



NATIONAL PAPER COMPANY

COMPANY DESCRIPTION

The National Paper Factory, located in Valaichenai in the Eastern province of Sri Lanka, is a government-owned company of the National Paper Company (NPC) and produces paper and paper board from waste paper. The factory was established in 1955 with one paper machine and with an annual capacity of 2,675 tons. The board machine was established in 1972 with an annual capacity of 4,116 tons. Main changes since the company's inception include a restructure into a government-owned company in 1992, a change-over from straw to waste paper as raw material due to pollution problems, and several production expansions. As recorded in 2004, the annual turnover is 78 million Rupees (US\$ 780,000). The installed daily capacity is 35 tons paper and 44 tons board.

With the liberalization of the economy in 1977 and the promotion of a free market economy ever since, the company faced severe competition, aggravated by the political unrest in the area. This resulted in the fast deterioration of the financial situation, interrupted production, and frequent material shortages and power cuts. This in turn led to a capacity utilization of only 30% and higher costs per ton product, including energy costs. For example, furnace oil usage, which was at an average 300 liters/ton product, has increased to 600 liters/ton product.

For these reasons, SMED, who implemented the GERIAP project in Sri Lanka, initially had doubts whether to select this company to participate. However, company management was very keen to implement low cost energy efficiency options using the Cleaner Production approach to bring down energy costs. In addition to commitment by company management, the present Sri Lanka government has also given fresh hope of revamping the company, and a program is being planned under the Public Enterprise Reforms Commission.

PROCESS DESCRIPTION

The main products of the company are paper and paper board made from 100% waste paper. A brief description of the production process is given below:

- **Raw material procurement and sorting:** Waste paper is bought by the company mainly from Government offices, Government printing and State printing corporations. Since recycled paper is high in demand by export markets, its supply is sometimes a problem to ensure continuous production. However, as only 20-30% of waste paper in Sri Lanka is collected there is potential to increase waste paper collections locally. Waste paper is manually sorted according to color and texture and plastics, metals and other waste materials are removed
- **Pulping:** Water is added to the waste paper and pulped using a beater.
- **Stock Preparation:** The stock from the beater is first sent to the blender where chemicals and dyes are added, then to the machine chests, and following a series of refinements it is fed into the paper machines.
- **Paper Machines:** "Paper making is adding waste and removing". Pulp is sent through:
 - A vertical screen where further unwanted particles are removed
 - Wire mesh for sheet formation and removal of waste by press suction
 - Steam dryers, where water is mechanically removed from 35% to 6%
 - Calendars and wound on reels and cut to required sizes.



METHODOLOGY APPLICATION

The draft Company Energy Efficiency Methodology was used as a basis for the plant assessment to identify and implement options to reduce energy and other materials and wastes. Some of the interesting experiences are:

▪ ***Task 1b – Form a team and inform staff***

The Team structure at this company was different than for most other companies. Instead of one team, the Mill Manager acted as Team Leader and appointed technical staff to take part in two separate teams for two focus areas (boiler and steam distribution). The external facilitators supervised the two teams and facilitated the application of the methodology.

Lesson learnt: Rather than having one Team it is also possible to have a separate Team for each focus area supervised by the Team Leader and/or the external facilitators.

▪ ***Task 2d – Quantify inputs and outputs and costs to establish a baseline***

The company had a fair amount of baseline data. However, the meters of the boiler plant were malfunctioning and therefore monthly cost statements were used to obtain fuel and technical data. For water this was not a solution and the company did not have monitoring instruments to measure the water flow and subsequently calculate water consumption

Lesson learnt: Sometimes invoices and reports on production and costs can be used to obtain baseline data when meters are either absent or broken, although this is not a solution for all resources and waste streams.

▪ ***Task 3c – Screen options for feasibility analysis***

This government-owned company had a poor cash flow situation, and the Sri Lanka Government was not willing to invest additional capital in the plant. For this reason the company was not in a position to invest in high cost options and therefore selected only low cost options for further feasibility analysis and implementation, although it was clear that the company could have benefited a lot from some of the medium and high cost options. Since then the government has called for expressions of interest from private investors to revamp the company through the “Public Enterprises Reforms Committee” (PERC). The company is hopeful that when new private capital is invested in the plant there will be more opportunities to investigate and implement additional options in the near future.

Lesson learnt: The cost factor is especially important when the company has a poor cash flow situation. In such a case, low cost options should be considered first and foremost. Higher cost options can be considered later if the company financial situation improves.

▪ ***Step 6 – Continuous improvement***

The company does not have an environmental or energy management system in place, which contributed to a relatively low awareness of energy efficiency and Cleaner Production at the start of the GERIAP project. It is interesting to note that through the GERIAP project, management and staff the company has slowly but gradually begun to realize the importance and potential of energy efficiency. The company will continue with energy efficiency in CPEE in the following ways:

- The company’s departments have been given permission to continue implementing no and low cost options
- In 2004 operators and factory supervisors attended a comprehensive in-house training course, which was given by a GERIAP consultant and the Sri Lanka external facilitators from SMED in Tamil, which is widely spoken in the area where the company is located. The course focused on the 6-step methodology to improve energy efficiency based on Cleaner Production. Participants were split into three groups and each group was given assignments on Cleaner Production and energy efficiency. Some assignments on CP/EE were given to three groups. When the consultant returned to the plant several months later, the workers union officer lead one of the groups and expressed his



National Paper Company: *Company Case Study*

satisfaction of the training course and explained how it had resulted in the implementation of further options.

