

NAGAON PAPER MILL

(i) 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 112.0% of its installed capacity in 2003-04. 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.

(ii) Energy consumption:

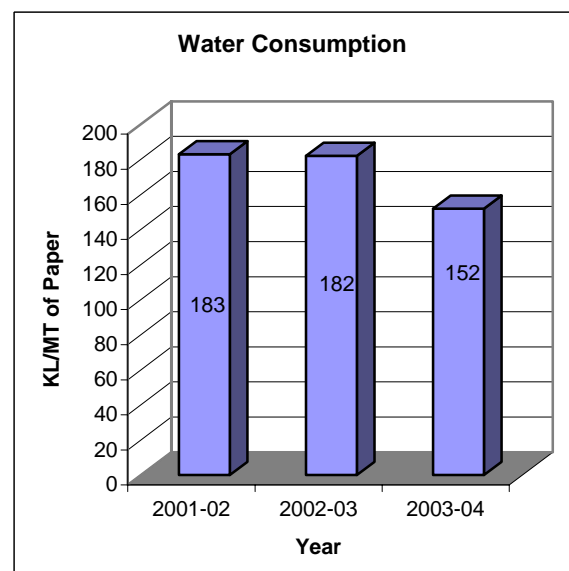
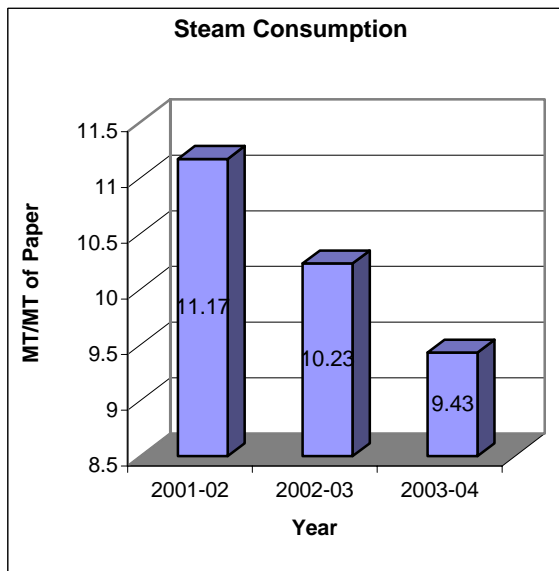
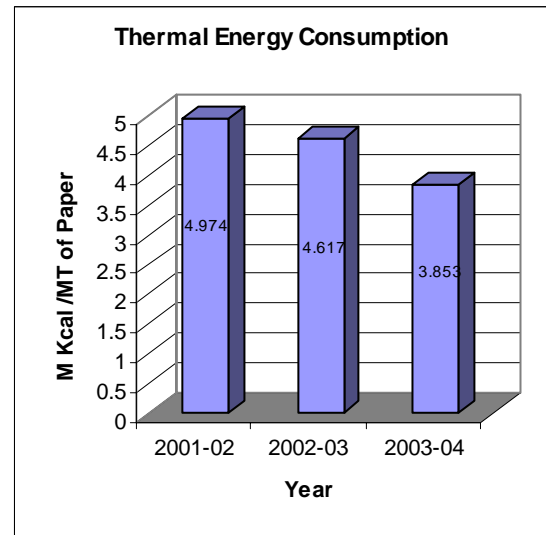
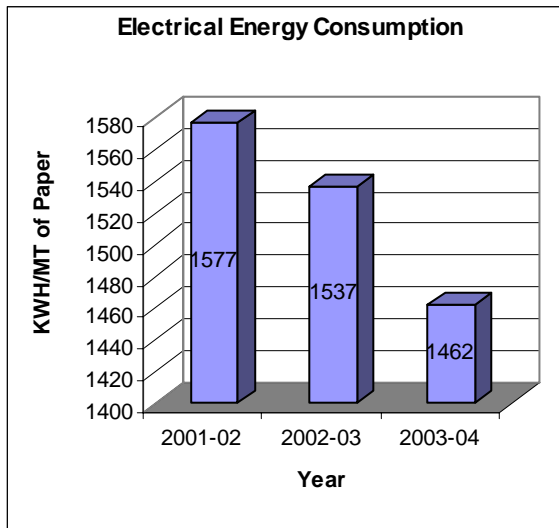
Steady decrease in specific electrical and thermal energy (process steam) consumption has been achieved through the implementation of various energy conservation schemes.

