



Monitoring report form (Version 03.2)

Monitoring report

Title of the project activity	KM RE project
Reference number of the project activity	0915
Version number of the monitoring report	1.0
Completion date of the monitoring report	07/06/2014
Registration date of the project activity	28/04/2007
Monitoring period number and duration of this monitoring period	6, (28/04/2012 to 27/04/2013) first & last days included
Project participant(s)	1. K M Sugar Mills Ltd (India) 2. Agrinergy Ltd (United Kingdom of Great Britain and Northern Ireland)
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	1: Energy industries (renewable -/ non-renewable sources) Approved consolidated baseline and monitoring methodology ACM0006, Version 04 “Consolidated methodology for grid-connected electricity generation from biomass residues”
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	59,502 tonnes of CO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	61,182 tonnes of CO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	14,523 tonnes of CO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	46,659 tonnes of CO ₂ e

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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1. The purpose of the project activity is to generate electricity using bagasse and thereby reducing GHG emissions by displacing the fossil fuel dominated grid based electricity with biomass based renewable electricity.
2. The project activity is the installation of a new biomass residue fired cogeneration unit, which is operated next to existing biomass residue fired power generation unit and includes the installation of two high pressure/temperature boilers of capacity of 100 tph and 50 tph and two turbine generators of capacity 15 MW and 10 MW.
3. The project activity was commissioned in two phases.

10 MW turbine	26/12/2006
15 MW turbine	05/05/2007

4. The project activity was synchronized with grid on 18/03/2007

A.2. Location of project activity

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The project activity is located in village Masaudha, Tehsil Sohawal on the Faizabad to Sultanpur highway in Uttar Pradesh, India. The GPS coordinates are 26°47' (26.7833) N and 82°8' (82.1333) E.

A.3. Parties and project participant(s)

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Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	K M Sugar Mills Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Agrinergy Ltd.	No
Switzerland	Agrinergy Ltd.	No

A.4. Reference of applied methodology

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Approved consolidated baseline and monitoring methodology ACM0006, Version 04
“Consolidated methodology for grid-connected electricity generation from biomass residues” is applied to the project activity.
<http://cdm.unfccc.int/methodologies/DB/U3THXNPFFSPP2WO1MFB20DXU1444S5/view.html>

A.5. Crediting period of project activity

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Crediting Period: 28/04/2007 – 27/04/2017 (fixed)
 Length: 10 years, 0 months
 Start date: 28/04/2007

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

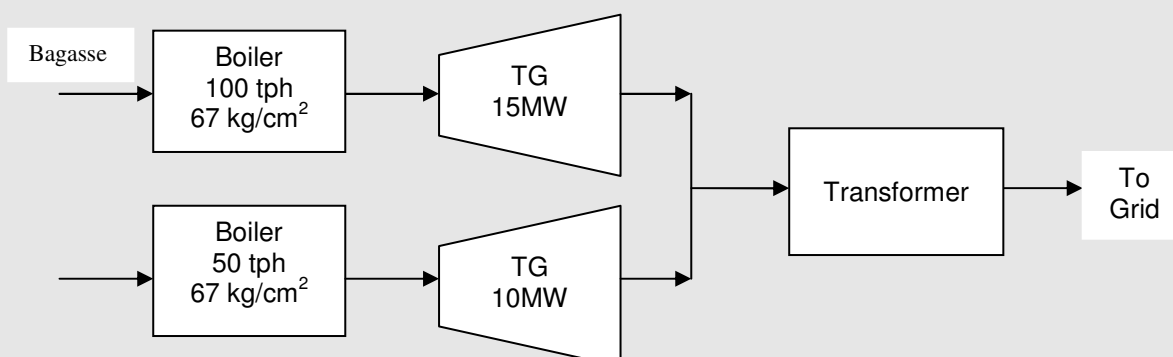
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The project activity involves the installation of two high pressure/temperature boilers manufactured by Walchandnagar, India. The boilers have a capacity of 100 tonnes per hour and 50 tonnes per hour, the outlet pressure and temperature of the boilers are 67 kg/cm² and 515°C respectively. Two turbine generators manufactured by Triveni are installed, one backpressure type turbine of 10MW and one condensing cum extraction type of 15MW. The electricity is generated at 11kV and stepped up at the plant to 132kV to parallel with the grid. The electricity is supplied to the grid via the 132kV Darshannagar sub-station, which is located 15km from the plant.

