



TRI-COUNTY
REGIONAL ENERGY NETWORK
SAN LUIS OBISPO • SANTA BARBARA • VENTURA

Electrification Products for the Central Coast Climate

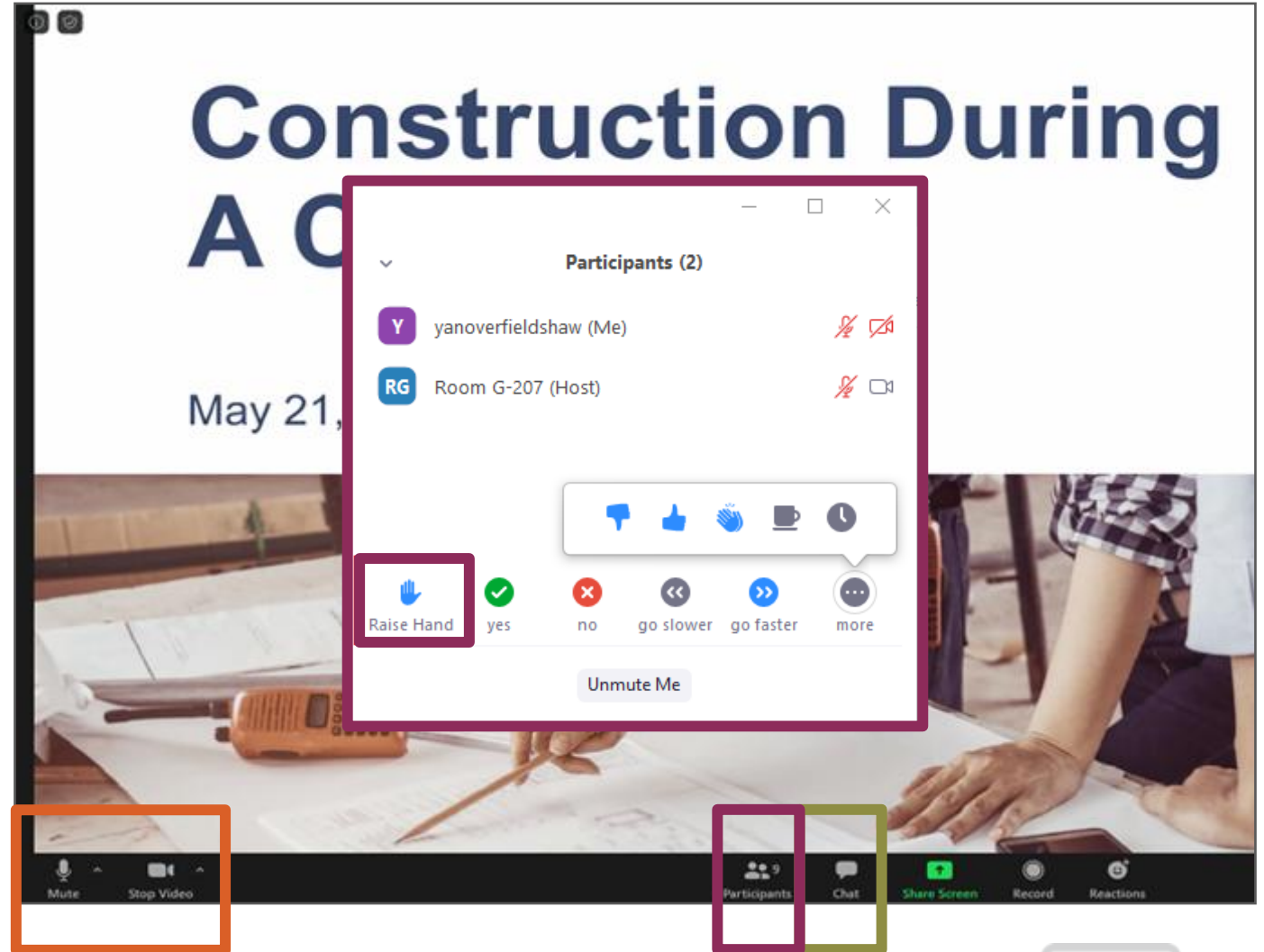
Larry Waters – Electrify My Home

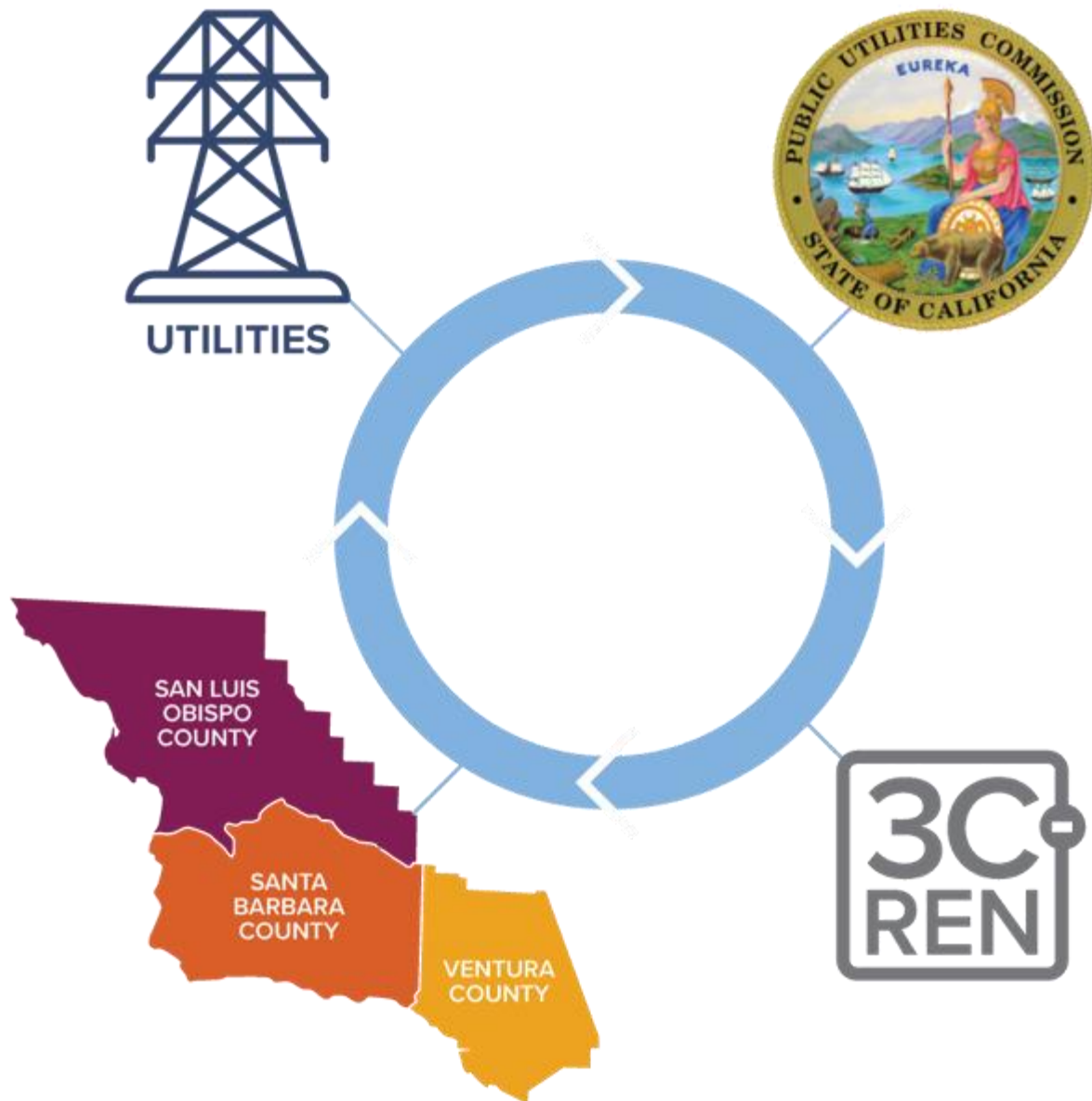
May 6, 2025



Zoom Orientation

- Add an **introduction** in the chat. Be sure **full name** is displayed.
- Did you call in? Please **share** first and last name with us.
- Please **mute** upon joining
- Use the "**Chat**" to share questions or comments
- Under "**Participant**" select "**Raise Hand**" to share a question or comment verbally
- Session may be **recorded** and posted to 3C-REN's on-demand page
- Slides/recording are **shared** after most events





Tri-County Regional Energy Network

3C-REN is a collaboration between the tri-counties

Our programs reduce energy use for a more sustainable, equitable and economically vibrant Central Coast

Our free services are funded via the CPUC, bringing ratepayer dollars back to the region



Our Services

Incentives



HOME ENERGY SAVINGS

3c-ren.org/for-residents
3c-ren.org/multifamily



COMMERCIAL ENERGY SAVINGS

3c-ren.org/commercial

Contractors can enroll at
3c-ren.org/contractors

Training



BUILDING PERFORMANCE TRAINING

3c-ren.org/events
3c-ren.org/building



ENERGY CODE CONNECT

3c-ren.org/code

View past trainings at
3c-ren.org/on-demand

Technical Assistance



AGRICULTURE ENERGY SOLUTIONS

3c-ren.org/agriculture



ENERGY ASSURANCE SERVICES

3c-ren.org/assurance



3C-REN Achievements



4,000+

Individuals Attended
Training



1,374

Energy-Saving
Projects Completed



334

Title 24/CalGreen
Questions Answered



\$155M

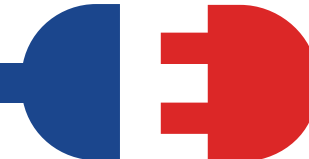
Secured for investment
in the tri-county region
through 2028

Data from 2019-2023 for three programs



Agenda

- ⚡ Introductions, PG&E Safety Message, and Welcome
- ⚡ Overview of the “Electrify Efficiently” webinar series
- ⚡ Product/Manufacturer Disclaimer
- ⚡ Electric options for HVAC and water heating
- ⚡ Electric options for other home appliances



Who's This Dude?



⚡ 1982 (UTI), with these tools



⚡ Certs along the way



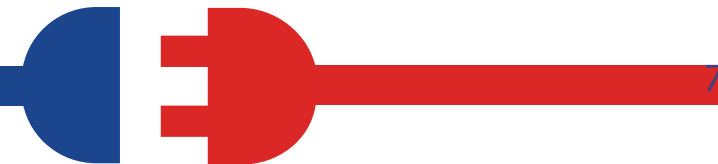
⚡ 2015 – only
heat pumps



⚡ 2020, founded
Electrify My Home



Larry Waters
President, Electrify My Home



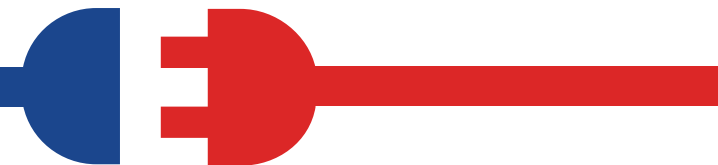
Electrify My Home's Upcoming 3C-REN Webinars

- 🔌 **3/11/25: Nail the Sale: Getting Past Heat Pump Objections**
- 🔌 **4/8/25: Panel Detectives – Electrical Panel Assessments for Heat Pump Installers**
- 5/6/25: Electrification Products for the Central Coast Climate**
- 🔌 **6/17/25: Optimizing Heat Pump Zoning for Maximum Comfort and Efficiency**

Electrify My Home – Electrification Pioneers

Our Mission:

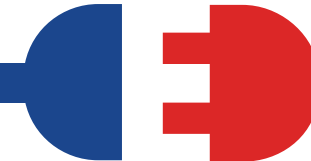
*To provide the **most efficient** cost-effective electrification solutions to California homeowners, to practice **good stewardship** of the electrical panel, and to **train and influence** other contractors to do the same.*



Before We Get Started...

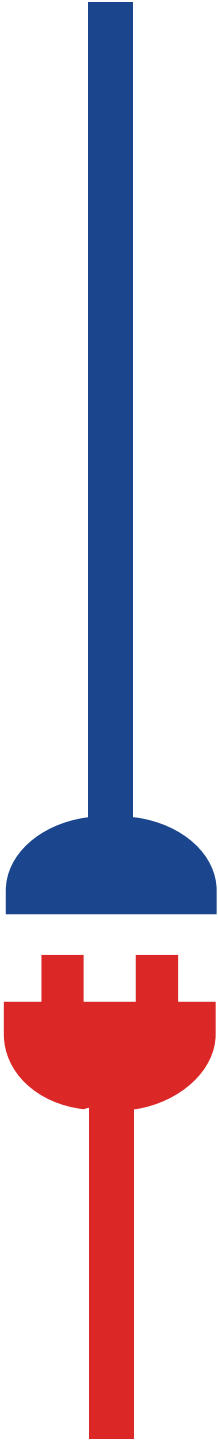
Disclaimer: The products and brands shown in this presentation are provided as examples of potential electrification solutions.

