

DETAILED WRITE-UP OF 2006-2007 PROJECTS

1. Conversion of Thermopacs and Boilers from HSD to LPG

Background of the project

We are using HSD for running of Thermopacs and Boilers in Resin house.

Observation made

As a part of our continuous exercise to reduce cost and develop a cleaner environment, we had explored usage of various cheaper yet cleaner fuels & LPG was found the most appropriate fuel available at higher calorific value and lower cost.

Technical and financial analysis

A detailed study was made with SUPER GAS and proposed to install two LPG bullets by SUPER GAS on BOM basis.

Implementation

One no. of 10 MT and one no. of 5 MT LPG bullets installed by SHV Energy in our premises on BOM (Build, own & maintain) basis. Bullet refilling to be done every 5th day with 7 ton tanker.

Thermopacs TP-20, one no. TP6 & one Revomax boiler converted to handle LPG. The above heating utilities consume 70% of the total fuel and hence maximum benefits arising out of conversion. Any contingency arising out of gap in LPG supply can be managed by running other standby Thermopacs and Boiler on HSD. After installation the consumption of LPG is monitored on monthly basis.

Energy savings per annum	:	160 MKcal
Savings in Rs.per annum	:	52 Lakhs
Investment made	:	24.3 Lakhs
Pay back	:	6 Months

LPG Yard



2. Power quality improvement

Background of the project

Capacitor panels are used to control the power factor of the total loads in the plant..

Observation made

While measuring the various parameters of the power distribution systems at Main PCC, WBU, SBU, IPU, RH such as KW, KVA, MD, voltage, current, harmonics, Power factor etc. we found variation in values at different times and different locations

Technical analysis

A detailed study was made with POWER MATRIX. Measurements are taken on the secondary load side of the main transformer on the common buss as well as each subsequent feeder downstream of the main distribution. The MaxPower™ system allows the correction of multiple problems at once, which results in energy savings and power quality

Implementation

The MaxPower™ unit is installed in LT room as well as in individual MCCs at 6 different areas in the plant. This unit samples voltage, amperage, power factor, and current threshold. After the samples have been taken, it calls for different stages and different configurations and different hybrid configurations of the stages to address a particular or multiple problems that exist. The unit then reads again to see that the steps it took corrected the problems. If the problems were not corrected, it stops and samples again. MaxPower™ unit comprises of a combination of components which include inductors, reactors, capacitors, resistors, filters, contactors, breakers, Self Diagnostic Feature's), and in some cases MaxPower™ Regulator (microprocessors).

Energy savings per annum	:	3.9 Lac KWH
Savings in Rs.per annum	:	14.1 Lakhs
Investment made	:	25 Lakhs
Pay back	:	21 Months

Power quality improvement panel



3. Replacement of old inefficient air compressor with new screw air compressor

Background of the project

Presently we are using one 470 cfm and 250 cfm, 12 years old screw compressors to fulfill the air requirement of the plant.

Observation made

During energy audit in the plant we found that we are using 11.86 KWH power per 1 KL paint production which was found very high. After this study we decided to replace the old inefficient air compressors with new compressors and some energy conservation activities in the compressed air network.

Technical analysis

After the study we decided to replace the old inefficient air compressors with new compressors and some energy conservation activities in the compressed air network.

Implementation

We have replaced the two old compressors with one 587 cfm screw compressor. As this new air compressor is air cooled we have stopped the water pump of 2.2 KW.

Separated the high pressure areas which operate at 6 bar pressure (Ex Packing machines, Pneumatic conveying diverter valves.) and low pressure areas which operate at pressures between 4 to 5 bar (Ex Diaphragm pumps, Air purging for BSM, BDM hoppers, Actuated valve operation.) We have identified 6 areas of body cleaning near charging areas and MHE maintenance area. Air guns and pressure regulators are provided to give low pressure air for cloth and body cleaning near charging areas.

Energy savings per annum	:	3.6 Lakhs KWH
Savings in Rs.per annum	:	12.96 Lakhs
Investment made	:	8 Lakhs
Pay back	8 Month	

Air Compressor



4. Replacement of old inefficient cooling water pumps in Grundfos Hydro pumping system

Background of the project

Resin House cooling tower was found to run 24 hrs per day with three pumps in operation.

Observation made

During energy audit in the plant we observed that cooling water valves were found open without utilization when process equipment were not running. Cooling water supply is required only during the cooling cycle of Reactors and Blenders remaining time no need of cooling water circulation. But irrespective of cooling water requirement all pumps are running continuously without utilization

Technical analysis

Interlocking of the cooling water valves with process equipment during running. When the valves are in closed condition the pressure in the pump discharge header will increase. Installation of pressure transmitter in the header to sense the pressure and giving feed back to the pump drive to control the speed of the pump.

Implementation

Installed the auto cutoff valves in cooling water lines of the equipment and given interlock such a way that valve open only when the agitator is in ON condition. Replaced all the old inefficient pumps with Grundfos skid mounted Hydro pumping system with inbuilt VFD and Microprocessor to control the pumps depending on the discharge header pressure. Installed one pressure transmitter in the delivery header of the pumps to sense the pressure in the header. When the equipment is not running cooling water valves closes automatically, when the valves closes pressure in the header will increase. This pressure will be sensed by pressure transmitter and will give feed back to the microprocessor in the pumping system, this microprocessor will give signal to the VFD to control the speed of the pump to match the discharge header pressure with SET pressure. There are three pumps in the system on common skid, depending on the pressure requirement ether one, two or three pumps will be in ON condition. VFD will be shifted from one pump to other pump depending on the running hours of the individual pump.

