Energy conservation in Hindustan Newsprint Limited

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A. Introduction

The creation and use of Energy is basic to all industry. Prior to 1973, decision regarding energy utilisation in an energy intensive industry such as Newsprint industry were based on two assumptions

a) There is unlimited supply of Energy.

b) There is almost unlimited supply of cheap Energy.

The shock of the 1973 OPEC crisis was, as you all know, two fold. First there was an awareness that Energy would no longer be cheap and there were at least some questions in the early days following the 1973 crisis regarding future supply and ultimate limit. How far industry can go in improving its energy utilisation ? The simplistic answer is to say that every Mill can do as well as the best. Whether this is economically achieveable with todays and tomorrows energy cost compared to capital assests of upgrading all plants is a question. Beyond indentifying improvements in energy utilisation the other challenge is to implement these more rapidly achieving the optimal energy utilisation level as early as a date possible. Cost of the energy is expected to run faster and offset the economic benefits of the improvements. The challenge is to identify and implement further efficiency measures.

The specific energy consumption varies widely from Mill to Mill depending primerly on

a) Choice of Technology (Process)

b) Chemi-Mechanical Pulp, Chemical pulp and deinked pulp content (Product mix ratio) in the furnish.

c) Design and performance of equipment (energy efficient)

d) Layout of plants (Reduced handling and Automation)

e) Type and quality of fuel used.

f) Capacity utilisation.

g) Utilisation of captive power on co-generation concept.

B. Hindustan Newsprint

India has been a traditional importer of Newsprint. The present total installed capacity of 4 major News print Mills in India is 3.0 lakhs Tonnes.

One of the biggest and most sophisticated Newsprint Mills in the country, HNL with a capital investment of Rs. 160 crores and annual capacity of 80000 MT manufactures Newsprint through unique process using reed and bamboo, and hardwood like Eucalyptus grandis and hybrid as basic raw materials.

Hindustan Newsprint has been built up to the North American standards as prevalent in the early 1970's. In addition to inbuilt energy conservation, improved house keeping and maintenance measures, quite a few technology upgradation, process control and modifications have been carried out looking to the advances and developments in the very field of energy reduction and conservation.

C. Energy Conservation-Where do we Start

The basic things are.

1. To Assign responsibility
2. Monitor process and accumulate base line data.

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3. Establish and monitor energy reporting system.

4. Develop, update, review and publicize all datas and motivate with incentives.

5. Assure that Energy Conservation schemes are included in all short range and long range capital plans.

D. What HNL has done

HNL has considered Energy conservation as a continuous effort and taken into account the above motivation and control methods.

The variable cost per MT of finished Newsprint on account of purchased fuel is 33% and the total cost per MT of finished newsprint on account of purchased fuel is 23% (see figure I, II, IV) with the increase in the Electricity charge and also cost of coal and transportation charge these will again go up and it became essential for us to look some ways for reducing this cost and we are forced to concentrate in increasing our energy efficiency and timely implementation of energy conservation schemes.

1. HNL has its own energy conservation cell with involvement of senior officers and it has a monthly energy reporting system (see format -1)

2. Whenever and wherever required, HNL is not hesitating to take the advice of reputed consultant like M/s PCRA, Tata Consultants M/s C.I.I. etc for energy conservation aspects. HNL has engaged M/s C.I.I. Madras to conduct a detailed Energy Audit and recommend measures to further reduce energy consumption.

3. For creating an energy conservation awareness and to generate popular participation from top to shop floor HNL is arranging a well thought media compaign by way of posters, circulars, cost charts, energy slogans etc. and also by in house training and other out side seminars.

4. HNL has conducted a seminar on Energy conservation in association with Ministry of power and Non Conventional Energy Source, Department of Power, Government of India and Swedish International Development Agency in the year 1991.

5. HNL is making use of Co-operation from all employees by introducing productivity linked incentive scheme giving due weightage for energy usage.

