

MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version number 01 Date 15/11/2011

Biomass Based Independent Power Project at Malwa Power Private Limited, Mukatsar, Punjab
Project Reference Number: 0331
Monitoring Period: 7 (01/09/2010 - 31/08/2011)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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Malwa Power Private Limited (MPPL) was incorporated in January 2002 as a Special Purpose Vehicle for setting up biomass based power plants. MPPL has set up the biomass based power plant at district Mukatsar in state of Punjab (project activity). The project activity generates electricity and exports it to the regional grid. The major equipment of the project activity comprise a 7.5 MW bleed cum condensing type turbine and one 31.5 tons per hour (TPH) and 67 atmosphere (atm) pressure boiler.

The purpose of the project activity is to utilize surplus biomass available in the region for effective generation of electricity for supply to grid to meet the ever-increasing demand for energy in the region. The project activity reduces the Green House Gas (GHG) emissions produced by the regional grid generation mix, which is mainly dominated by fossil fuel based power plants.

The technology employed in the project activity consists of a boiler to combust biomass and generate steam that drives a turbine. The turbine is connected to a generator that converts the mechanical energy into electricity energy. Since, the GHG emissions due to the combustion of biomass are neutralized by the sequestration that took place during the growth cycle of the biomass crop, the CO₂ emissions during combustion of biomass can be ignored. Therefore, electricity is generated through sustainable means without causing any negative effect on the environment and hence the technology is environmentally safe and sound.

The project activity was synchronized with the grid on 27 April 2005 and was declared commercially operative on the same day.

The total emission reductions achieved in this monitoring period are 44,150 tCO₂.

A.2. Project Participants

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants(as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	Malwa Power Private Limited (Private Entity)	No
Germany	Vattenfall Europe Generation AG (Private Entity)	No
United Kingdom of Great Britain and Northern Ireland	EDF Trading Ltd. (Private Entity)	No

A.3. Location of the project activity:

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The project activity has been implemented at the following location:

Village: Gulabewalla
Tehsil: Mukatsar
District: Mukatsar
State: Punjab
Country: India

GPS Coordinates at Boiler:

Latitude: 30.5511° N
Longitude: 74.4995° E

A.4. Technical description of the project

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The power plant has a boiler sized to produce a maximum of 31.5 TPH of steam and 7.5 MW steam turbine, which is a bleed cum condensing type machine. The steam conditions at the boiler heat outlet are a pressure of 67 atm and temperature of 465 °C. Fluidized Bed Combustion type boiler has been selected, primarily due to its flexibility in fuel firing and as per the norms prescribed by Punjab Pollution Control Board. All the necessary auxiliary facilities of the power plant including Reverse Osmosis water treatment plant, cooling tower, condensate system, fuel storage and handling systems, electrical power evacuation system, ash handling system, fire fighting system, compressed air system, instrumentation and control system etc. have been provided for the power plant. The plant and equipment facilities have been designed to comply with the applicable stipulations / guidelines of statutory authorities such as State Pollution Control Board etc. Power is generated at 11 kV at the plant and is evacuated to grid at 66 kV through a capacity transformer.

Combustion technology has been selected for the power plant, wherein biomass is burnt as fuel in a steam generator to produce high pressure steam, which is then expanded in turbo-generators to generate power. Therefore, electricity is generated through sustainable means without causing any negative effect on the environment and hence the technology is environmentally safe and sound.

The major equipments installed in the project activity are as follows:

S. No.	Equipment	Supplier
1.	<u>Boiler</u> Type: Fluidized Bed Combustion Capacity: 31.5 TPH, 67 atm & 465 °C Serial No.: BDF-315	Thermax Limited, Pune
2.	<u>Turbine</u> Type: Bleed cum condensing Capacity: 7.5 MW steam turbine Serial No.: 16	M/s Triveni Engineering & Industries Ltd 12A, Peenya Industrial Area Bangalore, India
3.	<u>Generator</u> Type: Brushless Synchronous Capacity: 7.5 MW Serial No.: 431798261-11-01	Bharat Heavy Electricals Ltd.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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Title: AMS.I.D '*Grid connected renewable electricity generation*' Version 07

Main Category: Type I - Renewable Energy Projects

Sub Category: I.D- Grid connected renewable electricity generation

The reference has been taken from the indicative simplified baseline and monitoring methodologies for small-scale CDM project activity categories -Version 7

A.6. Registration date of the project activity:

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30th April 2006

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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Crediting period: 01 May 05 - 30 Apr 15

Choice of crediting period: Fixed

A.8. Name of responsible person(s)/entity(ies):

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Entity responsible for completing the monitoring report form (CDM-MR):

Malwa Power Private Limited

Mr. Krishan Lalit Bansal

Director

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The project activity was synchronized with the grid on 27 April 2005 and was declared commercially operative on the same day. The project activity has been in operation continuously (with outages – forced & planned) ever since.

