

## HINDUSTAN NEWSPRINT LIMITED



### 1.0 UNIT PROFILE

Hindustan Newsprint Limited (HNL), a Subsidiary of Hindustan Paper Corporation Limited, a Govt. of India Undertaking operates one of the largest integrated newsprint mills in the country. The mill was commissioned in 1982 with an installed capacity of 80,000 MT/annum, which was raised to 1,00,000 MT/annum in 1993-94 with major modernization and technological up gradation. The company achieved capacity utilization of 112% consecutively in 2003-04 & 2004-05. HNL's major product is 48.8 GSM newsprint and during the last two financial years, 45 GSM newsprint was also made to cater to the market demand. Also, the company achieved a record sales turnover of Rs 273.9 crores during 2004-05.

HNL has undergone a number of major plant modernization and technological up gradations like commissioning of environment friendly and energy efficient 100 TPD De-inking plant in December 2002, commissioning of the state- of the art Quality Control System (QCS) for Paper machine in July 2002, commissioning of latest technology Distributed Control System (DCS) interfacing and integrating Paper machine, Chemical Pulp mill and Chemi-Mechanical pulp mill, in July 2002 etc.

HNL is always keen in energy conservation activities with a dynamic and professional energy management set up, supported by a well structured energy policy and latest technology energy management tools like Centralized Energy monitoring system of Enercon eLAN and ERP system of BaaN –IV giving reliable and accurate MIS reports, creating awareness among all levels of employees, which results in a high level of employee participation for energy conservation and by implementing a number of practical schemes proposed through Employee Suggestion Schemes. With the energy conservation measures taken up, HNL could reduce the Contract Demand with Kerala State Electricity Board from 30MVA to 26MVA with effect from 1<sup>st</sup> November, 2003.

During 2004-05, the company implemented a number of major energy conservation schemes like speed control of pumps and fans through variable frequency drives for 45 equipments, replacement of low efficiency pumps with new generation energy efficient pumps, commissioning of trim pulper with cyclone separator etc and also a number of no investment schemes proposed by our employees, all of which resulted in considerable saving in electrical and thermal energy fronts.

### 2.0 ENERGY CONSUMPTION

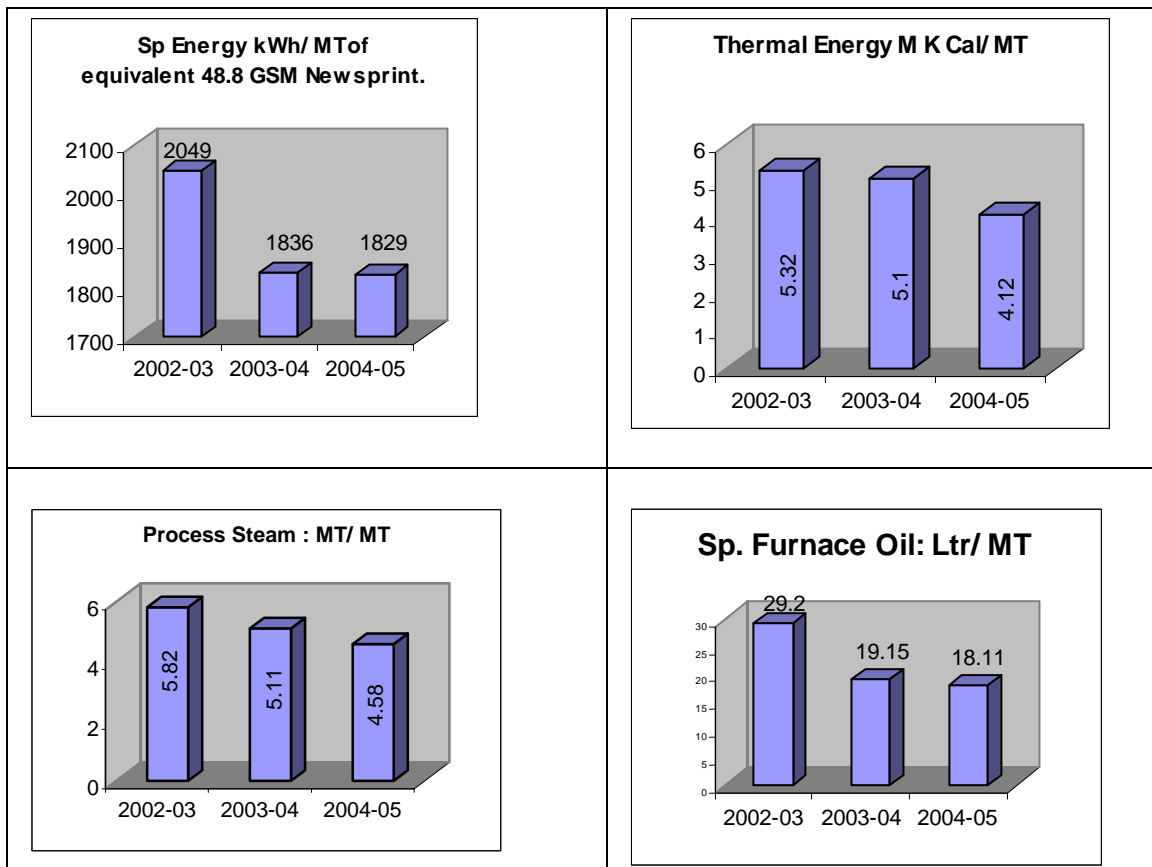
The energy scenario of HNL in the past three years is given below :-

