VCS Monitoring Report

MONITORING REPORT FROM 30-10-2009 TO 28-02-2011

Document Prepared By Universal Biomass Energy Private Limited

Project Title	Biomass Based Power Generation Plant at Village Channu, Punjab
Version	02
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1 PROJECT DETAILS

1.1 Summary Description of Project

The proposed CDM project activity is undertaken by Universal Biomass Energy Private Limited (UBEPL) in Muktsar district of Punjab, India. The project involves installation of a new 14.50 MW Bio-mass Residue based Power Plant to generate electricity and export power to the regional grid. The power plant will be fired primarily with cotton stalk, a by-product of cotton cultivation with mustard stalk being other locally available agricultural wastes as the other fuel. The project activity shall thus reduce GHG emissions by displacing the fossil fuel dominated grid based electricity with biomass residues based renewable electricity.

The purpose of the project activity is to utilize the surplus biomass available in the region namely cotton stalks and mustard stalk effectively for generation of power. Electricity thus generated will be exported to the regional grid and hence will contribute to Green House Gas (GHG) emission reductions and sustainable economic growth. The proposed project will further help to reduce the ever-increasing demand and supply gap of electricity in the host country, India.

The location of proposed UBEPL's power plant in Muktsar District, Punjab was considered keeping in view the availability of cotton stalk in the area. Muktsar lies in southern Punjab which is the main cotton growing area of the state. Muktsar, Bathinda and Ferozepur districts of Punjab have been Identified as the other prime source of feedstock i.e. cotton stalk to run the power plant. The state of Punjab produces 25% of Country's cotton.

Project activity of UBEPL proposes to adopt Rankine cycle of combustion technology, where the Biomass fuels can be directly fired inside the boilers to generate 14.5 MW. The project activity will result in Net Energy Generation of 90,311 MWh.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 01

Project Type: The project activity is a type I i.e. Renewable Energy Projects.

The project activity is an individual project activity and not a grouped project.

1.3 Project Proponent

Organization:	Universal Biomass Energy Private Limited (UBEPL)
Street/P.O.Box:	Giddarbaha-Lambi Road, Village Channu
Building:	-
City:	District Muktsar
State/Region:	Punjab
Postfix/ZIP:	152107
Country:	India
Telephone:	+91 1637 241501
FAX:	+91 1637 241502
E-Mail:	universalbiomass@rediffmail.com
URL:	-
Represented by:	

Title:	Director
Salutation:	Mr.
Last Name:	Singh
Middle Name:	
First Name:	Jasbir
Department:	-
Mobile:	+91 98761 31882
Direct FAX:	+91 1637 241502
Direct tel:	+91 1637 241501
Personal E-Mail:	sukhbiragroenergy@gmail.com

1.4 Other Entities Involved in the Project

Not Applicable

1.5 Project Start Date

30/10/2009

1.6 Project Crediting Period

Crediting Period: *30/10/2009 to 14/03/2011 (previous day of CDM crediting period start date) .*

1.7 Project Location

The project activity is located in village Channu, Tehsil Malout, District Muktsar Punjab state in India. Muktsar district is located in south western part of Punjab. It is surrounded by states of Rajasthan and Haryana in the south, district Faridkot in north, Ferozepur in west and Bathinda in the east. The western Himalayas in the north and Thar Desert in the south and south west determine the climatic condition of the district. It covers an area of 2615 sq km, which constitutes 5.19 % area of the state of Punjab. Muktsar city is well connected by rail and road. It is located at 260 km from Chandigarh and 356 km from New Delhi.

The coordinates of project activity site village Channu (Tehsil Malout) are:

Latitude – 30 degree 07' 15.95" N to 30 degree 07' 21.38" N

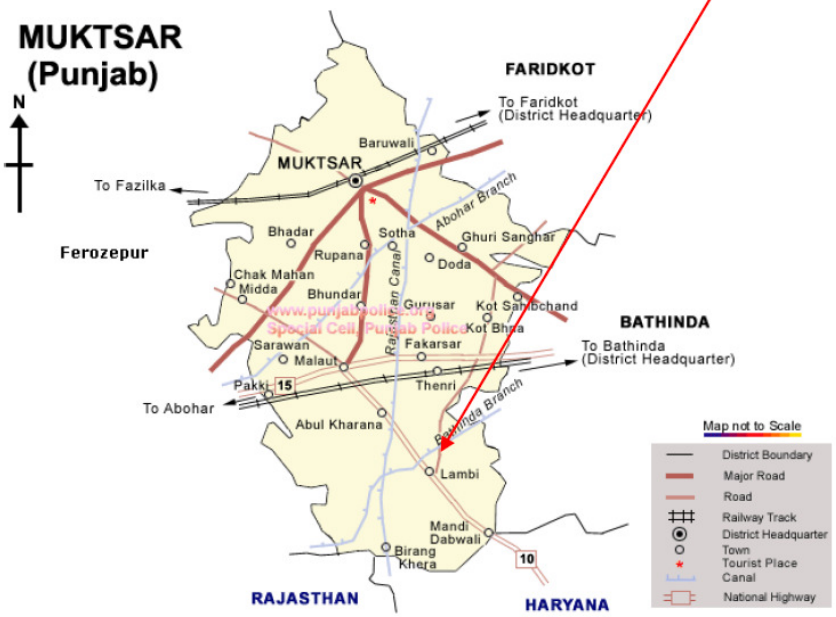
Longitude – 74 degree 36' 52.15" E to 74 degree 37' 00.59" E