The plant operates in three shifts of eight hours every day:

Shift A: 06:00 AM to 02:00 PM

Shift B: 02:00 PM to 10:00 PM

Shift C: 10:00 PM to 06:00 AM (next day)

For example, the plant started operation at 12:42 AM on 21.09.2009 but this was recorded in the C shift of 20.09.2009 itself.

The outages in the current monitoring period are as follows:

Month	From		To		HRS	Total HRS
	Date	Time	Date	Time		
September' 10	1-Sep	12:00 AM	2-Sep	4:04 AM	28.07	176.08
	14-Sep	5:13 AM	17-Sep	2:27 PM	81.23	
	23-Sep	1:29 AM	25-Sep	8:16 PM	66.78	
October' 10	5-Oct	10:50AM	6-Oct	8:15AM	21.42	216.04
	10-Oct	10:19PM	11-Oct	12:56PM	14.62	
	18-Oct	7:25PM	20-Oct	4:12AM	32.78	
	21-Oct	12:44AM	27-Oct	3:57AM	147.22	
November' 10	20-Nov	11:45AM	21-Nov	9:51AM	22.10	22.10
December' 10	27-Dec	10:47AM	28-Dec	5:25PM	30.63	30.63
January' 11	18-Jan	2:32 PM	19-Jan	11:19 AM	20.78	28.85
	31-Jan	3:56 PM	31-Jan	12:00 AM	8.07	
February' 11	1-Feb	12:00 AM	1-Feb	3:36 AM	3.60	80.62
	9-Feb	7:57 AM	12-Feb	12:58 PM	77.02	
March' 11	9-Mar	11:25 PM	18-Mar	2:12 PM	206.78	231.40
	27-Mar	1:34 PM	28-Mar	2:11 PM	24.62	
April' 11	2-Apr	12:32 PM	3-Apr	2:02 AM	13.50	147.75
	5-Apr	8:36 AM	6-Apr	7:11 PM	34.58	
	12-Apr	6:22 AM	12-Apr	6:38 AM	0.27	
	12-Apr	8:00 AM	12-Apr	8:12 AM	0.20	
	12-Apr	8:35 PM	12-Apr	8:55 PM	0.30	
	12-Apr	9:08 PM	12-Apr	9:29 PM	0.35	
	13-Apr	4:51 PM	13-Apr	5:06 PM	0.25	
	16-Apr	9:08 PM	17-Apr	8:36 PM	23.47	
	18-Apr	10:13 PM	20-Apr	12:17 PM	38.07	
	21-Apr	9:30 PM	22-Apr	4:11 AM	6.68	
	22-Apr	2:01 PM	22-Apr	2:36 PM	0.58	
	28-Apr	7:57 AM	29-Apr	1:27 PM	29.50	
May' 11	11-May	6:38 AM	11-May	6:50 AM	0.20	45.71
	11-May	11:25 AM	11-May	11:46 AM	0.35	
	11-May	12:00 PM	11-May	12:26 PM	0.43	
	11-May	1:16 PM	11-May	1:39 PM	0.38	

	11-May	1:43 PM	11-May	2:18 PM	0.58	
	11-May	3:30 PM	11-May	3:50 PM	0.33	
	12-May	2:47 PM	12-May	3:15 PM	0.47	
	15-May	6:12 PM	12-May	6:21 PM	0.15	
	15-May	10:36 PM	12-May	10:48 PM	0.20	
	16-May	4:51 PM	16-May	5:10 PM	0.32	
	19-May	7:15 PM	20-May	6:18 PM	23.05	
	27-May	8:40 AM	28-May	3:55 AM	19.25	
June' 11	11-Jun	9:48 AM	11-Jun	1:01 PM	3.22	35.82
	19-Jun	10:20 PM	21-Jun	6:56 AM	32.60	
July' 11	1-Jul	12:35 PM	6-Jul	12:15 PM	119.67	196.09
	19-Jul	10:37 PM	21-Jul	1:10 PM	38.55	
	29-Jul	11:51 PM	31-Jul	1:09 PM	36.35	
	31-Jul	6:27:00 AM	31-Jul	7:58 AM	1.52	
August' 11	8-Aug	5:07 PM	16-Aug	4:23 PM	191.27	283.66
	17-Aug	12:13 AM	17-Aug	1:59 PM	13.77	
	28-Aug	5:23 PM	31-Aug	12:00 AM	78.62	
Total					1494.75	1494.75

No events or situations have occurred during the monitoring period which may impact the applicability of the methodology.

B.2. Revision of the monitoring plan

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There has been no revision in the monitoring plan for the project activity.

B.3. Request for deviation applied to this monitoring period

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There has been no deviation applied to this monitoring period of the project activity.

