Nagaon Paper Mill, Assam

Unit profile:

Nagaon Paper Mill is a unit of Hindustan Paper Corporation Limited, a Govt. of India Enterprise, incorporated in 1970 to produce 100000 MT per annum of writing & printing paper so as to provide a fill up to its scarcity prevailing at that time. NPM being the first paper mill in the world to produce Kraft pulp in Kamyr Continuous Digester with 100% bamboo as raw material, started commercial production in 1985. Challenging all odds like locational disadvantage, infrastructural and communication bottleneck, continuous ethnic problems etc., NPM never looked back. The mill attained 100% of its installed capacity in 2000-01 and since then the mill has been showing continuous rise in production attaining 106.30% of its installed capacity in 2004-05. In quality front also, NPM was accredited with ISO: 9001-2000 certification by Det Norske Veritas (DNV) of Netherland in 1998 and been maintaining since then.
Over and above meeting 17% of Indian market share of Cream wove variety and a good share of education sector requirement, NPM has been exporting paper to countries like Sri Lanka, Bangladesh, Egypt and Iran etc.
The major activities involved in manufacture of paper in NPM are shown in the Flow diagram enclosed.

Energy consumption:

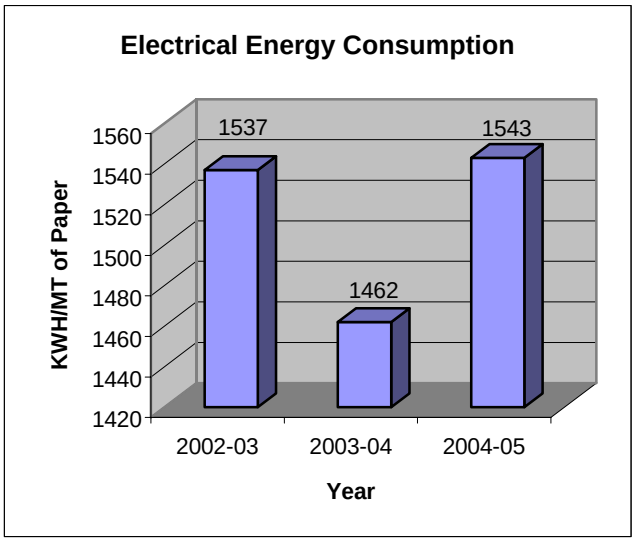
Steady decrease in specific electrical and thermal energy (process steam) consumption has been achieved through the implementation of various energy conservation schemes.

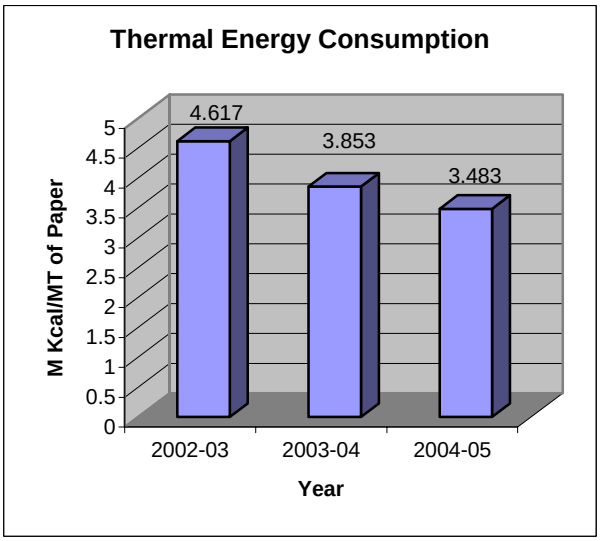
a. Energy consumption in terms of percentage of manufacturing cost;

