

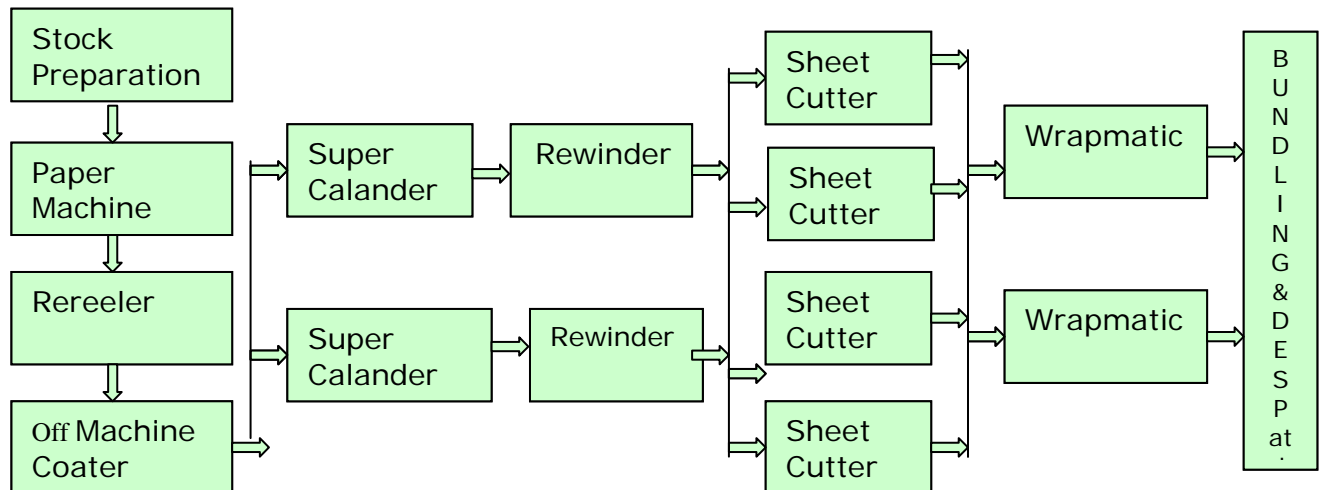


Ballarpur Industries Limited

Unit -Bhigwan



Simple schematic diagram of the production process along with view of plant



: ENERGY POLICY :

We, Ballarpur Industries Limited - Unit Bhigwan, manufacturer of coated paper are committed to provide

- ❖ Continual improvement in our working to maximize efficiency and achieve resource conservation like water, power, steam, air, oil and coal.
- ❖ Operate reliable processes and reduce cost through efficient use of energy resources / renewable energy sources.
- ❖ To ensure that all statutory rules and regulation related to energy management are followed.
- ❖ To minimize the waste generation and disposal in enviro – friendly way
- ❖ Create a participative, motivating and challenging environments amongst our employees to strive for highest degree of energy conservation and achieve national / international Benchmark.

June 10, 2004

**Neehar Aggarwal
(Vice President – Operations)**

Ballarpur Industries Limited, unit Bhigwan (formerly known as Bilt Graphic Papers Ltd.) is an ISO 9001, 2000 & ISO 14001,1996 company. It is one of the largest state-of-the-art Paper Mill, with a capacity to manufacture 1,15,000 tpa of coated wood free paper of various grades based on 100% imported pulp at village Bhadalwadi, Taluka Indapur, Dist. Pune, Maharashtra.

Plant and machinery includes :



Stock Preparation



Paper Machine



Off Machine Coater



Re-Reeler



Super Calander



Sheet cutter



Despatch



Wrapmatic

Manufacturing process

Our process starts from stock preparation where slushing in pulpers, deflacking, refining, centri cleaning activities are carried out. Refiners, pulper are run by 500 KW, 350 KW HT motors respectively. In Paper Machine on line coating is done at BTG coater and base paper is produced. This base paper is processed in OFF MACHINE COATER to produce coated paper. The coater has 4 coating stations with Electrical Infra red dryers and 4 cylinder groups where steam is used for paper drying. The coating chemicals / colour is produced in colour kitchen. The coated paper is processed in the fully automated Finishing house equipped with Super calendars, Rewinders, Synchro fly sheet cutter, ream wrapping machines and bundling machines.

