Researching Plug-in 120V Heat Pump Water Heaters in the Midwest

Kevin Gries | Slipstream

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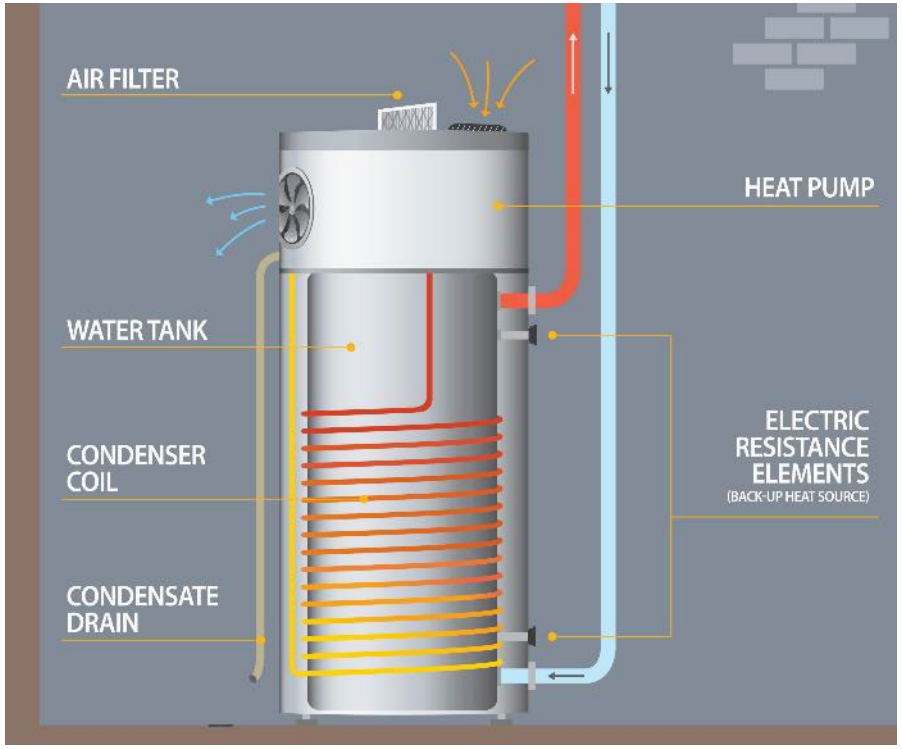
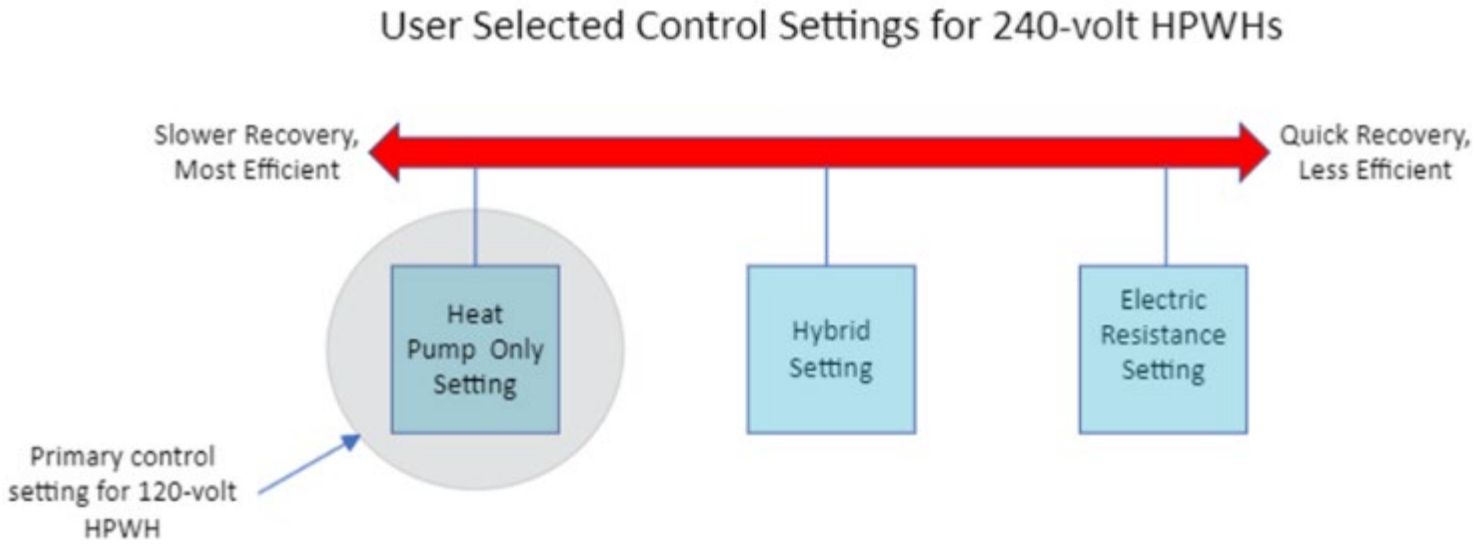
January, 2024

