Monitoring report form (Version 03.1)

Monitoring report

Title of the project activity	Yicheng Biomass Cogeneration Project in Hubei Province, China
Reference number of the project activity	3089
Version number of the monitoring report	01
Completion date of the monitoring report	07/04/2013
Registration date of the project activity	30/11/2010
Monitoring period number and duration of this monitoring period	Monitoring period number:2nd Duration: 01/10/2011- 31/12/2012 (first and last days included, 458days in total)
Project participant(s)	Project Owner: Anneng (Yicheng) Biomass Thermo-Electricity Co., Ltd. CERs Buyer: Emissionshandels Gesellschaft Bavaria GmhH
Host Party(ies)	People's Republic of China
Sectoral scope(s) and applied methodology(ies)	Sectoral scope 1: Energy industries (Renewable/ non-renewable sources) Applied methodology: ACM0006, "Consolidated methodology for electricity generation from biomass residues", version10
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	179,477 tCO_2
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	176,983 tCO_2

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Yicheng Biomass Cogeneration Project in Hubei Province, China (hereafter referred to as "the project") is a newly-built biomass cogeneration project. It installs two 75 t/h biomass direct burning boilers and two 12 MW steam turbines and two generators, so the total installed capacity is 24 MW. In the registered PDD[1], the annual operation hours are estimated to be 6,500h with a load factor of 74.2 % (6,500h/8,760h), the estimated annual electricity generation is 156,000 MWh, the estimated annual grid connected electricity is 141,960MWh, and the estimated annual steam generation is 529,740 GJ. The generated electricity is delivered to the Central China Power Grid (hereafter referred to as *CCPG*) and it is estimated that the heat will be supplied to surrounding industrial and commercial heat/steam end users.

When the project is put into operation, it can help reduce GHG emissions from CCPG, which is dominated by fossil fuel fired power plants, and can reduce CO_2 emissions from coal fired boilers through clean heat/steam generation. Moreover, the project uses biomass in high efficiency for energy purpose, which can reduce CH_4 emissions due to the biomass is dumped or left to decay or burned in an uncontrolled manner in the absence of the project.

In the registered PDD, it is stated that "Considering the conservativeness of the emission reductions, the project owner finally decided not to claim the emission reductions due to displacement of heat. So the emission reductions due to displacement of heat ($ER_{Heat,y}$) is zero in all the crediting periods". The estimated annual GHG emission reductions are 143,033 tCO2e in the registered PDD.

The construction of the project started on 23/07/2008. The first set of steam turbine and generator unit was commissioned at 2:00 on 09/03/2010, and the second at 16:00 on 16/05/2010.

The Project was registered on 30/11/2010.

The total emission reductions achieved in this monitoring period are 176,983tCO_2.

A.2. Location of project activity

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The project power plant is located in Yicheng City, Hubei Province, China. The concrete coordinate at the gate of the power plant was north latitude of 31.71°(i.e. 31°42′36″) and east longitude of 112.28°(i.e. 112°16′48″)[2].

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 if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host)	Anneng (Yicheng) Biomass Thermo-Electricity Co. Ltd	No
Germany	Emissionshandels Gesellschaft Bavaria GmbH	No

[1] http://cdm.unfccc.int/Projects/DB/TUEV-SUED1256564957.94/view

[2] The evidence of the coordinates of the project measured on-site by Yicheng City Planning Bureau has been submitted to DOE. The coordinates in the registered PDD is at the FSR stage, and the above is measured on-site after the project's operation. So there is a little difference between them.

A.4. Reference of applied methodology

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The approved baseline and monitoring methodology applied in the proposed project activity is ACM0006, "Consolidated methodology for electricity generation from biomass residues" (version 10, EB 52)

Tools and other methodologies to which the applied methodology refers include:
1. Methodology ACM0002, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version 11, EB52),
2. "Tool to calculate the emission factor for an electricity system" (version 02, EB50),
3. "Combined tool to identify the baseline scenario and demonstrate additionality" (version 02.2, EB 28),
4. "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (version 02, EB 41), and
5. "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01, EB39).

