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Presented by

Low-GWP Central Heat Pump Water Heating

Design and Installation Lessons Across Five Sites

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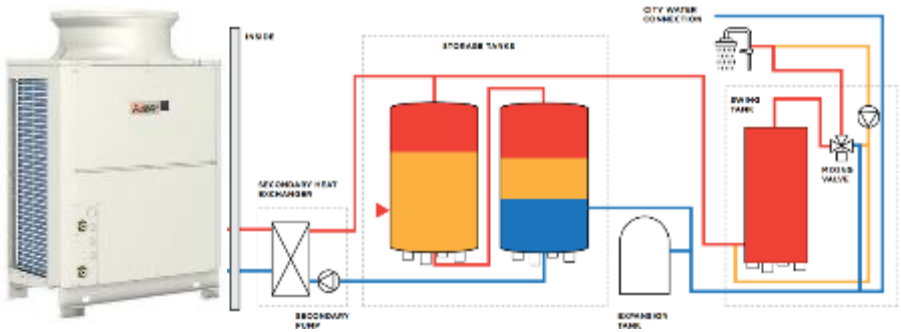
Equipment in Study

Mitsubishi Heat$_2$O

- 136k btu/hr CO2 heat pump
- Secondary Hx, tanks, controls
- Site-built*



WaterDrop

- Multiple 15.4k btu/hr SANCO2 heat pumps, tanks, controls
- Factory-built skid

Images: Mitsubishi, WaterDrop

Demonstration Sites

Site	Dwelling Units	HPWH Product	HPWH Recovery (btu/hr)	Primary Storage Volume (gal)	Storage Ratio (Gal/Ton)	Notes
A – San Francisco	81	$Heat_2O$	273k	357	16	Noise ordinance
B – East Palo Alto	28	$Heat_2O$	273k	300	13	Plumber resistance to controls scope
C – San Diego	74	$Heat_2O$	273k	785	35	TOU electrical cost concerns
D – Fontana	90	$Heat_2O$	B1: 136k B2: 136k	300 600	26 52	Targeting full electrification
E – Fresno	106	WaterDrop	139k (x2)	505 (x2)	44	Skid modified to meet updated load calc