Electrify My Home does not endorse, recommend, favor, or receive payment from any of the product manufacturers or distributors of examples shown herein.

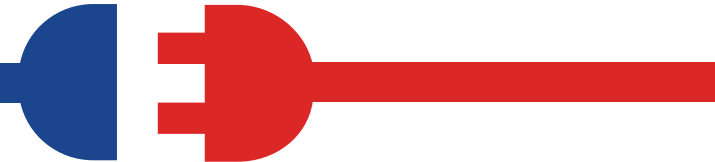




Electric HVAC Products (Heat Pumps!)



How Much Have Furnaces Changed? 150-year-old Technology



Vehicles Are Evolving -- So Is HVAC

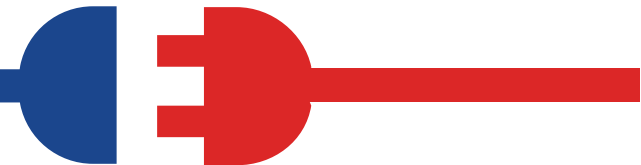


Typical Outdoor Unit Classifications

2 Primary Types



Unitary

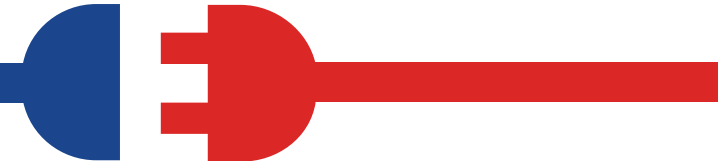


Typical Outdoor Unit Classifications

2 Primary Types

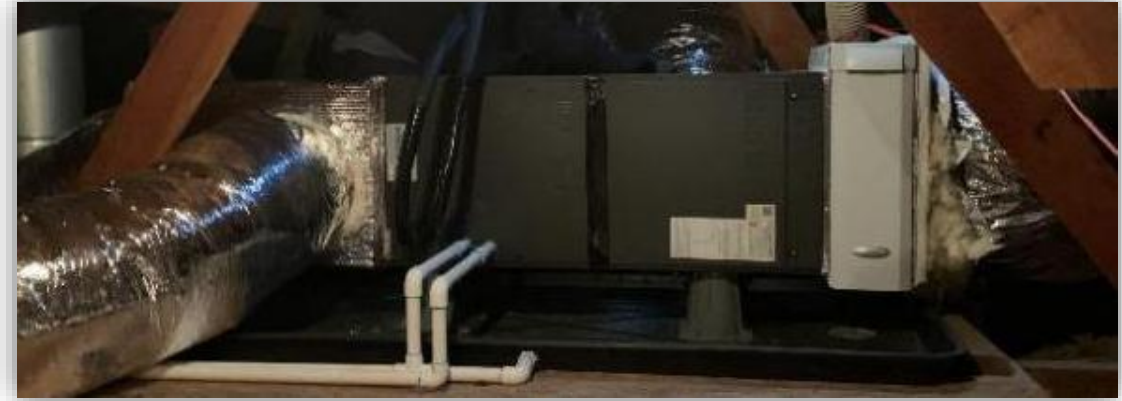


Mini-Split Platform

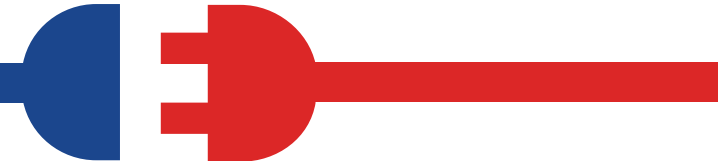


Typical Indoor Unit Classifications

3 Primary Types

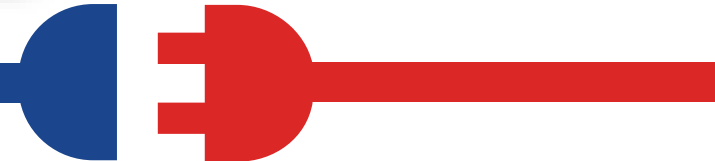


***Conventional
Ducted***

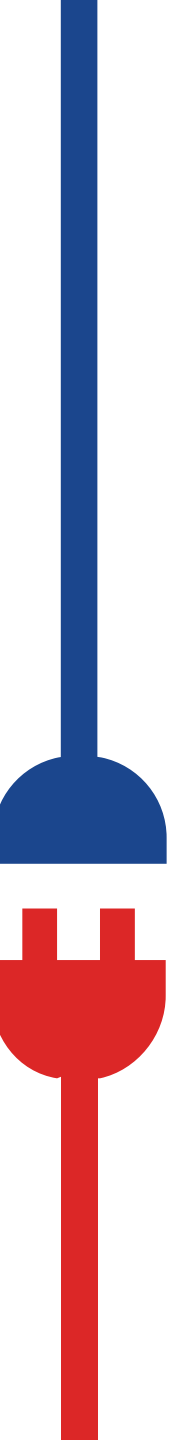


Typical Indoor Unit Classifications

3 Primary Types



Slim Duct Options Can Be Very Discrete!



Typical Indoor Unit Classifications

3 Primary Types

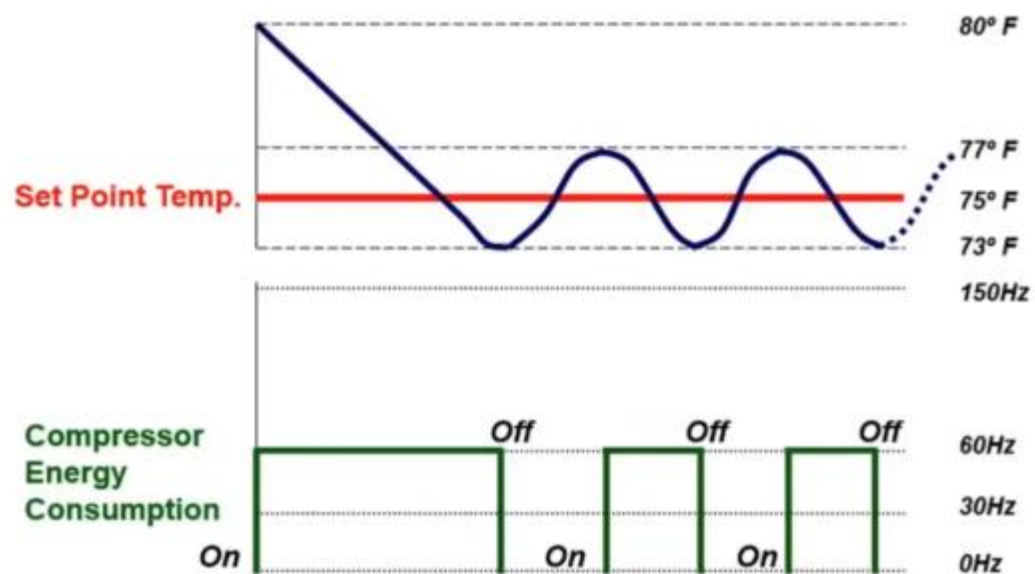


***Ductless:
Wall, Floor, &
Ceiling Options***

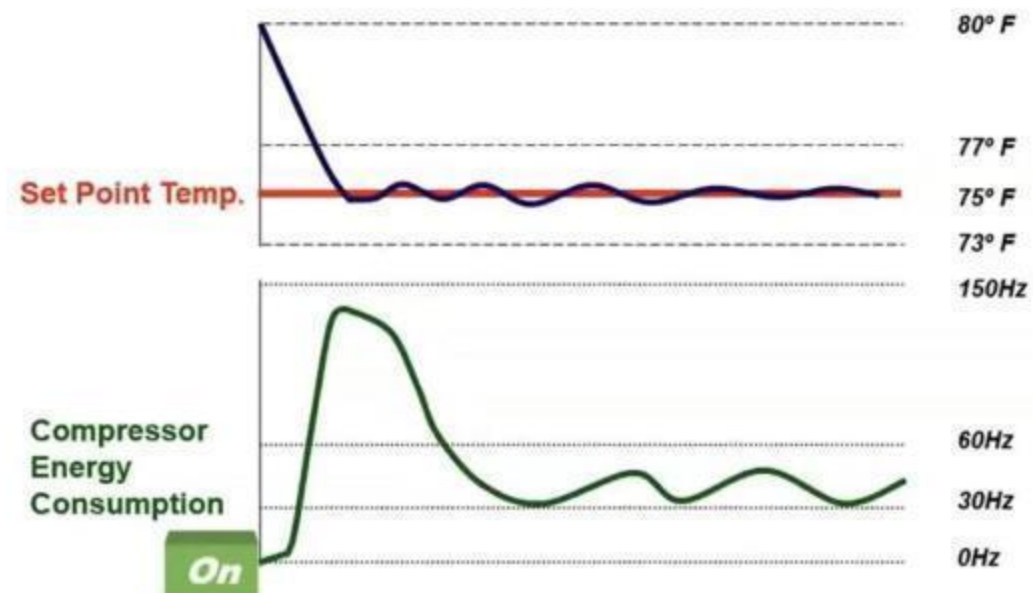


What is an Inverter?

Traditional Compressor



INVERTER-driven Compressor



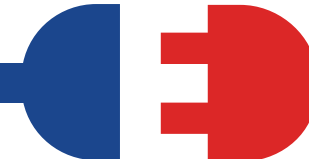
Inverter Differences

Feature	Fully modulating and communicating inverter	Temperature-sensing and pressure-based inverter
SYSTEM TYPE	Mini-split based; some very high end unitary	Unitary
EFFICIENCY	Based on nominal rated outputs	Great efficiencies
CONTROLLER	Manufacturer communicating controller	Traditional on/off thermostat, 24-volt
CONTROL FEATURE	Adjusts output based on control setting	Does not respond to t-stat changes in real time
COMPRESSOR SPEED	Up to 700+ points of communication	Based on coil temp
AIR SPEED	No fixed air speed	Fixed blower speed ECM
COMPONENT COMMUNICATION	All components	NA
POWER (Air Handler)	Wire from air handler to outdoor unit (typically)	Air handler requires its own circuit
CAPACITY	Some run 20% to 130%	Adjustable based on setting



Advantages of Mini & Multi Split Inverters

- ⚡ Inverter gives large range of operating capacity
- ⚡ Slim to fit - just 20 inches off the wall
- ⚡ 56 Db is a loud one; some are <47 Db
- ⚡ One power wire for most applications
- ⚡ Low static pressure models for small applications
- ⚡ Mid static products open new opportunities



Mini Split Heat Pumps Ductless vs Ducted

Ductless Advantages

- 🔌 Single zones 1-1 wall mounts efficiency up to 31 SEER +
- 🔌 Lots of configurations and styles
- 🔌 Great for 1-3 room with multi zone



Ductless Disadvantages

- 🔌 Condensation drain dictates location
- 🔌 Outside wall or pump
- 🔌 Difficult for service
- 🔌 Tough sell for because of aesthetics