B.4. Notification or request of approval of changes

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There has been no notification submitted or request of approval of changes from registered PDD applied to the project activity.

SECTION C. Description of the monitoring system

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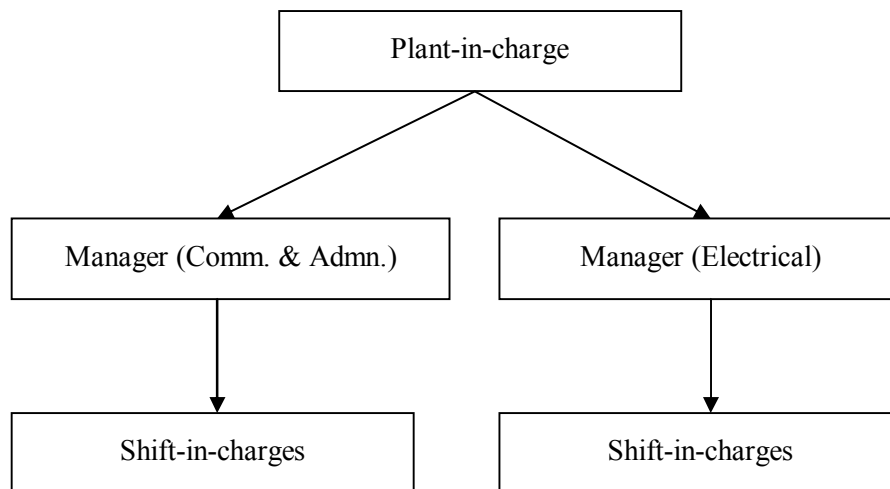
The energy exported to the PSEB is recorded from two independent set of meters - Main Meter & Check Meter. The readings from the Main Meter are used for billing purposes. In case the Main Meter goes out of operation, the reading of the backup meter (Check Meter) is used for billing. Till date only the 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 Shift-in-charge which is thereafter approved by the Plant in-charge. 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.

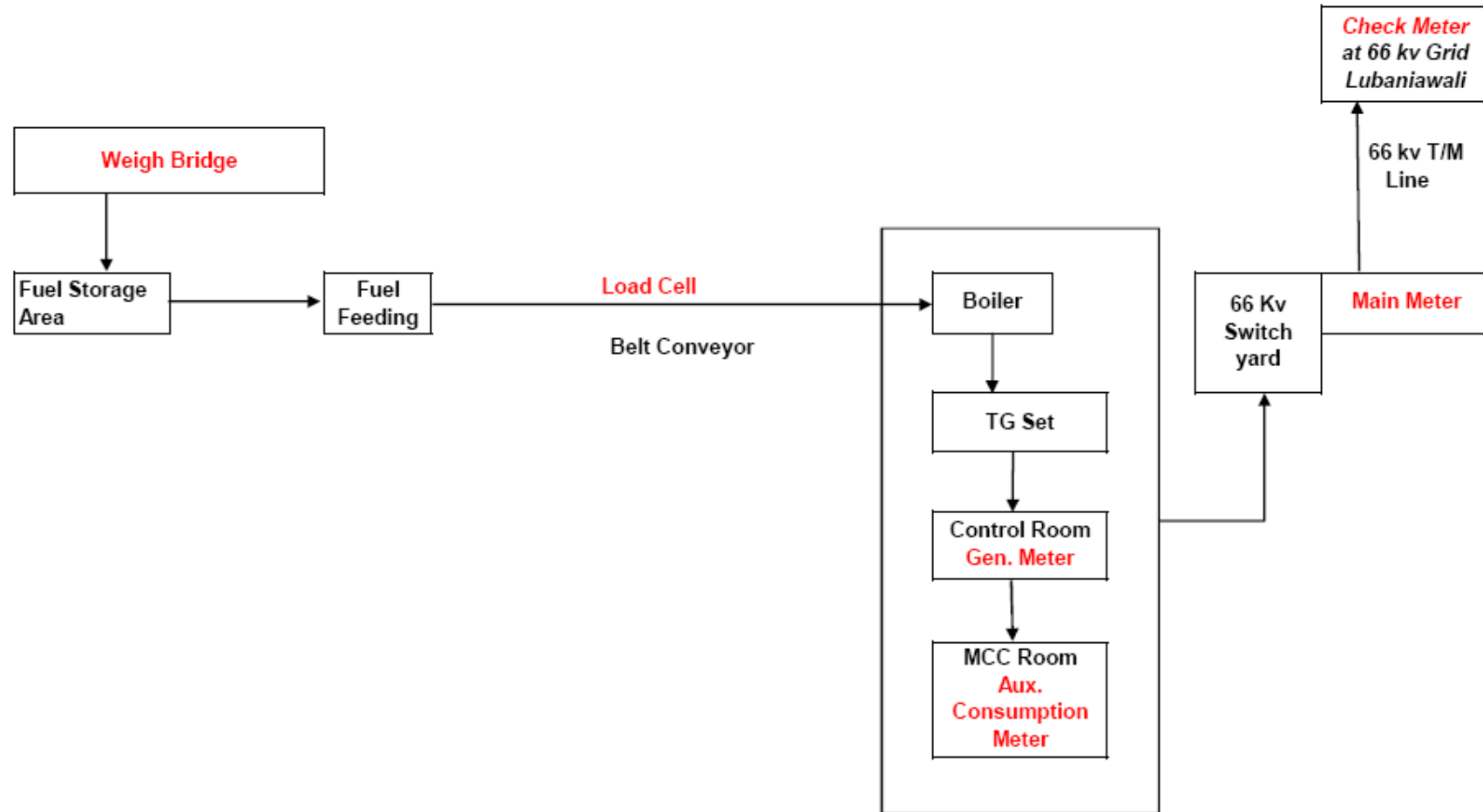
MPPL is the sole agency responsible for implementation of the monitoring plan. The Shift in-charge is responsible for the hourly data recording at generation end. Daily and monthly reports stating the generation, auxiliary consumption, and net power export are prepared by the Shift in-charge and verified 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 MPPL to ensure compliance with the monitoring methodology and plan.