Energy savings per annum	:1.08 Lakhs KWH
Savings in Rs.per annum	:4.32 Lakhs
Investment required	:6 Lakhs
Payback	:16 Months

Grundfos Pumping System



5. Energy efficient agitator for continuously run high rated motors.

Background of the project

50 HP motors with worm and Worm gear box is running in Resin house trade Reactors.

Observation made

With advent of new technology agitators with hydrofoil design was found in the market.

Technical analysis

A detailed study was made with RATHI LIGHTENIN and proposed to install energy efficient hydrofoil design agitator with helical gear box to Reactors.

Implementation

The new energy efficient hydrofoil design agitator was installed, commissioned and performance was found satisfactory. This idea would be extended in phase wise for other Reactors in next year.

Energy savings per annum	:	1.44 Lakhs KWH
Savings in Rs.per annum	:	5.184 Lakhs
Investment required	:	9.0 Lakhs
Payback	:	21 Month

Energy Efficient Agitator for Reactor



6. Auto cut off for Cooling Tower pump in WBU cooling water system when reactor cooling is not there

Background of the project

WBU cooling tower was found to run 24 hrs per day

Observation made

While the process equipment was not running the cooling tower pumps were found to run

Technical and financial analysis

Interlocking of the cooling tower pump with the process equipment was thought off and discussed with the process owners

Implementation

Interlocking between pump and auto cutoff of cooling valves was made in the existing DCS System. When one of the cooling valves of both reactors are in open condition pump will in ON condition, if all 5 valves are in closed condition pump will switch OFF automatically.

Energy savings per annum	:	24000 KWH
Savings in Rs.per annum	:	0.865 Lakhs
Investment required	:	0 Lakhs
Payback	:	0 Months

WBU Cooling Tower Pumps



7. VFD for Cold well pump in 36 TR Chilling plant

Background of the project

Cold well pump is running continuously 24 hrs a day at different pressures at different times.

Observation made

During the study in chilling plant we observed that chilling plant load is connected to 14 Sand mills and all sand mills do not run simultaneously. At any point of time running no. of sand mills depends on process requirement.

Technical analysis

We have decided to install a new VFD with pressure transmitter in the discharge header of the pump.

Implementation

We have provided VFD for Coldwell pump of chilling plant and interlocked the VFD with pressure transmitter fitted in the discharge header of the pump. Whenever sand mills are not running pressure in the discharge header will increase and the same will be sensed by pressure transmitter which will give feed back to VFD to control the speed to maintain constant head in the discharge header.

Energy savings per annum	:	37440 KWH
Savings in Rs. per annum	:	0.70 Lakhs
Investment required	:	1.348 Lakhs
Payback	:	6 Months

V.F.D with Pressure sensor for 36 Ton Chilling plant Cold



8. Interlocking of Chilled water valves with process equipment(Sand Mills) to reduce the load on the pump as well heat load to chiller.

Background of the project

SBU Chilling plant compressor found running 20 hrs per day.

Observation made

During energy audit in the plant we observed that chilling water valves were found open without utilization, when process equipment were not running. Chilling water supply is required only during the running time of Sandmills, remaining time no need of chilling water circulation. But irrespective of chilling water requirement all valves are in open position and chilling plant is running without proper utilization.

Technical analysis

Interlocking of the chilling water valves with process equipment during running was thought off. When the valves are in closed condition the load on the chilling plant will be reduced and no. of hours running chilling plant will be reduced, at the same time load on Coldwell pump also will reduce.

Implementation

Installed the auto cutoff valves in chilling water lines of the equipment and given interlock such a way that valve open only when the Sandmill is in ON condition. Installed one pressure transmitter in the delivery header of the pumps to sense the pressure in the header. When the equipment is not running cooling water valves closes automatically, when the valves closes pressure in the header will increase. This pressure will be sensed by pressure transmitter and will give feed back to the VFD of Coldwell pump to control the speed of the pump to match the discharge header pressure with SET pressure.

Energy savings per annum	:	21840 KWH
Savings in Rs.per annum	:	0.78 Lakhs
Investment required	:	0.9 Lakhs
Payback	:	14 Months

Sandmill with Auto cutoff Valves



9. Elimination of running of additional Cooling Tower for D.G. Sets

Background of the project:

Two cooling towers were running continuously when the power goes and D.G. Sets are in ON condition.

Observation made

In order to meet the total heat load of four D.G. Sets both the cooling towers were run continuously.

Technical analysis

After conducting heat load study and effectiveness of the cooling tower we found that the Cooling Water requirement for 4 D.G.Sets can be served by only one cooling tower instead of two cooling towers.

Implementation:

The Cooling loop was modified and interconnected all 4 D.G. sets cooling water lines to both of the cooling towers and taken trial with 4 D.Gs on one cooling tower. Trial was taken for continuous 48 hours operation without stopping the D.Gs at full load. Now one cooling tower became standby.

Energy savings per annum	:	2880	KWH
Savings in Rs.per annum	:	0.3168	Lakhs
Investment required	:	0.1	Lakhs
Payback	:	4	Months

Interconnections in between Cooling Towers

