

# **Monitoring Report**

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## **A.T. Biopower Rice Husk Power Project in Pichit Thailand**

CDM Registration Number: 1026

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**July, 9 2007 Version 1**

**Monitoring Period  
December 21, 2005 To : June 30, 2007**



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## **Current Status of The Project**

The 22MWnet rice husk fired Power Project at Pichit, Thailand has been commissioned.

First synchronization of the project with 115 kV Substation at Bang Moon Nak was performed on September 20, 2005 and after initial operation, commercial operation (COD) was declared on December 21, 2005.

The project has been completed with major equipment supplied as follows:

<u>No.</u>	<u>Equipment</u>	<u>Supplier</u>
1.	Boiler	Electrowatt-Ekono (Thailand) Ltd.
2.	Turbine & Generator	Electrowatt-Ekono (Thailand) Ltd.
3.	Balance of Plant	Electrowatt-Ekono (Thailand) Ltd.
4.	Fuel Handling System	Electrowatt-Ekono (Thailand) Ltd.

The entire equity of ATB has been provided by the following parties.

- ✓ Chubu Electric Power Co., Inc. (Japan)
- ✓ Al Tayyar Energy Limited (United Arab Emirates)
- ✓ Private Energy Market Fund L.P. (Finland)
- ✓ Finnish Fund for Industrial Cooperation Ltd. (Finland)
- ✓ Flagship Asia Corporation (Malaysia)
- ✓ Rolls-Royce Power Ventures Limited (United Kingdom)

The project has been completed as planned and described in the Project Design Document (PDD), aiming to establish it as Clean Development Mechanism (CDM) project. The plant is in operation continuously (with outages - forced & planned) since December 21, 2005. The plant has used rice husk as Biomass fuel, and fossil fuel of diesel oil has been used only for boiler combustion auxiliary use.

## **Monitoring Period**

This monitoring period is from December 21, 2005 to June 30, 2007.

## **Sustainability -Economic and Social well being**

Energy is one of the vital resources for a country's economic development. Thailand's demand for electricity will be expected to increase sharply in coming future. Securing steady supply sources of electricity is a matter of vital importance for Thailand's economy. Biomass fuels represent particularly rich energy resources for Thailand. These renewable energy sources currently fuel less than 1% of Thailand's electricity generation as of 2005, which is dominated by natural gas, lignite and imported fuel oil. Recognizing the potential contribution of renewable energy to the Thai energy mix, the government has placed great importance on supporting renewable sources of energy and has set a goal that the renewable sources of energy increase to occupy 8% of Thailand's energy production in the next 10 years. This project contributes to Thailand's national policy.

The Project contributes to environmental protection instead of combusting fossil fuel for power generation and by using instead rice husk as fuel. Rice has always been Thailand's flagship agricultural product, with Thailand being the world's largest exporter of rice. There is, however, relatively low demand for rice husk. In Central Thailand, where ATB will locate its plant and procure rice husk, rice can be harvested three times a year. The disposal of rice husk, which is either open burned or dumped, is a constant worry for rice millers. The Project is to use this rice husk as renewable energy.

The Project Company has been aware of its social responsibility and has contributed to social infrastructure by establishing the Community Development and the Environmental Protection Guarantee Fund.

## **Obtained Parameter According to Monitored Plan**

For the project, following parameters were monitored on a continuous basis:

### **1. Fuel (Rice husk) on dry basis:**

The rice husk fuel on receipt in the plant premises is weighted at the Electronic Weigh-Bridge installed at the plant site. The moisture content of the received rice husk is also measured at the same time. The amount of rice husk combusted is almost equivalent to the amount of rice husk delivered to the site. In order to estimate rice husk combusted more accurately, the rice husk inventory at the initial and final stage per each verification period must be monitored and verified. The recording data of rice husk fuel on receipt will be archived with relevant data including the date of delivery, weight of delivered rice husk and identification of rice miller from which the husk is sourced. Once rice husk is delivered to the site, it is piled at the storage yard neighboring to the plant in the regular manner with constant height and width, so that the rice husk inventory at the storage yard can be estimated easily by operators.

### **2. Fuel (Diesel oil)**

The diesel oil has been consumed in the plant site for off-site and on-site rice husk transportation and boiler start-up/auxiliary use.

