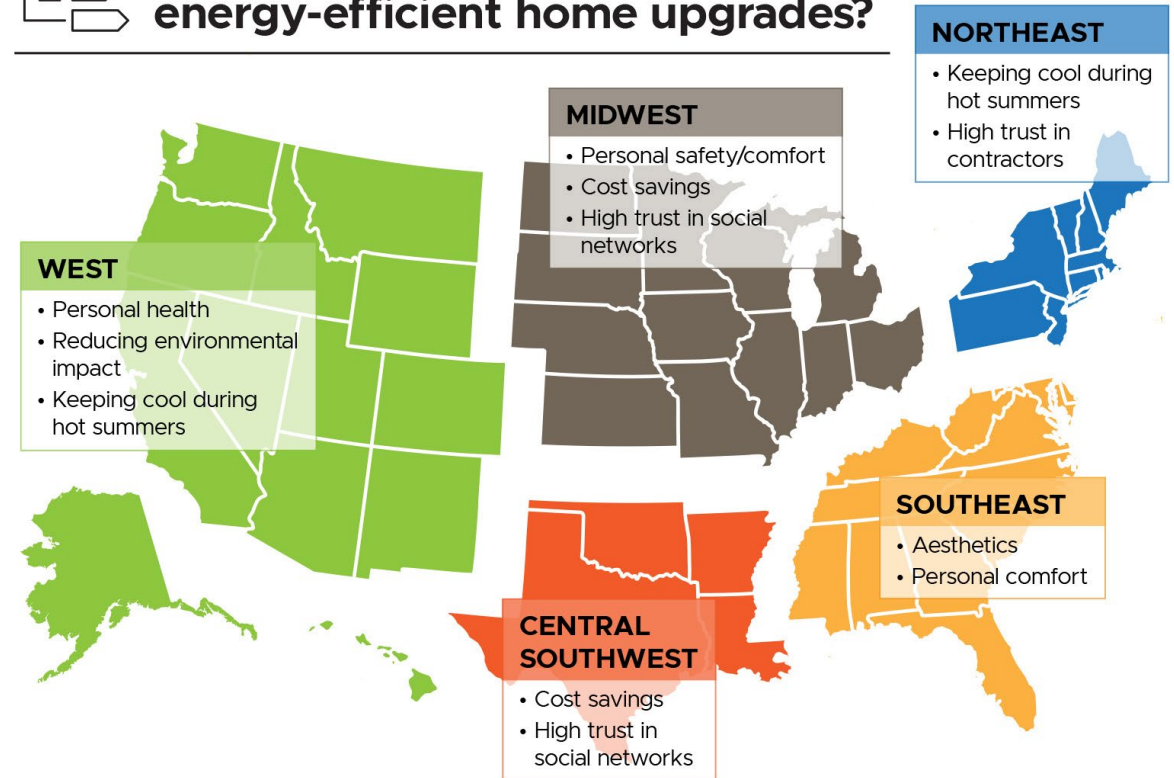
- About half of homeowners are aware of how heat pumps differ from air conditioners
- Most homeowners would pay more for a heat pump that delivers on performance
- For those that purchased heat pumps, homeowners recommended heat pumps to others for following benefits:
 - saving money
 - better efficiency
 - reduced emissions
 - better cooling performance

HOMEOWNER MOTIVATIONS

- In a survey of more than 10,000 people, researchers found that homeowners' motivations for making energy upgrades differ regionally
- The research team is looking through the data to pull out other factors that may hinder adoption of energy-efficient technology



What motivates people to add energy-efficient home upgrades?



REPLACEMENTS ARE OPPORTUNITIES FOR CHANGE

67%

of homeowners are unsatisfied or somewhat unsatisfied
with their current heating system

source: 6th annual NW DHP Project Market Progress Report

CUSTOMER-FIRST APPROACH

- Customers awareness and interest is growing
- Listen to pain points, needs, and wants
- Orient around building solutions to meet needs of client



BUILDING A REPLACEMENT CULTURE INCREASES BUSINESS PROFITS

- Heat pumps increase the ticket total and net profit
- Rebates and tax credits reduce consumer cost
- Heat pumps can solve larger comfort issues
- Quality replacements will increase customer referrals



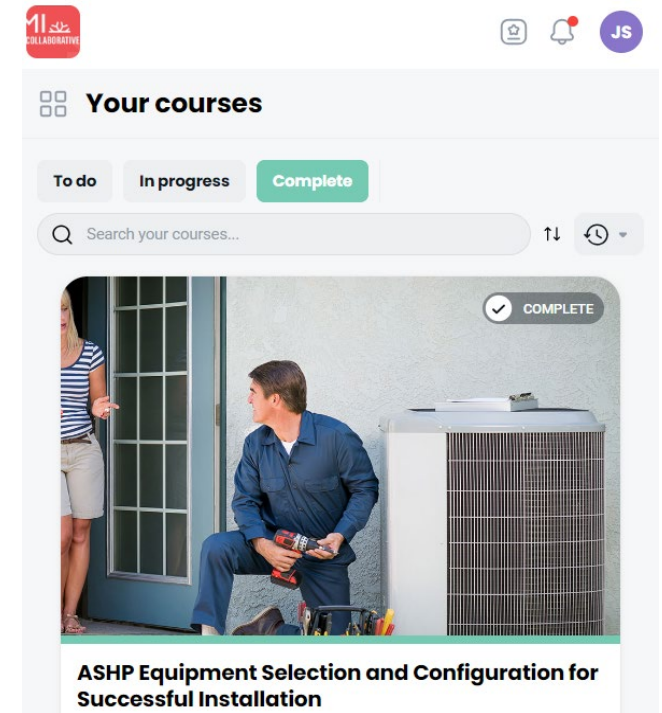
WE'RE HERE TO HELP YOU!

TRAINING ON-DEMAND

- All our trainings are available on-demand if you missed the live sessions
- Join our learning management workspace to take advantage of these courses on your own time, pass the quizzes, and earn a designation to set yourself apart
- Content currently available:
 - **Heat Pump Water Heater Trainings** – with AO Smith, Bradford White and Rheem
 - **Why Offer Heat Pumps?**
 - **Introduction to Heat Pumps and Heating Applications**
 - **Sales and Marketing for Heat Pumps**
 - **ASHP Equipment Selection and Configuration for Successful Installation**
 - **Introduction to Cold-Climate Air-to-Water Heat Pumps**

BECOME A GRADUATE

- The designation functions on an individual basis with requirements customized to different heat pump types, based on your business model
 - Heat pump water heaters
 - Air source heat pumps
 - Geothermal heat pumps
 - Air-to-water heat pumps
- Visit us at miheatpumps.com/graduate-designation



BENEFITS OF GRADUATE

- Help connect you to customers looking to install heat pumps
- Promote the designation on your website/social/materials
- Listed on our contractor search page
- Access to educational resources for your customers



TIPS ON APPLYING:

- You can submit multiple applications for different designations
 - You will leave today having qualified for the designation in ASHPs, **only**.
 - Only select ASHPs when you apply, **unless you've completed the additional MIHPC requirements for the other designations at the time of application.**
 - You can always apply for the other designations after having completed the additional requirements.

We **highly recommend** applying for the ASHP designation and then revisiting the other designations! It will speed up your designation, **significantly**.



We want your feedback!

**Please follow this QR
code to the event
evaluation to help us
improve future events!**



Thank You!