The list of equipments is as follows:

Sr. No	Boiler Details	Make
1.	Steam Generation – 100tph Working Pressure – 67 kg/cm ² Steam Temperature – 515°C	Walchandnagar, India
2.	Steam Generation – 50tph Working Pressure – 67 kg/cm ² Steam Temperature – 515°C	Walchandnagar, India

Sr. No	Turbine Details	Make
1.	Type: Backpressure Power Generation – 10 MW Inlet Steam Pressure – 65 kg/cm ² Inlet Steam Flow – 62 tph Extraction Pressure – 1.5 kg/cm ² Extraction steam Flow – 60 tph Turbine Speed – 8303 rpm	Triveni Engineering & Industries Limited
2.	Type: Condensing cum extraction Power Generation – 15 MW Inlet Steam Pressure – 65 kg/cm ² Inlet Steam Flow – 94 tph Extraction Pressure – 1.5 kg/cm ² Extraction steam Flow – 65 tph Condenser steam flow – 54 tph Turbine Speed – 6850 rpm	Triveni Engineering & Industries Limited



B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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There are no any deviations from the registered monitoring plan or applied methodology.

B.2.2. Corrections

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There are no corrections.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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There are no permanent changes from registered monitoring plan or applied methodology.

B.2.4. Changes to project design of registered project activity

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There are no changes to project design of registered project activity.

B.2.5. Changes to start date of crediting period

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There is no change to the start date of crediting period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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Not Applicable

SECTION C. Description of monitoring system

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The project activity is implemented as mentioned in the registered PDD. No new technology measure or retrofits have been added during this verification period.

The major downtime details are given below,

TG-breakdown/ shutdown details (hrs)	28-Apr 11b to 30 Apr. 11	May 11	Nov 12	Dec 12	Jan 13	Feb 13	Mar 13	Apr 13
10 MW	72	744	22.21	8.47	10:54	0.47	27.30	7.17
Reason	Fuel Problem	Fuel Problem	No cane	Grid failure	No cane, Grid and C.T Failure	Grid failure	No Cane + grid failure	No cane
15 MW	16	709	0.56	13.59	13.27	17.13	8.29	4.24
Reason	Fuel Problem	Fuel Problem	grid failure	grid failure	grid failure and no cane	Grid failure, OLTC work & no cane	Grid failure	Grid failure

The monitoring of electricity data revolves around the power generation from the turbine generators and the auxiliary consumption of the power plant. All auxiliary units at the power plant are metered and there are main meters attached to each turbine generator to determine their total generation.

The monitoring frequency of the data is on a continuous basis through a Distributed Control System (DCS system) (for the new power plant) but records are maintained on an hourly basis for all turbine generators by the turbine operators. These records then collated at the end of every shift (8 hours) by the engineer in charge and then again at the end of every day again by the engineer in charge and signed off by the power plant manager. Furthermore as a back-up to the meter readings the “governor” on turbine generator is the source of monitoring if there is a failure with the main meters.

For determining the NCV of bagasse combusted in the boiler, the plant monitors the sucrose and moisture content of bagasse on a daily basis. The measurement of the NCV was undertaken on a daily basis through the application of the method in E. Hugot, Handbook of cane sugar engineering, 3rd edition, page 922, and equation 41.20 which is also in line with the PDD (page 13 foot note):

$$NCV = 4250 - 12s - 48.5w$$

Where,

s: sucrose % in bagasse; and

w: moisture % in bagasse

The monitoring plan has followed the registered PDD which had correctly applied the methodology for the emission reduction calculation.

The logbooks held to record the data and this are also stored electronically for a minimum of two years after the end of the crediting period.

The monthly monitored data is sent to Agrinergy which then prepares a CER generation report. This CER generation report forms the basis of the on-going CDM monitoring and reporting of the project activity.