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

Description	Unit	2001-02	2002-03	2003-04
Annual production of paper	MT	100946	106091	112639
Total Electricity consumption	Lakhs kwh	1592	1631	1647
Total Thermal energy consumption.	M Kcal	502097	489888	434079
Total Manufacturing Cost	Rs. per MT of Paper	23155.68	24063.46	21495.37
Total Energy Cost	Rs. per MT of Paper	2457.72	2320.83	2177.64
Energy cost as % of Total Manufacturing Cost	%	10.61	9.64	10.13

b. Specific energy consumption:

Year	Electrical energy		Thermal energy	
	Consumption (kwh/MT of Paper)	% Reduction over 2001-02	Consumption (M Kcal/MT of paper)	% Reduction over 2001-02
2001-02	1577	--	4.974	--
2002-03	1537	2.536	4.617	7.177
2003-04	1462	7.292	3.853	22.537



(iii) 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.

(iv) Energy Conservation Achievement:

Energy Conservation Projects completed during the year 2003-04 are listed below.

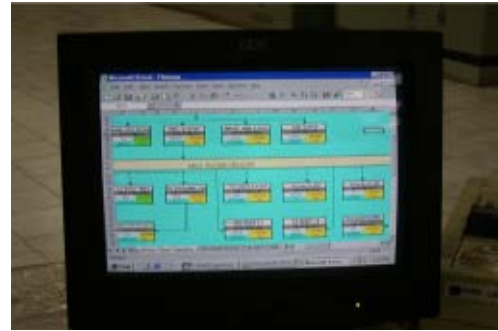
1. Installation of Water flow meters in various locations

Due to non-availability of water flow meters, proper monitoring and accounting was not possible.

Investment made: 22 lakhs

Saving: Water - 3600 KL per day

Monetary saving: 2.15 lakhs per annum



2. Conversion of wet handling fly ash system to dry fly ash system

Fly ash collection in wetting system threats pollution problem and accounts loss in terms of water & power.

Investment made: 40 lakhs

Saving: Power – 788 kwh per day

Water – 1313 KL per day

Monetary saving: 4.27 lakhs per annum



3. Installation of VFD in Tertiary air Fan of Recovery Boiler.

Tertiary air fed to Boiler was damper controlled, resulting power loss.

Investment made: 4 lakhs

Saving: Power – 192 kwh per day

Monetary saving: 0.84 lakhs per annum



Some other energy conservation schemes completed during 2003-04:

- (a) Overflow from warm water tank of Paper machine pumped back to mill water header resulting in saving of around 45 KL water per hour.
- (b) Use of Deculator seal pit water as sealing water for vacuum pumps saving 60 KL per hour of water.
- (c) Use of warm water from surface condenser of evaporator for pulp dilution in unbleached high-density tower saving 60 KL per hour of water
- (d) Incorporation of 2 – Stage heating (MP & LP) at Recovery Boiler SCAPH-Secondary

(v) Energy conservation Plans and Targets:

Energy Conservation Measures (Planned)	Anticipated savings (Rs. in lakhs)	Approx. investment (Rs. in lakhs)	Project Completion year
1. Reusing of Paper M/c vacuum pump flume water after passing through cooling tower and separator.	2.88	40.0	2004

2. Installation of Centrifugal Air Compressor	19.89	100.40	2005
3. Installation of VFD in Recovery Boiler Primary and Secondary Air fans	8.40	18	2004
4. Installation of capacitor bank & Filter in HT and LT line.	11.93	58.21	2004
5. Installation of VFD in Bleached stock pumps	13.26	20.0	2005
6. Renovation of Pocket Ventilation system in both machines	33.26	17.0	2005
7. Installation of VFD in Secondary fan in both machines.	10.0	45.0	2005
8. Installation of auto on/off control in cooling tower fans in Utility	1.76	6.50	2005
9. Installation of VFD in Secondary air fans of 3 CFBs	0.88	14.00	2004
10. Interchanging/replacement of underutilized motor in different locations	2.54	0.50	2005
11. Installation of auto combustion control in 3 CFBs	43.24	41.00	2005
12. Installation of one Fluidized Bed Boiler of capacity 50 TPH	156.75	1500.00	2006

(vi) Environment and Safety:

Parallel to quality of product, NPM is equally conscious for protection of environment in and around the mill premises as well as safety of its employees and equipments. As a result of its sincere efforts towards these areas, NPM was accredited with ISO 14001 certification for its Environment Management System by BVQI of United Kingdom in 2002 and OH&S 18001 certification by DNV in December 2003. Nagaon Paper Mill is the **first Paper mill** in India to get this **certificate**.