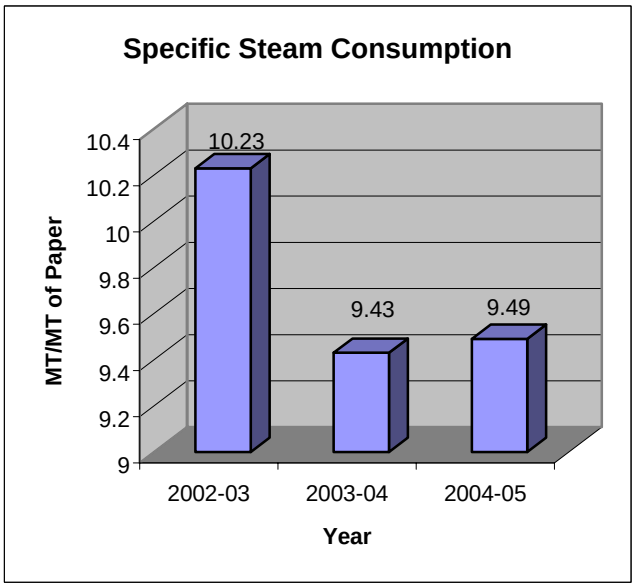
Description	**Unit**	**2002-03**	**2003-04**	**2004-05**
Annual production of paper	MT	106091	112639	106300
Total Electricity consumption	Lakhs kwh	1631	1647	1640
Total Thermal energy consumption.	M Kcal	489888	434079	370317
Total Manufacturing Cost	Rs. per MT of Paper	24063.46	21495.37	21802.99
Total Energy Cost	Rs. per MT of Paper	2320.83	2177.64	2615.97
Energy cost as % of Total Manufacturing Cost	%	9.64	10.13	11.99

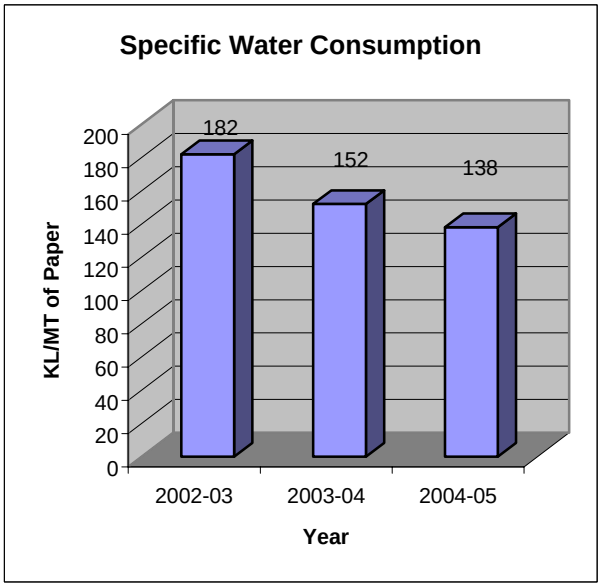
b. Specific energy consumption:

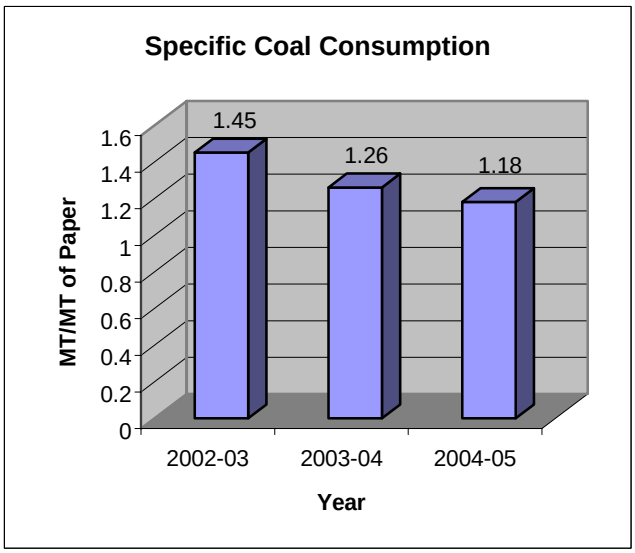
Year	**Electrical energy**		**Thermal energy**	
	Consumption (kwh/MT of Paper)	% Reduction over 2002-03	Consumption (M Kcal/MT of paper)	% Reduction over 2002-03
2002-03	1537	--	4.617	--
2003-04	1462	4.879	3.853	16.547
2004-05	1543	(+) 0.390	3.483	24.561