There's No Way I'm Putting That On My Wall

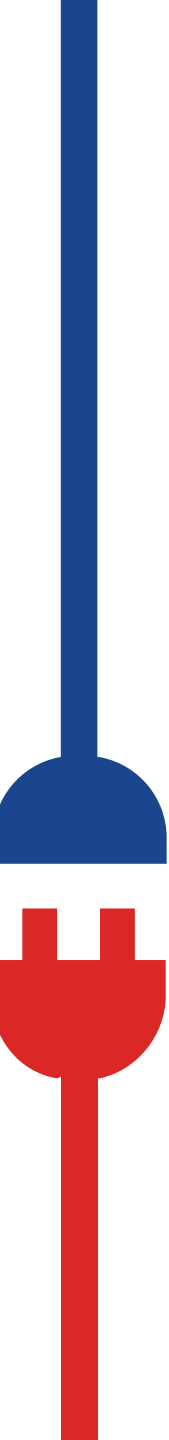
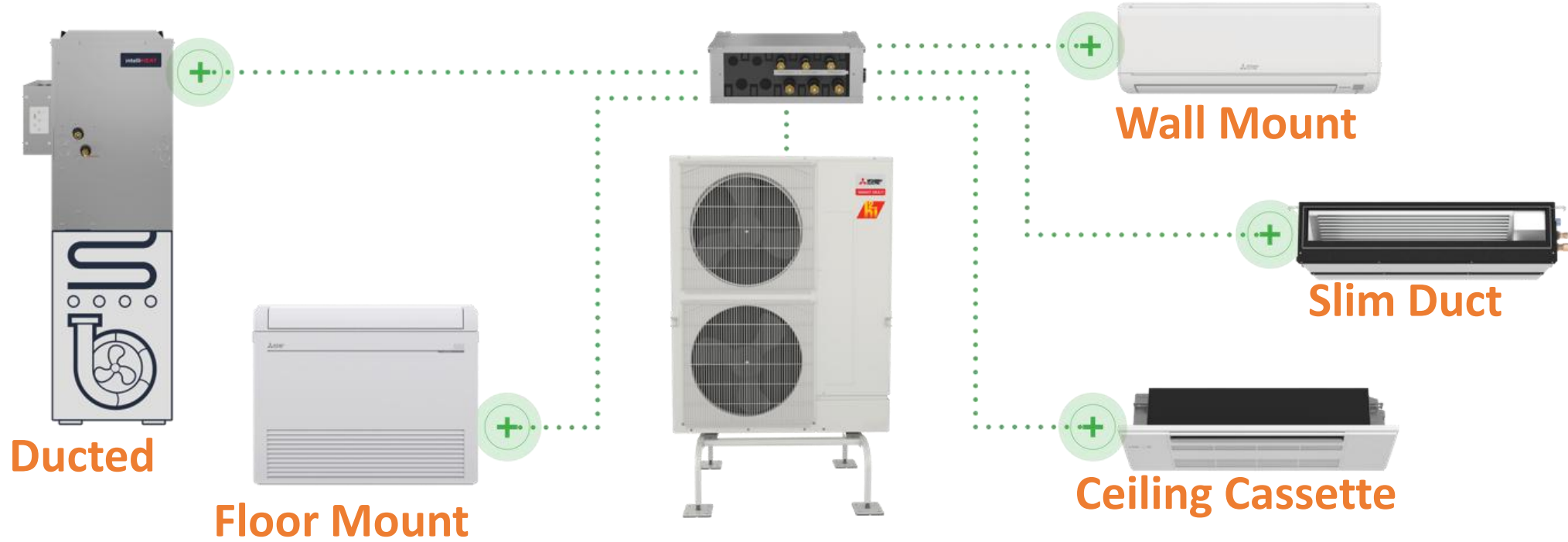


cassettes

🔌 Go ducted!

🔌 Startups solving this!

Multi-Zone Options



Multi-Zone Systems

Advantages

- ⚡ Flexibility for multi-room solutions (ducted and/or ductless)
- ⚡ Houses with a separate climate zones
- ⚡ Less space needed

Disadvantages

- ⚡ More refrigerant
- ⚡ More chance for leaks
- ⚡ Capacity penalty
- ⚡ Lower efficiency ratings
- ⚡ No redundancy
- ⚡ More difficult to repair
- ⚡ More complicated installation



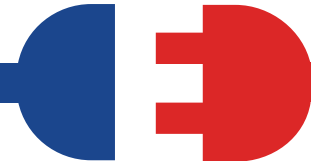
Single Zone Ducted

Advantages

- ⚡ Multiple rooms with 1 unit
- ⚡ Smaller capacity than multi zone
- ⚡ Quieter
- ⚡ Discrete
- ⚡ Better aesthetics

Disadvantages

- ⚡ More involved installation
- ⚡ Requires planning/load calc
- ⚡ Demands great install quality



Room Options – Great for Apartments/Single Rooms



Gradient



Ephoca



Olimpia Splendid

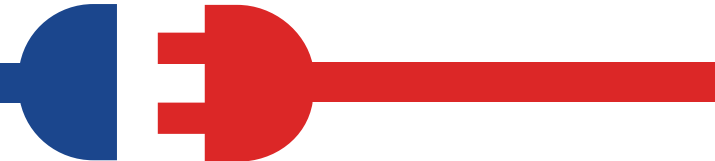


Portable HP

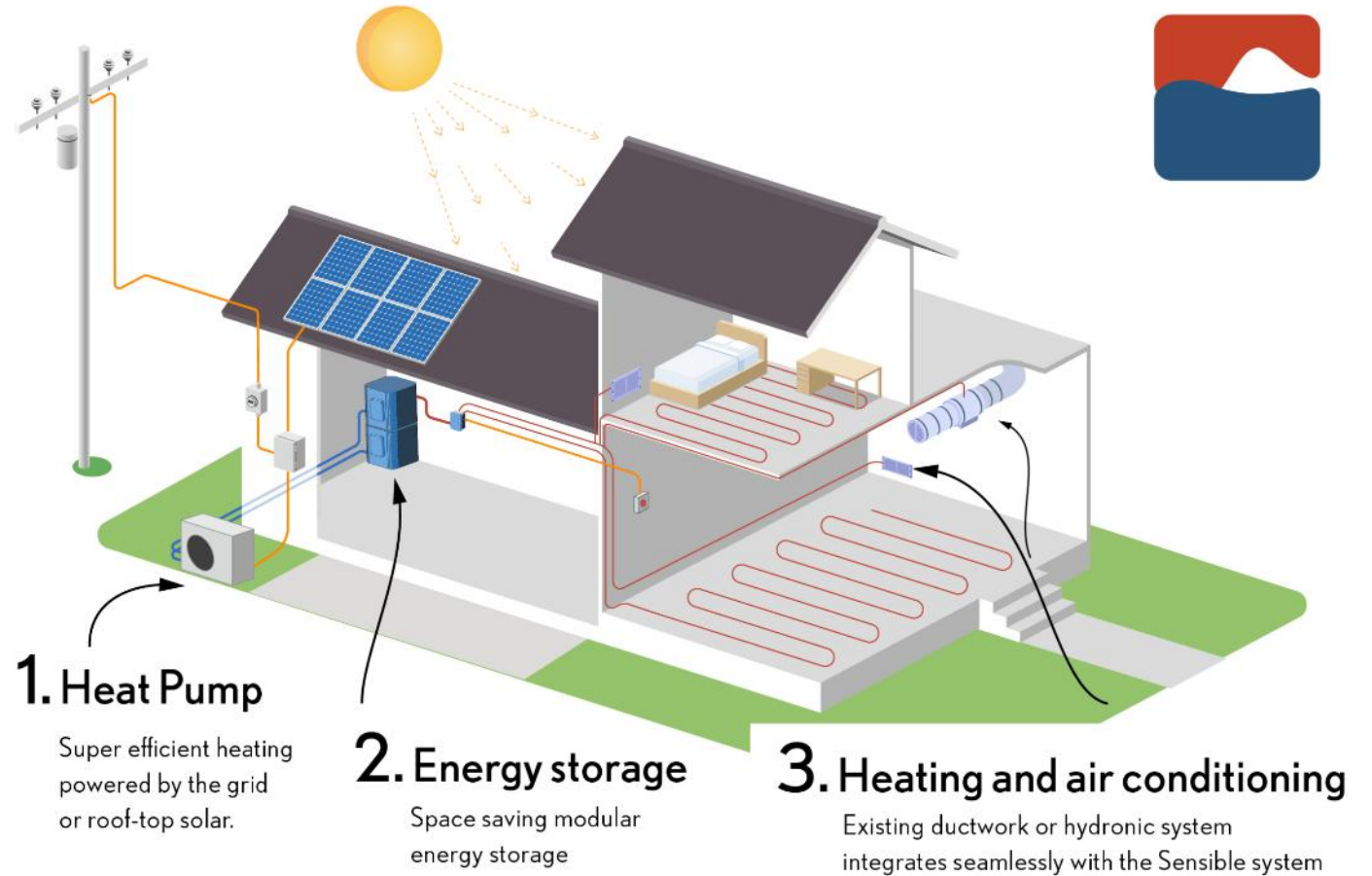
Furnace Backup/Resistance Backup



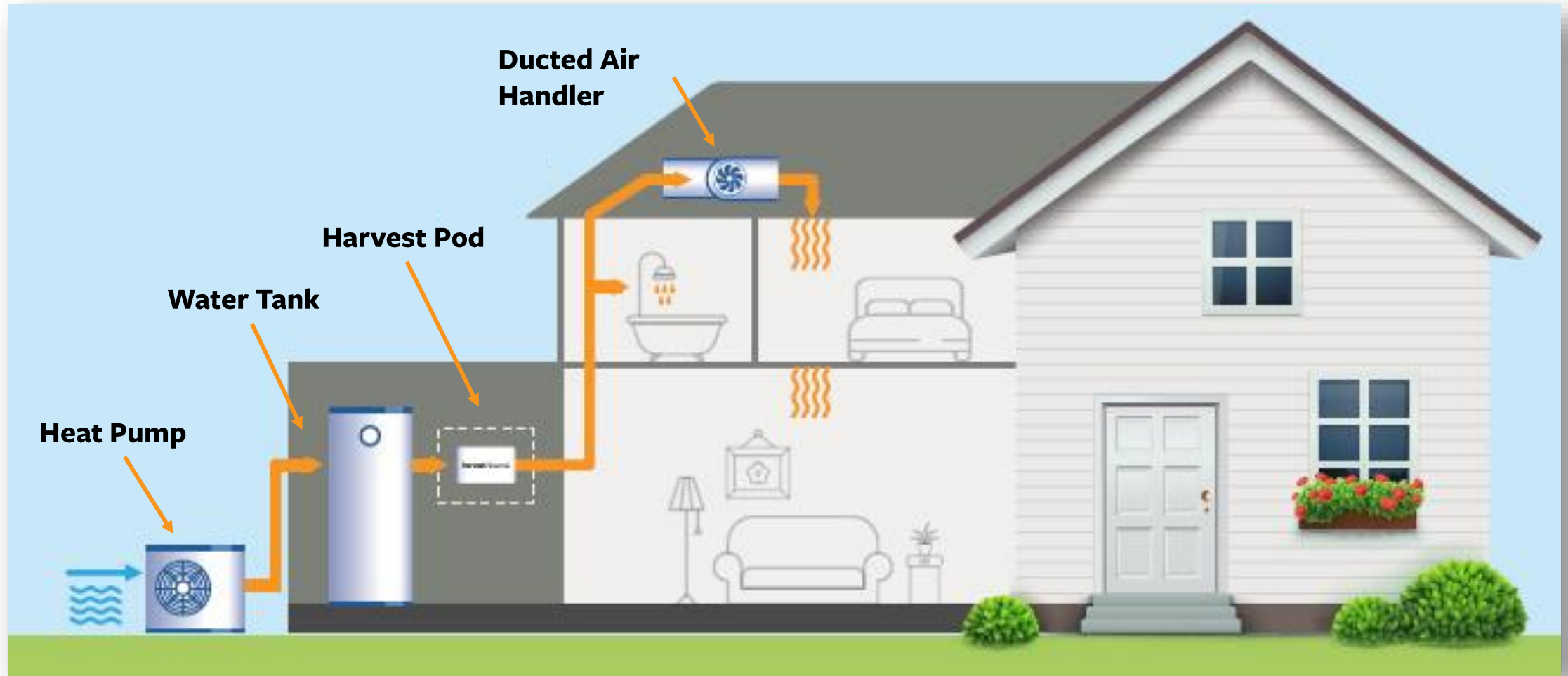
Image Source: <https://evergreenhomeheatingandenergy.com/blog/bid-219238-types-of-heat-pumps>



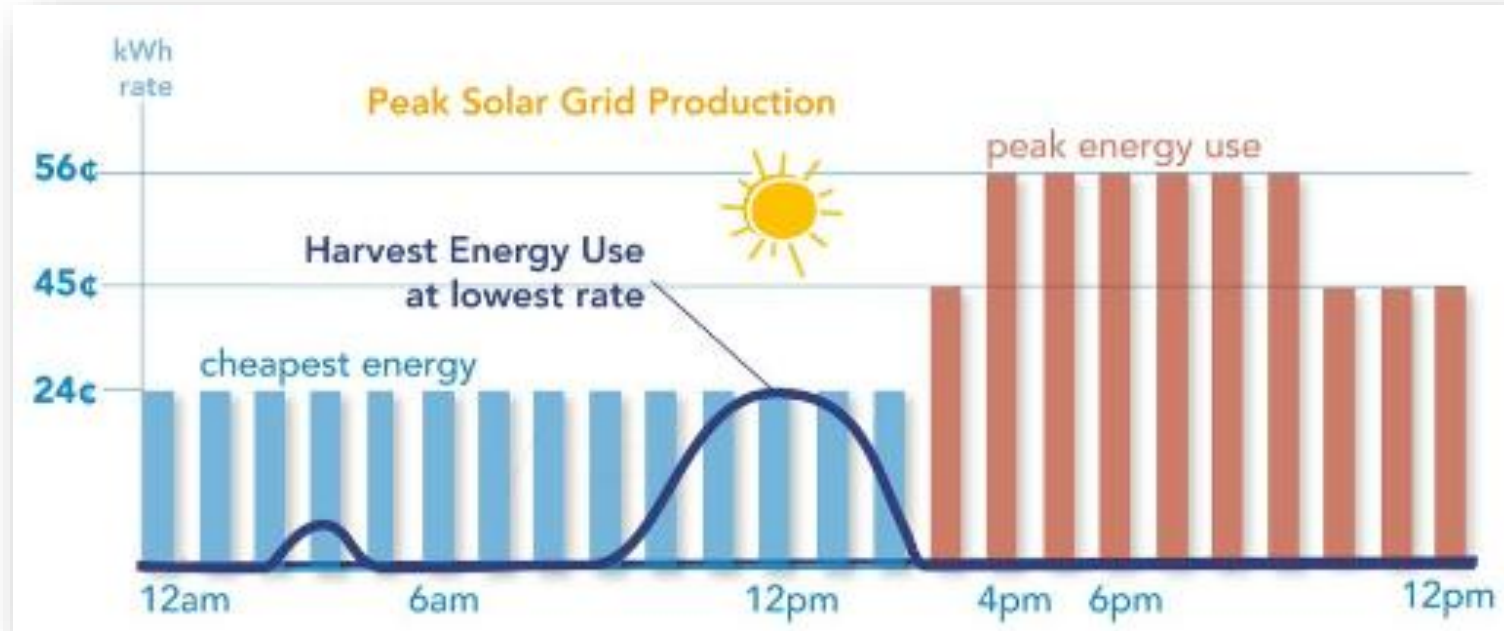
Air to Water Heat Pumps for Hydronic Fan Coils or Radiant