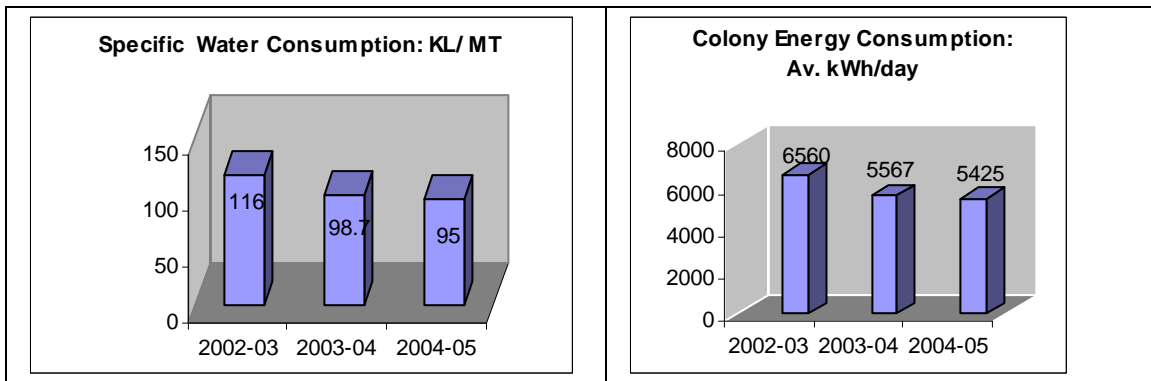
Sl. No	Description	Unit	2002-03	2003-04	2004-05
I	Production of Newsprint	MT	1,00,495	1,09,263	98,749
	a) 48.8 GSM				
	b) 45 GSM	MT	0	3,292	13,453
	c) Total Production of equivalent 48.8 GSM Newsprint.	MT	1,00,495	1,12,832	1,13,332
II	<b>Total Electrical energy Consumption:</b>				
	a) Electrical energy Purchased	Lakh kWh	1151	1095	1135
	b) Electrical energy generated thro' TG	Lakh kWh	932.29	997.75	956.57
	c) Electrical energy generated thro' DG	Lakh kWh	0.71	0.47	1.46
	d) Total electrical energy consumption	Lakh kWh	2084	2093.22	2093.03
III	a) Total Coal Consumption	MT	1,24,361	1,44,308	1,66,604
	b) Total Furnace oil consumption	KL	2892	2216	2058

