

Ballarpur Industries Limited Unit, Shree Gopal Yamunanagar

UNIT PROFILE

Ballarpur Industries Limited (BILT) is the flag ship company of the reputed Thapar Group of Industries and acknowledged as leaders in pulp & paper industry comprising of six Pulp / Paper mills and contributes 15% of country's overall paper production, with manufacturing 60% of country's value added and specialty paper. BILT- Unit Shree Gopal, Yamunanagar which was established in 1936 with 52 MT capacity is now producing 220 MT of speciality grade, high value added premium paper. The unit is ISO 9001 certified with state of art DCS controlled pulp mill with first unit in India to go for medium consistency Chlorination and Eco friendly bleaching sequence and CLO2 plant based on R8 process. The unit also Off line blade coater with latest technology.

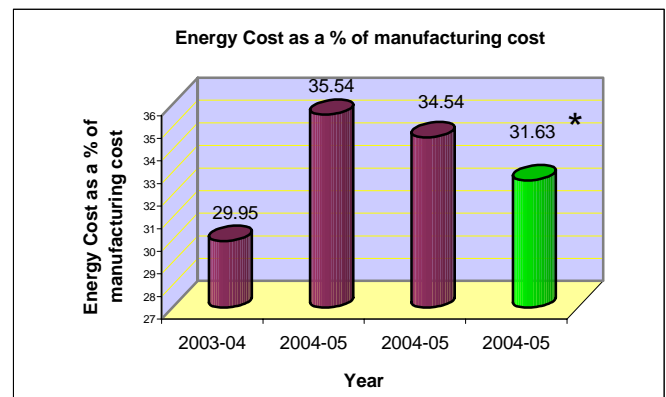
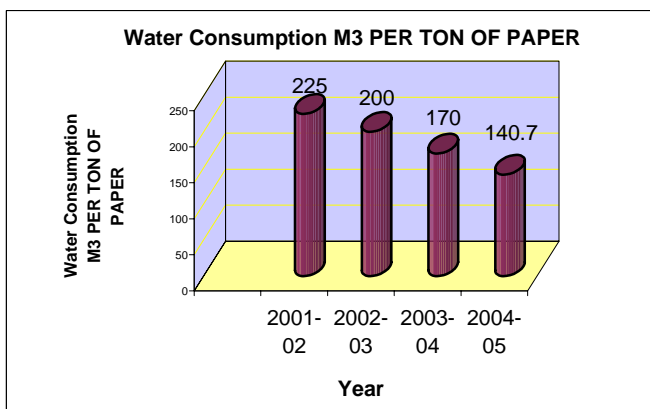
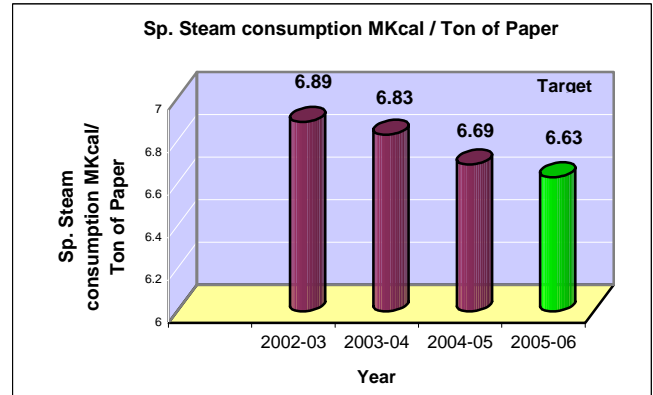
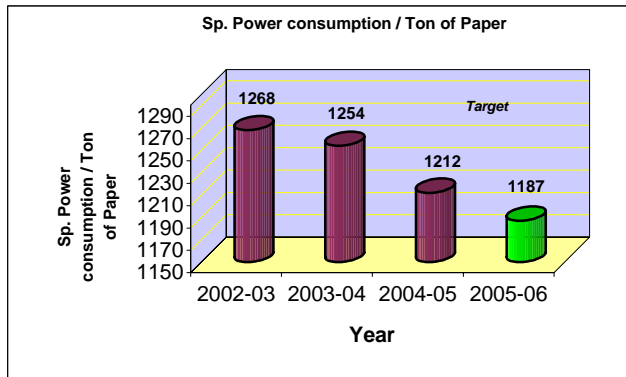


BILT-SGU like any other paper industry is highly energy intensive. Company's commitment to manage its energy resources in an efficient manner, beginning at the highest level, is a prerequisite to its success and have been regular recipient of prestigious National Energy Conservation Award by Govt. of India for past many years. By and large all the thrust for energy efficiency in the industry comes from the top management with identification and implementation comes from the respective departments and supported by Energy Cell.

