

MONITORING REPORT

MONITORING PERIOD FROM 01/08/2008 TO 30/04/2009

**“4.5 MW Biomass (low density Crop Residues) based Power
Generation unit of Malavalli Power Plant Pvt Ltd.”**

Ref: No FR-UNFCCC00000298CDMP

Project Site: - MPPL Renewable Energy (P) Ltd
Formerly Malavalli Power Plant (P) Ltd
Kirugavalu,
Near Santhemaiddana,
Malavalli Taluk, (Mysore-Bannur High way)
Mandya District, Karnataka.

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CURRENT STATUS OF THE PROJECT

The 4.5 MW Biomass fired Power Project at Kirugavalu, (Near Santhemaiddana), Malavalli Taluq, Mandya District of Karnataka state in India and started commercial operation in August 2001

The project was completed with major equipment supplied as follows:

S/No.	Equipment	Supplier	Technical Description
01	Boiler	M/s. IJT – Noida	Superheated steam flow: 22 MTPH, Type: Water wall Tube, Travelling Grate Boiler Temperature: 445 ±5°C Steam Pressure @ Super heater outlet: 45 ata Feed Water Temp: 105 °C
02	Turbine	M/s. Triveni Engineering & Industries Ltd. – Bangalore.	Turbine Inlet Steam:: 440 °C Inlet Steam Pressure: 42 ata Inlet Steam to Turbine: 21.5 TPH
	Condenser	M/s. GEI Godavari	Condenser cooling water temp: 105 °C Steam Inlet flow to Condenser : 19.80 TPH Steam Inlet temp: 48 °C
03	Balance of Plant	M/s Ion Exchange	DM plant Capacity - 2 Cu M /hr
	DM Plant	M/s Paharpur Cooling Tower	Flow Capacity: 1200 m ³ Cu M /hr, 2 Cell CT
	Cooling Tower	M/s. Avery Weigh Bridge	Weigh Bridge Capacity – 15 – 20 MT
	Weigh Bridge		
04	Fuel Handling System	M/s. Manco Engineers - Hariyana	Straw Cutter output: 3 - 4 TPH

The entire equity was provided by Company and loan taken from IREDA

STATEMENT TO WHAT EXTENT THE PROJECT HAS BEEN IMPLEMENTED AS PLANNED

The project was registered with CDM Executive Board on 21 July 2006.

The project was completed as planned and described in the Project Design Document (PDD).

During the first Monitoring Period (01 August 2001 to 30 June 2006) plant exported 103.861GWh of electricity to the grid and issued 77 294 CERs.

During the second Monitoring Period (01 July 2006 to 30 September 2007) plant exported 24.251 GWh of electricity to the grid and issued 17 160 CERs.

During the third Monitoring Period ((01 October 2007 to 31 July 2008) plant exported 11.693 GWh of electricity to the grid and emission reduction for the period is currently under verification (8 191 CER's)

MONITORING PERIOD

Methodology Applied: Simplified baseline and monitoring methodology AMS-I.D – “Grid connected renewable electricity generation”, Version 13.

The monitoring period is from 01/08/2008 to 30/04/2009

The Plant had suffered major outages as detailed below during the period:

PLANT SHUTDOWN TIME MONTH WISE			
Month	Hours	Minutes	Seconds
AUGUST	247	7	12
SEPTEMBER	218	22	48
OCTOBER	632	30	0
NOVEMBER	345	30	0
DECEMBER	72	7	12
JANUARY	268	30	0
FEBRUARY	11	25	48
MARCH	32	49	48
APRIL	13	12	0
	1841	56	48

Total = 1841 hours 56 Min and 48 Seconds

SUSTAINABILITY – ECONOMIC AND SOCIAL WELL- BEING

The project activity has resulted in sustainable development in the region as follows:

1. Procurement of biomass fuel from local farmers and biomass suppliers has generated additional income and improved economic condition of the community. This has also resulted in local employment generation. Plant has generated employment opportunities directly / indirectly to more than 400 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.,
2. Surplus Crop residue is properly used for power generation, which was otherwise burnt in the fields.
3. Project activity has resulted in generation of direct and in-direct employment due to biomass collection, transporting and unloading etc.

OBTAINED PARAMETERS ACCORDING TO MONITORING PLAN

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

1. **Power Generation (KWh):** 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 measure the auxiliary consumption of the plant after deducting power exported to the grid.
2. **Power Export & Import (KWh):** Power exported to the grid and imported from the grid is monitored from energy meters installed at project site on end of every billing month. A joint meter reading for the energy exported to the Grid will be recorded by representatives of KPTCL and MPPL and the readings will be 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 MPPL Renewable Energy (P) Ltd. (MPPL)
3. **Biomass Residues (MT):**

The Biomass Crop residues were procured from farmers, in Carts, Tractor Trolleys, Trucks, etc. For measuring Weighing scale was installed. Fuel was handled through Dozer / Man power from storage yard to cutters. Fuel feeding was through belt and Slat Conveyor to bunker & then fed to the boiler through rotary feeders. All fuels arriving at the plant are weighed and recorded before stocking near feeding points. This weighed stock when charged to the conveyor is recorded as consumption of fuel for each shift. The shift data is then transferred to soft copy to make monthly records.
4. **Net Calorific Value (Kcal/Kg):**

As per PDD monitoring of NCV of Biomass residues on Batch Basis” Batch-wise means measurement for an entire “Batch of Biomass” in the given time.