Altitude- 164 Metres above mean sea level.

The following map shows the exact location of the project activity.


INDIA
States and Union Territories
AFGHANISTAN
PAKISTAN
CHINA
TIBET
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI LANKA
Srinagar
JAMMU & KASHMIR
HIMACHAL PRADESH
Shimla
Chandigarh
PUNJAB
Dehradun
UTTARAKHAND
HARYANA
DELHI
Jaipur
RAJASTHAN
UTTAR PRADESH
Lucknow
SIKKIM
Gangtok
Itanagar
ARUNACHAL PRADESH
Dispur
ASSAM
NAGALAND
Kohima
Shillong
MEGHALAYA
Imphal
MANIPUR
Agartala
TRIPURA
Aizawl
MIZORAM
BIHAR
Patna
JHARKHAND
Ranchi
WEST BENGAL
Kolkata
Gandhinagar
GUJARAT
Bhopal
MADHYA PRADESH
Raipur
CHHATTISGARH
Bhubaneshwar
ORISSA
Daman
Diu
Silvassa
DADRA & NAGAR HAVELI
Mumbai
MAHARASHTRA
BAY OF BENGAL
ARABIAN SEA
Hyderabad
ANDHRA PRADESH
Yanam (Puducherry)
Panaji
GOA
KARNATAKA
Bengaluru
Chennai
Puducherry
Mahe (Puducherry)
Karaikal (Puducherry)
Kavaratti
LAKSHADWEEP (INDIA)
TAMIL NADU
KERALA
Thiruvananthapuram
Port Blair
ANDAMAN & NICOBAR ISLANDS (INDIA)
LEGEND
International Boundary
State Boundary
National Capital
State & U.T. Capital
Map not to Scale
Copyright © 2007 Compare Infobase Limited
INDIAN OCEAN
www.mapsofindia.com


PUNJAB
District Map
JAMMU & KASHMIR
PAKISTAN
HIMACHAL PRADESH
HARYANA
RAJASTHAN
Gurdaspur
GURDASPUR
Amritsar
AMRITSAR
HOSHIARPUR
Hoshiarpur
Kapurthala
KAPURTHALA
Jalandhar
JALANDHAR
Nawanshahr
NAWANSHAHR
RUPNAGAR
Firozpur
FIROZPUR
Faridkot
FARIDKOT
MOGA
Moga
LUDHIANA
Ludhiana
CHANDIGARH
Fatehgarh Sahib
FATEHGARH SAHIB
MUKTSAR
Muktsar
Bhatinda
BHATHINDA
SANGRUR
Sangrur
Patiala
PATIALA
Mansa
MANSA
LEGEND
International Boundary
State Boundary
District Boundary
State Headquarter
District Headquarter
Map not to Scale
Copyright © 2007 Compare Infobase Limited
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MUKTSAR
(Punjab)
N
FARIDKOT
To Faridkot
(District Headquarter)
Baruwali
MUKTSAR
To Fazilka
Abohar Branch
Ferozepur
Bhadar
Sotha
Ghuri Sanghar
Rupana
Doda
Chak Mahan
Midda
Bhundar
Rajasthan Canal
Gurusar
Kot Sabir Chand
Kot Bhai
BATHINDA
Sarawan
Fakarsar
To Bathinda
(District Headquarter)
Malaut
Pakki
15
Thenri
To Abohar
Abul Kharana
Bathinda Branch
Lambi
Mandi Dabwali
Birang Khera
10
RAJASTHAN
HARYANA
Map not to Scale
District Boundary
Major Road
Road
Railway Track
District Headquarter
Town
Tourist Place
Canal
National Highway
www.punjabpolice.gov.in
Special Cell, Punjab Police

1.8 Title and Reference of Methodology

Title	Grid connected renewable electricity generation
Version number	*15*
Reference	http://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project activity is located at Channu village. Project was implemented and commissioned on 30/10/2009 which is before the registration[1] with UNFCCC. All facilities and equipment have been installed. The instances when there was a shut down in the plant due to various reasons have been detailed below:

Table 1: Plant shutdown details

Date	Time			Total Duration	Remarks
	From	To	Duration		
08/01/2010	0:16:00	0:00:00	23:44:00	23:44:00	BFP Problem
09/01/2010	0:00:00	0:00:00	24:00:00	24:00:00	BFP Problem
10/01/2010	0:00:00	4:30:00	4:30:00	4:30:00	BFP Problem
10/02/2010	23:05:00	0:00:00	0:55:00	0:55:00	Stoker Problem
11/02/2010	0:00:00	24:00:00	24:00:00	24:00:00	Stoker Problem
12/02/2010	0:00:00	24:00:00	24:00:00	24:00:00	Stoker Problem
13/02/2010	0:00:00	3:40:00	3:40:00	3:40:00	Stoker Problem
05/10/2010	0:00:00	6:32:00	6:32:00		Chain Carrier Problem
	8:40:00	24:00:00	15:20:00	21:52:00	Chain Carrier Problem
06/10/2010	0:00:00	7:42:00	7:42:00		Sec. Super Heater Problem
	8:29:00	12:15:00	3:46:00		Sec. Super Heater Problem

[1] The project got registered on 22/02/2011 with UNFCCC

	19:10:00	24:00:00	4:50:00	16:18:00	Sec. Super Heater Problem
07/10/2010	0:00:00	24:00:00	24:00:00	24:00:00	Chain Carrier Problem
08/10/2010	0:00:00	9:16:00	9:16:00	9:16:00	Chain Carrier Problem
10/01/2011	16:15:00	24:00:00	7:45:00	7:45:00	Replacement of superheater tubes
11/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
12/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
13/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
14/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
15/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
16/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
17/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
18/01/2011	0:00:00	24:00:00	24:00:00	24:00:00	Replacement of superheater tubes
19/01/2011	0:00:00	14:15:00	14:15:00	14:15:00	Replacement of superheater tubes

There have been a number of instances of grid non availability due to which the plant had to be shut down. The details are furnished below:

Table 2: Grid non availability details

Date	**Time**			**Total Duration**
	From	**To**	**Duration**	
02/12/2009	10:30:00	13:30:00	3:00:00	3:00:00
13/12/2009	5:20:00	5:45:00	0:25:00	0:25:00
21/12/2009	17:16:00	17:39:00	0:23:00	0:23:00
03/01/2010	0:14:00	6:18:00	6:04:00	6:04:00
24/01/2010	3:25:00	7:06:00	3:41:00	
	14:40:00	17:45:00	3:05:00	6:46:00
01/06/2010	11:05:00	15:20:00	4:15:00	4:15:00
23/06/2010	8:18:00	10:28:00	2:10:00	2:10:00
09/07/2010	11:15:00	11:50:00	0:35:00	0:35:00

10/07/2010	10:00:00	11:15:00	1:15:00	1:15:00
14/07/2010	9:45:00	12:01:00	2:16:00	
	8:21:00	8:45:00	0:24:00	
	11:30:00	12:00:00	0:30:00	3:10:00
16/10/2010	0:00:00	2:42:00	2:42:00	2:42:00
23/10/2010	0:00:00	8:00:00	8:00:00	
	17:22:00	19:25:00	2:03:00	10:03:00
03/11/2010	5:13:00	7:15:00	2:02:00	2:02:00
25/12/2010	1:25:00	2:25:00	1:00:00	
	6:55:00	17:10:00	10:15:00	11:15:00
01/02/2011	10:15:00	19:25:00	9:10:00	9:10:00

2.2 Deviations from the Monitoring Plan

NA

2.3 Grouped Project

NA

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	**EF_{CO2}**
Data unit:	tCO_2e/MWh
Description:	Combined margin (CM) value of CO2 baseline emission factor for the grid electricity displaced due to the project activity during the year y
Source of data:	Central Electricity Authority, India "CO2 baseline database, version 5, November 2009)" (http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf)
Value applied:	0.84

Purpose of the data:	Used for calculation of Baseline emissions
Any comment:	Baseline emission factor will be constant as ex-ante based and fixed for entire crediting period, same shall be collected on yearly basis from CEA.

