

Cutting gas consumption by 14% through a turnkey steam network revamp

 **Indonesia**

 **Hospitality**

Problem

A five-star hotel in Indonesia was running two 1TPH (2205lb/h) and one 2TPH (4409lb/h) coil type boilers to meet its steam requirements. The use of coil type boilers resulted in poor steam quality, necessitating the operation of multiple boilers to cater to the hotel load. Steam was generated and distributed at just 5-6barg with redundant supply lines, complete venting of flash steam and recovery of 50-60% condensate. The feedwater temperature was between 40°C to 50°C (104°F to 122°F). Overall this was resulting in substantial energy losses, and excessive fuel and water consumption.

Solution

Forbes Marshall conducted a detailed audit to identify gaps in the existing steam system. Based on a heat mass balance of the existing system, we recommended reducing boiler capacity to 2 shell type boilers of 1.5TPH (3307lb/h) each and rationalisation of the distribution network from 4 lines to a single 100NB line. In order to enhance steam distribution pressure, the existing system was replaced with our own pressure reducing station (FMPRS) and relocated from the boiler house to the process area. A boiler efficiency monitoring system (EffiMax™) was installed to monitor real time boiler performance. By automating blowdown control we were able optimise boiler water total dissolved solids (TDS) reducing blowdown losses. A FlashJet™ Pump was also installed to eliminate venting of flash steam and optimise condensate recovery. These interventions collectively improved energy efficiency, and ensured reliable, sustainable boiler operation for the plant.





Benefits delivered

	Before	After
Boiler installed capacity	4TPH coil type (1TPH x2 & 2TPH x1) ; 8818 Pounds per hour coil type (2205lb/h x2 & 4409lb/h x1)	3TPH shell type (1.5TPH x2) 6614lb/h shell type (3307lb/h x2)
Boiler operating capacity	2-3TPH (4409 - 6614lb/h)	1.5TPH (3307lb/h)
Boiler operating pressure	5-6barg	8-9barg
Blowdown operation	Manual	Auto
Blowdown TDS	1,500pmm	3,500pmm
Feedwater tank capacity	10 Kilolitres (2641 Gallons)	4 Kilolitres (1057 Gallons)
Feedwater temperature	40-50°C (104-122°F)	90°C (194°F)
Condensate recovery factor	50-60%	90-95%
Distribution pressure	5-6barg	8-9barg
Steam distribution lines	4 lines (100NB, 80NB, 40NB, 25NB)	1 line (100NB)
Pressure reducing	4 in the boiler house	3 near the process area
Fuel (gas) consumption	35,000m ³ /month (1.23 million Cubic Feet per month)	29,800m ³ /month (1.05 million Cubic Feet per month)
Water consumption (makeup water to boiler)	20KLD (5283 Gallons per day)	5KLD (1321 Gallons per day)
Electrical consumption	4,200 kWh	3,600 kWh (estimated)

