Driven by participation in the Housing Development Consortium’s Exemplary Buildings program, the Seattle Housing Authority (SHA) elected to use Sanden CO₂ heat pump water heaters (HPWH) for its Sawara building. The efficiency of the Sanden units, along with an optimized plumbing distribution system, brings significant energy and utility savings while reducing their carbon footprint.

HPWHs that use CO₂ as the refrigerant work well in Seattle’s climate, are much more environmentally friendly, and are easy to operate and maintain by onsite maintenance staff. And because they are 3x more efficient than standard electric heaters, the building owner can use operational savings to keep rents affordable for low-income residents.

**PERFORMANCE**

- **ENERGY SAVINGS OF** 67% OVER STANDARD ELECTRIC WATER HEATER AND 73% OVER GAS BOILER
- **UTILITY COST SAVINGS OF** $24K PER YEAR OVER STANDARD ELECTRIC HEATER
- **CARBON REDUCTION OF** 55+ tons CO₂/year OVER REGIONAL ELECTRIC AND GAS BASELINES
- **SIMPLE PAYBACK OF** 7 years BEFORE UTILITY INCENTIVES

**LESSONS LEARNED**

- **Invest in early design decisions.** Working closely with the architects to allocate space in the garage to house both water heating plants and inform the arrangement of dwelling units to minimize hot water distribution piping are two critical details that were addressed early in the design process. The advanced plumbing distribution design informed the sizing of the HPWH system to minimize the overall system cost and increase the payback for the building owner.

[exemplarybuilding.housingconsortium.org](http://exemplarybuilding.housingconsortium.org)