Data Unit / Parameter:	$\mathbf{EF_{grid,OM,y}}$
Data unit:	tCO_2e/MWh
Description:	Operating Margin (OM) emission factor for northern grid
Source of data:	Central Electricity Authority, India "CO2 baseline database, version 5, November 2009)" (http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf)
Value applied:	1.01
Purpose of the data:	Used for calculation of Baseline emissions
Any comment:	-

Data Unit / Parameter:	$\mathbf{EF_{grid,BM,y}}$
Data unit:	tCO_2e/MWh
Description:	Build Margin (OM) emission factor for northern grid
Source of data:	Central Electricity Authority, India "CO2 baseline database, version 5, November 2009)" (http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf)
Value applied:	0.68
Purpose of the data:	Used for calculation of Baseline emissions
Any comment:	-

Data Unit / Parameter:	$\mathbf{EF_{km,CO2,y}}$
Data unit:	tCO_2e/km
Description:	Average CO_2 emission factor for the trucks during the year y
Source of data:	The emission factor has been determined using appropriate net calorific values and CO_2 emission factor from national reliable default values and/or IPCC default values.
Value applied:	0.00044
Purpose of the data:	Used for calculation of Project emissions

Any comment:	-

Data Unit / Parameter:	**$EF_{DieselCO2}$**
Data unit:	tCO_2/TJ
Description:	The CO_2 emission factor of Diesel
Source of data:	National CO2 emission factor for diesel
Value applied:	71.4
Purpose of the data:	Used for calculation of project emissions
Any comment:	National CO2 Emission factor for Diesel as mentioned in the report on India"s initial National Communication to UNFCCC.

Data Unit / Parameter:	**SFCbiomass**
Data unit:	Kg/kWh
Description:	Specific fuel consumption of biomass fuel types envisaged to be utilized in the project activity
Source of data:	"Detailed Project Report", prepared by Subhash Kamboj & Associates.
Value applied:	Type of biomass: SFC (kg/kWh) Cotton stalk (75%): 1.188 Mustard stalk (25%): 1.188
Purpose of the data:	To cross check the generation. Theoretical electricity generation calculated using the specific fuel consumption of each biomass used in the project activity.
Any comment:	-

3.2 Data and Parameters Monitored

Data Unit / Parameter:	**$EG_{BL,y}$**
Data unit:	MWh
Description:	Quantity of Electricity exported to the grid by the project during the year y
Source of data:	Joint Meter reading
Description of measurement methods and procedures to be applied:	-The electricity is measured with the help of electronic tri vector meters both by the operator and Punjab State Power Corporation Ltd. (PSPCL) as specified in PPA.

<table>
<tr><td></td><td>- 100% of the data is monitored

- Along with the main meter there is a check meter to crosscheck the main meter reading.</td></tr>
<tr><td>Frequency of monitoring/recording:</td><td>The data is measured continuous and recorded hourly</td></tr>
<tr><td>Value monitored:</td><td>114242</td></tr>
<tr><td>Monitoring equipment:</td><td>
<table>
<tr><td></td><td>Type</td><td>Accuracy Class</td><td>Serial Number</td></tr>
<tr><td>Main meter</td><td>Trivector meter of L & T</td><td>0.5s</td><td>08043957</td></tr>
<tr><td>Check meter</td><td>Trivector meter of L & T</td><td>0.5s</td><td>08043951</td></tr>
</table>
</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>The electronic meters are calibrated annually to ensure correct readings throughout the project life.
The calibration details for both main and check meters is furnished below:
First Calibration: 15/10/2009
Second Calibration: 08/10/2010</td></tr>
<tr><td>Calculation method:</td><td>It is calculated based on the electricity export and import</td></tr>
<tr><td>Any comment:</td><td>This data is used for calculation of emission reductions after the subtraction of the electricity imported from the grid. The data would be archived for 2 years beyond the crediting period.</td></tr>
</table>

Data Unit / Parameter:	$Q_{y,\ cotton\ stalk}$
Data unit:	Tonnes/year
Description:	Quantity of cotton stalk received in the project activity
Source of data:	Plant records/log books
Description of measurement methods and procedures to be applied:	-All the biomass is received truck wise and is recorded, these is collated on daily and monthly basis. - Each truck that enters the site will be recorded at the weighbridge installed at the factory.

Frequency of monitoring/recording:	Batch monitoring (every truck of biomass will be monitored)
Value monitored:	2354747.4
Monitoring equipment:	Weighbridge is used to measure the weight of the biomass that is received. The details of the weighbridge is given below: Serial Number: 2008-043 Model Number: FSD-501 Tolerance Value: 10 Kg
QA/QC procedures to be applied:	The weighbridge records will be tallied against transporters receipts or against the computer generated payment invoices. The weighbridge is calibrated annually to ensure proper functioning. The calibration details are: First calibration: 16/09/2009 Second Calibration: 03/10/2010
Calculation method:	It is calculated based on the weight of the loaded truck and the empty truck.
Any comment:	All data will be kept for a minimum of 2 years in soft copies following issuance of certified emission reductions or the end of the crediting period, whichever is later.