The 30 MW cogeneration thermal power plant is equipped with High pressure CFBC boiler and extraction cum condensing turbine. Steam requirement for the paper plant is supplied thru extraction and power is generated partly (20%) with extraction and mostly (80%) by condensing. The balance power after meeting the paper plant requirement is exported to MSEB grid. The process flow chart with equipment details is enclosed for reference.

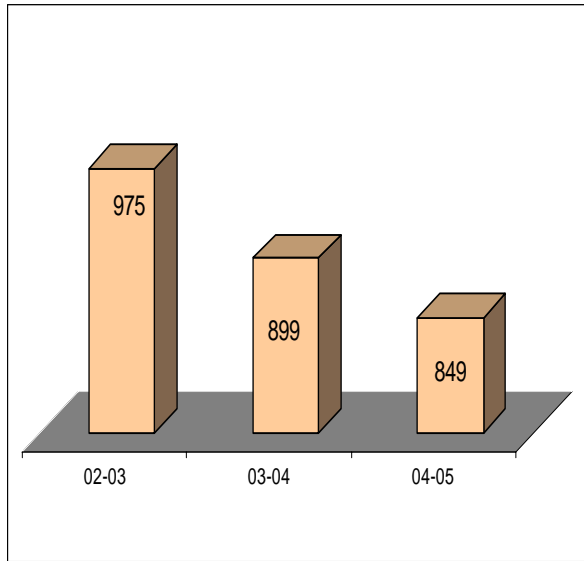
Energy Consumption

With consistent effort and sustained focus on Energy consumption, controlled use, its analysis and implementation of various energy consumption projects the specific energy consumption has reduced and the production quantity along with quality is improved.

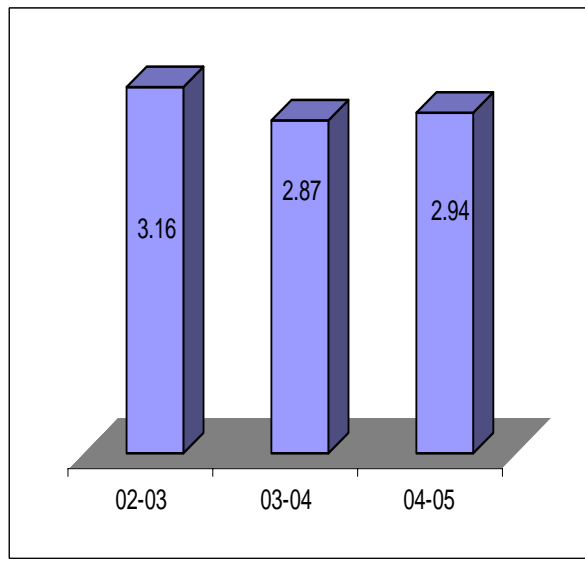
Description	Unit	2002-03	2003-04	2004-05
Annual production	MT	102045	113102	116907
Electrical Energy Consumption	Lakh KWH	994.47	1016.29	992.05
Specific electrical Energy Consumption	Kwh / Ton	975	899	849
Specific Thermal Energy Consumption	Ton /Ton	2.78	2.49	2.58
Specific water Consumption	Cub. Mtr /Ton	26.68	24.39	22.45
Energy cost as % of manufacturing cost	%	11.30	10.24	11.25
Coal GCV	KCAL	4355	4603	4608
Coal cost	Rs / Cal	0.40	0.39	0.48

Graphical Presentation of Energy Consumption

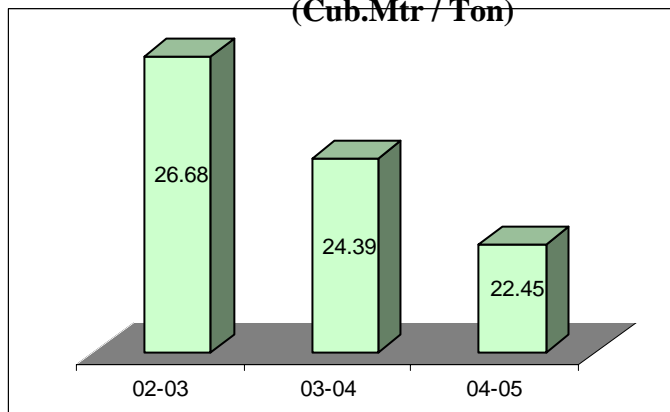
Specific Electrical Energy Consumption (KWH / Ton)