“The energy content of the biomass is measured on batch wise basis with results used to determine the share of energy produced via biomass input with event of fossil fuel being used”. Assuming that the biomass input might vary over a time in its composition. As a Biomass mix remains consistent and hence no change in batch of biomass firing.

As per PDD Net Calorific Value of Biomass to be monitored on Batch wise. (ie on yearly basis – since fuel mix remains unchanged throughout the year) as a conservative view MPPL monitors the same on monthly basis by third party, NABL accredited laboratory M/s. Ganesh Consultancy & Analytical services is adopted

NCV is not a parameter that is directly applied in the emission reduction calculation taking a very conservative view, project proponent monitors the same on monthly basis in order to maintain a check on quality of biomass being fired in the Boiler
5. **Specific Fuel Consumption of each kind of biomass residues:** Inline with the applied version of monitoring methodology AMS I.D version 13, MPPL has to do Comparison of amount of electricity generated using biomass residues (metered) with the amount of electricity generated calculated using specific fuel consumption and

amount of each type of biomass residues used during the verification period and the lower of the two values has been used to calculate emission reductions.

However the requirement of fixing specific fuel consumption was not covered in the registered PDD; hence upon request from DoE, MPPL has fixed the specific fuel consumption of each kind of biomass residues used during the verification period.

The specific fuel consumption values of each kind of biomass residues has been provided is below table:

S.No.	Fuel	Net Station Heat Rate (Kcal/KWh)	Design NCV (Kcal/Kg)	Design SFC (Kg/KWh)
1.	Rice Husk	4040	3624	1.0758
2.	Cane Trash	4040	3307	1.2216
3.	Coconut Fronds	4040	3748	1.0779
4.	Corn Cob	4040	3756	1.08
5.	Survey Topping	4040	3755	1.0756

- The net station heat rate of the plant has been fixed based on the performance review study of the MPPL plant conducted by CPRI, government of India.
- NCV of each kind of biomass residues has been sourced from lab analysis from independent third party.

Note:

(1). Design NCV is based on dried biomass (typically 15% moisture). Actual NCV will be higher as the moisture of fired biomass will vary between 20 to 35% based seasonal variations.

(2). Design SFC is based on design NCV as above. Actual SFC will be higher due to lower NCV of the fired biomass as well as lower efficiency of travelling grate boiler while firing higher moisture biomass (which results in higher unburnts)

MONITORING PERIOD FROM 01.08.2008 TO 30.04.2009

Sl. No.	Data Type	Data Variable	Calibration frequency	Calibration Validity		Authorised Calibration Agency
				From	To	
1	Calibration of Energy Meter for Electricity Exported and Import	Main Meter # 01955018 & Check Meter # 01955020	Yearly	12/2/2008 14/02/2009	11/2/2009 13/02/2010	KPTCL (MRT Division)
2	Weigh Bridge	Calibration of Weigh Bridge	Yearly	26/04/2008 28/04/2009	25/04/2009 27/04/2010	"Controller of Weights and Measures" department of Karnataka
3	Pollution	Consent for water & air	Yearly	1/7/2008	30/06/2009	KSPCB
4	Boiler	Consent to use boiler	Yearly	18/06/2008	17/06/2009	Karnataka State Boiler Inspection Department
5	Weighted average emission factor of current generation mix	Weighted average emission factor of southern regional grid of India	Fixed ex antae	780	t CO ₂ e/GWh	Carbon Dioxide Baseline Data base, CEA
6	Emission Factor of diesel due to transportation	Emission factor of diesel	NA	3.185	t CO ₂ e/ton of fuel	IPCC
7	NCV of biomass residues	Sample testing in lab	Batch wise	Monthly 3rd Party Certificates Available.		

Note:

- Energy Meter:** Calibration is carried out on annual basis, by Department of Government of Karnataka Viz by "Karnataka Power Transmission Corporation Ltd - Meter and Relay Testing Division" Calibration during 2008 was carried out on 12/02/2008. Calibration during 2009 was carried out on 14/02/2009. As the above actions are by Government Department, MPPL cannot influence date of Calibration. Calibration conducted on 14/02/2009 confirms that meter was working satisfactory for the period from 11/02/2009 to 14/02/2009. The meters is in Accuracy Class 0.5S, which allows a maximum inaccuracy specification of + or -0.5%. The application of maximum inaccuracy specification of the meters for the period when the meters were in use without being calibrated will result in reduction of less than one CER.
- Weigh Bridge:** Calibration is carried out on annual basis, by Department of Government of Karnataka Viz by "Controller of Weights and Measurement" Calibration during 2008 was carried out on 26/04/2008. And is valid from 26/04/2008 to 25/04/2009 next calibration was conducted on 28/04/2009 and is valid from 28/04/2009 to 27/04/2010. The calibration conducted on 28/04/2009 confirms that weigh bridge was working fine during the period from 25/04/2009 to 28/04/2009. As the above actions are by Government Department, MPPL cannot influence date of Calibration beyond paying applicable fees, in time, which was done by MPPL on 25th April 2009.