6. To reduce dependance of non conventional raw material and purchased energy HNL propose to install Deinking plant which consumes only quarter of the power for mechanical pulp for Hardwood and also the process is evironmental friendly.

7. HNL has to take stringent pollution control measures which also adds up to our total energy consumption. In HNL power consumption for effluent treatment plant comes to about 50 KWH/ MT of Finished Newsprint.

E. Capital Schemes

The short term and long term capital projects already implemented are:

1. Thermal insulation of all the surfaces which are not insulated so far

2. For recovering more condensate

   a) Tube stacks of liquor preheaters in digester were replaced.

   b) Replaced the damaged and inefficient steam traps.

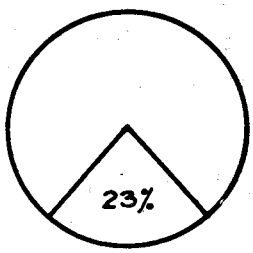
3. a) Most of the Mercury vapour lamps have been replaced with sodium vapour lamps.

   b) 40w fluorescent tubes replaced with 36W slim tubes.

4. Replaced the steam ejector with vacuum pump in Recovery plant, since the cost of power (Rs. 0 88/ unit) is cheaper compared to steam cost (Rs. 400/ MT). In our case usage of electric motor driven vacuum pump is more cost effective than steam

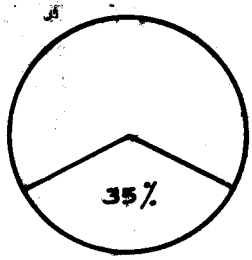
HINDUSTAN NEWSPRINT LTD

FIG (1)



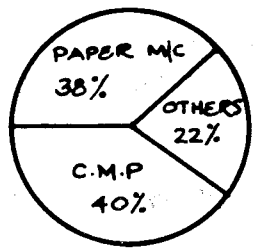
TOTAL COST OF PRODUCTION PER MT OF FNP ON PURCHASED ENERGY.

FIG (2)

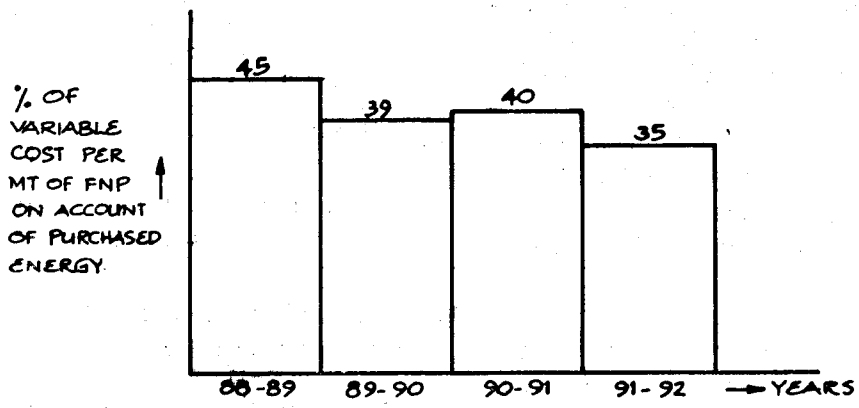


VARIABLE COST OF PRODUCTION PER M.T. OF F.N.P. ON A/C OF PURCHASED ENERGY.

