T@W Good Practice Form: Thailand

A.T. Biopower Rice Husk Power project in Pichit

Setting:

Title:	A.T. Biopower Rice Husk Power Project in Pichit
Country:	Thailand
Location:	Hor-krai Sub-district, Bang-moon-nak District, Pichit Province, Thailand
Start date:	2004
End date:	2028
Technology keyword(s):	Agricultural Waste
Host sector:	The Project fits under Sectoral Scope 1: Energy industries (renewable sources).

General description:

Summary:

The project is the rice husk fired power plant in Pichit province, Thailand, with approximately 22 MW-gross and 20 MW net capacities. Generated electricity will be sold through a 25-year power purchase agreement (PPA), firm-contract with the Electricity Generating Authority of Thailand (EGAT). A.T. Biopower (ATB) will generate electricity 147,627 MWh-gross annually, of which 132,864 MWh-net will be exported to EGAT. GHG emission reduction shall be come from the amount of electricity substitute to Thailand's grid electricity generation and amount of rice husk used in the project instead of dispose it in uncontrolled conditions (decay or burned in open air).

Aims:

The Project is designed to use rice husk for electricity generation that would otherwise be burned in the open air or left to decay in field. The project involves the construction and operation of a new rice husk power plant in Pichit province, central Thailand, with 22 MW gross generating capacity, 20 MW net. Electricity will be sold through a 25-year power purchase agreement (PPA) with the Electricity Generating Authority of Thailand (EGAT).

Summary of Results:

ATB plans to operate the plant for 24 hours a day, 346 days a year. According to the PPA, EGAT guarantees minimum purchase of 80% of the contracted capacity, so the minimum amount of electricity sales to EGAT will be 132,864 MWh/yr

(20 MW × 24 hr × 346 day × 80% = 132,864 MWh/yr). It is expected that the plant will internally consume about 10% of the electricity it produces, so ATB has to generate 147,627 MWh/yr of gross electricity. GHG emission reduction of this project is approximately 77,292 tonnes CO_2equivalent/year.

Planning Time: The starting date of the project activity (date on starting construction work) is 5th January 2004. The Project will finish all construction and related works, and aims to start the credit period by 21st December 2005.

Operation Time: Power plant life time is minimum 25 years.

Technical details:

Technical details: This project is a thermal-steam cycle power plant, which uses rice husk as heat energy source. The power plant is expected to have thermal-electrical conversion efficiency approximately 30%. The plant will operate using suspension-fired boilers, designed to burn ground rice husk in suspension. This particular boiler technology was adopted due to their ability to produce high quality ash product, which will be suitable as a substitute ingredient for cement.

Energy data:

Energy data: ATB expects to produce approximately 147,627 MWh of electricity annually, of which 132,864 MWh will be exported to EGAT, and the remaining is for internal consumption. Based on the calorific value of rice husk at 13,607 kJ/ton. The quantity of rice husk required is approximately 144,558 tonnes/year. Given the ash content of 17.75%, the combustion of the above amount of rice husk will result in ash of 25,659 tonnes/year.

Energy saved/generated: An electricity export to grid annually is 132,864 MWh/year which is equivalent to 531,000 GJ/year.

Monitoring: The approved consolidated baseline and monitoring methodology ACM0006 (Version 03) is applied to the project activity. The plant manager and operators will be responsible for the execution of the monitoring plan. Data and Parameters that shall be monitored in this project are;

- Quantity of rice husk combusted in the ATB plant

Net calorific value of rice husk and diesel

Methane emission factor for combustion of rice husk at ATB plant

Average return trip distance between rice millers and ATB plant

Number of truck trips for the transportation of rice husk

Average CO_2 emission factor for transportation of rice husk

Fossil fuel consumption for on-site transportation of rice husk

CO_2 emission factor for diesel

On-site fossil fuel consumption of diesel for start-up/auxiliary use

Net quantity of electricity generated in the ATB plant

CO_2 emission factor of the grid

CO_2 Operating Margin emission factor of the grid

CO_2 Build Margin emission factor of the grid

Amount of each fossil fuel consumed by each power source/plant

CO_2 emission coefficient of each fossil fuel

Electricity generation of each power source/plant

Identification of power source/plant for the OM

Identification of power source/plant for the BM

Methane emission factor for uncontrolled combustion of rice husk

CO_2 emission factor of the most carbon intensive fuel in the calculation of the combined margin with methodology ACM0002

