

Large-scale Commercial Heat Pump Water Heaters

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Large-scale Applications

- Multifamily
- Hotels
- Barracks
- Schools
- Hospitals
- Offices



Typical Capacity Range



Per Module

5 – 60 Tons (60 – 720 MBH)

Project

5 – 250 Tons (60 – 3,000 MBH)

Storage

240 – 20,000 gallons

Commercial HPWH Unit Design

- Electrically driven, vapor compression cycle
- Direct heating of potable water
- Paired with commercial storage tanks
- Minimum 140F potable output
- Modular design
- Air or water source



HFC Refrigerants

- R-410a GWP: 2,088
- R-134a GWP: 1,430
- Common components and servicing
- Phasing out to HFO replacements



Natural Refrigerants

- R-744 (CO₂) GWP: 1
- R-717 (Ammonia) GWP: 0
- R-290a (Propane) GWP: 3

- Low-temperature operation
- Limited components and servicing
- Pressure, flammability, toxicity



HFO Refrigerants

- R-1234yf GWP: 1
- R-1234ze GWP: 1
- Currently limited component availability
- Flammability



Benefits of HPWHs

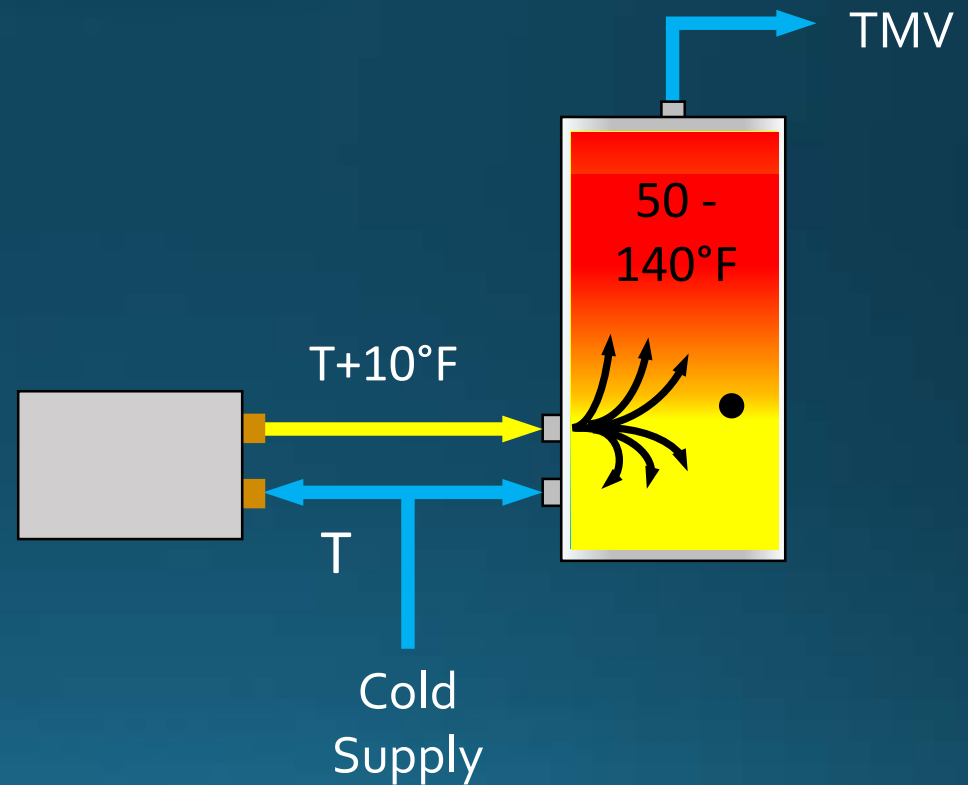
- Electrification
- 150 - 600% efficient (COPs of 1.5 - 6)
- Load shifting, night operation
- Free cooling or heat recovery
- Smaller electrical service vs. electric resistance