ENERGY CONSUMPTION

With various energy conservation measures implemented on year to year basis, the Specific Electrical Consumption has shown continuous downward trend and reductions achieved are 2.88 % during 2004-05 compared to 2002-03 as illustrated by performance figures given below.

DESCRIPTION	UNIT	2002-03	2003-04	2004-05
Annual Production	MT	72622	72116	77595
Total Coal Consumption	MT	145515.43	149549.8	148781.43
Total Electrical Energy Consumption (Paper)	Lacs KWH	906.21	926.13	962.35
Specific Energy Consumption Electrical (Paper)	KWH / MT	1248	1254	1212
Total Thermal Energy Consumption (Paper)	Million Kcal	482814.38	493294.17	519299.96
Specific Energy Consumption Thermal (Paper)	Million Kcal / MT	6.67	6.84	6.69
Total Manufacturing Cost	Lacs Rs.	16434.85	14198.25	16858.94
Total Energy Cost	Lacs Rs.	4922.5	5045.74	5823.41
Energy Cost as % of manufacturing Cost	%	29.95	35.54	34.54



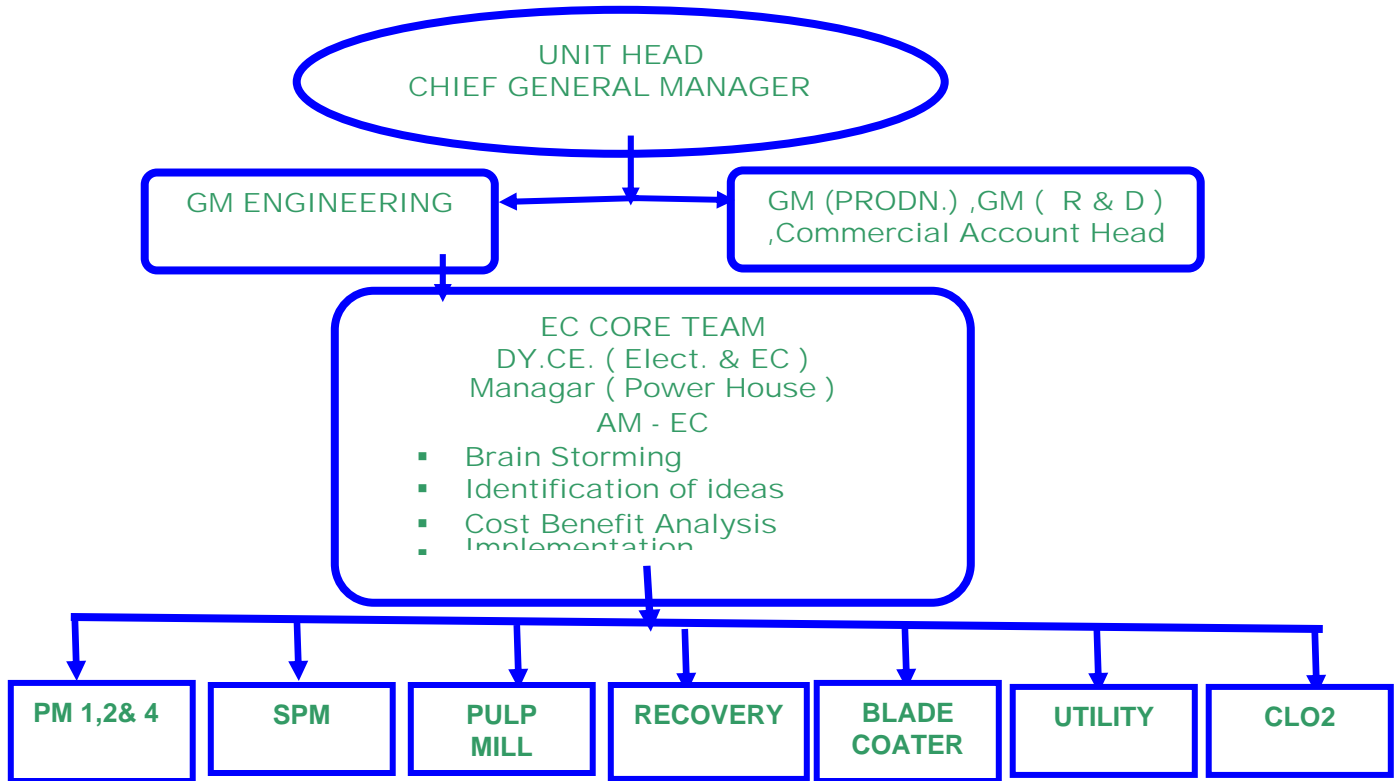
*Coal cost in 2004-05 was Rs. 3290 per MT against 2920 in 2003-04. Had coal cost remained same, energy cost as % of manufacturing would have been 31.63 % against actual 34.54 during 2004-05.