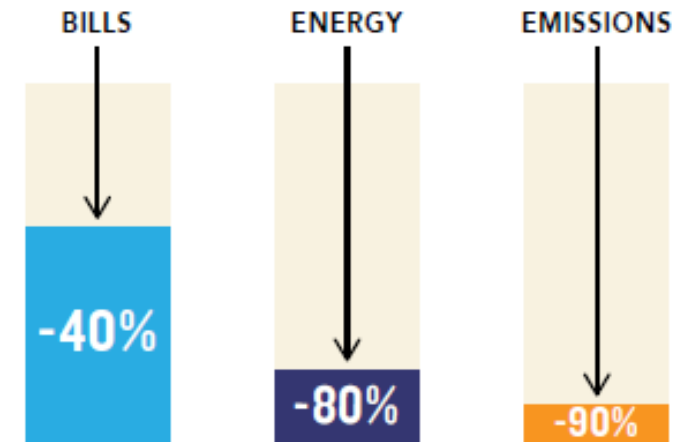
2-In-1 HVAC+Water Heating – Harvest Thermal



Harvest Thermal



Harvest Thermal by the numbers.



EXAMPLE FOR MID-SIZED HOME IN NORTHERN CALIFORNIA

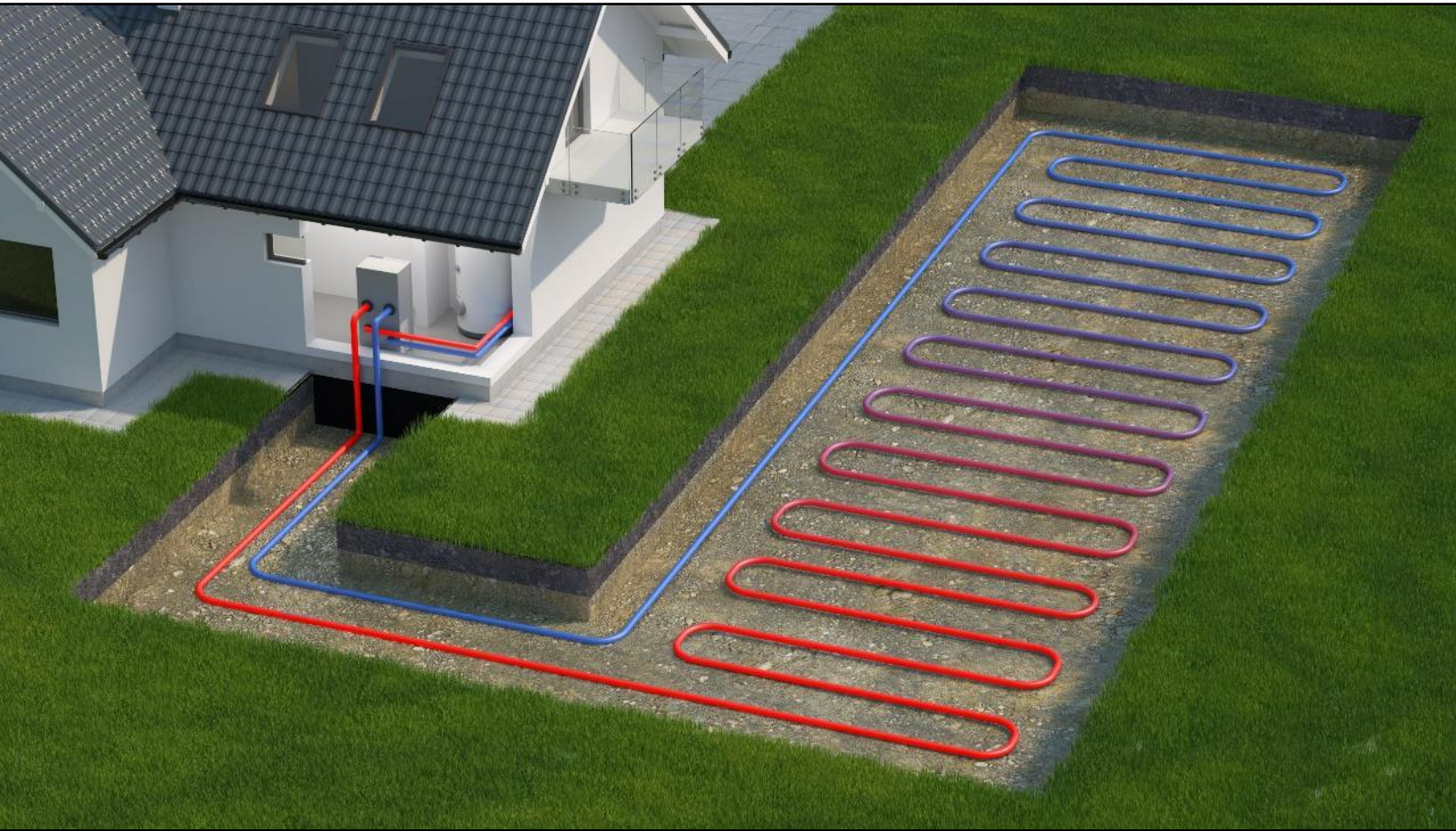
harvest thermal

Confidential – do not duplicate or distribute without written permission from Electrify My Home

Public



Geothermal



Not best for mild climate great for areas with cold winters

Air Source and Ground Source Heat Pumps for Radiant Floors (and swimming pools and hot tubs)



GeoCool



Nordic

R Series Residential



Water Furnace

7 Series - 700A11



Arctic
Heat Pump 020A



Spacepak
Split System
Inverter



Aermec
ANK
(030,045,050)



Chiltrix
CX34



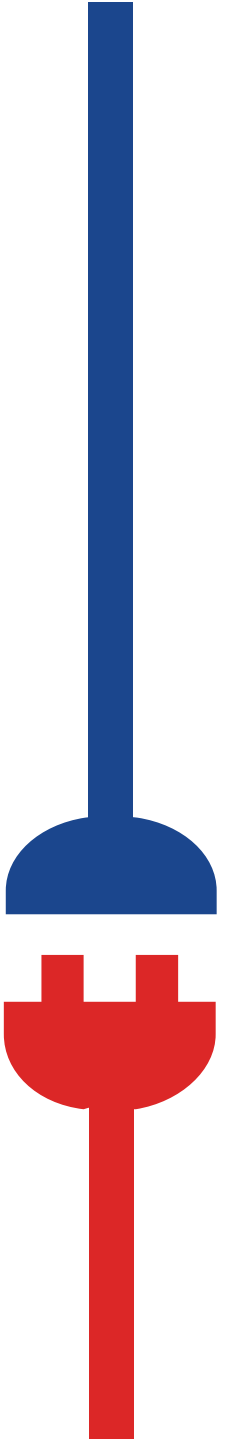
A Tale of Two Cities: The Mitsubishi Multi “City” Variable Refrigerant Flow Systems



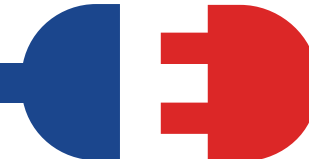
Ross Family Residence in Amherst, MA



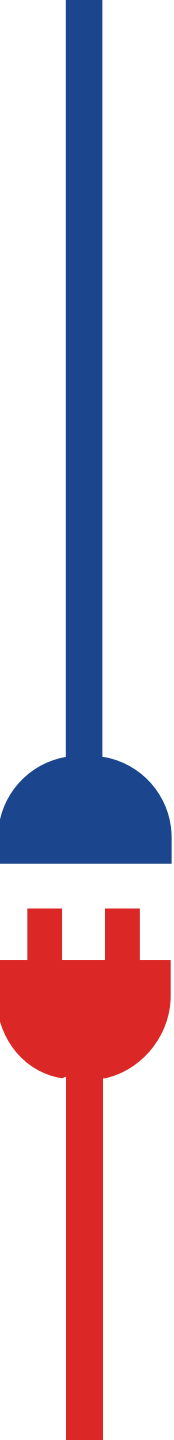
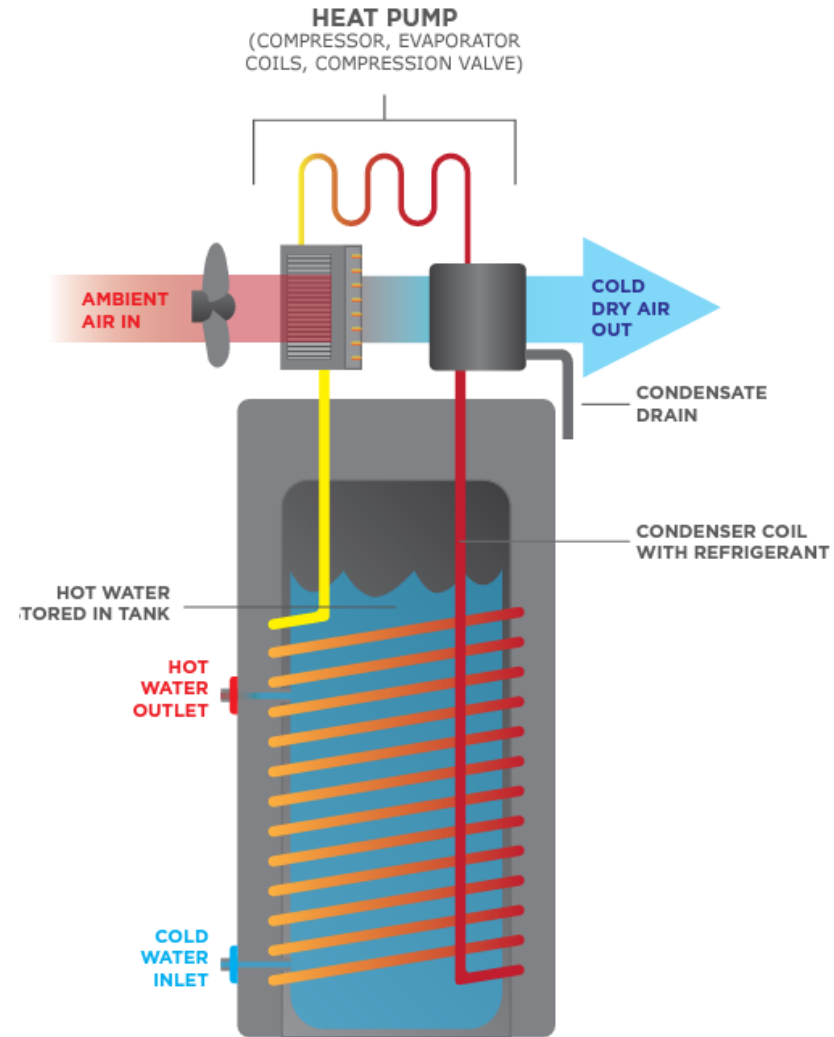
Electric Water Heating Products



Alternatives to Traditional Water Heaters?



How Does A Heat Pump Water Heater Work?

