

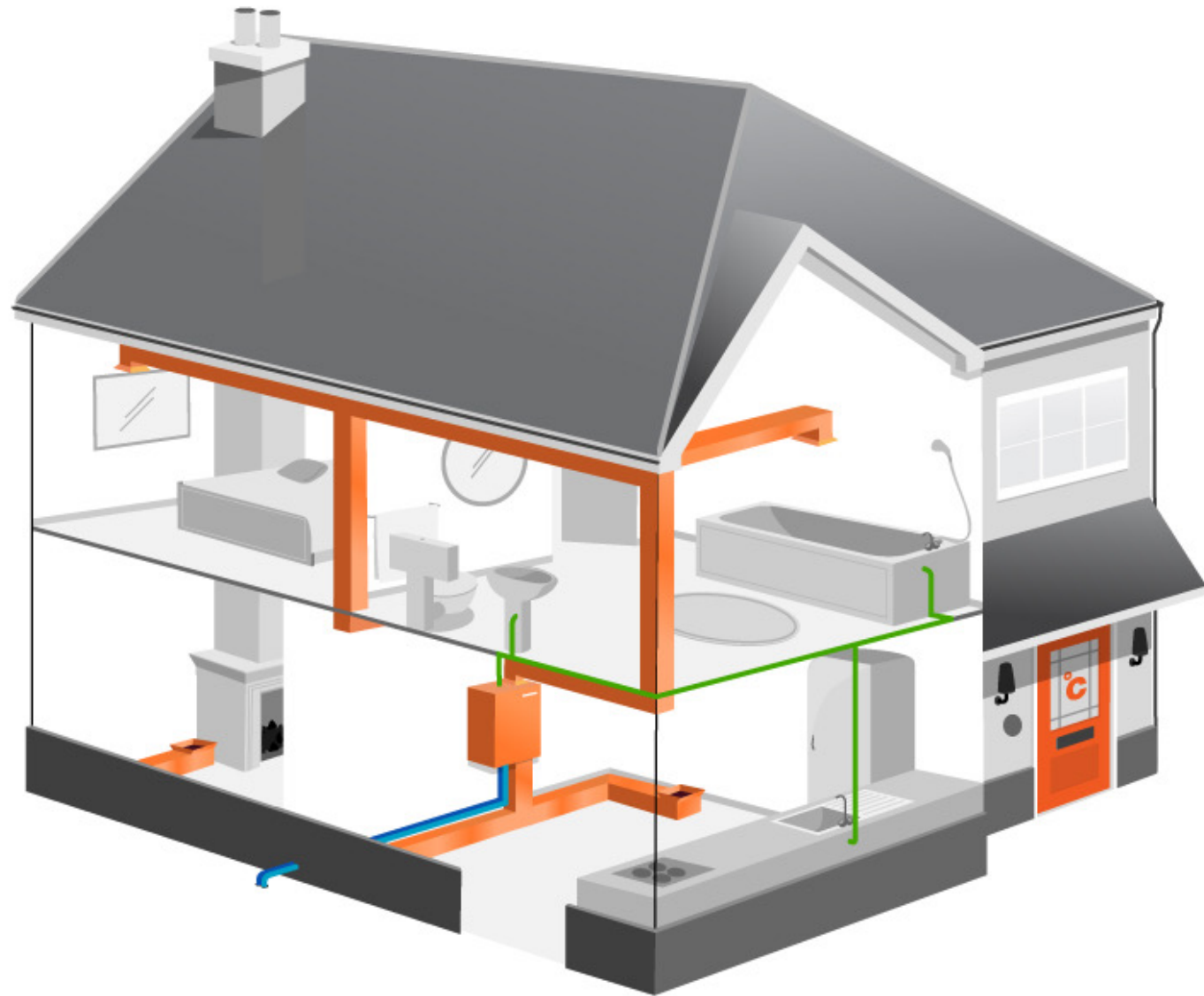
# LPEEA

La Plata Electric Association, Inc.

A Touchstone Energy<sup>®</sup> Cooperative 

## Heating Season Prep: The Latest in Electric Heating Tech

# AGENDA



Reducing Heating Load

Indoor Air Quality

Electric Heating Options

Heat Pumps

Cost Comparison

LPEA Rebates + Tax Incentives

How To Get Started Purchasing A New System

Q&A Session



# Beneficial Electrification (BE)

Beneficial Electrification means using electricity as a power source (over propane or gas) when doing so satisfies at least one of the following conditions, without adversely affecting the others:

- Saves members money
- Benefits the environment and reduces GHG emissions
- Fosters a more robust and resilient power grid



# Electrification Perks

- Saves members money
- Better indoor air quality
- Improved health, safety, and comfort
- Benefits the environment and reduces GHG emissions
- Fosters a more robust and resilient power grid







# Building Science

# Glossary

**BTU:** British Thermal Unit of heat

**Ton:** 12,000BTU

**Watt:** Unit of power – 1 watt =  
3.412 BTU

**ASHP/ccASHP:** Air Source/Cold  
Climate Air Source Heat Pump

**COP:** Coefficient of Performance

**HSPF:** Heating Seasonal Performance  
Factor – Measurement of ASHP heating  
efficiency

**SEER:** Seasonal Energy Efficiency  
Ratio

**EER:** Energy Efficiency Ratio





# How to Get Started

## ENERGY EFFICIENCY FIRST

1. Get an energy audit
2. Address building envelope with air sealing and insulation
3. Pursue all low cost/no cost measures, “low hanging fruit”
4. Limit heat generating plug loads
5. Use passive solar to heat and blinds or curtains to keep things cool