Standard Heat Pump Water Heaters (240V)

Also called “hybrid electric water heaters”





A HPWH that plugs in

Rheem Proterra Plugin

Operates on a 120V, 15-amp shared circuit

- Standard wall outlet

Designed for fuel switching retrofits

- Can reduce home electric upgrade costs
- With an outlet nearby, plumber can install without electrician

Similar equipment efficiency to standard HPWH

- UEF in 3 to 3.5 range
- Must validate it can deliver enough hot water

AO Smith Voltex

How to make enough hot water with lower power requirements?

Larger tanks

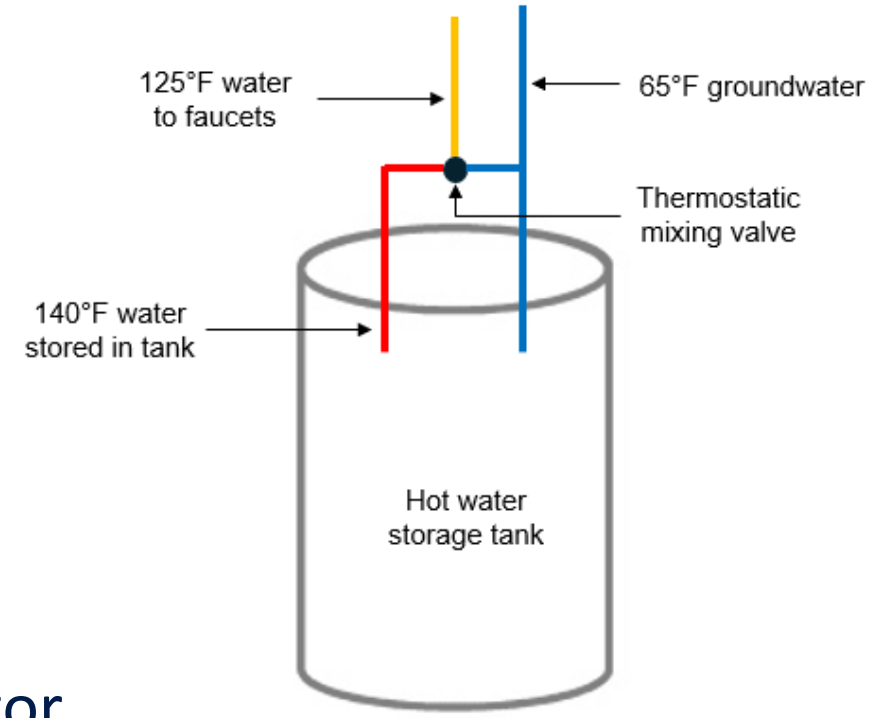
- 1-2 sizes larger than the replaced gas heater

Mixing valves

- Increases hot water energy stored in tank

15-amp circuit types

- Shared circuit – can share an outlet with the refrigerator
- Dedicated circuit – needs the 15-amps to itself



