



Monitoring report form
(Version 05.1)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT

Title of the project activity	Shandong Gaotang 30MW Biomass Power Generation Project	
UNFCCC reference number of the project activity	1375	
Version number of the monitoring report	01	
Completion date of the monitoring report	10/11/2015	
Monitoring period number and duration of this monitoring period	3 rd Monitoring Period: 26/12/2012-19/03/2015 (first and last day included)	
Project participant(s)	National Bio Energy Co., Ltd. (as the project owner) EDF Trading Limited (as the CER buyer)	
Host Party	P.R. China	
Sectoral scope(s)	Sectoral scope(s): 1 : Energy industries (renewable-/non-renewable sources)	
Selected methodology(ies)	ACM0006 "Consolidated methodology for grid-connected electricity generation from biomass residues" (Version 04).	
Selected standardized baseline(s)	Not applicable	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	313,769tCO ₂ e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	2,313tCO ₂ e	311,456 ¹ tCO ₂ e

¹ According to the requirement by EB 66th meeting, the annual amount of ERs to be issued to this Project shall be capped at the average annual emissions reductions estimated in the original registered PDD, i.e. 140,695 tCO₂ per year. Therefore, the amount of emission reductions which could be claimed during 01/01/2013-19/03/2015 should be 311,456 tCO₂=140,695 tCO₂/365*(814-6) days.

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The Shandong Gaotang 30MW Biomass Power Generation Project (hereafter referred to as the Project), developed by National Bio Energy Co., Ltd, is located in Gaotang County, Shandong Province, P.R.China. The Project collects and utilizes biomass residues (cotton straw, wood residues and wheat bran) to generate electricity and realizes biomass comprehensive utilization in the province served as a demonstration project in China.

The total installed capacity of the Project is 30 MW. And the straw-fired boiler is imported from Demark BWE Company, which is a world leading company in biomass boilers production and biomass cogeneration. So the project has also assisted in transferring advanced biomass technology to China. Electricity generated by the Project is exported into the Shandong provincial power grid that is a part of the North China Grid (NCG) to replace the capacity of coal-fired power plants and help reduce greenhouse gas (GHG) emission from the high-growth, coal-dominated power generation of NCG. Furthermore, the Project also accomplishes an extra benefit of GHG mitigation derived from a reduction of methane emission from biomass dumping or uncontrolled burning. The estimated annual GHG emission reductions are 180,881 tCO₂e in the approved changed PDD version 07, and the claimed annual GHG emission reductions shall be capped at the average annual emission reductions estimated in the original registered PDD, i.e. 140,695 tCO₂e.

This Project was constructed since 01/04/2006. It was put into trial operation on 29/01/2007 and in full commercial operation since April 2008. It is estimated that the Project can deliver 187,626 MWh of electricity to NCG with a biomass residues consumption of 247,506 tonnes per year (on wet base). In this monitoring period, the total emission reductions achieved are 432,993 tCO₂e. However, according to the requirement by EB 66th meeting, the annual amount of ERs to be issued to this Project shall be capped at the average annual emissions reductions estimated in the original registered PDD, i.e. 140,695 tCO₂ per year. So the amount of emission reductions which could be claimed during this monitoring period should be 313,769² tCO₂e.

A.2. Location of project activity

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The Project site is located in Gaotang Economic Development Zone, Gaotang County, Liaocheng City, Shandong Province, P.R.China. The Project has geographical coordinates with east longitude of 116°10'39" and north latitude of 36°54'36".

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
P.R. China (Host)	National Bio Energy Co., Ltd. (as the project owner)	No
United Kingdom of Great Britain and Northern Ireland	EDF Trading Limited (as the CER buyer)	No

A.4. Reference of applied methodology and standardized baseline

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ACM0006 "Consolidated methodology for grid-connected electricity generation from biomass residues", version 04.

² 313,769tCO₂=140,695tCO₂/365*814days

A.5. Crediting period of project activity

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The renewable crediting period (7yrs*3) is adopted. The start date of the first crediting period of the Project is 20/03/2008.

A.6. Contact information of responsible persons/entities

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Mr. Guo zhigang

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Tel: +86(0)13466709793

Beijing LvYuanRenHe Investment Consulting Co., Ltd

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

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The total installed capacity of the Project is 30MW. The technology employed by the Project is from domestic and international advanced technologies. One biomass residues direct burning boiler of 130t/h with high temperature and high pressure is imported from Denmark BWE Company, with burning completely and no knotting residue. One 30MW steam turbines and one suited generator of 30MW have been applied in the Project.

The electricity output is transmitted through a transformer at the site to Huixin Substation, and then connected to Shandong Provincial Grid that is an integral part of NCG.

Table B.1 to Table B.3 list the key specifications of the main equipments, and Figure B.1 shows the technical diagram of the Project.

Table B.1 Key technical specifications of BWE boiler

Parameters Name	Unit	Value
Boiler maximum continuous rating	t/h	130
Superheated steam pressure	MPa	9.2
Superheated steam temperature	°C	540
Boiler feed-water temperature	°C	210
Boiler exhaust temperature	°C	130
Boiler efficiency	%	≥92
Boiler dirt-discharge Rate	%	2

Table B.2: Key technical specifications of turbine

Parameters Name	Unit	Data
Model	/	N30-8.83/535
Rated output	MW	30
Rated rotation speed	r/min	3000
Rated flow	t/h	120
Rated pressure	Mpa	8.83
Rated temperature	°C	535

Table B.3: Key technical specifications of generator

Parameters Name	Unit	Data
Model	/	QF-30-2
Rated output	MW	30
Rated voltage	kV	6.3
Rated electric current	A	3473
Rated rotation speed	r/min	3000

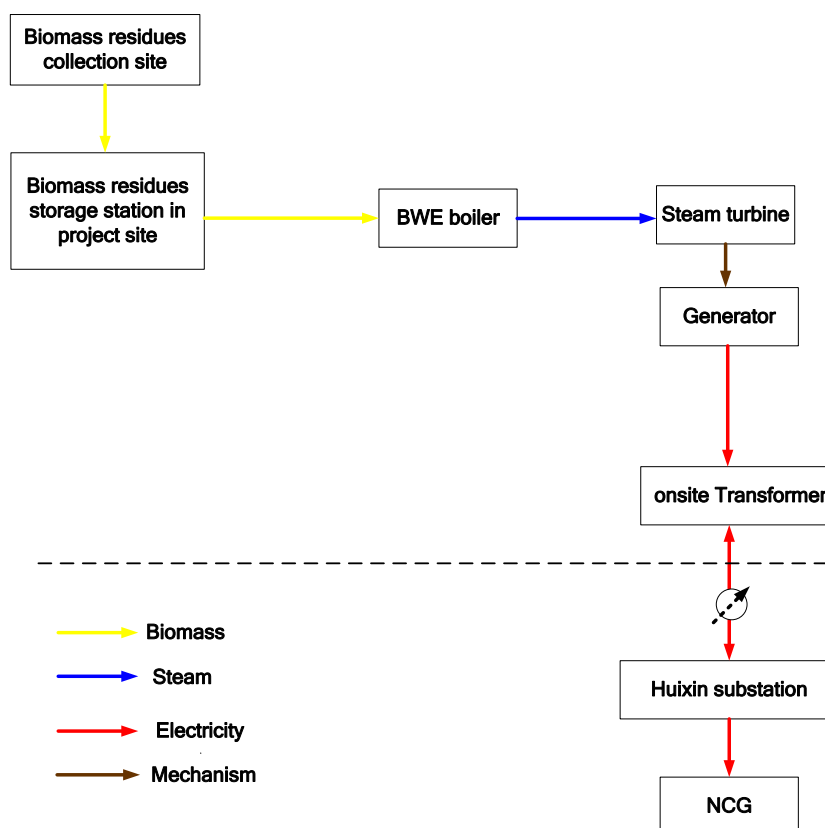


Figure B.1 Technical Diagram

The Project started to construct since 01/04/2006. It was put into trial operation on 29/01/2007 and in full commercial operation since April 2008.

During this monitoring period, all the monitoring equipments and facilities have been managed by responsible person, and the Project has been running normally. Local surplus biomass residues (cotton straw, wood residues and wheat bran) have been utilized by the Project for electricity generation. Data record and management system were in place and managed by designated persons.

There was no special event or situation may impact the applicability of the methodology occurred over this monitoring period

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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There is no temporary deviation from registered monitoring plan or applied methodology or applied standardized baseline in this monitoring period.

B.2.2. Corrections

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There is no correction during this monitoring period.

B.2.3. Changes to start date of crediting period

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There is no changes to start date of crediting period.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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Not applicable.

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

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The revised monitoring plan has been approved with the revised PDD by EB on 02/03/2012 during the verification of the first monitoring period.

B.2.6. Changes to project design of registered project activity

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Two permanent changes from project description in registered PDD occurred during the project actual activities, include:

Change1: three types of biomass residues (cotton straw, wood residues and wheat bran) have been applied to the project;

Change2: higher power generation.

These changes in revised PDD version7 have been approved by EB on 02/03/2012 during the verification of the first monitoring period.