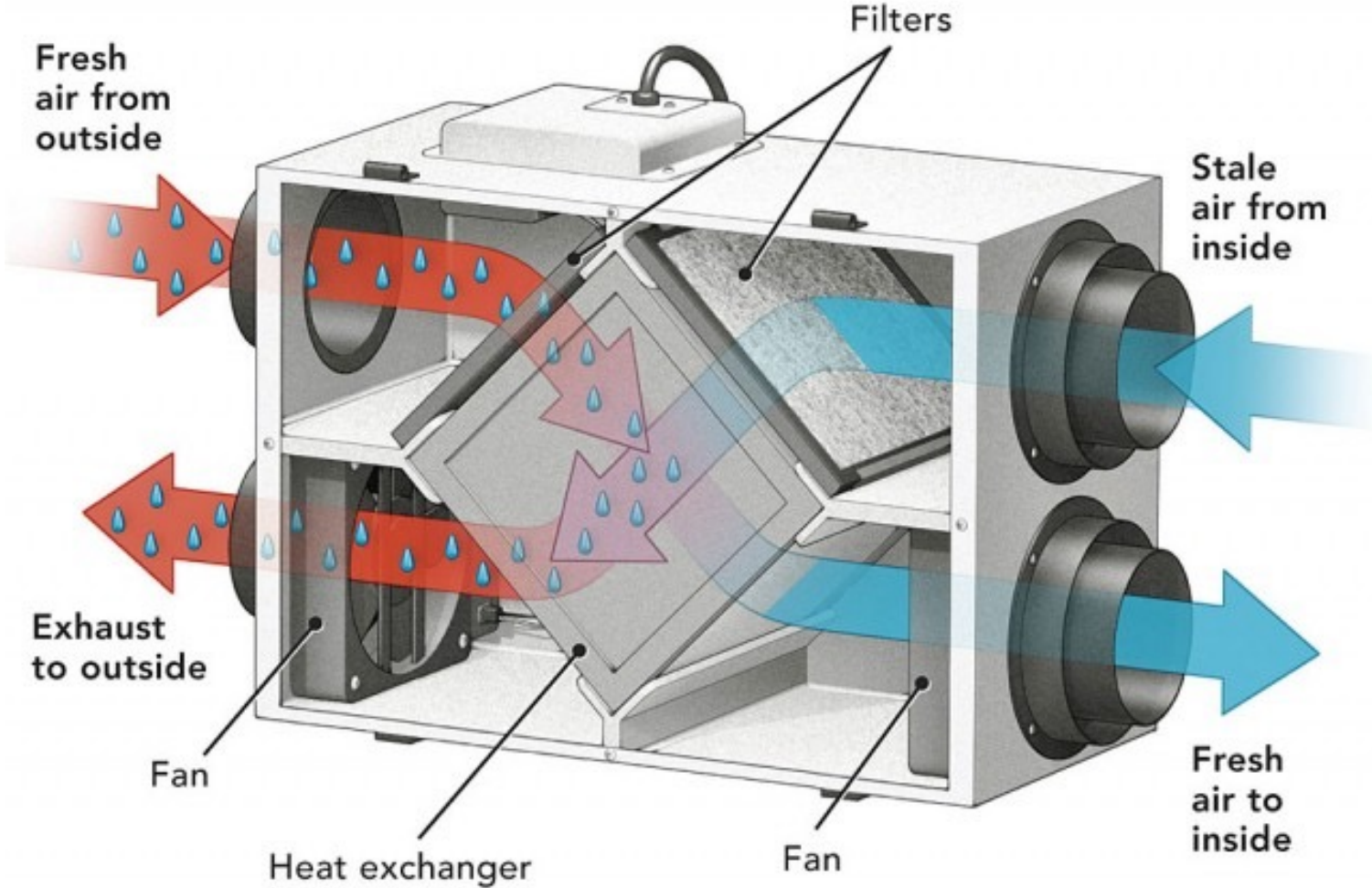
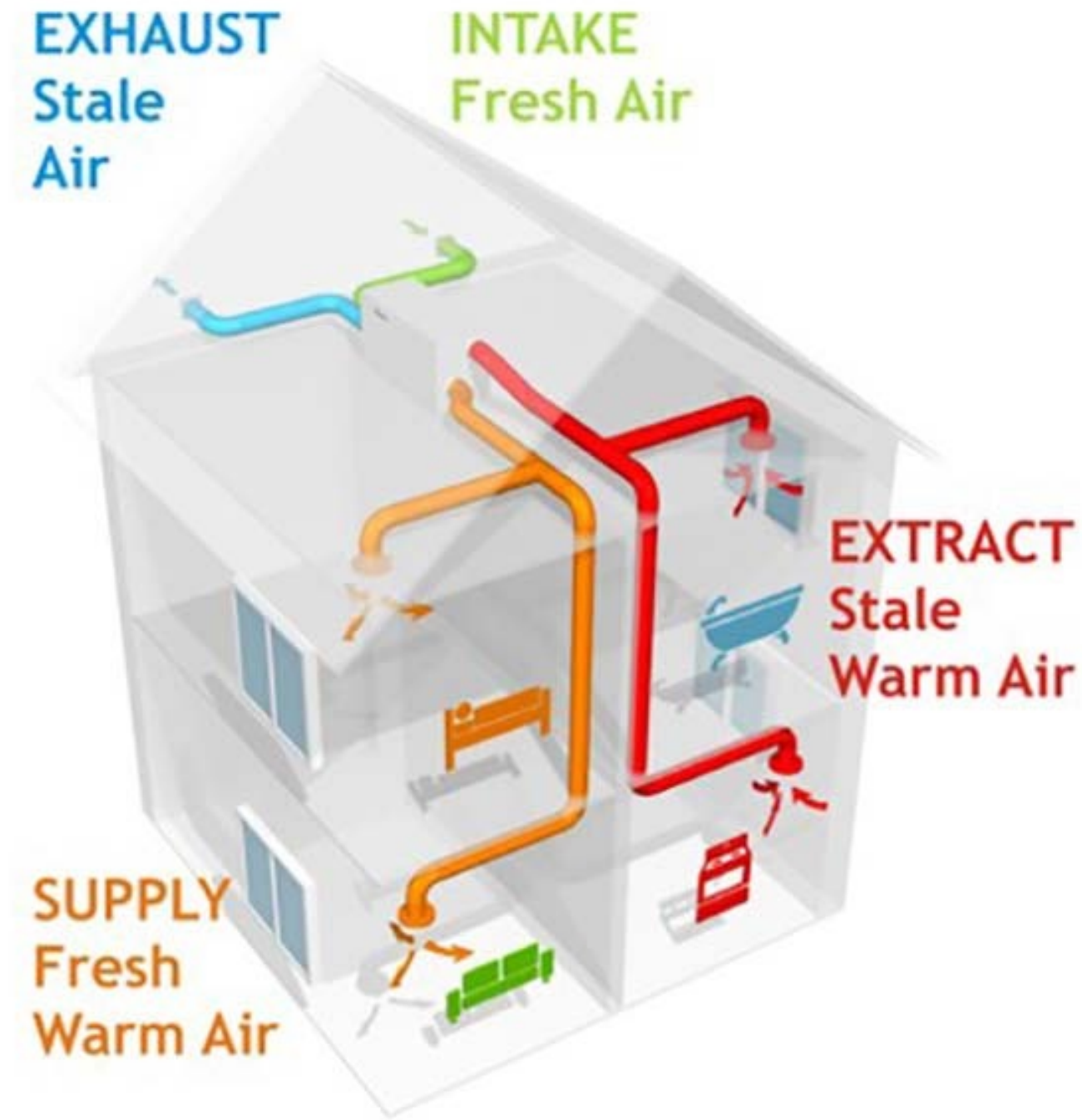
# Mechanical Ventilation + Indoor Air Quality

- “Seal it tight and ventilate right”
- Ventilation needed to maintain proper indoor air quality (IAQ)
- Heat Recovery Ventilator or Energy Recovery Ventilator