Emergency procedures

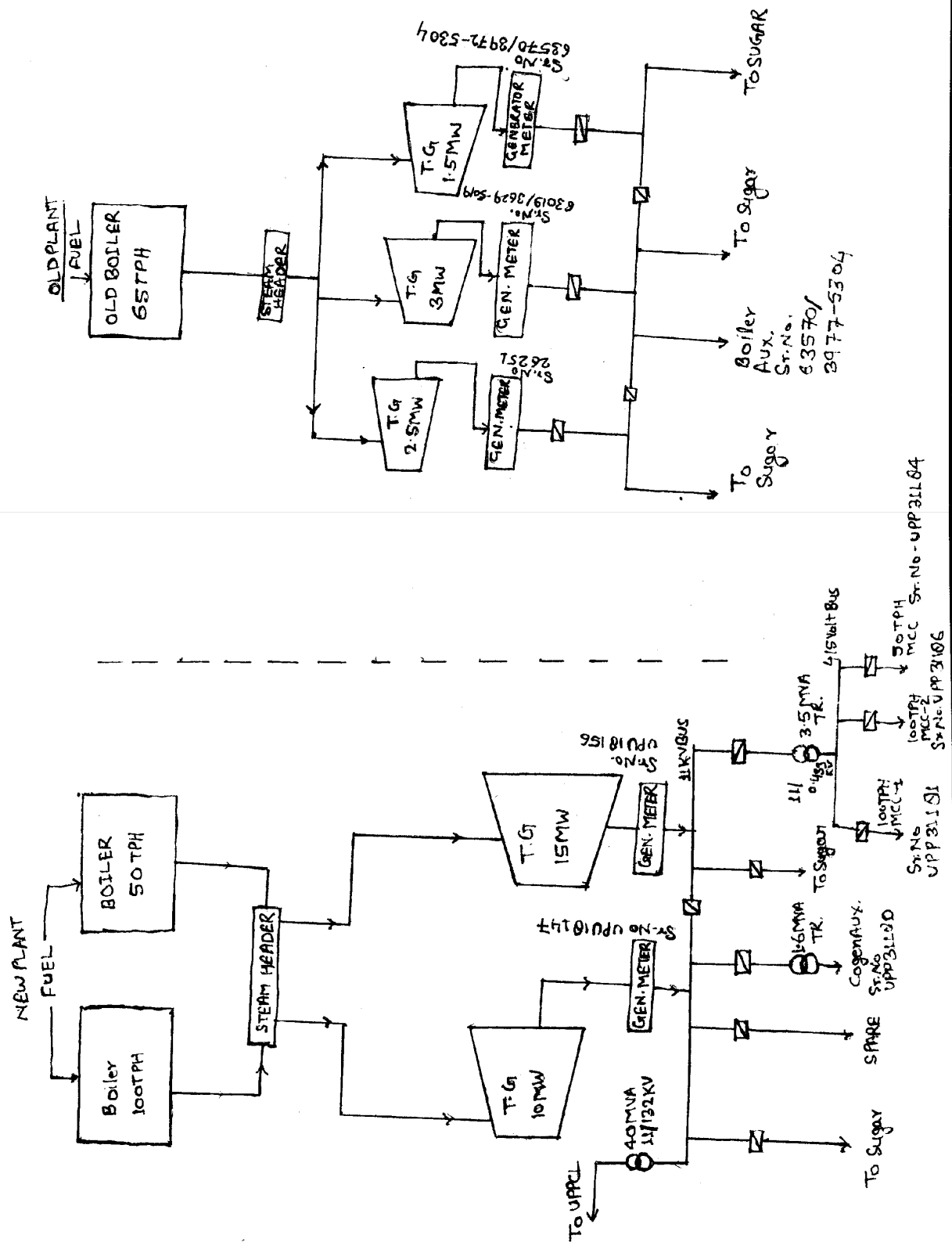
The plant maintains the data in both hard and soft copy formats. Agrinergy also receives the monthly data from the plant and if any discrepancies are observed, questions are raised and corrections made accordingly. In general, the plant operates in line with the ISO 9001 procedures.

However, no emergencies occurred during the period under verification which could have given rise to emissions.

QA/QC procedures

All monitored data will be kept for a minimum of two years after the end of the crediting period.