B.2.7. Types of changes specific to afforestation or reforestation project activity

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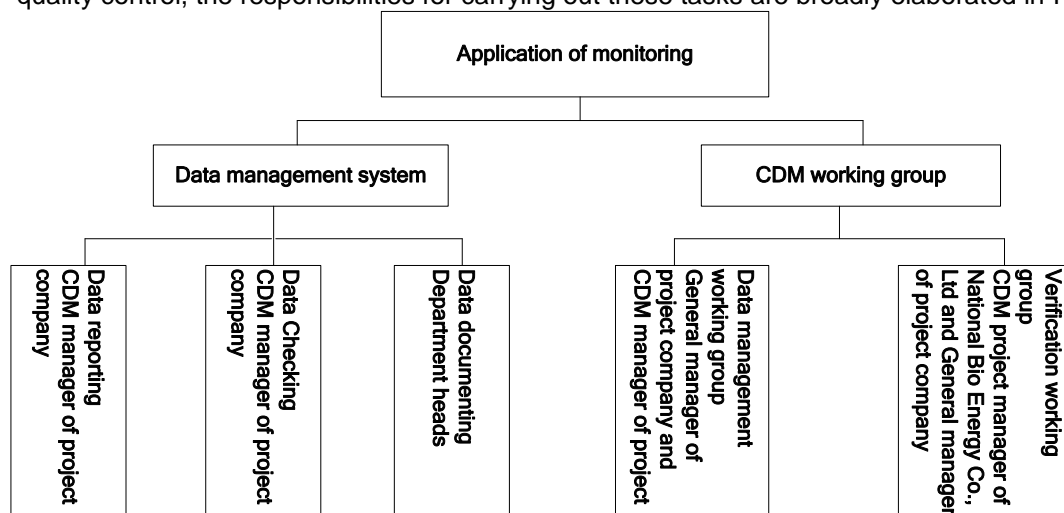
Not applicable.

SECTION C. Description of monitoring system

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Organizational Structure

National Bio Energy Co., Ltd has established and maintained the appropriate monitoring systems and quality control, the responsibilities for carrying out these tasks are broadly elaborated in Figure C.1 below:



. Figure C.1 Organizational Structure

Roles and responsibilities of personnel

National Bio Energy Co., Ltd. is the project owner. Staffs from the onsite company conduct the monitoring procedures and work based on the monitoring methodology described.

The application of monitoring includes two parts: data management system and CDM working group. The monitoring data such as all kinds of tables for different monitoring parameters, reports are processed and stored first in the plant office by operating manager and biomass purchase department manager, and are reported and checked by CDM manager of project company. The General manager and CDM manager of project company are in charge of the data management working group and the results are sent periodically

to the manager of National Bio Energy Co., Ltd and a number of the verification working group, for quality assurance.

The personal responsibilities of the Project are:

Operating manager of the plant: Overall management of power plant operation and in charge of collecting monitoring data as requested by the monitoring plan.

Biomass purchase department manager: Biomass collection and summarizing the data collected at the collection stations in terms of types, amount, and transportation record, etc of straws. Ensuring the biomass at the sites would not be stored over one year.

Data collection procedures

• Line diagrams

The line diagrams are shown in below:

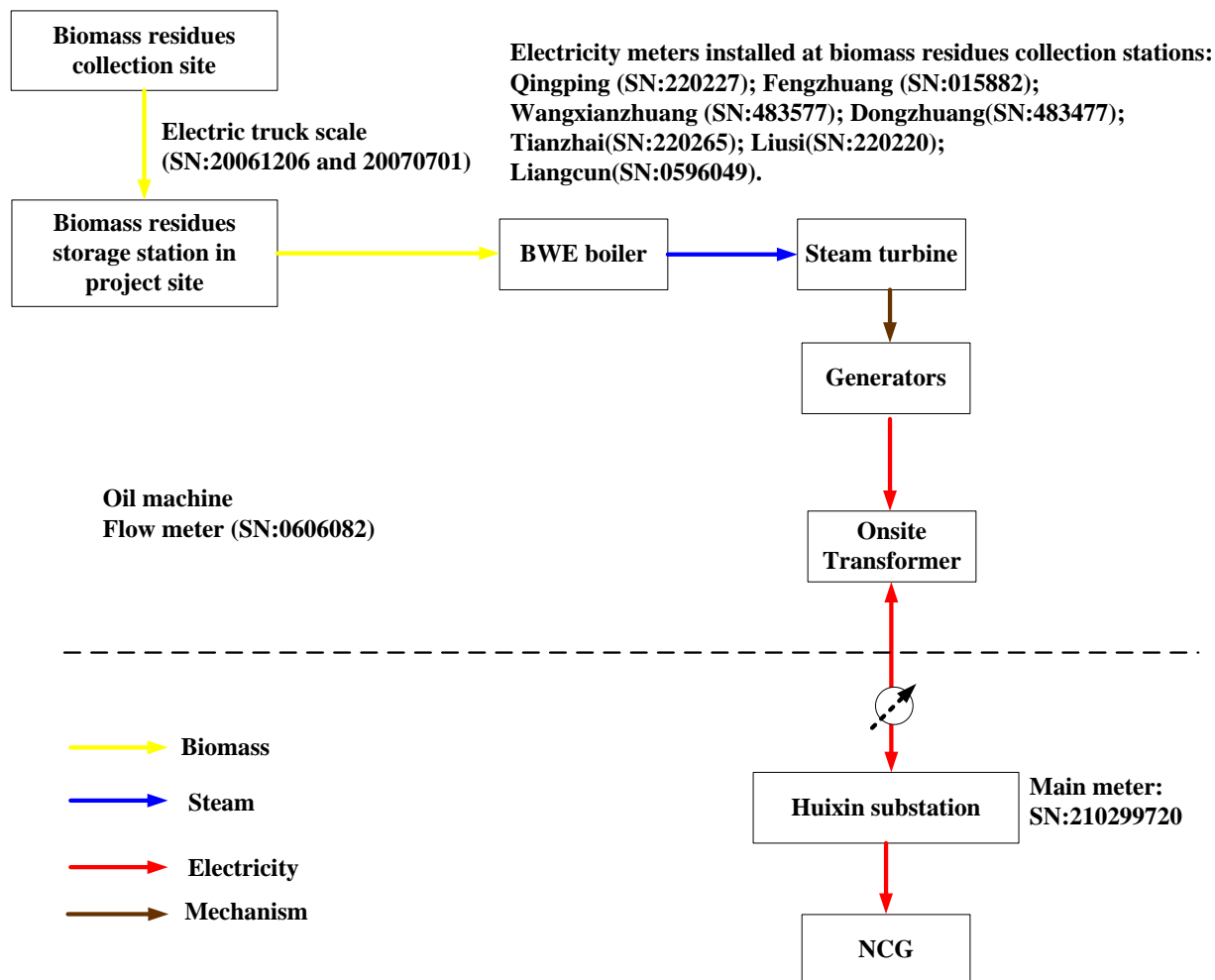


Figure C.2 Line diagrams

• Information flow

EG_y: Net quantity of electricity delivered to grid.

A main meter installed at the Huixin Substation is used for monitoring electricity supplied by the Project plant continuously. Data from the meter is monthly recorded by the grid company. The reading of main meter is cross checked by the electricity sales receipts, and the conservative values is applied in ER calculation.

BF_{k,y}: Quantity of biomass residues type *k* combusted in the Project plant.

On site measured by weight meters (two truck scales) and recorded by the procurement department of the plant. In order to determine the quantity of dry biomass, the moisture content of biomass residues is used for adjusting. Total consumptions are summarized in the monthly report.

Moisture: Moisture content of the biomass residues.

When biomass residues are transported to the plant, each batch of different biomass of homogeneous quality are sampled and monitored by the moisture analyzer at chemical laboratory on site. Mean values of each kind of biomass are calculated monthly.

NCV_k: Net Calorific Value of biomass residue type *k* consumed by the Project.

Biomass residues are sampled and NCV of them is monitored by a calorimeter at the chemical laboratory on site. The operator takes at least three samples of biomass residues for each measurement according to the monitoring plan of the approved changed PDD and national standard (GB/T213-2008). Measured records have been saved. Measurements are summarized monthly. Mean values of each kind of biomass are calculated monthly.

AVD_y: Average return trip distance (from and to) between biomass fuel supply sites and the project site.

Whenever the truck arrives at the plant, the staff puts down the name of biomass supply site and trip distance provided by the truckers. The maximum value is adopted for every monitoring month for conservation.

N_y: Number of truck trips for the transportation of biomass.

Whenever the truck arrives in the power plant, the staff puts the number and the distance in the data collection system. It is summarized monthly.

FF_{project, site, i, y}: Quantity of diesel combusted at the Project for other purposes that are attributable to the project activity.

Diesel consumed by vehicles (grass-grasping machine and loader) which are used for preparation of biomass residues on site is measured by a volume flow meter installed on an oiling machine. It is summarized monthly.

EC_{PJ, y}: On-site electricity consumption attributable to the project activity.

The main meter installed at Huixin substation, which is the same one used for monitoring EG_y, is also used for monitoring the electricity consumed by the project plant continuously. The reading of main meter is cross checked by the electricity sales receipts, and the conservative value is applied in ER calculation. Meters installed at the biomass collection stations are used respectively for monitoring electricity consumed for the preparation of biomass continuously.

Emergency procedures

In case of emergencies, measures should be taken to guarantee the conservativeness of the project activities.

If the main meter is damaged or inaccurate, disposal of urgency would be implemented according to the stipulations in the Power Purchase Agreement, Parallel Operation Agreement, and so on.

For measurement of amount of biomass residues, if there is something wrong with the weight meter, the responsible person for CDM shall inform relevant staffs to repair and calibrate the equipments as soon as possible.

If malfunction of moisture analyzer/ calorimeter/ flow meter appears, the historical data will be used in the most conservative manner, and the responsible person for CDM shall inform relevant staffs to repair and calibrate the equipments as soon as possible.