A.5. Crediting period of project activity

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A renewable crediting period of 7×3 years has been chosen for this project. The first 7-year crediting period that corresponds to this monitoring period starts on 30/11/2010 and ends on 29/11/2017.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The project adopts biomass direct combustion technology for power generation. The biomass fuels are collected at the straw-collecting stations at first, and then packed and transported to the project power plant. The biomass fuels may be stored and then are shredded before being fed into the power generating system and burnt. The power generating system consists of two 75 t/h biomass direct burning boilers and two 12 MW steam turbines and two generators, which are manufactured by domestic companies. Key technical specifications of boilers, steam turbines and generators are listed as Table 1 below:

Table 1 Key technical specifications of boilers, steam turbines and generators

Boilers	
Items	**Parameters**
Model	HX75/9.8-IV1
Quantity	2
Manufacturer	China Western Power Industrial Co. Ltd.
Boiler rated evaporating capacity (t/h)	75
Rated pressure at the exit of Super heater (MPa)	9.8
Rated Temperature at the exit of Super heater (℃)	540
Boiler feed-water temperature (℃)	215
Lifetime of the boilers	30 years
Steam turbines	
Model	C12-8.83/0.98
Quantity	2
Manufacturer	Qingdao Jieneng Steam Turbines Group Sharing Co. Ltd
Rated capacity (MW)	12
Rated put-in steam pressure (MPa)(a)	8.83±0.49
Rated put-in steam temperature (℃)	535（+5, -10）
Rated rotating speed (r/min)	3,000
Rated Extraction steam pressure (MPa)(a)	0.98
Rated/Maximum Extraction steam amount(t/h)	30/50
Lifetime of the steam turbines	No less than 30 years
Generators	
Model	QF-12-2 (or QF1-12-2A)
Quantity	2
Manufacturer	Qingdao Jieneng Steam Turbines Group Sharing Co. Ltd and Dongfang Electric Consortium Dongfeng Electric Machinery Co., Ltd.
Rated capacity (MW)	12
Rated voltage (kV)	6.3
Capacity factor	0.8
Rated frequency (HZ)	50
Rated rotating speed (r/min)	3,000
The efficiency	≥97%
Lifetime of the generators	No less than 30years

Note:

1. Explanation Letter on the change of the model and manufacture of the boiler issued by the manufacture

has been submitted to DOE. Furthermore, the change is only for the nameplate and the name of manufacture, and it will have none of effect on essence and performance of equipments.

2. As for the model of the generators, according to the purchase agreement of turbines and generators the model is QF-12-2, and the model in the nameplate is QF1-12-2A. “12” means 12MW, and “2” means two poles, and “1” in the QF1-12-2A means the first time design, and “A” in the QF1-12-2A means the design serial number. The basic and key parameters of them are the same.
3. As for the manufacture of the generators, according to the purchase agreement of turbines and generators signed between the project owner and Qingdao Jieneng Steam Turbines Group Sharing Co. Ltd, it is regulated and said in this agreement that the generator will be manufactured by Dongfang Electric Consortium Dongfeng Electric Machinery Co., Ltd. So the manufacture of the generators in the nameplates is Dongfang Electric Consortium Dongfeng Electric Machinery Co., Ltd.

The voltage of electricity at the outlets of the two generators is 6.3 kV, and will be increased to 35 kV by the main transformers and then sent to Baimiao Substation through two 35 kV circuits, finally to CCPG.

The construction of the project started on 23/07/2008. The first set of steam turbine and generator unit was commissioned at 2:00 on 09/03/2010, and the second at 16:00 on 16/05/2010.

According to the overhaul record submitted by the project owner(this evidence has been submitted to DOE), 1# Steam turbine was overhauled in January and April 2012, and 2# Boiler was overhauled in December 2011 and December 2012. The overhauls were completed successfully, and they didn’t effect the operation of the project and there is none of major change in equipments.

No malfunction or change of equipment has taken place. Moreover, no events or situations have occurred during this monitoring period that could have impacted the applicability of the applied methodology.

The biomass fuels are directly combusted in boilers to generate steam, which is subsequently expanded through turbines to drive generators to produce electricity.

The whole technical process, as described above, is summarized in the following diagram.