The single line diagram showing all relevant electricity monitoring points is given below.



SINGLE LINE DIAGRAM – ELECTRICAL MONITORING POINTS

SECTION D. Data and parameters**D.1. Data and parameters fixed ex ante or at renewal of crediting period**

Data/Parameter	EG_{historic,3yr}
Unit	MWh
Description	Historic 3 year average net generation of existing power plant
Source of data	Plant records
Value(s) applied	9,560
Purpose of data	Baseline emission calculations
Additional comment	The time series data is provided in Annex 3 of the PDD

D.2. Data and parameters monitored

Data / Parameter:	EF_y
Unit:	tCO ₂ /MWh
Description:	Emission factor
Measured /Calculated /Default:	Calculated
Source of data:	Calculated from the weighted average of the Simple Operating Margin and Build Margin Central electricity Authority (CEA) database version 9.0 (emission data for April 2011 to March 2012)
Value(s) of monitored parameter:	0.9518
Monitoring equipment	Not Applicable
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	$EF_y = (\text{Simple Operating Margin} + \text{Build Margin})/2$
QA/QC procedures:	Not Applicable
Purpose of data	Baseline Emission calculations
Additional Comment	-

Data / Parameter:	EF_{OM,y}
Unit:	tCO ₂ /MWh
Description:	Simple Operating Margin
Measured /Calculated /Default:	Calculated
Source of data:	Central Electricity Authority: CO ₂ Baseline Database, version 9.0, (emission data for April 2011 to March 2012)
Value(s) of monitored parameter:	0.9691
Monitoring equipment	Not Applicable
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	-

QA/QC procedures:	-
Purpose of data	Baseline Emission calculations
Additional Comment	-

Data / Parameter:	$EF_{BM,y}$
Unit:	tCO ₂ /MWh
Description:	Simple Build Margin
Measured /Calculated /Default:	Calculated
Source of data:	Central Electricity Authority: CO ₂ Baseline Database, version 9.0, (emission data for April 2011 to March 2012)
Value(s) of monitored parameter:	0.9345
Monitoring equipment	Not Applicable
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures:	-
Purpose of data	Baseline Emission calculations
Additional Comment	-

Data / Parameter:	$F_{i,y}$
Unit:	Mass or volume
Description:	Amount of each fossil fuel consumed by each power source/plant
Measured /Calculated /Default:	Measured by independent plants and reported to Central Electricity Authority
Source of data:	Central Electricity Authority, most recent General Review or other publication that contains fossil fuel consumption by power plants.
Value(s) of monitored parameter:	The values are not provided since they are being monitored by Central Electricity Authority (CEA), a Government of India authority on an annual basis, but the monitored values are not available in the public domain. However, the CEA provides the values of OM and BM which are required to calculate the grid emission factor.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data	Baseline emissions calculations
Additional Comment	-

Data / Parameter:	COEF_i
Unit:	tCO ₂ /mass or volume unit
Description:	Emission factor
Measured /Calculated /Default:	Measured by relevant Indian ministries or agency on their behalf.
Source of data:	India's Initial National Communication to the UNFCCC, http://natcomindia.org/pdfs/chapter2.pdf for the NCV and EF and IPCC data for OXID
Value(s) of monitored parameter:	The values are not provided since they are being monitored by Central Electricity Authority (CEA), a Government of India authority on an annual basis, but the monitored values are not available in the public domain. However, the CEA provides the values of OM and BM which are required to calculate the grid emission factor.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data	Baseline emissions calculations
Additional Comment	-

Data / Parameter:	EG _{project plant, y}				
Unit	MWh				
Description:	Electrical energy generated by the project activity				
Measured /Calculated /Default:	Calculated				
Source of data:	Plant records				
Value(s) of monitored parameter:	49274.89				
Monitoring equipment	Type: Energy meter, Calibration frequency: Annually Calibrating Agency: Solution Point				
	Location	Serial No	Accuracy class	Calibration date	Valid till
	10 MW Generator I/C	UPU 18147	0.2s	28/11/2011 02/11/2012	27/11/2012 01/11/2013
	15 MW Generator I/C	UPU 18156	0.2s	27/11/2011 02/11/2012	26/11/2012 01/11/2013
	100 TPH MCC-1 Feeder	UPP 31181	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013
	100 TPH MCC-2 Feeder	UPP 31186	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013
	50 TPH MCC Feeder	UPP 31184	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013
TURBINE AUX FEEDER	UPP 31180	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013	

