

Heat Pumps for Homeowners - Products & Selection



Larry Waters, Electrify My Home

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August 1st, 2023



3C-REN: Tri-County Regional Energy Network

- Three counties working together to improve energy efficiency in the region
- Services for –
 - **Building Professionals:** industry events, training, and energy code compliance support
 - **Households:** free and discounted home upgrades
- Funded by ratepayer dollars that 3C-REN returns to the region



3C-REN Programs

- **Energy Code Connect (ECC)**
 - Energy Code Coach: Title 24 Compliance Support Hotline (805) 220-9991
- **Building Performance Training (BPT)**
 - Industry Trainings & Certification for current and perspective building professionals
- **Home Energy Savings (HES)**
 - Flexible Home Energy Upgrades for Multifamily and Single Family homes





HOME
ENERGY
SAVINGS

Single Family Program

- Discounted pricing available from enrolled contractors- **up to 75% off project costs.**
- **Any project that saves energy (gas or electricity)* is eligible for savings when you work with an enrolled contractor.**
- Actual discount depends on how much energy the project saves
**not solar*

Visit 3C-REN.org/for-residents



How much can I really save?

Example project: replace furnace with heat pump

- Single Family Program Incentive: ~\$2,000
- Other local/state programs: ~\$2,500
- Tax Credit: ~\$2,000
- **TOTAL SAVINGS: ~\$6,500**

Or, potentially half off of a \$12,000 project.



How much can I really save?

Make Sure that you're accessing all relevant incentives.

- Use 3C-REN's Program and Incentives Tool
- Call or email for support:

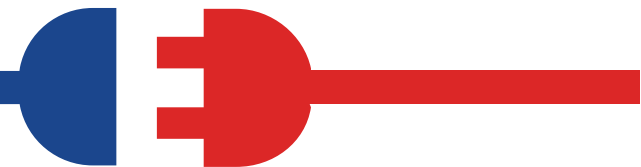
JLares@cecmail.org

(805) 881-3877



Agenda

- ⚡ Introductions 3C REN
- ⚡ Setting the stage – why electrification?
- ⚡ How does a heat pump work?
- ⚡ Heat pump options for HVAC
- ⚡ Heat pump options for water heating



About Larry Waters



🔌 HVAC trade from UTI in 1982



🔌 In the trade before the first cordless drill



🔌 Nate certified



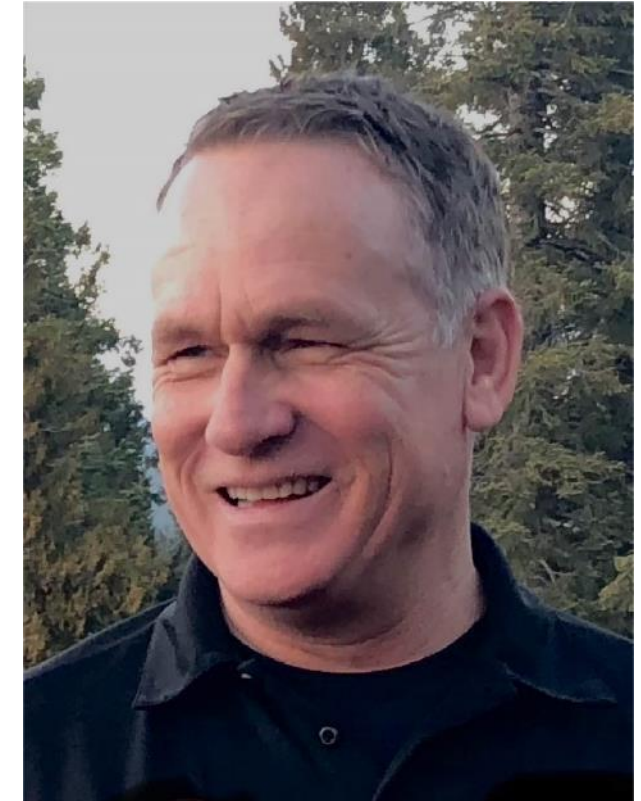
🔌 2009/ 2010 BPI certification



🔌 Installing only heat pumps since 2015



🔌 Founded Electrify My Home in 2020



Electrify My Home – Electrification Pioneers

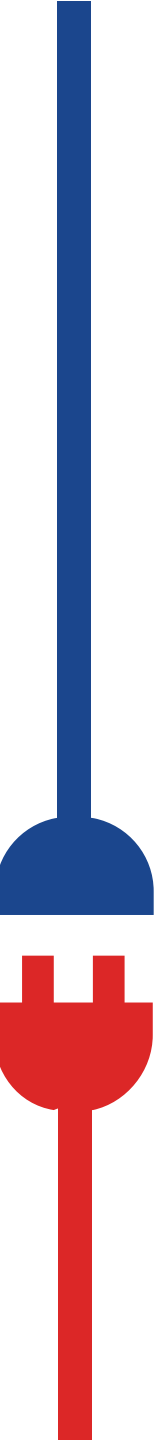
Our Mission:

*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.*



ELECTRIFY
MY HOME

Why Electrification?



Flames Out By 2030

6 Million

Heat Pumps Installed

California has a goal of 6 million heat pump installations in less than 7 years

No New Gas

Furnaces & Water Heaters

The California Air Resources Board has initiated plans to phase out new gas furnace & water heater installs. Starting even earlier in the Bay Area.

Big Opportunity, Big Risk (If Done Poorly)

90%

90% of CA homes rely on gas for **space or water heating** ¹

11.7
Million

CA homes (96%) with gas or elec resistance **heating** ²

12
Million

CA homes (99%) with gas or elec resistance **water heaters** ²

3.4
Million

CA homes with **no AC** ³

¹Decarbonization of Heating Energy Use in California Buildings. Synapse Energy Economics, Inc. 2018.

³Canary Media. "California could ban new gas heaters after 2030. The goal: healthier air." 2022

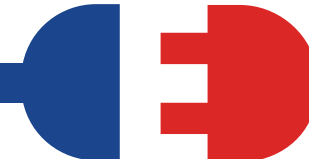
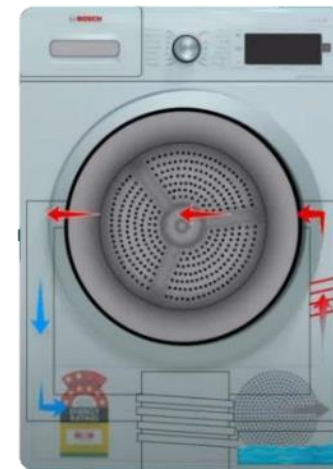
²CA Heat Pump Residential Market Characterization & Baseline Study. Opinion Dynamics, 2022

Topic of the Day

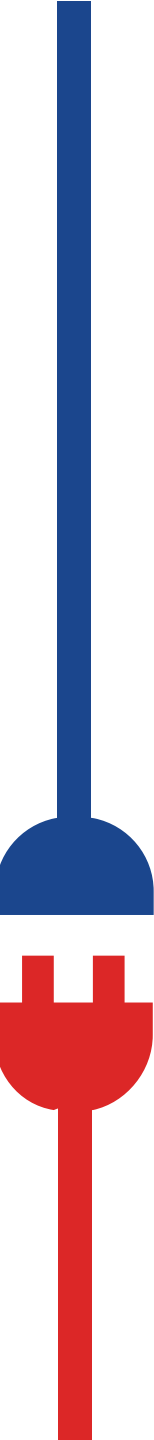
Heat Pump Products

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!)

