High Performance CO₂
Heat Pump Water Heaters
for multifamily housing

Domestic hot water accounts for the largest portion of a multifamily building’s energy use and greenhouse gas emissions. Using affordable and cost-effective technologies like electric heat pump water heaters will maximize energy efficiency, reduce emissions, and meet energy code requirements without compromising service to residents.

BENEFITS

**Efficient**
Proven to be up to three times more efficient than gas or traditional electric resistance water heaters.

**Affordable**
Incremental costs for HPWHs are between $500-$1,000 per apartment, and are expected to drop with increased uptake. Utility incentives may be available.

**Futureproof**
All-electric technology qualifies for planned energy code requirements.

**Safe**
Resilient technology that eliminates the chance of gas leaks or explosions, especially during seismic events.

**Clean**
Produces zero direct emissions and uses the most climate-friendly refrigerant (CO₂) with a Global Warming Potential of 1.
Operation of a high performance HPWH is based on the same thermodynamic cycle found in household refrigerators, which involves the circulation of a fluid refrigerant through a loop that successively undergoes expansion, evaporation, compression, and condensation.

High performance CO₂ heat pumps are 3x more efficient than gas or standard electric water heaters, can produce very hot water (up to 180°F) to mix with cold for optimal comfort, work well in temperatures below zero, and use the most climate-friendly refrigerant.

Typical Configurations

- **Centralized**
  HPWH plant serving whole building

- **Grouped by stack**
  1-3 residential HPWHs serving multiple units

- **Individual**
  One HPWH per unit (larger units)

**Location**

Because heat is sourced from the surrounding air, CO₂ HPWH compressors can be located outdoors or in a buffered basement or garage.

**Sizing**

HPWHs heat water more slowly than natural gas; to ensure meeting peak time-of-use needs, more storage is required.

**Ecosizer**

A free tool that supports designers with optimal sizing of centralized heat pump water heater systems for multifamily buildings.

Advanced Water Heating Initiative
newbuildings.org

Exemplary Buildings Program
exemplarybuilding.housingconsortium.org