oventrop

Aquanova Systems

Regumaq X Series

Melbourne-based Hotel

Heat Pump DHW Solution

Case Study

Solution Comparison for Domestic Hot Water Plantrooms

Areas to Consider

- Water Hygiene
- Plant design
- Equipment costs
- Running costs
- Plant footprint
- Water storage
- Reload time

Project:

- 3-level hotel situated in Melbourne.
- Domestic hot water plantroom serving 124 rooms.

Initial Design:

- Typical domestic hot water heat pump design.
- 4x 30kW heat pumps.
- **5x** 2000L **stainless steel** storage tanks for primary-side **potable** water.
- Heat pumps and tanks must both have **WaterMark** approval.

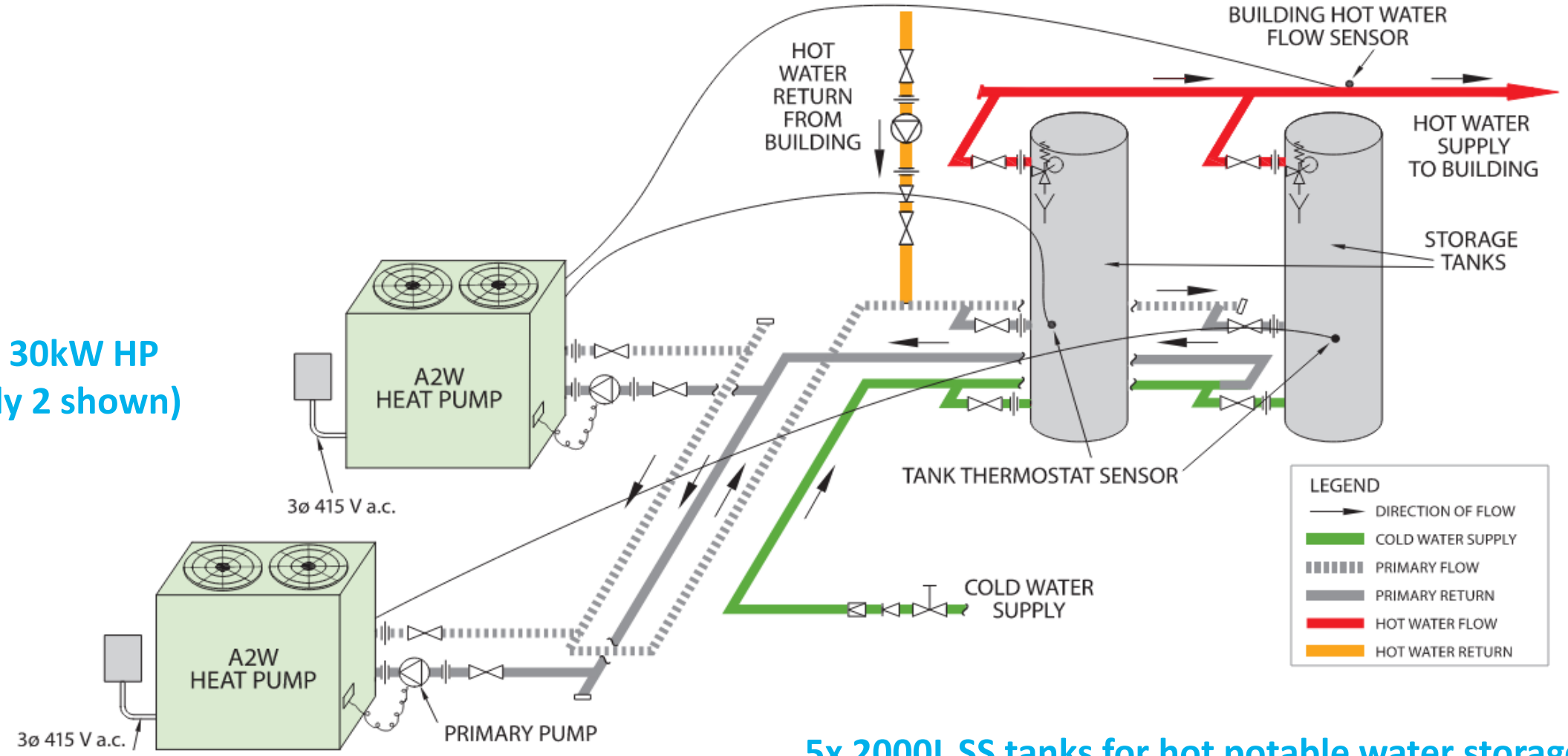
Next Generation Design:

- Next gen domestic hot water heat pump design.
- 2x 77 kW heat pumps.
- **3**x 1500L **steel buffer** tanks for primary-side **non-potable** water.
- 4x WaterMarked **Oventrop Regumaq** hygienically fresh hot water stations.