Surplus Biomass Residues Availability Analysis

An independent third party has conducted a biomass residues availability study in the region within 100 km radius of the project activity for the current monitoring period. The major findings of the study are tabulated below:

Sl. No.	Type of Fuel	Total Residue Generation in MT	Usage of Biomass from Others MT	Available Biomass before consumption from MPPL	Usage of Biomass by MPPL	Net Surplus residue Availability
1	Cane Trash	486,150.00	22,000.00	464,150.00	2,423.52	461,726.48
2	Coconut Fronds	148,359.00	26,428.00	121,931.00	14,684.53	107,246.48
3	Corn Cobs	41,164.00	35,883.00	5,281.00	1,079.18	4,201.82
4	Rice Husk + Ground Nut Husk	75,361.00	51,661.00	23,700.00	4,446.74	19,253.26

5	Toppings	28,132.00	12,287.00	15,845.00	3,362.45	12,482.55
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EMISSION REDUCTIONS

Base line emissions:

Net Electricity Exported x Baseline emission factor = (t CO₂e)

= 12.130 GWh x 780 tCO₂e/Gwh = 9,461.357 tCO₂e

The project has been considered the ex-post emission factor for the weighted average emissions of the current generation mix (incl. imports) of Southern regional grid. MPPL has reviewed the emission factors were mentioned in the registered PDD and the Carbon Dioxide Baseline Data base, Version 3, 15 December 2007 published by Government of India, Ministry of Power Central Electricity Authority¹, Government of India. Since electricity generation data for Southern grid for the year 2007-08 was not available on the CO₂ data base of official website of Central Electricity Authority of India till end date of the chosen verification period, the emission factor taken as the weighted average of the current generation mix for the most recent year (2006-07) data available has been considered based on the guidance provided in “**Tool to calculate the emission factor for an electricity system**”.

Project Emission

Project Emissions: Nil

Leakage

Leakage due to Transport = 250.028

Net Emission Reduction=

=Baseline Emission – (Project Emission + Leakages)

= 9,461.357 – (0 + 250.028) = 9,211.329

Net Emissions (ton CO₂): = 9,211

¹ <http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>

MEASURES TO ENSURE THE RESULTS / UNCERTAINTY ANALYSIS

The energy exported by MPPL is recorded from independent main meter installed at project site. In the event, the main meter is not in operation, the reading from check meter is used for billing. The Energy exported to the KPTCL was recorded from Main Energy Meter and cross verified by Check meter and same will be calibrated periodically by KPTCL Metering Unit, whereas the KWh Meter located in Control panel is calibrated periodically by MPPL. Electricity export to grid and electricity import is being recorded and the same is being verified by the respective officials. Both meters are of same specifications & frequency and approved by KPTCL.

ROLES & RESPONSIBILITIES

A CDM team has been formed in MPPL for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of MPPL. Qualified and trained people monitor the parameters and emission reduction calculations. In the complete implementation and monitoring plan, MPPL is the sole agency responsible for implementation and monitoring. The details of monitoring team are detailed below:

Name	Position
1. Mr. K. Krishan,	Managing Director
2. Mr. NarSingh	Project coordinator
3. Mr. M. A. Sharief,	Plant Manager

Comparison of Actual Emission reduction against estimated in the registered PDD:

The actual emission reductions achieved during the verification period 01 August 2008 to 30 April 2009 is lower than estimated emission reduction reported in the registered PDD is due to:

- Less number of actual operating hours in project scenario in comparison to operating hours considered in the registered PDD.
- MPPL fires 100% Biomass, primarily low density crop residues. During the period under verification, there was a significant number of rainy days during which it was not possible to fire low density crop residues, notwithstanding huge surplus availability of cane trash and Coconut fronds due to inaccessibility of fields as well as moisture content being >35% (which is not feasible to be fired in our travelling grate boiler).
- There were inordinate delays in MESCOM (Power Purchaser) releasing payments which led to cash flow problems.

Comparison of Actual Emission reduction against estimated in the registered PDD -MONITORING PERIOD FROM 01.08.2008 TO 30.04.2009

S.No.	Emission Reductions as per PDD for the period 01 August 2008 to 30 April 2009 - tCO ₂	Actual Emission Reduction for the period 01 August 2008 to 30 April 2009 - tCo ₂
1	15,000 t Co ₂	9,211