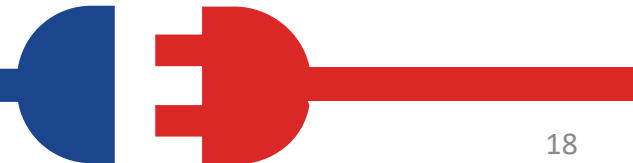




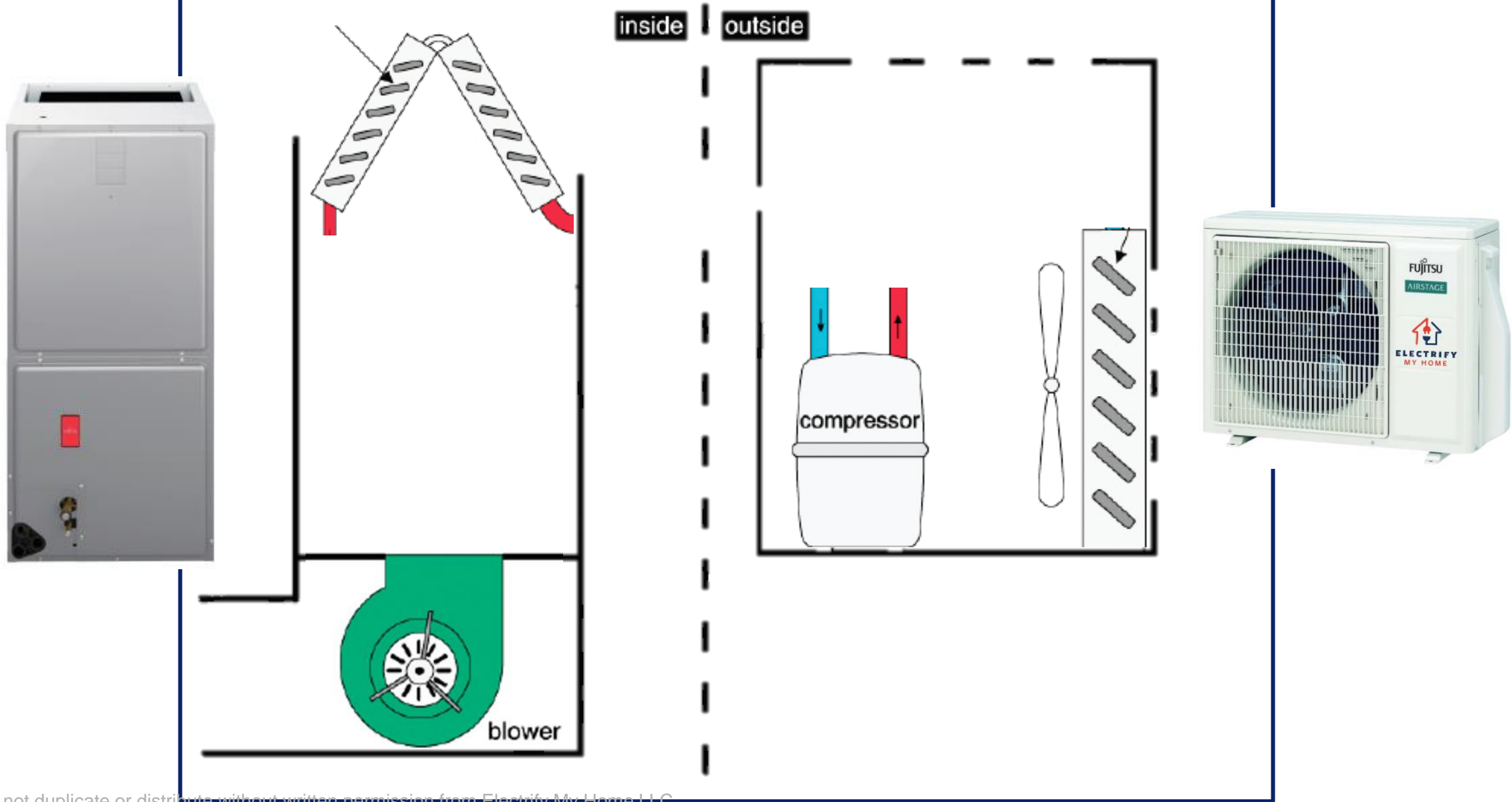
What is a Heat Pump?

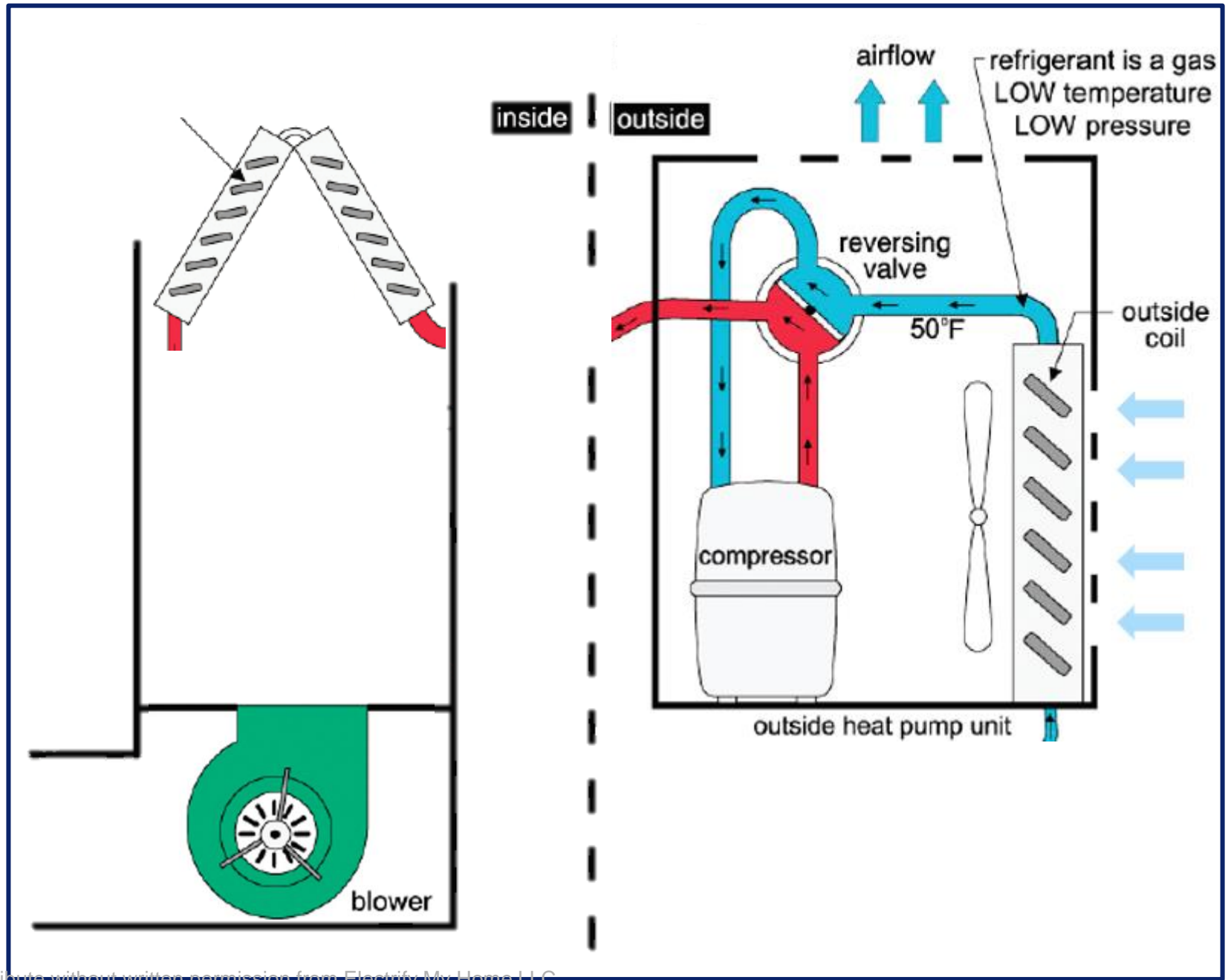
Hint – there's one in your house!

- 🔌 Gas Furnaces **CREATE** Heat
- 🔌 Heat pumps **MOVE** heat
 - 🔌 Via Refrigerant Cycle (next slides)