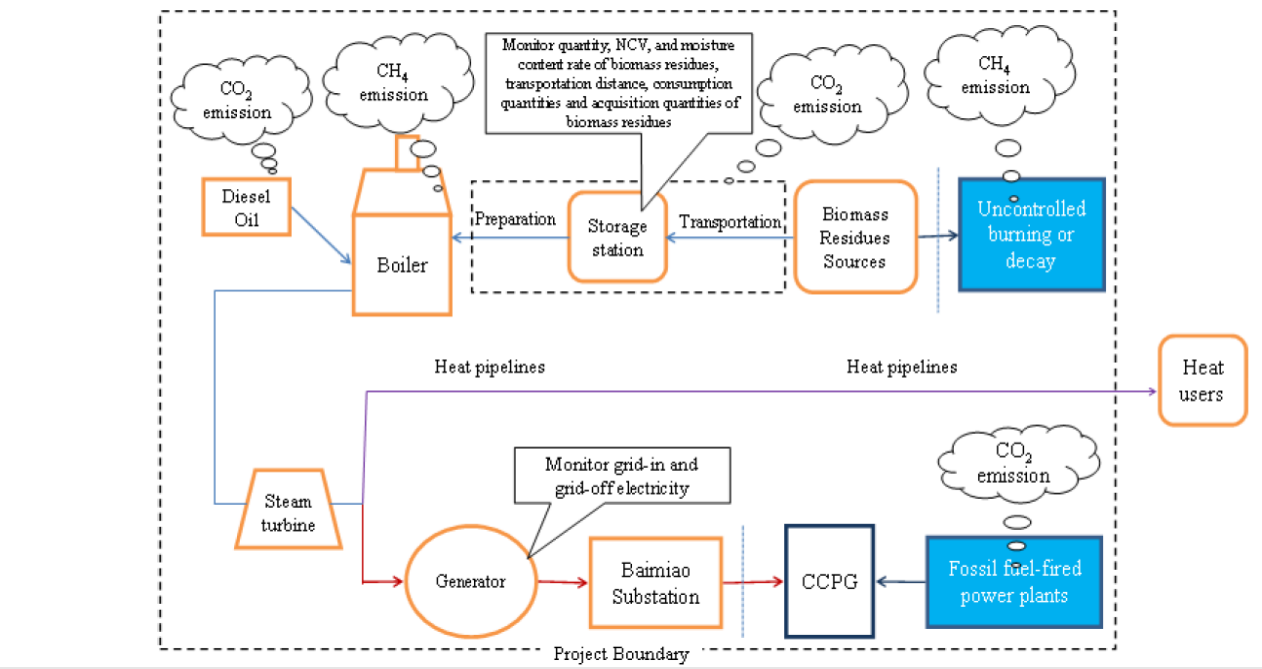

Figure 1 Technical process diagram

B.2. Post registration changes

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

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No temporary deviations from registered monitoring plan or applied methodology have been applied during this monitoring period.

B.2.2. Corrections

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No corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report.

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

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No permanent changes from the registered monitoring plan or applied methodologies have been submitted with this monitoring report.

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

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No changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report.

B.2.5. Changes to start date of crediting period

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No changes to the start date of the crediting period have been approved during this monitoring period or submitted with this monitoring report.

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 monitoring system is designed in accordance with the requirements of "Consolidated methodology for electricity generation from biomass residues" (version 10).

C.1. Data collection procedures

For all data need to be monitored and detailed monitoring information, please see section D of this monitoring report.

C.2. Organizational structure and responsibilities

The organization for CDM monitoring of Anneng (Yicheng) Biomass Thermo-Electricity Co. Ltd. is as follows:

The vice president is in charge of CDM

The vice president of Anneng (Yicheng) Biomass Thermo-Electricity Co. Ltd. will be the person in charge of CDM, who is in charge of issues related to CDM projects, in particular: track the development of CDM, keep in touch with EB, DOE and relevant agencies; supervise the project operation related to data monitoring and the monitoring process as well and ensure a smooth and orderly monitoring process.

The CDM manager

One of the engineers will be the CDM manager, who is in charge of the everyday CDM management, including the statistics of the monitored data, calculation of emission reduction and work with DOE to do the validation and verification work.

The CDM monitoring team

Several workers will form the CDM monitoring team to do the concrete monitoring work including monitoring, record, calibration and maintenance of the equipment etc.

