ET Summit 2020

Presented by

EMERGING TECHNOLOGIES COORDINATING COUNCIL

SANCO2 Heat Pump Water Heater for Multifamily Applications

A Plug-and-Play Packaged System

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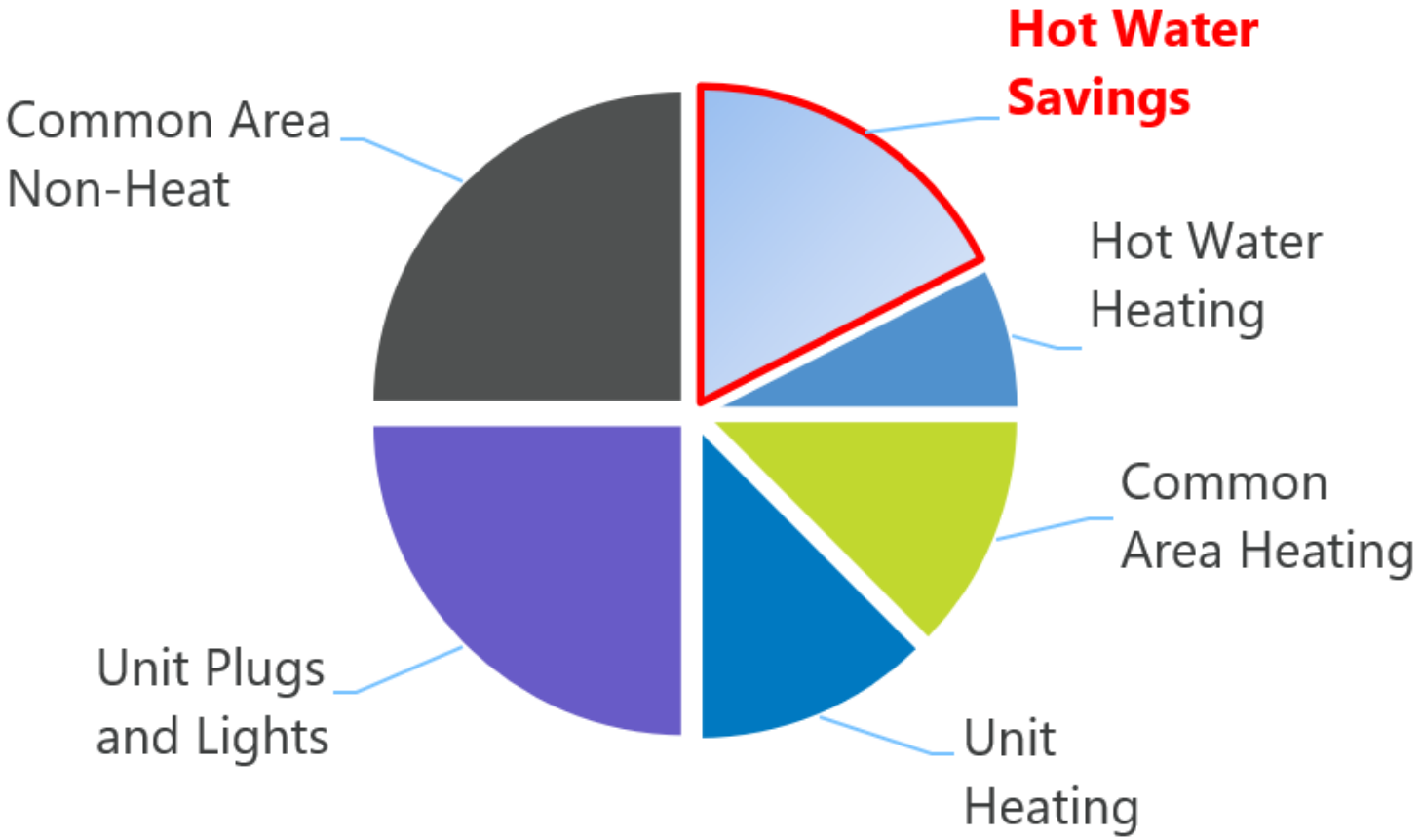
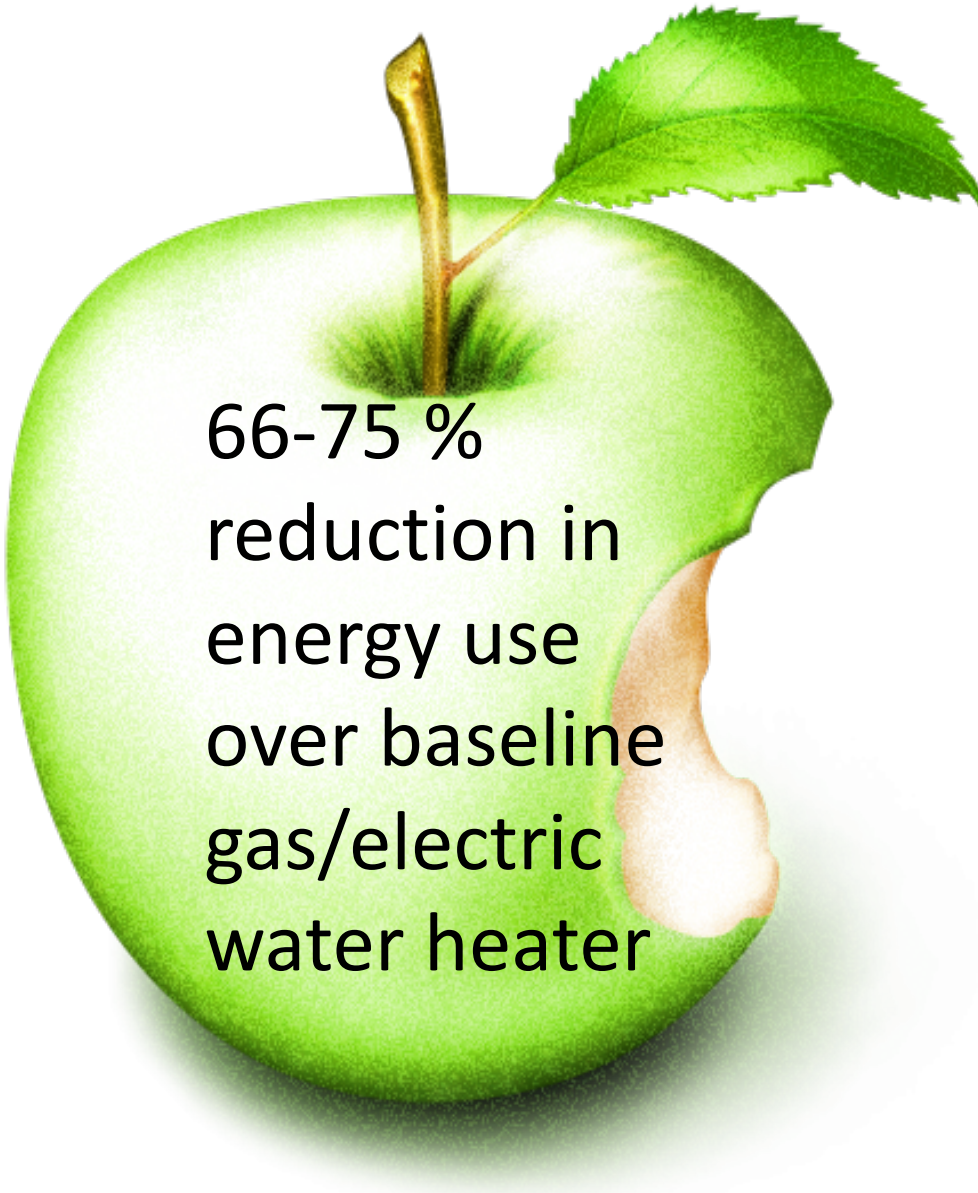
SANCO2 Heat Pump Water Heater (HPWH)