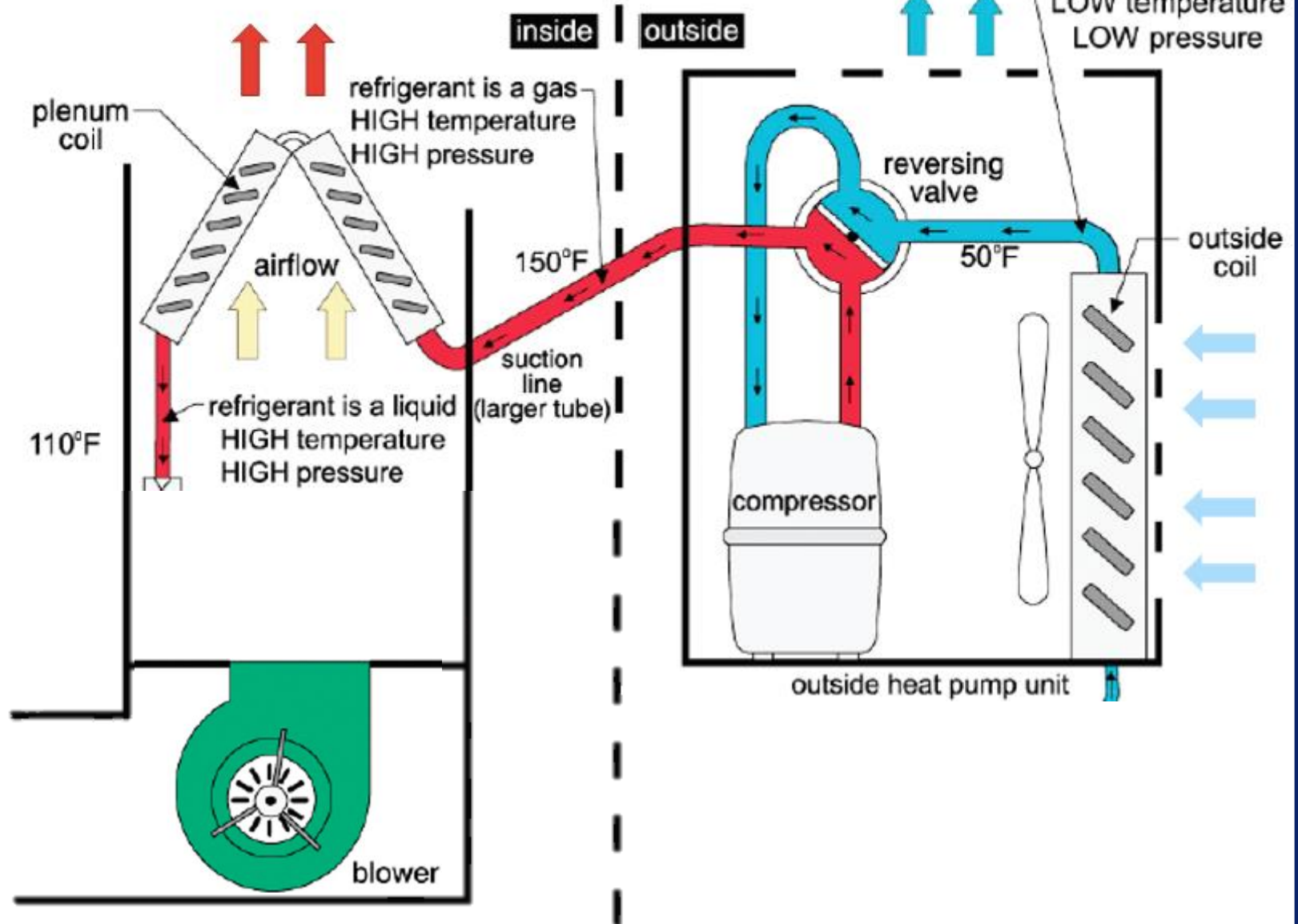


How Does It Work (simple version)?

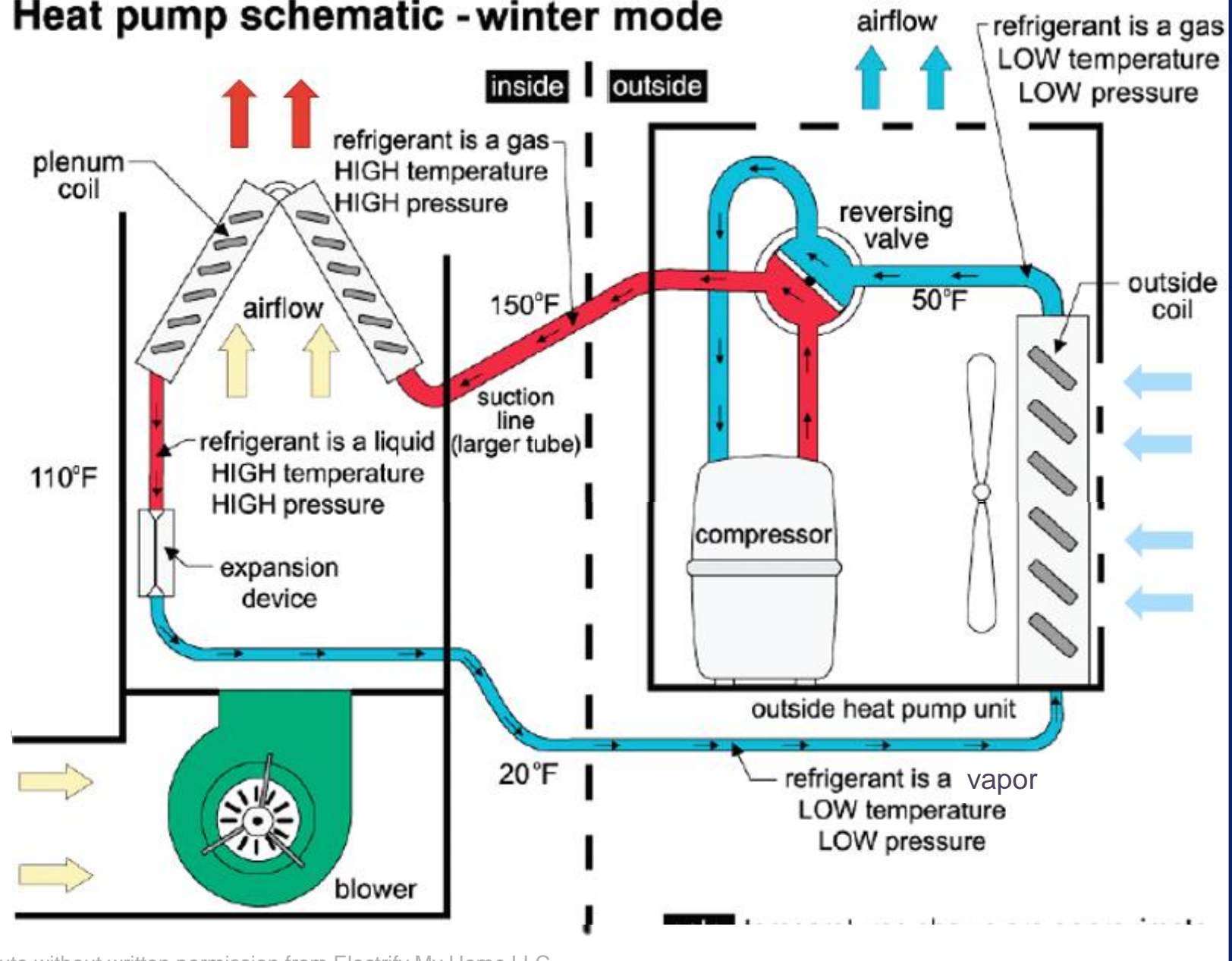




Heat pump schematic - winter mode



Heat pump schematic - winter mode

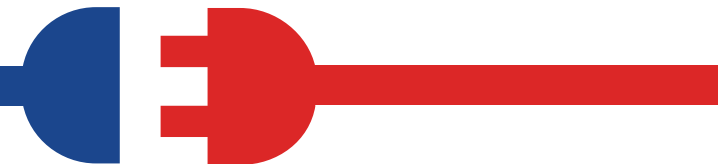


When you think
“Heat Pump,” is
this what you
envision?



There Are Many Options ...But Don't Let That Scare You!

Air-to-Water Zoned Ceiling-Cassette
Hyper-Heat Ductless Water-to-Water
Slim-Duct Air-Source Multi-Zone
Multi-Split Packaged-Unit
Mini-Split Hybrid
Unitary Multi-Position Dual-Fuel
Hydronic Ducted Floor-Mount
Variable-Refrigerant-Flow Cold-Climate
Exhaust-Air Ground-to-Water
Window-Mount Air-to-Air