ENERGY CONSERVATION COMMITMENT, POLICY & SET UP (Please include a photocopy of unit's Energy Conservation Policy if any) Salient Features Of Energy Conservation Cell

Top management of the unit is the driving force behind the Energy Conservation activities of the Mills. There is an "Energy Cell" in the Unit since 1985, which is headed by Deputy Chief Engineer (Electrical) who is assisted by 7 nos. of cross-functional team in Paper Machines (2 Nos, Pulp Mill, Recovery, Blade Coater, Utility & CIO2). **Two members of core team are certified Energy Managers as per EC Act 2001.**

The departmental EC team is headed by respective heads of all the process and utility Sections and supported by management staff and senior workmen of Electrical & Mechanical engineering. **The total strength of Qualified Engineers and technicians in 7 nos. of Departmental Energy Conservation team is 63.** These sub teams periodically meet the core team for review; Brainstorming for new ideas and implement identified energy saving ideas.

ENERGY CONSERVATION TEAM STRUCTURE



ENERGY CONSERVATION ACHIEVEMENTS

Through such small group activities following TQM Methodology we could save Rs 20563 Lacs worth of energy by implementing total of 70 nos. (including those for water conservation) of proposals during the period 2002-2005 out of which Rs. 9608 Lacs worth of energy was saved by implementing 23 nos. of proposals during 2004-05.

Major Energy Conservation Projects Implemented During 2004-05

1) Installation of Variable frequency Drives on identified pumps in NPM & Fan in Lime Kiln.

In New Pulp Mill, upon undertaking study of pumps in respect of designed flow & head and matching it with process requirement of flow and head, it was that in case of four pumps, discharge valve is throttled in varying proportion depending on bleached pulp requirement of process.

In case of rotary Lime Kiln, Delivery valve of ID fan was again throttled in varying proportion depending on Lime production requirement.

VFD's were installed at these five locations. Savings achieved are as detailed below.

Total Investment: - Rs. 16.25 Lacs

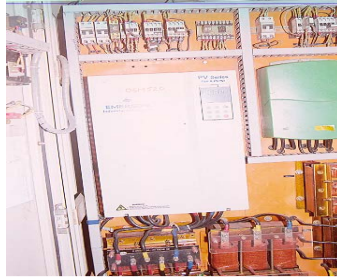
**Energy saved: - 72 KW * 8760 Hrs. per annum * 90% uptime *Rs. 2.39 per KWH
= Rs. 13.60 Lacs,**

Payback period: - 14 Months

VFD on Vat Dilution Pump in NPM



VFD on Launder Dilution Pump in NPM



VFD in ID Fan in Rotary in lime Kiln

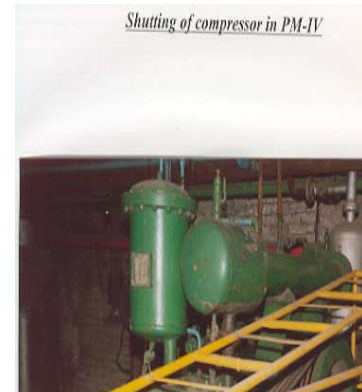


2) Shutting of reciprocating air compressor.

