FIFTH MONITORING REPORT

VERSION 01 DATED 27th November 2009

FOR THE PERIOD
01st January 2009 to 31st August 2009

"Biomass based independent power project at Malwa Power Private Limited, Mukatsar, Punjab"

Reference no. UNFCCC00000331CDMP

Project Location:

Village Gulabewalla, Tehsil Mukatsar, District Mukatsar
Punjab, India

Project Proponent:

Malwa Power Pvt. Limited
1255, Sector 14, Faridabad-121007
Haryana, India

For Malwa Power Pvt. Limited
Authorised Signatory

Mr. K.L. Bansal
Director, MPPL

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Current Status of the Project

The biomass based power plant had been successfully commissioned by the project proponent i.e. Malwa Power Pvt. Ltd. (MPPL). The project activity is located in Village Gulabewalla, Tehsil Mukatsar, District Mukatsar, Punjab, India (30˚33'38"N, 74˚28'39"E). It was completed with major equipment supplied as follows:

S. No.	Equipment	Supplier
1.	Boiler	Thermax Limited, Pune
2.	T.G. Set	M/s Triveni Engineering & Industries Ltd 12A, Peenya Industrial Area Bangalore, India

The entire equity was provided by the Company (MPPL) and loan was taken from IREDA.

During the present monitoring period i.e. 01st January 2009 to 31st August 2009, the plant exported net power of 32.67 Million kWh to PSEB grid and consumed 49,667 MT of biomass as fuel.

Statement to What Extent the Project has been Implemented as Planned

This project was completed as planned and described in the Project Design Document (PDD). It has been in operation continuously (with outages – forced & planned) since commissioning. Commercial operation was declared on April 27, 2005.

Monitoring Period

This is the fifth monitoring report associated with the MPPL project activity.

The first monitoring report covered the period from 01/05/2005 to 31/03/2006 (Both days included) and was issued 42,337 CERs.

The second monitoring report covered the period from 01/04/2006 to 31/12/2006 (Both days included) and was issued 35,894 CERs.

The third monitoring report covered the period from 01/01/2007 to 31/12/2007 (Both days included) and was issued 49,757 CERs.

The fourth monitoring report covered the period from 01/01/2008 to 31/12/2008 (Both days included) and has requested an issuance of 48,307 CERs.

The period covered in this monitoring report is from 01/01/2009 to 31/08/2009 (Both days included). This monitoring report does not cover any period of time covered by any of the previous monitoring reports.

Sustainability – Economic and Social Well-being

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

1. The project activity has created employment opportunities in the area for skilled and unskilled labour during operation and maintenance of the power plant. The project activity has generated opportunities for the uneducated and poor for collection and supply of agro waste material. The biomass collection activity has benefited approximately 1400 families from villages in and around the plant by way of revenue from selling the surplus biomass residues to the project plant.
2. MPPL has encouraged and motivated the unemployed, educated youth to arrange tractors, trolleys, chippers etc to transport the biomass to project site.
3. MPPL has motivated the farmers in the regions to adopt mechanized farming methods by way of demonstration plantations on the MPPL land. This has helped in increasing awareness and technical know how of the farmers, thereby increasing yield as well as providing an additional source of income for the farmers by selling the surplus biomass residues to the company.
4. By generating clean power, project activity has helped to eliminate an equivalent Carbon dioxide, Sulphur dioxide, Nitrogen oxides, SPM etc. which would have been otherwise generated to produce electricity in the grid. The project activity also helps to conserve finite natural resources like coal and natural gas which dominates the fuel mix in the regional grid.
5. By generating decentralized power close to load points, the project activity has helped reduce transmission losses.
6. The project proponent also actively promotes social welfare activities in the neighbouring villages by providing financial and material aid to the poor and underprivileged.
7. The Sarpanch of Gram Panchayat of Gulabewala has acknowledged the valuable contribution of the project proponent. The project proponent has also been encouraging computer and science education among the children through donations to educational institutions.