# Mechanical Ventilation + Indoor Air Quality





# Types of Electric Heating



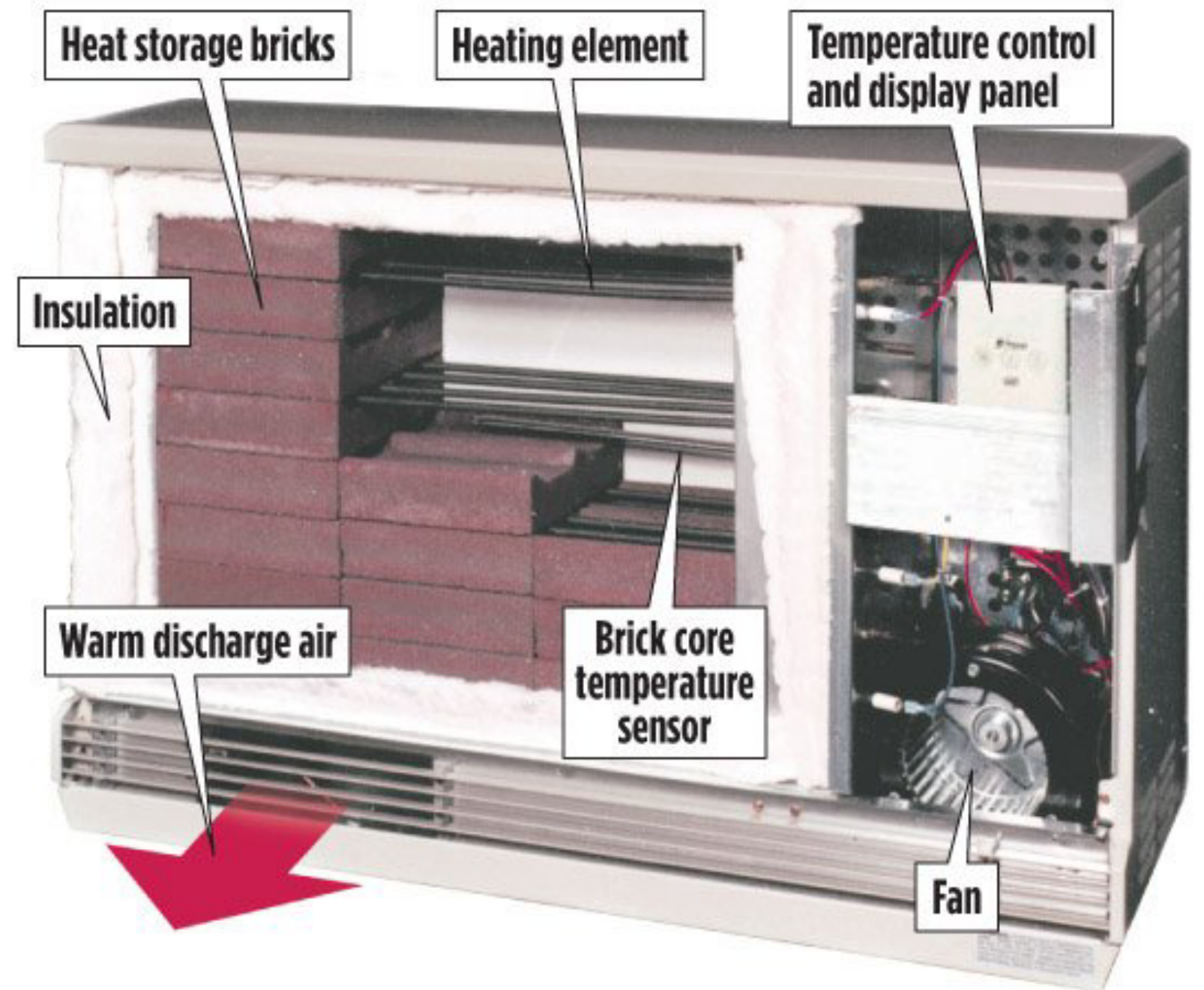
# Types of Electric Heating

- Baseboard
- Plug in heaters
- Electric boilers + forced air furnace
- Radiant heaters
- ETS
- Heat pumps



# ETS – Electrical Thermal Storage

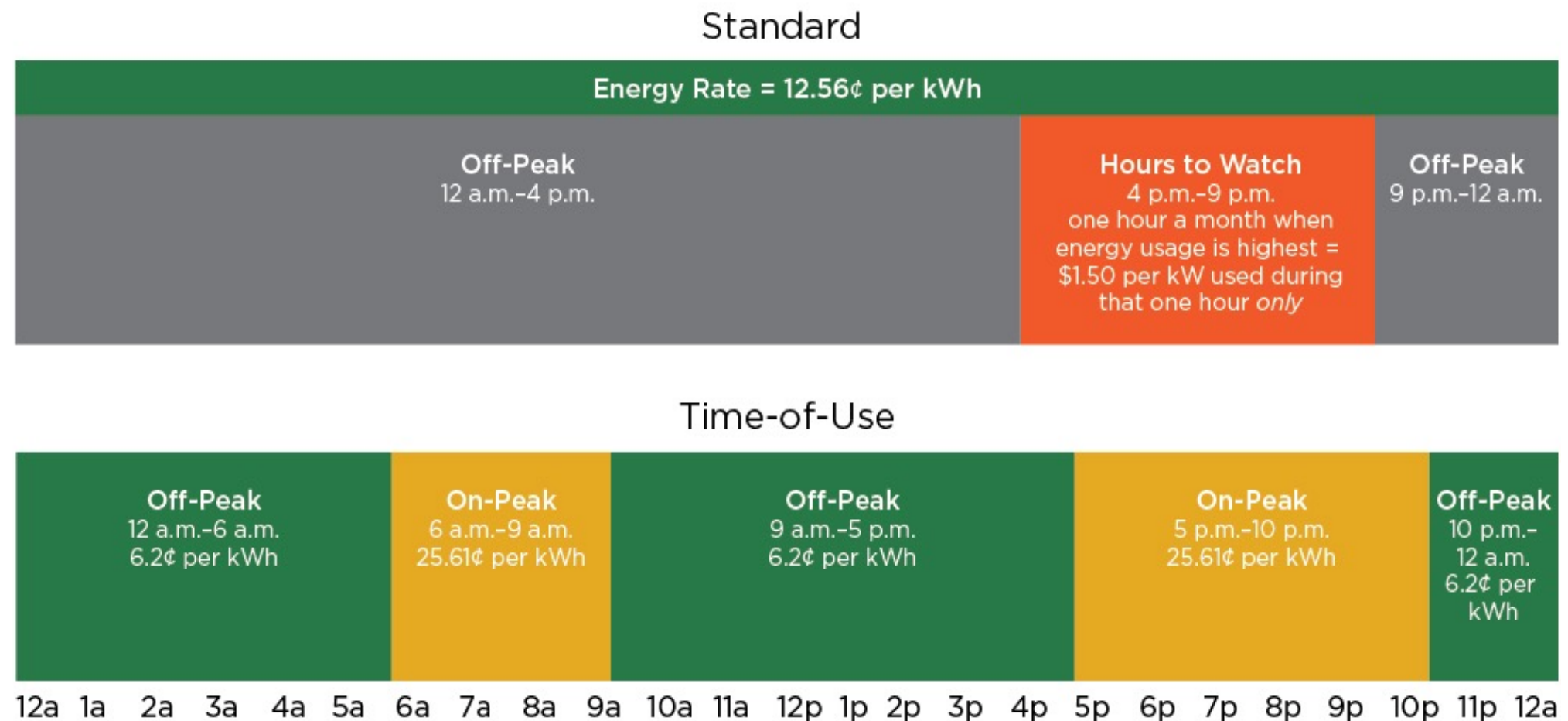
- Available in room units, central air, and hydronic in-floor
- Off-Peak power used to store heat in a thermal mass
- PLC Controller takes advantage of LPEA's Time-of-Use rate

