COGEN 3
Proven, Clean & Efficient Biomass, Coal, Gas Cogeneration
The EC - ASEAN Business Facilitator

FSDP special issue

Successful conversion of palm oil wastes into useful energy:
How TSH Bio-Energy Sdn Bhd will do it.

TSH BIO-ENERGY PROJECT BACKGROUND

TSH Bio-Energy is one of the subsidiaries of TSH Resources Bhd (TSHRB). TSHRB is involved in oil palm plantation, palm oil milling, timber products, cocoa processing, forest management activities and power generation.

TSHRB's plan to venture into downstream activities such as biomass energy generation and palm oil effluent applications is to integrate and consolidate its oil palm business.

TSHRB is building a 14 MWe cogeneration plant with a total live steam capacity of 80 tonnes/hour at 66.5 bar(g) and 402 °C.

10MWe will be exported to the local grid. In addition, 25 tonnes of steam will be used for palm oil processing. The owner intends to utilise excess capacity for further downstream processing.

The use of palm oil residues such as Empty Fruit Bunches (EFB)/ Fibres/Shells as fuels which provide an effective avenue to dispose the processing residues from palm oil milling activities while generating additional income.

This project will also provide socio-economic benefits to the surrounding area, as up to 40 locals will be employed for the operation of the plant. It is estimated that between 40,000 to 50,000 tonnes of carbon dioxide (CO_2) will be mitigated annually. CO_2 reduction is the result of the biomass energy plant replacing some of the energy supplied by other power producers who use fossil fuel.

LOCATION

TSH Bio-Energy is located in Kunak, Sabah, East Malaysia.

ECONOMICS

The total investment costs amount to Euro 9 millions, excluding civil works and building foundations. The expected pay back period is 4 years after commissioning.

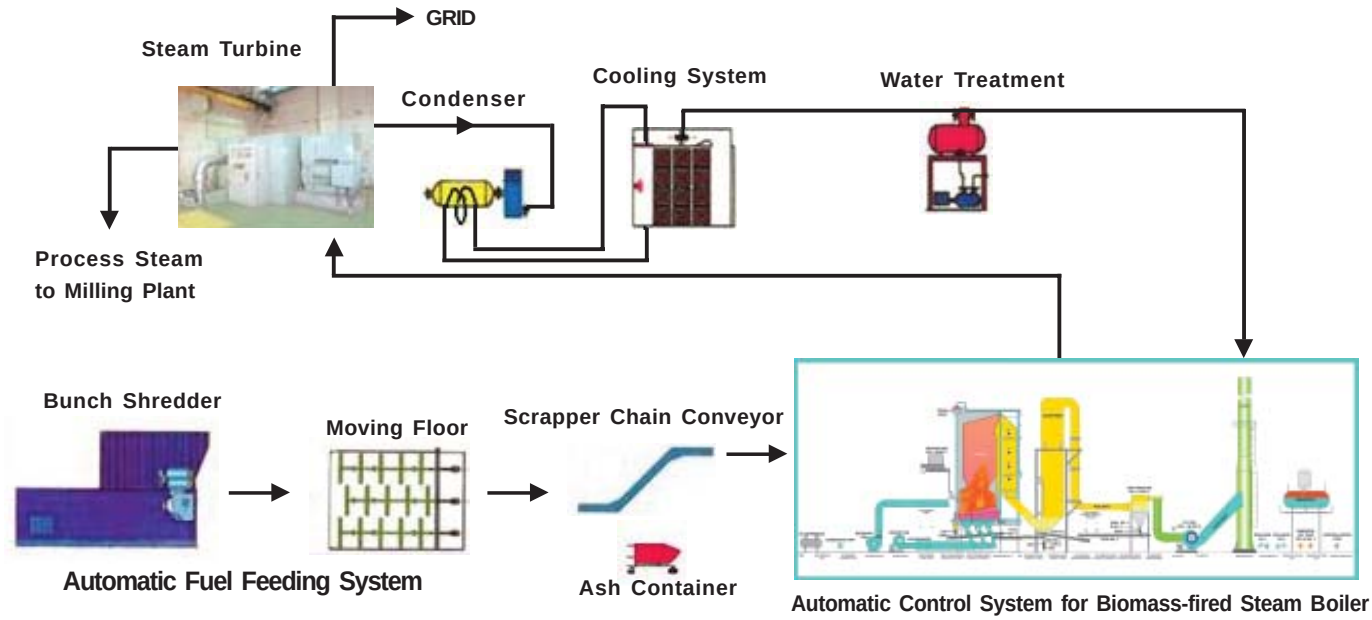
TECHNOLOGY

The plant consists of the following components:

- Fuel conveying system;
- Water-Cooled Inclined Vibrating Membrane Grate
- Water-Tube Steam Boiler, with a capacity of 80 T/H, 66.5 bar(g).
- Automatic De-ashing System
- High Efficiency Water-Resistant Cast Iron Multi-Cyclones (2 sets)
- Multi Valve Steam Turbine, with inlet pressure at 50 bar(g).
- Turbo Alternator with rated output of 17,500 KVA.