Amount of rice husk fried in all grid-connected power plants in the region/country

Amount of rice husk that is available in surplus in the region/country

Environmental data:

Environmental data:

Power Plant is designed to be complied with Thailand's Regulations related to Environmental requirements as follows:

- SO_2 emissions will be minimal. NO_x emissions will be kept within the standards prescribed by the Ministry of Science, Technology and Environment and the Ministry of Industry;

- To ensure observance of the standards, a continuous air emission monitoring system (CEMS) will be installed;
- Particulates and fly ash will be captured in an electrostatic precipitator. Preliminary air dispersion simulations suggest that the maximum concentrations of solid particulate emitted by the plant will be less than 20% of the national standard;
- Wastewater will not be permitted to leave the plant site;
- Ash will be disposed of safely, if the 25,400 tonnes/yr of rice husk ash expected from the project cannot be sold to Cement factories as planned;
- The large size of the site combined with tree plantings at each plant will buffer ambient noise.

According to Thai regulations, an Environmental Impact Assessment (EIA) is required for the proposed plant. The EIA was approved by the National Environmental Board (NEB) on 20 November 2002. As part of EIA compliance, ATB will submit to the OEPP regular semi-annual EIA reports, which will include the following:

Results of continuous monitoring of air emission from the stack

Ambient air quality

Noise level at monitoring points in the neighbourhood

Water quality at the holding pond

Occupational health and safety

Record of accidents

Project GHG-emissions: Project GHG emission, which is mainly come from CO_2 emissions from combustion of fossil fuels for biomass transportation, CO_2 emissions from on-site consumption of fossil fuels (dump trucks, etc.), and CH_4 emissions from combustion of biomass is approximately 2,168 tonnes CO_2 equivalent/year.

GHG-emission reductions: GHG emission reduction from the project is approximately 77,292 tonnes CO_2equivalent/year.

"EAU, CER, ERU, AAU": CER

Methodology: ACM0006 (Version 03) – "Consolidated baseline methodology for grid-connected electricity generation from biomass residues"

Baseline:	The baseline of this project is the CO_2 emission of Thailand's Grid Electricity Generation including CH_4 emission from uncontrolled disposal (burning) of rice husk.
Monitoring:	The approved consolidated baseline and monitoring methodology ACM0006 (Version 03) is applied to the project activity. The plant manager and operators will be responsible for the execution of the monitoring plan. Data and Parameters that shall be monitored in this project are as above.
Contribution to Sustainable Development:	The Project will assist Thailand's sustainable growth by providing electricity through biomass power production without relying on fossil fuel combustion. These renewable energy sources currently fuel less than 1% of Thailand's electricity generation, which is dominated by natural gas, lignite and imported fuel oil. In addition to providing renewable energy, the Project will have an added contribution to Thailand's sustainable development in that it will improve the disposal of a major source of agricultural waste.

Economic data:

Economic data:	ATB's financial plan includes 55% debt and 45% common equity which is provided by the equity investors. The interest of the major investor CEPCO is expressly tied to the Project's designation as a CDM project and was conveyed to ATB only after the CDM methodology submitted for the Project was approved.
Financing:	Source of Financing is come from Financial Institute and Groups of Eequity Investors, namely, Chubu Electric Power Co, Inc., Rolls-Royce Power Ventures Ltd., Al Tayyar Energy Ltd., Private Energy Market Fund L.P., Finnish Fund for Industrial Cooperation Ltd., Flagship Asia Corporation, and Mitsubishi UFJ Securities Co., Ltd.
Capital cost:	US$36 million. This includes the cost of an EPC contract, land cost, interest during construction, project development fees, financing fees, and contingencies.