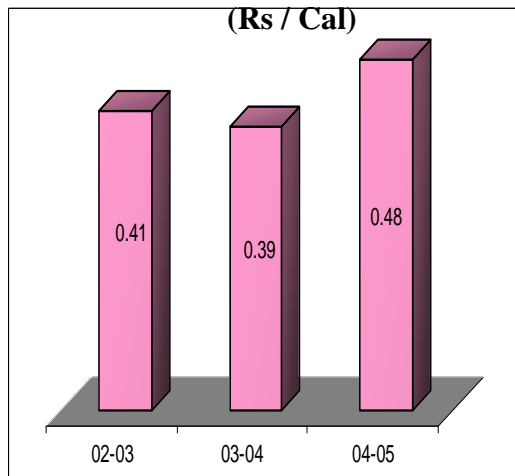
Specific Thermal Energy Consumption (Steam ton / Ton)



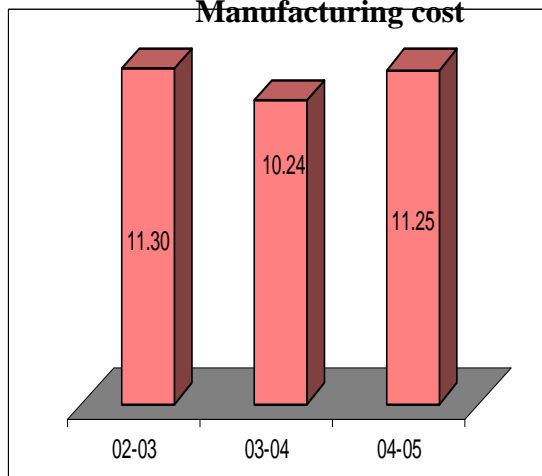
Specific Water Consumption (Cub.Mtr / Ton)



Increase in coal price (Rs / Cal)



Energy cost as a % of Manufacturing cost



Energy conservation Commitment, Policy and Set Up

We at BILT are committed for effective energy utilization. Our Energy Policy, Energy cell set up, energy monitoring and reporting system, Implementation strategy etc. is detailed in point no. 13 In the year 2004 – 05 , eight major energy saving projects are implemented. The investment made is Rs 206.50 Lacs resulting in total saving of around Rs 273.57 lacs.

The summary of projects is as below:

1. Installation of Variable Frequency Drives



Annual Savings : Rs 104 Lakhs

Investment made : Rs 60.0 Lakhs

2. Installation of HT Capacitors



Annual Savings : Rs 5.46 Lakhs
(Excluding PF rebate)

Investment made : Rs 10.0 Lakhs

3. Installation of Steam Soot Blower



Annual Savings : Rs 93.73 Lakhs

Investment made : Rs 100.0 Lakhs

4. Installation of 75 KW pump in WTP

Annual Savings : Rs 8.70 Lakhs

Investment made : Rs 6.0 Lakhs



**Write-up on the Energy Conservation Project Implemented
(Year 2004-2005)**

1 - Tap changing of the power transformer

Back-ground of the project :

- * The motors are rated for 415 V +/- 10%
- * Rated secondary voltage of xmer is 433 V
- * Reducing the transformer secondary voltage up to motor rated terminal voltage will result in energy saving.

Observations made :

The operating secondary voltage of the transformers was in the range 428 to 440 V AC.

Check the running loads of the motor. The motors are not loaded to its Loaded up to rated capacity. Applying 415 V at motor terminal by reducing the secondary voltage of the transformer will reduce the motor fixed losses as well as electrical system losses and increase the motor efficiency.

Technical and financial analysis :

Annual Energy saving : 7.56 Lakhs Unit
Annual Saving in Rs : 31.27 Lakhs
Investment made Rs : 0.0



Transformer Tap position

Implementation:

Reduced the tap position from 3 to 2 . Measured the transformer secondary voltage, it is in range 410 to 416 V. Performance observed found satisfactory.

