

IFC and Cleaner Production

Building competitive advantage for IFC's Clients

Cleaner Production is best practice. It is an integrated strategy to maximize profits by making more efficient use of inputs (such as energy, water raw materials), thereby minimizing waste and pollution at source.

IFC experience shows that Cleaner Production assessments and investments can improve **production efficiency** and **profitability**, and is interested in helping clients take full advantage of this instrument.

IFC recognizes that cleaner production is a key instrument for carbon dioxide emission reductions and an effective way to mitigate risks known to cause or accelerate climate change.

CASE STUDY—Biomass Cogeneration at a Saw Mill Plant

15 MW Combined Heat and Power (CHP) plant using wood waste

Deforestation is a serious problem in Africa, accounting for about 55% (4 million hectares) of the annual global forest loss. Globally, the impact of deforestation through burning is estimated to contribute 20% of the recent rise in carbon dioxide emissions in the atmosphere. In Tanzania and Uganda 15% and 25% respectively of forest has been lost since 1990. The company, Green Resources, commissioned a feasibility study with IFC's support to increase the amount of trees planted every year from 3,000ha to 15,000ha, and generating 15 MW of electricity from wood waste from sustainably managed forests. The recommended project will also increase the availability of sawn timber used for construction and furniture production.

Green Resources is a plantation, forest products, renewable energy and carbon offset company with an active focus on addressing the damage created by deforestation in the region. The Company employs 1,500 people and has activities in Tanzania, Uganda and Mozambique. Green Resources' industrial operation, Sao Hill Industries, is East Africa's largest sawmill and one of the largest treated pole producers, it also has carpentry and joinery plants with multiple branches throughout Tanzania.



Sao Hill CHP Plant, Tanzania

Benefits

The proposed new 15 MW CHP biomass-fired power plant will ensure much greater reliability of power supply both to the sawmill and to local consumers, who frequently have erratic electric supply. The plant will utilize sawmill wood waste to generate electricity and steam. The steam will be used for thermal processes such as dry kilns and a portion of the electricity generated will be used to operate the sawmill. Excess electricity is to be sold to Tanzania Electric Supply Company (Tanesco) or to local industries nearby.

Technology

The purpose of the design was to specify the CHP plant configuration which fits best the technical and economic criteria taking into account the present and the future conditions at Sao Hill. The CHP configuration for the plant is based on the evaluation of the following issues:

- Availability of the biomass to be used as the main fuel in the CHP plant
- Demand of energy (power and heat) of the off-takers
- Low investment cost
- Efficient electricity production

Different steam generator types, including travelling grate and bubbling and circulating fluidized bed boilers, combined with an extraction-condensing turbine and generator set have been reviewed to achieve most efficient and reliable operation and maximized electricity generation. Biomass in form of sawmill and forest residues will be the main fuel for the CHP plant. Target is to run the plant with biomass only but have possibility to use small amount of coal as reserve fuel if necessary. The size of the plant, 15 MW electric capacity has been selected to meet the different criteria related to heat and power needs for own sawmill operation, biomass availability, power purchasing agreement with Tanesco, CDM carbon credit sales concept and availability of standard plant equipment at reasonable cost.

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Project Economics

Annual Operating Days	310
Capital Cost	\$26.5 million
Annual Electrical Generation	100,000 MWh
Revenue – Electrical	\$9.1 million
Carbon Credit Revenues	\$1.3 million
Total Revenues	\$10.4 million
Biomass Fuel Cost	\$4.9 million
IRR pre tax	18%

Outcome

In June 2009, IFC announced that it will invest \$18 million to help Green Resources plant 8,000 hectares of forest in Tanzania, implement international environmental standards, and increase productivity and energy efficiency. IFC's investment includes a \$10 million senior loan and an \$8 million subordinated loan. The plantation and forest products company will plant forests on grassland and deforested areas, modernize sawmill and wood harvesting equipment, and build a 15 MW heat and power plant fuelled by wood waste from its own and neighboring sawmills.

“The study undertaken with IFC’s advisory services helped us in developing our game plan—understanding biomass fuel availability, heat value, sizing the generation unit, identifying suppliers, developing EPC proposals, developing project economics, and specifying equipment to make IFC environmental emission standards.”

—Mads Asprem, Green Resources CEO