Melbourne-based Hotel – Traditional Design Example

Heat Pump + Potable Water Storage

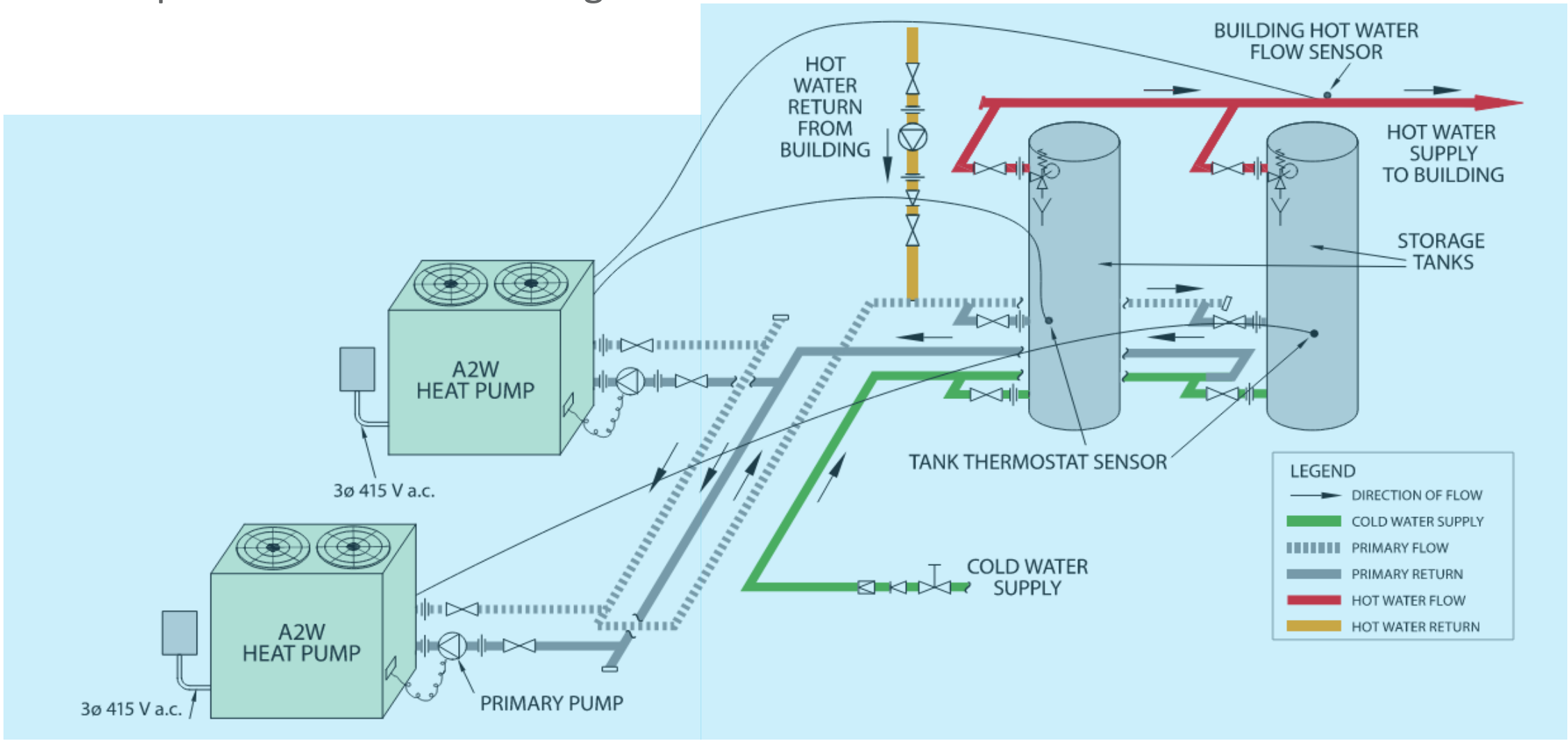
4x 30kW HP (only 2 shown)