Let's Break it Down: Typical Outdoor Unit Classifications

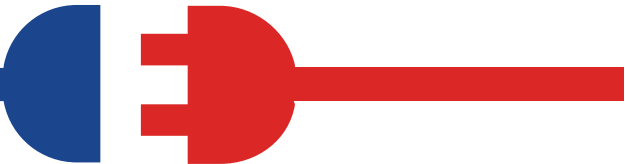
Unitary



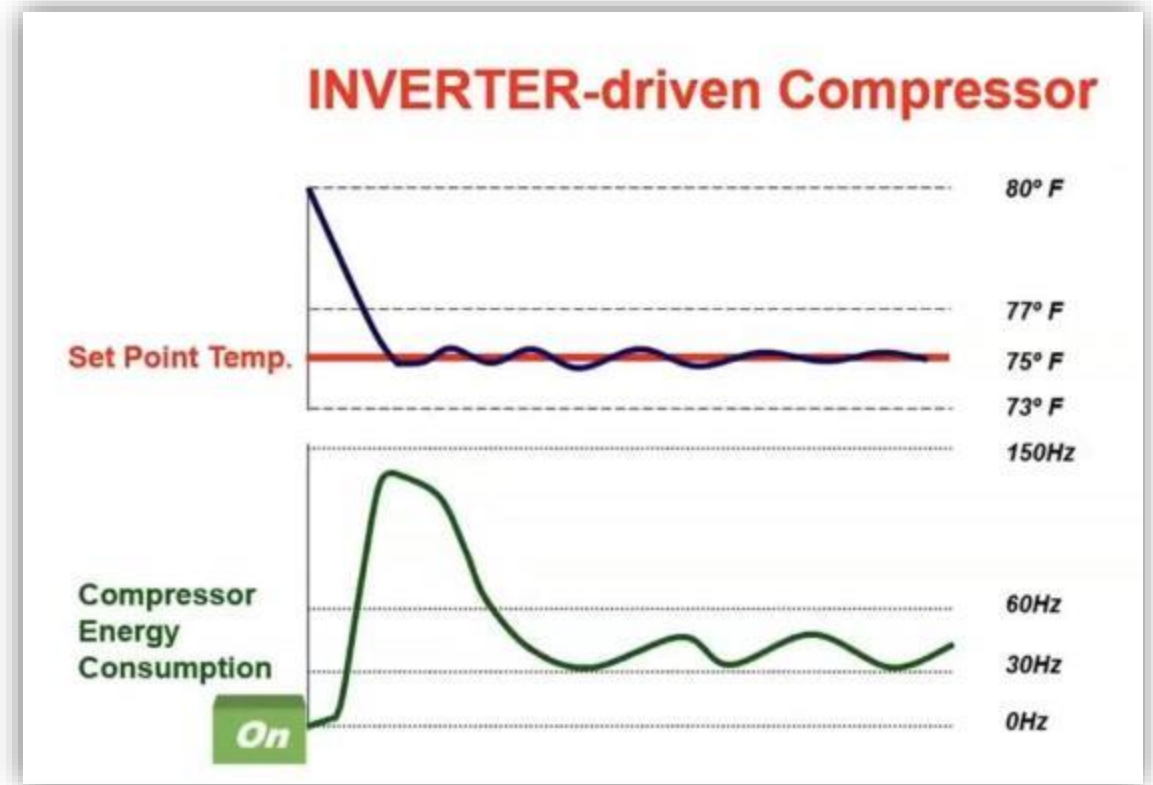
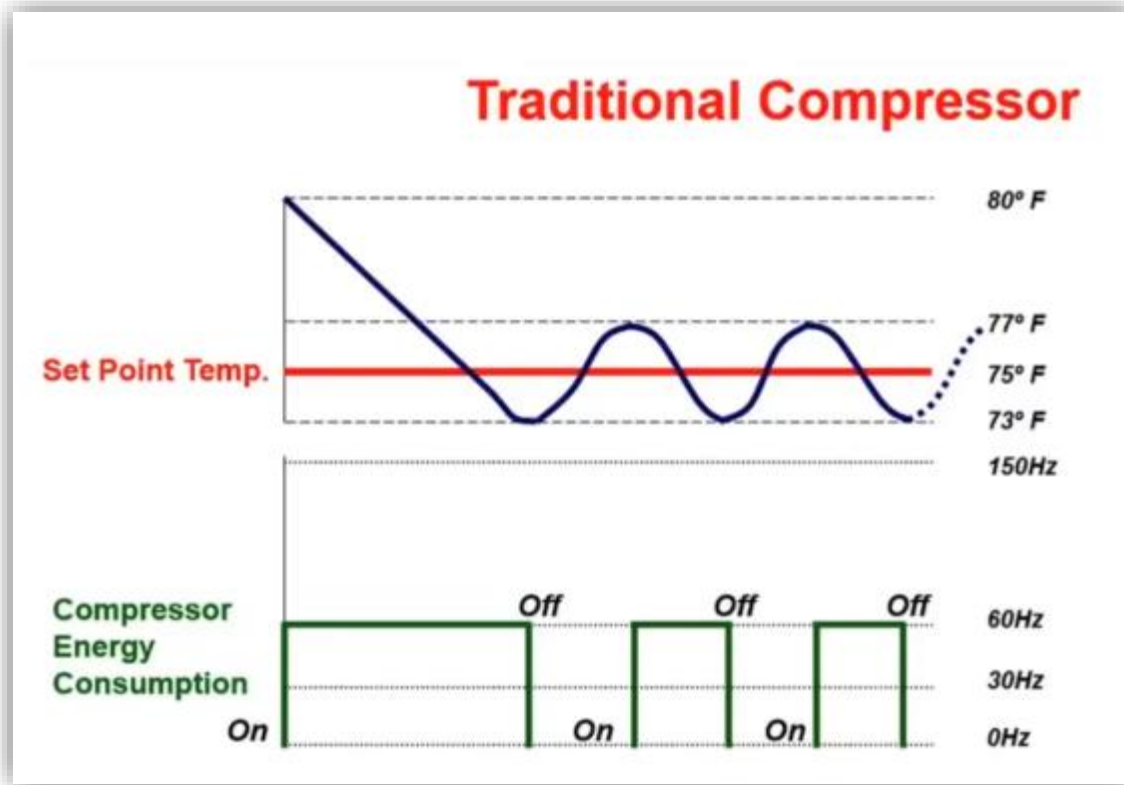
Mini Split/Suitcase



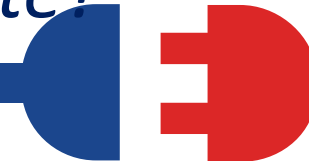
All-In-One



Outdoor Units – Single Stage vs Inverter



Ok, so inverters look great – is that the same as the variable speed system in my quote?



Indoor Unit Classifications – Ducted

Conventional Ducted

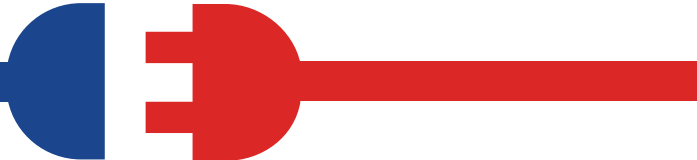
Slim Ducted



Unitary ODU



Mini Split ODU



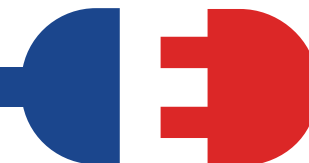
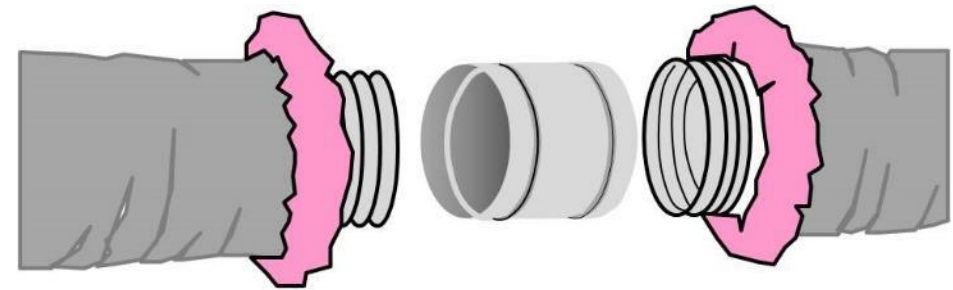
Single Zone Ducted Advantages & Disadvantages

Advantages

- ✔ Aesthetically appealing
- ✔ Ability to reuse infrastructure if existing central system
- ✔ Serves entire home with 1 unit
- ✔ Quieter
- ✔ Smaller capacity than multi-zone – can be more efficient

Disadvantages

- ✔ Installation can be complex
- ✔ Requires space for ductwork
- ✔ Needs a load calc for best result
- ✔ Correct registers needed