Additional Information:

Printed or electronic reports or other literature available:

Title	A.T. Biopower Rice Husk Power Project in Pichit, Thailand Version 01, 11/09/2006 (ver. 03.1)
Methodology	**ACMOO06 ver.3**
	Address for download of electronic document:
http://cdm.unfccc.int/methodologies/DB/AEXF9VXI2FOS2AXNKG3371B8QROLJF/view.html	
Project Document	Address for download of electronic document:
http://www.dnv.com/certification/climatechange/Upload/Pichit%20PDD%20_Sept%202006_.pdf	

Project Web site: www.atbiopower.co.th

Photo Library

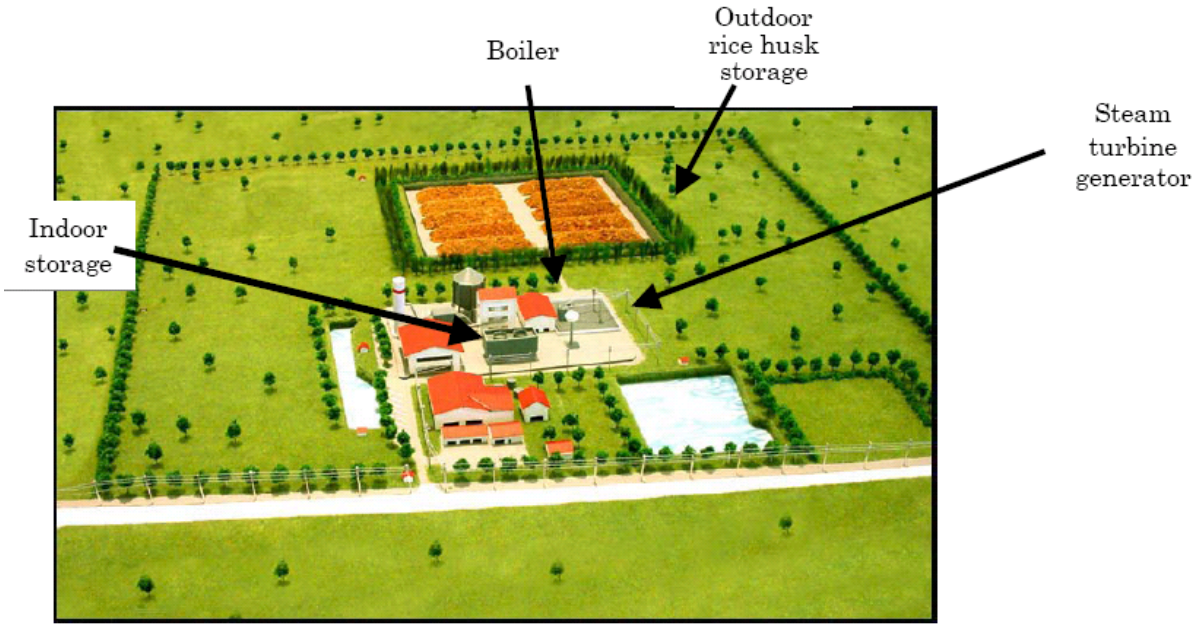

Figure 1 Project's Site Layout

(Source: CDM-PDD of A.T. Biopower Rice Husk Power Project in Pichit)

