

MONITORING REPORT

VERSION 2 DATED 12 SEPTEMBER 2007

FOR THE PERIOD

1st April 2006 TO 31st March 2007

PERPETUAL ENERGY SYSTEMS PVT LTD

Perpetual 7.5 MW Non-Conventional Renewable Sources Biomass Power Project
(Project name in Host country Approval: 7.5 MW Biomass Based Power project)
Electricity Generation from Biomass Fuels
Project Registration No. with UNFCCC: 0390

Project Site

Appayyapeta Village, Seetanagarm Mandal, Vizianagaram District, Andhra Pradesh, India

Perpetual Energy Systems Pvt Ltd

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Current Status of the Project

Perpetual Energy Systems Pvt Ltd 's (PESPL) 7.5 MW Non-Conventional Renewable Sources Biomass Power Project at Appayyapeta Village, Seetanagarm Mandal, Vizianagaram District, Andhra Pradesh, India has been commissioned and is in continuous operational since 23rd March 2003.

During the present monitoring period i.e., 1st April 2006 to 31st March 2007 Plant has exported 42.58 Million kWh of power to APTRANSCO grid and consumed 74449.1 MT of biomass fuel and 80 MT of coal.

Statement to what extent the Project has been implemented as planned

The Project has been completed as planned and described in the Project Design Document (PDD).

The Plant is in operation continuously (with outages - forced and planned) during the present monitoring period.

The Plant is using mainly Biomass fuels like Juliflora, Rice Husk & Bagasse and coal as supplementary fuel (much less than the permitted quantity) as permitted by Statutory Authorities. In addition, plant also uses small quantity of diesel very occasionally for power generation using DG set to meet emergency power requirement during complete black out of the Plant.

Summary of Panned and Forced Outages (1st April 2006 to 31st March 2007)	
Planned Shutdown	15 Days 21 Hours 2 Minutes
Forced Shutdown (Grid Failure + Breakdown)	10 Days 23 Hours 44 Minutes

Monitoring Period

The present Monitoring period is chosen from 1.04.2006 to 31.03.2007, both days included.

Sustainability – Economic and Social well being

The Company has spent around 101.255 Million INR (Approx. US\$ 2.25 Million, 1US\$ = 45 INR) during the monitoring period towards fuel usage in the Plant. Procurement of biomass fuel from local farmers and biomass suppliers has generated additional regular income for the farmers and improved economic condition of the farming community.

This has also resulted in local employment generation. Plant has generated employment opportunities directly / indirectly to more than 100 people.

As a part of social responsibility, Plant has been contributing to social infrastructure by way of employing local people for the Plant operations and also paying significant amount as tax for the local Panchayat etc.

Parameters being monitored according to Monitoring Plan

For the Project, the following parameters are being monitored on continuous basis:

- 1 **Power Generation:** Power generation from the plant is measured continuously using the generation meter installed in the control room of the plant. The total generated power will also be used to compare the auxiliary consumption of the plant after deducting power exported to the grid from total generation.
- 2 **Power Export and import:** Power exported to the grid and imported from the grid is monitored from energy meters installed at APTRANSCO sub station on 24th day of every month. A joint meter reading for the energy exported to the Grid is recorded by representatives of APTRANSCO and Company and the readings are jointly signed by both the parties as a proof of export of Power to the grid from power plant and import of Power from grid by the power plant. These meter readings are the basis for the invoices raised by the Company.
- 3 **Biomass Fuel:** The Biomass fuel (of all kinds) on receipt in the Plant is weighed in the Electronic Weigh Bridge installed in the Plant and unloaded in the fuel storage yard. The biomass fuel after necessary preparation is fed to the Boiler as per the requirement and consumption will be recorded on daily basis.
- 4 **Calorific value of the Biomass fuel:** The calorific value of the Biomass fuel (of all kinds) being used is being measured in the in house laboratory on daily basis as per the arrivals and average value will be considered on monthly basis for energy balance calculations.
- 5 **Coal/Diesel:** Coal on receipt in the Plant is weighed in the Electronic Weigh Bridge installed in the Plant and unloaded in the fuel storage yard. Coal is fed to the Boiler as and when required and consumption will be recorded whenever it is used. In addition, Diesel consumption in the DG set will be monitored on regular basis.
- 6 **Carbon content in Coal:** Carbon content in the coal received is being considered as per the analysis reports of reputed laboratory which are furnished by the coal supplier or conducted by the project participant using authorized laboratories.
- 7 **Calorific value of coal:** CV of coal is being measured in the in house laboratory on daily basis as per the arrivals and these values are being cross checked with the analysis reports of the external laboratory.