IV	Energy Cost Details: a) Energy cost as % of total cost of prodn. b) Cost of Electricity c) Cost of Coal d) Cost of Furnace oil	% Rs Lakhs Rs Lakhs Rs Lakhs	32.80 5682.51 1712.85 387.09	29 6125.54 2021.13 300.07	30.82 6140.97 2095.92 302.01
V	<b>Specific Energy Consumption / MT of equivalent 48.8 GSM NP :</b>				
1)	Specific Electrical energy	KWh/MT	2073	1855	1847
2)	Specific Thermal energy	Million K Cal/MT	5.32	5.10	4.12
3)	Specific Process steam	MT/MT	5.82	5.12	4.58
4)	Specific Furnace oil	L/MT	29.2	19.15	18.11
5)	Specific Water	KL/MT	116	98.7	95

Continual improvement in specific energy consumption has been achieved for electrical energy, process steam, furnace oil, water & thermal energy during 2002 to 2005. The trends of specific energy consumption figures are graphically represented below.

### Specific Energy Consumption Trends





### 3.0 ENERGY CONSERVATION COMMITMENT, POLICY AND SET UP

#### a) Commitment:

The daily monitoring & review of all energy parameters of various plants at MD's chamber with core team of energy management cell including energy manger and the weekly review of all energy parameters and status of on going energy conservation schemes in the performance review meeting of MD with HODs and energy manger show the commitment of top management at HNL .

The monitoring & review of all energy parameters of various plants in the daily plant performance meeting of General Manager (Works) with sectional managers and sectional mangers with the plant team and the chairman of the Energy Management Cell with the members on monthly basis etc. show the commitment of the middle management and our employees towards energy conservation.

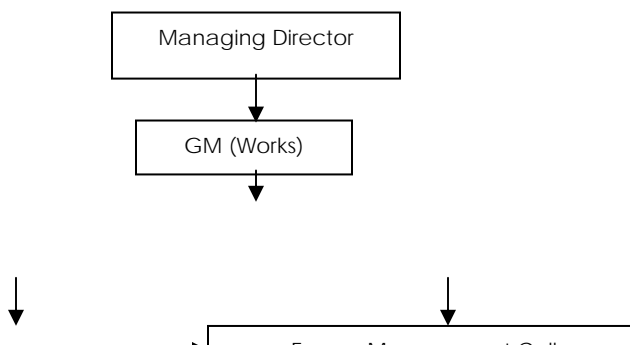
100% of our technical staff of various plant sections were given energy awareness training, covering 495 employees in 14 batches, for enlightening them on Energy Conservation Act-2001, scarcity of natural resources, need for energy conservation and the details of the on going energy conservation schemes. Also brain storming session conducted to trigger the employees in identifying new avenues for energy conservation was very successful and as a result a number of creative, no investment and practical energy saving suggestions were proposed by the employees, especially from the operational side and all the practical schemes have been completed during 2004-05. One of these schemes, which was found innovative, brought a saving of 2500 units a day which brings an annualized saving of 8.5 Lakh units and annualized energy cost saving of Rs 29.75 Lakhs, without any investment.

