

## CENTURY PULP AND PAPER

### COMPANY PROFILE :

Energy resources are getting scarce and increasingly exorbitant with time. Share of Energy costs in total production costs is rather significant Reduction in energy costs can improve the bottom line of any company significantly.

Century Pulp And Paper has adopted a systematic Energy Management Plan with focus on reducing losses, regular tracking of consumption, energy auditing and benchmarking to continually improve on this front.

Century Pulp and Paper, a unit of Century Textiles and Industries Ltd. Is Flagship Company of B.K. BIRLA GROUP of industries. The company is an ISO- 9001: 2000 , ISO- 14001 OHSAS-18000 certificated unit and has established it's brand very well in the domestic and overseas market, with excellent quality of it's products i.e. Writing Printing Papers and Dissolving/ Paper Grade Pulp. The company has the following installed capacities:

Rayon Grade/ Paper Grade Pulp : 31320 TPA  
Writing & Printing Papers (wood) : 37250 TPA  
Writing & Printing Papers ( Bagasse) : 84600 TPA  
Waste Paper based writing & printing Paper : 84600 TPA

A State Of The Art Technology for Bagasse pulping, sound Environment practices and excellent Product Quality are the core competencies of the company.

### Energy Consumption :-

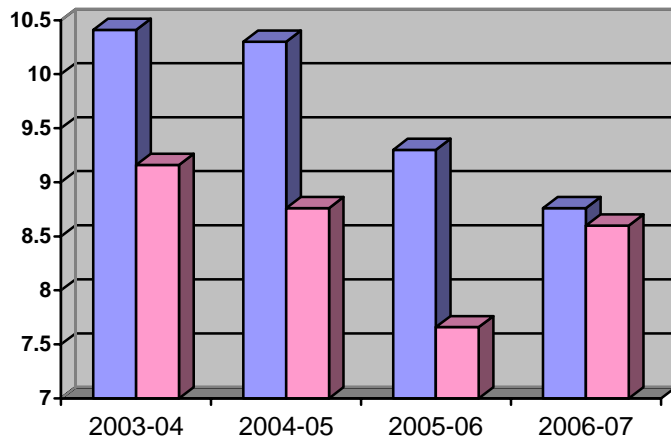
The power requirement of the plant is met by a 7500 MVA grid connection from UPCL and 21 MW , 6.8 MW & 16 MW own turbo generator sets. The plant consumes approx 9.30 lacs units per day, 94% of which is met by own generation. The daily thermal energy inputs are from 800 tons of coal through 7 CF Boilers. Black Liquor & Pith generated as liquid & solid wastes are also used for meeting steam and power requirements of the mill.

The annual energy bill of the company is **15.61** % of the manufacturing cost. Because of continuous energy conservation efforts, plant optimization and adopting technological advances, there has been a continuous reduction in specific energy consumption.

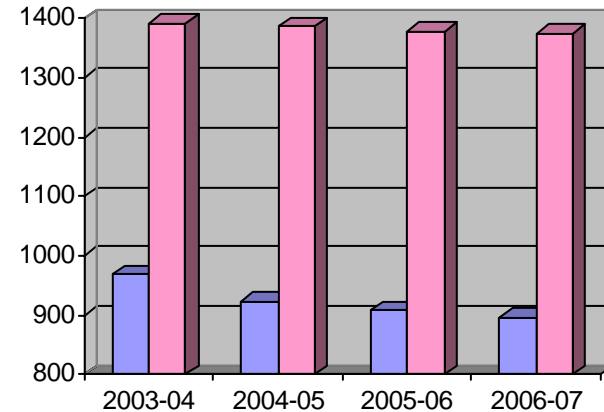
### ENERGY CONSUMPTION TRENDS :

UNITS/TON	2001-2002	2002-2003	2003-2004	2004-05	2005-06	2006-07
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RGP	1012	976	969	924	908	897
PAPER	1483	1424	1391	1386	1378	1375
<b>STEAM/TON</b>	<b>2001-2002</b>	<b>2002-2003</b>	<b>2003-2004</b>	<b>2004-05</b>	<b>2005-06</b>	<b>2006-07</b>
RGP	12.68	11.56	10.41	10.3	9.3	8.76
PAPER	11.24	10.72	9.16	8.76	7.66	8.60



STEAM CONSUMPTION TREND



POWER CONSUMPTION TREND

## ENERGY CONSERVATION COMMITMENT POLICY AND SET UP

CPP has accorded high priority for energy conservation from the inception. Accordingly for energy conservation, a cell consisting of all energy producers & consumers is formed. The objective of the cell is to coordinate the steam and power requirement of the mill, study the causes of variance in consumption figure with targets on daily basis and take corrective measures. The cell also identifies energy conservation schemes and monitors their progress.

