What are Heat Pumps?

South Coast AQMD
GO ZERO Pilot Incentive Program

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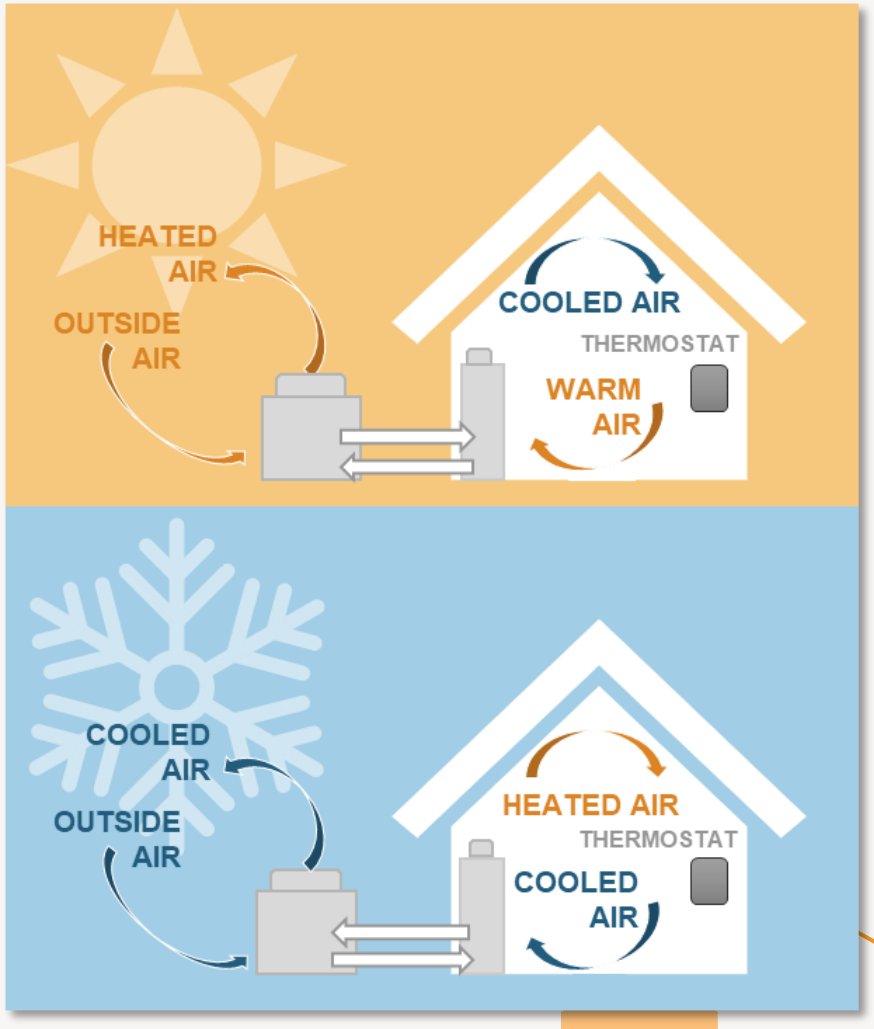
What is a Heat Pump?

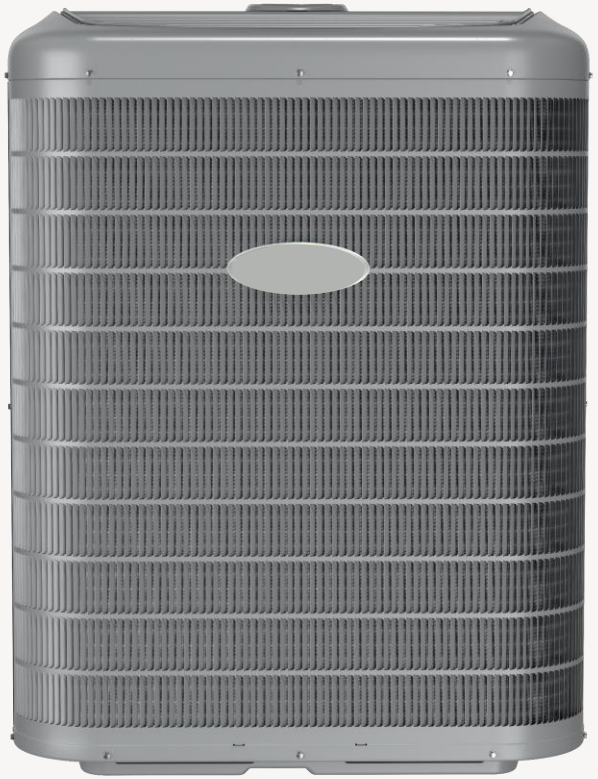
- Heat pumps work like an air conditioner or refrigerator in reverse: moving heat from the outside to the inside of the home
- Most heat pumps draw heat from the air, but others can use ground or water
- Heat pump systems can also provide:
  - Air conditioning (AC)
  - Hot water