Organizational Structure



**Single Line Diagram for Monitoring Points of 7.5 MW Power Plant of M/s Malwa Power (P) Ltd.
at Vill - Gulabewala, Distt - Muktsar (PB)**



SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	EF_v
Data unit:	tCO ₂ /MWh
Description:	CO ₂ baseline emission factor for the electricity displaced due to the project activity
Source of data used:	The baseline emission factor for the project activity has been calculated in the registered PDD using the power generation mix and recent capacity additions of Northern Regional electricity grid
Value(s) :	0.942
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	This parameter has been fixed ex-ante for the entire crediting period in the registered PDD.

D.2. Data and parameters monitored

Data / Parameter:	Energy exported
Data unit:	kWh
Description:	Electricity exported by the project activity to PSEB
Measured /Calculated /Default:	Measured
Source of data:	Monthly Joint Meter Readings taken at the interconnection point in the presence of officials of MPPL and PSEB
Value(s) of monitored parameter:	Monthly recorded values of exported energy have been presented in a tabular format in section E.1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p>Main Meter</p> <p>Type: Electronic Trivector Energy meter Accuracy Level: 0.5 Serial number: 04180597 Model No.: ER300P Meter Manufacturer: L&T Measurement principle: 4 quadrant bidirectional meter Measurement range: 0 – 99,999,999 Location: 66 kV Switch Yard near power plant Calibration frequency: Six months</p> <p>Date of calibration test: 24.06.2009 Validity till: 24.12.2009 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 24.12.2009 Validity till: 24.06.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 23.06.2010</p>

	<p>Validity till: 23.12.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 02.12.2010 Validity till: 02.06.2011 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 26.05.2011 Validity till: 26.11.2011 Calibration Agency: Punjab State Electricity Board</p> <p><u>Check Meter</u> Type: Electronic Trivector Energy meter Accuracy Level: 0.5 Serial number: 04180598 Model No.: ER300P Meter Manufacturer: L&T Measurement principle: 4 quadrant bidirectional meter Measurement range: 0 – 99,999,999 Location: Lubaniawali Substation Calibration frequency: Six months</p> <p>Date of calibration test: 24.06.2009 Validity till: 24.12.2009 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 24.12.2009 Validity till: 24.06.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 23.06.2010 Validity till: 23.12.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 02.12.2010 Validity till: 02.06.2011 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 26.05.2011 Validity till: 26.11.2011 Calibration Agency: Punjab State Electricity Board</p>
Measuring/ Reading/ Recording frequency:	Recording frequency: Monthly
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	The calibration test of accuracy of main and check meters is done every six months.

Data / Parameter:	Energy imported
Data unit:	kWh
Description:	Electricity imported by the project activity from PSEB
Measured /Calculated /Default:	Measured
Source of data:	Monthly Joint Meter Readings taken at the interconnection point in the presence of officials of MPPL and PSEB
Value(s) of monitored	Monthly recorded values of imported energy have been presented in a