San Francisco - Retrofit

Images: BrightPower

East Palo Alto – Gut Rehab

Images: AEA

Complexity of Secondary Hx

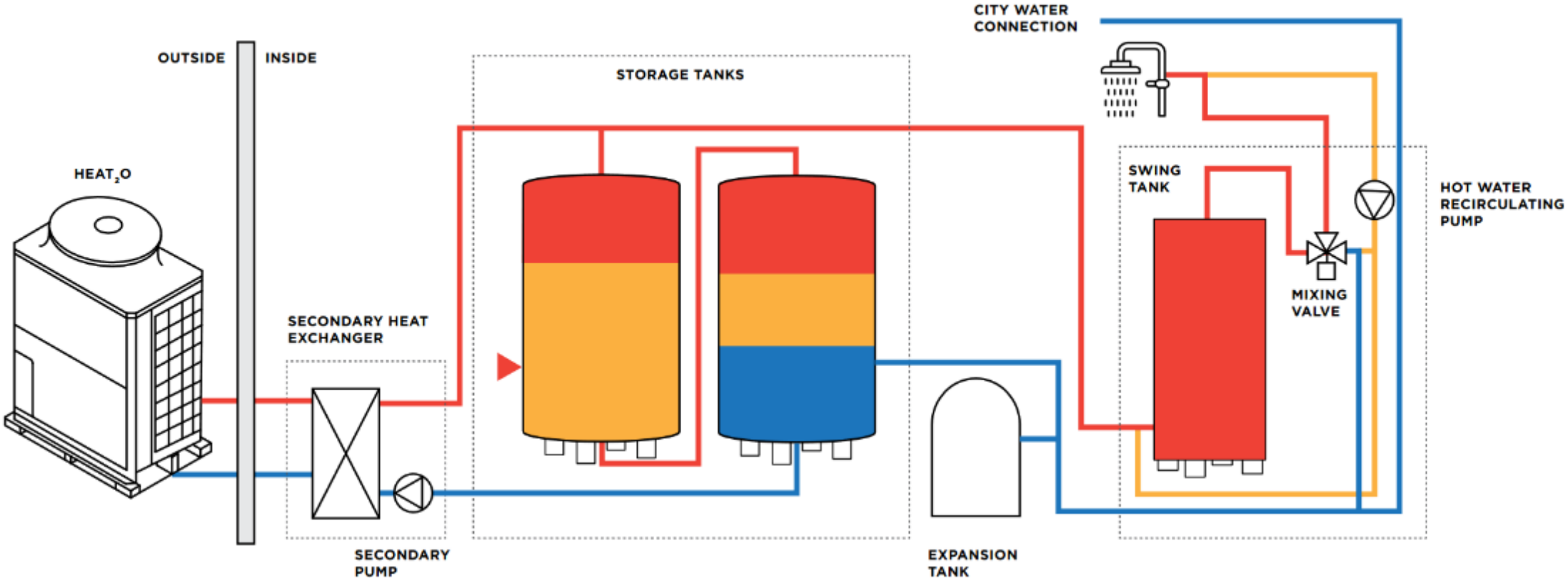
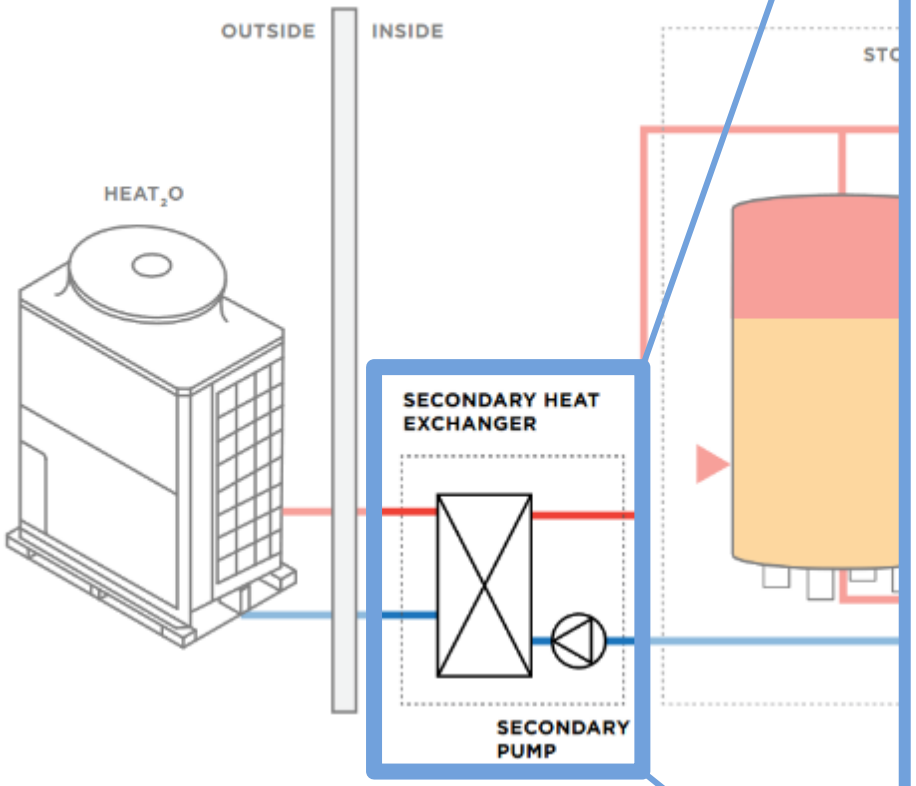