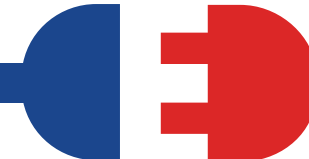
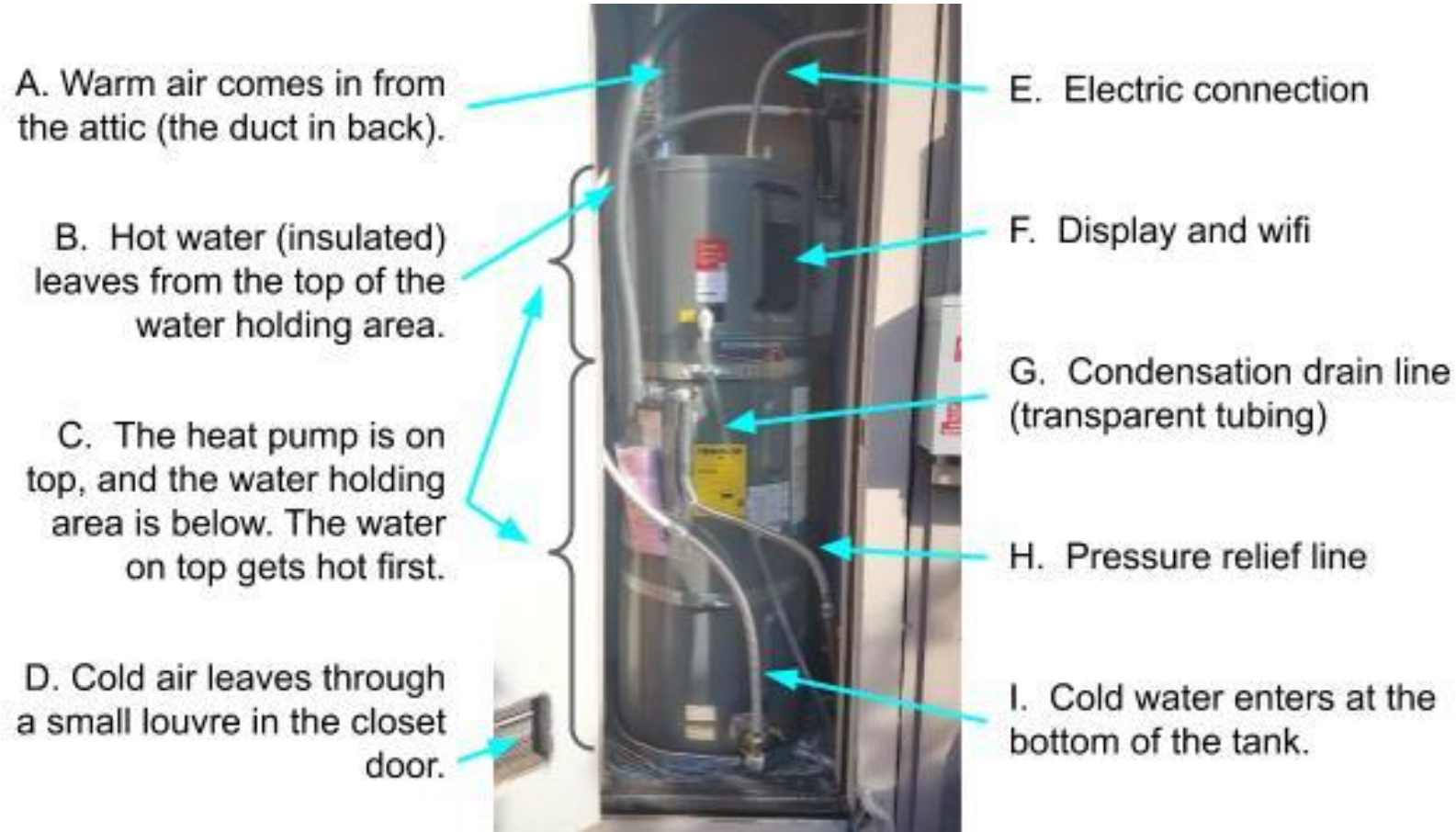


Many Players In the Market & More Coming!



⚡ Application-specific, we recommend carrying more than one brand!

Installers Must Be Trained, DIY Not Recommended





How Quiet Is Your Lifestyle?

Split Configuration Helps with Application Challenges

Split system HPWH solves several problems

- 🔌 Location
- 🔌 Sound – 37 DbA
- 🔌 Faster Heat – 115 gal (83-gal system) 145°F temp
- 🔌 Best for environment – CO₂ = GWP of 1
- 🔌 15A breaker
- 🔌 Works well at low temperatures
- 🔌 Inverter-based

Disadvantages

- 🔌 Higher cost [But higher margin!]
- 🔌 Additional time required
- 🔌 Outdoor unit must be kept upright and level



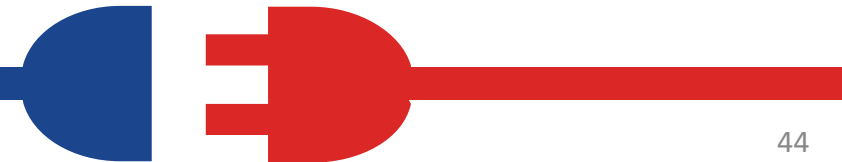
What About Electric Tankless?



- ⚡ Not practical (whole home)
- ⚡ Huge capacity penalty

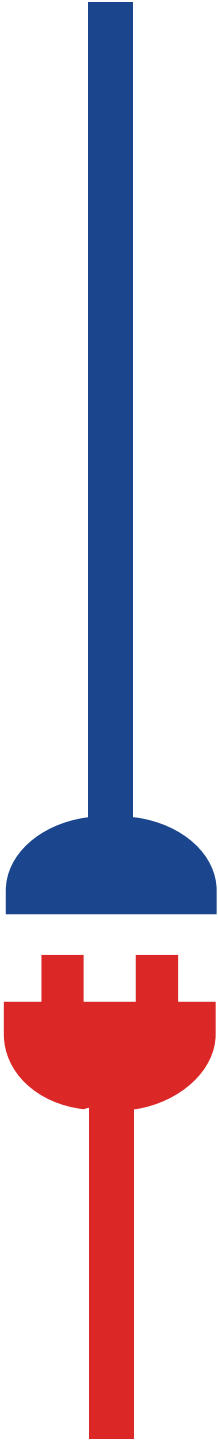


- ⚡ Buyer Beware





Electric Panel Products



Summary: Solutions to “Full” Panels

Task: Add a HPWH Circuit

🔌 Option 1: Quad it out!



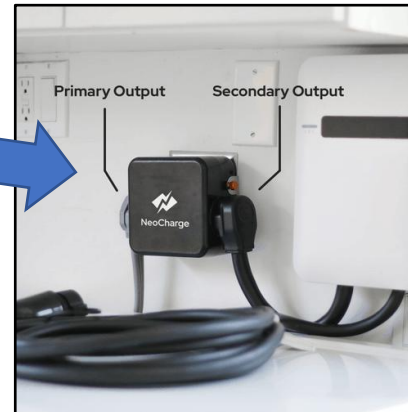
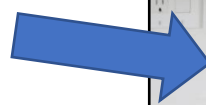
Summary: Solutions to “Full” Panels

Task: Add a HPWH Circuit

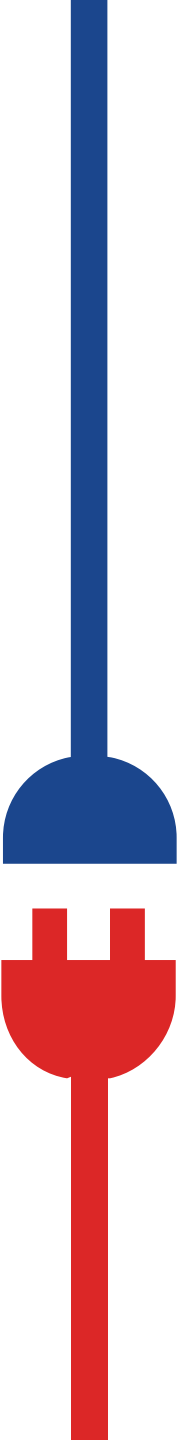
🔌 Option 2: Circuit Splitter!



+



Public



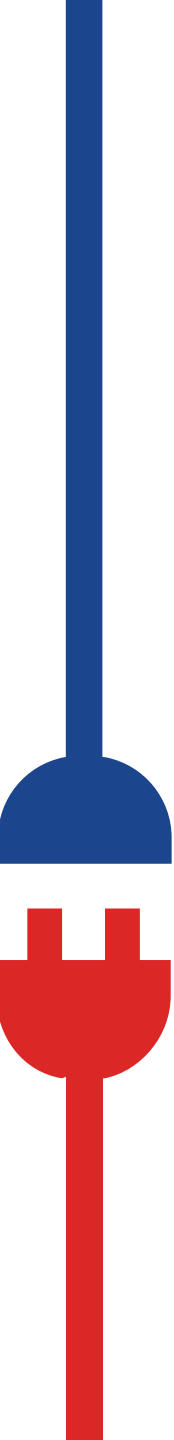
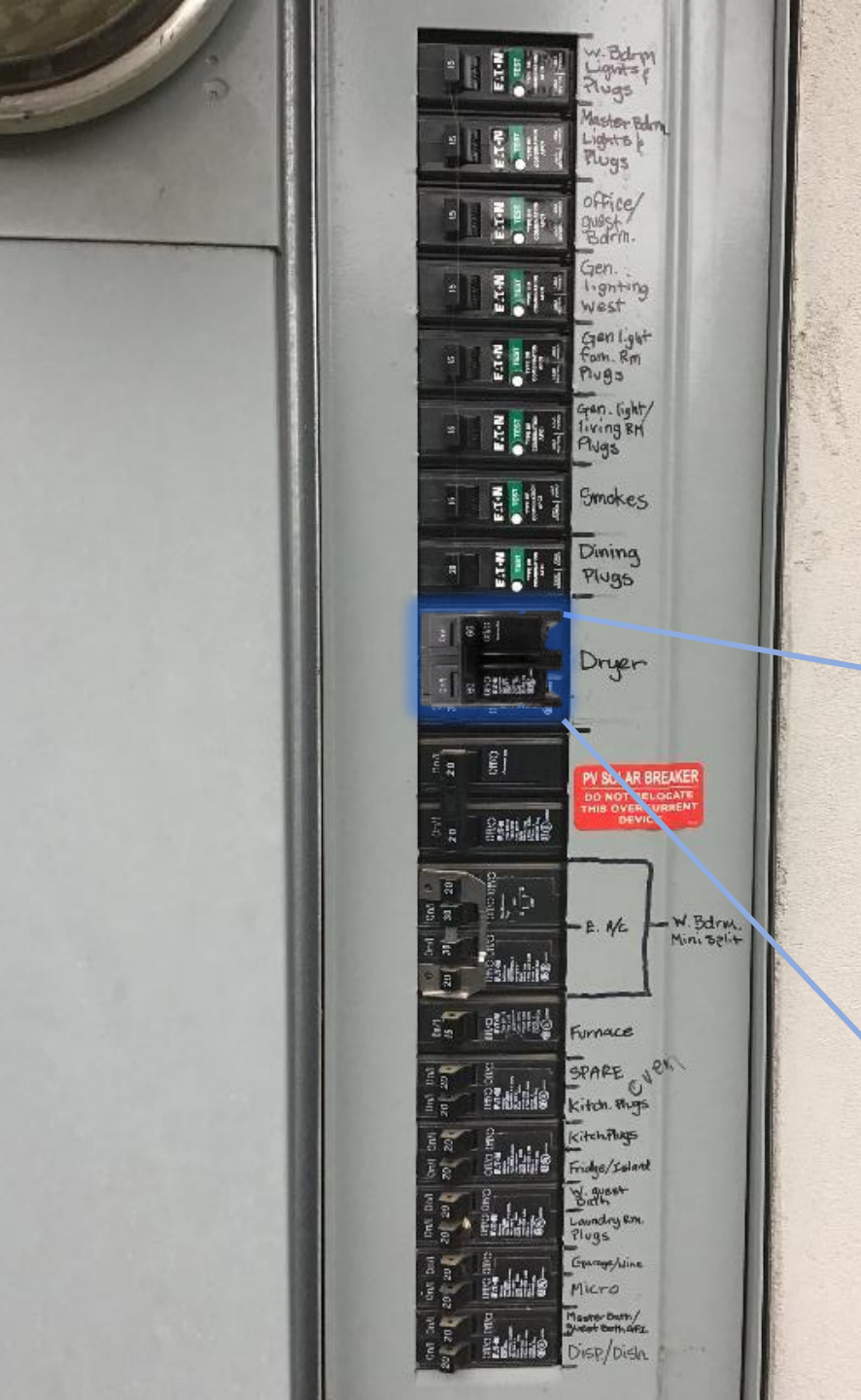
Summary: Solutions to “Full” Panels