SECTION D. Data and parameters

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

(Copy this table for each piece of data and parameter)

Data/parameter:	GWP _{CH4}
Unit	tCO ₂ e/tCH ₄
Description	Global Warming Potential for CH ₄
Source of data	IPCC 2006 default value Errata to table 2.14, IPCC 4th Assessment report.
Value(s) applied)	21 in the first commitment period; 25 in the second commitment period.

Choice of data or measurement methods and procedures	-
Purpose of data	Baseline emission calculation ($BF_{\text{biomass},y}$), and Project emission calculation(PE_y)
Additional comments	21 tCO ₂ e/tCH ₄ was fixed for the first commitment period. And has been updated according to the Decision 4/CMP.7.

Data / Parameter	$EF_{\text{electricity},y}$
Unit	tCO ₂ e/MWh
Description	CO ₂ emission factor for the electricity displaced due to the project activity during the year y
Source of data	Approved changed PDD
Value(s) applied	0.975
Choice of data or Measurement methods and procedures	-
Purpose of data	Emission reductions due to displacement of electricity ($ER_{\text{electricity},y}$)
Additional comment	-

Data / Parameter	$EF_{\text{grid},y}$
Unit	tCO ₂ e/MWh
Description	CO ₂ emission factor for grid electricity during the year y
Source of data	Approved changed PDD
Value(s) applied	0.975
Choice of data or Measurement methods and procedures	-
Purpose of data	Project emission calculation ($PE_{EC,y}$)
Additional comment	-

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

Data / Parameter:	EG_y
Unit:	MWh
Description:	Net quantity of electricity delivered to grid in year y
Measured/ Calculated / Default:	Measured
Source of data:	Main meter reading at Huixin Substation
Value(s) of monitored parameter:	437,619.600

Monitoring equipment:	<p>EG_y is monitored continuously by a bidirectional electricity meter installed at Huixin Substation.</p> <table border="1"> <thead> <tr> <th colspan="2">Electricity meter (Main meter)</th> </tr> </thead> <tbody> <tr> <td>Location</td><td>Huixin Substation</td></tr> <tr> <td>Type</td><td>MK6E</td></tr> <tr> <td>Accuracy class</td><td>0.2s</td></tr> <tr> <td>Serial Number</td><td>210299720</td></tr> <tr> <td>Calibration frequency</td><td>Once per year</td></tr> <tr> <td>Calibrated on</td><td>04/01/2012 03/01/2013 02/01/2014 01/01/2015</td></tr> <tr> <td>Valid date to</td><td>31/12/2015</td></tr> <tr> <td>Comments</td><td>-</td></tr> </tbody> </table>	Electricity meter (Main meter)		Location	Huixin Substation	Type	MK6E	Accuracy class	0.2s	Serial Number	210299720	Calibration frequency	Once per year	Calibrated on	04/01/2012 03/01/2013 02/01/2014 01/01/2015	Valid date to	31/12/2015	Comments	-
Electricity meter (Main meter)																			
Location	Huixin Substation																		
Type	MK6E																		
Accuracy class	0.2s																		
Serial Number	210299720																		
Calibration frequency	Once per year																		
Calibrated on	04/01/2012 03/01/2013 02/01/2014 01/01/2015																		
Valid date to	31/12/2015																		
Comments	-																		
Measuring/ Reading/ Recording frequency:	Continuous on-site measurements and monthly recording by the power distribution company																		
Calculation method (if applicable):	-																		
QA/QC procedures:	<p>The electricity meter is operated by the power distribution company and calibrated at least once a year by accredited entity.</p> <p>The monthly metered electricity records have been cross checked by electricity sales receipts.</p>																		
Purpose of data:	Emission reductions due to displacement of electricity (ER _{electricity,y})																		
Additional comment:	-																		

Data / Parameter:	BF _{k,y}																								
Unit:	Tons																								
Description:	Quantity of biomass residue type <i>k</i> combusted in the project plant during the year <i>y</i>																								
Measured/ Calculated / Default:	Measured																								
Source of data:	Project records from project procurement department of plant																								
Value(s) of monitored parameter:	175,577 tons (dry base) for cotton straw; 199,824 tons (dry base) for wood residues; 18,685 tons (dry base) for wheat bran																								
Monitoring equipment:	<p>BF_{k,y} is on site measured by weight meters (two truck scales)</p> <table border="1"> <thead> <tr> <th></th><th>Electric truck scale #1</th><th>Electric truck scale #2</th></tr> </thead> <tbody> <tr> <td>Location</td><td>East weight house</td><td>West weight house</td></tr> <tr> <td>Type</td><td>SCS-30</td><td>SCS-30</td></tr> <tr> <td>Accuracy class</td><td>class III</td><td>class III</td></tr> <tr> <td>Serial Number</td><td>20061206</td><td>20070701</td></tr> <tr> <td>Calibration frequency</td><td>Once per six months</td><td>Once per six months</td></tr> <tr> <td>Calibrated on</td><td>19/11/2012 15/05/2013 14/11/2013 13/05/2014 12/11/2014</td><td>19/11/2012 15/05/2013 14/11/2013 13/05/2014 12/11/2014</td></tr> <tr> <td>Valid date to</td><td>11/05/2015</td><td>11/05/2015</td></tr> </tbody> </table>		Electric truck scale #1	Electric truck scale #2	Location	East weight house	West weight house	Type	SCS-30	SCS-30	Accuracy class	class III	class III	Serial Number	20061206	20070701	Calibration frequency	Once per six months	Once per six months	Calibrated on	19/11/2012 15/05/2013 14/11/2013 13/05/2014 12/11/2014	19/11/2012 15/05/2013 14/11/2013 13/05/2014 12/11/2014	Valid date to	11/05/2015	11/05/2015
	Electric truck scale #1	Electric truck scale #2																							
Location	East weight house	West weight house																							
Type	SCS-30	SCS-30																							
Accuracy class	class III	class III																							
Serial Number	20061206	20070701																							
Calibration frequency	Once per six months	Once per six months																							
Calibrated on	19/11/2012 15/05/2013 14/11/2013 13/05/2014 12/11/2014	19/11/2012 15/05/2013 14/11/2013 13/05/2014 12/11/2014																							
Valid date to	11/05/2015	11/05/2015																							
Measuring/ Reading/ Recording frequency:	Continuous on-site measurements and summarized into monthly summary																								

Calculation method (if applicable):	-
QA/QC procedures:	All purchase records, invoices, biomass available in the store and biomass quantity combusted for production are all available at the plant site. $BF_{k,y}$ measurements had been crosschecked with an annual energy balance that is based on purchased quantities and stock change for QA/QC.
Purpose of data:	Baseline emission calculations ($BE_{biomass,y}$) and Project emission calculations (PE_y)
Additional comment:	-

Data / Parameter:	Moisture content of the biomass residues																	
Unit:	% water content																	
Description:	Moisture content of each biomass residue type <i>k</i>																	
Measured/ Calculated / Default:	Measured																	
Source of data:	On-site measurements by moisture analyzer																	
Value(s) of monitored parameter:	Please see the column of moisture content for each kind of biomass in Table E.2.																	
Monitoring equipment:	<div>Moisture content of the biomass residues is on site measured by moisture analyzer.<table><tr><td>Type</td><td>Moisture analyzer</td></tr><tr><td>Location</td><td>Chemical lab</td></tr><tr><td>Model</td><td>SDTGA300</td></tr><tr><td>Accuracy class</td><td>0.01</td></tr><tr><td>Serial Number</td><td>3506073</td></tr><tr><td>Calibration frequency</td><td>Once a year</td></tr><tr><td>Calibrated on</td><td>30/03/2012 30/03/2013 29/03/2014</td></tr><tr><td>Valid date to</td><td>28/03/2015</td></tr></table></div>		Type	Moisture analyzer	Location	Chemical lab	Model	SDTGA300	Accuracy class	0.01	Serial Number	3506073	Calibration frequency	Once a year	Calibrated on	30/03/2012 30/03/2013 29/03/2014	Valid date to	28/03/2015
Type	Moisture analyzer																	
Location	Chemical lab																	
Model	SDTGA300																	
Accuracy class	0.01																	
Serial Number	3506073																	
Calibration frequency	Once a year																	
Calibrated on	30/03/2012 30/03/2013 29/03/2014																	
Valid date to	28/03/2015																	
Measuring/ Reading/ Recording frequency:	Continuous on-site measurements and summarized in monthly measure report																	
Calculation method (if applicable):	Weighted average values calculated for each kind of biomass residues during corresponding month																	
QA/QC procedures:	-																	
Purpose of data:	Baseline emission calculations (BE _{biomass,y}) and Project emission calculations (PE _y)																	
Additional comment:	-																	

Data / Parameter:	NCV_k
Unit:	GJ / ton of dry matter
Description:	Net Calorific Value of biomass residue type k consumed by the project
Measured/ Calculated / Default:	Measured

Source of data:	Inspection reports from Shandon Taishan Institute of Mineral Resource Detection on 30/11/2012, 25/05/2013, 23/11/2013, 24/05/2014 and 23/11/2014. Three samples have been analyzed at the same time by the test institutions above and reported according to relevant international standards at least every six months. And the average of NCV of these samples was adopted.
Value(s) of monitored parameter:	Please see the columns of NCV_k for each kind of biomass in Table E.6.
Monitoring equipment:	-Not applicable
Measuring/ Reading/ Recording frequency:	At least once half a year.
Calculation method (if applicable):	-Not applicable
QA/QC procedures:	PO has checked consistency of measurements with public available data, i.e. default values by IPCC ³ . There is no significant difference between the measurement results and the default values, so PO did not collect additional information.
Purpose of data:	Project emission calculation ($PE_{Biomass,CH_4,y}$)
Additional comment:	-

Data / Parameter:	AVD_y
Unit:	km
Description:	Average return trip distance (from and to) between biomass fuel supply sites and the project site
Measured/ Calculated / Default:	Measured and calculated
Source of data:	Records by project participants
Value(s) of monitored parameter:	Please see the columns of AVD _y in Table E.3.
Monitoring equipment:	The project owner named each site and measured the distances of different collection sites on map. The staffs find which collection site it is from and put down the name of collection site when each truck arrives. And then distance of biomass can be identified and is put down in the data collection system. Finally, the maximum value is adopted for every month for conservation. There is no instrument for AVD _y .
Measuring/ Reading/ Recording frequency:	Recording distance when every truck arrived at project site.
Calculation method (if applicable):	The maximum value is adopted for each corresponding month, this is conservative.
QA/QC procedures:	PO has checked consistency of distance records in which those distances are provided by the truckers by comparing recorded distances with maps for QA/QC.
Purpose of data:	Project emission calculations (PET_y)
Additional comment:	-

³ 2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 1.2, Volume 2 Energy, chapter 1, Page 1.19.