For Paper Machine No. I, II & IV, two nos. of non-lubricated, reciprocating air compressors rated 1100 / 200 KW & 400 CFM / 90 KW are installed. By optimizing RPM of 1100 CFM compressor and overhauling of both compressors where all the suction / delivery valves / air filter were changed, optimizing main header pipe line size, plugging air leakages, 400 CFM Air Compressor is totally shut & 1100 CFM Compressor is running in capacity control mode by activation of continuous loading / unloading cycles. Resulting in saving of Rs. 7.93 Lacs / Annum.

Investment: - 0.30 Lacs

Annual Savings: - Rs 7.93 Lacs, Payback: - 15 days



3) Use of Dynamix – F (Multi Functional Energy Saving Fuel Additive) for reducing Fuel Oil Consumption.

In our Rotary Lime Kiln with a rated production capacity of 60 TPD CaO, 12000 Ltrs. Of RFO is consumed per day. The Fuel Oil suffers from following deficiencies.

- 4) Pre-Combustion Problems: -
Choking of Fuel Oil Filter & Pipe Line due to sludge formation.
- 5) Combustion Problems: -
Higher viscosity & Inferior quality leading to poor Atomization and thus poor combustion.
- 6) Post Combustion Problems: -
Formation of slag due to presence of Sulphur & Vanadium.

By use of Dynamix-F, Savings of Rs. 11.76 Lacs per annum has been achieved as illustrated below.

CALCULATIONS

4. Daily Consumption of RFO: - 12000 Ltrs.
5. Reduction in RFO consumption by usage of Dynamix-F (4%): - 480 Ltrs.
6. Monetary Savings per Day: - Rs.13.00 per Ltr. Of RFO * 480 Ltrs. RFO savings= Rs. 6240/-
4. Quantity of Dynamix-F required per Day = 11.5 Ltrs.
Cost of Dynamix –F per Day: - Rs. 250 per Ltr.* 11.5 Ltrs. Per day = Rs. 2880
Net Monetary Savings per day in RFO consumption: - Rs. 3360 /-
- Net Monetary Savings per annum: - 3360 * 350 days per annum of operation = Rs. 11,76,000 /-



Energy Conservation Plans and Targets

The mill is committed to further improve its energy performance by implementation of following major projects during 2005-06.

- Installation of VFD on identified Pumps with Investment of Rs. 16.00 Lacs & Energy Savings of Rs. 15.80 Lacs.
- Replacement of Inefficient Pumps and motors with Investment of Rs. 11.80 Lacs & Energy Savings of Rs. 7.53 Lacs.
- Reduction in coal consumption by Installing new heat exchanger in DM plant, replacing ineffective steam traps on PM-I & Installing online O₂ analysers on HP Coal Boilers with Investment of Rs. 22.00 Lacs & Energy Savings of Rs. 13.08 Lacs.
- Installation of New thermo compressor based cascading system on PM-5 with Investment of Rs. 80.00 Lacs & Energy Savings of Rs. 53.20 Lacs.

ENVIRONMENT & SAFETY

SAFETY

Company has also full-fledged safety department to look after the safety of plants and the employees. The main activities are Conduction of regular training programmes on safe work practices for permanent / casual / contract workmen ,Celebration of Safety week in March every year during which essay / slogan and sketches competition is conducted , Annual Safety Audit by external agency, Yearly Health checks up of employees working in hazardous area and Chemical plants, Monitoring of Work Permit System , On site emergency plans & Conducting Safety / Fire Drill and demonstrations.