- 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)

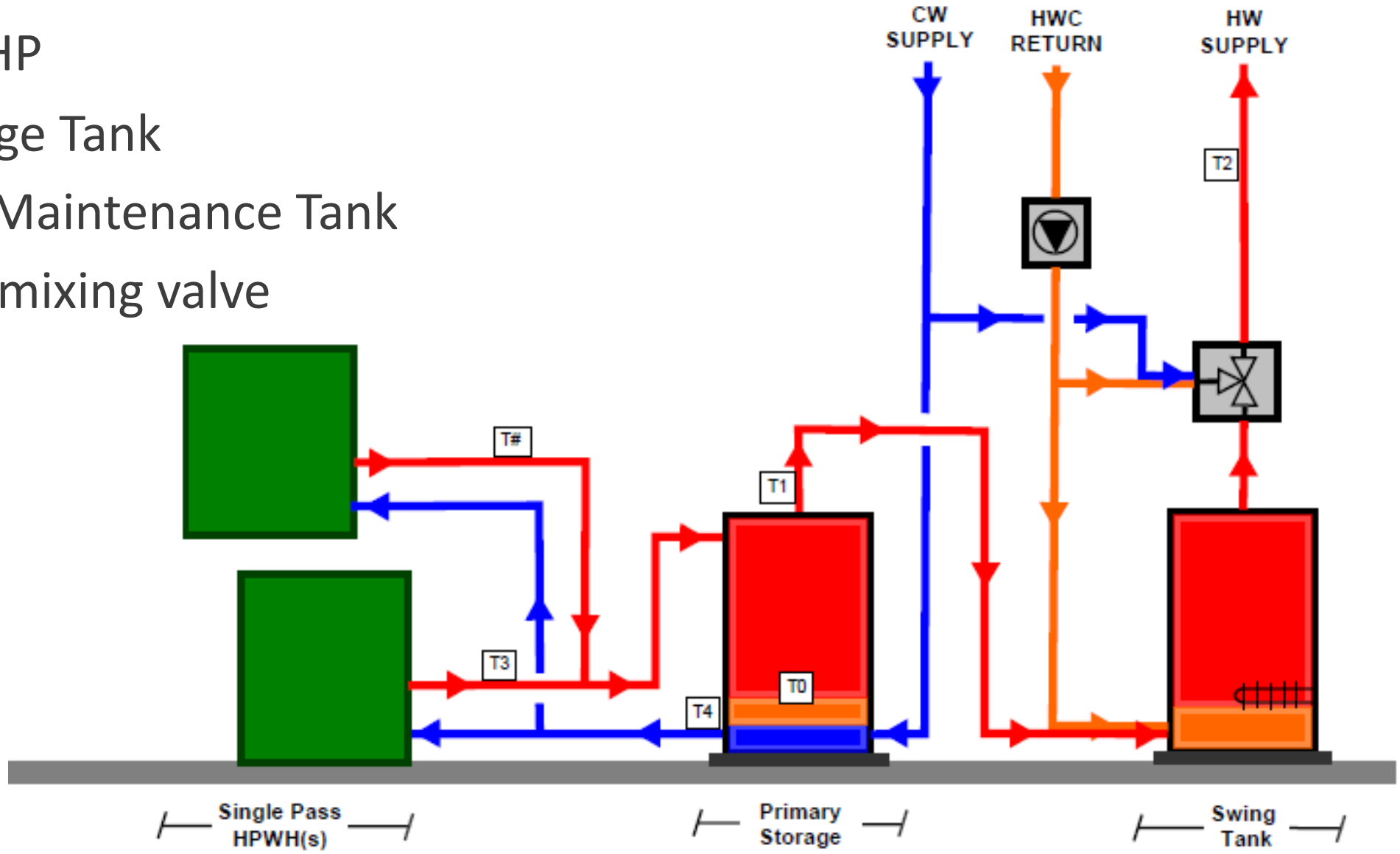
Technical Potential





System Components: Single-Pass Swing Tank Design

- Compressor/HP
- Primary Storage Tank
- Temperature Maintenance Tank
- Thermostatic mixing valve

