



**Pacific
Northwest**
NATIONAL LABORATORY

Air Source Heat Pumps

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U.S. DEPARTMENT OF
ENERGY **BATTELLE**

PNNL is operated by Battelle for the U.S. Department of Energy



Warming Up

Do you mainly heat with a:

- electric resistance system?
- heat pump?
- gas/propane furnace?
- gas/oil boiler?

Do you use two sources of heating?

Comment if you have something else



What are Air Source Heat Pumps?

Use air to remove or add heat to a building





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Why are we talking about heat pumps now?

Zero-emissions by 2050



Why are we talking about heat pumps now?

High efficiency HPs that work in all climates:

- Cold Climate
- Inverter-Driven
- Variable Capacity
- Variable Speed Compressor



Not your parent's heat pump!



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MYTHBUSTING





MYTHBUSTING

(Residential) heat pumps blow cold air.

FALSE*: Heat pumps create warm air, but not hot air like fossil fuel furnaces

*Some systems can produce cold air briefly while in defrost mode; this depends on the design

MYTHBUSTING



Heat pumps don't work when it's cold.

FALSE: Newer heat pumps designed for cold temperatures can operate below -20°F .



MYTHBUSTING

Hydronic heating systems (think steam and hot water boilers) can't be retrofit to use heat pumps

FALSE: There are many heat pump solutions that can work for retrofits, even large and small hydronic systems*

*They can be more complicated



MYTHBUSTING

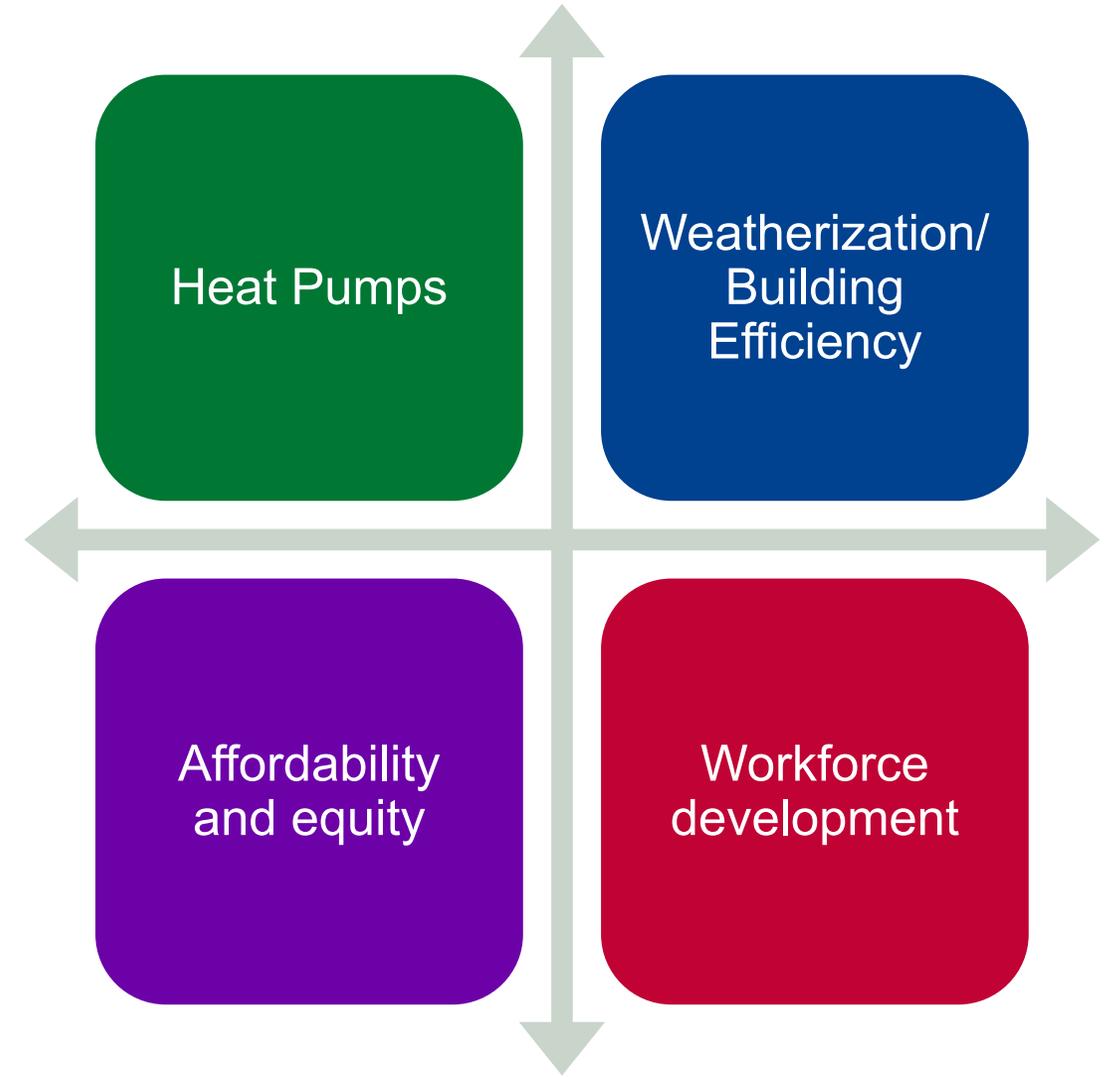
Cold Climate Heat Pumps are only relevant in cold areas

FALSE: These heat pumps are helpful for the vast majority of the US. Think “All-Weather Heat Pumps” instead.

Poll: What is the Biggest Barrier for Heat Pump Adoption?

- Consumer awareness/interest
- Workforce availability
- Installation Cost
- Operation Cost (change in utility bills)
- Lack of technology
- Regulations
- Other

DECARBONIZING HEATING SYSTEMS





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ELEVATE



**Jackie
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Director of Building
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TODAY'S PANEL

Jackie Montesdeoca, Elevate, Director of Building Electrification
Kevin Frost, Slipstream, Energy Engineer
Jon Harrod, Halco Energy, Project Manager

Jackie Montesdeoca



Director of Building Electrification, Elevate

Jackie is responsible for managing equitable building electrification strategies, including developing and implementing retrofit projects, in coordination with technical teams across the organization. Prior to her current role, Jackie worked on Elevate's National Strategic Engagement team, specializing in technical assistance, project management, and residential program design and implementation serving both subsidized and naturally occurring affordable housing. She has managed a variety of projects, grants, and staff working on energy efficiency and resiliency across multiple states.

Energy Engineer, Slipstream

Kevin models energy efficiency in building and consults with building owners, architects and engineers to implement building energy efficiency measures. His background in HVAC design and field experience as well as his analytical skills allow him to recommend advanced energy analysis and recommendations. Kevin has a Bachelor of Science in Architectural Engineering from the Milwaukee School of Engineering.

Kevin Frost



Project Manager, Halco Energy

Jon has worked in green energy since 2001 as a building analyst, insulator, HVAC technician, and trainer. His current role involves overseeing design and installation of air source heat pumps in homes around Central NY. He writes on electrification, indoor air quality, and building science for *greenbuildingadvisor.com*.

Jon Harrod



RESOURCES

Building Science Education	bsesc.energy.gov
Building America Solution Center	basc.pnnl.gov
Better Buildings	betterbuildingsolutioncenter.energy.gov