Star Paper Mills Limited, Saharanpur (U.P.)

Unit Profile

Star Paper Mills Limited, started commercial production of 6000 MT/annum in the year 1938 and after successfully implementation of various expansion programmes, it now produces above 71000 TPA Paper using Mixed Hard Wood and Bamboo as fibrous raw material.

The company strongly believe in conservation & efficient utilization of natural resources .Some of the steps taken by Company in this direction like rain water harvesting & use of recycled water reflect the level of Company's commitment.

With infusion of professional, technical and financial resources, Company is forging ahead and committed for productivity improvement.

Mill has 4 Nos. Paper Machines giving flexibility to cater different segments and as per customers requirement. The product-mix comprises of 30% Cultural Papers and 70% Industrial Papers.

Star Paper Mills Limited is an ISO 9001:2000 Company certified by DNV, UK .The Company recently got ISO: 14001 which exhibits its strong commitment to cleaner environment follows TQM and Quality Circles with a vision to be front runner in quality products.

Company is committed to manage its energy resources in an efficient manner and is continuously making efforts to reduce energy cost. The company has bagged the National Energy Conservation Award, Ist Prize in Pulp & Paper Sector during 1992-93 and Certificate of Merit, Government of India in 1998-99. Last year the company was awarded Certificate of Merit for IAPMA Energy Conservation Award 2004 ,which strengthens its policy of continual improvement.

Energy Consumption

Implementation of various energy conservation measures, energy scenario of last 3 years is given below.

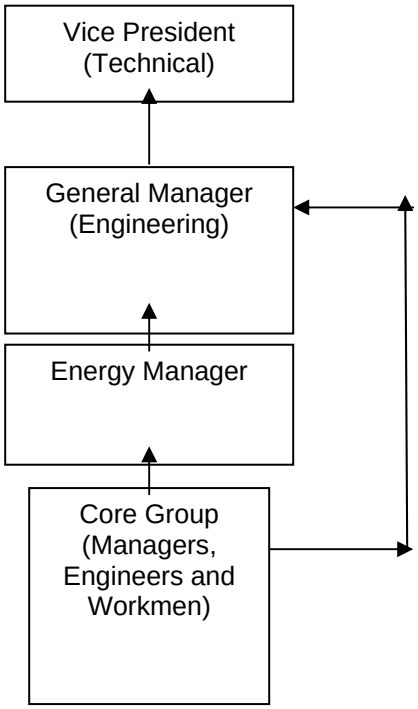
Description	**Unit**	**2002 – 03**	**2003 – 04**	**2004-05**
Annual Production	MT	62590	66184	71106
Total Electrical Energy Consumption (including Lime Kiln)	Lakh Kwh	771.94	795.70	854.35
Sp. Energy Consumption (Electrical) for paper	**Kwh/T**	**1223**	**1189**	**1194**
Total Thermal Energy Consumption (including Lime Kiln)	Million Kcal	314147	322535	345506
Sp. Energy Consumption (Thermal) for Paper	**Million Kcal/T**	**4.62**	**4.49**	**4.56**
Total Energy Cost	Rs.lacs	3323.94	3426.57	3964.94
Total Manufacturing Cost	Rs.lacs	9041.09	10241.31	10911.71
Energy Cost as % of Total Manufacturing Cost	%	37.81	33.46	36.34

Energy Conservation Commitment, Policy and Set-up

Company is committed to the energy efficient usage of its Assets. To achieve this, Company has formulated energy policy into the overall structure of the organisation. Copy of the "Energy Policy" is also enclosed

Company has an "Energy Management Cell" which is responsible for the monitoring of energy consumption and also for implementation of "Energy Savings Ideas". In addition to this, Company gives strong emphasis on the involvement of all the persons down the line for productivity improvement.

General Manager (Engg.) holds the additional responsibility as Head of the Energy Management Cell who is assisted by "Certified Energy Manager" and other Process and Engineering Officers. Ideas are generated through Brain Storming and discussions. Ideas are evaluated and Cost-Benefit Analysis is done and after approval of the Management, implementation and monitoring is done.



