



P. T. PINDO DELI PULP & PAPER MILLS

Installation of CFB Boiler and Use of Paper Sludge as Alternative Fuel

SUMMARY OF THE OPTION

PT. Pindo Deli Pulp & Paper produces photocopy paper, specialty paper and tissue paper with a production capacity of 1,465,000 tons per year. The GERIAP project focused on machine number 8 (PM# 8) that produces mainly the photocopy paper with a production capacity of 240,000 tons per year.

At Pindo Deli's Waste Water Plant, 1000 to 1500 tons of paper sludge is collected at the Belt Press. Until 2003, 40% (~300 – 400 Tons per month) of the sludge produced on site is given away, at no cost, to the local mushroom and cassava growers for use as compost. Since 2003, the permission to use sludge as compost and media grower was withdrawn by the Ministry of Environment (MoE) due to high heavy metal content in sludge. The MoE suggested the company to dispose the sludge to the landfill area.

Cement Plants can utilize this paper sludge as a coal substitute for firing at ILCs (In-Line Calciners) or SLCs (Spirit Line Calciners). At one of the Cement Companies, the stack downstream of the cooler vent fan had a recorded temperature of about 175°C. An opportunity may be available to use some of the waste heat to dry the sludge from Pindo Deli, to reduce its moisture content to an acceptable level before using it. Another option was to use sludge as fuel in the new Circulated Fluidized Bed (CFB) Boilers as 5% mix in coal.

Pindo Deli has decided to install CFB Boiler to produce electricity and steam for consumption in Pindo Deli I, and this plant can directly utilize maximum of 5% sludge mix in coal as substitute fuel without pre drying. This project started in the beginning of 2005 and presently (June 2005), it is still in equipment design stage. The CFB Boiler that will be installed by Pindo Deli is designed to utilize coal with low calorific value having high sulfur content and allowing using 5% of paper sludge. This plan will produce 220 ton/hour steam and 30 MW electricity. Coal consumption of CFB is 650 ton/day that have calorific value of about 5,500 kcal/ kg. Sludge consumption is 5 % of total calorific value, that is $5\% \times 5,500 \text{ kcal/ kg} \times 650,000 \text{ kg} = 178,750,000 \text{ kcal}$. Dry sludge has calorific value 2,000 kcal/ kg, therefore, 89 tons dry sludge = 223 tons wet sludge (moisture content of sludge is 60%) could be utilized each day. Assuming CFB operated at 80% capacity, the amount of wet sludge needed is 5,352 tons/month.

Pindo Deli II produces wet paper sludge of about 1,500 ton/month, and Pindo I produces 1,000 tons per month. The total sludge from Pindo I and II can be utilized as substitute fuel. This amount is equivalent to 900 tons coal per month.

The investment cost of CFB Boiler is about US\$ 32 million (Rp. 288,000,000,000,-*) and the annual operating cost of CFB is about US\$ 8 million (Rp. 72,000,000,000,-*) per year. The CFB Boiler will solve the paper sludge problem in Pindo I and II and will reduce GHG emission from reduced coal combustion by about 27,108 tons CO₂ per year (calculated by UNEP Simplified GHG Calculator, www.uneptie.org/energy/tools/ghgin/).

The existing CFB Boiler will reduce the space of landfill, because only slag with less volume will be dumped in the landfill. Fly ash collected from Electrostatic Precipitator will be sold to cement industries. Both slag and fly ash can be used for soil stabilization, concrete blocks, road base, structural fills, etc.

*) USD1 = Rp. 9,000,-

KEYWORDS

Indonesia, Pulp & Paper, Paper Sludge, Water

FOR MORE INFORMATION

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