Concerning off-site transportation use, it is estimated based on the record of rice husk receipt measured on truck scale system at the plant gate. Namely the number of truck transportation, the identification of rice miller as rice husk supplier and the distance between rice husk miller and the plant site enables to estimate the fossil fuel used for rice husk transportation.

Concerning on-site use, it is estimated based on the record of fossil fuel receipt.

### **3. Energy (Electricity)**

The electricity exported to power grid (MWh/yr) is monitored and verified continuously by both plant site and electricity off-taker (EGAT) side by electronic measurement exactly. According to Power Purchase Agreement, the recording data of off-taker side is prior to that of the project side. Principally operator monitors amount of electricity exported to power grid by using off-taker data. The recording data of electronic meter installed at control room is treated as backup monitoring.

Electricity Exported & Fuel (Biomass & Fossil Fuel) Consumed per month:

No.	YY/MM	Net Electricity Exported (kWh)	Rice husk fuel consumed (t - dry basis)	Off-site transportation distance (km)	On-site diesel oil consumed for biomass (t)	On-site diesel oil consumed for boiler combustion (t)
1	2005/Dec	2,704,450	2,090	12,596	2.1	77.7
2	2006/Jan	4,581,730	4,870	34,460	5.5	151.6
3	2006/Feb	8,686,850	9,246	86,740	6.9	34.6
4	2006/Mar	8,326,510	7,942	162,896	6.6	36.2
5	2006/Apr	12,957,070	12,798	140,750	8.4	32.0
6	2006/May	11,701,780	12,250	92,652	8.9	39.4
7	2006/Jun	12,711,350	12,027	93,466	8.4	29.0
8	2006/Jul	12,685,350	11,953	74,140	8.4	19.6
9	2006/Aug	13,634,010	12,905	86,194	8.9	28.3
10	2006/Sep	10,182,340	11,305	63,396	8.5	122.3
11	2006/Oct	10,093,280	10,915	53,650	9.9	19.8
12	2006/Nov	12,698,620	13,117	63,486	8.5	5.1
13	2006/Dec	7,784,410	8,222	43,548	7.9	26.5
14	2007/Jan	7,667,890	8,111	54,332	7.3	34.8
15	2007/Feb	12,454,860	12,589	90,122	7.4	3.0
16	2007/Mar	13,536,490	13,735	117,162	8.6	1.5
17	2007/Apr	10,931,980	11,730	103,138	9.1	28.0
18	2007/May	9,953,990	11,057	87,578	8.6	43.3
19	2007/Jun	11,789,720	12,360	110,224	7.0	23.7
	Total	195,082,680	199,220	1,570,530	146.9	756.5

## **Emission Reductions**

	Item	t-CO <sub>2</sub>
Baseline Emissions	CH <sub>4</sub> emissions from uncontrolled burning of rice husk	12,195
	CO <sub>2</sub> emissions from fossil fuel fired plants connected to the power grid	99,492
Project Emissions	CO <sub>2</sub> emissions from off-site transportation	1,723
	CO <sub>2</sub> emissions from on-site transportation	577
	CO <sub>2</sub> emissions from fossil fuels for Start-up/Auxiliary use	2,410
	CO <sub>2</sub> emissions from boiler combustion of rice husk	2,288
Emission Reductions	Baseline Emission - Project Emission	104,689

## **Measures to ensure the results / uncertainty analysis**

Truck scale equipment will undergo maintenance subject to appropriate industry standards. The meter readings will be checked against purchase receipts and inventory data.

Diesel oil consumption meter reading can be compared against fuel purchase invoices and will be double-checked if required.

As per the Power Purchase Agreement (PPA), the energy exported to the Thailand Grid is recorded from two independent meters - Main meter & Backup meter. Reading of main meter is used for billing. In the event of main meter not in operation, the reading of the backup meter is to be used for billing. The main meter is maintained by EGAT subject to appropriate industry standards. The accuracy of the meter readings will be verified by EGAT, who will issue receipts. From project side, the accuracy of the main meter is verified by comparing the values with the back-up meter.



## **Roles & Responsibilities**

In the complete implementation and monitoring plan referred above, ATB Plant Manager is responsible for implementing and monitoring at project site, and ATB head office staff is responsible for the data collection and review other than those monitored at plant site. And finally ATB vice president is the sole agency responsible for the all the monitoring results and ERs calculation results.