Data Unit / Parameter:	$Q_{y,\ mustard\ stalk}$
Data unit:	Tonnes/year
Description:	Quantity of mustard stalk received in the project activity
Source of data:	Plant records/log books
Description of measurement methods and procedures to be applied:	-All the biomass is received truck wise and is recorded, these is collated on daily and monthly basis. - Each truck that enters the site will be recorded at the weighbridge installed at the factory.
Frequency of monitoring/recording:	Daily and monthly basis
Value monitored:	493466.15
Monitoring equipment:	Weighbridge is used to measure the weight of the biomass that is received. The details of the weighbridge is given below: Serial Number: 2008-043 Model Number: FSD-501 Tolerance Value: 10 Kg
QA/QC procedures to be applied:	The weighbridge records will be tallied against transporters receipts or against the computer generated payment invoices. The weighbridge is calibrated annually to ensure proper functioning. The calibration details are:

	First calibration: 16/09/2009 Second Calibration: 03/10/2010
Calculation method:	It is calculated based on the weight of the loaded truck and the empty truck.
Any comment:	All data will be kept for a minimum of 2 years in soft copies following issuance of certified emission reductions or the end of the crediting period, whichever is later.

Data Unit / Parameter:	**$BF_{k, y, cotton\ stalk}$**
Data unit:	Tonnes of cotton stalk per annum
Description:	Quantity of biomass residue (cotton stalk) combusted in project plant during the year y
Source of data:	Plant records
Description of measurement methods and procedures to be applied:	Biomass received is analysed for moisture content. . Analysis will be carried out in the laboratory at the project site itself. The quantity of biomass shall be measured by weighbridge at the project site.
Frequency of monitoring/recording:	Batch monitoring (every truck of biomass will be monitored)
Value monitored:	116682.42
Monitoring equipment:	Periodically quantity of fuel actually used on a particular day is weighed on the weight bridge and data collated. The same is also cross checked with monthly stock balance. The details of the weighbridge is given below: Serial Number: 2008-043 Model Number: FSD-501 Tolerance Value: 10 Kg
QA/QC procedures to be applied:	Biomass combusted in the boilers shall be cross checked through an energy balance undertaken on quarterly basis for the project activity. This will include the calculation of the both types of biomass residues used in the boilers. The calibration details are: First calibration: 16/09/2009 Second Calibration: 03/10/2010
Calculation method:	It is calculated based on the weight of the loaded truck and the empty truck.
Any comment:	All data will be kept for a minimum of 2 years in soft copies following issuance of certified emission reductions or the end of the crediting period, whichever is later.

Data Unit / Parameter:	**$BF_{k, y, mustard\ stalk}$**
Data unit:	Tonnes of mustard stalk per annum
Description:	Quantity of biomass residue (mustard stalk) combusted in project plant during the year y

Source of data:	Plant records
Description of measurement methods and procedures to be applied:	Biomass received is analysed for moisture content. . Analysis will be carried out in the laboratory at the project site itself. The quantity of biomass shall be measured by weighbridge at the project site.
Frequency of monitoring/recording:	Batch monitoring (every truck of biomass will be monitored)
Value monitored:	38894.15
Monitoring equipment:	Periodically quantity of fuel actually used on a particular day is weighed on the weight bridge and data collated. The same is also cross checked with monthly stock balance. The details of the weighbridge is given below: Serial Number: 2008-043 Model Number: FSD-501 Tolerance Value: 10 Kg
QA/QC procedures to be applied:	Biomass combusted in the boilers shall be cross checked through an energy balance[2] undertaken on quarterly basis for the project activity. This will include the calculation of the both types of biomass residues used in the boilers. The calibration details are: First calibration: 16/09/2009 Second Calibration: 03/10/2010
Calculation method:	-
Any comment:	All data will be kept for a minimum of 2 years in soft copies following issuance of certified emission reductions or the end of the crediting period, whichever is later

Data Unit / Parameter:	**AVD_y**
Data unit:	km
Description:	Average round trip distance (from and to) between biomass fuel supply sites and the project site
Source of data:	Plant records
Description of measurement methods and procedures to be applied:	- Factory records maintained at the factory gate at the time of receipt of biomass residues at factory include the distance from the collection centres and weight carried out.
Frequency of monitoring/recording:	Batch monitoring (every truck carrying biomass will be monitored)
Value monitored:	61.37

[2] The quarterly energy balance calculation are shared with the DOE.

Monitoring equipment:	Plant records for the consignment that enters and the distance of the various centres from where it comes.
QA/QC procedures to be applied:	Record of all distance of various collection centre from project site will be maintained separately to cross check the distance travelled for each consignment.
Calculation method:	Total Round Trips of Cotton Straw and Mustard Straw/ total no of Trips of Cotton Straw and Mustard Straw
Any comment:	All data will be kept for a minimum of 2 years in soft copies following issuance of certified emission reductions or the end of the crediting period, whichever is later.