The energy conservation is a part of our Company Policy. Some of the major energy saving projects implemented by us are :

- Capacity utilization continuously increased
- Fine tuning of pumps and motors
- Installation of VFD'S

- Optimization of voltages & frequency of own generation.
- Optimization of operating procedures for Agitator, pumps, Depithers
- Energy efficient lighting practices
- Prevent idle running of equipments

CPP also believes that apart from energy conservation lot of savings can be generated by effective utilization of plant capacities. The thrust is on continuous plant operation without any unscheduled stoppages. In order to involve and motivate all employees of the company we have Kaizen Scheme ( small improvements ) which lays emphasis on minimizing of all types of waste.

We have also executed a Productivity linked scheme wherein monthly specific steam & power consumption are compared with a base value and consumptions beyond a stipulated value enhance the pay package. A reduction of 1T/T of steam on 9.37 T/T results into an increase of Rs 650.00 similarly a reduction of 1 units results into Rs 2. An employee today earns Rs 500 - 700 per month on account of this scheme.

The company gets Energy Audits conducted by Professional bodies on regular basis. During the recent years, following audits were conducted:

- Audit by ECHO Pumps on Paper M/c Vacuum System – 4 schemes
- Audit by DSCL on Power Plant - 4 schemes.
- Motor Efficiency study conducted by VBI Systems Bangalore.
- Plant Technical Audits conducted by Independent Consultants
- Audit conducted by CII in Dec 2006 - 42 Schemes identified.

There are two components to the overall Energy Management System

- Conservation : The avoidance of wasteful energy use and reduction in demand for energy related services.

- Efficiency : The reduction in consumption of energy by introducing more efficient equipments & systems.

It is often seen that in our enthusiasm to adopt energy efficient; new systems; the core ideas of conservation are overloaded. After installing various schemes towards this goal at our unit ,the simple conservation steps like insulation and avoidance of leakages too contributed significantly in the overall improvement as seen in the list of measures.

The above mentioned methodology adopted has resulted into 259 measures in last 3 years requiring an investment of Rs 4496.0 lacs and has yielded a saving of Rs 2479 lacs. A list of these measures is annexed.

Some of the innovative measures are -

## Installation of Pith- cum – coal fired boiler

Bagasse a waste product of sugar industry is used for paper making after removal of short fibres called pith. Pith is a very light substance and occupies lot of space and its disposal is a problem.

The pith has a heating value of 1500 Kcal/Kg so efforts were made to burn it in conventional coal fired boilers. The conventional Boilers are not designed to handle such a light substance and the pith burning in them resulted in poor efficiency and frequent failures due to improper heat distribution.

Pith alone can not be used as a fuel and requires a support fuel like coal. Hence a coal cum pith fired boiler was thought of. The technology of burning this substance was not available so the manufacturers T B W had to do a lot of R& D with our pith. A control combustion zone Boiler (patented design of Babcock & Wilcox, USA ) was designed to burn pith and coal with varying proportions of pith max being 80% pith.

The project required an investment of Rs2350 lacs and resulted into annual saving of 42896 mt coal equivalent to Rs 793.6 lacs.



## Recovery and utilization of waste from Producer gas plant

In Producer gas plant, Coal when Gasified results into Producer Gas along with the mixture of Tar oil, Phenolic compounds soluble in water and other organic compounds. As per the plant supplier the tar oil was to be separated and disposed off to parties for use as coat on wooden part of sea boats. This mode of disposal was found difficult. It was observed that tar oil had calorific value and could be used for substituting fuel.

The challenge was to separate it, The mixture contains certain organic chemicals which are in suspended solid form and gets dissolved into alkaline solution of Phenolic compounds. So a way out was worked out to separate tar oil from mixture by treating it with Soda Ash. Soda ash treatment results in increasing density of water - soluble mixture and tar oil gets separated fast to top layer. It is collected and used in Lime kiln along with fuel oil.

The scheme required an Investment of 4.0 lacs and resulted into an annual savings of 72.0 lacs.