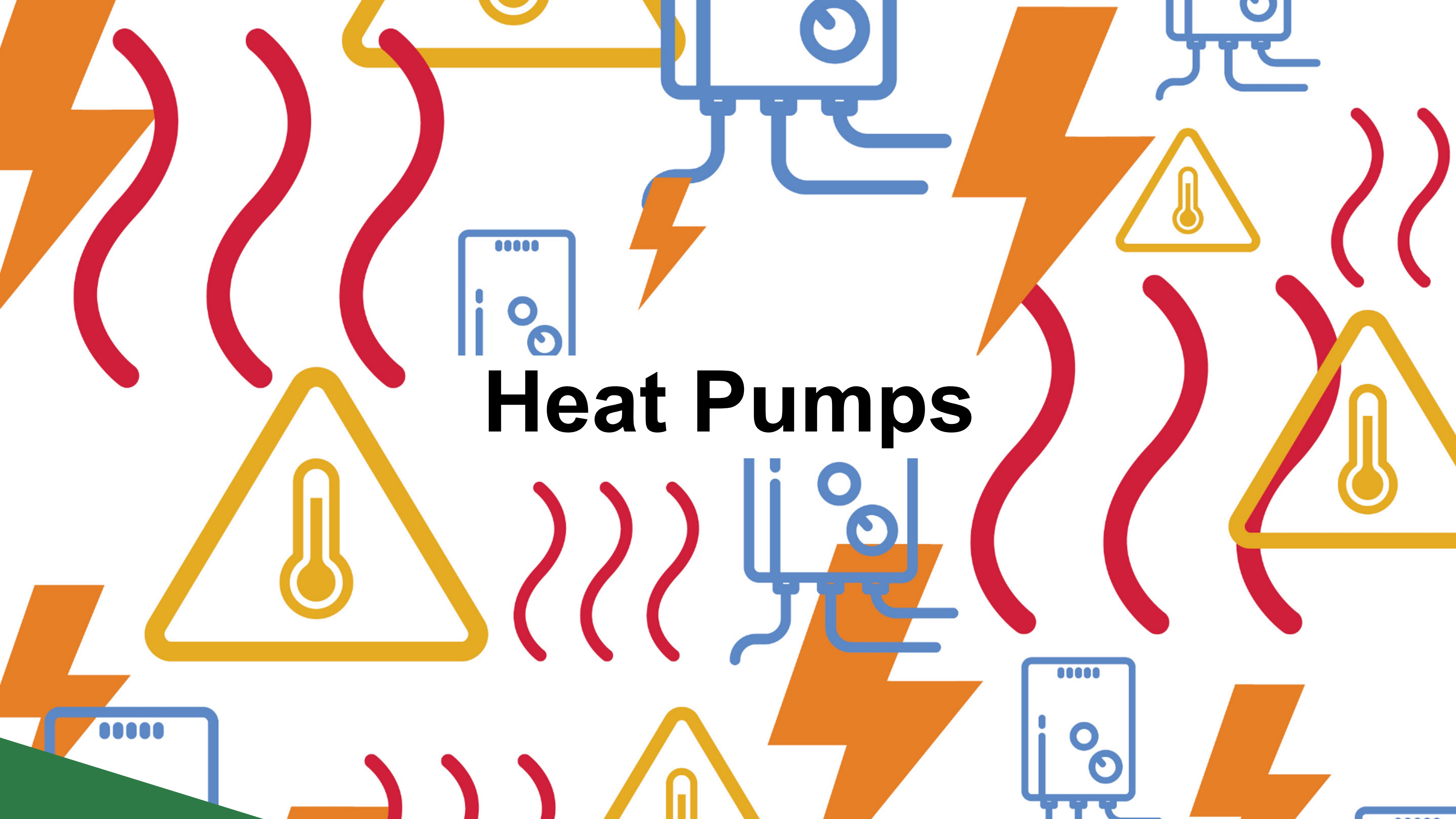




# LPEA's Time-of-Use Rate

- Save \$ - Reduced electric bills by switching to the Time-of-Use (TOU) rate
- On and Off-Peak periods
- 4,000+ LPEA members currently on TOU