Data Unit / Parameter:	N_y
Data unit:	-
Description:	Number of truck trips for the transportation of biomass.
Source of data:	Plant records
Description of measurement methods and procedures to be applied:	All consignments shall be entered in the log-book maintained at the main gate by security persons.
Frequency of monitoring/recording:	Batch monitoring (every truck carrying biomass will be monitored)
Value monitored:	25068
Monitoring equipment:	Plant records for the number of consignment that enters
QA/QC procedures to be applied:	These shall be cross checked with the bills produced by suppliers for supply of biomass residues.
Calculation method:	
Any comment:	All data will be kept for a minimum of 2 years in soft copies following issuance of certified emission reductions or the end of the crediting period, whichever is later.

3.3 Description of the Monitoring Plan

As per the requirement of monitoring methodology, following parameters will be monitored:

- Net electricity exported to grid.
- Quantity of each of biomass (cotton stalk and mustard stalk) received in project activity.
- Quantity of each of biomass (cotton stalk and mustard stalk) consumed in project activity.
- Average round trip distance between the point of fuel supply sites and the project site.
- Number of truck trips in a day.

All the above parameters have been monitored using the meters as detailed in the monitoring plan of the registered PDD.

Metering and related issues:

1. The generated electricity is purchased by the state electricity utility of Punjab. The meters are therefore sealed and managed by the state electricity utility.
2. The electricity generation measurements are required by the utility and the investors to assess electricity sales revenue.
3. The power generation of the plant is metered by electronic Trivector main meter. The net electricity exported to the regional grid at a PSEB sub-station shall be monitored through a 2-way Trivector meter. To measure the auxiliary power consumption bi hourly two meters are at the site and this has been monitored periodically to reconcile the total power generation.
4. The electricity exported can be cross checked through check meter. Both electricity meters measuring power export have been calibrated as per outlines provided in the PPA which is annually. The weighbridge at the entrance that measures the quantity of biomass that comes is also calibrated on annual basis.

Calibration details of energy meters and weigh bridge in the current monitoring period:

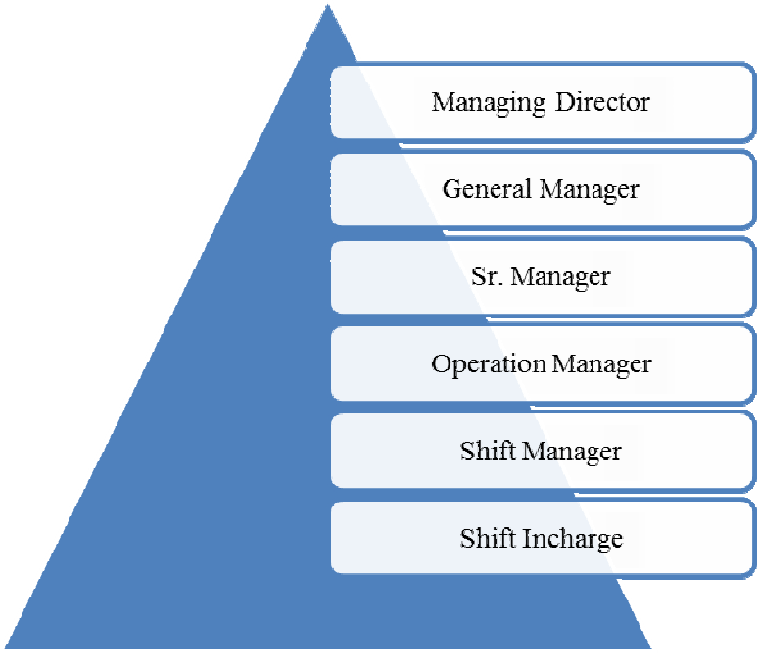
Table 3: Calibration Details

Measuring Parameter	Identification No. of the meter	First calibration	Second calibration
Net electricity exported – main meter	08043957	15/10/2009	08/10/2010
Weighbridge	2008-043/FSD-501	16/09/2009	03/10/2010[3]

5. Record of quantity of biomass residue procured is maintained at the factory gate and later transferred on daily basis to central record maintenance system for the GHG emission reduction activity.
6. Records Receipts maintained at the main gate includes the type of biomass, name of collection Centre, net weight of biomass, date and time of receipt of consignment etc. This forms basis for monitoring the number of truck trips and the average distance travelled to determine the project emissions.
7. There are no probabilities that project activity can lead to unpredicted GHG emissions, however, occurrence of any such possibility of emission will be monitored and corrective action taken. No need is envisaged for emergency preparedness in data monitoring considering unpredicted emissions.