<u>Energy Conservation Achievements</u>

Over a period of three years, Company has implemented around 53 Ideas giving total energy savings of Rs. 400 lacs/annum with an investment of Rs. 1550 lacs.
Since the RFO price is hampered by increasing trend the company had decided to go for high pressure cogeneration scheme & under the scheme, the following retrofitting and up gradation programme are in final stage of execution:-

1. Retrofitting of Chemical Recovery to operate at 42 kg/cm^2 pressure from present 20 kg/cm^2 operating pressure . The project was executed on war footing and completed in a record time of 30 days shut down of Recovery Boiler .Besides this a large economizer in Recovery Boiler was installed and discarded both cascade evaporators to increase steam generation from Recovery Boiler. This job was also done in 30 days recovery boiler shut down.

2. The Strong Black liquor concentration from Evaporator Plant was increased from 52% to 65% by the addition of FFFF concentrator and LTV evaporator.

3. To increase power generation the existing 5 MW BHEL turbine presently operated at 20 kg/cm2 pressure is being retrofitted to operate at 42 kg/cm2 working pressure . The project has recently been completed and performance is under observation

4. Presently the double extraction cum condensing 5 MW steam turbine is inadequate in capacity to meet out the process steam requirement and a part of process steam requirement is met through PRDS . We have decided to stop this PRDS and ordered a 5 MW extraction cum back pressure turbine to meet out the process steam requirement and generating additional power . The project is in erection stage .

5. For running turbines at 42 kg/cm2 pressure SPML introduced a 42 kg/cm2 multi-fuel boiler and the project is just completed and is under commissioning trials.

After completion of scheme SPML shall reduce load on HFO based D.G.Sets resulting in reduction in petroleum fuel consumption besides saving in power cost due to high power cost of HFO based D.G.Sets.

Higher Specific Electrical & Thermal Energy Consumption

Though the Energy Consumption pattern of the Mill was following a decreasing trend for last 5-6 years but this year the energy consumption trend is slightly on higher side because of following reasons:-

1. The Recovery Boiler was shut down for one month for retrofitting jobs. This has resulted lower pulp & paper production as SPML had to store all the black liquor available from pulp mill in the available storage facilities for maximum capacity utilization.

2. Nearly 4-5 months erection and civil construction work was going in the plant and additional power was consumed in welding generator sets and Air compressors and other equipments required for civil work.

Energy Conservation Plans and Targets

Company has identified various Energy Savings and Energy Cost reduction Scheme for implementation during coming years. This year the company has been Awarded Certificate of Merit for IAPMA Energy Conservation Award 2004.

The on going Co-generation Scheme is expected to be completed by Novemember 2005 . We expect about Rs.2500 lacs expenditure for this scheme and expected to get a saving in fuel & power cost of about Rs. 1200 Lacs.

Details of other measures identified have been given in the S.No. 18 of Award Format.

Targets for the Year 2005-06 and 2006-07 have been given in the following Table.

Year	**Electrical Energy (KWH/T)**	**Thermal Energy (Mkcal/T)**	**Expected Reduction over 2004-05**	
			Electrical Energy (%)	**Thermal Energy (%)**
2004-05 (Base year)	1194.00	4.56	-	-

2005 - 06	1185.00	4.54	0.5	0.5
2006 - 07	1265.00	4.54	(Increasing trend)	0.5

Note : For the year 2006-07 the Specific power consumption shall increase due to additional power consumption in ODL Plant .

SPML has ordered Oxygen Delignification & White Liquor Oxidation Plants to reduce chlorine consumption in Bleach Plant and reducing AOX level and also increasing Paper Brightness.This shall contribute to additional power consumption per ton of Finished Paper.