Indoor Unit Classifications – Ductless



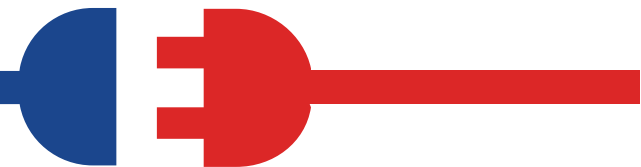
Ceiling Cassette



Floor Mount



Wall Mount



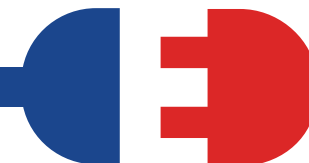
Ductless Advantages & Disadvantages

Advantages

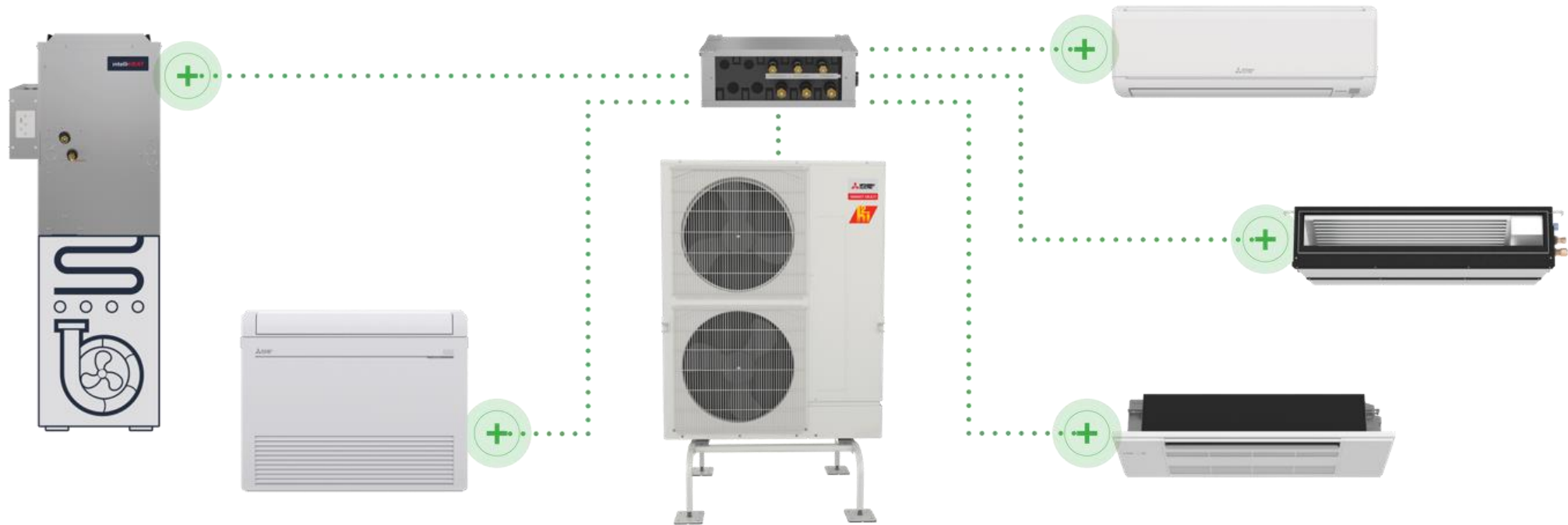
- ✔ Single Zone systems have high **efficiency** ratings
- ✔ Addresses “**problem rooms**”
- ✔ Affordable option for **wall/floor furnace** replacement
- ✔ Lots of **configurations** and styles

Disadvantages

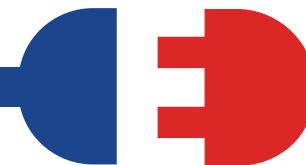
- ✔ Potential for **leaks** (refrigerant, condensation)
- ✔ Poor air **filtration**
- ✔ Difficult for **service**
- ✔ Less desirable **aesthetics**



Multi-Zone aka Multi-Split



- 🔌 Multiple indoor air handlers hooked up to one outdoor unit
- 🔌 All ducted, all ductless, or combo



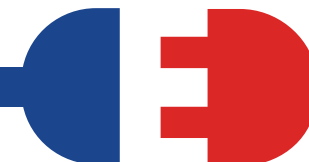
Multizone Advantages & Disadvantages

Advantages

- 🔌 Flexibility for multi-room solutions
- 🔌 Ducted and/or ductless
- 🔌 Helpful where distinct temperature zones exist
- 🔌 Saves space outside

Disadvantages

- 🔌 More refrigerant
- 🔌 More chance for leaks
- 🔌 Must be operated correctly
- 🔌 Capacity penalty
- 🔌 Lower efficiencies
- 🔌 No redundancy
- 🔌 More difficult to repair



For Some Applications Variable Refrigerant Flow (VRF) or VRV

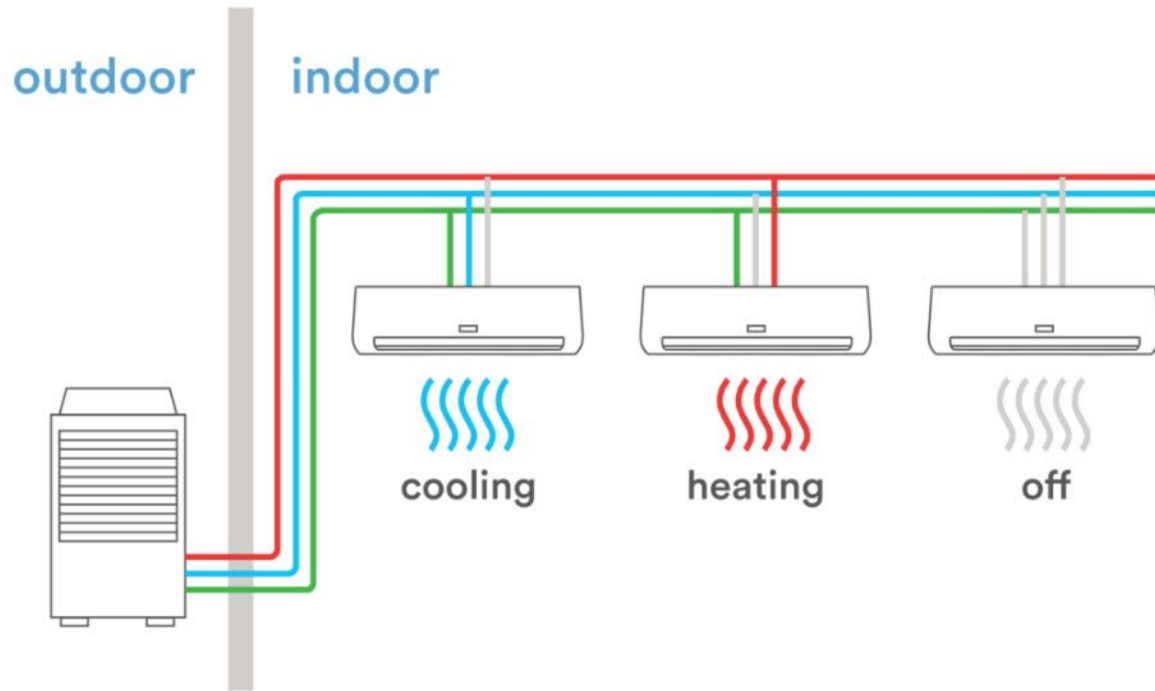
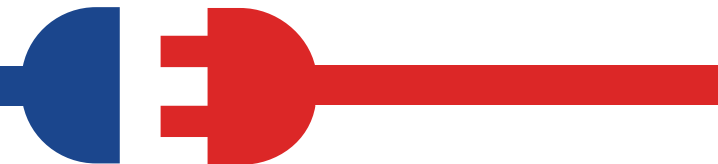


Image source: Colorado Mechanical

- 🔌 Solves some capacity and sizing challenges
- 🔌 Simultaneous heating & cooling
- 🔌 Large houses or commercial applications
- 🔌 Costlier, more complex, more refrigerant