Data / Parameter:	Ny
Unit:	-
Description:	Number of truck trips for the transportation of biomass
Measured/ Calculated / Default:	Measured
Source of data:	On-site measurement
Value(s) of monitored parameter:	43,131
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Recording distance when every truck arrived at project site.
Calculation method (if applicable):	Monthly data were summarized into monthly summary.
QA/QC procedures:	PP has checked consistency of the number of truck trips with the inventory of combusted biomass and quantity of biomass purchased for QA/QC.
Purpose of data:	Project emission calculations (PET _y)
Additional comment:	-

Data / Parameter:	EF_{km,CO₂,y}
Unit:	tCO ₂ /km
Description:	Average CO ₂ emission factor for transportation of biomass with trucks
Measured/ Calculated / Default:	default
Source of data:	IPCC 2006 default value form Moderate Control index for the US heavy Duty Diesel Vehicle.
Value(s) of monitored parameter:	0.001011
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Review annually
Calculation method (if applicable):	-
QA/QC procedures:	The available IPCC default value is used, and has been reviewed for the appropriateness with the latest version of IPCC
Purpose of data:	Project emission calculations (PET _y)
Additional comment:	-

Data / Parameter:	FF_{project plant,i,y}
Unit:	tons
Description:	Quantity of diesel combusted in the biomass residue fired power plant during the year y
Measured/ Calculated / Default:	Measured
Source of data:	Project records from project procurement department of plant

Value(s) of monitored parameter:	0
Monitoring equipment:	According to the actual design, the boiler does not need any diesel for start-ups, so no monitoring equipment has been settled to monitor $FF_{\text{project plant},i,y}$
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	-
Additional comment:	-

Data / Parameter:	$FF_{\text{project site},i,y}$																		
Unit:	tons																		
Description:	Quantity of diesel combusted at the project site for other purposes that are attributable to the project activity during the year y																		
Measured/ Calculated / Default:	Measured																		
Source of data:	Direct measurement and calculation in the procurement department of plant																		
Value(s) of monitored parameter:	430.57																		
Monitoring equipment:	<p>The volume of diesel has been continuously monitored by flow meter.</p> <table border="1"> <thead> <tr> <th>Type</th><th>Flow meter</th></tr> </thead> <tbody> <tr> <td>Location</td><td>Gaotang NBE petrol station</td></tr> <tr> <td>Model</td><td>JDK50C111</td></tr> <tr> <td>Accuracy class</td><td>0.3%</td></tr> <tr> <td>Serial Number</td><td>0606082</td></tr> <tr> <td>Calibration frequency</td><td>Once per year</td></tr> <tr> <td>Calibrated on</td><td>15/05/2012 13/05/2013 13/05/2014</td></tr> <tr> <td>Valid date to</td><td>12/05/2015</td></tr> <tr> <td>Comments</td><td>-</td></tr> </tbody> </table>	Type	Flow meter	Location	Gaotang NBE petrol station	Model	JDK50C111	Accuracy class	0.3%	Serial Number	0606082	Calibration frequency	Once per year	Calibrated on	15/05/2012 13/05/2013 13/05/2014	Valid date to	12/05/2015	Comments	-
Type	Flow meter																		
Location	Gaotang NBE petrol station																		
Model	JDK50C111																		
Accuracy class	0.3%																		
Serial Number	0606082																		
Calibration frequency	Once per year																		
Calibrated on	15/05/2012 13/05/2013 13/05/2014																		
Valid date to	12/05/2015																		
Comments	-																		
Measuring/ Reading/ Recording frequency:	Measuring continuously and recorded for each corresponding month																		
Calculation method (if applicable):	<p>The volume of diesel has been multiplied by density of diesel to get the mass quantity of diesel.</p> $FF_{\text{project site},i,y} = \rho_{\text{diesel}} (\text{kg/liter}) * \text{volume flow}(\text{liter}) / 1000$																		
QA/QC procedures:	The consistency of metered diesel consumption is crosschecked with purchase receipts.																		
Purpose of data:	Project emission calculations (PE_{FFy})																		
Additional comment:	-																		

Data / Parameter:	ρ_{diesel}
Unit:	kg/liter
Description:	Density of diesel

Measured/ Calculated / Default:	Default
Source of data:	The national standard “automobile diesel fuel GB 19147-2013”
Value(s) of monitored parameter:	0.85.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	Default value from national standard GB19147-2013 is used and has been reviewed annually.
Purpose of data:	Project emission calculations (PEFF _y)
Additional comment:	-

Data / Parameter:	EF_{CO2,FF,i}
Unit:	tCO ₂ /GJ
Description:	CO ₂ Emission Factor for fossil fuel type i
Measured/ Calculated / Default:	Default
Source of data:	IPCC 2006 default value (table 1.4, chapter1, volume2: energy)
Value(s) of monitored parameter:	Diesel: 0.0741
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Review annually
Calculation method (if applicable):	-
QA/QC procedures:	The available IPCC default value are used, and is reviewed for the appropriateness of data annually with latest version of IPCC
Purpose of data:	Project emission calculations (PEFF _y)
Additional comment:	-

Data / Parameter:	NCV_i
Unit:	GJ/ton fossil fuel
Description:	Net Calorific Value of fossil fuels combusted at the project site for other purposes that are attributable to the project activity during the year y
Measured/ Calculated / Default:	Default
Source of data:	China Energy Statistical Yearbook 2013
Value(s) of monitored parameter:	Diesel : 42.652 GJ/ton
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Annually

Calculation method (if applicable):	-
QA/QC procedures:	PO has checked the consistency of national data with default values by the IPCC, in table 1.2, Chapter 1, volume 2 of IPCC 2006 manual, it stated that the Net Calorific Value of diesel is 0.043 TJ/tonne which differs little with China Energy Statistical Yearbook 2013. So, 42.652 GJ/tonne was thought to be suitable and accurate.
Purpose of data:	Project emission calculations (PEFF _y)
Additional comment:	-

Data / Parameter:	NCV_k*EF_{burning,CH4,k,y}
Unit:	tCH ₄ /ton biomass residue
Description:	CH ₄ emission factor for uncontrolled burning of the biomass residue type k during the year y
Measured/ Calculated / Default:	Default
Source of data:	IPCC 2006 default value 0.0027 tCH ₄ /ton is used as NCV _k *EF _{burning,CH4,k,y} , and the conservative factor of 0.73 is applied
Value(s) of monitored parameter:	0.001971
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	Baseline emission calculations (BE _{biomass,y})
Additional comment:	-

Data / Parameter:	EF_{CH4,BF}
Unit:	tCH ₄ /GJ
Description:	CH ₄ emission factor for the combustion of biomass residues in the project plant
Measured/ Calculated / Default:	Default
Source of data:	Default values, as provided in Table 3 of ACM0006 (Version 4) which sources from 2006 IPCC Guideline, Volume 2, Chapter 2, Tables 2.2 to 2.6
Value(s) of monitored parameter:	0.0000411
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures:	The available IPCC default value is used, and has been reviewed for the appropriateness with the latest version of IPCC

Purpose of data:	Project emission calculations ($PE_{\text{biomass,CH}_4,y}$)
Additional comment:	-

Data / Parameter:	$EC_{PJ,y}$
Unit:	MWh
Description:	On-site electricity consumption attributable to the project activity during the year y
Measured/ Calculated / Default:	Measured
Source of data:	Main meter reading at Huixin substation and electricity meters reading at collection stations
Value(s) of monitored parameter:	1,215.72

Monitoring equipment:

	Electricity meter (Main meter)
Location	Huixin Substation
Type	MK6E
Accuracy class	0.2s
Serial Number	210299720
Calibration frequency	Once per year
Calibrated on	04/01/2012 03/01/2013 02/01/2014 01/01/2015
Valid date to	31/12/2015
Comments	-

Electricity meters installed at biomass residues collection stations:

	#1 electricity meter
Location	Qingping collection station
Type	DT862
Accuracy class	2.0
Serial Number	220227
Calibration frequency	Once per five years
Calibrated on	20/09/2006 15/09/2011
Valid date to	14/09/2016

	#2 electricity meter
Location	Fengzhuang collection station
Type	DT862
Accuracy class	2.0
Serial Number	015882
Calibration frequency	Once per three years
Calibrated on	30/09/2006 20/09/2009 13/09/2012
Valid date to	12/09/2015