# Heat Pumps

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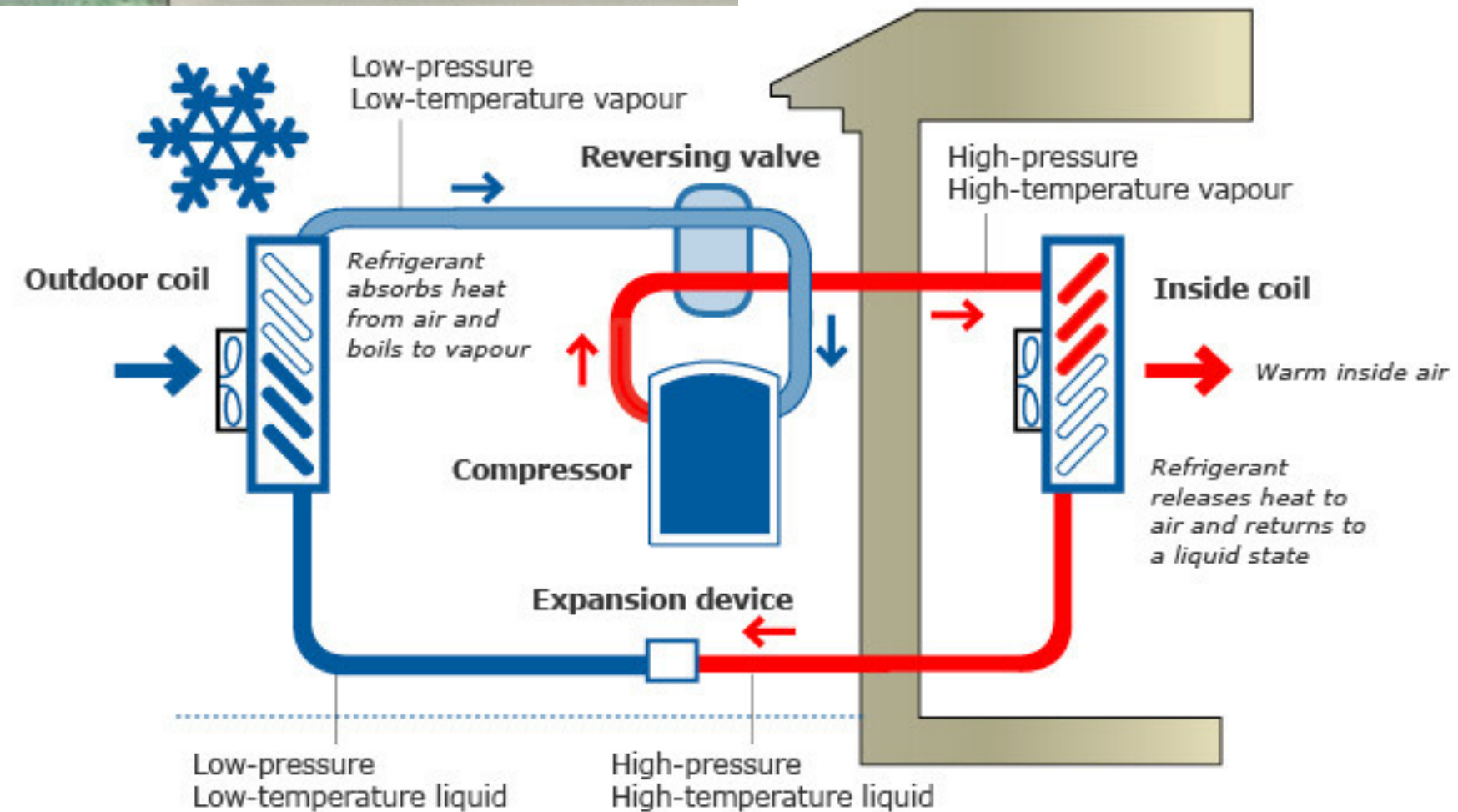
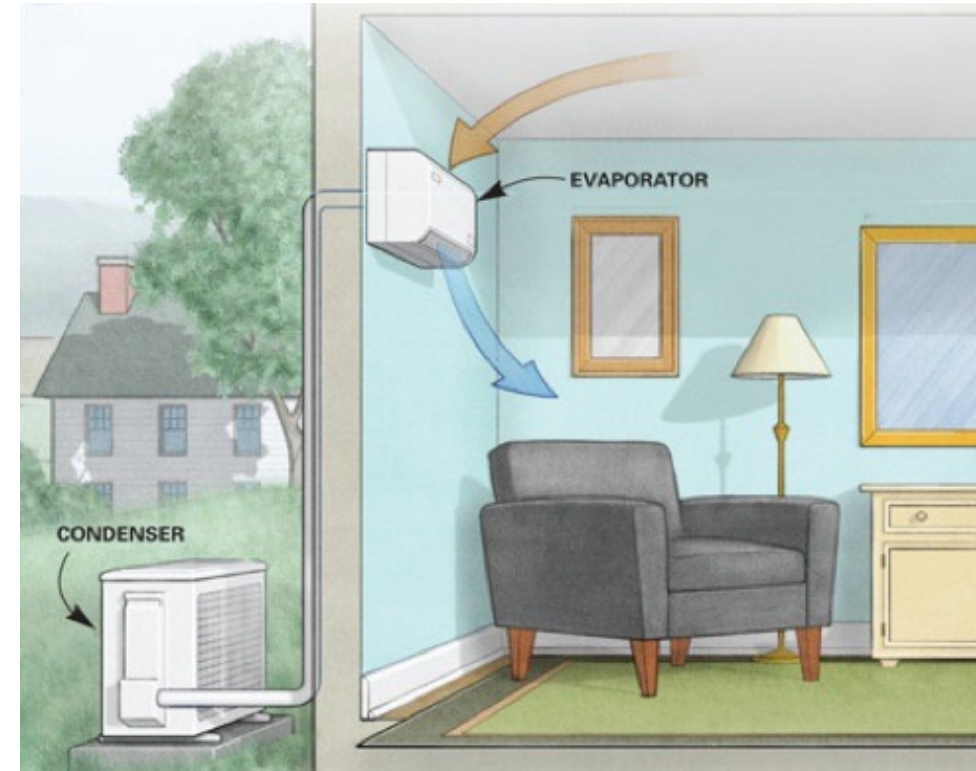
# How Heat Pumps Work

## Heating Mode:

Outdoor Unit > Compressor > Indoor Unit > Expansion > Outdoor Unit

## Cooling Mode:

Indoor Unit > Compressor > Outdoor Unit > Expansion Valve > Indoor Unit



# Heat Pump Benefits + Myths

## Benefits

- Improved air quality and safety
- Zone control and comfort
- Cooling
- Smoke management

## Myths

- Not efficient in cold temperatures
- Need a backup
- Don't work at our altitude
- Only work in newer homes
- Need to be turned down at night to save energy
- Require a lot of maintenance