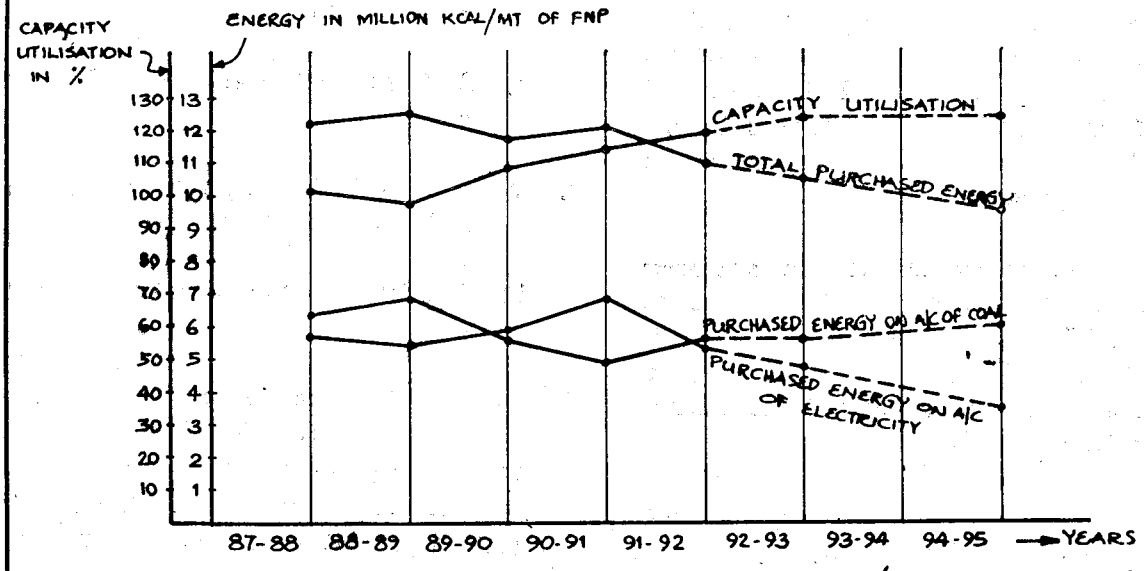
FIG (3)



PERCENTAGE OF POWER DISTRIBUTION



YEARWISE PURCHASED ENERGY COST/MT OF FNP FIG (4)



YEARWISE PURCHASED ENERGY CONSUMED/MT OF FNP FIG (5)

ejectors. The power is comparatively cheap in Kerala i.e. Rs. 0.88 per unit for 92-93 while cost of coal is more because HNL is far away from Coal sites.

5. Basic weight, Mositure and Caliper control system (Micro Processor based) in paper machine (Rs. 200 lakhs) : In addition to fibre saving, improvement in production efficiency, higher capacity utilisation, substantial amount of energy reduction is there after the implementation of the scheme. There is 13% reduction in steam consumption and on account of this alone the annual savings is about Rs. 100 lakhs.

6. By increase of raffinator disc size from 54" to 58" and with the increase in capacity utilization and programmed rnnning of plant, specific power has come down to an optimum value. Power requirement for refining plant has been substantially reduced by marginal increase in the impregnation chemical which has also contributed to improved strength characteristic of mechanical pulp.

In HNL 40% of the total power is used in our CMP plant and in CMP 70% is for refining only. With the above modification power consumption has come down from 1400 kwh/hr to 1150 kwh/MT. which amounts to an annual saving of Rs. 65 lacs.

F. New Projects On Energy Conservation

Out of Rs. 700 million sanctioned for the upgradation and modernisation of the mill, more than Rs. 250 millions is earmarked for the following.

1. Conversion of 3Nos 60 T/hr, 60Kg/cm² stoker fired boilers to FBC System.

The present thermal efficiency is only 67%. We expect an efficiency of 82% after conversion of boilers to FBC system. With an increase of 15% in thermal efficiency there is an annual saving of Rs 270 lacs. In addition to this the conversion will facilitate burning of low quality coal as well as other fuels like lignite leco etc.

2. Utilisation of raw dust and effluent waste as fuel in boilers

Generation of heat from waste is a must for survival in the years to come. HNL has forseen this and we are making use of wood dust (8 tons/day) and effluent sludge, (20 tons/day) as fuel in our FBC boiler. By making use of this we expect our coal consumption will reduce by about 25 tonnes per day resulting an annual saving of Rs. 90 lacs.

3. Micro processer based instrumentation system for boilers

1% to 2% increase in thermal efficiency is possible with automation and we expect a smooth running of plant and a better load management.