Task: Add a HPWH Circuit & a Couple More

🔌 Option 3: Add a Subpanel



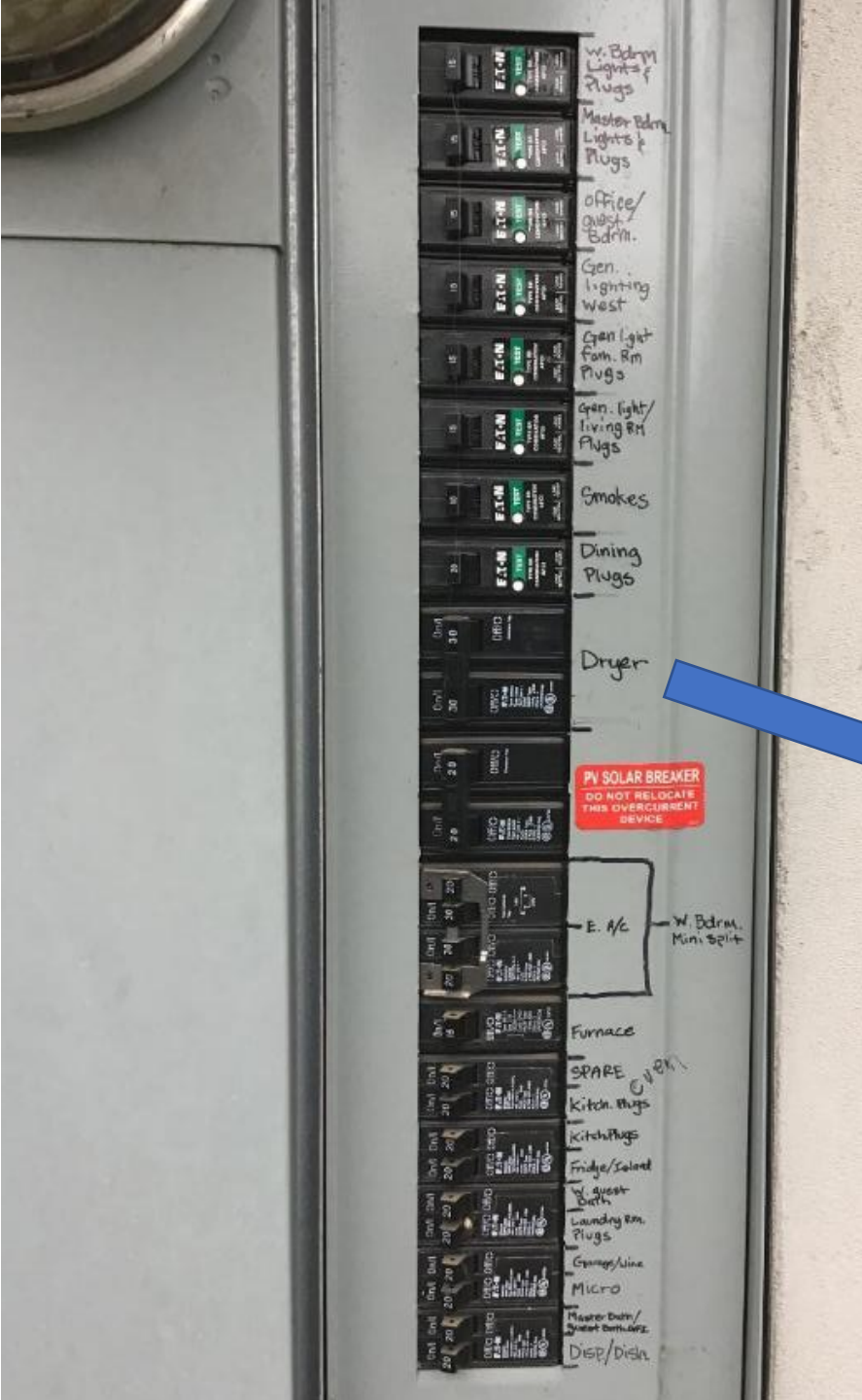
🔌 Tip – add the neutral!



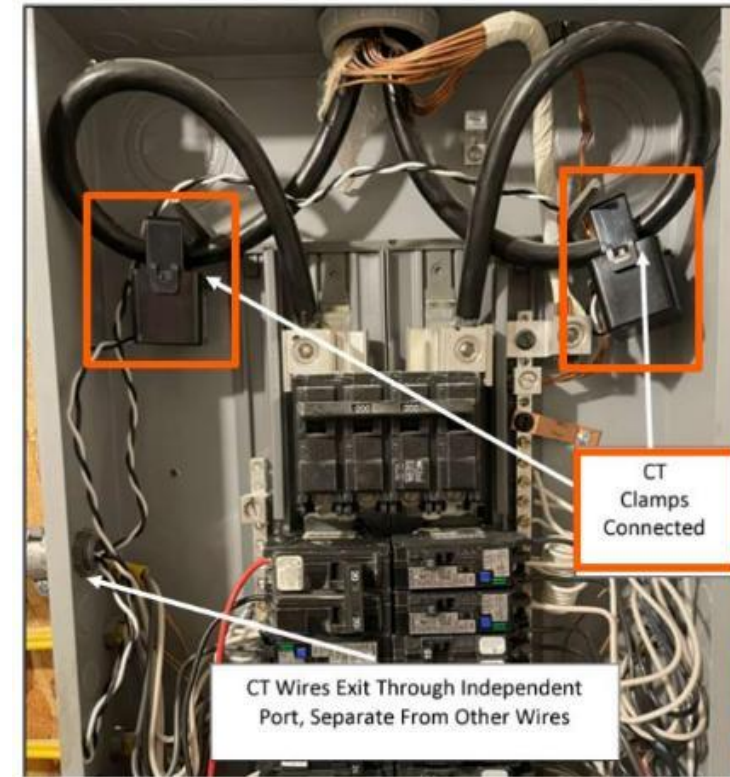
Solutions to “Full” Panels

Task: Add a HPWH Circuit

🔌 Option 4: Circuit Pausing!



Public

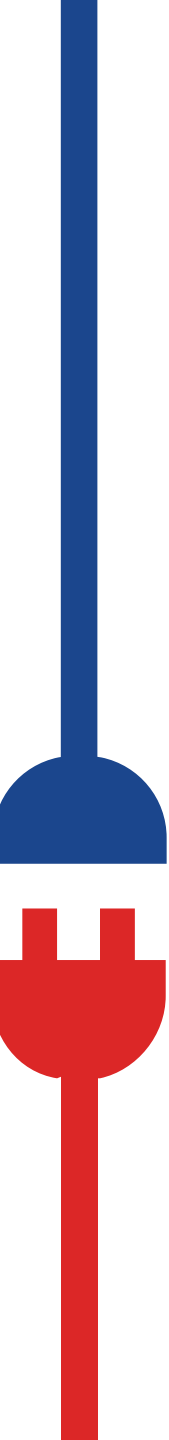




Summary: Solutions to “Full” Panels

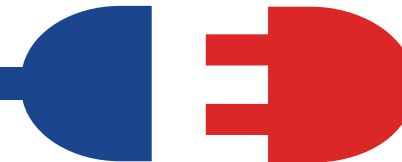
Task: Add a HPWH Circuit
(and much more)

🔌 Option 5: Smart Panel



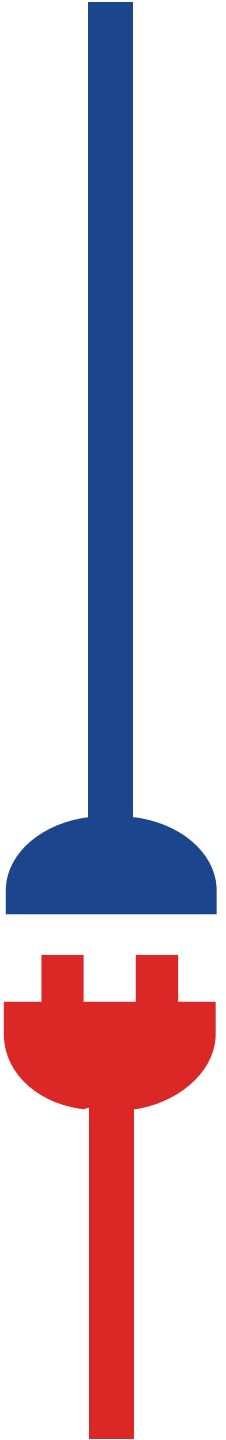
Sub Circuit Energy Monitoring

- 🔌 Pinpoint energy utilization
- 🔌 Several options available



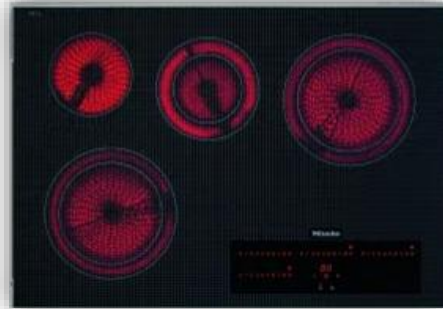
Part 2 – Other Electrification Products

Special thanks to:

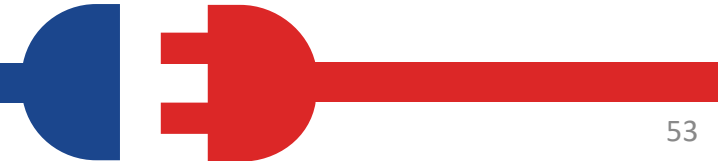
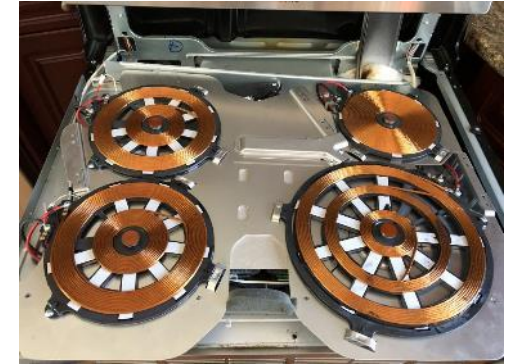


Stoves: 60% Are Already Electric in the U.S.



- Electric Resistance



- Electric Induction








Low Cost

Amana AER6303MFS 	Whirlpool WFE320M0ES 	Frigidaire FFEF3052TS 	GE Appliances JBS60DKBB 
1,800	3,000	100-3,000	3,100
\$450	\$550	\$550	\$550

Mid Range

Frigidaire FFIF3054TS 	LG LSE4616ST 	Frigidaire Gallery FGIH3047VF 	Samsung Virtual Flame NE58K9560WS 	GE Profile PHS930SLSS 
\$1,000	\$1,900	\$2,000	\$2,400	\$2,440

Retro Luxury

Smeg Range Cooker Victoria TR4110IPG 	Retro Collection BCRI30 	Elmira Northstar 1954P 	Ilve Majestic II Collection UMDI10NS3MBP 	AGA Classic ATC3 
\$3,500	\$5,100	\$5,800	\$9,100	\$22,000