2 - Bio-refining for Stock-preparation

Back-ground of the project

To increase the production rates, refining was bottle neck. Refining power enhancement by installing higher KW motor was under consideration. To avoid capital Investment, brain storming done for other measures to reduce refining requirement. Process initiative of Biorefining has come up.

Where in the Bio- enzymes to be used to improve the pulp fiber properties and reduce refining requirements.

Observation made

Lab trials were conducted, desired results achieved. Plant trial taken, similar results obtained. Refiner Loadings are reduced. Energy saving and improvement in paper quality are the out come of Bio-refining by use of

Uni enzymes in stock preparation area.



Refiner in stock Preparation

Technical and financial analysis

Energy saving : 5.88 Lakhs Unit

Saving in Rs : 24.32 Lakhs

Investment made Rs : 30.0 Lakhs

Implementation

Bio refining is implemented as normal practice in the stock preparation. Resulted in de bottle necking of refining capacity. The capital investment for increasing motor KW was avoided.

03 - Single blade operation of Off machine coater

Back-ground of the project

OMC has 4 coating stations. Where 2 layer of coating is done. Market demands single coating in chromo grade paper. Coating is done in only two coater heads during the run of chromo grade paper. Other coating station and cylinder group were also running. Envisaged the possibility of energy saving with modification in operation / control logic.

Observation made

Done the necessary modifications and trial taken, found the operation successful. Resulted in saving of 500 KW/Hour. This operation is done for 22 hours in one month. This time is spared for carrying out the maintenance of the bypassed coating stations.