Measuring/ Reading/ Recording frequency:	Hourly																
Calculation method (if applicable):	Net electricity generation = Gross electricity generation – Auxiliary consumption																
QA/QC procedures	<p>This parameter is checked with the quantity of biomass fired in the project activity, i.e. show that the electricity generation divided by the quantity of biomass fired results in a reasonable efficiency as compared with the previous year.</p> <table><tr><td>EG_{project plant} generation efficiency current year</td><td>18.5%</td></tr><tr><td>EG_{project plant} generation efficiency previous year</td><td>14.8%</td></tr></table> <p>The biomass fired in the project activity boilers is measured through belt weigher (also known as belt scale and load cell forms the integral part of the belt weigher). The details of belt scale are as follows,</p> <table><tr><th>Measuring instrument</th><th>Serial No</th><th>Calibration date</th><th>Valid till</th></tr><tr><td>Belt weigher</td><td>BCW55LO654/09</td><td>12/08/2011</td><td>11/08/2012</td></tr><tr><td>Load cell</td><td>297208, 297308, 299408, 299508</td><td>08/08/2012</td><td>07/08/2013</td></tr></table> <p>Calibrating agency: IPA Private Limited</p>	EG _{project plant} generation efficiency current year	18.5%	EG _{project plant} generation efficiency previous year	14.8%	Measuring instrument	Serial No	Calibration date	Valid till	Belt weigher	BCW55LO654/09	12/08/2011	11/08/2012	Load cell	297208, 297308, 299408, 299508	08/08/2012	07/08/2013
EG _{project plant} generation efficiency current year	18.5%																
EG _{project plant} generation efficiency previous year	14.8%																
Measuring instrument	Serial No	Calibration date	Valid till														
Belt weigher	BCW55LO654/09	12/08/2011	11/08/2012														
Load cell	297208, 297308, 299408, 299508	08/08/2012	07/08/2013														
Purpose of data	Baseline emission calculations																
Additional Comment	-																

Data / Parameter:	EG _{total,y}				
Unit	MWh				
Description:	Net quantity of electricity generated in all power units at the project site, generated from firing the same type(s) of biomass as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year y				
Measured /Calculated /Default:	Calculated				
Source of data:	Plant records				
Value(s) of monitored parameter:	54685.14				
Monitoring 3equipment	Type: Energy meter, Calibration frequency: Annually Calibrating Agency: Solution Point				
	Location	Serial No	Accuracy class	Calibration date	Valid till
	3 MW power house	63019/3629-5019	1.0	03/10/2011 02/10/2012	02/10/2012 01/10/2013
	2.5 MW power house	26251	2.0	03/10/2011 02/10/2012	02/10/2012 01/10/2013
	1.5 MW power house	63570/3972-5304	0.5	03/10/2011 02/10/2012	02/10/2012 01/10/2013
	65 TPH boiler feeder	63570/3977-5304	0.5	03/10/2011 02/10/2012	02/10/2012 01/10/2013
	Location	Serial No	Accuracy class	Calibration date	Valid till
	10 MW Generator I/C	UPU 18147	0.2s	28/11/2011 02/11/2012	27/11/2012 01/11/2013
15 MW Generator I/C	UPU 18156	0.2s	27/11/2011 02/11/2012	26/11/2012 01/11/2013	