	#3 electricity meter
Location	Wangxianzhuang collection station
Type	DT862-4
Accuracy class	2.0
Serial Number	483577
Calibration frequency	Once per five years
Calibrated on	25/11/2006 20/11/2011
Valid date to	19/11/2016

	#4 electricity meter
Location	Dongzhuang collection station
Type	DT862-4
Accuracy class	2.0
Serial Number	483477
Calibration frequency	Once per five years
Calibrated on	05/11/2007 30/09/2012
Valid date to	29/09/2017

	#5 electricity meter
Location	Tianzhai collection station
Type	DT862

	Accuracy class	2.0	
	Serial Number	220265	
	Calibration frequency	Once per three years	
	Calibrated on	21/08/2006 19/08/2009 15/08/2012	
	Valid date to	14/08/2015	
	#6 electricity meter		
	Location	Liusi collection station	
	Type	DT862	
	Accuracy class	2.0	
	Serial Number	220220	
	Calibration frequency	Once per three years	
	Calibrated on	08/10/2006 06/10/2009 30/09/2012	
	Valid date to	29/09/2015	
	#7 electricity meter		
	Location	Liangcun collection station	
	Type	DT862-4	
	Accuracy class	2.0	
	Serial Number	0596049	
	Calibration frequency	Once per five years	
	Calibrated on	05/12/2007 30/09/2012	
	Valid date to	29/09/2017	
	Measuring/ Reading/ Recording frequency:	<p>Electricity consumed by the project plant is continuously on-site measured and monthly recorded by the power distribution company.</p> <p>Electricity consumed by the biomass collection stations is continuously measured by meters installed at the collection stations. It is read and recorded according to the schedule of the power distribution company.</p>	
	Calculation method (if applicable):	<p>The seven out site collection stations were not used in this monitoring period and there was no electricity consumed in these stations in this monitoring period.</p> <p>Thus, $EC_{PJ,y}$ = electricity consumption at the project site</p>	
	QA/QC procedures:	<p>The electricity meter installed at Huixin Substation is operated by the power distribution company and calibrated at least once a year by accredited entity.</p> <p>The monthly metered electricity records have been cross checked by electricity sales receipts.</p> <p>The electricity meters installed at the collection stations are calibrated periodically according to relevant national standards.</p>	
Purpose of data:	Project emission calculations ($PE_{EC,y}$)		
Additional comment:	-		

Data / Parameter:	-
Unit:	Tons
Description:	Quantity of available biomass residues of type k in the region

Measured/ Calculated / Default:	Calculated
Source of data:	Statistics from local government
Value(s) of monitored parameter:	This is obtained from official data. Please refer to Table E.7 below for more details.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Data was obtained from statistic or survey conducted by local government annually.
Calculation method (if applicable):	-Not applicable
QA/QC procedures:	The statistic data of biomass in the region was provided by local government which is official and authoritative
Purpose of data:	Leakage emission calculations
Additional comment:	-

Data / Parameter:	-
Unit:	Tons
Description:	Quantity of biomass residues of type <i>k</i> that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region
Measured/ Calculated / Default:	Calculated
Source of data:	Statistics from local government
Value(s) of monitored parameter:	This is obtained from official data. Please refer to Table E.7 below for more details.
Monitoring equipment:	-Not applicable
Measuring/ Reading/ Recording frequency:	Data was obtained from statistic or survey conducted by local government annually.
Calculation method (if applicable):	-Not applicable
QA/QC procedures:	The statistic data of biomass in the region was provided by local government which is official and authoritative
Purpose of data:	Leakage emission calculations
Additional comment:	-

D.3. Implementation of sampling plan

>>

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

>>

According to the approved change PDD, the emission reductions by the project are calculated as follows:

$$ER_y = ER_{\text{electricity},y} + ER_{\text{heat},y} + BE_{\text{biomass},y} - PE_y - L_y$$

a) Emission reductions due to displacement of electricity ($ER_{\text{electricity},y}$)

$$ER_{electricity,y} = EG_y * EF_{electricity,y}$$

Where:

$ER_{electricity,y}$ are the emission reductions due to displacement of electricity during the year y (tCO₂/yr).

EG_y is the net quantity of electricity delivered to grid in year y.

$EF_{electricity,y}$ is the CO₂ emission factor for the electricity displaced due to the project activity during the year y (tCO₂/ MWh), which is 0.975 tCO₂e/MWh.

$EG_y = 437,619.600$ MWh, please refer to Table E.1 for monthly monitoring data.

Therefore,

$$ER_{electricity,y} = EG_y * EF_{electricity,y} = 437,619.600\text{MWh} * 0.975\text{tCO}_2\text{e/MWh} = 426,679.11\text{tCO}_2\text{e}$$

Table E.1. Monitored data for EG_y

Period	Data from meter reading (MWh)	Data on sales receipt (MWh)	Minimum value of meter reading and sales receipt (MWh)	Data for ERs calculation (MWh)
	D1	E1	F1=MIN(D1,E1)	G1=F1
26/12/2012-25/01/2013	16,995.000	16,995.000	16,995.000	16,995.000
26/01/2013-22/02/2013	11,266.200	11,266.200	11,266.200	11,266.200
23/02/2013-25/03/2013	10,845.120	10,845.120	10,845.120	10,845.120
26/03/2013-24/04/2013	16,303.320	16,303.320	16,303.320	16,303.320
25/04/2013-25/05/2013	18,709.680	18,709.680	18,709.680	18,709.680
26/05/2013-24/06/2013	17,410.800	17,410.800	17,410.800	17,410.800
25/06/2013-25/07/2013	18,183.000	18,183.000	18,183.000	18,183.000
26/07/2013-25/08/2013	13,091.760	13,091.760	13,091.760	13,091.760
26/08/2013-24/09/2013	15,816.240	15,816.240	15,816.240	15,816.240
25/09/2013-25/10/2013	18,085.320	18,085.320	18,085.320	18,085.320
26/10/2013-24/11/2013	17,484.720	17,484.720	17,484.720	17,484.720
25/11/2013-25/12/2013	14,971.440	14,971.440	14,971.440	14,971.440
26/12/2013-25/01/2014	14,695.560	14,695.560	14,695.560	14,695.560
26/01/2014-22/02/2014	19,050.240	19,050.240	19,050.240	19,050.240
23/02/2014-25/03/2014	19,774.920	19,774.920	19,774.920	19,774.920
26/03/2014-24/04/2014	18,336.120	18,336.120	18,336.120	18,336.120
25/04/2014-25/05/2014	14,843.400	14,843.400	14,843.400	14,843.400
26/05/2014-24/06/2014	15,586.560	15,586.560	15,586.560	15,586.560
25/06/2014-25/07/2014	18,763.800	18,763.800	18,763.800	18,763.800
26/07/2014-25/08/2014	18,589.560	18,589.560	18,589.560	18,589.560
26/08/2014-24/09/2014	18,086.640	18,086.640	18,086.640	18,086.640
25/09/2014-25/10/2014	18,563.160	18,563.160	18,563.160	18,563.160
26/10/2014-24/11/2014	7,694.280	7,694.280	7,694.280	7,694.280
25/11/2014-25/12/2014	18,060.240	18,060.240	18,060.240	18,060.240
26/12/2014-25/01/2015	17,212.800	17,212.800	17,212.800	17,212.800
26/01/2015-22/02/2015	14,772.120	14,772.120	14,772.120	14,772.120
23/02/2015-19/03/2015	14,427.600	14,427.600	14,427.600	14,427.600
Total	-	-	-	437,619.600

b) Emission reductions due to displacement of heat ($ER_{heat,y}$)

Emission reductions due to displacement of heat ($ER_{heat,y}$) is not considered for the project. Therefore, $ER_{heat,y} = 0$ tCO₂e

c) **Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues ($BE_{biomass,y}$)**

$$BE_{biomass,y} = GWP_{CH_4} * \sum_k BF_{PJ,k,y} * NCV_k * EF_{burning,CH_4,k,y}$$

Where:

$BE_{biomass,y}$ is baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO₂e/year).

GWP_{CH_4} is the Global Warming Potential for methane valid for the relevant commitment period which is determined in the PDD as 21 tCO₂/tCH₄.

NCV_k is the net calorific value of the biomass residue type k in GJ per tons of dry matters.

$BF_{PJ,k,y}$ is the incremental quantity of biomass residue type k used as fuel in the project plant during the year y in tons.

And $GWP_{CH_4} = 21$ for the first commitment period and 25 for the second commitment period, and since 25/01/2013, the GWP for CH₄ of 25 has been applied in the baseline emission calculation, which is conservative.

$EF_{burning,CH_4,k,y}$ is the CH₄ emission factor for uncontrolled burning of the biomass residue type k in tCH₄/GJ.

According to the changed PDD, $NCV_k * EF_{burning,CH_4,k,y} = 0.001971$ tCH₄/ton.

$$\sum_k BF_{PJ,k,y} = BF1 + BF2 + BF3^4$$

$$= 5,673.11 \text{ t} + 6,685.96 \text{ t} + 61.53 \text{ t} = 12,460.60 \text{ t} \text{ (26/12/2012-25/01/2013) ;}$$

$$\sum_k BF_{PJ,k,y} = BF1 + BF2 + BF3$$

$$= 169,903.46 \text{ t} + 193,138.03 \text{ t} + 18623.65 \text{ t} = 381,665.14 \text{ t} \text{ (26/01/2013-19/03/2015) ;}$$

Please refer to Table E.2 for monthly monitoring data.