## WEAK BLACK LIQUOR CLARIFIER

We have three Pulp mills for Rayon Grade Pulp, Wood Paper. Bagasse Paper which process Hard Wood, Bamboo and Bagasse. The cooking methods are different and accordingly the WBL generated also has different characteristics. The mixed WBL consists of lot of solids in the form of fractional fibers, earthy and siliceous material. These suspended solids on evaporation cause scale formation on the heating surface thereby reducing the capacity of evaporation and affecting the steam economy. It also requires frequent stoppages of Evaporators.

To overcome this problem we installed storage cum clarifier of 2000 m<sup>3</sup> capacity where suspended solids along with fractional fibers and earthy materials settle down by gravity and are withdrawn from the bottom of clarifier and clear

Black Liquor with 300 ppm suspended solids is available resulting in better heat transfer and reduced steam consumption. The scheme required an investment of Rs 120 lacs and resulted in an Annual Savings of Rs 9.29 lacs.



## DIVERTER FOR PITH CONVEYOR

For producing Bagasse Paper we consume 1200 tons of Whole Bagasse daily. This whole Bagasse consists of approx 65% Fiber which is used for manufacture of paper. The balance 35% is Pith which is removed during the dry and wet depithing and is used as a substitute of Coal. The pith separated during dry depithing is carried to Pith yard by a conveyor. From the discharge of the conveyor the pith is shifted and stacked by Pay Loaders. It was later transported to Coal Fired Boilers by Tractor Trolleys. These trolleys were filled by pay loaders and during loading yard stones got mixed with pith.

To overcome this problem direct feeding of pith to Boilers was thought of. Accordingly three Diverters were provided on the main conveyor such that the trolleys could be directly filled without the pith coming in contact with the ground.

Pith devoid of stones caused removal of screens in the Boiler resulting in increased utilization of waste Biomass and reduced coal consumption. This direct feeding of pith also reduced handling of pith in yard resulting in savings in Pay loaders operations.

The investment was 0.5 lacs resulting into a saving of Rs 52.5 lacs through diesel & Pay loader hiring charges and Rs 97 lacs through higher utilization of Biomass and savings of coal.



## PRODUCER GAS PLANT

We have got two rotary Lime kilns to recalcine Lime sludge which is a waste Material generated during Chemical Recovery process. The lime produced is used in process. In this process the energy is supplied for drying, pre heating & calcining through the firing of R.F.O. In both the Lime Kilns about 36 tons of oil is consumed per day.

Considering the spiraling cost of oil we decided to install a Producer Gas Plant as a fuel substitution measure. Producer Gas is generated by gasification of coal in extended shaft as producer. This required an investment of Rs. 338.0 Lacs. The project was executed in April 2003 and resulted into a saving of Rs 196.0 lacs.



## VACCUUM PUMPS IN WPP

In Paper plant, Vacuum pumps are used for dewatering from pulp or paper sheet. They consume large amount of power. These pumps were evaluated and found to be operating at low efficiency. 10 pumps were substituted by high efficiency pumps

	<b>Before consumption</b>	<b>after consumption</b>	<b>savings</b>
Pulp mill	180 kw	136 kw	44kw
Paper m/c	1274kw	1040 kw	234 kw

This required an investment of Rs 63 lacs and resulted into a savings of Rs 51.18 lacs



## IMPROVED HEAT TRANSFER IN PAPER M/C DRYING CYLINDERS

For obtaining uniform moisture profile across the deckle and reduction in steam requirement for drying, the surface of dryer cylinders were ground and polished for paper m/c I this resulted in reduced steam consumption with improved Moisture profile. The project required an investment of Rs 107 lacs and an annual savings of Rs 30.4 lacs

## VARIABLE FREQUENCY DRIVES

Several fans and pumps in plant have variable flow requirements. This is achieved by valve throttling/ damper operations. By this method the reduction in power consumption decreases but at the same time the efficiency of the equipment decreases drastically. RPM reduction by VFD is closest to ideal capacity control. 43 Equipments ( for applications of pulp Stock, chemical dozing, back water supply, FD & PA fans) were identified and provided with VFD's. this required an investment of Rs 53.0 lacs and resulted into a saving of Rs 35.3 lacs.

## NEUTRAL COMPENSATOR

Lighting loads are single phase loads and are difficult to balance. An unevenly loaded Phase circuit results in different phase to neutral voltage and heavy return current in Neutral. It is difficult to balance it and energy is lost through uneven voltage and Neutral current.

