

# Heat Pumps

Widening consumer understanding of beneficial electrification is creating a groundswell of interest in everything from electric vehicles to induction stoves. Among the appliances getting particular attention are heat pumps, which can efficiently condition a space by transferring heat or cold from the air or ground. They're not a new technology, but recent advances have made them even more efficient, versatile and easier to install. Here's a look at the three primary heat pump types and how they're used.

## Air-Source

Heat is extracted from the air using a fan and refrigerant-filled coils. A compressor turns the refrigerant into warm vapor, which is pumped to coils inside the building for use in a water tank or air handler. Air-handler systems can run in reverse to cool the building.

Cool refrigerant

Under-floor heating

Water tank

Wall-mounted indoor unit

Warm air

Floor-mounted indoor unit

Hot vapor

Outdoor compressor

Outside air

Outdoor compressors

Outside air

Ducted system

## Ground-Source

Refrigerant- or water-filled tubing absorbs the relatively constant temperature found underground and transfers it to an indoor air handler. The flow can be reversed to cool the building.

## Mini-Split

Air-source heat pump system that works with small indoor condenser units to heat or cool. Good for homes that don't already have ductwork.

Warm liquid  
Cool liquid

Polyethylene tubing

Tubing buried 3 to 8 feet deep, depending on climate