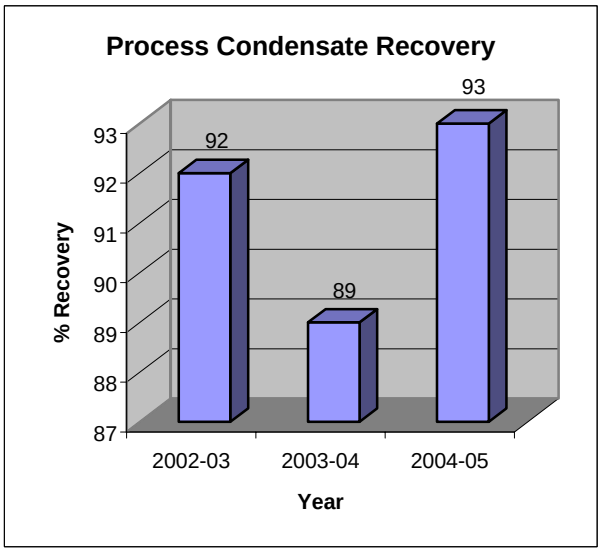

Electrical Energy Consumption
KWH/MT of Paper
1560
1540
1520
1500
1480
1460
1440
1420
1537
1462
1543
2002-03
2003-04
2004-05
Year


Thermal Energy Consumption
M Kcal/MT of Paper
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
4.617
3.853
3.483
2002-03
2003-04
2004-05
Year


Specific Steam Consumption
MT/MT of Paper
10.4
10.2
10
9.8
9.6
9.4
9.2
9
10.23
9.43
9.49
2002-03
2003-04
2004-05
Year


Specific Water Consumption
KL/MT of Paper
200
180
160
140
120
100
80
60
40
20
0
182
152
138
2002-03
2003-04
2004-05
Year


Specific Coal Consumption
MT/MT of Paper
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1.45
1.26
1.18
2002-03
2003-04
2004-05
Year


Process Condensate Recovery
% Recovery
93
92
91
90
89
88
87
92
89
93
2002-03
2003-04
2004-05
Year

Energy conservation commitment, Policy and Organizational set up:

The scope of saving energy includes optimization of boiler efficiency, reducing steam/air distribution losses, better heat transfer in various heat exchangers, reduction of water consumption, optimization of condensate recovery, power loss in distribution, efficient running of equipment etc.

To identify the scope for energy conservation and implementation of energy conservation measures there is an Energy Conservation Cell headed by an Energy Manager who monitors the trend of consumption on daily basis and each year set target for the next year in consultation with respective HOD and concurrence of the Chief Executive. The Chief Executive also reviews the daily energy consumption figures against the set norms in the production meeting and concerned HODs and Managers are asked to explain in case of any deviations and necessary corrective measures.

Energy Management Policy:

Hindustan Paper Corporation Limited is committed to conservation of energy through –

- Use of energy – efficient and environment friendly technologies.
- Optimal utilization of natural resources and undertaking a war on wastages
- Continual review of the specific energy consumption norms for bench marking with the best in the industry
- Carrying out regular energy audits internally and through external experts.
- Promoting awareness amongst the employees and other stakeholders.

Organizational set up:

Chief Executive
↓
General Manager (Works)
↓
Energy Manager
↓
HOD/HOS
↓
Shop Floor Managers
↓
Asstt. Engrs/Plant Engrs/Sr. Plant Engrs
↓
Frontline Supervisors/Sr. Supervisors/Foremen/Sr. Foremen

Energy Conservation Achievement:

Energy Conservation Projects completed during the year 2004-05 are listed below.