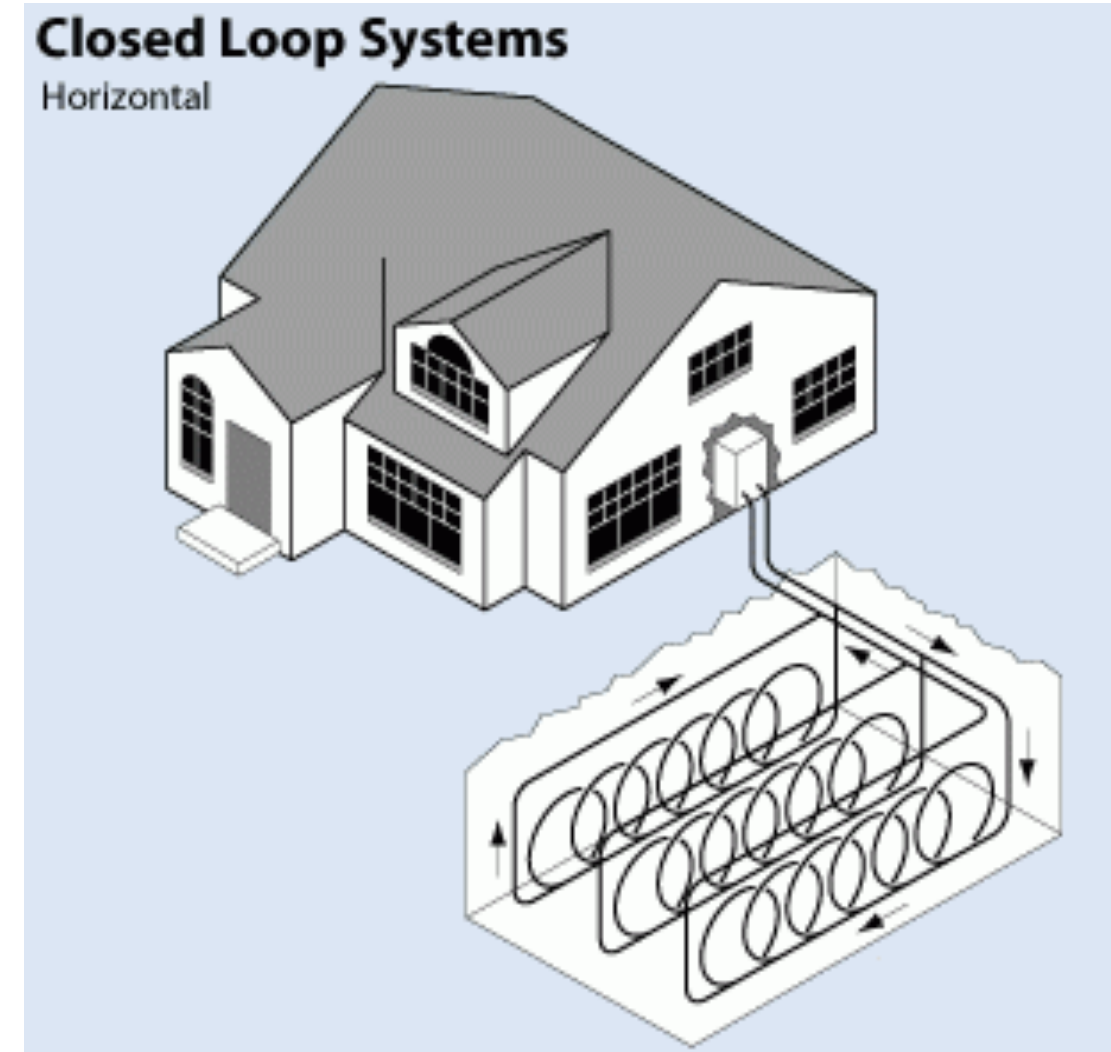




# Heat Pump Types – Outdoor Unit



Air Source Heat Pump



Ground Source Heat Pump

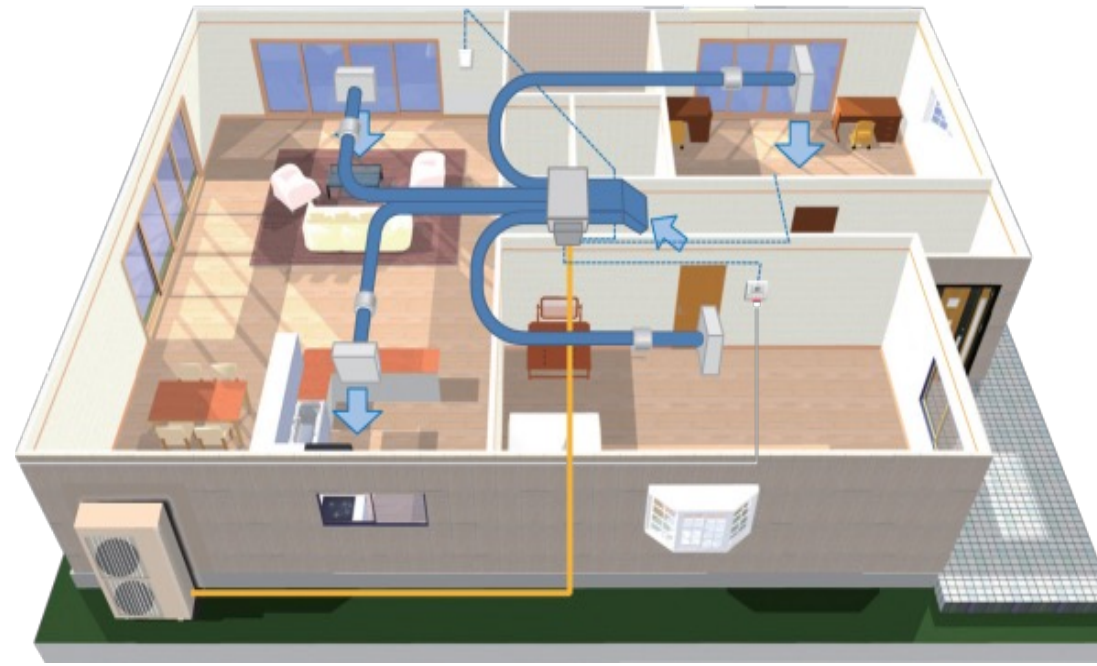
# Heat Pump Types – Indoor Unit



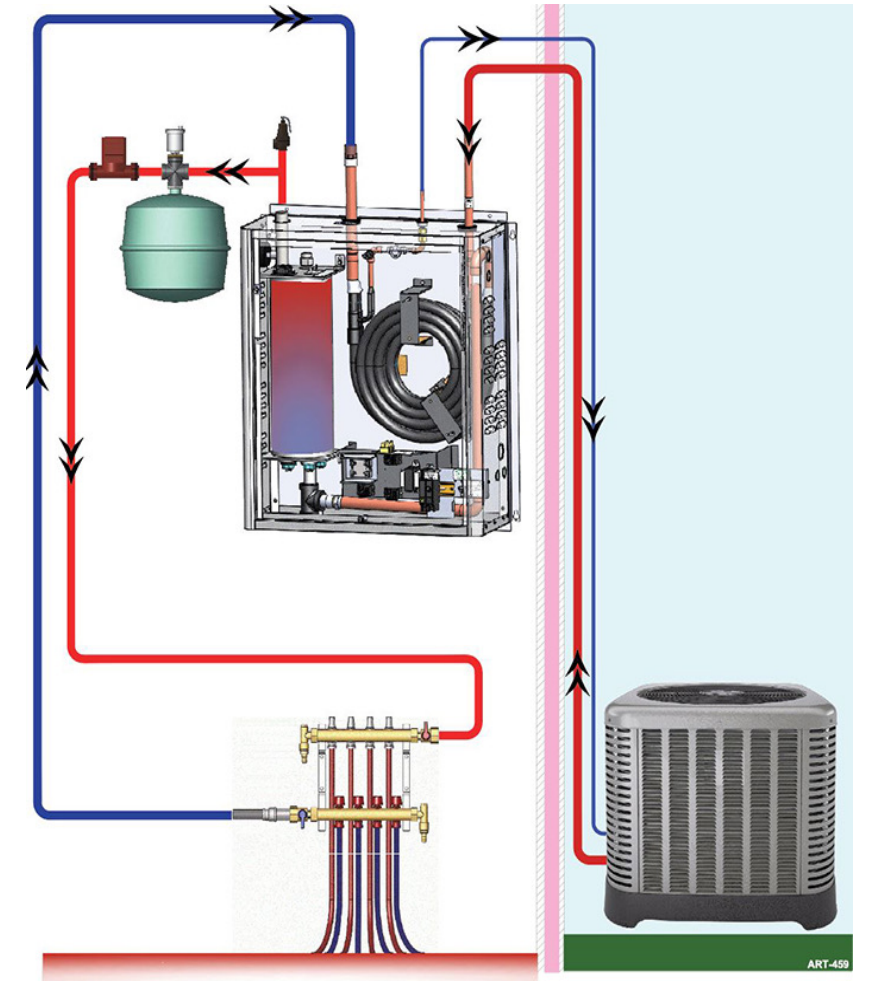
Central Air Handler



Mini-Split / Ductless



Ducted mini-split / slim duct



Hydronic / Boiler



# Mini Splits

- Also known as “ductless”
- Higher efficiencies than other heat pump applications (no duct losses)
- Most common heat pump installations
- Most versatile retrofit option





## Ducted Forced Air

- Better suited for new construction with correctly sized ductwork
- Can be retrofitted in existing homes with proper ductwork and upgrades





## Air to Water (Boilers)

- Best suited for new construction
- Can be retrofitted with in-floor radiant systems.
- Will NOT work with radiant baseboard registers.



