NATIONAL PAPER COMPANY

Substitution of Fuel Oil with Paddy Husk in Boiler

Note: *This is a case study of a potentially viable option, which the company is interested in, but is still under consideration due to financial constraints.*

SUMMARY OF THE OPTION

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 company, with support from the Government, is seriously considering the option of partial substitution of furnace oil by rice husk, which is a serious waste problem in the Batticaloa district where the mill is located. This requires converting the two existing water-tube boilers to run on furnace oil and rice husk. Estimated investment costs are US$ 250,000, annual furnace oil savings would be 400,000 liters or US$ 92,000, and with a payback period of 2.7 years. GHG emissions would be reduced with 1,108 tons CO2 per year.

The company seeks support for a study of the technology to use rice husk as fuel at the factory, information about vendors who can implement the technology, and financial support (possibly through the Clean Development Mechanism).

KEY WORDS

Pulp and Paper, Sri Lanka, Fuels and Combustion, Boilers and Thermic Fluid Heaters, Paddy Husk, Alternative Fuel

OBSERVATIONS

Two boilers at the NPC are a major energy user and were for this reason selected for an energy assessment. These water tube boilers have the following specifications:

- Capacity: 15 tons/hr
- Pressure: 285 lbs/sq. inch
- Operating pressure: 110 lbs/ sq. inch
- Annual fuel consumption: 1200 kilo liters
- Operating hours: 12 hours per day, except public holidays
- Evaporation capacity of the boiler: 33,000 lbs/hr
- Present cost of furnace fuel: Rs 28.30
- Furnace oil consumption (according to maintenance department): 450-600 liters/hr

The mill is located in the Batticaloa district, which is Sri Lanka's highest rice growing area. Rice milling generates about 78% (weight) rice, broken rice and bran. The remaining 22% is husk, which is the shell around the paddy grain. Part of this husk is used as fuel in the rice mills to generate steam for the parboiling process. The husk contains about 75% organic volatile matter that is burnt during the firing process and the balance of 25% is converted into rice husk ash (RHA). This RHA in turn contains around 85-90% amorphous silica and is used as an additive in the cement industry. Not all rice husk is used as fuel and is therefore available in abundance in the area, which causes considerable environmental pollution because it must be disposed of. A

survey by the Rice Processing and Development Center estimated the availability of 4,700 tons per year from 30 mills in the district. Rice husk can be used as a fuel by other industries, which is well practiced in India.

OPTIONS

The company has serious financial constraints since 1986, and is therefore interested in ways to bring down production costs. With the increasing oil prices, consideration of alternative fuels is inevitable. The company, with support from the Government, is seriously considering the option of partial substitution of furnace oil by rice husk.

During a visit by SMED (the National Focal Point for the GERIAP project in Sri Lanka) and the UNEP Consultant, the option to switch fuel or partial substitution was discussed with the General Manager and investigated. It was concluded that this option would not only be a solution to bringing down the cost of production, but would also solve a major environmental problem of husk disposal. This option could therefore be seen as a sustainable development opportunity.

To implement this option, the following must be done, and the company requests support for this:

- Study of how to convert the boilers to run on furnace oil and rice husk. The Team identified that only super heated saturated steam is useful and strongly recommended reconditioning and revival of old and dysfunctional co-generation plant of 1 MW capacity at the factory. A more detailed study is necessary.
- Information of vendors who can provide and install the required technology
- Collection scheme for rice husk and transport to the factory
- Solution for RHA, for example, this could be sold to the cement factory in Puttalam
- Financial support, possibly through Clean Development Mechanism (CDM) funding

RESULTS

Financial benefits (expected):

- Investment: US$ 250,000
- Annual cost savings: US$ 92,000 (400,000 liters furnace oil X US$ 0.23 per liter)
- Payback period: 2.7 years

Environmental benefits (expected):

- Annual furnace oil savings: 400,000 liters, calculated as follows:
  - Furnace oil use: 400 liters/ton (provided by the company but this is a low figure)
  - Furnace oil substitution by paddy husk: 50% (estimated)
  - Average annual production: 2,000 tons/year
  - 2000 X 400 X 50% = 400,000 liters
- Annual GHG emission reduction: 1,108 tCO_2 (400 kiloliters X 3.08 tCO_2/kl oil)

Other benefits (expected)

- This option will help the community to resolve the ever increasing problem of paddy husk disposal
- Improved company reputation
- Improved relations with the Government who are very keen on finding a sustainable solution for paddy husk waste and growing fossil fuel shortages in Sri Lanka

FOR MORE INFORMATION

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