Heat Pumps for Space Heating and Cooling

Ducted Heat Pump Systems

- Produce hot or cold air which is distributed through the home via ducts
- For homes that already have central AC and furnace
  - Replace both AC and furnace
  - Easy “drop-in” installation
  - Lower cost than installing separate furnace and AC per E3 study*



*E3 - Residential Building Electrification in California

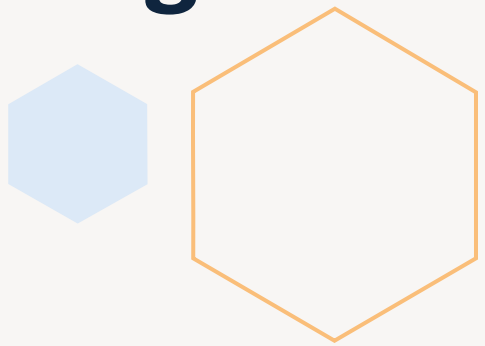
Ductless Mini- or Multi- Split Units

- Has indoor units in each room rather than air ducts
- Single outside unit can serve multiple indoor units
- For homes without AC: cheaper to install than ducted systems
- Efficient to operate, can set different rooms to different temperatures

Window Heat Pumps

- Can be plugged into a standard electrical outlet, no panel upgrade required
- Rests on windowsill, simple installation
- Cheaper for room heating and cooling than mini-split

Heat Pumps for Water Heating



Heat Pump Water Heaters

- Similar to space heating heat pumps, but use heat pump to heat water in a holding tank
  - Three to five times more efficient than electric resistance and gas water heaters
  - Often have back-up electric resistance element
  - Many models are similar size as traditional gas water heaters
  - 240-Volt and 120-Volt standard outlet

120-Volt Plug-in Water Heaters

- Newer heat pump water heaters available that can be plugged into a standard 120-Volt outlet
  - Requires minimal electrical work
- Similar size and shape of gas tank water heater, though slightly larger than comparable gas heater
- Similar performance to 240-Volt units but with lower energy efficiency and without electric resistance back-up
- Suitable for:
  - Warmer climates
  - Replacing gas unit without panel upgrade

Frequently Asked Questions

Q: Are Heat Pumps New Technology?

A:

- No, heat pumps have been around for a long time and are commercially available
  - Technology first developed in mid-1850, commercialized in the 1960s
- Monthly shipment reports indicate that more heat pumps have been sold in the U.S. for space heating than gas furnaces since 2021
- Heat pumps have even higher adoption rates in Asian countries than in North America
  - 90 percent of households in Japan have heat pumps for heating and cooling

Q: Will a Heat Pump Work When it is Cold Outside?

A:

- Cold climate heat pumps can pull heat from the air even at sub-zero temperatures
- Heat pump technologies have been adopted in many cold climate regions such as Maine, Vermont, Alaska, and within our own mountain communities such as Lake Arrowhead and Big Bear
- According to the International Energy Agency, 60 percent of Norway's buildings are fitted with a heat pump

Q: Will I need to Upgrade my Electrical Panel to Operate a Heat Pump?

A:

- If your home or business already has a central air conditioner, a panel upgrade or upsizing will not likely be needed
- Some technologies that are less likely to require a panel upgrade include:
  - 120-Volt plug-in heat pump water heaters
  - Portable heat pumps for space heating/cooling
  - Multi-functional heat pumps for water heating and space heating/cooling

Q: Will my Heat Pump Operate when the Power is Out?

A:

- No, but neither will your modern gas space and water heaters
- Blowers and electronic components in many modern appliances prevent their operation when the power is out
- Battery backups and solar panels pair well with heat pumps

Q: Are Heat Pumps Costly to Run?

A:

- Over time, consumers are expected to save money on operating costs when switching to heat pumps
- Running a heat pump results in operational cost savings over the lifetime of the appliance
- Heat pumps have high COPs (Coefficient of Performance, ratio of energy produced to energy used for heat pumps) meaning they are generally over 3 to 5 times more efficient than gas appliances
- Electric resistance furnaces are not as efficient as heat pumps since they convert electricity to heat in a nearly one-to-one ratio

Q: How Much Will my Electrical Bills Increase if I Install a Heat Pump?

A:

- Predicting future utility costs is a challenge, however, the California Energy Commission's forecast projects increasing natural gas prices, while electricity rates will go up more slowly†
- Lower annual operational costs are anticipated based on the projected fuel price estimates

†https://www.energy.ca.gov/publications/2024/2024-integrated-energy-policy-report-update