

Energy management and energy conservation in pulp and paper industry including co-generation and utilisation of renewable energy resources

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ABSTRACT

The Paper presents some of the projects carried out in the field of energy conservation with or without marginal investments. As the mill is new and scope of energy conservation is limited, by rationalisation and suitable modifications in process systems, energy conservation results are observed to be encouraging.

Introduction :

Paper industry is one among the highly power intensive and power consuming industries. Earlier energy requirement and cost used to be in the region of 11% of total operational cost. Now with Modernization equipment and mechanization of operations it has doubled to 22%. So, we in the Paper industry should not lag behind or be callous in our energy conservation measures.

TNPL's Energy Conservation Efforts :

Ours is a new mill having a production capacity of 300 TPD single paper machine with built in energy efficient technology/equipments. However, we have formed an energy cell during 1986 when our mill was commissioned and production was more or less stabilized. Monitoring of all energy consumption is being done very systematically (daily and monthly). We have conducted energy audits with the help of M/s Balmer lawrie and Co. Ltd. and M/s Confederation of Indian Industries during 1989-91. Apart from the suggestions received from our employees, they have also recommended several suggestions requiring minimum capital as well as large capital which are being implemented one by one. We have also steadily

increased our productivity and we are maintaining around 100% capacity utilization. Compared to our energy consumption of the year 1986-87, at present the overall energy consumption had come down by about 5%.

A few projects worth mentioning, that are implemented and under implementation can be summarized below (some of them are very typical for TNPL) :

a) Depithers and compactors :

Bagasse is collected from 5 Sugar Mills with an average lead distance of 65 kilometres. TNPL erected boilers in the Sugar Mills and exchanged the Bagasse on barter deal. The Collected bagasse from different Mills is depithed and stocked at Main site. Later on considering the transport cost, it was decided to install depithers and compactors at the Sugar Mill sites. Accordingly depithers have been provided in three mills (few depithers from main site and few new were utilized). Compactors were provided in four mills. Also, the boilers were provided with pith firing systems. Now some of the Sugar mills themselves are coming forward to put up depithers and

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compactors. Hence, due to pith firing introduced at sugar mills, equivalent coal movement from main site is avoided. Also the lorries could transport more bagasse in every trip from the sugar mills due to compacting of bagasse. This has resulted in a considerable drop in the transport cost of useful bagasse on weight basis.

Fluidised Bed Boilers :

Eventhough the boilers erected in the sugar mills are just 8 years old, one of the spreader stoker boilers of 45 ton capacity has been modified to fluidised bed type to utilize low calorific value fuels and to increase the efficiency. Conversion of two more boilers in other sites will be taken up during the financial year 1992-93.

Distributed Control System :

(A microprocessor based boiler control system) is provided for one of the Power Boilers of the Main site to optimize pith lignite firing and to reduce stack losses by controlling oxygen. Work has already been completed and the system is under trial. The percentage of raw lignite and pith firing could be improved to 70% from 50%. Also, lignite feeding through steam jacketed screw conveyor was installed.

Vacuum Pumps had been provided for Evaporators by replacing steam ejectors.

Sonic Soot Blowers are provided in Economiser of the Boilers instead of steam soot blowers.

Heat Exchangers :

In Paper Machine, implementation of hood heat recovery system to heat fresh pocket ventilation air is being taken up. Heat pipe heat exchanger has been received. Erection and commissioning is to be carried out during November/December 1992.

Paper Machine :

We have installed Measurex Process Control System" recently for measurement and control of caliper, grammage, ash content, moisture etc. and we expect increase in production by 3% and energy conservation of 1%. Trials are under way.

Solar Water Heater :

of 5000 LPD capacity installed in Canteen for

washing utensils/vessels and for hot water requirements. We have also installed few 100 LPD solar water heaters in our housing colony. Also we are planning to install solar water heater for our boiler feed water heating, having a capacity of 1000 cu.m.

Effluent Treatment Plant :

Drum filters were provided with variable speed drives and this has improved the operation/performance.

Boilers :

In view of problems in coal procurement and non-availability of high calorific coal, there is no other way except to go in for renewable energy sources. As a part of developing alternate fuel, we have fired briquettes (pellets) made out of Municipal solid wastes in combination with coal, lignite, leco etc., and separately as well. Trials were found successful. We are also embarking upon a plan of briquetting ETP cake and pith alongwith leco powder and municipal solid waste.

Boilers coal/leco particles

Escaping under the grate (under-grate siftings) are collected and refired. The un-burnt coal in ash (UBC) is maintained around 6.04% Further we are planning to recover heat from the flue gas by which our coal requirement and dependence on grid supply will be reduced.

Soft water plant :

Commissioned during Aug 91. By using soft water, chemical bagasse pulp blow tank exhaust heat could be recovered and hot water produced. (L.P.) steam savings about 16,500 tons per annum.

Harnessing Renewable Energy :

We are planning to establish wind farm of the capacity 20 MW in strong wind areas of Tamilnadu. Equipment ordering is over. Erection to be started during March 93. The generated power will be transmitted through TNEB grid and will be utilized in main site.

We are also planning to establish 3 small/mini hydro electric projects of total capacity 7.8 MW in the near future.

Conclusion :

By constant monitoring of power, steam and water consumption and implementing number of schemes the savings achieved during the year 1991-92 are as under.

- a) Electricity : 5.0 lakh units.
- b) Water : 7.6 lakh cu.m.
- c) Steam : 16,500 tons.

This will come to a total saving of more than 76 lakhs of rupees. To achieve this we have gone through the following processes which are necessary for each industry :

- a) An Energy Management Cell was constituted with members from various departments and is functioning well.

- b) Apart from internal audit by the Energy Cell, external energy audits were also carried out.
- c) Employees were motivated through appreciation, training and awards.
- d) The Management is implementing all the workable suggestions and Sr. Managers are participating regularly in the Energy Cell meetings.

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