Energy Audit Final Report
September - 2014

PT HM SAMPOERNA Tbk.

PT. HM SAMPOERNA Tbk.
Sukorejo, Indonesia

Address for Communication
Schneider Electric
Energy & Sustainability Services (ESS)
Global Solutions, Demand Operations

Description	Unit	Value
Estimated annual NG saving	m^3	2,652
Estimated annual energy saving	MMBTU	91
LNG cost	IDR/m^3	750
Energy cost	USD/MMBTU	6.43
Expected annual monetary (NG) saving	Million IDR	2
Expected annual monetary (Energy) saving	USD	588
Expected total annual monetary (Energy + NG) saving	Million IDR	9
	USD	759
Expected Investment	USD	708
Payback	Months	11

5.3.2 Provide level controller in feed water tank to increases the feed water supply temperature to boiler

Background

Feed water outlet from feed water tank goes from bottom of feed water tank & makeup water is adding into tank along with condensate from department and enters in to the feed water tank from top of the tank.

Findings

Feed water temperature on top of the tank is 125 °C and feed water temperature in bottom of the tank is around 92 °C due to water characteristic. Same time water level of feed water tank is maintained manually based on level of tank and it's around 90% to 100% of tank level. So that feed water temperature send to the boiler is around 92 °C.

Recommendation

Maintain feed water tank level is around 50% to 60% with the help of automatic level controller which is increase the feed water temperature and reduce the natural gas consumption in boiler.

Benefits:

The cost benefit analysis is given below:

Table 13. *Cost benefit analysis to provide automatic level controller in feed water tank*

Description	Unit	Value
PP-1 feed water tank height	m	2.4
Water level maintained	%	90 to 100
Water temperature at upper level	°C	125.0
Water temperature at lower level which feed to boiler	°C	92.0

5.3.4 Preheat make up water through blow down heat recovery in PP-1 boiler

Background

One 10 ton boiler is operating to cater the steam demand in process area and blow down is taking place and it's dumping to drainage by adding with normal water.

Findings

Blow down heat is wasting inform of heat which is going to waste in drainage.

Recommendations

Provide a heat exchanger connected with makeup water tank and blow down water from boiler to blow down tank.

Benefits

After makeup water preheating through blow down water, feed water temperature will slightly increase so that natural gas consumption will reduce in boiler. The cost benefit analysis is as follows

Table 15. *Cost benefit analysis of blow down heat recovery*

Description	Units	PP-1 Blow down heat recovery
Present system		
Blow down water temperature	°C	140
Average Blow down from boiler	M3/day	3.93
Density of blow down water	kg/m3	926
Theoretical heat available in blow down condensate	kJ/kg	589
Heat available	KJ/day	2,144,360
	Kcal/day	513,004.00
Make up water temperature	°C	30
Natural gas consumption in boiler (average)	M3/hr	490
Natural gas consumption in boiler (average)	M3/day	11,779
GCV of natural gas	kcal/M3	8,689
	M3/MMBTU	28
Boiler Efficiency	%	88.30%
Proposed System	**Plate heat exchanger & piping**	
Proposed feed water temperature	°C	80
Heat recovered by makeup water	kCal/day	307,803
Reduction in Natural gas consumption	M3/day	31
Energy save per hour	MMBTU/day	1.1
Annual operating hours	day/annum	330

Description	Units	Value
	Million IDR	406
Estimated investment	USD	40,000
	Million IDR	464
Payback	Months	14

5.4 Flash tower dryers (FTD's)

5.4.1 Heat recovery in Flash tower dryers (FTD)

Background

Sampoerna ,Sukorejo plant is operating one FTD for tobacco drying in PP-1 primary process area,. During the energy audit survey it was found that condensate which is coming from FTD and its venting to ambient as waste heat and it's dumping to atmosphere. It could be recovered and preheat the boiler makeup water through plate heat exchanger.

Findings

Condensate is going out at around 130 °C to 135 °C through fin tube heat exchanger with condenser exhaust fan and releasing to atmosphere.

Recommendations

Install a PHE in condensate line and pre-heat the boiler make up water in FTD.

Benefits

Additional hot water in boiler will results less natural gas consumption as well as hot water can be used in other area.

Table 17. *The Cost benefit analysis for heat recovery from FTD*

Description	Units	FTD
Present system		
Condensate temperature	°C	129
Average Condensate from FTD	Kg/hr	988
Theoretical heat available in condensate	kJ/kg	2,705
Heat available	kJ/hr	2,673,458
	Kcal/hr	639,583
Make up water temperature	°C	30
Natural gas consumption in boiler (average)	M3/hr	490
GCV of natural gas	kcal/M3	8,689
	M3/MMBTU	29
Boiler Efficiency	%	88.30%