5x 2000L SS tanks for hot potable water storage (only 2 shown)

Melbourne-based Hotel – Traditional Design Example

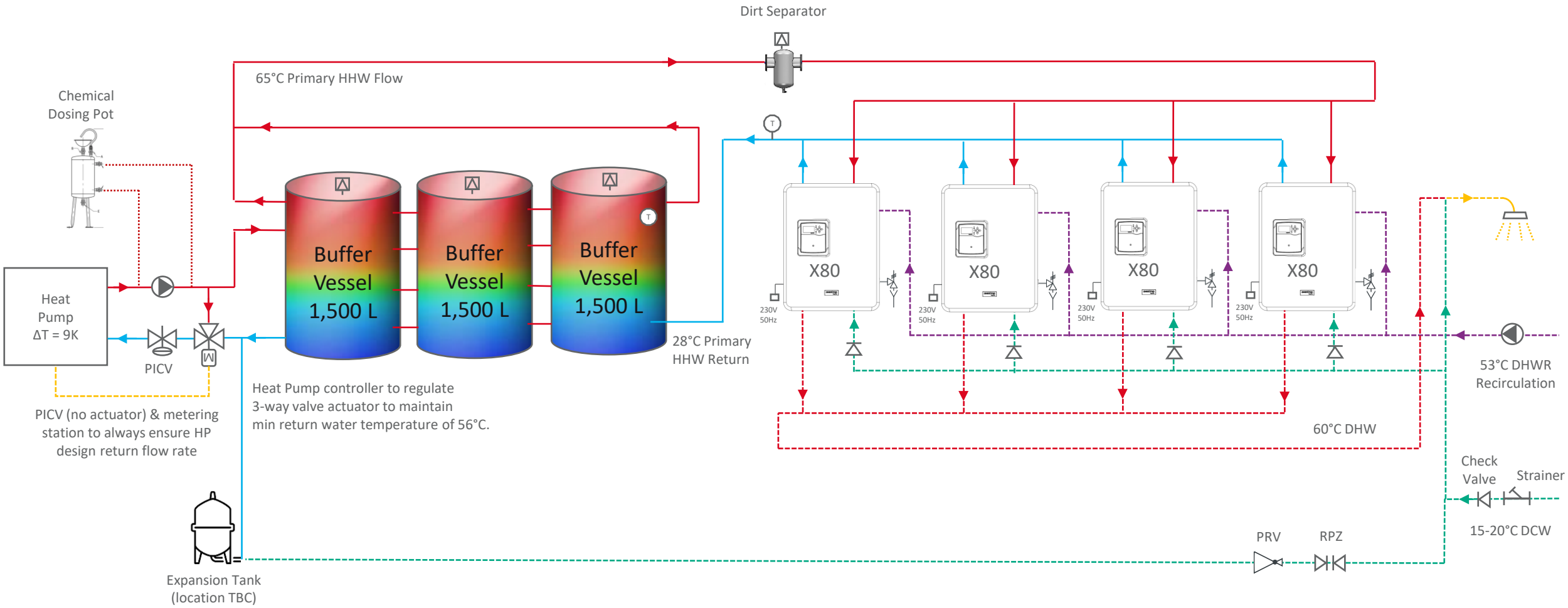