Obtained Parameters According to Monitoring Plan

Monitoring plan of parameters affecting the emission reductions as per the registered PDD

S. No.	Data Variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Testing/Calibration frequency
1	Energy exported	kWh	m	Monthly	Six monthly test checks
2	Energy imported	kWh	m	Monthly	Six monthly test checks
3	Net saleable energy	kWh	c	Monthly	-
4	Energy generated	kWh	m	Hourly	Six monthly test checks
5	Auxiliary energy consumption	kWh	m	Hourly	Six monthly test checks

Monitoring plan of fuel related parameters as per registered PDD

S. No.	Data Variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Testing/Calibration frequency
1	Biomass Quantity	MT	m	Daily	Annual calibration of weigh bridge
2	Biomass Calorific Value	Kcal/kg	m	Measured as and when biomass is received at the power plant but reported once in a year for each type of biomass	Bomb calorimeter is standardized every time it is used to measure calorific value of biomass according to procedures in IS:1350
3	Coal Quantity	MT	m	Daily	-
4	Carbon Content in Coal	%	m	For each batch of coal	-

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

1. **Energy:** The electricity exported to and imported from the grid by the project activity has been monitored through a main meter and check meter installed at the interconnection point for the delivery of the energy to the grid. The net electricity exported has been calculated as the difference of these two values. Monthly joint meter readings have been taken and signed at interconnection point by representatives of both MPPL and Punjab State Electricity Board (PSEB). MPPL has used these joint meter readings to raise the invoices to PSEB against the net energy exported to grid (net saleable energy). MPPL has maintained all records of joint meter readings at the interconnection point as well as the monthly invoices raised against net saleable energy to PSEB. Furthermore, continuous monitoring of gross electricity generation and auxiliary consumption is being carried out at the generation end (at the power plant) as well. Records of the same are being maintained in the plant log books.

2. **Fuel (Biomass):** A fuel stock inventory is maintained at the plant which contains a record of the amount of biomass purchased based on invoices/receipts from fuel contractors after weighing with the electronic weigh bridge installed at project site. The amount of biomass fed into the boiler is also recorded based on readings of the online meter installed on the conveyor belt prior to feeding the biomass into the boiler. Biomass consumption readings are also verified through audit reports and are recorded on a daily as well as monthly basis.

3. **Fossil fuel:** No fossil fuel has been used during the current monitoring period.

4. **Energy Content of Fuel:** The energy content of fuel/biomass is measured in-house using a bomb calorimeter as and when the biomass is received at the power plant site. A sample from the biomass received at plant is taken and tested for its GCV before being used in the boiler. The procedure for measurement of the calorific value of biomass using bomb calorimeter is as per standard procedure prescribed in IS: 1350 of the Bureau of Indian Standards (BIS). The GCV content of each type of biomass is reported once in the monitoring report based on the internal audit conducted for calorific value of biomass used.

Power Generation, Export & Import, Fuel Consumption and Fuel Analysis

Monthly data on gross power Generation, export of power to the grid, import of power from the grid, fuel consumption, fuel analysis and Net Emission Reductions for the monitoring period are as shown in the tables below:

Table 1: Fuel consumption and analysis

Billing Period	Mustard Husk (MT)	Wheat Straw (MT)	Paddy waste (MT)	Cotton stick (MT)	Total quantity of biomass consumed (MT)
1 Jan 09 – 2 Feb 09	25	3,870	155	3,013	7,063
2 Feb 09 – 2 Mar 09	14	3,267	67	2,757	6,105
2 Mar 09 – 1 Apr 09	5	3,159	35	3,004	6,203
1 Apr 09 – 30 Apr 09	636	3,550	55	1,754	5,995
30 Apr 09 – 1 Jun 09	315	2,560	35	3,209	6,119
1 Jun 09 – 1 Jul 09	167	2,720	69	3,478	6,434
1 Jul 09 – 1 Aug 09	513	3,055	47	2,365	5,980
1 Aug 09 - 31 Aug 09	106	1,315	429	3,918	5,768
Total	**1,781**	**23,496**	**892**	**23,498**	**49,667**

The emission reductions for the monitoring period are shown below:

Table 3: Electricity Generation, Export, Import and emission reductions

Billing Period	Gross Electricity Generated (kWh)	Auxiliary consumption (kWh)	Electricity Exported (kWh)	Electricity Imported (kWh)	Net Saleable Energy (kWh)	Baseline Emission Factor ($kgCO_2/KWh$)	Baseline Emissions (tCO_2)
1 Jan 09 – 2 Feb 09	5,360,524	602,525	4,758,000	10,000	4,748,000	0.942	4,472
2 Feb 09 – 2 Mar 09	4,526,047	510,547	4,015,500	20,500	3,995,000	0.942	3,763
2 Mar 09 – 1 Apr 09	4,566,468	529,468	4,037,000	21,500	4,015,500	0.942	3,782
1 Apr 09 – 30 Apr 09	4,600,462	520,962	4,079,500	22,500	4,057,000	0.942	3,821
30 Apr 09 – 1 Jun 09	5,388,016	615,016	4,773,000	11,000	4,762,000	0.942	4,485
1 Jun 09 – 1 Jul 09	4,840,192	570,692	4,269,500	17,500	4,252,000	0.942	4,005
1 Jul 09 – 1 Aug 09	4,149,014	495,014	3,654,000	41,000	3,613,000	0.942	3,403
1 Aug 09 - 31 Aug 09	3,520,413	439,413	4,054,600	31,570	4,023,030	0.942	3,789
Total	**36,951,136**	**4,283,637**	**32,667,500**	**177,000**	**32,490,500**	**--**	**30,602**