	100 TPH MCC-1 Feeder	UPP 31181	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013								
	100 TPH MCC-2 Feeder	UPP 31186	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013								
	50 TPH MCC Feeder	UPP 31184	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013								
	TURBINE AUX FEEDER	UPP 31180	0.5s	27/11/2011 04/11/2012	26/11/2012 03/11/2013								
Measuring/ Reading/ Recording frequency:	Hourly												
Calculation method (if applicable):	Net electricity generation = Gross electricity generation – Auxiliary consumption												
QA/QC procedures	This parameter is checked with the quantity of total biomass fired, i.e. show that the electricity generation divided by the quantity of biomass fired results in a reasonable efficiency as compared with the previous year.												
	EG _{project plant} generation efficiency current year				18.5%								
	EG _{project plant} generation efficiency previous year				14.8%								
	The biomass fired in the project activity boilers is measured through belt weigher (also known as belt scale and load cell forms the integral part of the belt weigher). The details of belt scale are as follows,												
	<table><tr><td>Measuring instrument</td><td>Serial No</td><td>Calibration date</td><td>Valid till</td></tr><tr><td>Belt weigher</td><td>BCW55LO654/09</td><td rowspan="2">12/08/2011 08/08/2012</td><td rowspan="2">11/08/2012 07/08/2013</td></tr><tr><td>Load cell</td><td>297208, 297308, 299408, 299508</td></tr></table>				Measuring instrument	Serial No	Calibration date	Valid till	Belt weigher	BCW55LO654/09	12/08/2011 08/08/2012	11/08/2012 07/08/2013	Load cell
Measuring instrument	Serial No	Calibration date	Valid till										
Belt weigher	BCW55LO654/09	12/08/2011 08/08/2012	11/08/2012 07/08/2013										
Load cell	297208, 297308, 299408, 299508												
	Calibrating agency: IPA Private Limited												
Purpose of data	Baseline emission calculation												
Additional Comment	-												

Data / Parameter:	BF _{k, y}					
Unit	tonnes					
Description:	Quantity of outside biomass used at the project activity site					
Measured /Calculated /Default:	Measured					
Source of data:	Plant records					
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.					
Monitoring equipment	Type: Weigh bridge, Calibration frequency: Annually Calibrating agency: Govt. Department of Weight & Measurement					
	Weigh Bridge Capacity,	Sl. No / Make	Location of weigh bridge	Accuracy Class	Calibration date	Valid till
	WB-1, 60T	LW/410, Make: TULSI	Mill Gate	±10Kg	07/11/2010 19/11/2011 18/11/2012	07/11/2011 19/11/2012 18/11/2013
	WB-2, 60T	LW/413, Make: TULSI	Mill Gate	±10Kg	07/11/2010 19/11/2011 18/11/2012	07/11/2011 19/11/2012 18/11/2013
	WB-3, 50T	C239, Make: Vishwakarma Scales Corp	Mill Gate	±10Kg	08/11/2010 22/11/2011 18/11/2012	08/11/2011 22/11/2012 18/11/2013
	WB-4, 30T	AW212 Make: Vishwakarma	Mill Gate	±10Kg	08/11/2010 19/11/2011 18/11/2012	08/11/2011 18/22/2012 18/11/2013

		Scales Corp				
	WB-5, 25T	745, Type: 336A, Make: India Machinery Co Ltd	Mill Gate,	±05Kg	07/11/2010 19/11/2011 18/11/2012	07/11/2011 19/11/2012 18/11/2013
	WB-6, 10T	CW/1118, Make: TULSI	Mill Gate	±05Kg	07/11/2010 19/11/2011 18/11/2012	07/11/2011 19/11/2012 18/11/2013
	WB-7, 10T	CW/1097, Make: TULSI	Mill Gate	±05Kg	07/11/2010 19/11/2011 18/11/2012	07/11/2011 19/11/2012 18/11/2013
Measuring/ Reading/ Recording frequency:	Daily					
Calculation method (if applicable):	-					
QA/QC procedures	-					
Purpose of data	Leakage emission calculations					
Additional Comment	-					

Data / Parameter:	Moisture content of biomass residues					
Unit	% water content					
Description:	Moisture content of each biomass residue k					
Measured /Calculated /Default:	Measured					
Source of data:	On-site measurements					
Value(s) of monitored parameter:	Bagasse:50.15 Outside biomass: No outside biomass used at the project activity site for the monitoring period.					
Monitoring equipment	Type: Electronic balance, Calibration frequency: once in six months					
	Sr. No	Location	Accuracy	Calibration date	Valid till	
	KMS/LAB/01,7 77	Production Lab	±0.1 gm	01/03/2011	31/08/2011	
				31/08/2011	29/02/2012	
				29/02/2012	28/08/2012	
28/08/2012				27/02/2013		
Measuring/ Reading/ Recording frequency:	Daily					
Calculation method (if applicable):	-					
QA/QC procedures	The measurement is carried out as per the standard procedures					
Purpose of data	Leakage emission calculations					
Additional Comment	-					