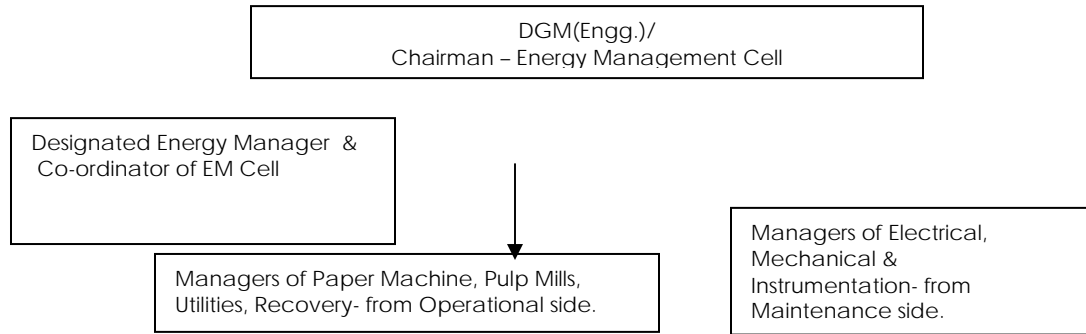
#### b) Organizational Set up for Energy Management

The company appointed Energy Manager as per the guidelines of EC Act 2001, in August 2003, who was later on qualified by BEE through the 1<sup>st</sup> National examination for energy managers. The designated energy manager acts as the co-ordinator and facilitator for energy management activities.

Energy Management Cell is headed by Dy. General Manager (Engg) with cross-sectional representatives comprising of Managers of Production and Maintenance teams of different Plants, as members and Designated Energy Manager as the co-ordinator. The responsibility of the above cell is to explore the new avenues for energy conservation in all areas, to implement the schemes, look for continuous improvement, conduct brain storming discussions and make awareness and involve all employees for the energy saving activities. The EC cell members review all energy parameters in all area on daily basis and initiate actions to improve the performance.

#### Energy Management Structure





#### **4.0 ENERGY CONSERVATION ACHIEVEMENTS:**

During 2004-05, our company invested Rs 356 Lakhs on various energy conservation schemes, which resulted in annualized energy saving of 99 Lakh units of electrical energy, 3804 MT of coal, 129.8 KL of furnace oil and a total energy cost saving of Rs 442 Lakhs.

#### **4.0 MAJOR ENERGY CONSERVATION PROJECTS IMPLEMENTED DURING 2004-05:**

##### **(1) Installation of Variable Frequency Drives for 45 Pumps & Fans:-**

After conducting a comprehensive study on energy saving potential in pumps and fans of various plants, installed variable frequency drives for 45 pumps / fans in two phases. Speeds of all these equipments were optimized through the drives ,by the process staff and maintenance engineers together as a team to get maximum energy saving without compromising on process quality parameters.



Investment	:Rs
247.10 Lakhs.	
Connected load of the equipments	: 3503 KW
Power Saving	: 880 KW
Annualised Energy Saving	: 66.99 Lakh kWh.
Annualised Energy Cost Saving	: Rs 234 Lakhs.
Simple Payback	: 13 Months.
Status:	Commssioned during July '04 to January '05

##### **(2) Replacement of low efficiency pumps with Energy Efficient Pumps with Energy Efficient Motors:**

###### **(a) 400 KW Secondary Cleaners Feed Pump in Paper Machine Plant by 250 KW Sulzer Pump:**

The secondary cleaners feed pump in Paper Machine of 400KW , running for 24 hours, was replaced with an energy efficient new generation Sulzer pump with energy efficient motor of 250KW to reduce the energy consumption of paper machine plant.

Pump Capacity:	32,400 LPM& 37m Head.
Power Saving	: 70KW
Investment	: Rs 18.13 Lakhs

Annualised Energy Saving	: 5.54 Lakh units
Annualised Energy cost Saving:	Rs 19.40 Lakhs
Simple Payback	: 1 Year
Status	: Completed in



January 2005.

**(b) 110KW Liquor Circulation pump by 90KW Sulzer Pump.**

The original pump was KMW Johnson make of 900cub.m/hr & head 23 m with 110 KW motor for black liquor circulation in Chemical Pulp mill. Due to inefficient operational performance, frequent gland leakage and maintenance problems, the pump was replaced with energy efficient new generation Sulzer pump with double mechanical seal and driving motor of energy efficient 90KW motor.