ENVIRONMENT

BILT, Yamunanagar is an environmentally conscious Unit and is committed towards continuous improvement of environmental performance by reducing air emission, process effluents and solid wastes and has taken following measures towards this objective.

a) WATER EFFLUENT

- During the period 2002-2005 reduction in AOX enhanced CLO₂ substitution of CLO₂ from 11-30 %, Now AOX is in the range of 0.5 to 0.7 kg /MT of paper
- During the period 2002-2005, measures have been taken with Investment of around Rs. 70.0 lacs annum to reduce water consumption from 225 M³ to 141 M³ per Ton of Paper and effluent discharge from 245 M³ to 160 M³ per Ton of paper.
- During the period 2002-2005, Use of treated effluent in the process as well as for gardening in the mills and colony.

b) AIR

- Our all the four nos. of Coal fired Boilers and two nos. of soda recovery boilers have ESP in operation since 1997-98.
- During the year 2004-05, two nos. of new ESP's supplied by Thermax, Pune were installed as under.
- One ESP for rotary Lime Kiln in January 2005 with design emission of 80 mg/ Nm³.
- Second ESP was installed in June 2005 on ABL recovery Boiler with design emission of 80 mg/ Nm³. This ESP has replaced old flakt design ESP that was in service for last 20 years and emission had increased abnormally. **The air emission has come down to 80 mg / Nm³ against 150 mg / Nm³ limits set by State Pollution Board. The recovery efficiency has also gone up from 94.3% to 95% giving additional monetary gain of 60.00 Lacs per annum by way of recovered sulphate.**

c) SOLID WASTE

Till now, lime sludge being generated in recausticizing process was disposed in waste low lying area. Rotary lime Kiln has been installed during 2004-05 to recycle the sludge & in operation since Jan-05. The quantity of solids generated and disposed has come down from 100 TPD to 8 TPD dry.

Write up on projects 2004-05

Trend Setter

Use of Dynamix – F (Multi Functional Energy Saving Fuel Additive) for reducing Fuel Oil Consumption.

In our Rotary Lime Kiln with a rated production capacity of 60 TPD CaO, 12000 Ltrs. Of RFO is consumed per day.

The Fuel Oil suffers from following deficiencies.

- 1) Pre-Combustion Problems: -
Choking of Fuel Oil Filter & Pipe Line due to sludge formation.
- 2) Combustion Problems: -
Higher viscosity & Inferior quality leading to poor Atomization and thus poor combustion.
- 3) Post Combustion Problems: -
Formation of slag due to presence of Sulphur & Vanadium.

By use of Dynamix-F, Savings of Rs. 11.76 Lacs per annum has been achieved as illustrated below.

CALCULATIONS

1. Daily Consumption of RFO: - 12000 Ltrs.
2. Reduction in RFO consumption by usage of Dynamix-F (4%): - 480 Ltrs.
3. Monetary Savings per Day: - Rs.13.00 per Ltr. Of RFO * 480 Ltrs. RFO savings= Rs. 6240/-
4. Quantity of Dynamix-F required per Day = 11.5 Ltrs.
Cost of Dynamix –F per Day: - Rs. 250 per Ltr.* 11.5 Ltrs. Per day = Rs. 2880
Net Monetary Savings per day in RFO consumption: - Rs. 3360 /-
Net Monetary Savings per annum: - 3360 * 350 days per annum of operation = Rs. 11,76,000 /-



Project No-2.

Installation of VFD on Launder Dilution Pump in NPM

Launder Dilution Pump 06M 520 is designed for Q: 276 m³/ hr, H: 35 m. It was operating with valve opening of 45%, which is an energy inefficient mode of control as throttling leads to large waste of energy and was taking 45 kW power. Installed Variable speed drive with speed control from zero to 100%, resulted in power savings of 12.0 KW with annual monetary gain of Rs. 2.27 Lacs

Investment: - 2.25 Lacs

Annual Savings: - Rs 2.27 Lacs

Payback: - 11 months.



Project No-3

Installation of VFD on Blow Stock pump of NPM

In NPM Blow Stock pump is designed for Q: 540 m³/ hr, H: 40 m, It is operating with valve throttling of 15 % and taking 65 kW. Installed Variable speed drive with speed control from zero to 100%, resulted in power savings of 15.0 KW with annual monetary gain of Rs. 2.82 Lacs.

Investment: - 5.50 Lacs

Annual Savings: - Rs 2.82 Lacs

Payback: - 23 months.