Power Generation Export & Import , Fuel Consumption and Fuel Analysis

Month-wise data on Power Generation, export, import, fuel consumption, diesel consumption, fuel analysis and Net Emission Reductions is given below for the monitoring period:

Fuel Consumption and Analysis:

Billing Month	Period		Bio-mass Consumption, MT	Coal Consumption, MT	Diesel Used (Ltrs)	% Carbon in Coal
	From	To				
April	01/04/2006	23/04/2006	5440	0	2	-
May	23/04/2006	23/05/2006	6235	0	100	-
June	23/05/2006	23/06/2006	6390	0	27	-
July	23/06/2006	23/07/2006	5677	0	33	-
August	23/07/2006	23/08/2006	4105	80	30	30.9
September	23/08/2006	23/09/2006	5736	0	2	-
October	23/09/2006	23/10/2006	5650	0	2	-
November	23/10/2006	23/11/2006	6075	0	2	-
December	23/11/2006	23/12/2006	6315	0	4	-
January	23/12/2006	23/01/2007	7440	0	10	-
February	23/01/2007	23/02/2007	7655	0	28	-
March	23/02/2007	23/03/2007	5655	0	2	-
April	23/03/2007	31/03/2007	2075	0	1	-
Total			74449.1	80	243	-

Note: 1) The above values are taken from 23rd to 23rd of Every Month (Billing Month Basis).

Power Generation, Export, Import & Emission Reductions

The emission reductions for the monitoring period are as given below:

As mentioned in the Project Design Document, Emission reductions are calculated based on the power exported to the grid, power imported from the grid during shut down and start up, coal and diesel consumed in the plant -.

Month	Period		Electricity Generated, kWh	Electricity Exported, kWh	Electricity Imported, kWh	Auxiliary Power Consump tion, kWh	Coal consump tion, MT	Diesel consump tion , lit	NETT EMISSION REDUCTIO NS, tCO ₂ e
	From	To							
April	01/04/2006	23/04/2006	3200300	2838100	0	362200	0	2	2356
May	23/04/2006	23/05/2006	3968300	3504500	6500	463800	0	100	2903
June	23/05/2006	23/06/2006	4197000	3701400	3400	495600	0	27	3069
July	23/06/2006	23/07/2006	4116900	3624700	2200	492200	0	33	3007
August	23/07/2006	23/08/2006	3207400	2802400	15700	405000	80	30	2222
Sept	23/08/2006	23/09/2006	4351400	3837500	500	513900	0	2	3185
October	23/09/2006	23/10/2006	4069000	3582500	2900	486500	0	2	2971
November	23/10/2006	23/11/2006	4046100	3557600	3500	488500	0	2	2950
December	23/11/2006	23/12/2006	4096300	3589900	800	506400	0	4	2979
January	23/12/2006	23/01/2007	4344500	3823900	0	520600	0	10	3174
February	23/01/2007	23/02/2007	4355500	3846300	4700	509200	0	28	3188
March	23/02/2007	23/03/2007	3233400	2865800	19800	367600	0	2	2362
March	23/03/2007	31/03/2007	1181400	1009600	1100	171800	0	1	837
TOTAL			48367500	42584200	61100	5783300	80	243	35203

Baseline and project emissions are calculated as per the formulas mentioned in Section E of the PDD. The same is given below;

Emissions	Formula used
Baseline emissions	= Electricity exported to the grid (kWh) x grid emission factor (tCO ₂ /kWh)
Project emissions	
Due to coal consumption	= Actual Coal consumed in MT x % carbon in coal x (44/12)
Due to diesel consumption	= [(Diesel consumed in liters x calorific value (TJ/kg) x density (kg/l))] x IPCC emission factor (tCO ₂ /TJ) x oxidation factor
Due to import of power from Grid	= Electricity imported from grid (kWh) x grid emission factor (tCO ₂ /kWh)

Note: A detailed excel sheet showing step by step calculations for arriving Nett emission reductions is given as Annexure - I.

Monthly Summary of Emission Reductions:

S.No.	Billing Month	Period		Grid Emission factor as per PDD, kgCo ₂ /kWh	Electricity Exported, kWh	Base line emissions, tCo ₂	Project emissions, tCo ₂	NETT EMISSION REDUCTION S, tCO ₂ e
		From	To					
1	April	01-Apr-06	23-Apr-06	0.830	2838100	2356	0	2356
2	May	23-Apr-06	23-May-06	0.830	3504500	2909	6	2903
3	June	23-May-06	23-Jun-06	0.830	3701400	3072	3	3069
4	July	23-Jun-06	23-Jul- 06	0.830	3624700	3009	2	3007
5	August	23-Jul- 06	23-Aug-06	0.830	2802400	2326	104	2222
6	Sept	23-Aug-06	23-Sep-06	0.830	3837500	3185	0	3185
7	October	23-Sep-06	23-Oct-06	0.830	3582500	2973	2	2971
8	November	23-Oct-06	23-Nov-06	0.830	3557600	2953	3	2950
9	December	23-Nov-06	23-Dec-06	0.830	3589900	2980	1	2979
10	January	23-Dec-06	23-Jan-07	0.830	3823900	3174	0	3174
11	February	23-Jan-07	23-Feb-07	0.830	3846300	3192	4	3188
12	March	23-Feb-07	23-Mar-07	0.830	2865800	2379	16	2362
13	March	23-Mar-07	31-Mar-07	0.830	1009600	838	1	837
TOTAL					42584200	35345	142	35203

Measures to ensure the Results / uncertainty analysis

Export meters:

As per the Power Purchase Agreement (PPA), the energy exported to the AP Grid is recorded from two independent meters viz., Main Meter and Check Meter and reading of main meter is used for billing. In the event of main meter not in operation / fails, the reading of the check meter shall be used for Billing.