Investment : Rs 13.77 Lakhs  
Annual Energy Saving : 79,200 units.  
Annual Energy Cost Saving: Rs 2.77 Lakhs  
Status : Completed in January '05



**(3) Trim Pulper with Cyclone Separator:**

Installed a trim Pulper with cyclone separator in Paper Machine plant to handle the winder trims, thereby avoiding the continuous running of 200KW agitator of Dry end pulper. The new trim pulper helped in reducing the running time of the 132 KW Dry end pulper pump from 8 hours to 6 hours and that of 200KW Dry end pulper agitator from 24 hours to 4hours.

Investment : Rs 26 Lakhs  
Energy Saving : 1500 units/ day  
Annualised Energy Saving : 4.95 Lakh units.  
Annualised Energy Cost saving: Rs 17.32 Lakhs.

Simple Pay back: 18 Months.  
Status : Commissioned in October '04.



**(4) Stoppage of running hours of CP Refiners in Paper Machine Plant for 5 to 8 hours a day:**

HNL implemented this '**No investment & Innovative**' Energy conservation Scheme on 01/01/2005.

**Background:**

The employees of all plants were given awareness classes on energy conservation, in different batches, during April '04 to October 04, in which some brain storming activity was carried out towards identifying new energy saving potential by operators and maintenance technicians, through operational improvements in different plants.

The scheme was evolved as a suggestion from one of the Senior Operators of Paper Machine, Production during the Employee Suggestion competition held during the observance of Energy Conservation week in December 2004.

**Scheme:**

The operator identified that, instead of running the two CP Refiners (450 KW & 400KW) in Paper Machine plant on continuous basis, as was the practice for the last 23 years, Batch Refining by increasing the through put and by storing the refined CP pulp utilizing an idle chest also, would be more energy efficient as there is possibility of stoppage of both the refiners for a duration of 5 to 10 hours a day during batch refining.

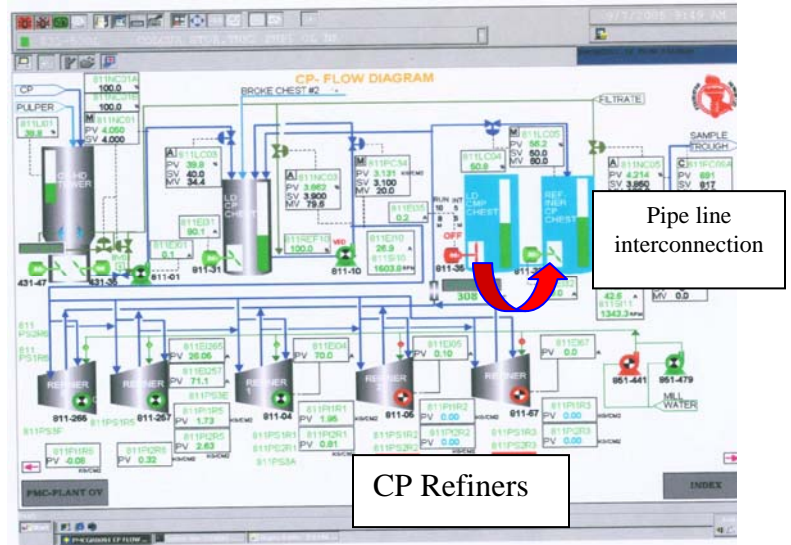
**Modification done:**

A short pipe line (using used pipe) laid between the two nearby chests.

**Energy Saving achieved :**

Average Energy Saving : 2500 units/day.  
Annualised Energy Saving: 8.5 lakh units.  
Annualised Energy Cost saving : Rs 29.75

Lakhs  
Investment: NIL.



**(5) Thermal insulation of the Inner Walls of package air conditioners room for Paper Machine DCS control rooms:**

The roof as well as the three walls of the package air conditioner rooms in Paper Machine DCS control rooms are exposed to sun and hence the roof as well as the three walls are getting heated heavily during summer. After insulating the inside of the roof and all the four walls, there is a considerable energy saving for air conditioners.