Basic Organizational Structure:

[3] There is 17 days delay in the calibration for weighbridge. However since the biomass consumption reading does not have any impact on emission reduction calculation the biomass consumption value is not adjusted. The Emission Reductions will be calculated based on electricity generated multiplied by grid emission factor.



Roles and responsibilities

Table 4: Roles and responsibilities

Designation	Responsibilities
Managing Director	✓ Verification of the monthly data on the operational details of the project activity
Senior Manager	✓ Responsible for the operations of GHG activity ✓ Maintenance of all records pertaining to CDM activity ✓ To prepare monthly reports
General Manager	✓ Verification of the daily data ✓ Verification of monthly report ✓ ensure that all persons required to monitor the project emissions are trained and competent
Shift Engineer	✓ To verify the readings taken by the shift incharge at the end of the shift ✓ To take action on the error reported
Shift Incharge	✓ To note the hourly reading ✓ Report error in the system, if any

Data Collection and Archiving:

The monthly data of electricity generated is collected in both log sheets and the electronic form. However, the data in electronic form is archived throughout the life time of the project. The electricity records are maintained regularly by the team at the site.

For the project emissions; the biomass received, combusted, number of trucks are monitored and the data is maintained in electronic format and shall be archived throughout the life time of the project activity.

Training: The personnel looking after the project activity are trained to ensure a competency. A training programme by the FICCI was organized on 20/06/2010 at Universal Bio-Mass Energy Private Limited.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Emission reductions due to displacement of electricity

The baseline emissions due to displacement of electricity are determined by the following equation,

$BEy = EGBL, y * EFCO_2$

Where,

BEy is Baseline Emissions in year y; tCO_2

EGBL, y is Energy baseline in year *y*; kWh

$EFCO_2$ *is* CO_2 Emission Factor in year y; tCO_2e/kWh

Determination of CO_2 emission factor ($EFCO_2$)

The emission factor for the displacement of electricity corresponds to grid emission factor ($EFCO_2$ = EFgrid). The grid emission factor (EFgrid) has been fixed ex-ante and has been determined as per the guidance provided in "Tool to calculate the emission factor for an electricity system Version 1.1" (as per CEA CO2 Baseline database for Indian Power sector, Version 5). The grid emission factor has been taken from the Central Electricity Authority, India "CO2 baseline database, Version 5, November 2009. (Source: http://www.cea.nic.in). As per the CEA report the Northern Regional Grid was synchronised with the integrated Eastern, North Eastern and Western Grid in August, 2006 and the four regional grids have since been operating in synchronous mode. Hence the grid emission for northern grid is now determined from the synchronous grid emission factor of Northern, Eastern, Western and North Eastern Grids (NEWNE). The value is determined as follows:

Simple Operating Margin (tCO_2/MWh)			
Grid	2006-07	2007-08	2008-09
NEWNE	1.01	1.00	1.01
Southern	1.00	0.99	0.97
India	1.01	1.00	1.01

Build Margin (tCO_2/MWh)			
Grid	2006-07	2007-08	2008-09
NEWNE	0.63	0.60	**0.68**
Southern	0.70	0.71	0.82
India	0.65	0.63	0.71

Combined Margin = Average Simple OM x 0.50 + BM x 0.50 = 1.01 x 0.50 + 0.68 x 0.50 = 0.84

(Source: CEA, CO2 baseline database, version 5, November 2009)

Determination of net electricity generation (EGy)

As per the AMS-I.D. Version 15, *EGBL*, *y* corresponds to Energy baseline in year *y*; kWh. Under the project activity this will be the net quantity of electricity exported to grid.

$$EG_{BL,y} = EG_{export,y}$$

4.2 Project Emissions

For most renewables the project emissions is considered to be zero as per applicable methodology. But PP has demonstrated with a conservative approach to demonstrate the possibility of emissions that may take place because of transportation of raw material. Although estimation of project emission indicates that all raw materials will be received by trucks, but it is highly probable that use of trolleys and bullock cart may be used for such low distance transmissions and these will be mentioned separately and excluded from possible project emissions. The possible project emissions account only due to transportation of biomass residue to project site. The following equation is used to calculate the total project emissions of the project activity during the year *y:*

$$PETy = Ny * AVDy * EF_{km,CO2}$$

Where,

PETy is CO2 emissions during the year *y* due to transport of the biomass residues to the project plant (tCO2/yr)

Ny is Number of Truck trips per during year y

AVDy is Average round trip distance (from and to) between the biomass residue fuel supply sites and the site of the project plant during the year *y* (km)

$EF_{km, CO2}$ is Average CO2 emission factor for the trucks measured during the year *y* (tCO2/km)

4.3 Leakage

As per the applicable approved methodology AMS-I.D. (Version 15), leakage is to be considered if the energy generating equipment is transferred from another activity. The project activity is a green field biomass based power generation facility and the energy generating equipment used in the project activity has not been transferred from any other activity.