To make such loads evenly distributed, a Neutral Compensator is installed. A neutral compensator is a specially wound transformer and establishes Neutral point symmetrical with respect to phase voltage, resulting in balance voltages in all three phases and reduced Neutral current. Four Neutral Compensators were installed with an investment of Rs 0.78 lacs and resulted into an annual saving of Rs1.5 lacs



## LIQUOR CIRCULATION PUMP

The liquor circulation pump in WPP Digester No 4 was installed since 1984. On Evaluation it was found to be operating at low efficiency. The pump was replaced by Sulzer make high efficiency pump resulting into an annual savings of Rs 1.92 lacs with an investment of Rs 17 lacs.



## OPTIMIZATION OF CAPTIVE GENERATION

For a generation of 18.5 MW from Double Extraction Condenser Turbine significant Quantity of steam was passed through the condenser and the Process steam requirement was met by PRDS. This caused partial utilization of steam energy and reduced efficiency. In order to recover both Thermal and Power energy from steam, optimum utilization of Extraction was done and the condenser was utilized for Process variations only.

The Reduced generation was made up from UPCL grid, at a tariff of Rs. 1.90/ kwh. This resulted into

- ✓ Full extraction of steam at 10.5 Kg/cm<sup>2</sup> from Turbine which helped in arresting steam through PRDS.
- ✓ Higher Power generation from Process Steam
- ✓ Avoided venting of steam at 3.5 Kg / cm<sup>2</sup> due to process fluctuations.
- ✓ Stop one coal fired boiler of 23 TPH capacity
- ✓ Steam to Dearator was reduced
- ✓ one boiler Feed pump of 150 Kw was stopped

savings :

- Coal - @2700 MT/ month resulting in annual gains of Rs 583 Lacs.
- Power - 350 KW Load i.e. 2.8 MKwh/annum resulting in annual gains of Rs 56 lacs



## **ENHANCED POWER GENERATION BY IMPROVED WATER TREATMENT**

21 MW TG had scale formation resulting into a washing cycle every 3-4 months. Turbine scale indicated presence of Sodium and Phosphate which was due to addition of CAUSTIC SODA to increase pH OF boiler water. To minimize scale formation caustic soda was substituted by Indion 1605 as a PH Booster. After the treatment the washing cycle could be extended to 11-12 months. Gain of power generation equivalent to 700 kw was achieved i.e. equal to Rs 106 lacs / annum.

## **OTHER MEASURES**

- ✓ Replacement Of 40 W Tubes.
- ✓ Use Of Energy Efficient Ballasts
- ✓ Use Of Low Loss Capacitors
- ✓ Optimization Of LT Operating Voltages
- ✓ Use Of Low Watt HRC Fuses
- ✓ Use Of LED Indicating Lights
- ✓ Optimum Utilization Of Plant

## **ENERGY CONSERVATION PLANS & TARGETS:**

The following measures are planned to be undertaken in future:

- 1) Replace 14 nos reciprocating compressors by 2 nos Centrifugal Compressors to achieve better energy efficiency. The scheme requires an investment of Rs 142.0 lacs , and would result in an annual savings of Rs 39.74 lacs.
- 2) Install a system for Sulphate stage heat recovery. The scheme requires an investment of Rs 76.25 lacs and will result in annual savings of Rs lacs.
- 3) Arrange heat recovery system for RGP Digesters. The scheme requires an investment of Rs 68.53 lacs and will result in annual savings of Rs26.73 lacs.
- 4) Retrofitting of Mud filter for improved Dryness of Lime mud for reduced consumption of FO in Lime Kiln. The scheme requires an investment of Rs 35.65 lacs and would result in savings of Rs 22.69 lacs
- 5) Replacement of Worm & Pinion Gear Boxes with Helical Geared Motors for effluent Areators. The scheme requires an investment of Rs 68.53 lacs and will result in annual savings of Rs26.73 lacs.
- 6) Reduction of Harmonics in Electrical distribution system. The scheme requires an investment of 27.5 lacs and will result in annual savings of Rs 22.62 lacs.
- 7) Implementation of 42 Energy Conservation measures identified by CII during their audit in Dec 2006. The scheme requires an investment of Rs 625.0 lacs and will result in annual savings of Rs 60.77 lacs.
- 8) Installation of Topping Turbine to utilize Steam Enthalpy during pressure reduction. The scheme requires an investment of Rs 65.0 lacs and will result in annual savings of Rs 39.10 lacs.