Room Options – Great for Adding AC In Coastal Areas ...some can be DIY-ed



Gradient



Ephoca



Olimpia Splendid



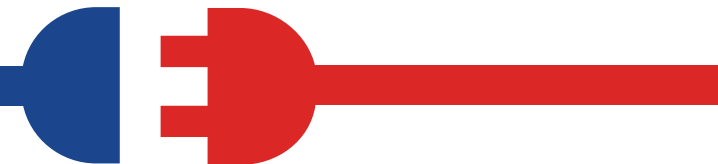
Portable HP

Furnace Backup/Resistance Backup

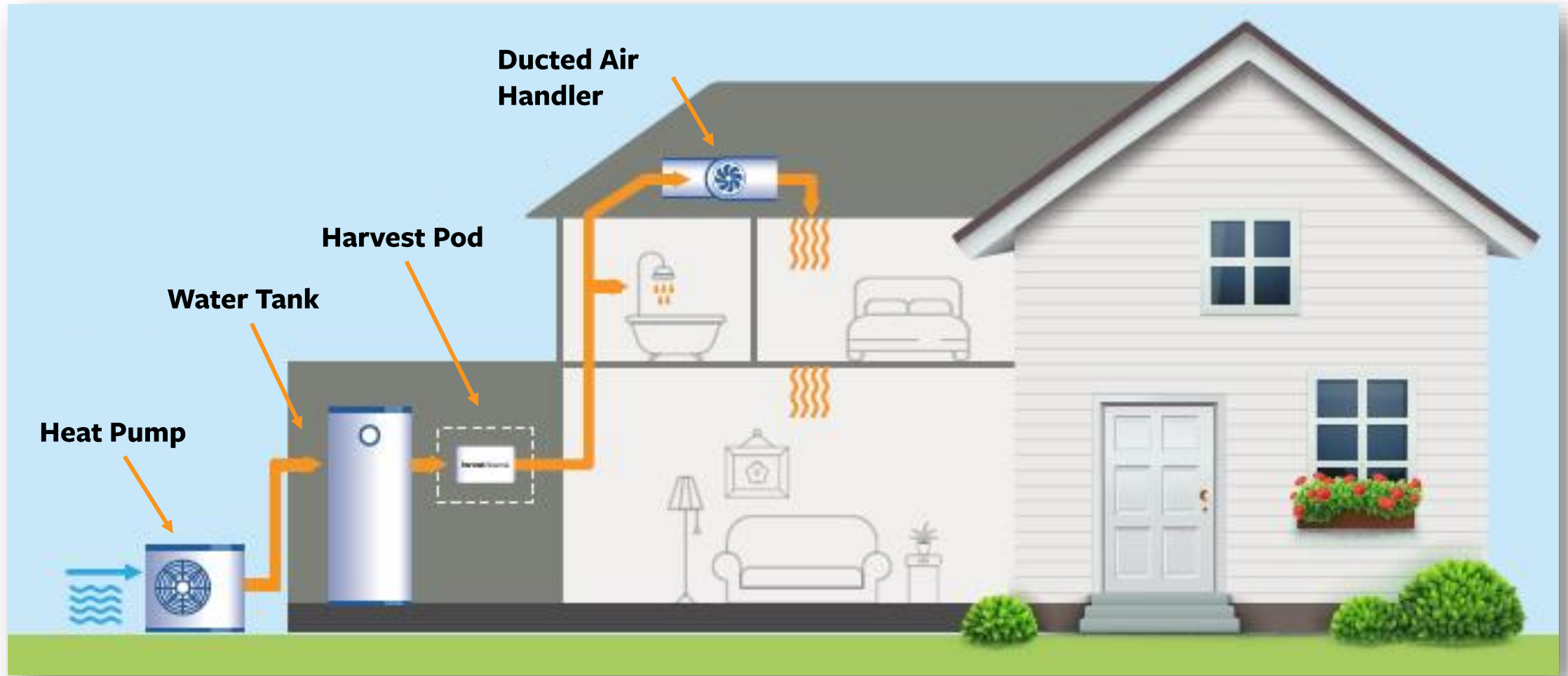
...Not Recommended for Coastal Climate



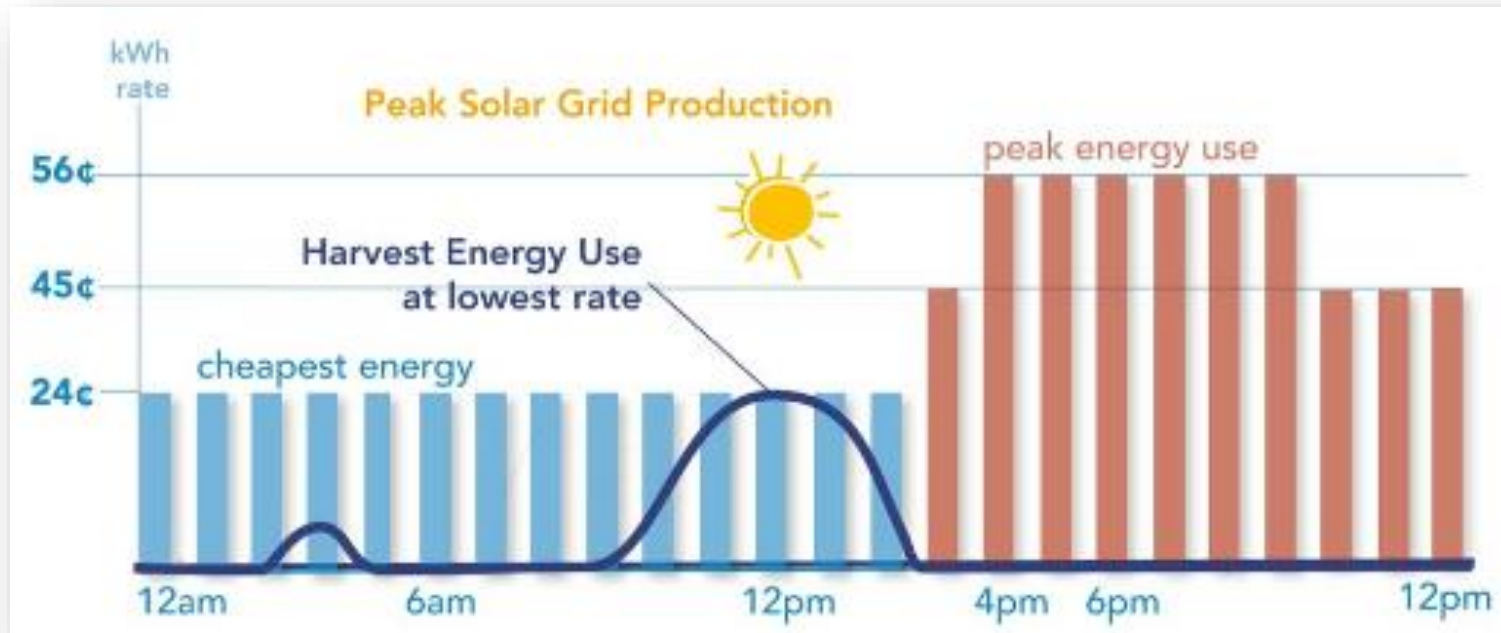
Image Source: <https://evergreenhomeheatingandenergy.com/blog/bid-219238-types-of-heat-pumps>



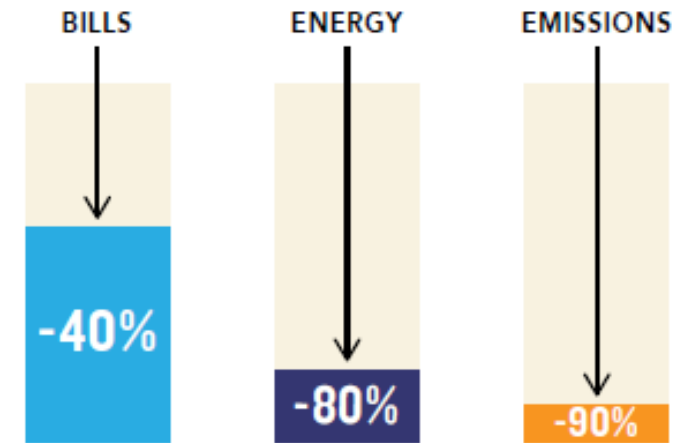
Harvest Thermal



Harvest Thermal



Harvest Thermal by the numbers.



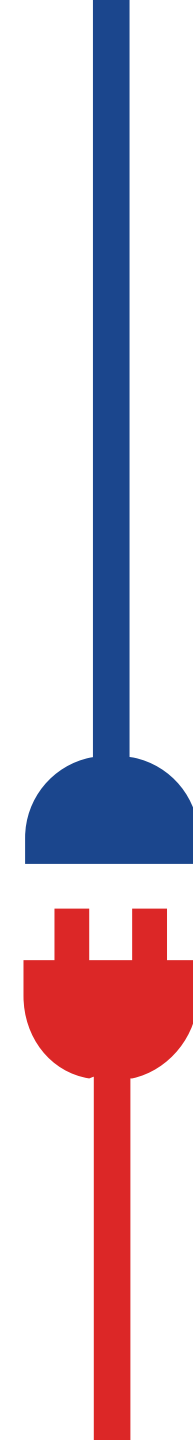
EXAMPLE FOR MID-SIZED HOME IN NORTHERN CALIFORNIA