parameter:	tabular format in section E.1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p><u>Main Meter</u> Type: Electronic Trivector Energy meter Accuracy Level: 0.5 Serial number: 04180597 Model No.: ER300P Meter Manufacturer: L&T Measurement principle: 4 quadrant bidirectional meter Measurement range: 0 – 99,999,999 Location: 66 kV Switch Yard near power plant Calibration frequency: Six months Date of calibration test: 24.06.2009 Validity till: 24.12.2009 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 24.12.2009 Validity till: 24.06.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 23.06.2010 Validity till: 23.12.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 02.12.2010 Validity till: 02.06.2011 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 26.05.2011 Validity till: 26.11.2011 Calibration Agency: Punjab State Electricity Board</p> <p><u>Check Meter</u> Type: Electronic Trivector Energy meter Accuracy Level: 0.5 Serial number: 04180598 Model No.: ER300P Meter Manufacturer: L&T Measurement principle: 4 quadrant bidirectional meter Measurement range: 0 – 99,999,999 Location: Lubaniawali Substation Calibration frequency: Six months Date of calibration test: 24.06.2009 Validity till: 24.12.2009 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 24.12.2009 Validity till: 24.06.2010 Calibration Agency: Punjab State Electricity Board</p> <p>Date of calibration test: 23.06.2010 Validity till: 23.12.2010 Calibration Agency: Punjab State Electricity Board</p>

	Date of calibration test: 02.12.2010 Validity till: 02.06.2011 Calibration Agency: Punjab State Electricity Board Date of calibration test: 26.05.2011 Validity till: 26.11.2011 Calibration Agency: Punjab State Electricity Board
Measuring/ Reading/ Recording frequency:	Recording frequency: Monthly
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	The calibration test of accuracy of main and check meters is done every six months.

Data / Parameter:	Net saleable energy
Data unit:	kWh
Description:	Net electricity exported by the project activity to PSEB
Measured /Calculated /Default:	Calculated
Source of data:	Monthly Joint Meter Readings taken at the interconnection point in the presence of officials of MPPL and PSEB
Value(s) of monitored parameter:	Monthly recorded values of net saleable energy have been presented in a tabular format in section E.1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Recording frequency: Monthly
Calculation method (if applicable):	Net saleable energy = Energy exported – Energy imported
QA/QC procedures applied:	The calibration test of accuracy of main and check meters is done every six months.

Data / Parameter:	Energy generated								
Data unit:	kWh								
Description:	Gross energy generated from the project activity								
Measured /Calculated /Default:	Measured								
Source of data:	Log books								
Value(s) of monitored parameter:	<table border="1"> <thead> <tr> <th>Month</th><th>Gross Electricity generated (kWh)</th></tr> </thead> <tbody> <tr> <td>01 Sep 10 - 30 Sep 10</td><td>4083927</td></tr> <tr> <td>01 Oct 10 - 31 Oct 10</td><td>3979482</td></tr> <tr> <td>01 Nov 10 - 30 Nov 10</td><td>5279825</td></tr> </tbody> </table>	Month	Gross Electricity generated (kWh)	01 Sep 10 - 30 Sep 10	4083927	01 Oct 10 - 31 Oct 10	3979482	01 Nov 10 - 30 Nov 10	5279825
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01 Sep 10 - 30 Sep 10	4083927								
01 Oct 10 - 31 Oct 10	3979482								
01 Nov 10 - 30 Nov 10	5279825								

	01 Dec 10 - 31 Dec 10	5401223
	01 Jan 11 - 31 Jan 11	5342801
	01 Feb 11 - 28 Feb 11	4498239
	01 Mar 11 - 31 Mar 11	3786888
	01 Apr 11 - 30 Apr 11	4185836
	01 May 11 - 31 May 11	4956980
	01 Jun 11 - 30 Jun 11	4802910
	01 Jul 11 - 31 Jul 11	3905218
	01 Aug 11 - 31 Aug 11	3095540
	TOTAL	53318869
	Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not used for any calculations. Demonstrates smooth operation of the power plant.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Type: Electronic Energy meter Accuracy Level: 0.5 Serial number: 4249596 Model No.: ER300P Meter Manufacturer: L&T Measurement principle: 4 quadrant bidirectional meter Measurement range: 0 – 99,999,999 Location: Power Plant Control Room Calibration frequency: Six months Date of calibration: 01.06.2009 Validity till: 01.12.2009 Calibration Agency: Internal Testing Date of calibration: 27.11.2009 Validity till: 27.05.2010 Calibration Agency: Internal Testing Date of calibration: 25.05.2010 Validity till: 25.11.2010 Calibration Agency: Internal Testing Date of calibration: 22.11.2010 Validity till: 22.05.2011 Calibration Agency: Internal Testing Date of calibration: 17.05.2011 Validity till: 17.11.2011 Calibration Agency: Internal Testing	
Measuring/ Reading/ Recording frequency:	Recording frequency: Hourly	
Calculation method (if applicable):	Not Applicable	
QA/QC procedures applied:	The meter is checked every six months through internal testing.	