Image: Mitsubishi

Complex



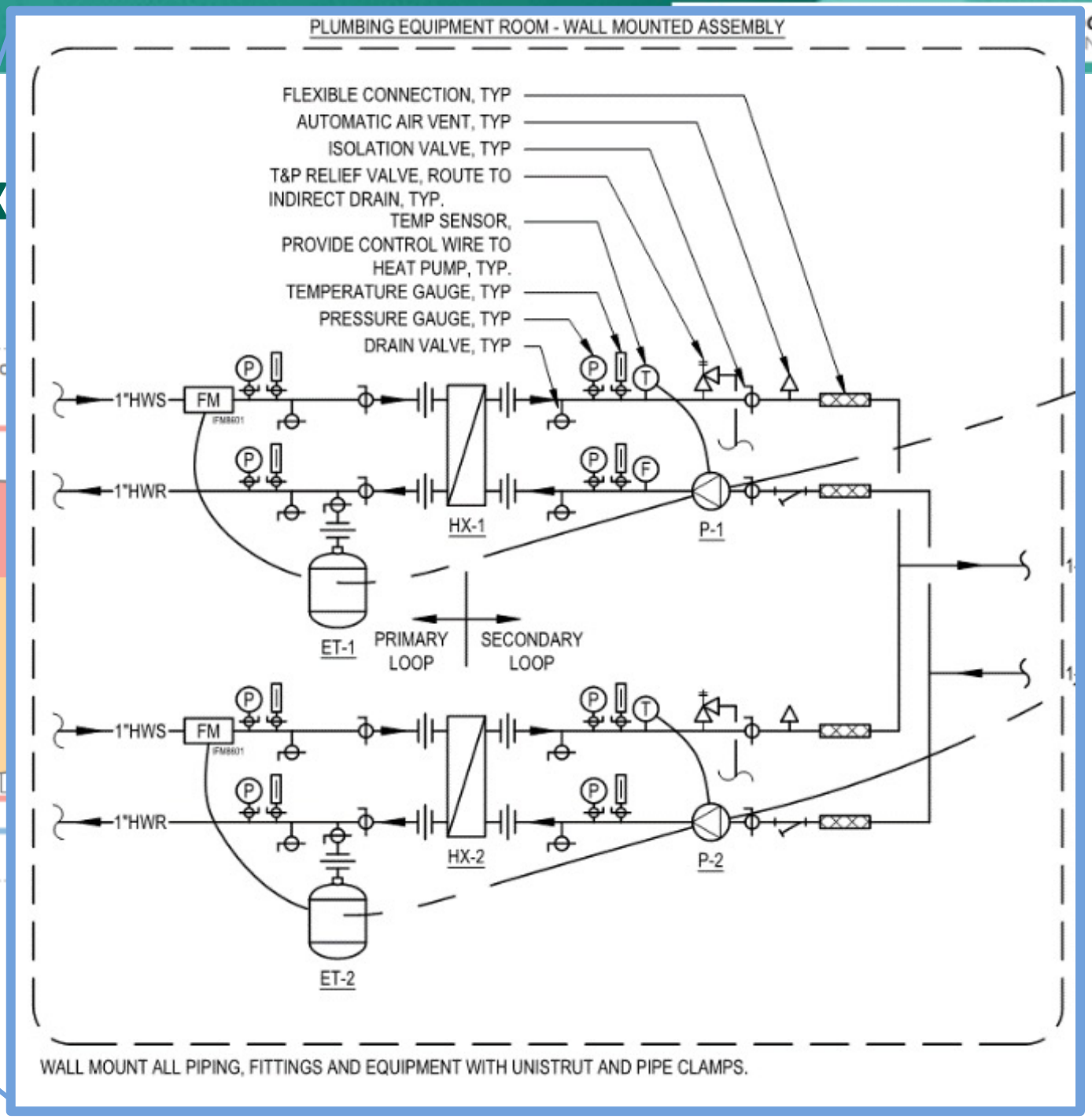


Image: Mitsubishi

Issues, Recommendations, and Updates

Issue	Recommendation		
Complexity is the enemy of success	Package as many components as possible while maintaining flexibility	✓	✓
Plumbers aren't comfortable with complex controls	Package controls so that only required connections are ethernet or simple thermistor	✓	✓
Nonstandard components can lead to install issues	Only include non-standard parts in factory-assembled/shipped kits	✓	✓
Tanks w/o proper fittings can kill stratification	Ensure purpose-built tank supply chain can meet demand	✓	✓

Testing and Data Collection

- Tests
  - Load shifting
  - Changing recirc return location
    - Test locations:
      - Swing tank
      - Cold water makeup
      - Middle of storage system
    - What is impact on system performance and efficiency?
    - Can we eliminate the swing tank?
- Collecting copious data on all systems to analyze performance

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Technology and Equipment for Clean Heating (TECH) Program

Multifamily Affordable Housing Electrification Program (MAHEP)

For more information, contact Nick Young at nyoung@aeacleanenergy.org.

Heat Pump Water Heater Product Information:

Mitsubishi Heat2O

www.heat2o.com

WaterDrop

www.waterdropsystems.com

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