Taylor Swift Cooks On Countertop Induction



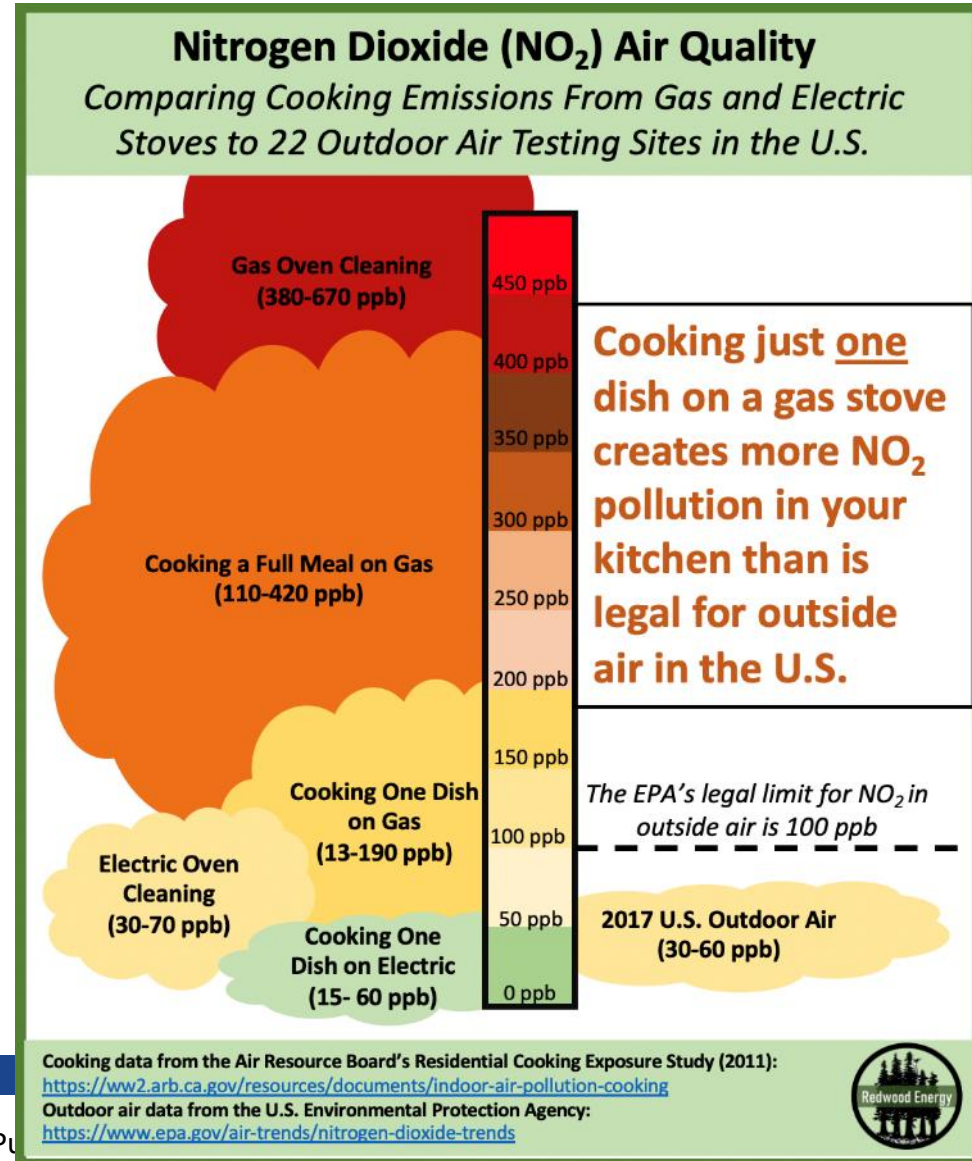
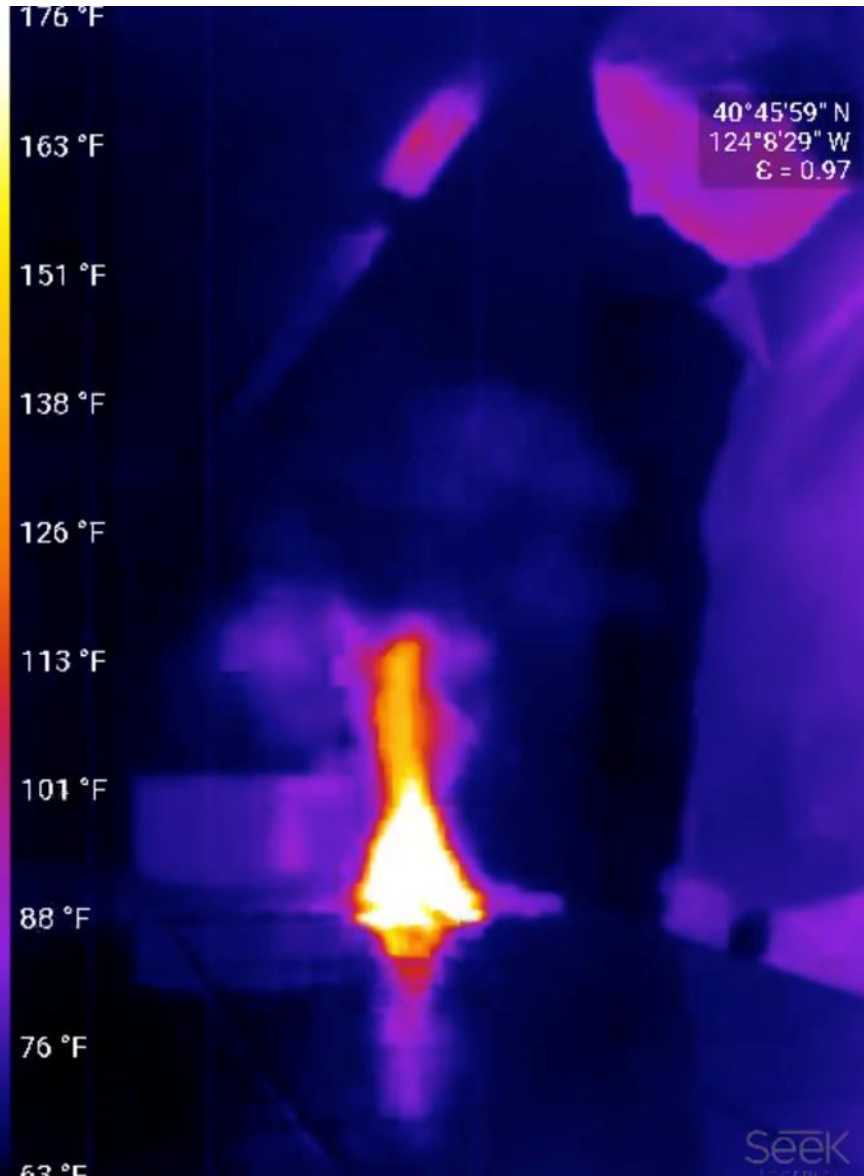
Empava IDC-36 36"	KitchenAid KCES556 HSS 36"	Bosch NETP068SUC 30"	Samsung NZ36K7880UG 36"	Frigidaire FPIC3677RF 36"
				
\$900	\$1,300	\$1,300	\$2,300	\$2,500

Energy Storage Enabled (ESE) Cooking



Copper 110V Battery-Integrated Range

Gas Stoves: Like A Pack of Cigarettes



Outdoor Entertaining: Heat and BBQ

Hanover 800-Watt Electric Patio Heater 	RADtec G15R 25" Golden Tube 	EnerG+ 5100 Tabletop Patio Heater 	Aura Comfort Plus Patio Heater 	Bromic Platinum Collection 
\$100	\$190	\$280	\$500	\$1,240 - \$2,250
Americana Electric Cart Grill 	Kuuma Profile 150 Electric 	Kenyon B70082 	Kenyon B70581 	ElectriChef Emerald 24" 
\$226	\$425	\$1,480	\$1,920	\$4,514

Fireplaces That Make Steam and Heat, No Smoke



Napoleon See-thru
(\$2,008)



Dynasty DY-BT79
(\$1,299)



Amantii BI-40-SLIM (In/Out)
(\$1,618)



Modern Flames CLX Series
(\$7,449)



EnerG+ Patio Heater
(outdoor) (\$186.99)



Touchstone Sideline
(outdoor) (\$574)








ClassicFlame Felicity
(\$349.77)

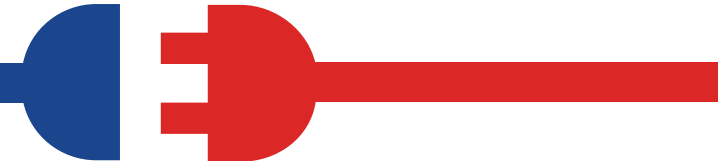
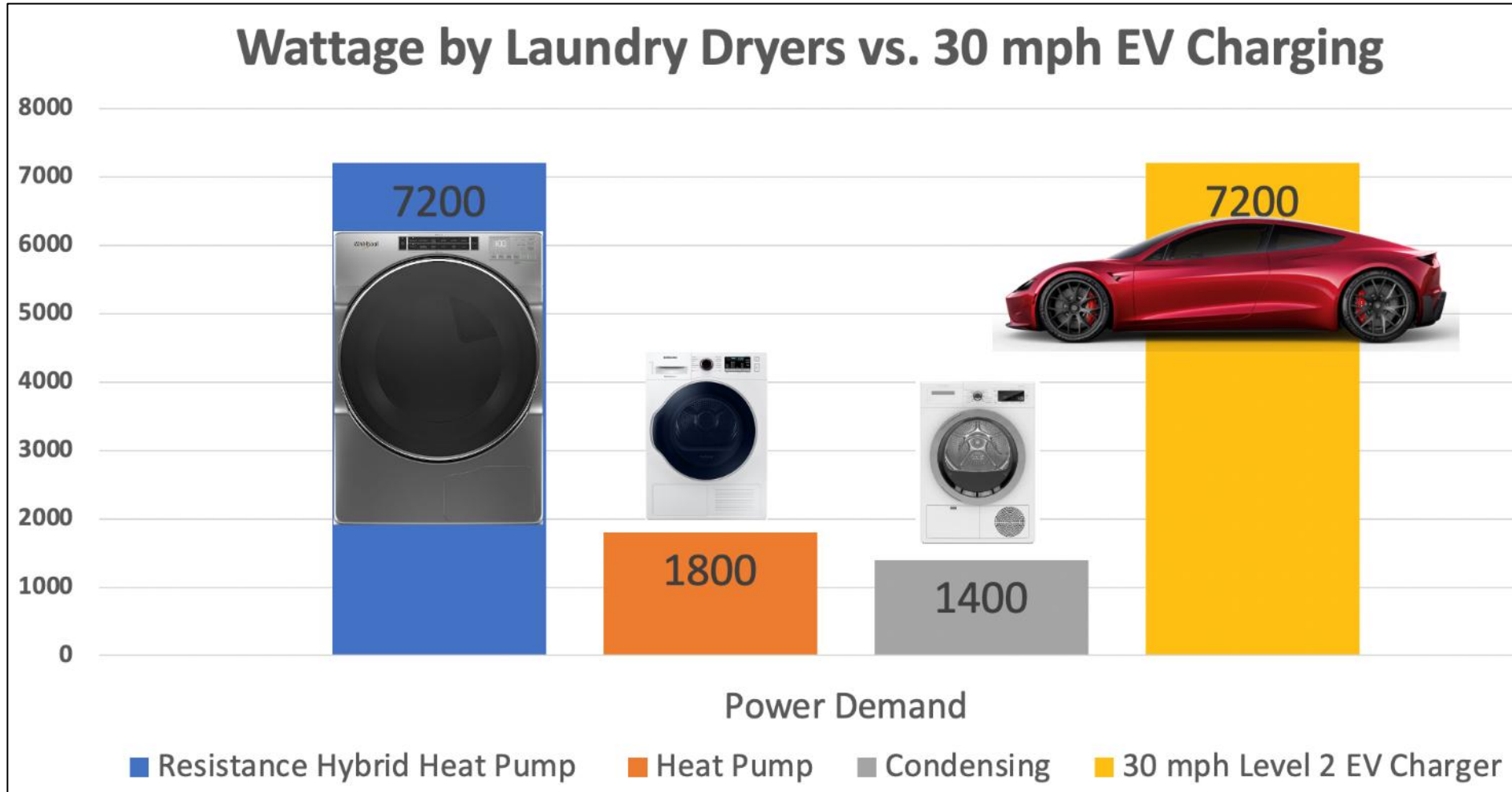


Altra Furniture
(\$160)