The above can be figured out as follows:

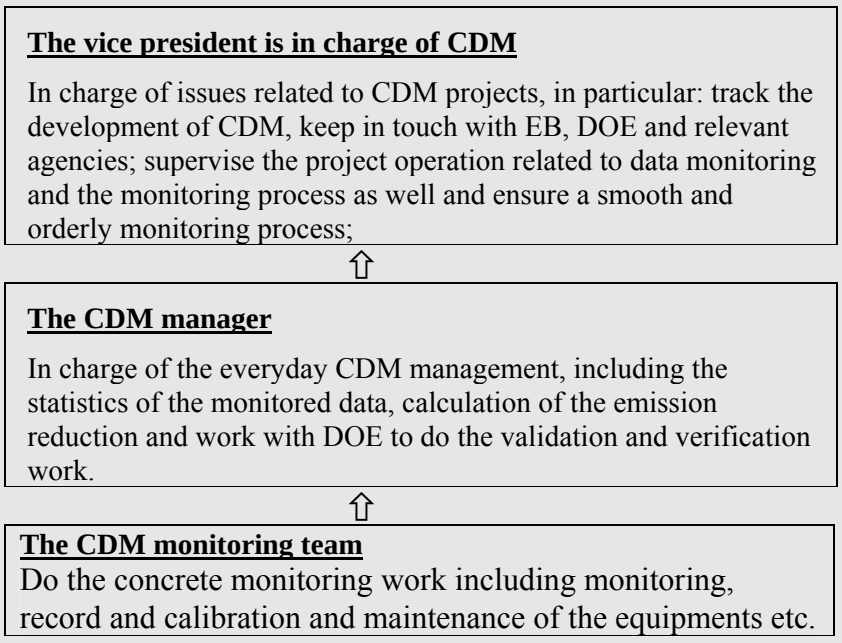

Figure 2 Organizational structure

C.3. Monitoring diagram

C.3.1 The meters

As the registered PDD, grid-connected electricity will be recorded in the positive way and the electricity provided by the grid to the plant will be recorded in the negative way by the main meters of the project. Furthermore, the backup meters will be installed at the output ends of the generators and at the output of the high voltage side of the main transformer. The backup meters are the back-ups of the main meters.
The accuracy level for all main meters and backup meters is 0.2S.

The meters are listed as follows:

Table2 List of the meters adopted by the project

Name	Num.	Place	Location points	Model	Serial No.	Accuracy level
Anyi 51 (backup)	M1	Exit of #1 generator	Equipment cabinet	DTSD341	20081167020074	0.2S
Anyi 71 (backup)	M2	Exit of #2 generator	Equipment cabinet	DTSD341	20081167020076	0.2S
Anyi 31 (backup)	M3	High voltage side of #1 main transformer	Equipment cabinet	DTSD341	9040060580297	0.2S
Anyi 32 (backup)	M4	High voltage side of #2 main transformer	Equipment cabinet	DTSD341	9040060580296	0.2S
Anyi 34 (main)	M5	Ⅰ grid-connected line	35kv switch house	MK6E	S/N:209151404	0.2S
Anyi 35 (main)	M6	Ⅱ grid-connected line	35kv switch house	MK6E	S/N:209151403	0.2S

The monitoring system diagram of the electricity of the project is as follows:

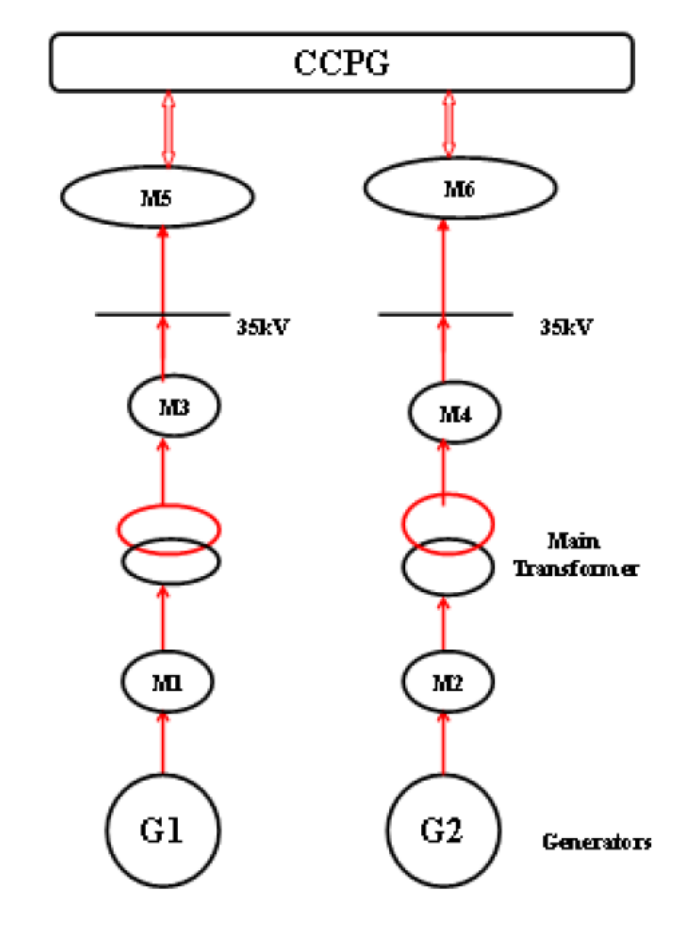

Figure 3 Monitoring system diagram of the electricity generation

C.3.2 The monitoring equipments for biomass

The monitoring equipment for the biomass quantities transported to the project site ($BF_{T,k,y}$) and combusted in the project plant ($BF_{k,y}$), moisture content rate, and NCV of biomass residues (NCV_k) are listed below:

Table3 List of the monitoring equipments related to the biomass utilization

Name	Location point	Model	Manufacturing number	Accuracy level
#1 the electronic truck scale	Storage yard	SCS-50	9050001	0.3S
#2 the electronic truck scale	Storage yard	SCS-50	11050003	0.3S
#1 the electronic belt	The place before the boilers	WPC-2000	JB1400-1	0.3S
#2 the electronic belt	The place before the boilers	WPC-2000	JB1400-2	0.3S
#1 electronic moisture analyzer	Laboratory inside the project	MA150	24208686	0.1S
#1 calorimetric meter	Laboratory inside the project	SDC5015	1809099	0.1S

#1 moisture meter	Weighbridge house	MS100	1222	0.1S
#2 moisture meter	Weighbridge house	MS100	1264	0.1S
#3 moisture meter	Weighbridge house	MS100	1266	0.1S

The monitoring diagram is shown below.