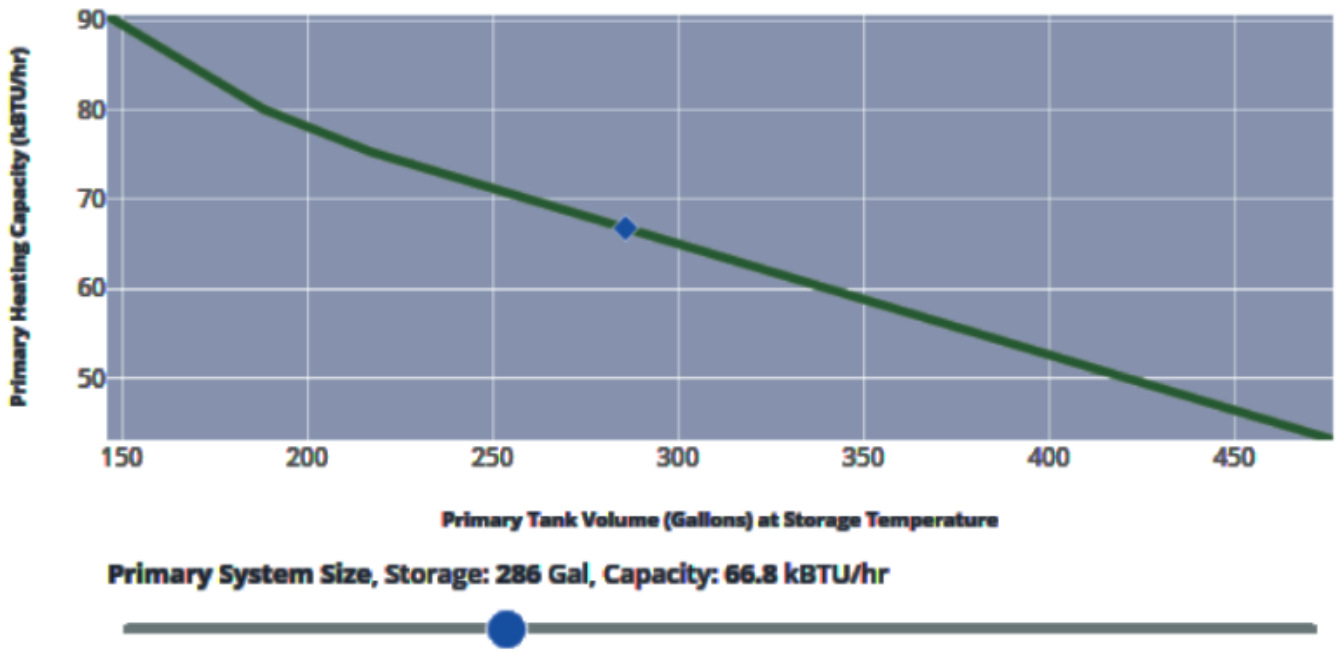


T# Temperature Sensor

Circulation Pump

Thermostatic Mixing Valve

EcoSizer 1.0 Sizing Tool



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

Tank Volume
285 Gallons

Heating Capacity
66.8 kBTU/hr

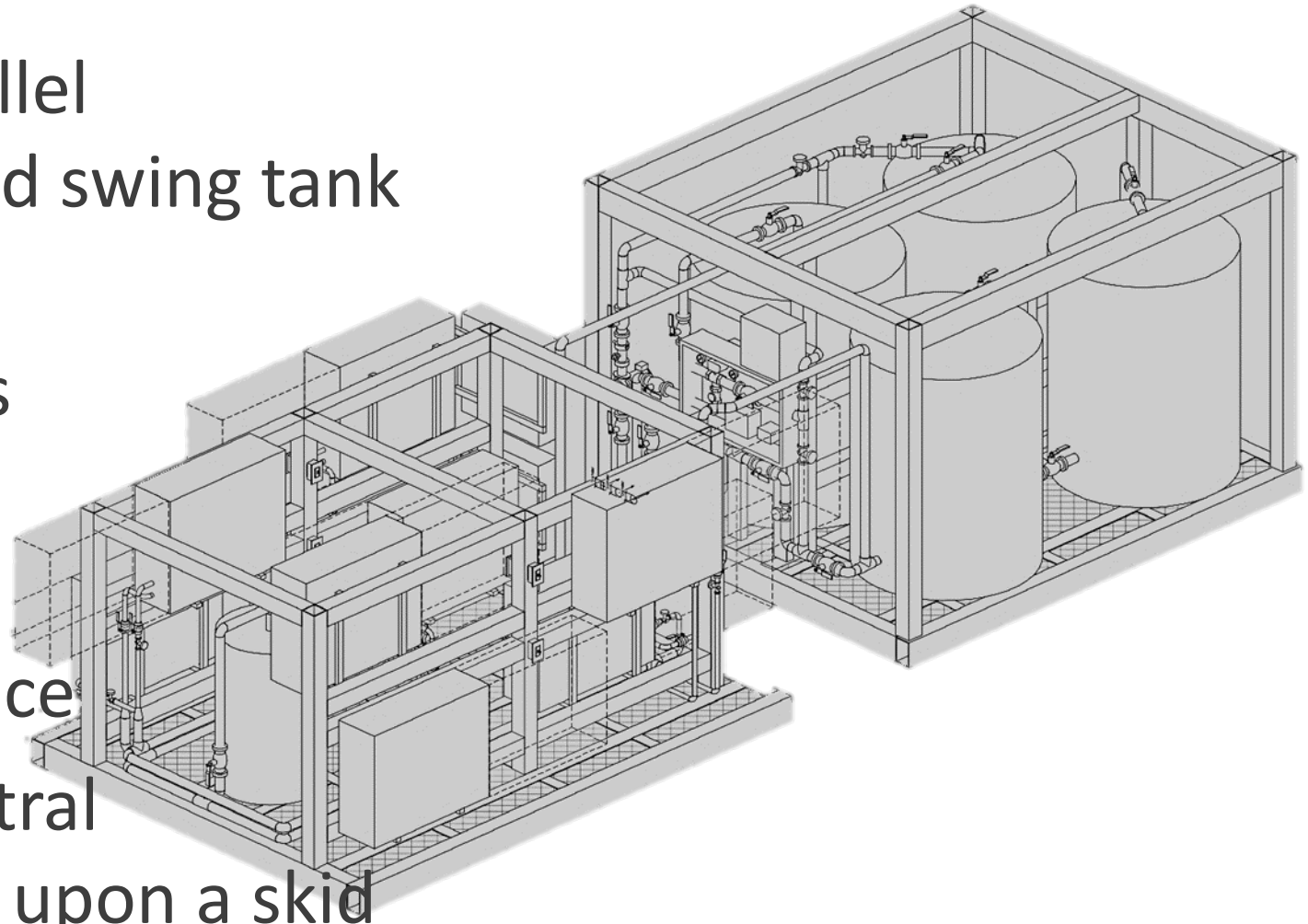
Swing Tank Volume
80 Gallons

Swing Resistance Element
4.7 kW · **15.9** kBTU/hr

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

Menlo Park Skid Design



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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