As per the attachment C to Appendix B it has been specified that for the small scale project activity, the leakage emission sources can be identified as follows:

1. As the project activity utilizes only cotton stalk and mustard stalk (biomass residue), the implementation of project activity did not lead to shifting of pre-project activities.
2. The biomass being used in the project activity is a waste generated from the cotton and mustard crop. This waste would have anyways been generated even in the absence of the project activity and would have burnt in the field in uncontrolled manner. The plant uses the waste generated and does not need application of fertilizer and clearance of land. Hence there are no emissions due to the same.
3. The only possible source of leakage in the project activity can be competing uses of biomass - The biomass residue may in the absence of the project activity be used elsewhere, for the same or a different purpose. To establish the same, UBEPL hired an independent agency to carry out a biomass residue assessment study in the surrounding area (surrounding area refers to the area within 50 km radius of the project activity). The results of the study pertaining to the surplus availability of cotton stalk and mustard stalk are available in the subject study report.

The biomass assessment study demonstrates that the quantity of available biomass in the region is larger than 25% after considering the biomass residue utilization in the area; hence this source of leakage is neglected.

4.4 Summary of GHG Emission Reductions and Removals

Table 5: Electricity Exported to the grid

Month	Monitoring Period		Export, Initial Reading, MWh	Export, Final Reading, MWh	Export, MWh	Import, Initial Reading, MWh	Import, Final Reading, MWh	Import, Mwh	Net Electricity exported, MWh
	Initial date	Final date							
Oct-09	30/10/09	31/10/09	0	24	24	0	347	347	-323
Nov-09	01/11/09	30/11/09	24	5518	5494	347	441	94	5400
Dec-09	1/12/09	31/12/09	5518	13936	8418	441	466	25	8393
Jan-10	31/12/09	01/02/10	13936	22991	9055	466	488	22	9033
Feb-10	01/02/10	02/03/10	22991	31448	8457	488	506	18	8439
Mar-10	02/03/10	31/03/10	31448	40276	8828	506	520	14	8814
Apr-10	31/03/10	30/04/10	40276	47096	6820	520	571	51	6769
May-10	30/04/10	31/05/10	47096	55986	8890	571	591	20	8870
Jun-10	31/05/10	30/06/10	55986	64138	8152	591	634	43	8109
Jul-10	30/06/10	31/07/10	64138	71047	6909	634	690	56	6853
Aug-10	31/07/10	31/08/10	71047	78135	7088	690	730	40	7048
Sep-10	31/08/10	30/09/10	78135	82559	4424	730	813	83	4341
Oct-10	30/09/10	01/11/10	82559	90332	7773	813	871	58	7715
Nov-10	01/11/10	30/11/10	90332	98854	8522	871	894	23	8499
Dec-10	30/11/10	31/12/10	98854	106003	7149	894	931	37	7112
Jan-11	31/12/10	31/01/11	106003	111851	5848	931	981	50	5798
Feb-11	31/01/11	28/02/11	111851	115267	3416	981	1025	44	3372
				Total	**115267**			**1025**	**114242**

Table 6: Baseline emission calculation

Parameter	2009	2010	2011	Value	Unit
$EG_{export, y}$	13470	91602	9170	114242	MWh
$EFCO_2$	0.84	0.84	0.84	0.84	tCO_2/MWh
Baseline Emission	11314.8	76945.68	7702.8	95963.28	tCO_2e

Table 7: Project emission calculation

Symbol	2009	2010	2011	Unit
Ny	4218	18930	1920	Number
AVDy	61.37580543	61.37580543	61.37580543	Km
$EF_{km,CO2}$	0.00044	0.00044	0.00044	tCO_2/km
PETy	113.91	511.21	51.85	tCO_2

Table 8: Emission reduction calculation

Parameter	2009	2010	2011	Unit
Baseline Emission	11314.8	76945.68	7702.8	tCO_2e
Project Emission	113.91	511.21	51.85	tCO_2e
Leakage Emission	0	0	0	tCO_2e
Emission Reduction	11200.89	76434.47	7650.95	tCO_2e
Emission reduction (round down)	11200	76434	7650	tCO_2e

5 ADDITIONAL INFORMATION

Comparison of emission reduction with ex-ante estimation:

Year	2009	2010	2011	Total
Actual Emission reduction achieved (t CO2)	11200	76434	7650	95284
ER as per PDD (pro-rata emission reduction) (t CO2)	12926	74891	12106	99923
Difference	-13%	2%	-37%	-5%

The actual emission reduction is achieved in the monitoring period is 5% less than the estimated value in the PDD. So the financial additionality of the project is still valid. Hence no justification is required.