COMMERCIAL HEAT PUMP WATER HEATERS



Heat pump water heaters are an energy-efficient alternative to traditional fossil-fueled or electric-resistance water heating; they are well-suited to supplying commercial hot water needs.

HOW IT WORKS

Heat pump water heaters (HPWHs), like heat pump HVAC equipment, use a thermodynamic process similar to refrigeration to transfer heat from the environment, in this case to bring water to a desired temperature. Most commercial HPWH installations are split systems, incorporating four distinct components. The HPWH unit brings the incoming water source to the desired temperature. Large, insulated storage tanks retain the heated water supply ready for use. A temperature maintenance system intercepts and reheats warm water returning from the building's water distribution system, to keep the water supply at temperature. This system may incorporate a swing tank, with an electric resistance element as a back-up heating resource, to keep the heat pump equipment isolated from the warm water return. A modern electronic control system performs programmed functions to ensure efficient system operation.

APPLICATIONS

Commercial heat pump water heaters serve loads with greater than 120 gallons of storage and/or more than 6 kW of input power. Heat recovery significantly increases overall efficiency. Applications include the following:

- **Hotels and motels:** Hot water and space cooling
- **Multifamily housing (four or more units):** Apartments, dormitories
- **Wineries**
- **Restaurants:** Dishwashing and kitchen cooling
- **Laundries:** Hot water and space cooling
- **Health clubs:** Hot water for spas and service hot water
- **Schools:** Food preparation and cleanup

DID YOU KNOW?

If a commercial HPWH is paired with a heat recovery system, one process can simultaneously provide both hot water and chilling, greatly enhancing energy savings.

BENEFITS

- **Energy-saving performance.** The coefficient of performance (COP) of a typical commercial HPWH lies in the range of 3-5, which translates to significant energy savings. An electric HPWH uses one-half to one-third the energy of a traditional electric resistance or natural gas water heater. Incorporating a heat recovery system can raise the overall COP to as much as 8.
- **Opportunities for multifamily housing.** Fully packaged, plug-and-play commercial HPWH systems are available today that can be easily installed on a roof or in the garage of a multi-family housing complex. This greatly simplifies the design and installation process, and these systems are sized to match this scale of water heating needs.
- **Elimination of gas venting and piping.** A HPWH requires no venting or piping. This translates to installation cost savings when compared with a gas water heater system.
- **Complementing peak demand reduction.** HPWHs are well-suited to demand response operation. By enabling demand response along with electrification, utilities can keep peak demand in check.
- **Enhanced sustainability.** HPWHs are a key element in planning for sustain-ability and greenhouse gas reduction, by advancing highly-efficient systems for electrification of essential services.
- **Elimination of pollution associated with gas or oil combustion.** Unlike traditional water heating systems, HPWHs produce no on-site emissions, and there are no potential issues with fuel leakage to the environment.
- **Supporting customer resilience.** In the event of power outages, customers with a need for reliable hot water supplies depend upon tank storage. HPWHs provide ample stored hot water to support building operations through most outages.

LIMITATIONS

- **Upfront Costs.** Commercial HPWH typically costs more upfront than traditional systems; on average, the cost difference can be as much a factor of five to ten. This represents a significant barrier to adoption. Installed costs also vary according to site-specific factors. However, the substantial energy savings make operating costs lower over the system lifetime. Manufacturer rebates, tax credits, and local utility promotions may offset the high upfront cost.
- **Operating noise.** Unlike resistance water heaters, HPWHs produce some noise during operation due to their use of fans and compressors.
- **Limited market presence, availability, and user knowledge.** Installers may carry limited commercial HPWHs in stock. For HPWHs to gain an increasing foothold in the market, customers need to be aware of their benefits and installers need to have them available.

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