# Heat Pump Replacement Options

- **Complete Replacement** – replace existing system with a new heat pump
- **Supplement Existing System** – new heat pump works alongside the existing system
- **Zonal Supplement** – heat pump added to heat/cool specific zones







# Heat Pump Retrofit Feasibility

- Boilers – Radiant in-floor can work but baseboard will not.
- Forced air – Can work but ductwork may be undersized. Emphasize duct repair and sealing of existing system.
- Mini splits with indoor head units most versatile.
- Recessed cassettes can be used with ceiling modifications.

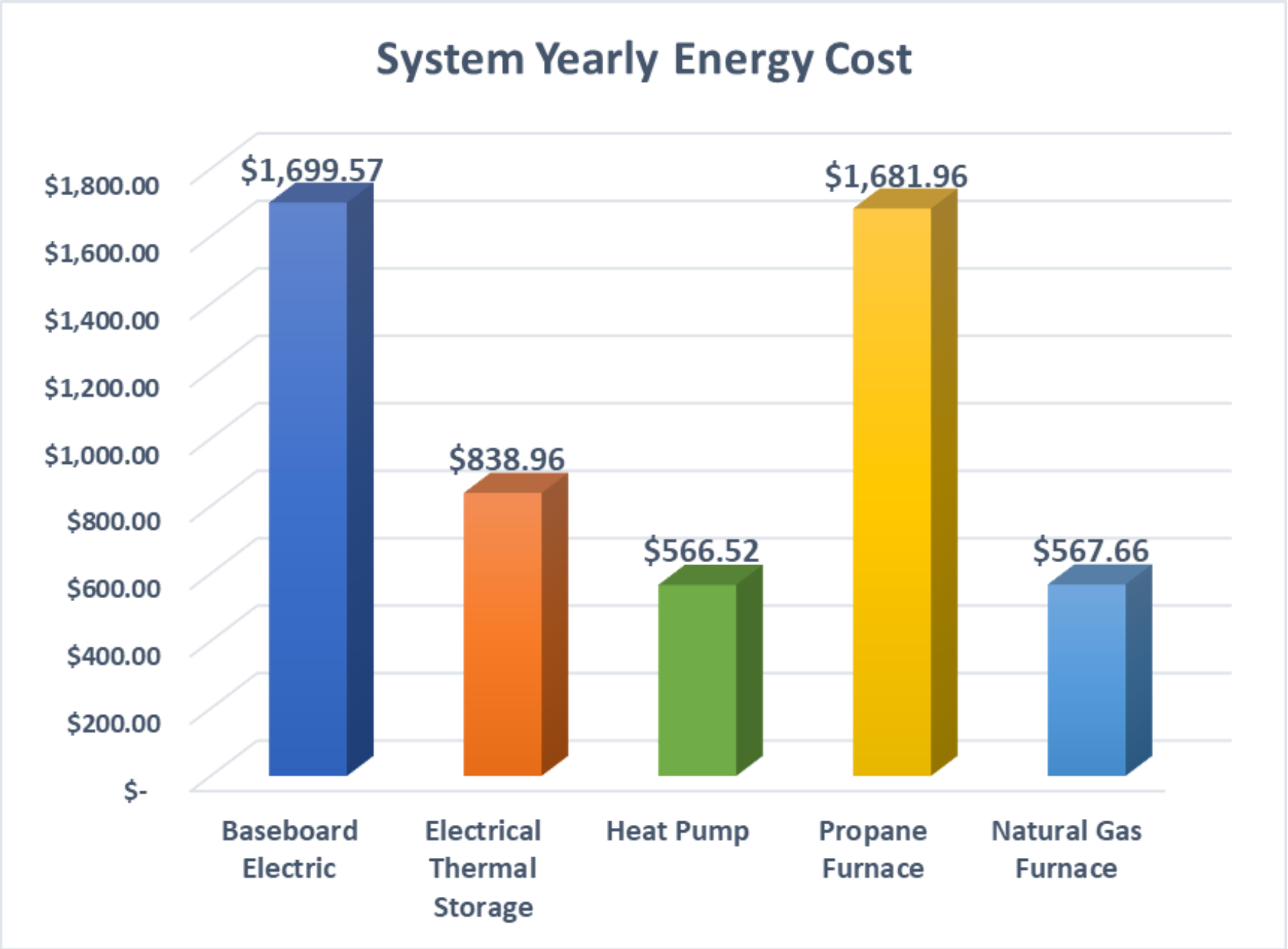


# Cost Comparison + Rebates



# Heating Options Cost Comparison

System	Cost	Rebates	Yearly Op Expense
Baseboard Electric	\$ 5,000.00		\$ 1,699.57
Electrical Thermal Storage	\$ 9,000.00	\$ 700.00	\$ 838.96
Heat Pump	\$ 13,500.00	\$ 3,500.00	\$ 566.52
Propane Furnace	\$ 11,000.00		\$ 1,681.96
Natural Gas Furnace	\$ 11,000.00		\$ 567.66



# Rebates + Incentives

## Heat Pump Rebates

TYPE	ELIGIBILITY REQUIREMENTS	REBATE AMOUNT*
Air Source HSPF ≥ 9.0 SEER ≥ 15	Minimum ½ ton	\$1000 – 0.5-2 tons \$2500 – 2+ tons
Cold Climate Air Source* HSPF ≥ 10.0 SEER ≥ 16	Minimum ½ ton	\$1500 – 0.5-2 tons \$3500 – 2+ tons
ETS backup		\$100/unit
New Ground Source	Minimum ¾ ton	\$550/ton
Replacement Ground Source	Minimum ¾ ton	\$300/ton
Air-to-Water	Minimum EER 19 Minimum COP 4	\$500/ton

\*Cold Climate Certified. Variable speed compressor or minimum of 3 stages of settings for fan speed. AHRI certified equipment must be used.





