28% fuel consumption reduction through improvements in the steam and condensate system for a confectionery plant

Indonesia | Food

Problem

A confectionery plant manufacturing chocolate paste in Banten, Indonesia was facing the following issues with its steam and condensate system at the vacuum belt dryer:

- Traps were leaking and some were being bypassed
- 100% flash steam was being vented
- Condensate was being recovered by an electric pump and condensate recovered temperature was low at 50-60°C (122-140°F)
- Feedwater temperature was 46°C (114.8°F)

Solution

Forbes Marshall recommended and implemented the following thermal energy conservation solutions in the plant to address these issues:

- Leaking traps were replaced by single orifice float traps (SOFT31).
- The electric pump was replaced by a FlashJet™ Pump (FJP) to improve condensate and flash steam recovery.
- A deaerator head was installed to enable the proper mixing of condensate, flash steam and makeup water.
- A steam injector was installed.

FlashJet™ Pump (FJP)

Benefits delivered

	Before	After
Fuel consumption	81,572 m^3/month (2.8 million ft^3/month)	63,187 m^3/month (2.2 million ft^3/month)
Steam generation	515,613 Kilogram steam/month (1.1 million Pounds steam/month)	622,683 Kilogram steam/month (1.3 million Pounds steam/month)
Flash steam	vented	recovered to the local hot water system
Condensate return temperature	50-60°C (122-140°F)	90-95°C (194- 203°F)
Feedwater temperature	46°C (114.8°F)	90.6°C (195.1°F)
Steam to fuel ratio	8.4 Kilogram steam/m^3 gas (0.53 Pounds steam/scf gas)	10.8 Kilogram steam/m^3 gas (0.67 Pounds steam/scf gas)
Fuel savings		increased by 18000 m^3 gas/month (635,665 ft^3 gas/month) (i.e. 28%)
Annual steam savings		62.3 Tonnes (137348 Pounds)
Annual water savings		10,582 m^3 (373,689 ft^3)
Annual monetary savings		USD 71,500 (~IDR 1,194,264,192 *converted based on exchange rate)