Data / Parameter:	Auxiliary energy consumption
Data unit:	kWh
Description:	Auxiliary energy consumption of the project activity
Measured /Calculated /Default:	Measured

Source of data:	Log books																												
Value(s) of monitored parameter:	<table border="1"> <thead> <tr> <th>Month</th><th>Auxiliary consumption (kWh)</th></tr> </thead> <tbody> <tr><td>01 Sep 10 - 30 Sep 10</td><td>422000</td></tr> <tr><td>01 Oct 10 - 31 Oct 10</td><td>404000</td></tr> <tr><td>01 Nov 10 - 30 Nov 10</td><td>495000</td></tr> <tr><td>01 Dec 10 - 31 Dec 10</td><td>524000</td></tr> <tr><td>01 Jan 11 - 31 Jan 11</td><td>525000</td></tr> <tr><td>01 Feb 11 - 28 Feb 11</td><td>441000</td></tr> <tr><td>01 Mar 11 - 31 Mar 11</td><td>398000</td></tr> <tr><td>01 Apr 11 - 30 Apr 11</td><td>434000</td></tr> <tr><td>01 May 11 - 31 May 11</td><td>503000</td></tr> <tr><td>01 Jun 11 - 30 Jun 11</td><td>489000</td></tr> <tr><td>01 Jul 11 - 31 Jul 11</td><td>426000</td></tr> <tr><td>01 Aug 11 - 31 Aug 11</td><td>348300</td></tr> <tr><td>TOTAL</td><td>5409300</td></tr> </tbody> </table>	Month	Auxiliary consumption (kWh)	01 Sep 10 - 30 Sep 10	422000	01 Oct 10 - 31 Oct 10	404000	01 Nov 10 - 30 Nov 10	495000	01 Dec 10 - 31 Dec 10	524000	01 Jan 11 - 31 Jan 11	525000	01 Feb 11 - 28 Feb 11	441000	01 Mar 11 - 31 Mar 11	398000	01 Apr 11 - 30 Apr 11	434000	01 May 11 - 31 May 11	503000	01 Jun 11 - 30 Jun 11	489000	01 Jul 11 - 31 Jul 11	426000	01 Aug 11 - 31 Aug 11	348300	TOTAL	5409300
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TOTAL	5409300																												
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not used for any calculations. Demonstrates smooth operation of the power plant.																												
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p>Type: Electronic Energy meter Accuracy Level: 1.0 Serial number: 63116/3171-0405 Model No.: ELF-3234 Meter Manufacturer: Enercon Measurement principle: 3 phase 4 wire Electronic energy meter Measurement range: 0 – 9,999 Location: Power Plant Control Room Calibration frequency: Six months</p> <p>Date of calibration: 01.06.2009 Validity till: 01.12.2009 Calibration Agency: Internal Testing</p> <p>Date of calibration: 27.11.2009 Validity till: 27.05.2010 Calibration Agency: Internal Testing</p> <p>Date of calibration: 25.05.2010 Validity till: 25.11.2010 Calibration Agency: Internal Testing</p> <p>Date of calibration: 22.11.2010 Validity till: 22.05.2011 Calibration Agency: Internal Testing</p> <p>Date of calibration: 17.05.2011 Validity till: 17.11.2011 Calibration Agency: Internal Testing</p>																												
Measuring/ Reading/ Recording frequency:	Recording frequency: Hourly																												
Calculation method (if applicable):	Not Applicable																												

QA/QC procedures applied:	The meter is checked every six months through internal testing.
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Data / Parameter:	Biomass Quantity																																																																										
Data unit:	MT																																																																										
Description:	Quantity of biomass consumed in the project activity																																																																										
Measured /Calculated /Default:	Measured																																																																										
Source of data:	Log books																																																																										
Value(s) of monitored parameter:	<table><tr><th>Month</th><th>Cotton Sticks</th><th>Mustard Husk</th><th>PADDY WASTE</th><th>Wheat Straw</th></tr><tr><td>Sep-10</td><td>4047</td><td>85</td><td>1664</td><td>248</td></tr><tr><td>Oct-10</td><td>2914</td><td>67</td><td>1983</td><td>129</td></tr><tr><td>Nov-10</td><td>3219</td><td>100</td><td>3015</td><td>1</td></tr><tr><td>Dec-10</td><td>4156</td><td>0</td><td>2587</td><td>9</td></tr><tr><td>Jan-11</td><td>5009</td><td>3</td><td>1875</td><td>59</td></tr><tr><td>Feb-11</td><td>4381</td><td>1</td><td>1581</td><td>32</td></tr><tr><td>Mar-11</td><td>3145</td><td>7</td><td>1969</td><td>110</td></tr><tr><td>Apr-11</td><td>2078</td><td>1424</td><td>1062</td><td>752</td></tr><tr><td>May-11</td><td>1746</td><td>1254</td><td>345</td><td>2605</td></tr><tr><td>Jun-11</td><td>2629</td><td>174</td><td>1938</td><td>1117</td></tr><tr><td>Jul-11</td><td>2657</td><td>394</td><td>649</td><td>1532</td></tr><tr><td>Aug-11</td><td>1615</td><td>821</td><td>1255</td><td>613</td></tr><tr><td>TOTAL</td><td>37598</td><td>4330</td><td>19922</td><td>7206</td></tr></table>					Month	Cotton Sticks	Mustard Husk	PADDY WASTE	Wheat Straw	Sep-10	4047	85	1664	248	Oct-10	2914	67	1983	129	Nov-10	3219	100	3015	1	Dec-10	4156	0	2587	9	Jan-11	5009	3	1875	59	Feb-11	4381	1	1581	32	Mar-11	3145	7	1969	110	Apr-11	2078	1424	1062	752	May-11	1746	1254	345	2605	Jun-11	2629	174	1938	1117	Jul-11	2657	394	649	1532	Aug-11	1615	821	1255	613	TOTAL	37598	4330	19922	7206
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Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not used for any calculations. Substantiates the power generation from the project activity.																																																																										
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p><u>Load Cell</u> Type: Load Cell Serial number: 167205 Model No.: BR011L0 Capacity: 10 MT Location: Belt Conveyor Calibration frequency: Annually Date of calibration: 29.05.2009 Validity till: 29.05.2010 Calibration Agency: IPA Private Limited Date of calibration: 01.06.2010 Validity till: 01.12.2010 Calibration Agency: IPA Private Limited There is a gap of 2 days in the calibration of the Load Cell. However, the calibration carried out on 01.06.2010 did not identify error beyond permissible limit and this instrument has no impact on the emission reduction calculations. Date of calibration: 18.05.2011 Validity till: 17.05.2012 Calibration Agency: IPA Private Limited <u>Weighbridge</u></p>																																																																										