Project No-4

Installation of VFD on EO washer in NPM

In NPM EO washer pump is designed for Q: 480 m³/ hr, H: 25 m .It was operating with valve throttling of 40 % and taking 35 kW. Installed Variable speed drive with speed control from zero to 100%, resulted in power savings of 12.0 KW with annual monetary gain of Rs. 2.27 Lacs.

Investment: - 2.75 Lacs

Annual Savings: - Rs 2.27 Lacs

Payback: - 14 months.



Project No-5

Replacement of 40 HP motor with 15 HP in weak wide liquor pump in causticizing plant.

In causticizing Plant, for weak white liquor pump, 40 HP pump /motor combination was used. The delivery was throttled to around 60%. New 15 HP energy efficient motor / pump was purchased and installed which has resulted in power savings of 15.00 KW amounting to saving of Rs. 2.82 Lacs / Annum.

Investment: - 1. 90 Lacs

Annual Savings: - Rs 2.82 Lacs

Payback: - 9 months.

Project No-6

Replacement of inefficient feed pump in soda recovery Chemical House.

Replaced inefficient feed pump in soda recovery chemical house with energy efficient pump. This has resulted in power savings of 3.00 KW amounting to saving of Rs. 0.55 Lacs / Annum.

Investment: - NIL Lacs

Annual Savings: - Rs 0.55 Lacs

Payback: - Instant

Project No-7

Installation of VFD in ID Fan in Rotary Lime Kiln.

To vary ID fan speed of rotary limekiln as per process requirement. Installed Variable frequency drive with speed control from zero to 100 %, this has resulted in power savings of 25.0 KW with annual monetary gain of Rs. 4.73 Lacs.

Investment: - 3.00 Lacs

Annual Savings: - Rs 4.73 Lacs

Payback: - 8 months



Project No-8.

Reduce RPM of Secondary Air Fan of Rotary Lime Kiln.

To reduce Secondary Air Fan speed of Rotary Lime Kiln as per process requirement, Changed 40 HP / 1500 RPM motor to 30 HP / 1000 RPM resulting in power savings of 5.0 KW with annual monetary gain of Rs. 0.95 Lacs.

Investment: - 0.10 Lacs

Annual Savings: - Rs 0.95 Lacs

Payback: - 2 months

Project No-9

Replaced inefficient sludge filter Vacuum pump in soda recovery.

In soda recovery sludge filter, inefficient Vacuum pump running while developing lower Vac. of 300 mm Hg and consuming 115 KW power. Installed energy efficient vac. pump (surplus available) with high vac. & low capacity, this has resulted in power savings of 55.0 KW with annual monetary gain of Rs. 10.34 Lacs.

Investment: - NIL Lacs

Annual Savings: - Rs 10.34 Lacs

Payback: - Instant



Project No-10.

Installing clock timers in UTM Pulper.

On PM-IV, 2 nos. pulper agitators have been installed on UTM pulpers each rated 75 KW. The earlier practice was to keep one pulper running continuously and second pulper was started during paper breakage. The second pulper was manually stopped by operator. Also PV blower installed on dryer hood for NCG removal was running continuously. The run hours of second pulper and PV system blower has now been optimized by installing clock timers. Second pulper is now switched off 20 minutes after manual start up and PV blower runs only during night hours. resulting in saving of Rs. 9.46 Lacs / Annum.

Investment: - 0.08 Lacs

Annual Savings: - Rs 9.46 Lacs, Payback: - Instant

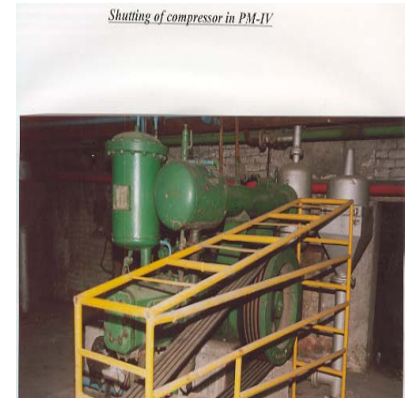
Project No-11.

Shutting of reciprocating air compressor.