# Rebates + Incentives

## Permanent Electric Heat Rebates

- \$50/kW for Electric Thermal Storage (ETS) heater controlled by a timer or master control system
- \$30/kW for Thermal Slab heating controlled by a timer or master control system Timer Credit
- Up to \$25 per timer installed and \$75 per smart thermostat controlling electric load. Not to exceed 50% of material cost (smart thermostats included)
- \$500 rebate to residential members building new all-electric homes
- **More info on our website at [LPEA.coop/rebates](https://LPEA.coop/rebates)**



# HOPE for HOMES

Inflation Reduction Act of 2022

# \$9B

in whole-house  
energy efficiency and  
electrification rebates

APPLIANCE	REBATE AMOUNT (MAXIMUM)
Heat Pump (For heating & Cooling)	\$8000
Electric stove, cooktop, range/oven, or clothes dryer	\$840
Heat Pump Water Heater	\$1750
Electric Wiring	\$2500
Electric Load Service Center (Breaker Box)	\$4000
Insulation, Air Sealing, and ventilation	\$1600

[events.building-performance.org/wp-content/uploads/2022/08/H4H\\_in\\_IRA\\_8\\_30.pdf](https://events.building-performance.org/wp-content/uploads/2022/08/H4H_in_IRA_8_30.pdf)



# Spec Sheet

- Manufacturer information
- Features & benefits
- Lists performance figures
- Use for rebate qualification guidelines
- Ensure compressor is variable speed or at least 3 fan speed stages



Outdoor Unit	
Compressor	DC inverter Driven Rotary
Uncrated Dimension (HxWxD)	27 1/2 x 35 x 13 7/8 in (697 x 890 x 353 mm)
Crated (HxWxD)	31 1/2 x 41 1/8 x 18 1/8 in (800 x 1046 x 460 mm)
Outdoor Sound Rating dB	54
Heat Exchanger Fin Type	Blue Fin
Weight (Ship/Net)	115.5/98.3 lbs
Factory Refrigerant Charge	R-410A (56.8 oz)

## Accessories

### Remote Controller

Ships with YR-HQ

### Wired Controller

Compatible with wired controller ACT17CWA

### Wind Baffle

Uses wind baffle QAWB37A

### Built-in Features

- WK-B wired controller adapter
- WiFi
- Occupancy sensor

Electrical Requirement	
Power Supply	208/230V, 1 Phase, 60 HZ
Operating Voltage Range	187-253 VAC
Recommended Fuse/Breaker Size	15A
MCA	13A

Connecting cable to indoor units must be 14/4 AWG unshielded stranded copper. Cable must be ran continuous, without splicing.

Operating Range	
Cooling	14-115°F (-10-46°C)
Heating	-31-75°F (-35-24°C)

Cooling Performance	
Rated Cooling Capacity	9,000 BTU
Cooling Capacity Range	3,100-12,000 BTU
Rated Power input	550 W
SEER	30.0
EER	16.0
Moisture Removal	2.5 Pt./h

Heating Performance	
Rated Heating Capacity	10,000 BTU
Heating Capacity Range	3,100-20,000 BTU
Rated Power Input	845 W
HSPF	15.2

Pipe Length	
Minimum Pipe Length	6 ft
Maximum Pipe Length	50 ft
Maximum Pipe Height Difference	33 ft
Flare Connection	1/4"(Discharge) 1/2"(Suction)

# Heating Capacity Tables

## Heating Capacity Data

Outdoor Air Temp DB	Indoor Set Temperature					
	60°F (16°C)		70°F (21°C)		77°F (25°C)	
	Maximum Heating Capacity (Btu/h)	Power Usage (w)	Max Heating Capacity (Btu/h)	Power Usage (w)	Max Heating Capacity (Btu/h)	Power Usage (w)
-31° (-35°)	3,050	1,180	3,200	1,300	3,250	1,370
-22° (-30°)	7,100	1,230	7,400	1,350	7,530	1,410
-15° (-26°)	8,260	1,380	8,600	1,480	8,750	1,520
-4° (-20°)	10,100	1,570	10,500	1,660	10,700	1,710
5° (-15°)	11,500	1,590	12,000	1,670	12,250	1,740
17° (-8°)	12,900	1,500	13,500	1,550	13,750	1,610
47° (8°)	15,400	1,480	16,000	1,520	16,300	1,570

Capacity and power usage are measured under the assumption of indoor humidity of 46%

## Cooling Capacity Data


Outdoor Air Temp DB	Indoor Set Temperature					
	70°F (21°C)		75°F (24°C)		80°F (27°C)	
	Total Capacity (Btu/h)	Power Usage (w)	Total Capacity (Btu/h)	Power Usage (w)	Total Capacity (Btu/h)	Power Usage (w)
14° (-10°)	6,700	610	6,500	540	6,200	480
65° (18°)	8,000	700	7,740	670	7,380	620
75° (24°)	9,450	830	9,150	800	8,940	780
85° (29°)	11,650	950	11,050	910	10,500	860
95° (35°)	13,000	1,080	12,200	1,000	11,500	960
105° (41°)	11,700	1,120	11,100	1,060	10,600	1,010
115° (46°)	10,060	1,050	9,600	990	9,150	930

Capacity and power usage are measured under the assumption of indoor humidity of 46%



# Air Conditioning, Heating, and Refrigeration Institute

Eligible for Federal Tax Credit.



## Certificate of Product Ratings

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AHRI Certified Reference Number : 205291988    Date : 09-13-2022    Model Status : Production Stopped  
AHRI Type : HRCU-A-CB-O (Mini-Split Heat Pump, with Remote Outdoor Unit Air-Source, Free Delivery)  
Outdoor Unit Brand Name : GE Appliances  
Outdoor Unit Model Number : ASH109URDSD\*  
Indoor Type : Mini-Splits (Non-Ducted)  
Indoor Model Number(s) : ASYW09URDWD\*

Rated as follows in accordance with the latest edition of AHRI 210/240 - 2017 with Addendum 1, Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment and subject to rating accuracy by AHRI-sponsored, independent, third party testing:

- Cooling Capacity (A2) - Single or High Stage (95F), btuh : 9000
- SEER : 30.00
- EER (A2) - Single or High Stage (95F) : 16.00
- Heating Capacity (H12) - Single or High Stage (47F) : 10000
- HSPF (Region IV) : 15.20

- Certificate for previous slide's heat pump model
- 3<sup>rd</sup> party verification
- AHRI certified equipment **MUST** be used to qualify for heat pump rebate

<https://www.ahridirectory.org/>



# How to Get Started



# How to Get Started Working with a Contractor

## **Electric Boiler + Baseboard**

HVAC Contractor or Plumber and Electrician

- System Sizing, Installation, Rebate

## **ETS**

LPEA Energy Management Advisor or Durango Electric

- System Sizing, Installation, PLC Configuration, Time-of-Use, Rebates

## **Heat Pump**

HVAC Contractor and Quality Install Program

- Manual J, System Selection, Installation, Rebate



# Resources

LPEA Energy Management Team

[rebates@lpea.coop](mailto:rebates@lpea.coop) or (970) 247-5786

[LPEA.coop/rebates](http://LPEA.coop/rebates)

[LoveElectric.org](http://LoveElectric.org)

[Neep.org](http://Neep.org)







# Questions?



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# LPEEA

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# Thank you!

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