Therefore,

$$BE_{biomass,y} = GWP_{CH_4} * \sum_k BF_{PJ,k,y} * NCV_k * EF_{burning,CH_4,k,y}$$

$$= (21 \text{ tCO}_2/\text{tCH}_4 * 12,460.60 \text{ t} + 25 \text{ tCO}_2/\text{tCH}_4 * 381,665.149) * 0.001971 \text{ tCH}_4/\text{ton}$$

$$= 19,320.65 \text{ tCO}_2\text{e}$$

Table E.2. Monitored data for $\sum_k BF_{PJ,k,y}$

Period	BF1, wet base (t)	Moisture 1 (%)	BF1, dry base (t)	BF2, wet base (t)	Moisture 2 (%)	BF2, dry base (t)	BF3, wet base (t)	Moisture 3 (%)	BF3, dry base (t)
	K1	L1	M1=K1*(1-L1/100)	K2	L2	M2=K2*(1-L2/100)	K3	L3	M3=K3*(1-L3/100)
26/12/2012-25/01/2013	8,545.90	33.62%	5,673.11	8,838.77	24.36%	6,685.96	74.77	17.70%	61.53
26/01/2013-22/02/2013	3,593.22	34.49%	2,353.79	8,243.68	21.20%	6,496.00	4.74	15.12%	4.02
23/02/2013-25/03/2013	19,590.41	35.31%	12,673.29	7,632.61	21.01%	6,028.93	230.50	20.17%	184.01
26/03/2013-24/04/2013	22,579.49	34.77%	14,728.90	9,275.63	19.53%	7,464.43	104.43	24.99%	78.33
25/04/2013-25/05/2013	16,231.19	34.05%	10,704.50	9,916.96	31.00%	6,842.92	128.91	13.97%	110.90

⁴ BF₁=Cotton straw; BF₂=Wood residues; BF₃=Wheat bran

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26/05/2013-24/06/2013	10,477.13	34.25%	6,889.18	4,058.63	33.67%	2,692.07	1,303.79	27.45%	945.89
25/06/2013-25/07/2013	14,099.58	36.18%	8,998.85	2,670.91	41.32%	1,567.20	3,593.46	25.36%	2,682.26
26/07/2013-25/08/2013	25,736.85	36.47%	16,350.89	6,873.09	36.22%	4,383.76	813.79	22.55%	630.24
26/08/2013-24/09/2013	8,919.72	38.12%	5,519.26	17,884.86	43.66%	10,077.17	492.36	13.61%	425.36
25/09/2013-25/10/2013	11,782.04	34.39%	7,729.76	16,345.92	36.72%	10,343.73	4.68	11.17%	4.15
26/10/2013-24/11/2013	2,315.67	37.05%	1,457.81	18,118.06	44.67%	10,025.09	13.17	29.95%	9.22
25/11/2013-25/12/2013	8,301.66	29.20%	5,877.99	14,534.01	42.33%	8,381.92	0.00	0.00%	0.00
26/12/2013-25/01/2014	9,098.08	26.11%	6,722.62	9,917.01	32.88%	6,656.52	0.00	0.00%	0.00
26/01/2014-22/02/2014	3,044.57	22.74%	2,352.37	6,623.48	28.61%	4,728.74	11.51	10.39%	10.31
23/02/2014-25/03/2014	21,421.38	37.67%	13,351.65	16,048.11	26.98%	11,718.53	0.00	0.00%	0.00
26/03/2014-24/04/2014	25,545.74	41.77%	14,874.95	10,406.41	23.32%	7,979.27	0.00	0.00%	0.00
25/04/2014-25/05/2014	19,915.73	46.22%	10,710.09	6,425.32	26.52%	4,721.37	0.00	0.00%	0.00
26/05/2014-24/06/2014	9,109.69	43.40%	5,155.71	4,395.72	30.60%	3,050.60	2.44	11.51%	2.16
25/06/2014-25/07/2014	19,597.91	45.28%	10,723.29	5,703.19	26.48%	4,193.26	15.32	12.46%	13.41
26/07/2014-25/08/2014	1,973.96	18.58%	1,607.15	14,637.78	44.44%	8,133.06	1,541.61	30.28%	1,074.81
26/08/2014-24/09/2014	2,070.26	20.23%	1,651.45	10,737.24	45.42%	5,860.08	3,223.58	24.16%	2,444.83
25/09/2014-25/10/2014	1,655.07	18.88%	1,342.60	24,444.57	39.39%	14,816.64	2,060.43	24.47%	1,556.21
26/10/2014-24/11/2014	2,783.50	18.42%	2,270.78	23,093.06	39.69%	13,927.92	1,112.06	26.88%	813.15
25/11/2014-25/12/2014	802.42	19.79%	643.58	13,101.80	33.60%	8,699.04	1,411.33	22.93%	1,087.73
26/12/2014-25/01/2015	3,071.82	17.34%	2,539.18	14,629.25	31.23%	10,060.15	5,020.19	21.58%	3,936.76
26/01/2015-22/02/2015	2,125.17	18.50%	1,731.95	8,014.90	32.46%	5,413.36	2,277.93	29.51%	1,605.78
23/02/2015-19/03/2015	1,148.27	17.97%	941.89	13,299.89	33.26%	8,876.32	1,478.58	32.09%	1,004.11
Total	275,536.4	/	175,576.57	305,870.87	/	199,824.0	24,919.5 5	/	18,685.18

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

>>

According to the approved changed PDD, project emissions GHG emissions from the project activity in year y are calculated on the following equation:

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH_4} * PE_{biomass,CH_4,y}$$

Where:

PE_y are project CO₂ emissions during the year y (tCO₂e/year),

PET_y are CO₂ emissions during the year y due to transportation of the biomass to the project plant (tCO₂e/year),

$PEFF_y$ are the CO₂ emissions during the year y due to fossil fuels co-fired by the generation facility or other fossil fuels consumption at the project site that is attributable to the project activity (tCO₂e/year),

$PE_{EC,y}$ are the CO₂ emissions during the year y due to electricity consumption at the project that is attributable to the project activity (tCO₂e/year).

GWP_{CH_4} is the Global Warming Potential for methane valid for the relevant commitment period,

$PE_{biomass,CH_4,y}$ is the CH₄ emissions from the combustion of biomass residues during the year y (tCH₄/year).

a) . Carbon dioxide emissions from combustion of fossil fuels for transportation of biomass residues to the project plant (PET_y)

$$PET_y = N_y * AVD_y * EF_{km,CO_2,y}$$

Where:

PET_y are CO₂ emissions during the year y due to transport of biomass residues to the project plant (tCO₂e/year)

AVD_y is the maximum 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)

$EF_{km,CO_2,y}$ is the average CO₂ emission factor for the trucks measured during the year y (tCO₂e/km)

N_y is the number of truck trips during the year y

According to the data in Table E.3,

$$PET_y = 4,360.54 \text{ tCO}_2\text{e}$$

Table E.3. Monitored data and calculation for PET_y

Period	N_y	AVD_y (maximum,km)	EF_{km,CO_2} (tCO ₂ /km)	PET_y (tCO ₂ e)
	T	U	V	W=T*U*V
26/12/2012-25/01/2013	1,667	100.00	0.001011	168.53
26/01/2013-22/02/2013	877	100.00	0.001011	88.66
23/02/2013-25/03/2013	2,135	100.00	0.001011	215.85
26/03/2013-24/04/2013	2,458	100.00	0.001011	248.50
25/04/2013-25/05/2013	1,876	100.00	0.001011	189.66
26/05/2013-24/06/2013	1,178	100.00	0.001011	119.10
25/06/2013-25/07/2013	1,241	100.00	0.001011	125.47
26/07/2013-25/08/2013	1,731	100.00	0.001011	175.00
26/08/2013-24/09/2013	1,515	100.00	0.001011	153.17
25/09/2013-25/10/2013	1,672	100.00	0.001011	169.04
26/10/2013-24/11/2013	1,328	100.00	0.001011	134.26
25/11/2013-25/12/2013	1,947	100.00	0.001011	196.84
26/12/2013-25/01/2014	1,760	100.00	0.001011	177.94

26/01/2014-22/02/2014	751	100.00	0.001011	75.93
23/02/2014-25/03/2014	2,752	100.00	0.001011	278.23
26/03/2014-24/04/2014	2,412	100.00	0.001011	243.85
25/04/2014-25/05/2014	1,697	100.00	0.001011	171.57
26/05/2014-24/06/2014	904	100.00	0.001011	91.39
25/06/2014-25/07/2014	1,699	100.00	0.001011	171.77
26/07/2014-25/08/2014	1,372	100.00	0.001011	138.71
26/08/2014-24/09/2014	1,152	100.00	0.001011	116.47
25/09/2014-25/10/2014	1,888	100.00	0.001011	190.88
26/10/2014-24/11/2014	1,911	100.00	0.001011	193.20
25/11/2014-25/12/2014	1,335	100.00	0.001011	134.97
26/12/2014-25/01/2015	1,742	100.00	0.001011	176.12
26/01/2015-22/02/2015	949	100.00	0.001011	95.94
23/02/2015-19/03/2015	1,182	100.00	0.001011	119.50
Total	43,131	/	/	4,360.54

b) Carbon dioxide emissions from fossil fuel consumption in the power plant ($PEFF_y$)

Following ACM0006 version 04 in the PDD, the project owner established the formulae for calculating the emissions from fossil fuel use in the project plant, using the quantity of each fuel combusted and the appropriate emissions coefficient, as follows:

$$PEFF_y = \Sigma (FF_{project\ plant,i,y} + FF_{project\ site,i,y}) * NCV_i * EF_{co2,FF,i}$$

Where:

$PEFF_y$ are CO₂ emissions from on-site consumption of fossil fuels in the biomass power plant during the year y in tons of CO₂ equivalents(tCO₂/yr),

$FF_{project, plant,i,y}$ is the quantity of fossil fuel type i combusted in the project plant during the year y (ton/year), which is 0 in this project,

$FF_{project, site,i,y}$ is the quantity of fossil fuel type i combusted at the project site during the year y (ton/year),

NCV_i is the Net calorific value of diesel (GJ/ton), which is 42.652 GJ/ton,

$EF_{co2,FF,i}$ is CO₂ emission factor for the diesel (tCO₂/GJ), which is 0.0741tCO₂/GJ.