Heat Pump + Potable Water Storage



PRIMARY (POTABLE) DHW

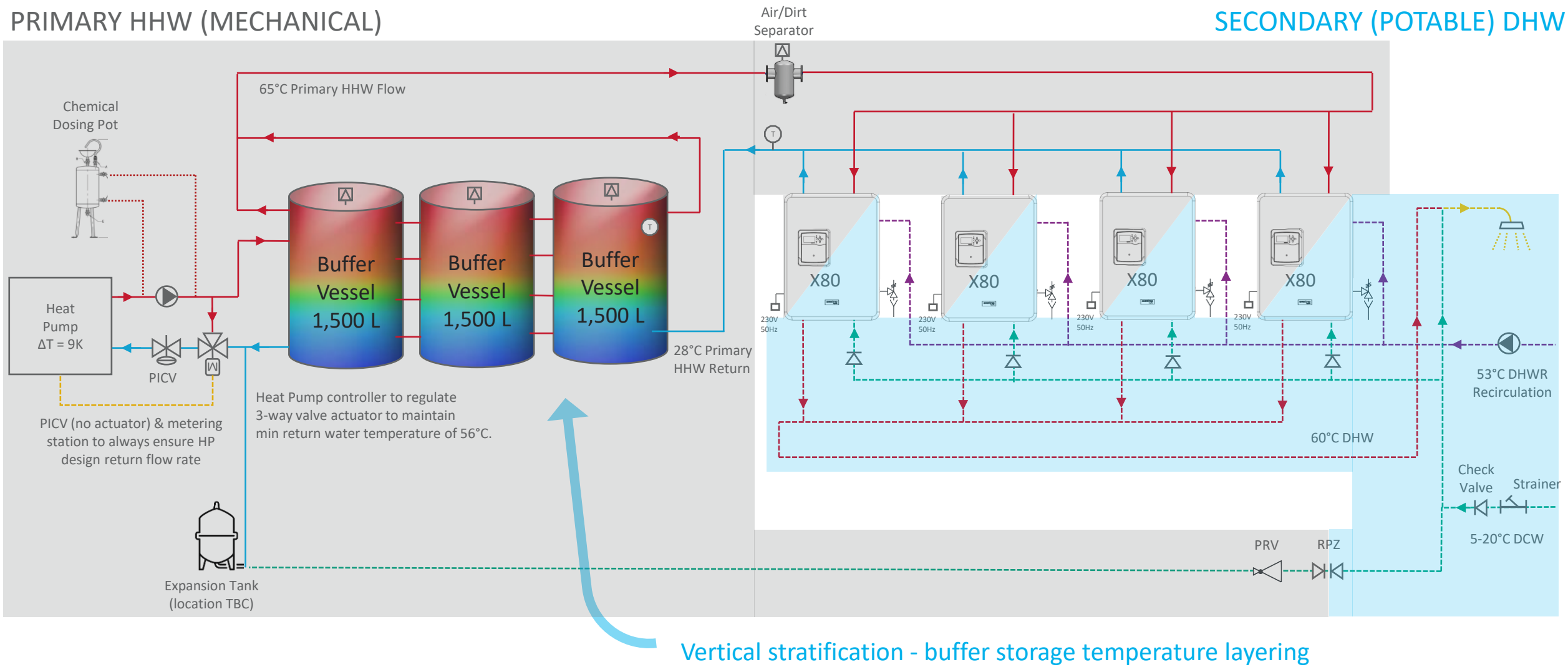
Melbourne-based Hotel – Next Gen Plant Design (60°C System)

