Factsheet

Energy Efficiency for Pulp and Paper Industry

Sector Highlights

Pulp and paper industry has completed almost four decades of production in Nepal. According to Central Bureau of Statistics (2007), the number of manufacturing unit of pulp & paper and paper board is 46 providing the employment to 2,035 peoples. The total input value in the sectors is about NPR 1.376 billion with the output value of NPR 2.945 billion. Majority of the paper industries are handmade units; seven of them are mechanized pulp and paper mills including an addition unit that came into operation after 2007. The average installed capacity of the paper plan is 45.6 Tons per day (TPD), whereas the average production is 22 TPD. At present the paper industries in Nepal are producing mainly two types of products: Bleached writing/printing & newsprint paper, and unbleached craft paper. The sector uses two types of fibers for papermaking. Both are locally produced: 63% non-wood pulp and 37% used/scrapped papers.

Energy Saving Potential

Paper industries consume electrical as well as thermal energy in their production processes. The larger units are installed with boiler for steam generation. These units use rice husk as fuel for boiler. Electrical energy is mainly used for the drives and lighting.

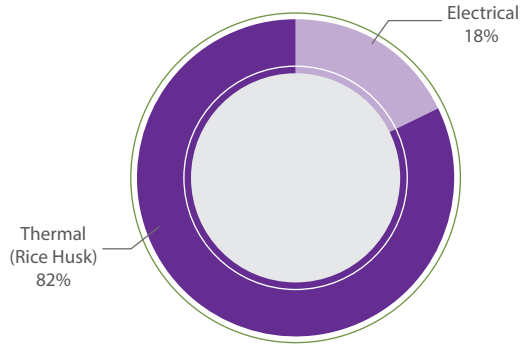


Figure 1: Energy use by resource in pulpe & paper industry (GIZ/NEEP 2012[1])

The energy cost on product value is 20% for paper and pulp sector. Energy saving potential for the sector is estimated to be 2% for electrical and 8% for thermal.

Type	Electrical (weighted average)	Thermal (weighted average)
Pulp and Paper	937 kWh/MT	15,434 MJ/MT

Table 1: Specific energy consumption in Nepalese Pulp & Paper Sector (GIZ/NEEP, 2012[1])

Pulp and Paper Sector by numbers

46 pulp and paper industries in total
7 larger pulp & paper industries
2,035 employments
NPR 1.569 billion value addition
45.6 TPD Installed capacity
20%- Energy cost

Saving potential-annual

919 KWh of electrical energy
136,848 GJ of thermal energy
33,663,972 NPR from Pulp & Paper
11928.36 kg of CO_2 emission

*Status 2006/07, update not available

Figure 2: Monetary saving potential in Nepalese Pulp and Paper sector (GIZ/NEEP, 2012[1])

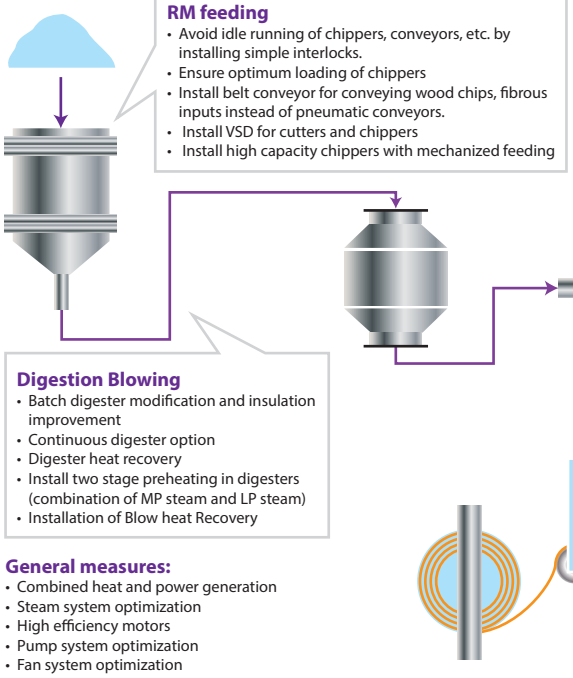
[1] GIZ/NEEP, 2012: Baseline study of selected sector Industries.

Experiences form the past have identified many options for improving energy efficiency in the pulp and paper sector that are highly profitable with the payback period of less than 3 years.

Option	Estimated Payback Period
Replacement of Dyno-drives with Variable Frequency Drives (VFD's) in Washer Drum Drives	3 years
Downsizing and use of energy efficient motors	1.5 years
Improvement of power factor to reduce reactive load of the plant	1 year
Steam leakage from valves and flanges	1 year
Installation of translucent sheets for optimal use of daylight	0.5 years
Insulation of steam pipes, valves, digesters etc.	0.5 years
Improvement of combustion efficiency by Boiler tuning.	0.5 years
Replacement of Suction Couch Roll by Solid Couch Roll in the Paper Machine	0.5 years

Table 2: energy saving options and payback period of investment for the pulp & paper sector (Danida/ESPS, 2005[2])

Energy Saving Tips



RM feeding
- Avoid idle running of chippers, conveyors, etc. by installing simple interlocks.
- Ensure optimum loading of chippers
- Install belt conveyor for conveying wood chips, fibrous inputs instead of pneumatic conveyors.
- Install VSD for cutters and chippers
- Install high capacity chippers with mechanized feeding

Washing and Screening
- Avoid fresh water for pulpers and beaters and use back water
- Interlock agitators with pumps at storage chests
- Providing timer control for agitators for sequential operation
- Optimize fresh water consumption in pulp mill washers e.g., alkali washer back water in chlorine washer and chlorine washer back water in brown stock washed pulp.
- Utilization of advanced washers, such as, flat belt wire washers, double wire press, DD washer and Twin drum washer.

Refining and Stock Preparation
- Cl2 preheating
- VSD for displacement pump, discharge pump, hot fill pump and warm fill pump of washing and screening plant
- Replacement of DDR with TDR
- Install pressure screens in pulp mill and avoid centri-cleaners
- Optimize loading of refiners and beaters
- Interlock agitators with pumps at storage chests
- Minimize recirculation in receiving chest and machine chest

Digestion Blowing
- Batch digester modification and insulation improvement
- Continuous digester option
- Digester heat recovery
- Install two stage preheating in digesters (combination of MP steam and LP steam)
- Installation of Blow heat Recovery

Paper making
- Install VSD for MG machine/MF machine hood fans
- Install cascade condensate system in paper machine area
- Install flash steam recovery system for paper machines
- Optimizing operation of hydraulic system of calendar
- Install tri-nip press section in paper machine to reduce drying load
- Install computerized automatic moisture control system for paper machines
- Install paper machine hood heat recovery system

General measures:
- Combined heat and power generation
- Steam system optimization
- High efficiency motors
- Pump system optimization
- Fan system optimization
- Compressed air system optimization
- Improvement of combustion efficiency in the boiler
- Steam distribution system including leakage control and insulation improvement
- Electricity load management

Contact details

If you are interested to know more about energy efficiency, please, do not hesitate to contact us!

- If you are a business man
get information about energy saving opportunities in your company and get an energy audit done by our professional expert team
- If you are an engineer
explore the articles in our energy efficiency knowledge website and participate in our training programs
- If you are a banker...
participate in our awareness raising seminars and explore the new market of energy efficiency investment.
- If you are an energy auditor...
register in our database of energy efficiency professionals and be listed on our webpage.
- If you are a supplier for energy-efficient technology
register in our online B2B portal and list your products and services.

eec energy efficiency centre

FNCCI

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giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

[2] Danida/ESPS, 2005: Cleaners production report of pulp and paper sector