	<p>Type: Electro-Mechanical Weighbridge Make: Leotronic Model No.: EDS501 Capacity: 30 MT Location: Before Fuel Yard Calibration frequency: Annually</p> <p>Date of calibration: 01.07.2010 Validity till: 01.07.2011 Calibration Agency: Leotronic Scales Private Ltd.</p> <p>Date of calibration: 29.10.2010 Validity till: 29.10.2011 Calibration Agency: Leotronic Scales Private Ltd.</p> <p>Date of calibration: 27.01.2011 Validity till: 27.01.2012 Calibration Agency: Leotronic Scales Private Ltd.</p> <p>Date of calibration: 25.04.2011 Validity till: 25.04.2012 Calibration Agency: Leotronic Scales Private Ltd.</p> <p>Date of calibration: 22.07.2011 Validity till: 22.07.2012 Calibration Agency: Leotronic Scales Private Ltd.</p>
Measuring/ Reading/ Recording frequency:	Recording frequency: Daily
Calculation method (if applicable):	Not Applicable
QA/QC procedures applied:	<p>The load cell is an online meter used to measure biomass consumption of the project activity.</p> <p>The weighbridge calibration is to be carried out annually but it is conducted on a regular basis (generally three months) to ensure greater accuracy.</p>

Data / Parameter:	Biomass – Calorific Value
Data unit:	kcal/kg
Description:	Calorific value of the different types of biomass fuels used in the project activity
Measured /Calculated /Default:	Measured
Source of data:	Log books
Value(s) of monitored parameter:	<p>Results of calorific value tests conducted on 24th January 2010:</p> <p>Mustard Husk: 3,320 kcal/kg Wheat Straw: 3,458 kcal/kg Paddy waste: 3,168 kcal/kg Cotton stick: 3,489 kcal/kg</p>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not used for any calculations. Substantiates the power generation from the project activity.
Monitoring equipment (type, accuracy class, serial	The energy content of biomass is measured in the in-house lab using a bomb calorimeter as and when the biomass is received at the power

number, calibration frequency, date of last calibration, validity)	<p>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.</p> <p>In the in-house testing with bomb calorimeter, the mass of the combustible charge used 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.</p> <p>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 the manufacturer's manual using the 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.</p>
Measuring/ Reading/ Recording frequency:	Recording frequency: Once in a year for each type of biomass
Calculation method (if applicable):	$GCV = \frac{T \times W - (CV_T + CV_W)}{M}$ <p>Where,</p> <p>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</p>
QA/QC procedures applied:	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 according to procedures in the manufacturer's manual every time it is used, the uncertainty level of the monitored data is low.

Data / Parameter:	Coal Quantity
Data unit:	MT
Description:	Quantity of coal used in the project activity
Measured /Calculated /Default:	Measured
Source of data:	Log books
Value(s) of monitored parameter:	0
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Recording frequency: Daily

Calculation method (if applicable):	Not Applicable
QA/QC procedures applied:	Coal has not been used during the current monitoring period. Further, the power plant does not have a coal mill required to grind the coal for use in the boiler.