The Environmental Policy and Occupational Health & Safety Policy of NPM are under.

i. Environmental Policy:

NPM, a unit of HPCL is committed to

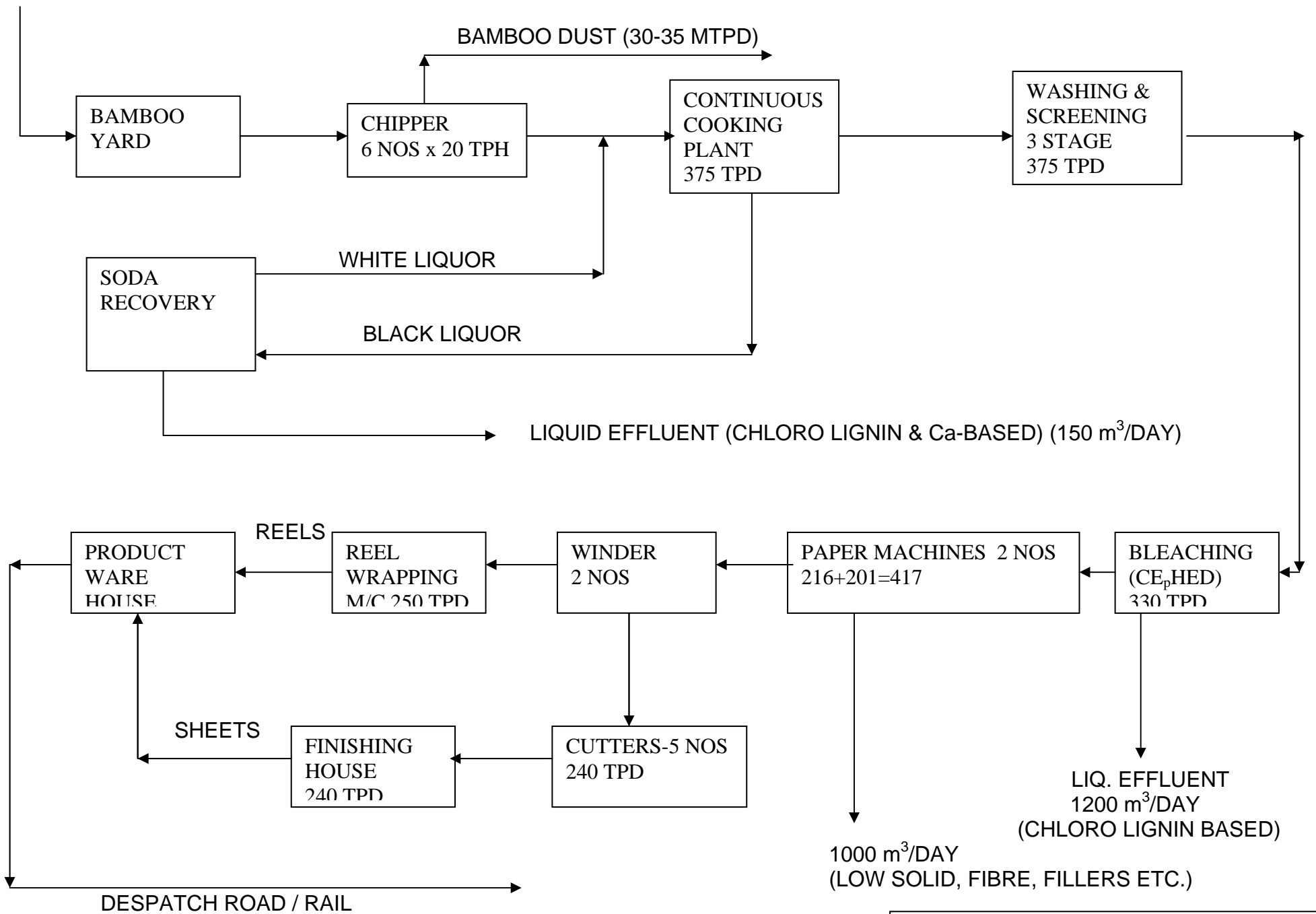
- Adopt an environment friendly approach in all activities related to its products and services.
- Ensure compliance of all relevant legislative enactments, statutory regulations and orders.
- Evolve eco-awareness among its members, affiliates and the community at large.
- Minimize the use of non-biodegradable substances.
- Upgrade process controls and operating practices to contain and counter pollution at source.
- Reduce the consumption of natural resources through conscious efforts to reuse and recycle wherever possible.
- Promote compensatory afforestation through community initiatives to reciprocate the gift of virgin fiber.
- Disseminate information through frequent exchange and interaction with internal and external constituents on the progress in implementation of Environmental Management Plan (EMP)

ii. Occupational Health & Safety Policy:

- Promote and maintain the Occupational and Health & Safety (OH&S) standards to protect its Human Resources (including interested parties), properties and environment from foreseeable work hazards associated with its integrated Pulp & Paper manufacturing process including captive units.
- Comply with all relevant statutory provisions and other requirements in respect of OH&S.
- Continually improve the OH&S standards through all reasonable efforts of risk reduction activities.