## **ACHIEVEMENTS:**

We have identified and implemented 259 schemes in the last 3 years with an investment of Rs 4495.93 lacs and resulting into a savings of Rs 2479 lacc .The specific energy has a reducing trend .

Appreciating our efforts –

- IPMA awarded us **ENERGY CONSERVATION AWARD** for the year 2002 – 03 & 2003 - 04.
- CII identified us as “**Energy Efficient Unit** “ for the year 2003-2004 & 2006-07
- Awarded **National Energy Conservation Award** for 2003 – 04 and 2005-06 by **G.O.I.**

## **ENVIRONMENT & SAFETY :**

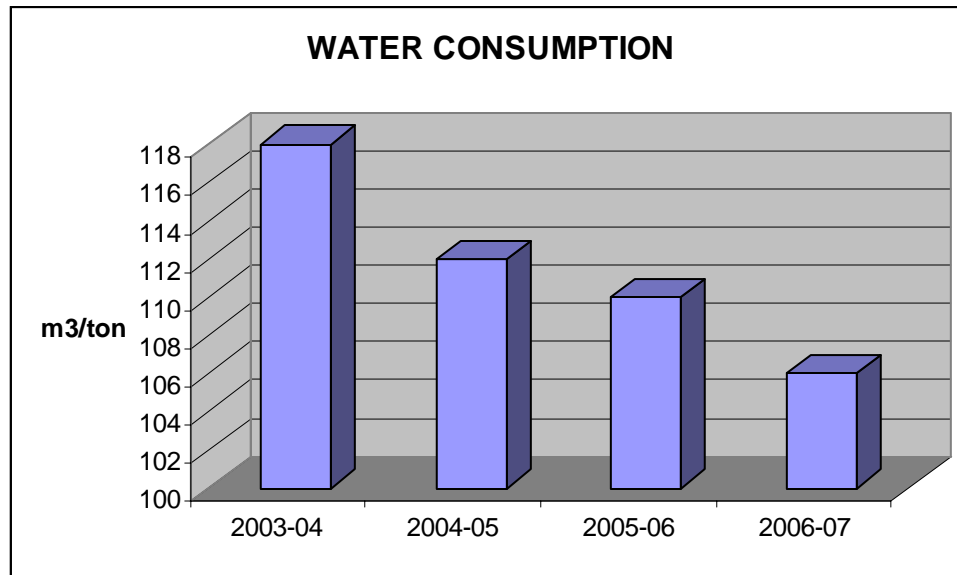
Preserving and protecting the environment is a top priority at century. We are always sensitive to our bio-diversity of the soil, water and air around us. The power plant features an efficient system for reducing Air emissions. Electrostatic Precipitators has been installed to remove particles from recovery Boilers, Coal- fired Boilers and Lime Kiln flue gases.

In strict adherence to the standards and guidelines, the effluents are treated in a modern Effluent Treatment Plant which is recognized as a Model Plant for its efficiency and performance. Company 's adoption of a systematic approach to the Environment matters including Waste Minimization, Water- Recycling and Re-use programs of the by – products has facilitated the company in getting the ISO-14001 Certification.

or it's Environment management System Company's friendship with Environment has also reflected in it's Bagasse - based papers being licensed for **ECO** Labeling a distinct honor to be attained. Sincere efforts are made to find applications for the waste material. Few examples are

- The dust generated during Lime stone crushing is used in place of normal sand with cement.
- The stones received along with coal are used for stone pitching in place of natural stones.
- The PH Liquor is directly burned in Chemical Recovery Boilers along with black liquor.
- The organic solid waste collected in P H Liquor Tank is burned in coal fired boilers.

Apart from reducing the effluent loads these schemes have resulted into a saving of Rs 8.94 lacs. Continuous efforts are made to minimize our water consumption by finding opportunities of Recycling and minimizing it's consumption . Water consumption trend is as shown.



Century's Socio-Forestry venture, to scientifically grow large – scale plantation to Meet the future Raw Material requirement reflects company's commitment towards sustainable development. The company maintains and distribute quality saplings to farmers and offers technical support. Massive plantation and Green belt has been developed within and around the company premises.

The employees are very conscious about the safety aspect of the mill and strive to achieve zero accidents. For this departmental safety committees operate under the control of central safety committee. Work permit system exists for all jobs. Why-why analysis is done for each accident, root causes identified and counter measures are taken. As a proactive approach, frequent safety patrols are carried out to identify unsafe acts and conditions in the plant .

There is continuous thrust for training of employees and regular training and awareness programs are conducted by internal and external faculties.