SANCO2 Heat Pump Water Heater for Multifamily Applications

A Plug-and-Play Packaged System

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SANCO2 Heat Pump Water Heater (HPWH)

- Heat pump cycle removes heat from ambient air and transfers that heat into potable domestic hot water
- 3-4 times more efficient than conventional fossil gas or electric resistance-based water heating systems
- Readily available, CO2 refrigerant, Global Warming Potential 1 (GWP)
- 100% heat capacity down to 5°F Outdoor Temp
- Original product too small to serve larger multifamily applications (15,400 BTU/Hr)
Technical Potential

- 66-75% reduction in energy use over baseline gas/electric water heater
System Components: Single-Pass Swing Tank Design

- Compressor/HP
- Primary Storage Tank
- Temperature Maintenance Tank
- Thermostatic mixing valve
EcoSizer 1.0 Sizing Tool

Primary Tank Volume (Gallons) at Storage Temperature

Primary System Size, Storage: 286 Gal, Capacity: 66.8 kBTU/hr

- Tank Volume: 285 Gallons
- Swing Tank Volume: 80 Gallons
- Heating Capacity: 66.8 kBTU/hr
- Swing Resistance Element: 4.7 kW · 15.9 kBTU/hr

This system was sized for:
- Occupancy: 60.0 People
- Apartments: 30.0 Units
- Daily Hot Water Usage: 25.0 Gallons per Day per Person
- Total Hot Water: 1500 Gallons per Day
Breakthroughs

- Group multiple units in parallel with larger storage tanks and swing tank
- Manufacturer partnership: new Gen4 with new controls and communication port
- Two loads: Primary heating and temperature maintenance
- Packaged Plug-and-Play Central HPWH system was designed upon a skid to serve 60-100 occupants
Current Technology Barriers

• Outdated industry sizing calculations developed for gas systems dramatically over-sizes equipment
• Need for custom engineering and specialized knowledge leads to high up-front system acquisition costs
• Lack of examples, training, and installation support leads to high perceived risks associated with CHPWH projects
Solutions

• Ecosizer 1.0 and standardized package sizes provides confidence to designers and right-sized equipment
• Pre-packaged systems eliminates need for custom engineering and specialized CHPWH knowledge
• Case studies provide examples and manufacturer online training program and technical support can lessen perceived risks.
Additional Studies

- Sanden Central CO2 HPWHs Series Serving Senior Housing
Thank You

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