Data / Parameter:	N _y					
Unit	-					
Description:	Number of truck trips of biomass procured during the period y					
Measured /Calculated /Default:	Measured					
Source of data:	Transporter receipts					
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.					

Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Project Emission calculations
Additional Comment	-

Data / Parameter:	AVD_y
Unit	km
Description:	Average return trip distance
Measured /Calculated /Default:	Measured
Source of data:	Transporter
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Project Emission calculations
Additional Comment	-

Data / Parameter:	TL_y
Unit	t/truck
Description:	Average truck load
Measured /Calculated /Default:	Measured
Source of data:	Transporter
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Project emission calculations
Additional Comment	-

Data / Parameter:	EF_{km,CO2,y}
Unit	tCO ₂ /km
Description:	Emissions factor for transport of biomass
Measured /Calculated /Default:	Measured

Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Project emission calculations
Additional Comment	-

Data / Parameter:	EF_{CO₂,LE}
Unit	tCO ₂ /GJ
Description:	CO ₂ emission coefficient for most carbon intensive fuel used in the country
Measured /Calculated /Default:	Measured
Source of data:	CEA, National Communication and/or IPCC
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Project emission calculations
Additional Comment	-

Data / Parameter:	NCV_k
Unit	GJ/t of dry matter
Description:	Net calorific value of rice husk for leakage estimation
Measured /Calculated /Default:	Measured
Source of data:	Measurements will be carried out by reputed laboratories
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period.
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Six months
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Project emission calculations
Additional Comment	-

Data / Parameter:	-
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Unit	-
Description:	Demonstration that the biomass residue type k from a specific source would continue not to be collected or utilised e.g. by an assessment whether a market has emerged for that type of biomass residue or by showing that it would still not be feasible to utilise the biomass residues for any purposes.
Measured /Calculated /Default:	Measured
Source of data:	Information by the site where the biomass is generated
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period and therefore no need of survey
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Leakage emission calculation (approach L1 of leakage test)
Additional Comment	-

Data / Parameter:	-
Unit	Tonnes
Description:	Quantity of biomass residues of type k that are utilised in the defined geographical region
Measured /Calculated /Default:	Measured
Source of data:	Survey of statistics
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period and therefore no need of survey
Monitoring equipment	-
Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	
Purpose of data	Leakage emission calculation (approach L2 of leakage test)
Additional Comment	-

Data / Parameter:	-
Unit	-
Description:	Availability of surplus biomass residues type k at the ultimate supplier to the project and a representative sample of other suppliers in the defined geographical region
Measured /Calculated /Default:	Measured
Source of data:	Surveys
Value(s) of monitored parameter:	No outside biomass used at the project activity site for the monitoring period and therefore no need of survey
Monitoring equipment	-

Measuring/ Reading/ Recording frequency:	Annual
Calculation method (if applicable):	Not Applicable
QA/QC procedures	-
Purpose of data	Leakage emission calculation (approach L3 of leakage test)
Additional Comment	-

D.3. Implementation of sampling plan

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Not Applicable

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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The formulae used to calculate the baseline emissions are:

$$ER_{electricity,y} = EG_y \cdot EF_y$$

Where:

$ER_{electricity,y}$	Emission reductions relating to the electricity generation from the project activity tCO ₂
EG_y	Net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh
EF_y	Grid based emission factor, tCO ₂ /MWh

$$EG_y = MIN \left[(EG_{projectplant,y}) \text{ and } \left(EG_{total,y} - \frac{EG_{historic,3yr}}{3} \right) \right]$$

Where:

EG_y	Net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year y (MWh/yr)
$EG_{projectplant,y}$	Net quantity of electricity generated in the project plant during the year y (MWh/yr)
$EG_{total,y}$	Net quantity of electricity generated in all power units at the project site, generated from firing the same type(s) of biomass as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year y (MWh/yr)
$EG_{historic,3yr}$	Net quantity of electricity generated during the most recent three years in all power plants at the project site, generated from firing the same type(s) of biomass as used in the project plant MWh

For 28 Apr 12 – 31 Dec 12

$$EG_{projectplant,y} = 20067.94 \text{ MWh}$$

$$EG_{total,y} = 21631.96 \text{ MWh}$$

$$EG_{historic,3yr}/3 = 9,560 \text{ MWh}$$

$$EG_y = MIN [(20067.94 \text{ and } (21631.96 - (8/12) \cdot 9560))] \\ = 15258.63 \text{ MWh}$$

$$EF_y = 0.9518 \text{ tCO}_2/\text{MWh}$$

$$ER_{electricity,y} = 15258.63 \cdot 0.9518$$

$$= 14523 \text{ tCO}_2 \text{ (28 Apr 12 – 31 Dec 12) round down to nearest integer}$$

For 01 Jan 13 – 27 Apr 13

$EG_{\text{projectplant}, y} = 49022.74 \text{ MWh}$

$EG_{\text{total}, y} = 53934.84 \text{ MWh}$

$EG_{\text{historic}, 3\text{yr}/3} = 9,560 \text{ MWh}$

$EG_y = \text{MIN} [(49022.74 \text{ and } (53934.84 - (4/12) \cdot 9560)]$
 $= 49022.74 \text{ MWh}$

$EF_y = 0.9518 \text{ tCO}_2/\text{MWh}$

$ER_{\text{electricity}, y} = 49022.74 \cdot 0.9518$

$= 46659 \text{ tCO}_2 \text{ (28 Apr 12 – 31 Dec 12) round down to nearest integer}$

E.2. Calculation of project emissions or actual net GHG removals by sinks

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The formula to calculate the Project emissions is

$$PET_y = N_y \cdot AVD_y \cdot EF_{kmCO_2}$$

Where,

PET_y	CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr)
N_y	Number of truck trips during the period y
AVD_y	Average round trip distance (from and to) between the biomass residue fuel supply sites and the site of project plant during the year y (km)
EF_{km, CO_2}	Average CO_2 emission factor for the trucks measured during the year y (tCO_2/km)

$PET_y = 0 \text{ tCO}_2\text{e}$

There is no transportation of external purchased biomass in the monitoring period under consideration and hence the project emissions are zero.

E.3. Calculation of leakage

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The formula to calculate the Leakage is

$$L_y = EF_{CO_2, LE} \cdot \sum_k BF_{PJ, k, y} \cdot NCV_k$$

Where,

L_y	Leakage emissions during the year y in tons of CO_2
$EF_{CO_2, LE}$	CO_2 emission factor of the most carbon intensive fuel used in the country (tCO_2/GJ),
k	Types of biomass residues for which leakage effects could not be ruled out with one of the approaches L_1 , L_2 or L_3
$BF_{PJ, k, y}$	Incremental quantity of biomass residue of type k used as a result of the project activity in the project plant during the year y (tons of dry matter or liter)
NCV_k	Net calorific value of the biomass type k (GJ/ton of dry matter or GJ/liter).

$L_y = 0 \text{ tCO}_2\text{e}$

There is no external purchase of biomass in the monitoring period under consideration and hence there is no leakage during this monitoring period.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	61182	0	0	61182

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO₂e)	59502	61182

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

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There is increase in the emission reductions during the current monitoring period relative to the estimation in the registered CDM-PDD. The emission reductions achieved during the monitoring period are 2.82% higher than the estimated in the registered PDD for following reasons,

1. The grid emission factor used for the purpose of calculations in the PDD was 0.75 tCO₂/MWh whereas for the current monitoring the applicable is 0.9518 tCO₂/MWh (grid emission factor is determined ex-post as per the registered monitoring plan and the methodology)
2. There were no project emissions due to the project activity during the monitoring period as compared to the PDD estimate of 5904 tCO₂ annually.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO₂e)	14,523	46,659

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: issuance Keywords: monitoring report, performance monitoring		