Included Products

	AO Smith	GE	Nyle	Rheem (shared circuit)	Rheem (dedicated circuit)
Product Line	Voltex	Geospring	e8	Proterra	Proterra
Availability	Since 2023	TBD	TBD	Since 2022	Since 2022
Small Electric Resistance Backup	Yes	Yes	Possible in tank	No	No
Compressor Location	On storage tank	On storage tank	Separate compressor box	On storage tank	On storage tank
Compressor BTUH	~5,000	Unknown	8,000	4,200	12,000
Mixing valve	No	Internal, electronic	Required as add-on	External, included	No
Grid connectivity	Yes	Yes	Yes	Yes	Yes
Years under warranty	10 years	Not available	20 years	10 years	10 years

Research in Two Phases

Phase 1: Market Research

- Modeling using custom performance curves
- Supply chain interviews
- Public data analysis
- Upgrade cost analysis from project data and interviews

Phase 2: Field Study

- Installing and monitoring across the Midwest
  - 27 Sites in 3 Climate Zones
- Installer interviews
- 4 Customer surveys
  - 1 prior unit satisfaction
  - 3 new unit satisfaction

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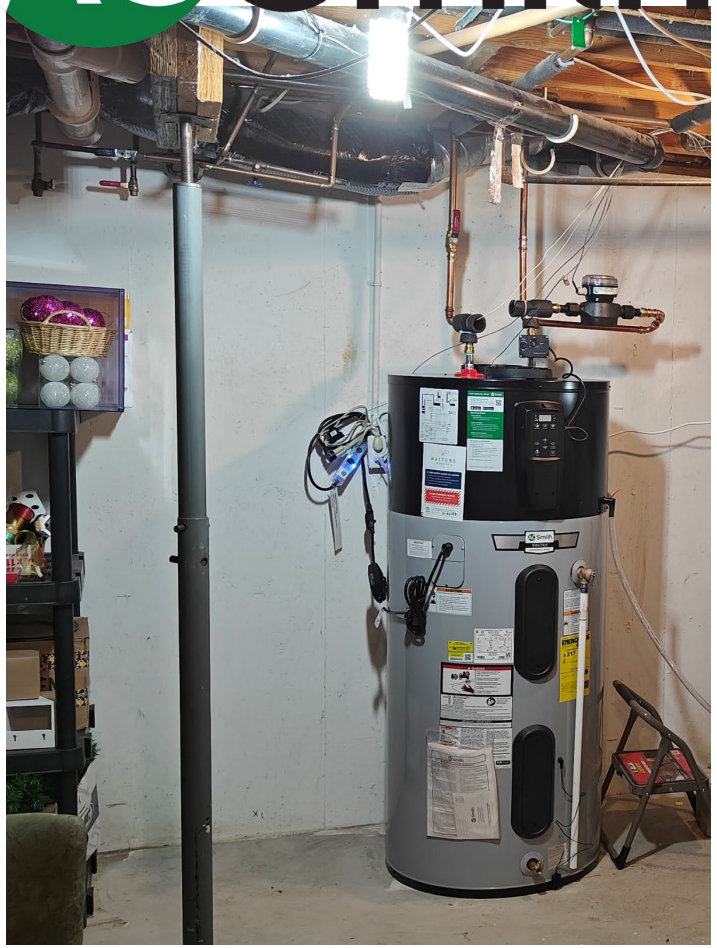
Phase 1 Market Research Findings

- **Market research**
  - Plumbers agree this would simplify HPWH retrofits
  - Supply chain wants MW field validation
- **Economics**
  - 120V has similar equipment and operating costs
  - Electric upgrade savings vary from $200-$4,000
- **Modeling**
  - Performs well under typical draw patterns
  - Large draws can deplete tank, slower recovery