Heat Pump + Regumaq + Mechanical Water Storage



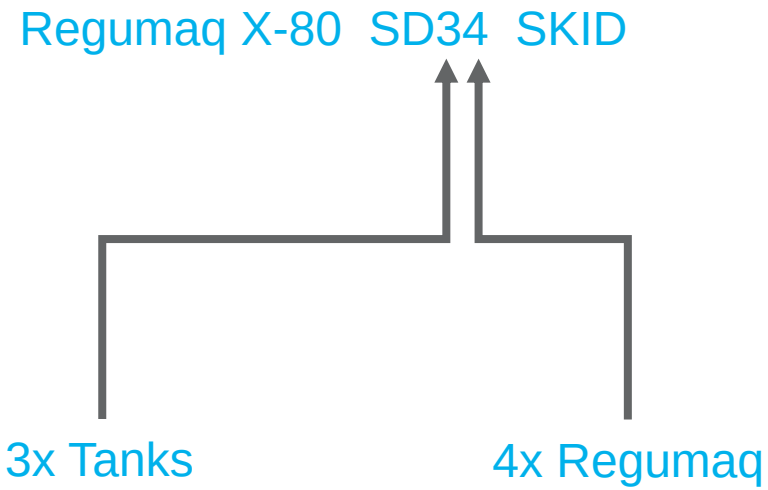
Regumaq X Next Generation DHW

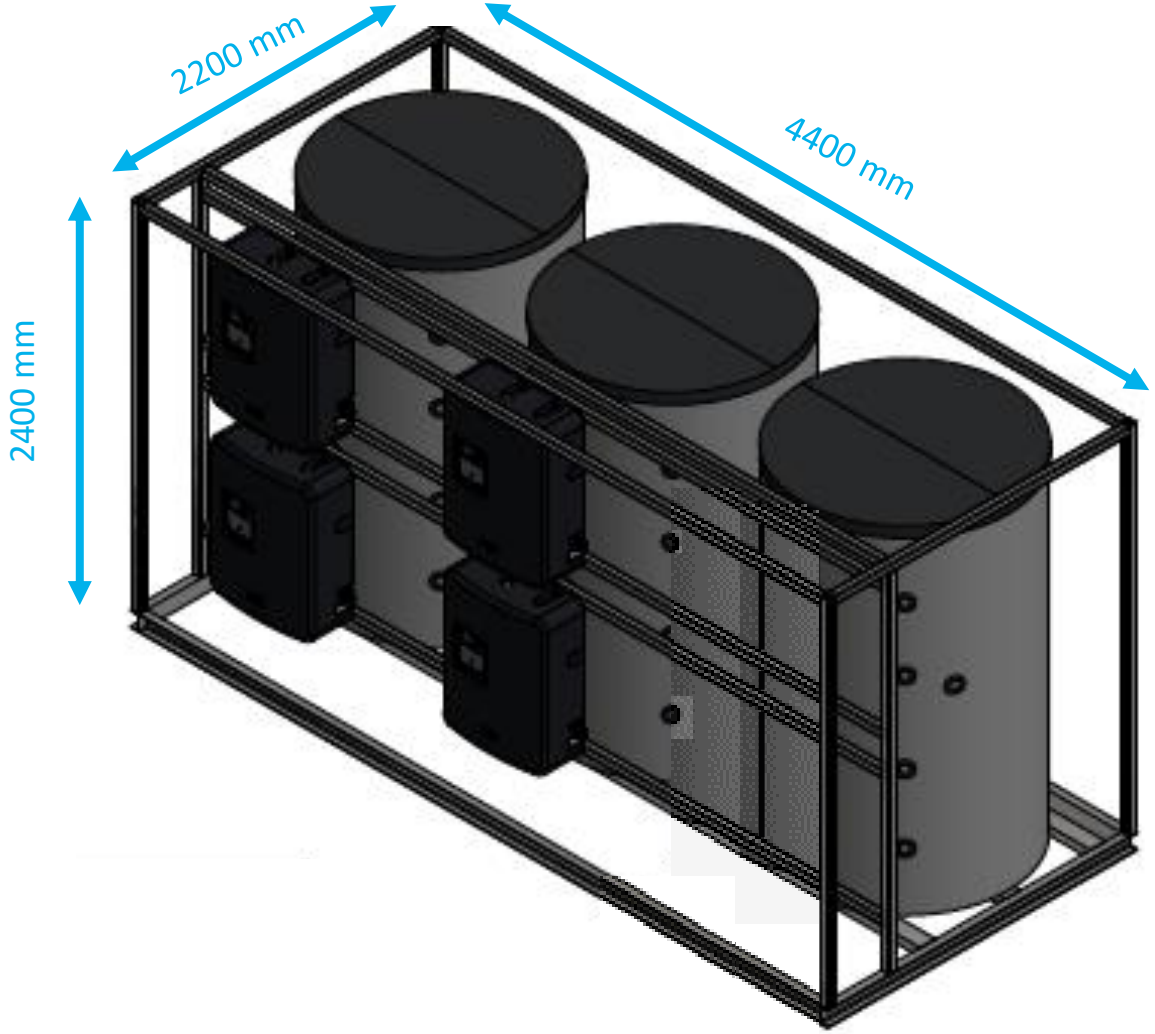
Heat Pump + Regumaq + Mechanical Water Storage



Melbourne-based Hotel

Potential Skid Arrangement





Dimensions TBC before manufacture

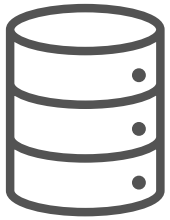
Melbourne-based Hotel

General Benefits of Regumaq Design

- Superior hygiene:
  - No hot potable water reserve required; just-in-time, demand only.
  - Return loop temperature always maintained at desired set point.
  - Eliminate risk of dangerous legionella bacteria.
  - Self-cleaning HEX to mitigate corrosion, calcification, bacteria, & fouling.
- Increased energy efficiency:
  - Heat generator temp rise reduced as heat in return water re-used.
- Reduce maintenance:
  - 10-year Regumaq flush only.
- Smaller plant footprint
  - Increased lettable space.