For Paper Machine No. I, II & IV, two nos. of non-lubricated, reciprocating air compressors rated 1100 / 200 KW & 400 CFM / 90 KW are installed. By optimizing RPM of 1100 CFM compressor and overhauling of both compressors where all the suction / delivery valves / air filter were changed, optimizing main header pipe line size, plugging air leakages, 400 CFM Air Compressor is totally shut & 1100 CFM Compressor is running in capacity control mode by activation of continuous loading / unloading cycles. Resulting in saving of Rs. 7.93 Lacs / Annum.

Investment: - 0.30 Lacs

Annual Savings: - Rs 7.93 Lacs



Project No-12

Shutting of reciprocating air compressor.

For Powerhouse, three nos. of lubricated, reciprocating air compressors rated 500 CFM with 75 KW motors and another two nos. lubricated reciprocating air compressors rated 100 CFM are with 22 KW motor installed. Out of this two 500 CFM & two 100 CFM compressors are running continuously. By optimizing RPM of compressors and overhauling of each compressors where all the suction / delivery valves / air filter were changed, plugging air leakages, one 500 CFM & one 100 CFM Air Compressors are totally shut Resulting in saving of Rs. 9.46 Lacs / Annum.

Investment: - 0.50 Lacs

Annual Savings: - Rs 9.46 Lacs

Payback: - One month



Project No-13

Optimize speed of Couch pit agitator.

Process stability was confirmed by RPM reduction achieved thru VFD run. Based on the conclusion, motor pulley of Dia -210 mm was installed against original 355 mm. At this pulley size, agitator rpm was reduced by 40 %.

Investment: - 0.10 Lacs

Annual Savings: - Rs 0.37 Lacs

Payback: - 3 months.

Optimize Trim-conveying line and pipe lay out at synchro sheeter.

In Syncho Sheeter, 2 nos. of trim blower each rated 20 KW were used to blow away paper trims from sheeter to trim pulper. By slightly increasing RPM of one blower and increasing header size to 8 inch for better discharge of trim, one blower has been shut down.

Investment: - 0.25 Lacs

Annual energy Savings: - 1.70 Lacs

Payback: - 2 months



Project No-15

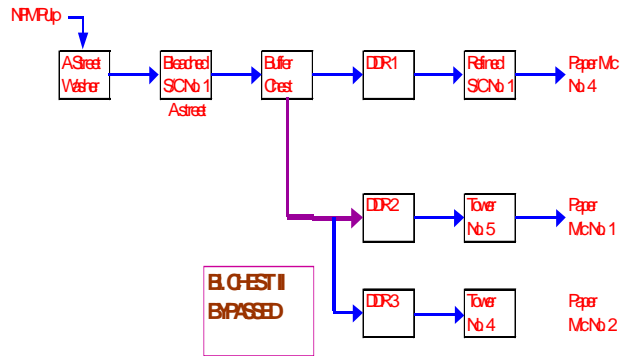
Common Bleached Stock chests.

Common Bleached Stock chests provided for PM-I, II & IV and bypassed one old chest earlier used which has saved Power consumption in Running of agitator. This has resulted in power savings of 13.0 KW with annual monetary gain of Rs. 2.44 Lacs.

Investment: - 0.10 Lacs

Annual energy Savings: - 2.44 Lacs

Payback: - 1 months



Project No-16

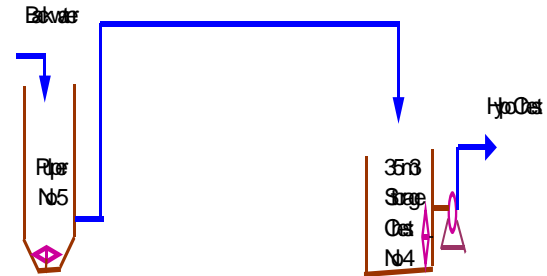
By passing Broke Storage towers no. 9

Broke pulp from pulper is now directly pumped in mixing chest bypassing broke storage tower no. 9. This has resulted in power savings of 2.0 KW with annual monetary gain of Rs. 0.38 Lacs

Investment: - 0.10 Lacs

Annual energy Savings: - 0.38 Lacs

Payback: - 3 months



Project No-17

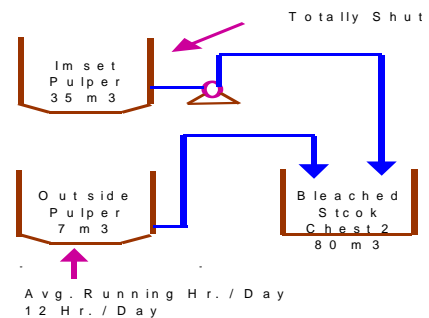
Shutting of imset pulper.