Data / Parameter:	Carbon content in coal
Data unit:	%
Description:	Carbon content of coal used in the project activity
Measured /Calculated /Default:	Measured
Source of data:	Test Reports
Value(s) of monitored parameter:	Not applicable
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Recording frequency: For each batch of coal
Calculation method (if applicable):	Not Applicable
QA/QC procedures applied:	Coal has not been used by the project proponent in the current monitoring period.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

The baseline emissions have been calculated as per the formula presented in section E.1.2.4 of the registered PDD:

$$BE_y = EF_y \times EG_y$$

Where

- BE_y - are the baseline emissions due to displacement of electricity during the year y in tons of CO₂
- EG_y - is the net quantity of electricity generated by the project activity during the year y in MWh, and
- EF_y - is the CO₂ baseline emission factor for the electricity displaced due to the project activity in tons CO₂/MWh

Billing Period	Electricity exported (kWh)	Electricity imported (kWh)	Net Saleable energy (kWh)	Baseline Emission Factor (kgCO ₂ e/kWh)	Baseline Emissions (tCO ₂ e)
01 Sep 10 - 30 Sep 10	3,670,500	23,500	3,647,000	0.942	3,435
01 Oct 10 - 31 Oct 10	3,506,500	31,000	3,475,500	0.942	3,273
01 Nov 10 - 30 Nov 10	4,676,000	5,000	4,671,000	0.942	4,400
01 Dec 10 - 30 Dec 10	4,627,500	7,000	4,620,500	0.942	4,352
31 Dec 10 - 31 Jan 11	4,901,000	9,500	4,891,500	0.942	4,607
01 Feb 10 - 28 Feb 11	4,015,000	10,000	4,005,000	0.942	3,772
01 Mar 11 - 31 Mar 11	3,311,000	30,000	3,281,000	0.942	3,090
01 Apr 10 - 01 May 11	3,843,500	30,000	3,813,500	0.942	3,592
02 May 11 - 30 May 11	4,094,000	13,500	4,080,500	0.942	3,843
31 May 11 - 30 Jun 11	4,354,000	9,000	4,345,000	0.942	4,092
01 Jul 11 - 31 July 11	3,413,500	29,500	3,384,000	0.942	3,187
01 Aug 11 - 29 Aug 11	2,686,500	24,500	2,662,000	0.942	2,507
TOTAL	47,099,000	222,500	46,876,500	-	44,150

E.2. Project emissions calculation

>>

As per registered PDD section E.1.2.1 project emissions would take place from the combustion of coal in the project activity. Since no coal has been consumed in the current monitoring period, project emissions have not been considered.

E.3. Leakage calculation

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As per registered PDD section E.1.2.1 leakage emissions from the transportation of biomass have been ignored.

Further, as per “General guidance on leakage in biomass project activities” Version 03 Paragraph 18, the project participant has evaluated once in the crediting period that biomass is available in surplus in the region (Refer MR of fourth verification of MPPL¹). Thus it has been demonstrated that the surplus biomass is at least 25% larger than the consumption of the region and leakage emissions due to competing uses of biomass can be neglected.

E.4. Emission reductions calculation / table

>>

Emissions reductions (ER_y) are calculated using the formula:

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission reductions from the project activity in the year y

BE_y = Baseline Emissions from the project activity in the year y

PE_y = Project Emissions from the project activity in the year y

Month	Baseline Emissions (tCO ₂ e)	Leakage Emissions (tCO ₂ e)	Project Emissions (tCO ₂ e)	Emission Reductions (tCO ₂ e)
Sep 2010	3,435	0	0	3,435
Oct 2010	3,273	0	0	3,273
Nov 2010	4,400	0	0	4,400
Dec 2010	4,352	0	0	4,352
Jan 2011	4,607	0	0	4,607
Feb 2011	3,772	0	0	3,772
Mar 2011	3,090	0	0	3,090
Apr 2011	3,592	0	0	3,592
May 2011	3,843	0	0	3,843
Jun 2011	4,092	0	0	4,092
Jul 2011	3,187	0	0	3,187
Aug 2011	2,507	0	0	2,507
TOTAL	44,150	0	0	44,150

Total baseline emissions: **44,150 tCO₂e**

Total project emissions: **0 tCO₂e**

Total leakage: **0 tCO₂e**

Total emission reductions: **44,150 tCO₂e**

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

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Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO ₂ e)	45,366	44,150

¹ <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1142618808.04/iProcess/TUEV-SUED1233142421.54/view>

E.6. Remarks on difference from estimated value in the PDD

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The emission reductions estimated in the registered PDD are 45,366 tCO₂ per annum. The emission reductions actually achieved in the monitoring period are 44,150 tCO₂. The emission reductions generated in the current monitoring period are less than the estimation for the period in the registered PDD because there was a lower demand of power in the facility which meets its power requirement from the project activity.

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History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory Document Type: Guideline, Form Business Function: Issuance		