Single & Multi-pass Operation

Multi-pass

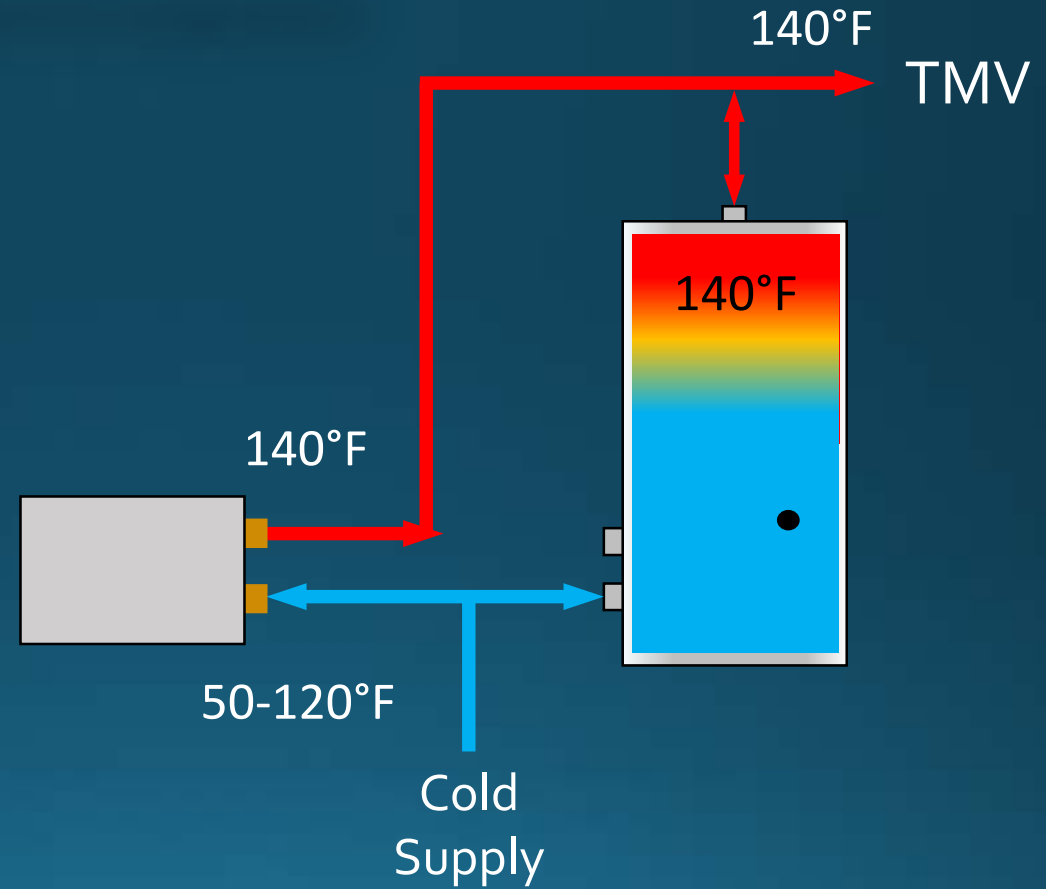
- Constant flow rate (higher)
- Varying output temperature
- Low lift