By optimizing run hours of efficient broke pulper and changing its impeller, one inefficient pulper has been shut. This has resulted in power savings of 13.0 KW with annual monetary gain of Rs. 2.44 Lacs

Investment: - NIL Lacs

Annual energy Savings: - 2.44 Lacs

Payback: - Instant



Use of low-pressure air for cooling.

In paper Machine No. 7, usage of compressed air for Kuster calender cooling has been stopped by using axial blower, which is delivering more air volume at lesser pressure. This has resulted in compressor unloading more often giving net savings of 20 KW.

Investment: - 1.00 Lacs

Annual energy Savings: - 3.78 Lacs

Payback: - 4 Months

Project No-19

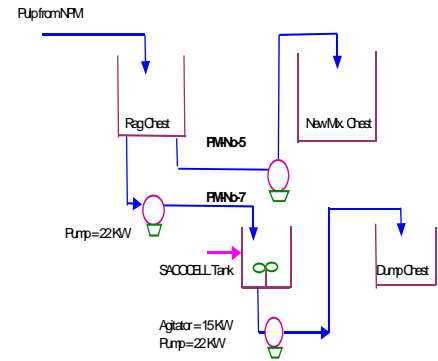
Bypassing Hydra pulper.

At PM-7, hydra pulper was used for batch preparation of NPM pulp as well as imported pulp bales, Pulp from NPM is taken to rag chest PM-5. New pump is provided to pump the pulp directly to Dump chest PM-7, Hydra pulper running hours is reduced, this has resulted in power savings of 18.0 KW with annual monetary gain of Rs. 3.39 Lacs

Investment: - 0.10 Lacs

Annual energy Savings: - 3.39 Lacs

Payback: - 1 Months



Project No-20

Improvement in overall condensate recovery.

Overall condensate recovery has been improved by 8 % by taking the following action

- Immediate attending leaking lines/steam traps
- Physical checking of condensate recovery in all process depts.
- Regularly checking the quality of Pulp Mill & Paper Machine Condensate to avoid draining of entire condensate in case of any contamination.

The above measure resulted in increased condensate recovery by 6 %. Annual saving worth Rs. 13.16 Lakhs with small investment of Rs. 0.50 Lakhs.

Investment: - 0.50 Lacs

Annual energy Savings: - 13.16 Lacs

Payback: - ½ Months

Stoppage of Electric Boiler Feed Water Pump.

In Old powerhouse 320Hp Electric feed pump is running to supply feed water to MP Boiler no-7 & JMW. It was found that in case of 1 HP Boiler shut, excess steam supply is available to run steam feed pump. Surplus steam available for 60 days a year during shut of either of HP Boiler is used to operate MP feed water pump enabling shutdown of electric feed pump this has resulted in power savings of 31.0 KW with annual monetary gain of Rs. 5.86 Lacs.

Investment: - NIL Lacs

Annual energy Savings: - 5.86 Lacs

Payback: - Instant

Replace AL blade with FRP Blade.

In CLO2 Plant Cooling Tower, changing heavy weight blades with new aerodynamic lighter weight FRP Blade, this has resulted in power savings of 4.0 KW with annual monetary gain of Rs. 0.76 Lacs

Investment: - 0.50 Lacs

Annual energy Savings: - 0.76 Lacs

Payback: - 10 months



Project No-23

Insulation of uninsulated steam line.

Insulation was provided on different lengths of steam carrying pipelines and tanks having hot liquor throughout the mills, which has resulted in energy savings of 6.58 Lacs per month. The KCAL saved was 1056 Million KCAL equivalent to 200 Tons of Coal.

Investment: - 8.00 Lacs

Annual energy Savings: - 6.58 Lacs

Payback: - 16 months