The calibration of monitoring equipment is being maintained as per the requirement of APTRANSCO and the same is being done regularly. Power Generation, Export & Auxiliary Consumption, fuel consumption are being recorded daily and the same is being verified by Manager (O&M) and approved by Dy. General Manager (O&M).

Carbon content in Coal:

Carbon content in the coal received is being considered as per the analysis reports of reputed laboratory which are furnished by the coal supplier or calculated by standard formula from the analysis values furnished in the received analysis reports.

Roles & Responsibilities

A CDM team has already been formed in the plant for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of the Company. Qualified and trained people are monitoring the parameters and emission reduction calculations.

Also the Company is in the process of formulating standardized procedures in order to obtain ISO 9001, ISO 14001 & OHASIS 18001 certification.

In the complete implementation and monitoring Plan, the Company is the sole agency responsible for implementation and monitoring.

Members of the CDM Team:

1. Mr. M Rambabu, Plant Manager(PESL Plant)
2. Mr. V. Brahmaiah, Plant Manager (O& M)
3. Mr. G, Rajivi, Manager (Finance & Accounts)
4. Mr. K.S. Koteswara Rao, Accountant

Annexure – I

Perpetual Energy Systems Limited Emission Reduction Calculations

Month	Year	Electricity Generated, kWh	Electricity Exported, kWh	Electricity Imported, kWh	Auxiliary Consumption		Biomass Used, MT	Coal Used, MT	Grand Total, MT	% Carbon in Coal	Emission Factor, kgCO2/ kWh	Baseline Emissions, Tons			Project Emissions, tCO2e				NETT EMISSION REDUCTIONS, tCO2e
					kWh	%	Total Biomass								Diesel consumption , lit	CO2 emission factor for diesel considering IPCC's tonnes of CO2/TJ	Due to consumption of Diesel	Due to consumption of Coal	
01-04-06 to 23-04-06	2006	3200300	2838100	0	362200	11.3	5440	0	5440	-	0.83	2356	2	74.1	0.01	0	0.00	0	2356
23-04-06 to 23-05-06	2006	3968300	3504500	6500	463800	11.7	6235	0	6235	-	0.83	2909	100	74.1	0.28	0	5.40	6	2903
23-05-06 to 23-06-06	2006	4197000	3701400	3400	495600	11.8	6390	0	6390	-	0.83	3072	27	74.1	0.08	0	2.82	3	3069
23-06-06 to 23-07-06	2006	4116900	3624700	2200	492200	12.0	5677	0	5677	-	0.83	3009	33	74.1	0.09	0	1.83	2	3007
23-07-06 to 23-08-06	2006	3207400	2802400	15700	405000	12.6	4105	80	4185	30.9	0.83	2326	30	74.1	0.08	91	13.03	104	2222
23-08-06 to 23-09-06	2006	4351400	3837500	500	513900	11.8	5736	0	5736	-	0.83	3185	2	74.1	0.01	0	0.42	0	3185
23-09-06 to 23-10-06	2006	4069000	3582500	2900	486500	12.0	5650	0	5650	-	0.83	2973	2	74.1	0.01	0	2.41	2	2971
23-10-06 to 23-11-06	2006	4046100	3557600	3500	488500	12.1	6075	0	6075	-	0.83	2953	2	74.1	0.01	0	2.91	3	2950
23-11-06 to 23-12-06	2006	4096300	3589900	800	506400	12.4	6315	0	6315	-	0.83	2980	4	74.1	0.01	0	0.66	1	2979
23-12-06 to 23-01-07	2007	4344500	3823900	0	520600	12.0	7440	0	7440	-	0.83	3174	10	74.1	0.03	0	0.00	0	3174
23-01-07 to 23-02-07	2007	4355500	3846300	4700	509200	11.7	7655	0	7655	-	0.83	3192	28	74.1	0.08	0	3.90	4	3188
23-02-07 to 23-03-07	2007	3233400	2865800	19800	367600	11.4	5655	0	5655	-	0.83	2379	2	74.1	0.01	0	16.43	16	2362
23-03-07 to 31-03-07	2007	1181400	1009600	1100	171800	14.5	2075	0	2075	-	0.83	838	1	74.1	0.00	0	0.91	1	837
Total		48367500	42584200	61100	5783300		74449	80	74529			35345	243		1	91	51	142	35203