The TSH Bio-Energy cogeneration plant

TSH BIO-ENERGY GENERATION PLANT



CUSTOMER VIEWPOINT

Datuk Kelvin Tan Aik Pen, Group MD of TSH Resources Bhd

TSH Resources Bhd (TSHRB) Group Managing Director Datuk Kelvin Tan said the group's expansion into power plants would cushion its core business in oil palm plantations, palm oil milling and wood-based operations.

"We will not go into power just like that. Power has to be integrated to make the core business more cost effective. It does not make sense for us to set up a power plant without a palm oil mill," he added.

" TSHRB has three palm oil mills in Sabah with combined milling capacity of 1 million tonnes Fresh Fruit Bunches (FFB) per annum. This will provide ample supply of palm EFB as fuel for our biomass power plant".

TSHRB expects its 14MWe renewable energy biomass power plant in Sabah to be commissioned in July 2004 to generate an annual profit of 8-10 millions RM (Euro 1.75 - 2.2 millions) through sales of power to the Sabah Electricity Sdn Bhd (SESB).

TSHRB is the first local company to sell renewable energy - from oil palm waste - to SESB, which is 80% owned by Tenaga Nasional Bhd.

"We are selling up to 10MWe at 21.25 sen (Euro cents 4.66) per kilowatt hour (KWh) through a 21-year renewable energy purchase agreement (REPA) to SESB," he told reporters at a media briefing in Petaling Jaya in April 2004.

The TSH Bio-Energy Cogeneration plant

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SUPPLIER VIEWPOINT

Mr. Allen Ng Enco's Managing Director

ENCO Systems Sdn. Bhd. has found a strategic co-operation partnership with Babcock & Wilcox Volund ApS (BWV) of Denmark, for the design of modern boiler pressure parts, including those for Grid-Connected Cogeneration Plants, with a boiler capacity of 80 T/H and design pressure of up to 66.5 bar(g) and beyond.

ENCO's Managing Director, Allen Ng, who has been in the boiler and energy business since 1975, is very upbeat with the TSH Project. "This is the first Palm-EFB-Fired Grid-Connected Cogeneration Plant with a high pressure modern boiler of 80 T/H, 66.5 bar(g), 402 °C in the world. It is also the first EFB-Fired Boiler employing the Well-Proven Vibrating Membrane Grate in South-East Asia," he added.

The boiler pressure parts, as well as the Vibrating Membrane Grates, are designed by world-renowned BWV, but fully fabricated locally at ENCO's modern factory in Rawang, Selangor, under the strict inspection of RWTUV, the German Third Party Inspector, and with advice from BWV. The boiler materials are imported from Germany and France, while the high pressure boiler fittings, and instrumentation, are also sourced from Europe.

The boiler is constructed with Fully-Welded Membrane Walls, with only sealing refractory works. The Boiler's overall height is about 25 metres. It is fitted with a Steam Drum of approximately 10 metres in length with a shell wall thickness of 60 mm, and weighs approximately 28 tonnes dry. The Boiler House is fitted with an elevator to facilitate vertical travel by the boiler operators.

"The Boiler Control System shall be fully-automatic, and controlled by a PLC in conjunction with a SCADA System. The whole Control System is designed by Enco, together with inputs from BWV, and other local partners" added Mr. Ng.

Babcock & Wilcox Volund Boiler structure & platform

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COGEN 3

The objective of COGEN 3 is to promote the use of cogeneration using biomass, coal or gas as fuel. This is achieved through partnerships between ASEAN industries and European suppliers.

The EC-ASEAN COGEN Programme Phase III is financed by the European Commission. It is co-ordinated in ASEAN by the Asian Institute of Technology (AIT), Bangkok, Thailand and in Europe by Carl Bro International, Sweden. COGEN 3 started its operation in January 2002 and will continue until December 2004. Besides Thailand and Sweden, COGEN 3 has offices in Cambodia, Indonesia, Malaysia, Philippines, Singapore and Vietnam.