Emission Reductions

Baseline Emissions:

Carbon Emission Factor as per the baseline adopted (EF_y) = 0.942 kg CO_2/kWh

Energy exported to the grid = 32,667,500 kWh

Energy imported from the grid = 177,000 kWh

Net saleable energy exported to the grid (EG_y)
= Energy exported to the grid - Energy imported from the grid
= 32,667,500 kWh - 177,000 kWh
= 32,490,500 kWh

Baseline emissions (BE_y) = EF_y x EG_y
= 30,602 tCO_2

Project Emissions (PE_Y): NIL

Emission Reductions (ER_Y) = BE_y - PE_y
= 30,602 t CO_2 – NIL
= 30,602 tCO_2

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

Measures to Ensure the Results/Uncertainty Analysis

The energy exported to the PSEB is recorded from two independent set of meters - Main Meter & Check Meter as per the Power Purchase Agreement (PPA). The readings from the Main Meter are used for billing purposes. In case the Main Meter goes out of operation, the reading of the backup meter (Check Meter) is to be used for billing. Till date only the main meter has been used for billing purposes.

The calibration and testing of monitoring equipment is being carried out regularly according to the requirements of PSEB. Power Generation, Export & Auxiliary Consumption and fuel consumption is being recorded and verified daily by the Plant Manager which is thereafter approved by the Director. Since hourly data logging is being carried out along with daily reporting, the uncertainty level associated with the monitored data used for calculating emission reductions is low.

It is to be noted that there has been no change in any of the metering equipment in the current monitoring period from 01/01/2009 to 31/08/2009 (both days included). The following table indicates the details of Main meter (Export/Import), and Check meter (Export/Import) including their calibration and testing dates:

Description	Main Meter	Check Meter
S. No.	04180597	04180598
Capacity	200/1A	200/1A
Accuracy Level	0.5	0.5
Make	L & T	L & T
Model No.	ER300P	ER300P
Date of Calibration in current monitoring period	24/06/2009	24/06/2009
Accuracy level observed during testing	0.08%	0.03%
Calibration & Testing Authority	Punjab State Electricity Board	Punjab State Electricity Board

In accordance with the monitoring plan, the meters at the generation end have also been test checked for accuracy. The half yearly test result details are as shown below:

Description	Gross generation meter	Auxiliary consumption meter
S. No.	4249596	63116/3171-0405
Capacity	600/1A	2500/5 A
Accuracy Class	0.5	1.0
Make	L & T	Enercon
Model No.	ER300P	DM 5240
Date of Testing	01/06/2009	01/06/2009
% Error	0.17% - 0.18%	0.37% - 0.42%

As can be seen, the error was found to be within permissible limits (0.5%) and no calibration or replacement was considered necessary.

The online meter used to measure biomass consumption has been inspected by an external agency to ensure effective operation. The details of calibration carried out in the current monitoring period are shown below:

Description	Load Cell
Model No.	BR011L0
Sl. No.	167205
Capacity	10 KG
Date of Calibration	29/05/2009
Calibration Authority	IPA Private Limited

The weigh bridge used to measure biomass consumption has also been inspected by an external agency to ensure effective operation. The details of calibration carried out in the previous as well as current monitoring period are shown below:

Description	Weigh Bridge		
Type	Electro-Mechanical Weighbridge		
Date of Calibration	18/02/2009	22/05/2009	11/08/2009
Calibration Authority	Leotronic Scales Private Ltd.		

The energy content of biomass is measured in-house using a bomb calorimeter as and when the biomass is received at the power plant site, however the GCV of each type of biomass is reported once in the monitoring report based on the internal audit conducted for calorific value of biomass used. The bomb calorimeter can be used to measure calorific value of a wide range of solid as well as liquid fuels and since it is standardized

every time it is used, the uncertainty level of the monitored data is low. The mass of the combustible charge can vary from less than one gram to 1,100 grams. However, the calories liberated in the test should not be more than 10,000.