Technical and financial analysis

Following are the details of our analysis

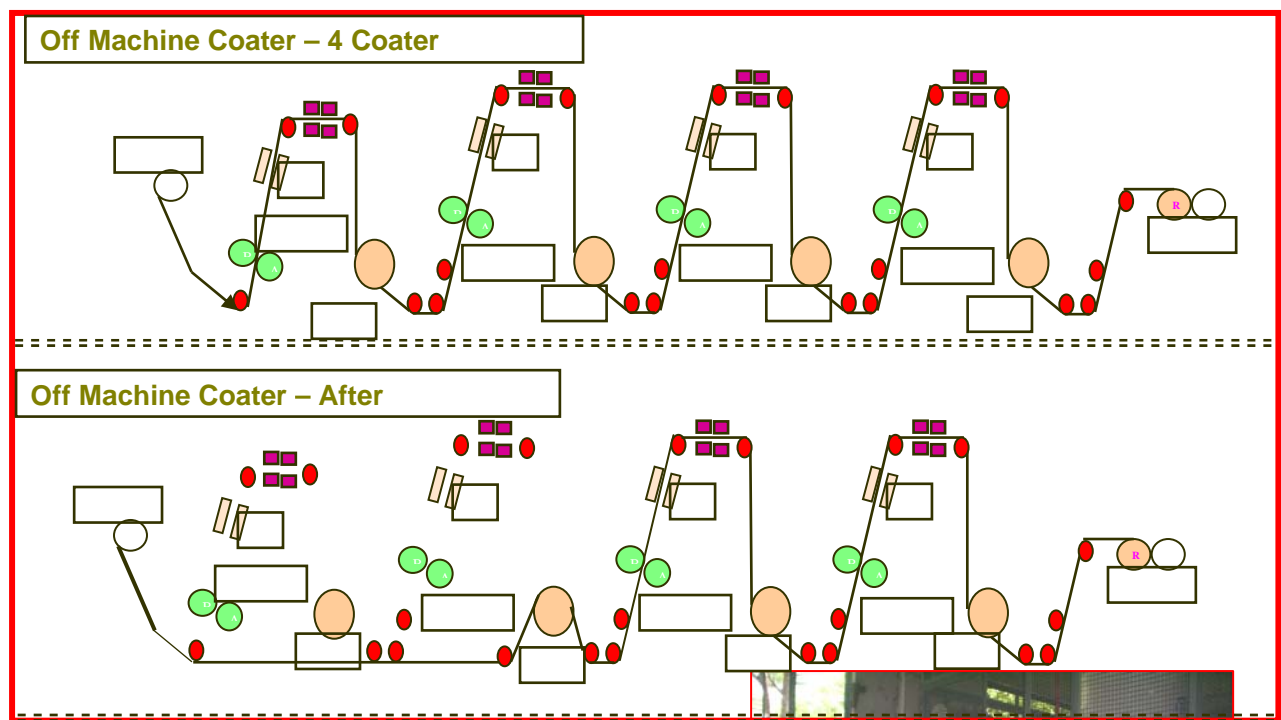
Energy saving : 1.32 Lakhs Unit

Annual Saving in Rs : 5.46 Lakhs

Investment made Rs : Nil

Implementation

Now this system will be implemented for the machine operation for 22 hours in a month



4 - Installation of HT Capacitor

Back-ground of the project

The average power factor of the mill was 0.93



Power import from MSEB is only during Power plant shut or TG tripping. To maintain the maximum demand within limit, paper plant has to run with load restrictions. To draw more active power from grid without exceeding MD project is undertaken. Planned to install HT capacitors (11 KV and 6.6 KV) close to load centre in power plant and paper machine HT Switch-boards to improve the power factor.
11 KV H.T. Capacitor

Observation made

1800 KVAR HT capacitor installed and found the improvement of power factor up to 0.99 during power plant shut. Recorded Maximum demand reduced by 10%. Paper plant run without any load restrictions. Power factor incentive obtained from state electricity board.

6.6 KV H.T. Capacitor

Technical and financial analysis :

Annual Energy saving : 1.32 Lakhs Unit

Annual Saving : Rs 5.46 Lakhs

Investment made : Rs 10.0 Lakhs

Implementation:

Capacitor installed and found the less maximum demand recording with increased power-factor.



5 - Installation of Variable Frequency drive

Back-ground of the project

The idea of installing VFD was found out as a result of electricians brain storming session for preventing motor burnouts due to frequent start / stops. The concept was discussed in small group of technicians and shift executive. The idea of installing VFD for smooth start up was converted into energy conservation opportunity by the group (considering blower application & affinity law). The effort for exploring the possibility of speed reduction of motor got initiated.

Observation made

Total 19 number drives of ratings 110 KW - 7, 30 KW - 4 & 15 KW - 8 are selected under this project . All these blowers are started by DOL starter. A sample study on 110KW motor conducted. Damper closed 20 to 30%. Motor running load was 65 to 70 KW. Opportunity of motor speed reduction was available. TQM project for Energy Conservation project was taken.



Technical and financial analysis :

Annual Energy saving : 25.20
Lakhs Unit

Annual Savings : Rs 104
Lakhs

Investment made : Rs 60.0 Lakhs

Implementation:

The project was implemented successfully. Energy saving of around 300 KW per hour is established.

6 - Installation of steam soot-blower in power plant

Back-ground of the project -

We have installed 1 x 175 TPH BHEL Circulating Fluidised Bed Combustion boiler (CFBC) adopting LURGYs technology for the first time in the country. BHEL insisted for installation of sonic soot blowers stating that they are economical and energy efficient. Similar other CFBC installations were equipped with conventional steam soot blowing which was abandoned by them with out any adverse effect on the boiler efficiency. By overcoming the usual teething problems, the boiler was commissioned and put on steaming in March 1998. After February 1999, when the boiler was operated on 80 % MCR, we faced the problem of high flue gas temperature at economiser inlet and ESP inlet. The actual values were around 525 deg .C & 165 deg. C as against design value of 400 deg. C & 140 deg.C. In order to bring down the temperatures at economiser inlet, we were forced to use excess air. Reducing the temperatures at economiser inlet and ESP inlet by improving effectiveness of existing sonic soot blower / installing new steam soot blower is taken up as an ECO.

Observation made

In the mean time in house team of power plant engineers have planned to establish the effectiveness of sonic soot blowers in cold condition. Small Prototype model of tube rows with a heap of ash is made and sonic soot blowers put in operation. The cold trial was excellent. After long delebration, BHEL suggested to change the location of sonic soot blowers at right angle to the previous direction. This was executed during shut down of March 01. Despite of this improvements the temperature pattern remained unchanged.