4. Modification and upgradation of steam and condensate system. Hood and pocket ventilation system in paper machine for recovering exhaust heat.

5. Water conservation scheme.

6. In corporation of a new press for improved recovery of chemicals from CMP plant will contribute to an additional 15Tonnes black liquor solid per day. This will also help in reducing the effluent load.

G. Co-generation and power factor

The power requirement of 35% is met by a 15 MW condensing cum extraction turbo generator and the rest 65% of power from State Electricity Board. Out of 60 MW connected load 35% is synchronous and the rest is induction load. With the installation of 3 MAVR capacitors, the power factor has reached an almost optimum valve of 0.95 which is one of the best in the state grid.

As the power situation in Kerala is very grim the demand has been going up exponentially compared to addition in generator capacity, HNL has to depend more and more on in house generation and the cost of which is related to cost of coal. The present variable cost of in house generation of power comes to Rs. 1.25 per unit.

ENERGY

Comparative Statement of energy utilisation tor the Year 87-88, 88-89, 89-90, 90-91, 91-92

Sl. No.	Particulars	Unit	87-88	88-89	89-90	90-91	91-92
A.	Production	MT	81513	78635	86844	90385	90181
B.	1. Capacity Utilisation	%	101.9	98.3	108.5	112.9	119.5
	2. Grade	gsm	52	52	52	52	49
C.	**Power**						
1.	Overall specific power						
a)	After adjusting for imported pulp usage and excluding colony	KWH/MT of FNP	2438	2424	2205	2251	2031
b)	Without adjustment	KWH/MT of FNP	2234	2391	2127	2033	1934
2.	Paper Machine	KWH/MT of FNP	852	899	790	744	740
3.	C.M.P.	KWH/MT of Bld pulp	1556	1470	1358	1356	1198
4.	C.P.	KWH/MT of Bld pulp	424	380	394	363	395
5.	Total power consumption	lacs KWH	1821	1880	1847.5	1838	1772
6.	% of own power to total power	%	29	34.6	22.5	7.3	24
7.	Average system power factor		0.94	0,95	0.94	0.94	0.95
D.	% of imported pulp usage on total pulp	%	16.7	5.5	10.8	12.8	10 2
E.	**Steam**						
1.	Overall (process only)	MT/MT of FNP	6.2	6.8	6.0	5.8	5.5
2.	Paper Machine	MT/MT of FNP	2.58	2.68	2.49	2.46	2.15
3.	C. P.	MT/MT of Bld pulp	2.62	3.07	2.93	3.0	2.64
F.	**Water**	M^3/MT of FNP	186	200	174	167	161
G.	Coal	MT/MT of FNP	1.62	1.77	1.41	1.27	1.47
H.	Tatal Energy	Kcal/MT of FNP	12,12x 10^6	12·49x 10^6	11.77x 10^6	12.0x 10^6	11.7x 10^6

Even though the cost of grid power is comparatively less at present, this will go up steeply in the years to come and we have to depend more on co-generation.

Conclusion

By better capacity utilisation, better house keeping, by technological upgradation, increased awareness of all employees, the total purchased energy consumption is coming down and we expect the total purchased energy consumption will come down to 9.5 million Kcal/MT of FNP after the commissioning of the energy projects and also production at 1,00,000 tonne (see fig 5). We in HNL consider energy conservation as a continuous effort in every area of energy use. We are proud to say that the present results have been achieved with a minimum capital outlay. Further more HNL hopes that scheme to be implemented as per energy audit study being conducted will give a good return on capital expenditure involved.

Every one must become invoved in the programme if it is to be effective. The success of conservation of energy mainly depends upon the creation of an awareness, among the employees in the very field of energy conservation. Whatever technology we adopt or modernisation we carryout, the very success mainly depends upon the people who are using it. So it is needless to say that the success of energy conservation mainly depends on the availability of funds for technology absorption and modernisation and the creation of energy conservation awareness among all the users.

Acknowledgement

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