A sample from the biomass received at plant is taken and tested for its GCV before being used in the boiler. The procedure for measurement of the calorific value of biomass using bomb calorimeter is as per standard procedure prescribed in IS: 1350 of the Bureau of Indian Standards (BIS) and ensures standardization of apparatus every time it is used. The procedure is first performed with a sample of benzoic acid whose calorific value is known (6,319 cal/gram) to determine the water equivalent (cal/˚C). After determination of the water equivalent, the same procedure is performed with the biomass sample to calculate the calorific value.

$$GCV = \frac{T \times W - (CV_T + CV_W)}{M}$$

Where,

GCV is the calorific value of sample in calories per gram

T is the final rise in temperature in ˚C

M is the mass of sample in grams

W is the water equivalent in calories per ˚C

CV_T is the calorific value of thread = 2.1/cm

CV_W is the calorific value of ignition wire = 2.33/cm

MPPL had developed an internal audit procedure as a measure of internal control to ensure accuracy and credibility of data reported. The following parameters were verified during the internal audit:

a. Gross energy generated;
b. Auxiliary consumption;
c. Electricity exported;
d. Electricity imported;
e. Net saleable energy;
f. Biomass fuel inventory;
g. Average calorific value and
h. Calibration & Testing records.

Any corrective actions required were promptly implemented and overall the project was found to conform to the planned arrangements of the monitoring methodology and plan.

Roles and Responsibilities

MPPL was the sole agency responsible for implementation of the monitoring plan. The Shift in-charge is responsible for the hourly data recording at generation end. Daily and monthly reports stating the generation, auxiliary consumption, and net power export are prepared by the Shift in-charge and verified by the Plant Manager. Records of the monthly joint meter reading are maintained by the Plant Manager at site as well as by PSEB at their office.

Furthermore Internal Audits are carried out in accordance with the GHG Performance Procedures of Malwa Power Limited to ensure compliance with the monitoring methodology and plan.

Annexure 1

Malwa Power Private Limited

Emission Reduction Calculations: 01st January 2009 to 31st August 2009

Billing Period	Gross Electricity generated (kWh)	Auxiliary consumption (kWh)	Electricity exported (kWh)	Electricity imported (kWh)	Net Saleable energy (kWh)	Biomass Used (MT)				Total quantity of biomass consumed (MT)	Baseline emission factor ($kgCO_2/kWh$)	Baseline emissions ($kgCO_2$)	Emission reductions (tCO_2)
						Mustard Husk	Wheat straw	Paddy waste	Cotton stick				
1 Jan 09 – 2 Feb 09	5,360,524	602,525	4,758,000	10,000	4,748,000	25	3,870	155	3,013	7,063	0.942	4,472,616	4,472
2 Feb 09 – 2 Mar 09	4,526,047	510,547	4,015,500	20,500	3,995,000	14	3,267	67	2,757	6,105	0.942	3,763,290	3,763
2 Mar 09 – 1 Apr 09	4,566,468	529,468	4,037,000	21,500	4,015,500	5	3,159	35	3,004	6,203	0.942	3,782,601	3,782
1 Apr 09 – 30 Apr 09	4,600,462	520,962	4,079,500	22,500	4,057,000	636	3,550	55	1,754	5,995	0.942	3,821,694	3,821
30 Apr 09 – 1 Jun 09	5,388,016	615,016	4,773,000	11,000	4,762,000	315	2,560	35	3,209	6,119	0.942	4,485,804	4,485
1 Jun 09 – 1 Jul 09	4,840,192	570,692	4,269,500	17,500	4,252,000	167	2,720	69	3,478	6,434	0.942	4,005,384	4,005
1 Jul 09 – 1 Aug 09	4,149,014	495,014	3,654,000	41,000	3,613,000	513	3,055	47	2,365	5,980	0.942	3,403,446	3,403
1 Aug 09 - 31 Aug 09	3,520,413	439,413	3,081,000	33,000	3,048,000	106	1,315	429	3,918	5,768	0.942	3,789,694	3,789
Total	**36,951,136**	**4,283,637**	**32,667,500**	**177,000**	**32,490,500**	**1,781**	**23,496**	**892**	**23,498**	**49,667**	**-**	**30,606,051**	**30,602**