1. **Reusing of Paper M/c Vacuum pump flume water after passing through Cooling Tower & Separator:**
   Flume water containing fiber and chemicals was going to drain because there was no system of recovery.
   Investment made: 40 lakhs
   Saving: Water saved 4000 KL per day
   Monetary saving: 0.80 lakhs per annum

2. <u>Installation of Capacitor Bank & Filter in HT and LT line:</u>

For running of all sections, 29 MW was required with a power factor of 0.78 in two TG sets. Capacitor Bank & Filter was installed and generation was reduced to 27.5 MW for all sections with a power factor of 0.88.
Investment made: 58.21 lakhs
Saving: Power generation reduced by 1.5 MW
Monetary saving: 92.53 lakhs per annum

3. <u>Installation of VFD in Secondary air fans of all 3 Coal Fired Boilers:</u>

Secondary air was manually damper controlled and resulting power loss during low load. VFD installed for proper control.
Investment made: 14 lakhs
Saving: Power saved 689 kwh per day
Monetary saving: 2.13 lakhs per annum

4. <u>Replacement of steam jet Ejector with Vacuum pump in Evaporator:</u>

In Evaporator, vacuum was created by using of MP steam. Later it was replaced with a Vacuum pump.
Investment made: 5.85 lakhs
Saving: MP steam saved 8.2 MT per day
Monetary saving: 2.65 lakhs per annum

5. <u>Utilization of Hydrobin decanting water in Ash Handling Plant:</u>

After some piping modification and civil job, Hydrobin decanting water was fully utilized in Ash Handling Plant sump.
Investment made: 0.15 lakhs
Saving: Water saved 700 KL per day
Monetary saving: 0.11 lakhs per annum

Some other energy conservation schemes completed during 2004-05:

(a) Fitting of 22 KW motor in 2nd Re-Chipper in place of 45 KW.
(b) Fitting of 55 KW motor in Back Water pump 321 – 59 (B) of Chip Washing Plant in place of 90 KW.
(c) Fitting of lower wattage lamp in Plant and Township in place of high wattage incandescent lamps.
(d) Using of Chlorine backwaters in UnBleached High Density Tower in Pulp Mill.
(e) Using of LP steam in 3rd coil of Secondary Air Preheater of Recovery Boiler.

(v) Energy conservation Plans and Targets:

Energy Conservation Measures (Planned)	Anticipated savings Rs. in Lakhs	Approx. investment Rs.in Lakhs	Project Commencement & Completion year
1. Installation of Centrifugal Air Compressor	19.89	100.40	Commencement: August'2002 Completion: May'2005
2. Installation of VFD in Recovery Boiler Primary and Secondary Air fans	8.40	18	Commencement: June'2003 Completion: June'2005
3. Laying of new drinking water line for Township	0.61	70.0	Commencement: January'2004 Completion: March'2006
4. Collection & reuse of pump gland sealing water in Causticizing area	0.20	0.40	Commencement: August'2005 Completion: June'2006
5. Collection & reuse of pump gland sealing water in Paper M/c area	0.40	0.50	Commencement: August'2005 Completion: June'2006
6. Renovation of Pocket Ventillation system in both machines	33.26 33.26	17.0	Commencement: March'2004 Completion: December'2005
7. Installation of VFD in Secondary fan in both machines.	10.00	45.0	Commencement: March'2004 Completion: December'2005
8. Installation of auto on/off control in cooling tower fans in Utility	1.76	6.50	Commencement: February'2004 Completion: September'2005
9. Interchanging/replacment of underutilized motor in different locations	2.54	0.50	Commencement: April'2005 Completion: March'2006
10. Installation of autocombustion control in 3 CFBs	43.24	41.00	Commencement: March'2003 Completion: March'2006
11. Installation of one Fluidised Bed Boiler of capacity 50 TPH	156.75	1500.00	Commencement: March'2003 Completion: March'2007