Rheem®

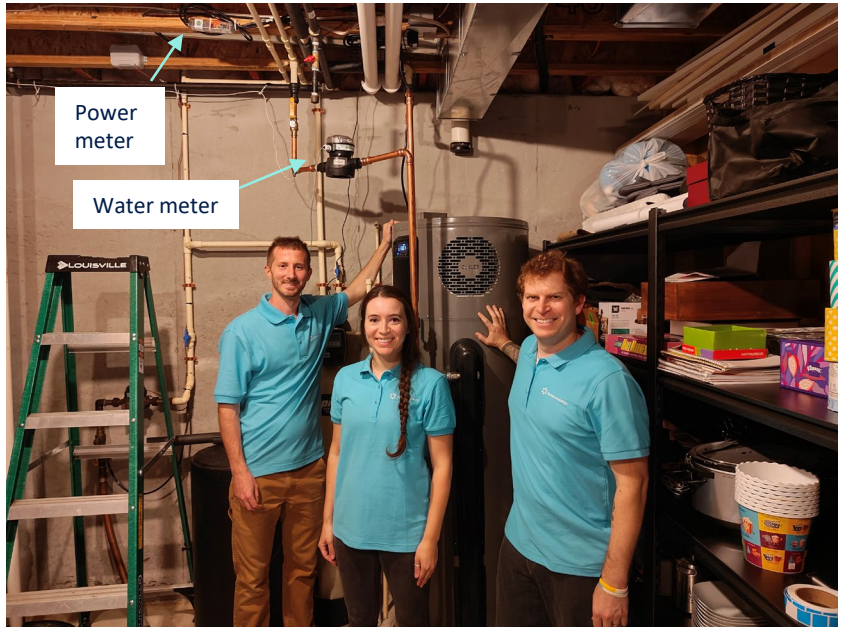
AO Smith®



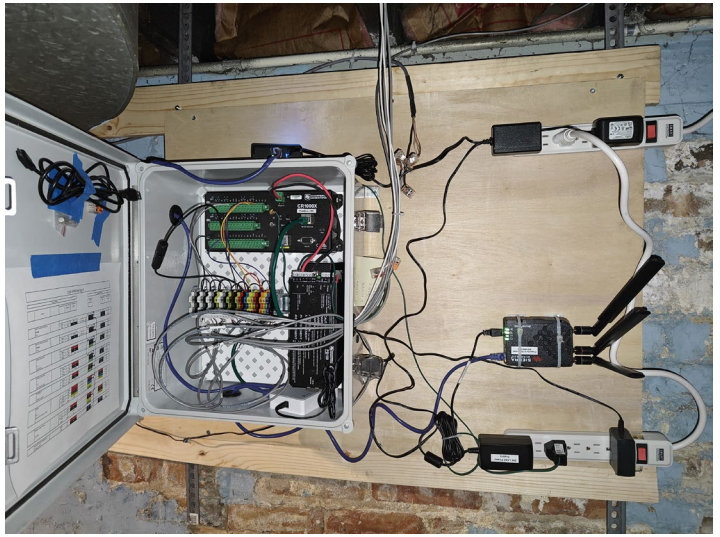
nyle systems

Phase 2 Progress

- All Customers Recruited
- 26 of 27 Site Installs Complete
- Monitoring Underway



Slipstream's installation team (Kevin Gries, Allie Cardiel, Jon Koliner)



Data logger and communications board

Picturesque fall morning in Traverse City

Field Study Informal Insights

Midwest Installation Potential

- **Closets are tough, basements are wide open**
- **Large basements are a double-edged sword**
  - Plenty of air volume and room for larger units
  - May not have outlets nearby (so why not run 240V?)
- **Handful of “easy wins”**

From Installers

- **Easiest option for some installs**
- **Top-heavy units make tough work for some installers**
- **Top-piping generally preferred**
  - Easier drop-in for gas replacements
- **Resistance to worrying about air volumes**
- **Split systems more complex to install**

Field Study Next Steps

- Monitoring across cold winter groundwater temps
- COP and cost analysis
- Customer satisfaction survey results
- Installer interview results

Thank you!

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