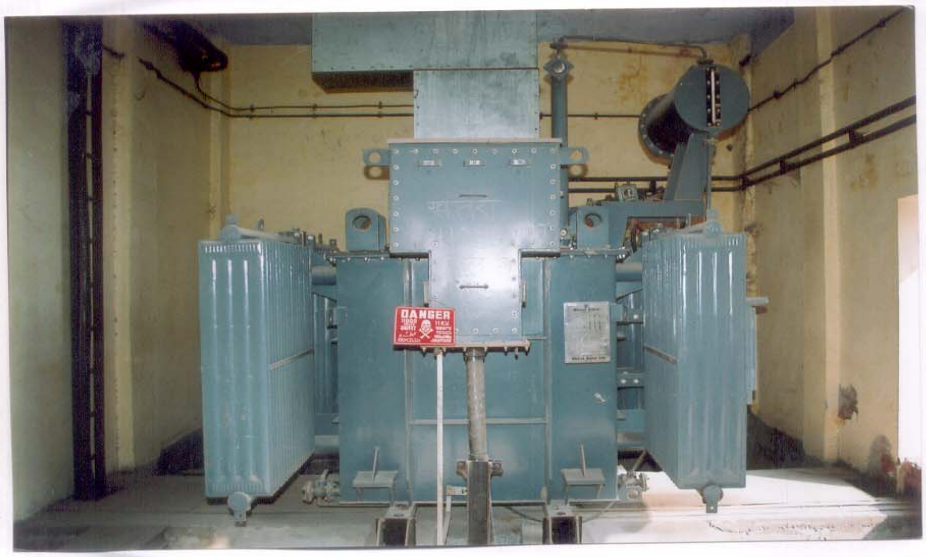
Details for the energy conservation measures implemented during last 3 years is given under S.No. 16 of the Award Format. However, description of jobs implemented during year 2004-05 are as under :

1. **Installation of Transformer at new location**

   The Recovery Boiler Transformer was very old and having high losses (load and no load) i.e. 540 units per day. We replaced this transformer to a low loss transformer which is having losses of 435 units per day .It was also observed that the old transformer was far away from the load center so we decided to install the new transformer near to the load center. This resulted saving in distribution losses. This gave us a saving of 0. 64 lacs. units per annum.

   Technical & Financial Analysis

- **Cost of New Transformer** **:Rs.10.00 lacs.**
- **Annual Power Saving** **:Rs.02.24lacs.**



2. **Replacement of Energy Efficient Vacuum Pump for Lime Kiln**

The Kakati make vacuum pump for Lime Kiln was very old & inefficient .We have replaced this pump with imported NASH make vacuum pump. This resulted in a power saving of about 2.38 lacs kwh/annum besides improvement in lime sludge dryness .

Technical & Financial Analysis

- **Cost of New pump etc.** : **Rs.10.0 lacs.**
- **Annual Power Saving** : **Rs.8.32 lacs.**

3&4.

Installation of VFD's for Decker in old & New Screening Plants

Both the Deckers of old and new Screening /bleaching Plant were running with eddy current drive which were replaced with VFD's resulting in power saving of 0.49 lacs. kwh/annum.

Technical & Financial Analysis

- **Cost of New VFD's** : **Rs. 4.0 lacs.**
- **Annual Power Saving** : **Rs. 1.74 lacs.**

5. Installation of white liquor uniclarifier

In Recausticizing Plant there were 2 nos. white liquor clarifier of very old design and inadequate in capacity. The white liquor over flow of 1st Clarifier was pumped to 2nd clarifier to improve white liquor clarity. By doing so there was considerable drop in white liquor temperature resulting higher steam consumption in Digesters.

After the installation of higher capacity white liquor uniclarifier the temperature of white liquor increased to about 15°C which has resulted in a Coal saving of about 633 TPA.