NPM has bagged prestigious "Greentech Safety Award-Silver" 2003-04 instituted by GREENTECH FOUNDATION, New Delhi for its outstanding achievements in Safety Management.

SCHEMATIC DIAGRAM OF PAPER PRODUCTION AT NPM



HINDUSATAN PAPER CORPORATION LTD.
NAGAON PAPER MILL

Schemes of Nagaon Paper Mill completed in 2003-04

1. Use of overflowing warm water in Paper M/c:

In both the Paper Machines, about 132 KL per hour of hot water from steam and condensate system condensers, sweat dryer and Pope reel was taken in hot water tank. Only a small portion of this hot water was used in Chemical Additive Preparation Plant (CAPP) for dissolving dyes etc. and the major quantity [about 90 KL per hour] was overflowing to the drains. This water was free from any contamination and was suitable for process water except the temperature, which was about 3 – 5 °C higher. Scheme was prepared to inject this water back into the process water header with a suitable pump. After commissioning of the pump, the overflow from the hot water tank stopped completely and saving was 45 – 50 KL per hour of process water.

Investment:	Rs. 0.6 lakhs
Impact of implementation:	Water saving of 45 KL per hour
Monetary saving:	Rs. 0.64 lakhs per annum

2. Reuse of Deculator seal tank water in Paper M/c:

Due to non-functioning of the cooling tower in Paper Machines, about 60 – 70 KL per hour of Deculator seal pit water of both the machines was used to overflow continuously. The quality of this water was suitable for vacuum pump sealing water in respect of clarity, temperature and pH value. Arrangement was made to pump this water of Machine No-2 seal pit to Machine No-1 seal pit and the combined water to the sealing water header of Machine No-1 vacuum pump. After completion of the scheme, overflowing of Deculator seal pit of both the machines stopped and the saving was found to be about 60 KL per hour of process water.

Investment:	Rs. 0.75 lakhs
Impact of implementation:	Water saved 60 KL per hour
Monetary saving:	Rs. 0.85 lakhs per annum

3. Use of Evaporator surface condensate in Pulp Mill:

After retrofitting of Falling Film Finisher in Evaporator plant, nearly 60 – 70 KL per hour of warm water from the surface condenser of Evaporator was drained. A scheme was prepared to use this water for dilution of pulp from Unbleached High Density Tower of Pulp mill, where previously fresh water was used. After completion of the project, water saving was around 60 KL per hour.

Investment:	Rs. 0.45 lakhs
Impact of implementation:	Water saved 60 KL per hour
Monetary saving:	Rs. 0.85 lakhs per annum

4. Installation of water flow meters at different points:

Eight numbers of water flow meters were installed at different points of process water (4 Nos), drinking water (2 Nos), make up water (1 No) and intake raw water line (1 No) to facilitate better control in monitoring of water consumption. This has proved very useful to locate the areas of higher consumption and taking corrective action. After installation, water saving was about 150 KL per hour.

Investment:	Rs. 22.0 lakhs
Impact of implementation:	Water saved 150 KL per hour
Monetary saving:	Rs. 2.15 lakhs per annum

5. Conversion of wet fly ash handling system to dry dense phase fly ash handling system:

Fly ash generated in Coal Fired Boilers was collected in Hydro bins [wet system] along with bottom ash. The overflow water from hydro bins was going to a settling pit and overflow water from this pit was discharged to the surface drain. This water was containing Suspended Solid (SS) of around 1800 – 2000 ppm, which was a major threat from environmental point of view. A scheme of Dry Dense phase fly ash collection system was prepared to collect this fly ash in dry system to reduce pollution problem as well as saving of power & water.

Investment:	Rs. 40.0 lakhs
Impact of implementation:	Power saved 788 kwh per day Water saved 1313KL per day
Monetary saving:	Rs. 4.27 lakhs per annum

6. Installation of VFD in Tertiary fan of Recovery Boiler:

In Recovery Boiler, Tertiary air fan feeds combustion air to the boiler at a higher elevation for complete combustion. It was having inlet damper for controlling air as per the requirement. It was decided to put VFD control in the fan for power saving.

Investment:	Rs. 4.0 lakhs
Impact of implementation:	Power saved 192 kwh per day
Monetary saving:	Rs. 0.84 lakhs per annum

7. Incorporation of 2 – Stage heating (MP & LP steam) at Recovery Boiler SCAPH:

In Recovery Boiler Secondary Coil Air Pre-heater (SCAPH) MP steam was used for heating the air. To cut down the cost of steam without affecting the required air temperature, three of these coils were converted to LP steam.

Investment:	Rs. Rs. 0.30 lakhs
Impact of implementation:	Saving of coal to the tune of 3655 MT per annum
Monetary saving:	Rs. 55.11 lakhs per annum