Ratings – What to Look For

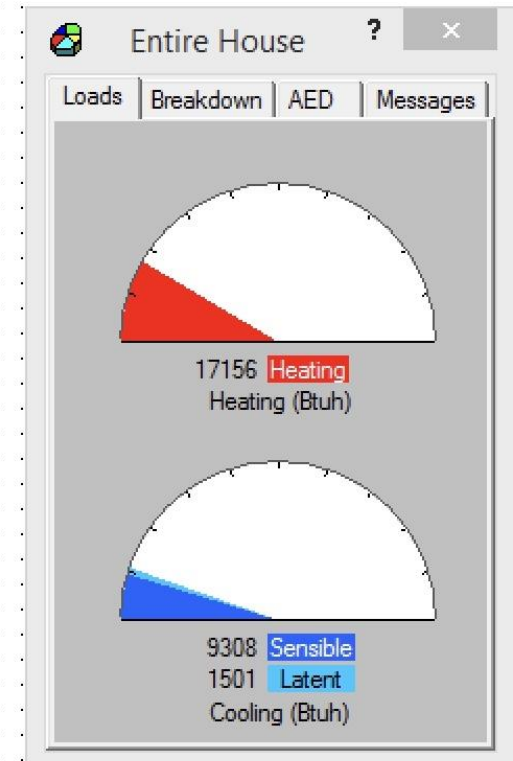
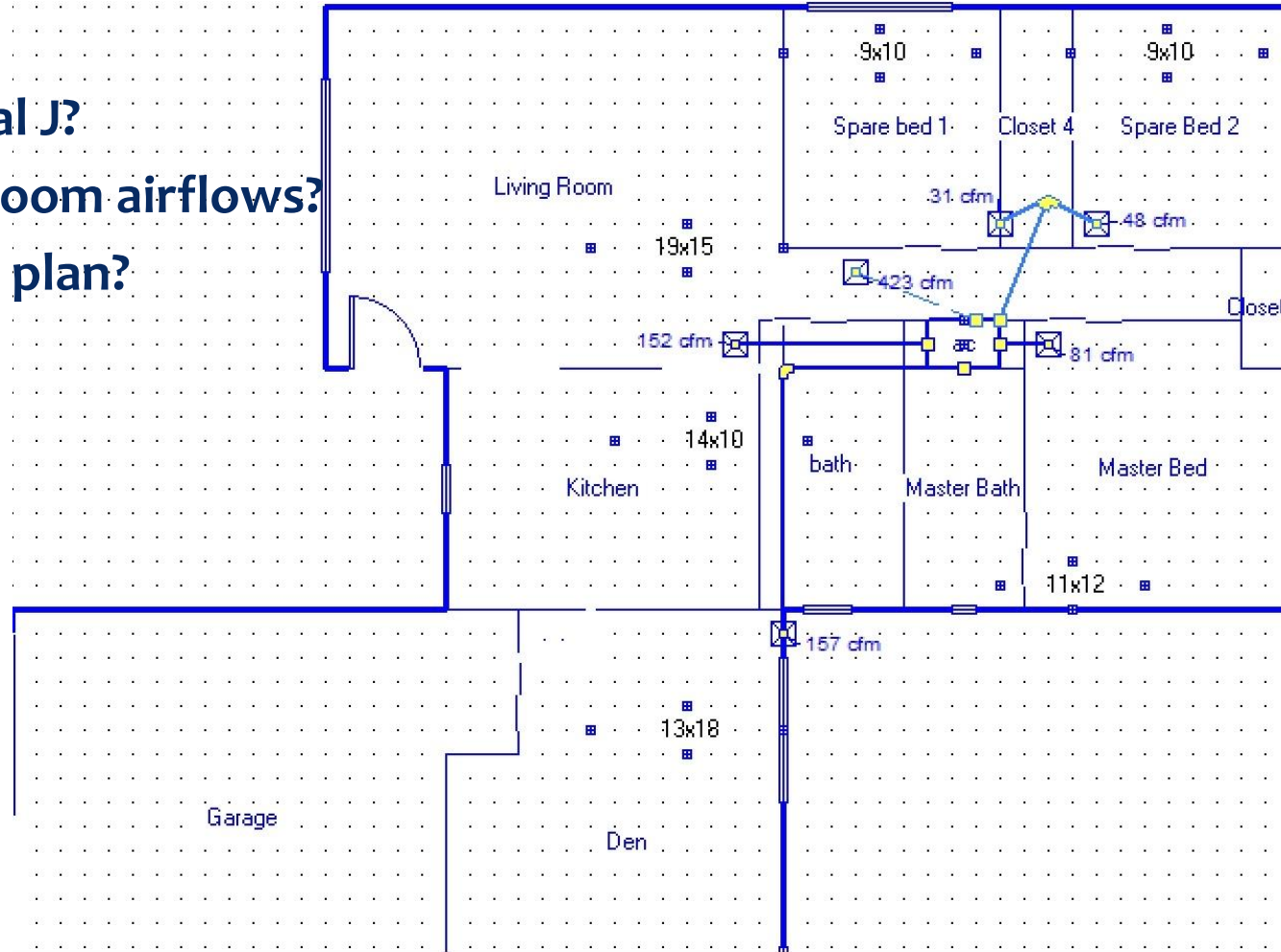
Indoor Model		24K (208/230V)
Energy Star		YES
Cooling Rated Capacity	Btu/h	24,000
Cooling Cap. Range Min - Max	Btu/h	6,500~27,800
SEER		20.6
EER		12.5
Heating Rated Capacity (47°F)	Btu/h	24,600
Heating Rated Capacity (17°F)	Btu/h	16,500
Heating Maximum Capacity (17°F)	Btu/h	26,500
Heating Maximum Capacity (5°F)	Btu/h	24,600
Heating Cap. Range Min - Max	Btu/h	12,200~32,200
HSPF		12.6
COP (47°F)	W/W	3.66
COP (17°F)	W/W	2.80
COP (5°F)	W/W	2.01



Load Calculations

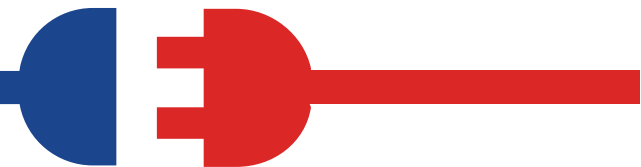
Ask your contractor:

- 🔌 Will you do a Manual J?
- 🔌 Including room by room airflows?
- 🔌 Do you need a floor plan?

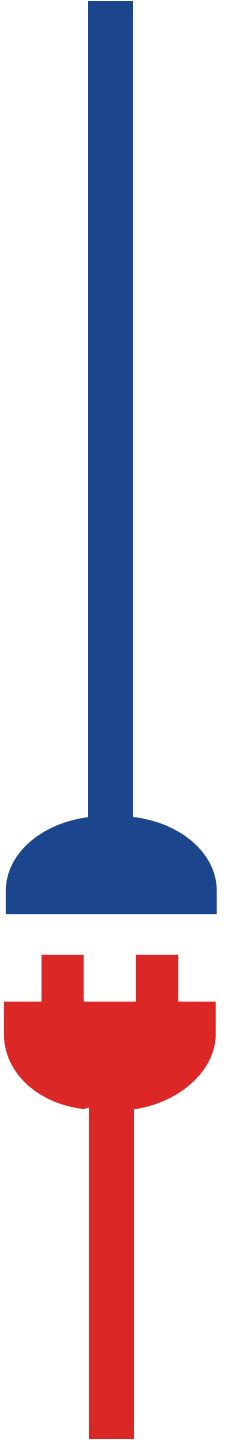


Coastal Considerations

- ⚡ Protect equipment from elements
 - ⚡ Maintenance
 - ⚡ “Premium manufacturers” with protective coatings
- ⚡ Proper drainage of condensate
- ⚡ Vapor barriers
- ⚡ Humidity – system selection