There is no fossil fuel was combusted as auxiliary fuel for boiler start up, thus,

$$FF_{project\ plant,i,y} = 0tCO_2$$

$FF_{project, site,i,y} = 430.57t$, please refer to Table E.4 for monthly monitoring data.

$$\text{Therefore, } PEFF_y = \Sigma (FF_{project\ plant,i,y} + FF_{project\ site,i,y}) * NCV_i * EF_{co2,FF,i}$$

$$= (0t + 430.57t) * 42.652 \text{ GJ/ton} * 0.0741tCO_2/GJ$$

$$= 1,360.82 \text{ tCO}_2e$$

Table E.4 Monitored data for $FF_{project, site,i,y}$

Period	Volume (liter)	ρ_{diesel} (kg/liter)	$FF_{project\ site,i,y}$ (t)
	Y2	Z2	$X2 = Y2 * Z2 / 1000$
26/12/2012-25/01/2013	13,371.64	0.85	11.37
26/01/2013-22/02/2013	22,923.11	0.85	19.48
23/02/2013-25/03/2013	20,230.41	0.85	17.20
26/03/2013-24/04/2013	24,946.62	0.85	21.20
25/04/2013-25/05/2013	24,717.64	0.85	21.01
26/05/2013-24/06/2013	10,443.42	0.85	8.88
25/06/2013-25/07/2013	20,815.30	0.85	17.69

26/07/2013-25/08/2013	9,624.71	0.85	8.18
26/08/2013-24/09/2013	19,482.35	0.85	16.56
25/09/2013-25/10/2013	25,082.59	0.85	21.32
26/10/2013-24/11/2013	24,476.00	0.85	20.80
25/11/2013-25/12/2013	17,373.23	0.85	14.77
26/12/2013-25/01/2014	12,473.31	0.85	10.60
26/01/2014-22/02/2014	25,021.17	0.85	21.27
23/02/2014-25/03/2014	10,752.94	0.85	9.14
26/03/2014-24/04/2014	23,814.65	0.85	20.24
25/04/2014-25/05/2014	23,050.82	0.85	19.59
26/05/2014-24/06/2014	12,719.17	0.85	10.81
25/06/2014-25/07/2014	20,736.57	0.85	17.63
26/07/2014-25/08/2014	11,280.90	0.85	9.59
26/08/2014-24/09/2014	24,290.47	0.85	20.65
25/09/2014-25/10/2014	24,509.90	0.85	20.83
26/10/2014-24/11/2014	12,823.53	0.85	10.90
25/11/2014-25/12/2014	21,840.00	0.85	18.56
26/12/2014-25/01/2015	9,359.33	0.85	7.96
26/01/2015-22/02/2015	27,801.18	0.85	23.63
23/02/2015-19/03/2015	12,590.96	0.85	10.70
Total	506,551.92	0.85	430.57

c) Carbon dioxide emissions from electricity consumption ($PE_{EC,y}$)

$$PE_{EC,y} = EC_{PJ,y} * EF_{grid,y}$$

Where:

$PE_{EC,y}$ are CO₂ emissions from on-site electricity consumption attributable to the project activity (tCO₂e/year) .

$EC_{PJ,y}$ is the on-site electricity attributable to the project activity during the year y (MWh),

$EF_{grid,y}$ is the CO₂ emission factor for grid electricity during the year y (tCO₂/ MWh), which is 0.975 tCO₂e/MWh.

Since the seven out site collection stations were not used in this monitoring period and there was no electricity consumed in these stations in this monitoring period. $EC_{PJ,y}$ = electricity consumption at the project site measured by main meter installed at Huixin Substation.

$EC_{PJ,y}$ = 1,215.72 MWh, please refer to Table E.5 for monthly monitoring data. Therefore

$$PE_{EC,y} = EC_{PJ,y} * EF_{grid,y} = 1,215.72 \text{ MWh} * 0.975 \text{ tCO}_2\text{e/MWh} = 1,185.33 \text{ tCO}_2\text{e}$$

Table E.5. Monitored data for $EC_{PJ,y}$

Period	Data from meter reading (MWh)	Data on Sales Receipt (MWh)	Maximum value of meter reading and sales receipt (MWh)	Data for ERs calculation (MWh)
	D2	E2	F2=MAX(D2,E2)	G2=F2
26/12/2012-25/01/2013	0.00	0.00	0.00	0.00
26/01/2013-22/02/2013	118.80	118.80	118.80	118.80
23/02/2013-25/03/2013	192.72	192.72	192.72	192.72
26/03/2013-24/04/2013	42.24	42.24	42.24	42.24

25/04/2013-25/05/2013	0.00	0.00	0.00	0.00
26/05/2013-24/06/2013	0.00	0.00	0.00	0.00
25/06/2013-25/07/2013	0.00	0.00	0.00	0.00
26/07/2013-25/08/2013	139.92	139.92	139.92	139.92
26/08/2013-24/09/2013	80.52	80.52	80.52	80.52
25/09/2013-25/10/2013	67.32	67.32	67.32	67.32
26/10/2013-24/11/2013	0.00	0.00	0.00	0.00
25/11/2013-25/12/2013	99.00	99.00	99.00	99.00
26/12/2013-25/01/2014	99.00	99.00	99.00	99.00
26/01/2014-22/02/2014	0.00	0.00	0.00	0.00
23/02/2014-25/03/2014	0.00	0.00	0.00	0.00
26/03/2014-24/04/2014	0.00	0.00	0.00	0.00
25/04/2014-25/05/2014	36.96	36.96	36.96	36.96
26/05/2014-24/06/2014	47.52	47.52	47.52	47.52
25/06/2014-25/07/2014	0.00	0.00	0.00	0.00
26/07/2014-25/08/2014	0.00	0.00	0.00	0.00
26/08/2014-24/09/2014	0.00	0.00	0.00	0.00
25/09/2014-25/10/2014	0.00	0.00	0.00	0.00
26/10/2014-24/11/2014	138.60	138.60	138.60	138.60
25/11/2014-25/12/2014	35.64	35.64	35.64	35.64
26/12/2014-25/01/2015	80.52	80.52	80.52	80.52
26/01/2015-22/02/2015	36.96	36.96	36.96	36.96
23/02/2015-19/03/2015	0.00	0.00	0.00	0.00
Total	/	/	/	1,215.72

d) Methane emissions from combustion of biomass residues ($PE_{\text{biomass,CH}_4,y}$)

$$PE_{\text{biomass,CH}_4,y} = EF_{\text{CH}_4,\text{BF}} * \sum_k BF_{k,y} * NCV_k$$

Where:

$PE_{\text{biomass,CH}_4,y}$ are the project emissions from biomass controlled burning (tCO₂e/year) ,

$BF_{k,y}$ is the quantity of the biomass residues used as fuel in the project plant during the year y in tons

NCV_k is the net calorific value of the biomass residues type k in GJ per ton, and

$EF_{\text{CH}_4,\text{BF}}$ is the CH₄ emission factor for controlled burning of the biomass residues in tCH₄/TJ, which is 0.0000411 tCH₄/GJ.

$PE_{\text{biomass,CH}_4,y} = 245.26 \text{ tCH}_4$, please refer to Table E.6 for details.

Table E.6. Monitoring data and calculation of $PE_{\text{biomass,CH}_4,y}$

Period	BF1, dry base (t)	BF2, dry base (t)	BF3, dry base (t)	NCV1, dry base (GJ/t)	NCV2, dry base (GJ/t)	NCV3, dry base (GJ/t)	$EF_{\text{CH}_4,\text{BF}}$ (tCH ₄ /GJ)	$PE_{\text{biomass,CH}_4,y}$ (tCH ₄)
	M1	M2	M3	Q1	Q2	Q3	R	$S=R*(M1*Q1+M2*Q2+M3*Q3)$
26/12/2012-25/01/2013	5,673.11	6,685.96	61.53	14.56	16.24	11.91	0.0000411	7.89
26/01/2013-22/02/2013	2,353.79	6,496.00	4.02	14.56	16.24	11.91	0.0000411	5.75
23/02/2013-25/03/2013	12,673.29	6,028.93	184.01	14.56	16.24	11.91	0.0000411	11.70
26/03/2013-24/04/2013	14,728.90	7,464.43	78.33	14.56	16.24	11.91	0.0000411	13.83
25/04/2013-25/05/2013	10,704.50	6,842.92	110.90	14.56	16.24	11.91	0.0000411	11.03
26/05/2013-24/06/2013	6,889.18	2,692.07	945.89	14.22	15.83	12.65	0.0000411	6.27
25/06/2013-25/07/2013	8,998.85	1,567.20	2,682.26	14.22	15.83	12.65	0.0000411	7.67