Investment: Rs 12,200/-

Annualised Energy Saving: 53, 000 kWh  
Annualised Energy Cost Saving: Rs 1.87 Lakhs.



**(6) Solar Lighting System at Factory main gate:**

As a footstep towards renewable energy sources, a solar lighting system of 500W rating has been commissioned at factory main gate to cater to the lighting requirement of factory gate & security office.

Solar Modules: 10 Nos.  
Capacity : 500W  
Connected load: 8 Nos. of 15W CFL & 1 no. T5 Fl. Lamp of 30W  
Annual Energy Saving: 730kWh  
Investment : Rs 2 Lakhs.



**(7) Coal saving by using non- conventional fuels in FBC Boilers:**

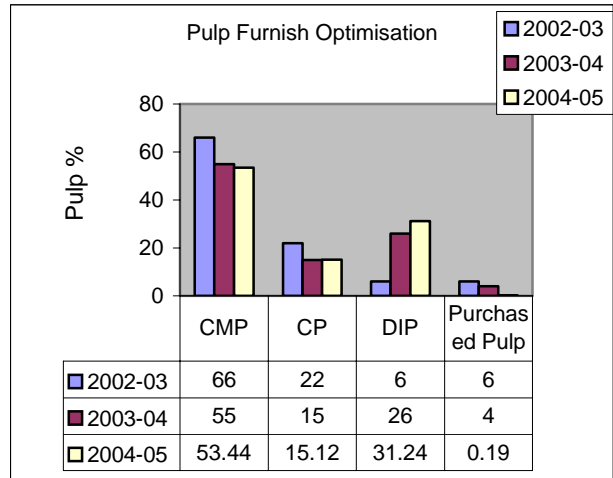
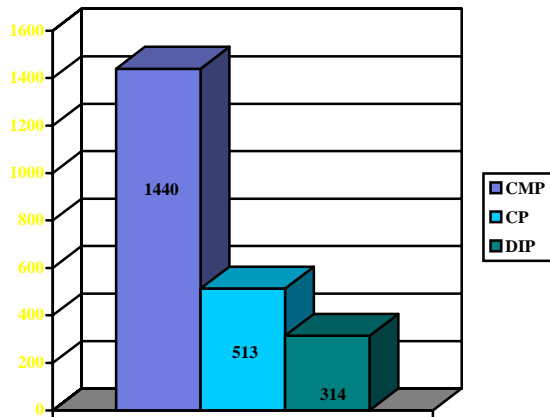
The internal waste generated as wood dust from pulp mill is being burnt in our FBC boilers to save consumption of coal.

Wood Fines burnt in FBC boilers: 4212 MT.  
Coal Saving: 3804 MT.  
Energy Cost Saving: Rs 76 Lakhs



**(8) Optimization of Pulp Furnish:**

The specific energy consumption of Chemi- mechanical pulp was 1440kWh/BDMT where as that of De-inked pulp was only 314KWh/BDMT during 2004-05. Reduced usage of energy intensive Chemi-mechanical pulp by increased usage of energy efficient de-inked pulp in the pulp furnish for making newsprint in paper machine resulted in an annualized saving of 9.65 Lakhs units of electrical energy and a cost saving of Rs 33.78 lakhs.



Investment for raw material change: Rs 45 Lakhs.

**(9) Replacement of one 55 KW Aerator with new Energy Efficient Aerator of 18.5KW:**

Replaced one of the 11 nos 55 KW aerators with energy efficient aerator of 18.5 KW in March 2004.

Power saving: 27 KW.  
Annual Energy Saving: 2.36 Lakh units.  
Annual Energy Cost Saving: Rs 8.28 Lakhs.  
Investment : Rs 4.5 Lakhs.