The team suspected that this failure could be because ash is less flowable at elevated temperature as compared to cold condition.



Thus making the high energy sound wave ineffective for its removal. This hinted to have an arrangement which would physically remove the ash deposition as the sound wave of any magnitude will not help. The idea of installing steam soot blower was innovated.



For evaluating effectiveness of steam soot blowers, we have verified the flue gas velocities in second pass for the installations where steam soot blowers were abandoned and found that the velocities are 8 to 10

mtr/sec where as our boiler (LURGY's design) has 3 to 4 mtr/sec. Other installations were facing the problem of high erosion rates.

The team proposed to install the conventional steam soot blower.

Technical and financial analysis :

Activity : Installation of steam soot blower

Location : In 2nd pass Super heater area.

Qty : 8 Nos

Investment : Rs 100 Lacs

Savings: Around Rs 40 Lacs / Anum

Payback : 2.5 Years

Implementation

The project is implemented successfully. The various benefits accrued after implementation are

1. Flue gas temp. at ESP Inlet Reduced from 165 to 142 deg. C
2. Flue gas temp. at ESP Outlet Reduced from 154 to 131 deg.C
3. SA air flow reduced from 102160 to 73238 Nm³/hr.
4. De-superheating water flow in superheater increased from 3T/Hr to 11 T/Hr. With the increase of De-superheating water the temperature in the combustor has come down.
5. Oxygen % reduced from 5.66 % to 3.44 %.This has resulted in stopping of one ID Fan(350KW) and One SA Fan(500KW).
6. The coal consumption was reduced by around 2 T/Hr.
7. As the ash deposition problem in second pass is eliminated, we can use high ash coal and we can even explore the multi-fuel firing capability.
8. ESP performance has improved as it has to handle low temperature flue gases having lower resistivity. We could get better performance of ESP even with three fields.

Annual Electrical Energy saving	: 24 Lakhs Unit
Annual Thermal Energy saving	: 7730 Lakhs MKCal
Total Annual Saving in Rs	: 93.73 Lakhs
Investment made Rs	: 100 Lakhs

7- Installation of Energy efficient tube-lights

Back-ground of the project

As a energy conservation measure, Energy efficient tube-lights are installed (50 No) in place of conventional tube-lights mill wide, where ever new renovation / modification work is carried out in the mill premises.



Observations Made

Conventional tube-lights consume more power

Technical and financial analysis

Following are the details of our analysis

Annual Energy saving : 0.11 Lakhs Unit

Annual Saving in Rs : 0.40 Lakhs

Investment made : Rs 0.50 Lakhs

Implementation

This is being implemented successfully, desired savings achieved..

View of Energy Efficient CFL Installation

8- Installation of 75 kw pump in WTP

Back-ground of the project



New 75 KW, 245 m3/ Hr capacity Pump

Water requirement of the mill is around 550 m³/hour. Two pumps of 110 KW, 375 m³/hour capacity were running for 24 hrs a day. Energy conservation opportunity is identified as replacement of one pump by less flow capacity pump of same head. Envisaged saving of around 25 KW.

Observation made

Installed new 75 kw pump, 245 m³/hour pump in place of 110KW pump. Flow requirement for the mill is fulfilled by two pumps of 110 KW - 1 no. & 75 KW 1 – no.

Technical and financial analysis

Following are the details of our analysis

Annual Energy saving : 2.10 Lakhs Unit
Annual Saving : Rs 8.70 Lakhs
Investment made : Rs 6.0 Lakhs

Implementation

A new pump is installed and connected to main mill suction and discharge header, during the regular boil out shut of the paper machine and coating plant. The project is implemented successfully and savings are established by measurement.

9 - ETP Waste sludge as fuel

Back-ground of the project

ETP Waste sludge is being generated in ETP Primary and secondary clarifier.

Observation made

The calorific value of sludge is from 700 to 1000 kcal/kg. After sun dry sludge is being used as fuel in the boiler with coal.

Technical and financial analysis

Following are the details of our analysis

Annual Energy saving : 3147 MKCal

Annual Saving in Rs : 15.16 Lakhs

Investment made Rs : 0.0 Lakhs

Implementation

This is being implemented successfully.