26/07/2013-25/08/2013	16,350.89	4,383.76	630.24	14.22	15.83	12.65	0.0000411	12.74
26/08/2013-24/09/2013	5,519.26	10,077.17	425.36	14.22	15.83	12.65	0.0000411	10.00
25/09/2013-25/10/2013	7,729.76	10,343.73	4.15	14.22	15.83	12.65	0.0000411	11.25
26/10/2013-24/11/2013	1,457.81	10,025.09	9.22	14.22	15.83	12.65	0.0000411	7.38
25/11/2013-25/12/2013	5,877.99	8,381.92	0.00	13.98	15.95	12.33	0.0000411	8.87
26/12/2013-25/01/2014	6,722.62	6,656.52	0.00	13.98	15.95	12.33	0.0000411	8.23
26/01/2014-22/02/2014	2,352.37	4,728.74	10.31	13.98	15.95	12.33	0.0000411	4.46
23/02/2014-25/03/2014	13,351.65	11,718.53	0.00	13.98	15.95	12.33	0.0000411	15.35
26/03/2014-24/04/2014	14,874.95	7,979.27	0.00	13.98	15.95	12.33	0.0000411	13.78
25/04/2014-25/05/2014	10,710.09	4,721.37	0.00	13.98	15.95	12.33	0.0000411	9.25
26/05/2014-24/06/2014	5,155.71	3,050.60	2.16	14.91	16.10	11.94	0.0000411	5.18
25/06/2014-25/07/2014	10,723.29	4,193.26	13.41	14.91	16.10	11.94	0.0000411	9.35
26/07/2014-25/08/2014	1,607.15	8,133.06	1,074.81	14.91	16.10	11.94	0.0000411	6.89
26/08/2014-24/09/2014	1,651.45	5,860.08	2,444.83	14.91	16.10	11.94	0.0000411	6.09
25/09/2014-25/10/2014	1,342.60	14,816.64	1,556.21	14.91	16.10	11.94	0.0000411	11.39
26/10/2014-24/11/2014	2,270.78	13,927.92	813.15	14.91	16.10	11.94	0.0000411	11.01
25/11/2014-25/12/2014	643.58	8,699.04	1,087.73	14.56	16.55	12.50	0.0000411	6.86
26/12/2014-25/01/2015	2,539.18	10,060.15	3,936.76	14.56	16.55	12.50	0.0000411	10.38
26/01/2015-22/02/2015	1,731.95	5,413.36	1,605.78	14.56	16.55	12.50	0.0000411	5.54
23/02/2015-19/03/2015	941.89	8,876.32	1,004.11	14.56	16.55	12.50	0.0000411	7.12
Total	175,576.57	199,824.00	18,685.18	/	/	/	/	245.26

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH_4} * PE_{biomass,CH_4,y}$$

$$= 4,360.54 \text{ tCO}_2\text{e} + 1,360.82 \text{ tCO}_2\text{e} + 1,185.33 \text{ tCO}_2\text{e} + (7.89^5 \text{ tCH}_4 * 21 \text{ tCO}_2\text{e/tCH}_4 + 237.37^6 \text{ tCH}_4 * 25 \text{ tCO}_2\text{e/tCH}_4) = 13,006.52 \text{ tCO}_2\text{e}$$

E.3. Calculation of leakage

The data of available biomass and biomass utilized out of the project in the region covering a radius of 50km around the project activity was calculated from official data provided by local government.

Please refer to Table E.7 for details.

Table E.7 Demonstration of abundant surplus of biomass availability

Year		Cotton Straw	Wood residues	Wheat bran
2013	Annual available amount (10 ⁴ tonnes)	100.60	123.40	9.78
	Other use, excluding the Project (10 ⁴ tonnes)	20.81	33.15	1.42
	Biomass utilized by the project (10 ⁴ tonnes)	15.22	12.44	0.68
	Total biomass utilized, including the project	36.03	45.59	2.10
	Available Biomass/Total biomass utilized -100%	179%	171%	367%
	Abundant surplus? (more than 25%)	Yes	Yes	Yes

⁵ PE_{biomass,CH₄,y} in 26/12/2012-25/01/2013.

⁶ PE_{biomass,CH₄,y} in 26/01/2013-19/03/2015.

2014	Annual available amount (10 ⁴ tonnes)	102.35	122.10	9.95
	Other use, excluding the Project (10 ⁴ tonnes)	20.55	31.22	1.42
	Biomass utilized by the project (10 ⁴ tonnes)	11.70	14.55	0.94
	Total biomass utilized, including the project	32.25	45.77	2.36
	Available Biomass/Total biomass utilized -100%	217%	167%	322%
	Abundant surplus? (more than 25%)	Yes	Yes	Yes

Note: The data of available biomass and biomass utilized out of the project in the region was calculated from official data provided by local government. The leakage information in 2015 will be assessed in the next monitoring period.

From Table E.7, it can be concluded that the available quantity of biomass in the region in year 2013~2014 is 25% larger than the quantity of biomass that is utilized, including the project.

Therefore, according to the approved changed PDD.

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

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

>>

The project achieves the GHG emissions by the way of CO₂ emission reductions through the substitution of electricity generation in North China Grid (NCG), CH₄ emission reductions from a reduction of natural decay or uncontrolled burning of biomass ($ER_{\text{electricity},y}$, $BE_{\text{biomass},y}$) by deducting the project emissions (PE_y) and leakage emissions (L_y).

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)
	$ER_{\text{electricity},y}$ (t CO ₂ e)	$BE_{\text{biomass},y}$ (t CO ₂ e)	PE_y	L_y	ER_y
Total	426,679.11	19,320.65	13,006.52	0	432,993

E.5. Comparison of actual emission reductions or net 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 CO ₂ e)	313,769 ⁷	432,993

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

>>

The total emission reductions achieved in this monitoring period (26/12/2012-19/01/2015) is 432,993 tCO₂e which is 7.34% higher compared with the estimated value^{8,9}, which is mainly because of the Net quantity of electricity delivered to grid is 4.30%¹⁰ higher compared with the estimated value in accepted PDD..

According to the requirement by EB 66th meeting, the annual amount of ERs to be issued to this project activity shall be capped at the average annual emissions reductions estimated in the original registered PDD, i.e. 140,695tCO₂e.

Therefore, the total emissions reductions achieved during this monitoring period (814 days) should be 313,769 tCO₂e

⁷ According to the requirement by EB 66th meeting, the annual amount of ERs to be issued to this Project shall be capped at the average annual emissions reductions estimated in the original registered PDD, i.e. 140,695 tCO₂ per year. Therefore, the amount of emission reductions which could be claimed during this monitoring period should be 313,769 tCO₂=140,695 tCO₂/365*814days.

⁸ 403,389 tCO₂e=180,881 tCO₂/365*814 days

⁹ 7.34% = (432,993 tCO₂e-403,389 tCO₂e) / 403,389 tCO₂e *100%

¹⁰ 4.30%= (195,684.78MWh of this MP-187,626MWh in accepted PDD) /187,626MWh*100%.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	<input checked="checked" type="checkbox"/> Project participant <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	National Bio Energy Co.,Ltd.
Street/P.O. Box	Deshengmen Wai
Building	Old Administration Building, No. 1 Beishatan
City	Chaoyang District, Beijing
State/region	-
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Country	People's Republic of China
Telephone	+86 10 6350 5377
Fax	+86 10 6350 5344
E-mail	wangchunli@sgecs.sgss.com.cn
Website	-
Contact person	Chunli Wang
Title	-
Salutation	Mr.
Last name	Wang
Middle name	-
First name	Chunli
Department	-
Mobile	-
Direct fax	+86 10 6350 5344
Direct tel.	+86 10 6350 5377
Personal e-mail	wangchunli@sgecs.sgcc.com.cn

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	EDF Trading Limited
Street/P.O. Box	80 Victoria Street, Cardinal Place
Building	-
City	London
State/region	-
Postcode	SW1E 5JL
Country	United Kingdom
Telephone	+44 207 061 4000
Fax	+44 207 061 5000
E-mail	-
Website	www.edftrading.com
Contact person	-
Title	-
Salutation	Mr.
Last name	ROWLAND
Middle name	-
First name	Justin
Department	-
Mobile	-
Direct fax	+44 207 061 5000
Direct tel.	+44 207 061 4000
Personal e-mail	cdm.team@edftrading.com

Project participant and/or responsible person/ entity	<input type="checkbox"/> Project participant <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	Beijing LvYuanRenHe Investment Consulting Co., Ltd
Street/P.O. Box	Wudaokou Road
Building	Huaqingjiayuan Building
City	Beijing
State/region	Beijing
Postcode	100083
Country	People's Republic of China
Telephone	86-010-13466709793
Fax	-
E-mail	gzg13066@hotmail.com
Website	-
Contact person	Guo Zhigang
Title	CEO
Salutation	Mr.
Last name	Guo
Middle name	-
First name	Zhigang
Department	-
Mobile	86-010-13466709793
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Direct tel.	86-010-13466709793
Personal e-mail	gzg13066@hotmail.com

Appendix 2. The energy balance calculation for the verification period

The total inputs of all types of fuels combusted and useful output of electricity from the project are presented below. From this data the conversion efficiency of the project in this period is calculated as 26.38%.

Table A-1. The energy input and electricity output in the project activity in this period

	BFi, dry base (t)	Energy (GJ)
BF1	175,577	2,517,044.58
BF2	199,824	3,219,548.88
BF3	18,685	230,690.29
Electricity exported (GJ)		4,376.59
Total		5,971,660.35
Electricity exported (GJ)		1,575,430.56
Efficiency		26.38%

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
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 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.
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