**SUMMARY OF POWER SAVING (KW) DUE TO MAJOR ENERGY SAVING SCHEMES – 2004-05**

Major schemes	KW Saving
VFDs	880
Energy Efficient Pumps	70
Trim Pulper	62
Employee Suggestion Schemes	125
<b>Total</b>	<b>1137 KW</b>

**5.0 Other EC Schemes implemented during 2004-05:**

1. Maintaining system power factor at 0.97 by power factor correction using proper capacitor banks and field control of synchronous motors.
2. Replacement of conventional chokes of 400W Sodium Vapour Lamps of raw material yard with electronic chokes.
3. Stoppage of no load running of hydra pulper in De inking Plant during each batch stoppages.
4. Cyclic switching ON & OFF of plant air conditioners for control rooms.
5. Automatic control of running hours of many equipments through proper DCS logics.
6. Reduced the secondary voltage of lighting transformers in chipper house and De-inking plant.
7. Reduced the delivery air pressure setting of Centrifugal air compressor for 7.05 to 6.7 kg/sq.cm.
8. Maintaining steam coal ratio to a minimum of 5 by proper mix of imported and Indian coal.
9. Replaced the thermal insulation of 608m of steam pipes.
10. Arresting all steam and air leakages , when ever found on immediate basis.
11. Re-circulation of paper machine back water in pulping mills & De-inking plant.
12. Purchase of only energy efficient pumps and motors, whenever required.
13. Replaced 50 nos of fluorescent lamps with T5 Lamps.
14. Replaced 10 nos of 150W HPMV lamps with 75W metal halide lamps in CP plant.
15. Replaced 10 nos 150W Sodium vapour lamps with 70 W for colony street lighting.
16. Heat recovery from condensate of impregnation liquor heater in CMP plant.

**Energy Saving Achieved in 2004-05 as a result of all Energy Conservation Schemes implemented between 1st April 04 & 31st March 05**

Comparison Period : Month of **March**, during stabilised plant operation & maximum production in both years

Period	March 1 to 31st		
	2003-04	2004-05	Variation
Finished Production	10,593	10,453	140
<b>Purchased Pulp Consumption MT</b>	<b>388</b>	<b>0</b>	<b>388</b>
Total Electrical Energy Consumed kWh	19,158,120	18,315,897	842,223
<b>Energy Saving for 31 days</b>			<b>842,223</b>
<b>Energy Saving per day</b>			<b>27,168</b>
<b>Average KW Saving</b>			<b>1,132</b>
<b>Power Saving : 1.132 MW</b>			

## **6.0 PLANS& TARGETS FOR 2004-05 & 2005-06:**

### **Target for 2005-06:**

Reduction of Specific electrical Energy from **1847 to 1825 units/ MT of newsprint.**

Reduction of Thermal Energy from **4.12 to 4.0 MKCal/MT of newsprint.**

The major energy conservation projects planned for achieving the above targets are:

- (1) Installation of Variable Frequency drives for 46 pumps/ fans in Phase III.
- (2) Replacement of 5 nos .old pumps with energy efficient new generation pumps.
- (3) Retrofitment of one agitator with energy efficient impeller.
- (4) Replacement of 3 nos aerators of ETP with energy efficient aerators.
- (5) Replacement of the 17 dynodrives, in chipper house & Chemical pulp mill with energy efficient motors driven by variable frequency drives.
- (6) Revamping of the compressed air distribution system to minimize distribution losses.
- (7) Revamping of thermal insulation of steam distribution system.
- (8) Optimizing the capacity utilization of the power boilers and thereby to maximize the internal power generation.
- (9) Maximizing the use of non-conventional fuels in FBC boilers.
- (10) Installation of Energy efficient Automatic FCMA slip regulator system for 970KW Wood chipper motor , presently with rotor resistance starting unit.
- (11) Automatic voltage control for colony street lighting through Beblec Energy saver.

(12) Lower capacity oven at motor maintenance shop for drying small motors after rewinding.