Technical & Financial Analysis

- **Cost of New White Liquor Clarifier** : **Rs. 77.0 lacs.**
- **Annual Power Saving** : **Rs. 20.27 lacs**

6. Installation of energy efficient vacuum pump for PM-1 Flat Boxes

The old vacuum pump was replaced with imported NASH make vacuum pump.It resulted in power saving of 0.40 lacs./kwh

Technical & Financial Analysis

- **Investment :Rs. 3.80 lacs.**
- **Annual Power Saving : Rs. 1.39 lacs.**

7. Mill water over head tank by-pass.

Before implementation the entire warm water from the outlet of surface condenser was going to Mill water over head tank (at 38Meter height) and from there the warm water was distributed to Pulp Mill and other sections. After by-passing the over head tank all the warm water from the outlet of surface condenser (located at 13 Meter height) was distributed to the other sections and for pulp mill washing & bleaching streets a separate small pump was put at ground floor. By-doing so there was reduction in power consumption to about 2.56 lacs.kwh/annum.

Technical & Financial Analysis

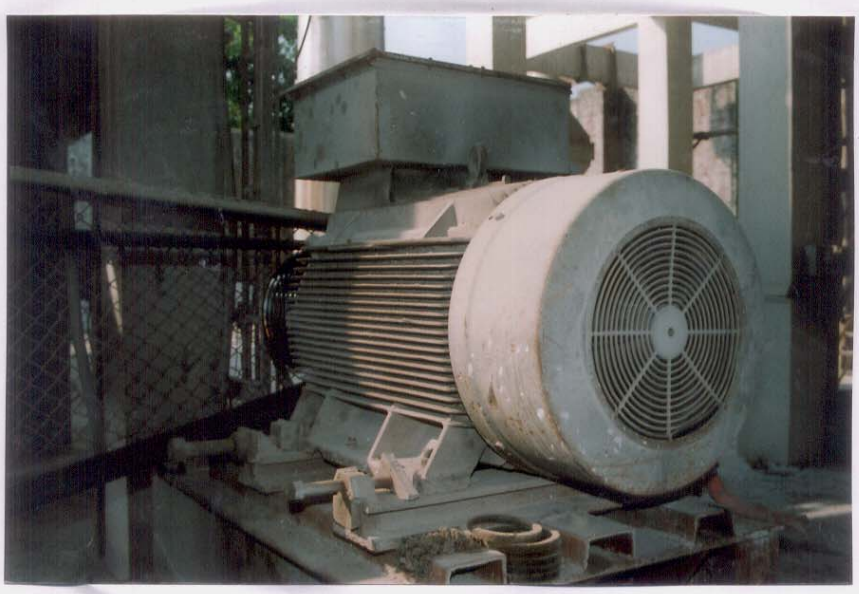
- **Cost of small pumps,motor starters etc : Rs. 7.50 lacs.**
- **Annual Power Saving : Rs.8.95 lacs.**

8. Squarrel Cage Motor for Mud Filter Vacuum Pump

The newly installed NASH vacuum pump for Lime Kiln was running with a slip ring motor of 180 KW . We have replaced this motor with a squarrel cage induction motor of 180 KW. .This resulted in power saving of 0.38 lacs, kwh/annum .The squarrel cage motor & Starter were available from the plant.

Technical & Financial Analysis

Cost of up gradation of Starters : Rs. 0.90 lacs.
Annual Power Saving : Rs. 1.34 lacs



9. **Retrofitting of Recovery Boiler to operate at 42 kg/cm2 pressure ,removal of cascade evaporators from recovery boiler & installation of large economiser and increasing black liquor concentration to 65% from evaporator by retrofitting it.**

This is a part of our ongoing cogeneration scheme and under this scheme we have retrofitted recovery boiler & evaporator plants and getting nett additional steam generation from recovery boiler due to the installation of economizer and getting a coal saving of about 3450 TPA .

Technical & Financial Analysis

Cost of retrofitting Recovery Boiler & Evaporator Plants : Rs. 1200 lacs.
Annual Coal Saving : Rs. 110 lacs

Note: The additional saving in electrical power shall come after the installation of 42 kg/cm2 turbines which are under erection