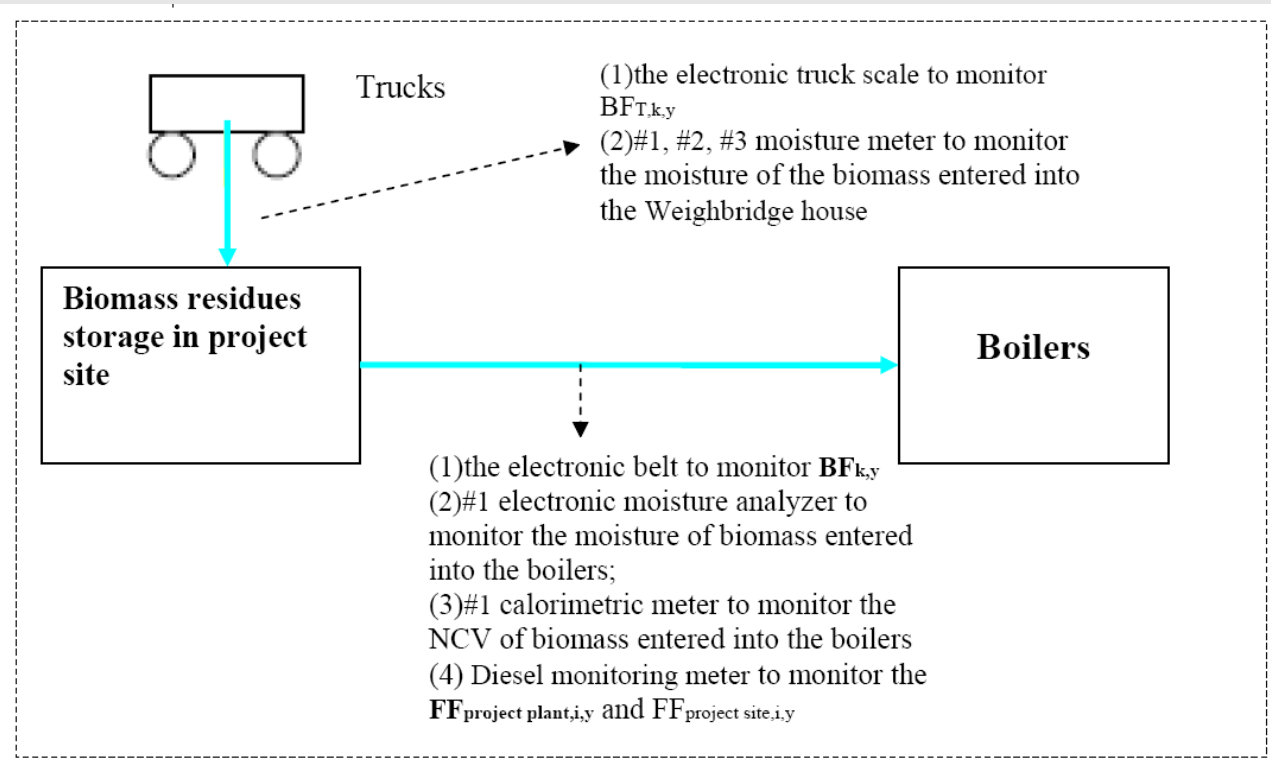

Figure 4 Monitoring system diagram of biomass utilization

During this monitoring period, the meters and monitoring equipment operated normally and no emergency occurred.

SECTION D. Data and parameters

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

Data / Parameter:	$EF_{grid, CM, y}$
Unit:	tCO_2e/MWh
Description:	CM emission factor of CCPG
Source of data:	The registered PDD (Version 05, completed on 20/11/2010)
Value(s) applied):	0.99695
Purpose of data:	Calculation of baseline emission
Additional comment:	None

D.2. Data and parameters monitored

Data / Parameter:	$BF_{k,y}$
Unit:	tons of dry matter
Description:	Quantity of biomass residue type *k* combusted in the project plant during the year *y*
Measured/ Calculated / Default:	Measured (for wet matter), adjusted based on the moisture content
Source of data:	On-site measurements
Value(s) of monitored parameter:	

	Rice straw	Cotton straw	Rape stalk
2011-10-01 - 2011-10-31	8215.95	9203.95	0.00
2011-11-01 - 2011-11-30	14381.78	6030.64	0.00
2011-12-01 - 2011-12-31	12145.36	2304.59	0.00
2012-01-01 - 2012-01-31	3162.30	5397.85	0.00
2012-02-01 - 2012-02-29	9902.72	2951.08	0.00
2012-03-01 - 2012-03-31	5624.18	5119.66	0.00
2012-04-01 - 2012-04-30	11519.65	3964.59	0.00
2012-05-01 - 2012-05-31	13034.01	1935.30	7767.75
2012-06-01 - 2012-06-30	14323.60	0.00	5409.81
2012-07-01 - 2012-07-31	10859.59	0.00	9951.80
2012-08-01 - 2012-08-31	3013.86	6045.83	7507.75
2012-09-01 - 2012-09-30	21766.41	0.00	0.00
2012-10-01 - 2012-10-31	7620.04	12919.63	0.00
2012-11-01 - 2012-11-30	22416.62	0.00	0.00
2012-12-01 - 2012-12-31	4902.68	10850.60	0.00
Total	**162888.75**	**66723.70**	**30637.12**

Monitoring equipment:	Equipment: #1 the electronic belt Type: WPC-2000 Accuracy class: 0.3S Serial number: JB1400-1 Calibration frequency: Once per year Date of last calibration: 04/03/2011, 04/03/2012 Validity: Up to 03/03/2013 Equipment: #2 the electronic belt Type: WPC-2000 Accuracy class: 0.3S Serial number: JB1400-2 Calibration frequency: Once per year Date of last calibration: 04/03/2011, 04/03/2012 Validity: Up to 03/03/2013
Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded.
Calculation method (if applicable):	Quantity of dry matter = quantity of wet matter × (1-moisture content)
QA/QC procedures:	Crosscheck the measurements with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of baseline emissions and project emissions
Additional comment:	None

Data / Parameter:	$BF_{T,k,y}$
Unit:	tons of dry matter
Description:	Quantity of biomass residue type k that has been transported to the project site during the year y where k are the types of biomass residues used in the project plant in year y
Measured/ Calculated / Default:	Measured (for wet matter), adjusted based on the moisture content
Source of data:	On-site measurements
Value(s) of monitored parameter:	Refer to Section E.2 and the data base. (The project owner sets up the data base of monitoring parameters based on the normal original monitoring data.)