- In anticipation of private capital to be invested in the company through the Government's Public Enterprises Reforms Committee (PERC) initiative, which will make it easier to get the investment costs for some medium and high options, top management is investigating the possibility of switching to paddy husk as fuel for the boiler

OPTIONS

- The company is under severe financial constraints since 1986. But the company realized through during the application of the *Company Energy Efficiency Methodology* it could save money by adopting low and no cost energy efficiency measures in several areas. The Team comprising company staff, SMED staff (organization implementing the GERIAP project in Sri Lanka) and UNEP consultants, and with the support of the Mill Manager therefore applied this methodology despite the uncertainty of the future and the financial constraints.
- In 2003, the company identified two main focus areas (1) compressed air and (2) steam supply, and two main options that have been implemented. In 2004, the company identified three options in connection with the paper machine, of which one was implemented, and six options in the boiler area.
- For the three options implemented, the total investment was US\$ 960, the annual savings US\$ 57,575 and the payback period almost immediate. This shows the incredible potential of low cost good housekeeping and improved management options. Another lesson learnt from this company is that motivated staff can contribute enormously to continuous improvements
- For the three options implemented, the total annual electricity reduction was 249 MW, fuel oil reduction 172,500 liters
- For the three options implemented, the total GHG emission reduction was 582 tons, which constitutes 12% of the company's total GHG emissions in 2004 (4,218 tons).
- A major option of switching to paddy husk and refurbishing the co-generation plant is seriously being considered for implementation. This would further reduce the company's GHG emissions by an additional 25%!

EXAMPLES OF OPTIONS IMPLEMENTED

FOCUS AREA/ OPTION	CP TECHNIQUE	FINANCIAL FEASIBILITY	ENVIRONMENTAL BENEFITS	COMMENTS
Steam Distribution System: Steam leak survey and repair leaks in steam distribution system (see case study)	Good Housekeeping	<ul style="list-style-type: none"> ▪ Investment: US\$ 760 ▪ Annual saving: US\$ 18,975 ▪ Payback period: 2 weeks 	<ul style="list-style-type: none"> ▪ Fuel savings: 82,500 l/yr ▪ GHG emission reduction: 254 tCO₂/yr ▪ Water savings ▪ SO₂, C emission reduction 	The Team with least financial resources is motivated to continually reduce steam leaks! Improved work environment
Compressed air system: Compressed air leak survey and leak repair (see case study)	Good Housekeeping	<ul style="list-style-type: none"> ▪ Investment: US\$ 100 ▪ Cost savings: US\$ 620/yr ▪ Payback period: 2 months 	<ul style="list-style-type: none"> ▪ Electricity savings: 8,726 kWh/yr ▪ GHG emission reductions: 1.8 ton CO₂/yr 	Following in-house training staff have continued with leak detection and repairs
Paper Machine 1: Replace mechanical scoop condensate	Good Housekeeping Production process	Results from scoop repair (instead of replacement): <ul style="list-style-type: none"> ▪ Investment: 	Results from scoop repair (instead of replacement): <ul style="list-style-type: none"> ▪ Electricity 	Scoop was not replaced due to lack of financing. Savings from

FOCUS AREA/ OPTION	CP TECHNIQUE	FINANCIAL FEASIBILITY	ENVIRONMENTAL BENEFITS	COMMENTS
removal system with a thermosiphon system at paper machine to increase condensate recovery (see case study)	/ Equipment modification	US\$ 100 ▪ Cost savings: US\$ 37,980/yr ▪ Payback period: immediate	savings: 240 MW/yr ▪ Fuel saving: 90,000 l/yr ▪ GHG emission reduction: 326 tCO ₂ /yr	scoop repaid based on production loss of 1 ½ hrs over a 10 hours per day production due to broken scoop
Paper Machine 2: Replace closed with open system for condensate collection at paper machine to increase flash steam recovery (see case study)	Production process / Equipment modification	▪ Investment: low ▪ Annual savings: high ▪ Payback period: low	▪ Furnace oil saving: not determined ▪ GHG emission reduction: not determined ▪ Water savings	Option not implemented due to financial constraints
Paper Machines: Closure of steam valves during machine stoppages using photocells (see case study)	Improved process management	▪ Not determined	▪ Fuel oil savings ▪ GHG emission reductions	Option not implemented due to financial constraints
Boiler house: Substitution of fuel oil with paddy husk in boiler (see case study)	New technology / equipment	▪ Investment: US\$ 250,000 ▪ Cost savings: US\$ 92,000/yr ▪ Payback period: 2.7 years	▪ Furnace oil savings: 400,000 l/yr ▪ GHG emission reduction: 1,108 tCO ₂ /yr ▪ Sustainable solution to paddy husk waste	Note: all figures are <u>expected</u> results only. A detailed feasibility study of this option has commenced

FOR MORE INFORMATION

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