Melbourne-based Hotel

Comparison Highlights



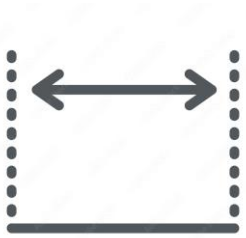
↓ 55%

water storage

↓ 81%

reload time

@ 7°C ambient



↓ 25%

plant space

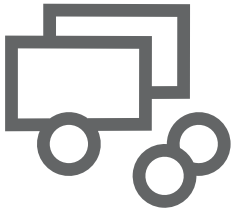
↓ 28%

weight (op)

↓ 58%

running cost

Based on comparative cost
to heat 9,900 litres of water



↓ 14%

equipment cost

Melbourne-based Hotel Design Solution Comparison

Project Details

Allowances	
124x Hotel Rooms	50L per room over 1 hour peak
31x Spa Rooms	100L per room over 1 hour peak
65x Restaurant Meals	6L per meal over 2 hour peak
3x Laundry Washing Machines	70L per machine over 1 hour peak

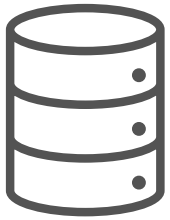
Comparison

Metric	Traditional HP Proposal	Oventrop Regumaq & HP Proposal
System - General		
HW Consumption (estimate)	9900L over 1 hour peak period	9900L over 1 hour peak period
HW Consumption (actual)	10,275L over 1 peak period	10,320L continuous
System Temperature Rise	50°C (10°C → 60°C)	50°C (10°C → 60°C)
Heat Pumps		
Number of heat pumps	4	2
Heat pump capacity @ ambient	24 kW @ 7°C / 30 kW @ 20°C	61 kW @ 7°C / 77 kW @ 20°C
Total capacity	96 kW / 120 kW	122 kW / 144 kW
WaterMark approval	Mandatory	Not required
HP Temperature Rise	50°C (10°C → 60°C)	37°C (28°C → 65°C)
Circulation Pumps		
Number of circulation pumps	4	3
WaterMark approval	Mandatory	Not required
Buffer Storage Tanks		
Number of tanks	5x 2000L	3x 1500L
Total storage	10,000L	4500L
Type of tanks	Stainless Steel	Steel
WaterMark approval	Mandatory	Not required

	Comparison	
Metric	**Traditional HP Proposal**	**Oventrop Regumaq & HP Proposal**
Oventrop Regumaq Units		
Number of Regumaq	N/A	4
Type of Regumaq	N/A	X-80
WaterMark approval	N/A	Yes
Coefficient of Performance		
COP (EN Standard) @ 20°C	?	2.88**
COP @ 7°C	3.60 (39°C in / 42°C out)*	2.40** (56°C in / 65°C out)
COP @ 20°C	4.28 (39°C in / 42°C out)*	3.10** (56°C in / 65°C out)
	***Not indicative of typical performance**	****Including circulators, fans, etc**
Weight & Plant Space (incl. clearances)		
Weight (operational)	12,580 kg	9,078 kg
Area for heat pumps	14.9 m^2	20.6 m^2
Area for tanks	25.6 m^2	9.7 m^2
Total footprint	40.5 m^2	30.3 m^2
Recovery		
Reload time @ 7°C ambient	376 mins (6.3 hours)	72 mins (1.2 hours)
Energy		
Energy Consumption	161.50 kWh	67.19 kWh
Cost to heat 9900L (avg rate $0.306/kWh)	$49.42	$20.56
Estimated annual saving for electricity		$42,000 - $53,000 per year
Cost		
Solution Cost Estimate	$212,500	$184,150
	BMS interface card not included	**BMS module included**
Commissioning	$1,800	$0
Total Cost (excl. GST)	$214,300	$184,150

Melbourne-based Hotel

Comparison Highlights



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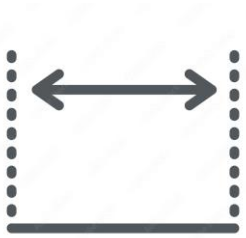

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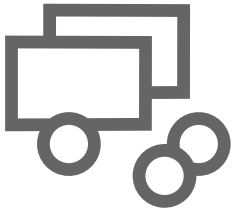

↓ 14%

equipment cost

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