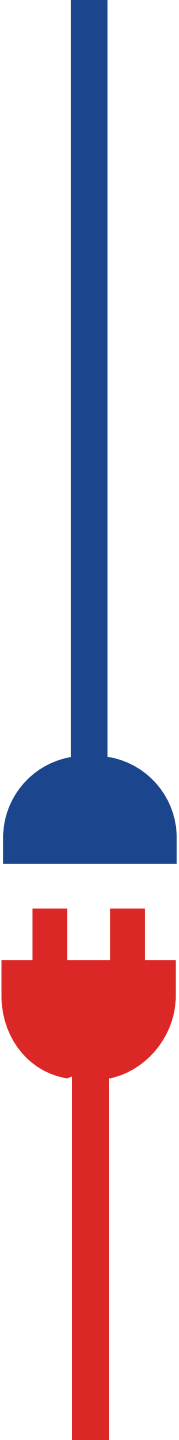
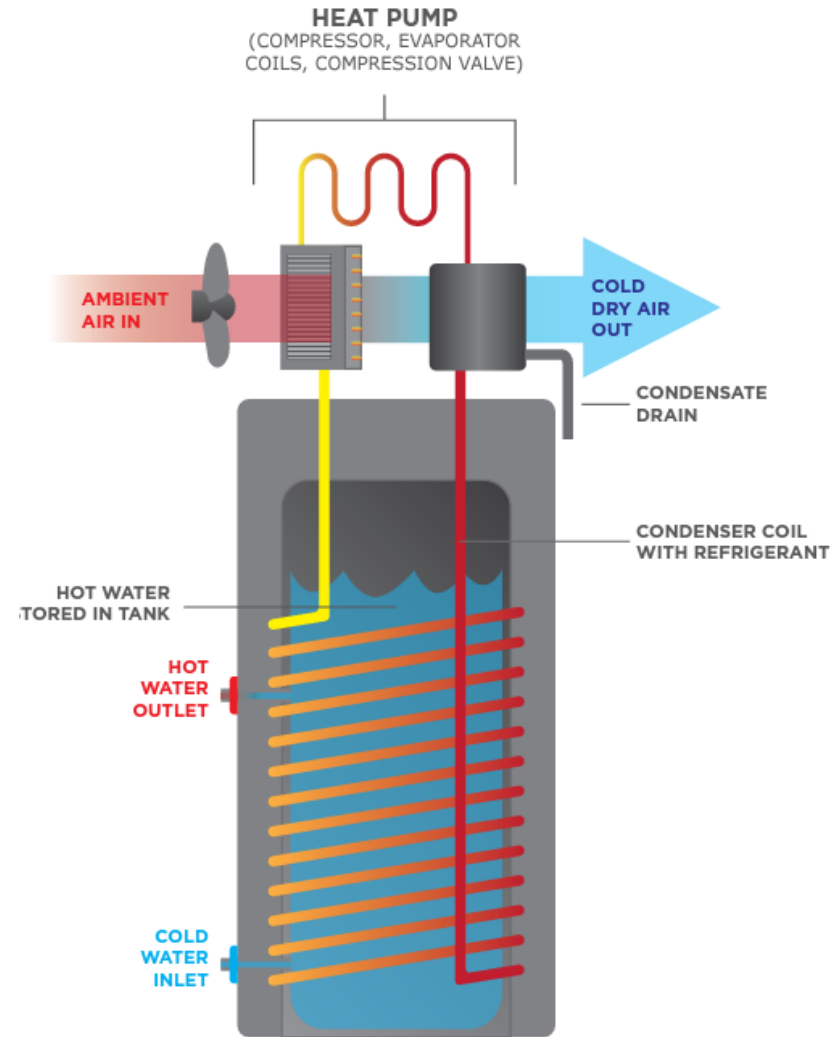
Electric Water Heating Products



Alternatives to Traditional Water Heaters?



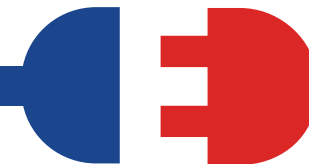
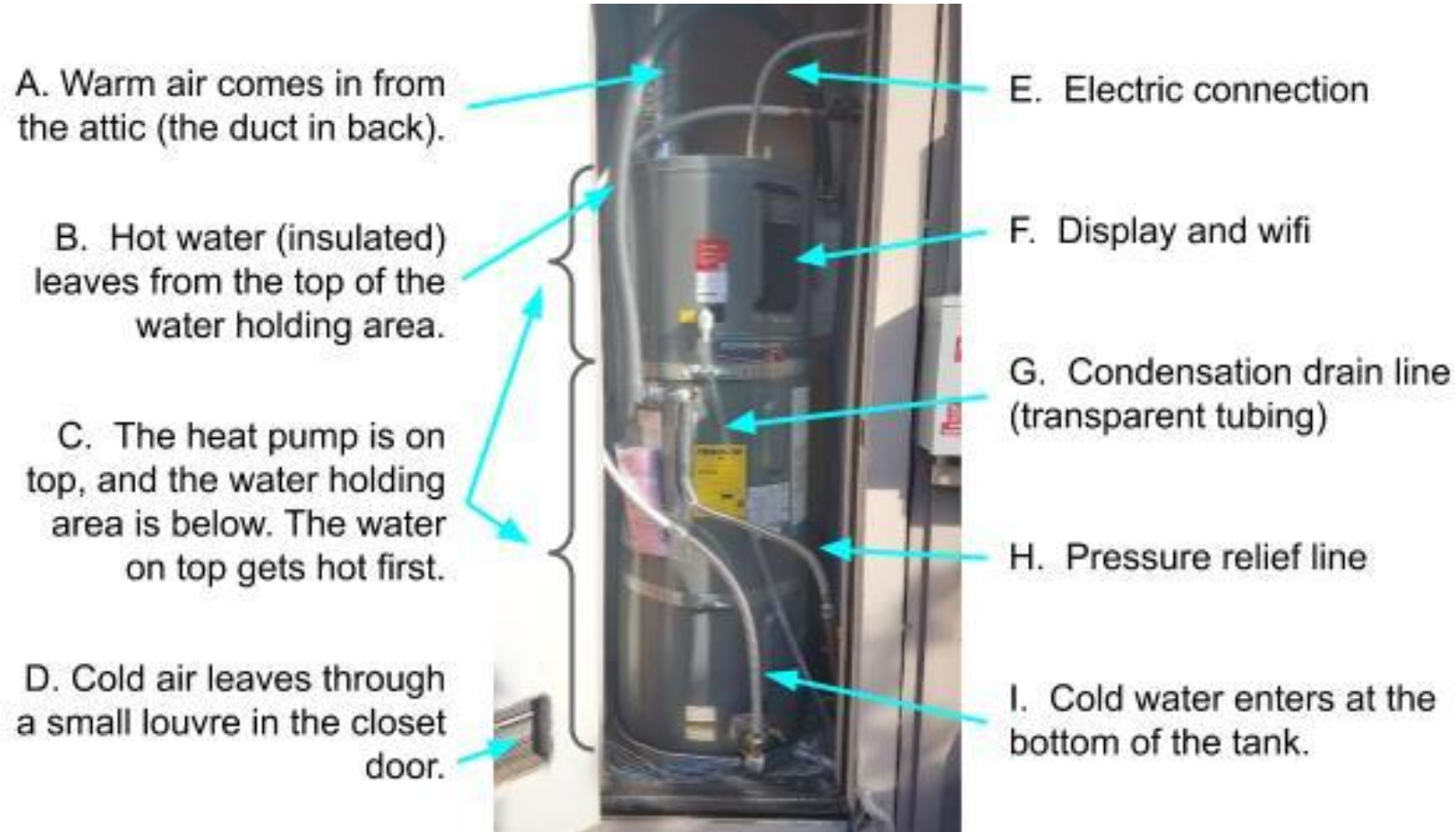
How Does A Heat Pump Water Heater Work?



Several Brands Available, One w/ 120V, Two with Top Connections



Installation is Different than Gas DIY Not Recommended

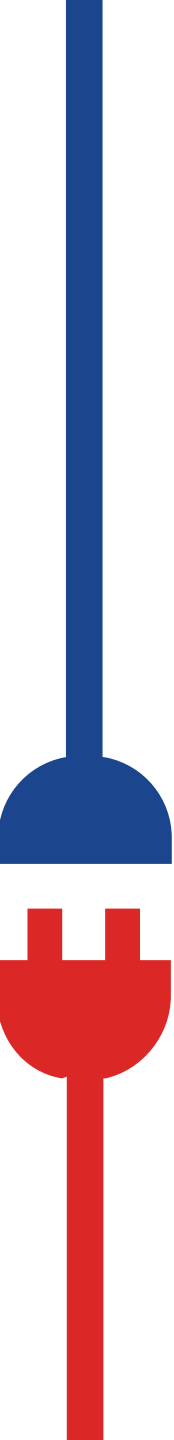




How Quiet Is Your Lifestyle?

SanCO₂ Heat Pump Water Heater

... solves nearly every issue



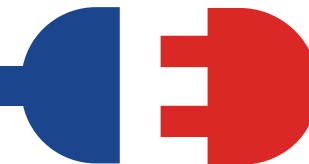
What About Electric Tankless?



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



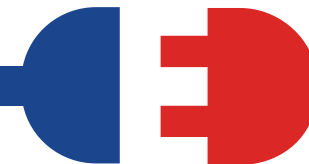
- ⚡ Buyer Beware



Questions?



Larry Waters | 707-840-3411 | www.electrifymyhome.com | info@electrifymyhome.com



Closing

- Coming to Your Inbox Soon!
 - Slides and Recording

Sign up to connect to a 3C-REN participating contractor for incentives:

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





Thank you!

For more info:
3c-ren.org

For questions:
info@3c-ren.org



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