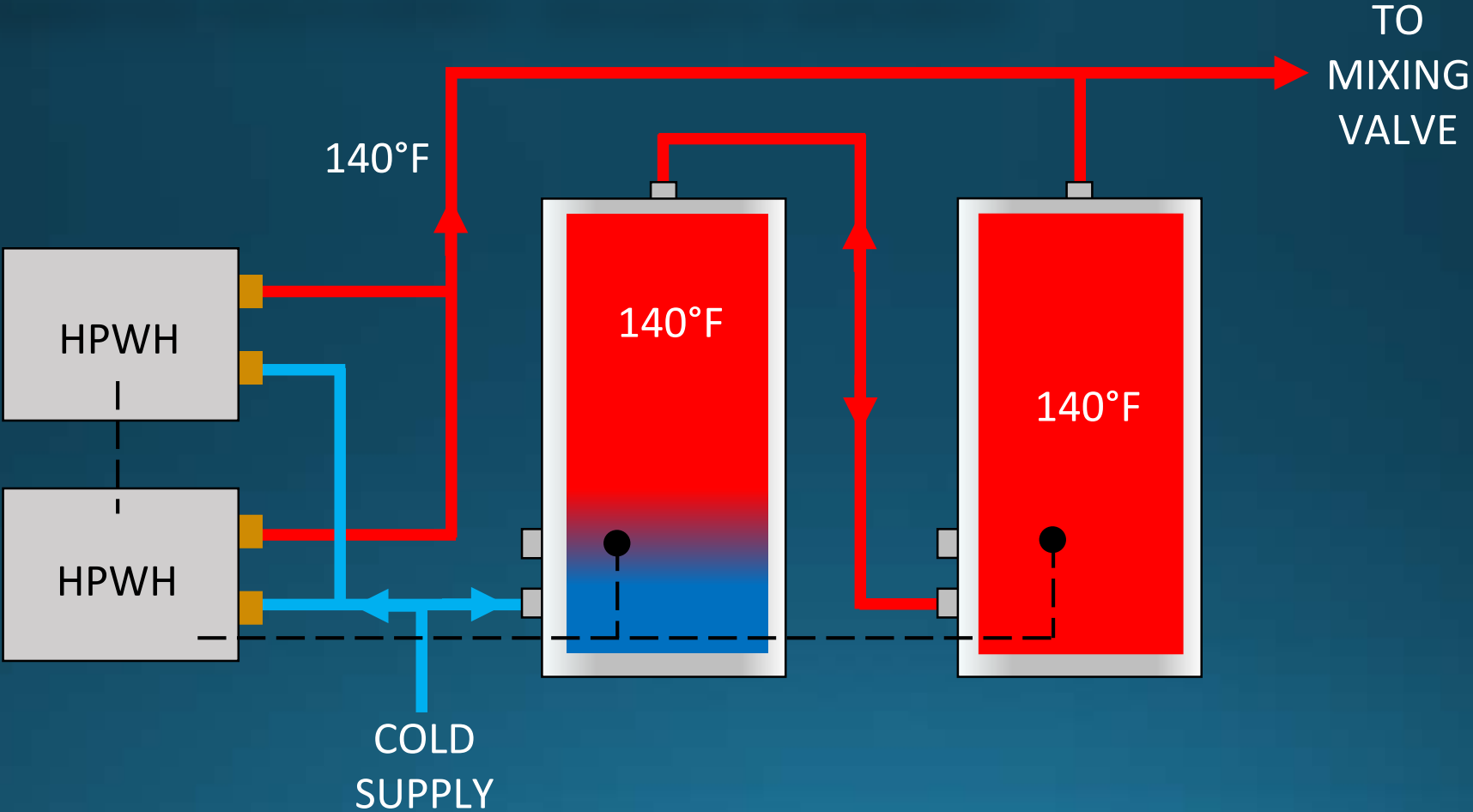
Single & Multi-pass Operation

Single Pass

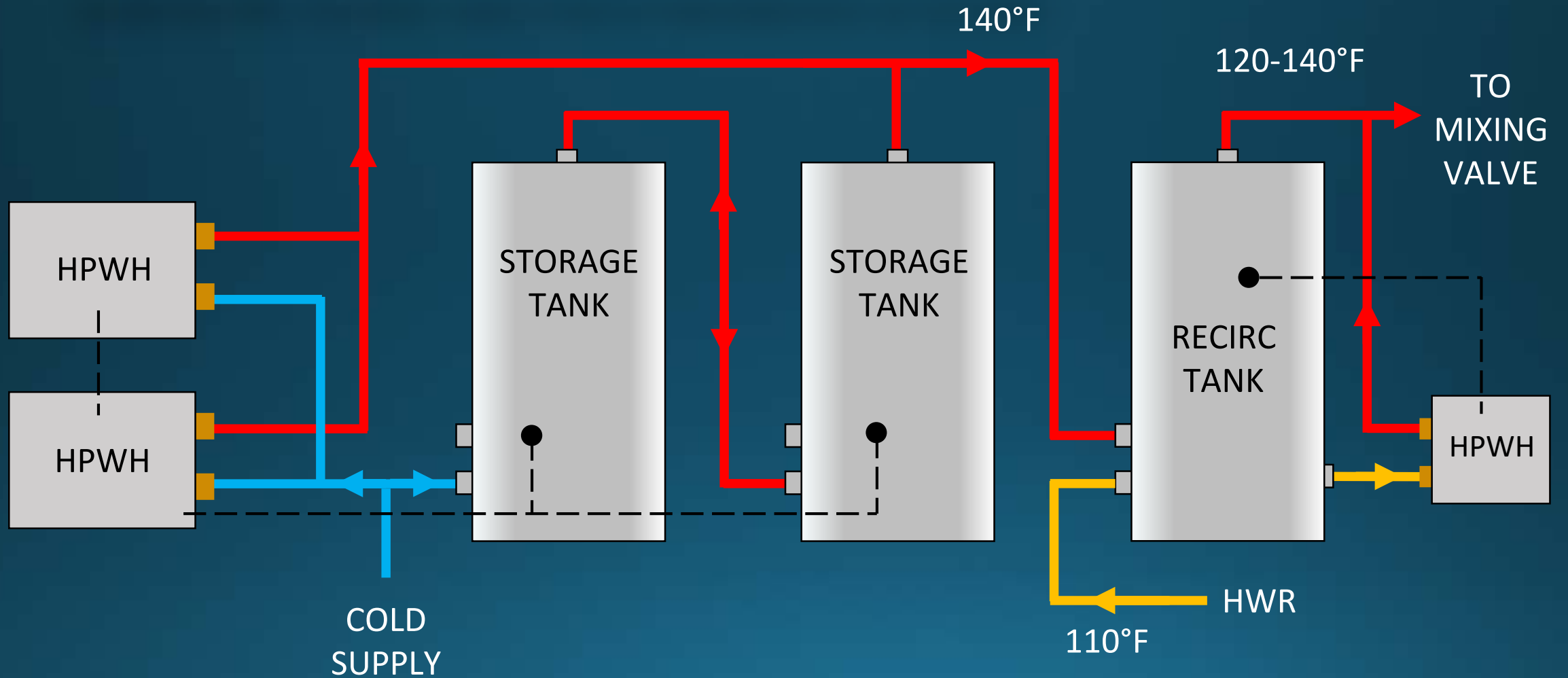
- Constant output temperature
- Varying flowrate
- High lift (Minimum 20°F)



Stratified storage, Series tanks



Piping with Recirculation Loop



Sizing New HPWH Systems



- Longer runtime, lower output
- Store energy for peak loads
- Remember recirculation loop
- Select units at lowest source temperature
- Stage/ramp units during warmer months

Retrofit Considerations

- Metered data
- Cost
- Leave old equipment?
- Electrical service limitations
- Single or multi-pass



Questions?



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