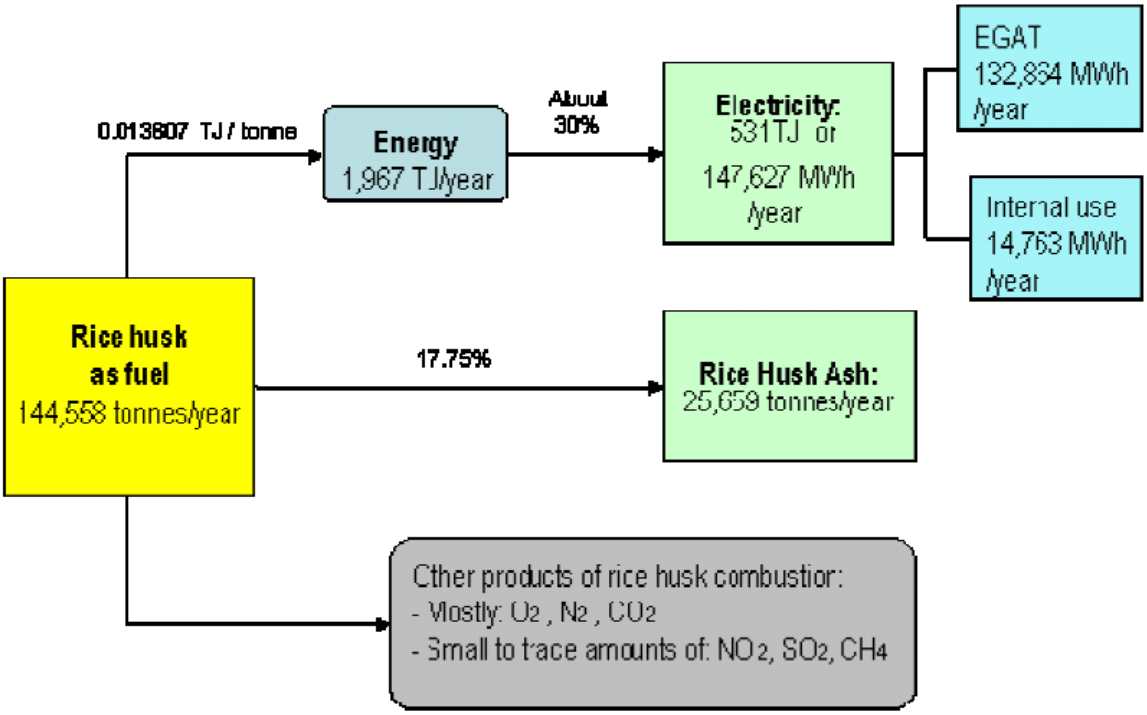

Figure 2 Mass/Heat Balance Diagram

(Source: CDM-PDD of A.T. Biopower Rice Husk Power Project in Pichit)

Contact information:

Type of Organisation:	Host Company
Organisation / Agency:	A.T. Biopower Co. Ltd.
Main contact: Mr. Natee Sithiprasasana, Deputy CEO	
Address:	KPN Tower, 14th Floor 719 Rama 9 Road, Huaykwang, Bangkapi, Bangkok Thailand 10320
Tel:	+66 2717 0445 to 8
Fax:	+66 2717 0449
E-mail:	natee@atbiopower.co.th
Web Site:	www.atbiopower.co.th
Description of the Organisation for inclusion in the database of Technology and Service Providers:	ATB is a project development and finance company.

Type of Organisation:	Project participant (Investor)
Organisation / Agency:	Chubu Electric Power Co., Inc.
Main contact:	Mr. Keiichi Yoneyama, Manager of International Business Department
Address:	1 Higashi shincho, Higashi-ku, Nagoya, Aichi Prefecture, Japan
Tel:	+81-52-973-2125
Fax:	+81-52-973-3147
E-mail:	Yoneyama.Keiichi@chuden.co.jp
Web Site:	www.chuden.co.jp/english/index.html
Description of the Organisation for inclusion in the database of Technology and Service Providers:	CEPCO, Japan's third largest electricity company in terms of generating capacity, founded in 1951, is the Project's major equity investor.

Type of Organisation:	Project participant (Investor)
Organisation / Agency:	Private Energy Market Fund L.P.
Main contact:	Mr. Olli Kuronen, Managing Director
Address:	Tekniikantie 4 D / P.O.Box 92, Espoo, Finland 02151
Tel:	+358 9 469 1201
Fax:	+358 9 469 1207
E-mail:	olli.kuronen@pemfund.com
Web Site:	www.pemfund.com
Description of the Organisation for inclusion in the database of Technology and Service Providers:	PEMF is a Finland-based Euro 50 million private equity fund.

Type of Organisation:	Project participant (Investor)
Organisation / Agency:	Finnish Fund for Industrial Cooperation Ltd.
Main contact:	Mr. Helena Korhonen, Senior Investment Manager
Address:	Ratakatu 27, P.O. Box 391, Helsinki, Finland 00121
Tel:	+358-9-34 84 34
Fax:	+358-9-34 84 33 47
E-mail:	helena.korhonen@finnfund.fi
Web Site:	www.finnfund.fi
Description of the Organisation for inclusion in the database of Technology and Service Providers:	FINNFUND is a Finnish government-owned development finance institution that provides long-term risk capital for private projects in developing countries and countries in transition.

Type of Organisation:	CDM Advisor
Organisation / Agency:	Mitsubishi UFJ Securities Co., Ltd.
Main contact:	Mr. Junji Hatano, Chairman, Clean Energy Finance Committee
Address:	Mitsubishi Building, 10th Floor, 2-5-2 Marunouchi, Chiyoda-ku, Tokyo, Japan 100-0005
Tel:	+81 3 6213 8500
Fax:	+81 3 6213 6175
E-mail:	hatano-junji@sc.mufg.jp
Web Site:	http://www.sc.mufg.jp/english/e_cefc/
Description of the Organisation for inclusion in the database of Technology and Service Providers:	MUS provides comprehensive CDM consultancy services.