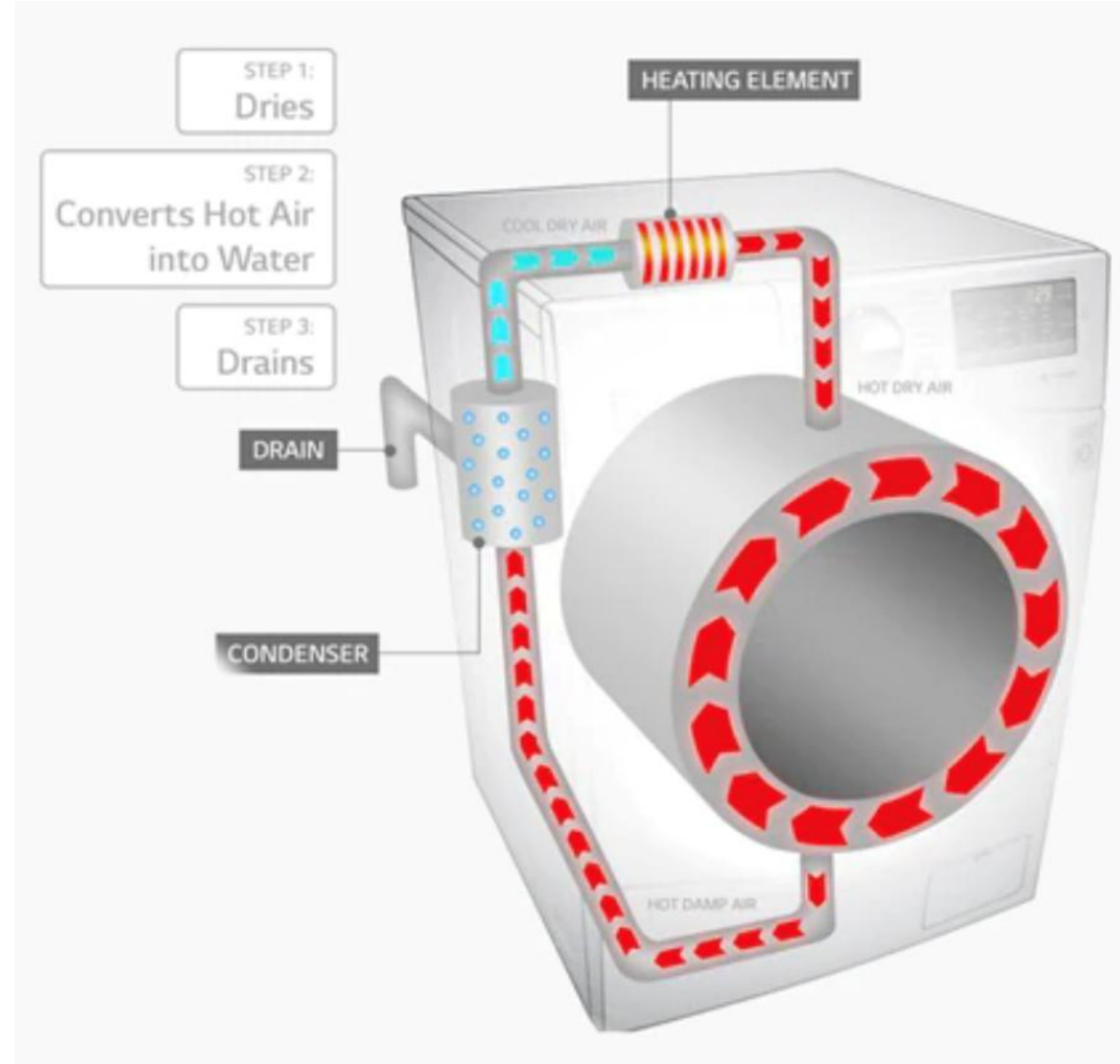


Freestanding	Freestanding	Freestanding Insert Water Vapor	Built-In Water Vapor	Built-In Water Vapor
ClassicFlame Electric Stove	FESTIVO 36in Freestanding	Aquafire Aquafire Lite	Dimplex Optimyst GBF1000-PRO	Dimplex Optimyst OLF86-AM
				
5,200 BTUh	3,400 BTUh	No Heat	4,984 BTUh	6,551 BTUh
120V/12A	120V/12.5A	120V/2A	120V/15A	240V/10A
\$100	\$450	\$1,400	\$5,250	\$10,000

Laundry Drying Can Take As Much Power as an EV!



What does
the drying
cycle look
like?



Condensing Washer/Dryers: 120V, no plumbing

\$1200

Equator All-in-one Compact Combo Washer Dryer 1200 RPM spin, Auto water level, Sensor Dry Optional Venting/Condensing in Merlot



\$1300

2.4 cu. ft. White High-Efficiency 120-Volt Ventless Electric All-in-One Washer Dryer Combo
by **GE** >



\$1700

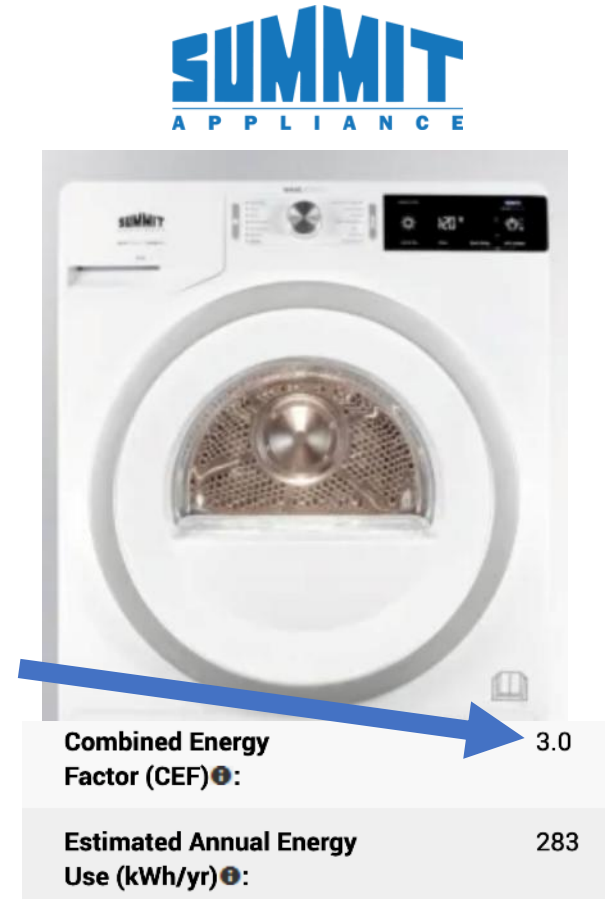
27 in. 4.5 cu. ft. Black Steel Ultra Large Capacity Electric All-in-One Washer Dryer Combo
by **LG Electronics** >



But what about efficiency? Well, it's an issue...



The most efficient
condensing dryer is
less efficient than
an inefficient **heat
pump** dryer





A highest efficiency heat pump dryer: 10.14 lbs/kWh

Combined Energy Factor (CEF):	10.14
Estimated Annual Energy Use (kWh/yr):	236

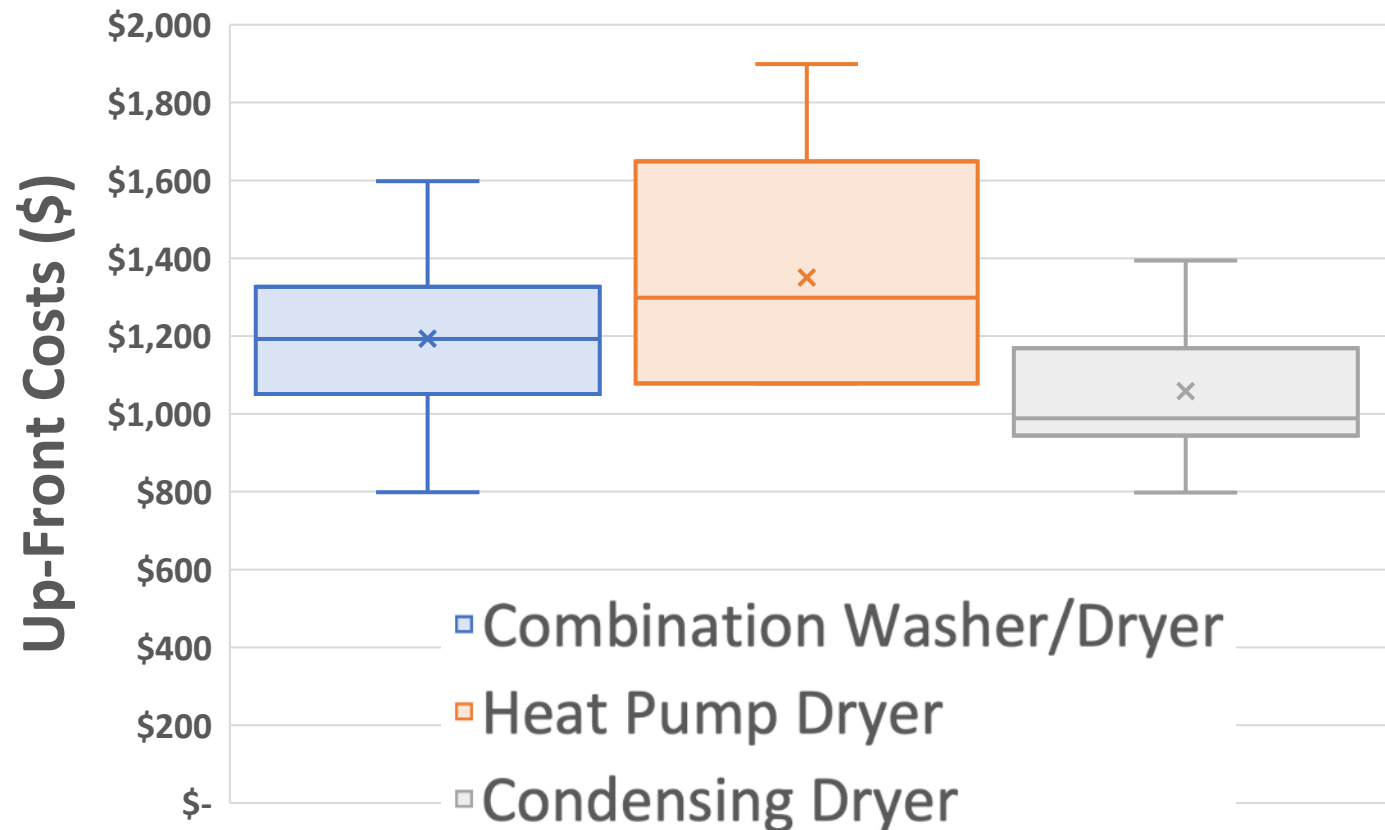


GE Profile™ Leads the Industry into the Future of Laundry with an All-In-One Solution

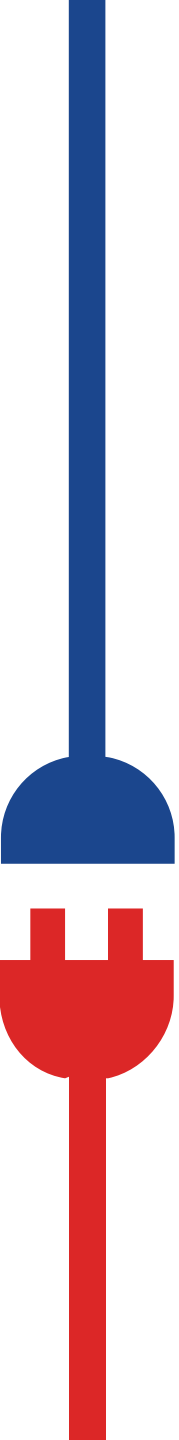


\$2,900
4.8 cu ft
120V/11A

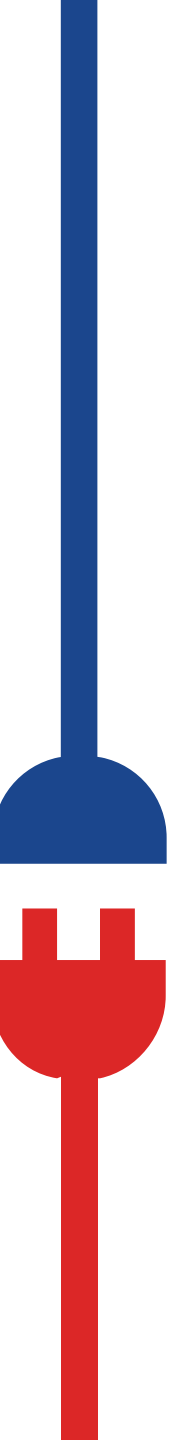
Does it save purchase costs?
Yes, compared to **also** buying a \$700-\$1200 washer.



Is The Best Power Outage Solution A Big EV Battery?



Taiga Snowmobiles



Taiga Jet Skis



Rambo Hunting e-bike



Rolls Royce 103 EX With An Artificial Intelligence Chauffeur



Silent 120 Solar Yacht with XP4 Electric Helicopter



Slide citation: Sean Armstrong, Redwood Energy - <https://www.redwoodenergy.net/>

The Silent 120 Comes with an Electric Personal Submarine by U-Boat Worx



Slide citation: Sean Armstrong, Redwood Energy - <https://www.redwoodenergy.net/>



POOL HEAT PUMP CUT BILLS IN HALF AT TAMARACK CLUB SLOPE SIDE HOTEL, ELLICOTVILLE, NY

Monarch's MK-V: An Autonomous Electric Tractor





Case 580EV Backhoe



Liebherr LR 1200.1 Unplugged Crawler Crane



Cat 320 Electric Medium Excavator



Volvo L25 Wheel Loader

World's Largest EV: Liebherr T264 Autonomous Electric Truck



The world's fastest EV charger – **6 MW!** – is in development to charge the T264's massive **3.2 MWh** battery in only 30 minutes



Oceanbird arrives in 2026 with 90% offset of fossil fuels in Transatlantic Shipping

Airbus has 3 Zero Emission Planes Planned for 2035



Closing



Continuing Education Units Available

- Contact julianna@3c-ren.org for AIA LUs and ICC CEUs

Coming to Your Inbox Soon!

- Slides, Recording, & Survey – Please Take It and Help Us Out!

Upcoming Electrify My Home Courses:

- Optimizing Heat Pump Zoning for Maximum Comfort and Efficiency (6/17)

Other Upcoming Courses:

- All Electric ADUs (IN-PERSON TRAINING) (5/16)
- A Builder's Perspective on Zero Net Energy (5/20)
- Green Building Construction Tour (IN-PERSON TRAINING) (6/3)

<https://www.3c-ren.org/calendar-of-events-and-trainings/>

Any phone numbers who joined? Please share your name!



Thank you!

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