Monitoring equipment:	Equipment: #1 the electronic truck scale Type: SCS-50 Accuracy class: 0.3S Serial number: 9050001 Calibration frequency: Once per year Date of last calibration: 04/03/2011, 02/03/2012 Validity: Up to 01/03/2013 Equipment: #2 the electronic truck scale Type: SCS-50 Accuracy class: 0.3S Serial number: 11050003 Calibration frequency: Once per year Date of last calibration: 16/08/2011, 02/03/2012 Validity: Up to 01/03/2013
Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded
Calculation method (if applicable):	Quantity of dry matter = quantity of wet matter × (1-moisture content)
QA/QC procedures:	Crosscheck the measurements with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	Moisture content of the biomass residues
Unit:	% Water content
Description:	Moisture content of biomass residue type *k*
Measured/ Calculated / Default:	Measured
Source of data:	On-site measurements
Value(s) of monitored parameter:	As for rice straw, the weighted mean value of moisture content in this monitoring period is 19.30%; As for cotton stalk, the weighted mean value of moisture content in this monitoring period is 26.90%; As for rape stalk, the weighted mean value of moisture content in this monitoring period is 23.03%; The details please refer to in section E.1 and the data base.

Monitoring equipment:	(1)As for the moisture of the biomass entered into the Weighbridge house, it is monitored by #1, #2, #3 moisture meter: Equipment: #1, #2, #3 moisture meter Accuracy class: 0.1S Serial number: 1222, 1264, 1266 Type: MS100 Calibration frequency: once half a year Date of calibration: As for 1#, 08/09/2011, 07/03/2012, 31/08/2012 Validity: valid to 27/02/2013; As for 2#, 08/09/2011, 07/03/2012, 31/08/2012 Validity: valid to 27/02/2013; As for 3#, 08/09/2011, 07/03/2012, 31/08/2012 Validity: valid to 27/02/2013. (2)As for the moisture of biomass entered into the boilers (This parameter is used to calculate $BE_{biomass,y}$ and $PE_{Biomass,CH4,y}$ in the following section E.): Equipment: #1 electronic moisture analyzer Accuracy class: 0.1S Serial number: 24208686 Type: MA150 Calibration frequency: once half a year Date of calibration: 09/09/2011, 07/03/2012, 31/08/2012 Validity: valid to 27/02/2013
Measuring/ Reading/ Recording frequency:	Measured continuously, recorded monthly
Calculation method (if applicable):	The monthly simple mean value of each type of biomass is worked out.
QA/QC procedures:	The monitoring instrument will be regularly calibrated as per related technical standard.
Purpose of data:	Calculation of baseline emissions and project emissions
Additional comment:	None

Data / Parameter:	AVD_y
Unit:	km
Description:	Average round trip distance (from and to) between biomass fuel supply sites and the project site
Measured/ Calculated / Default:	Records
Source of data:	Records by project participants
Value(s) of monitored parameter:	50*2=100, To be conservative, the longest distance between biomass fuel supply sites and the project site is used.

Monitoring equipment:	Check consistency of distance records provided by the truckers by comparing recorded distances with other information from other sources (e.g. maps); The relative maps have been submitted to DOE.
Measuring/ Reading/ Recording frequency:	Measured continuously
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Check consistency of distance records provided by the truckers by comparing recorded distances with other information from other sources (e.g. maps).
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	N_y
Unit:	-
Description:	Number of truck trips for the transportation of biomass.
Measured/ Calculated / Default:	On-site measurements
Source of data:	Records by project participants
Value(s) of monitored parameter:	N_y in this monitoring period sums to be 38010. The details please refer to in section E.2 and the data base
Monitoring equipment:	Since the quantity of the biomass residues and the transportation times of each truck is continuously recorded at the plant site, the total amount of truck numbers are recorded continuously correspondingly.
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Check consistency of the number of truck trips with the quantity of biomass combusted, e.g. by the relation with previous years
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	$EF_{km,CO2,y}$
Unit:	tCO_2/km
Description:	Average CO_2 emission factor for the trucks during the year *y*
Measured/ Calculated / Default:	Default
Source of data:	Default value for the Moderate Control in Table 1-32 of "Estimated Emission Factors for US Heavy Duty Diesel Vehicles" on Page 1.75 in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual

Value(s) of monitored parameter:	1.011×10^{-3}
Monitoring equipment:	Review the appropriateness of the data
Measuring/ Reading/ Recording frequency:	Review the appropriateness of the data annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Cross check with the values from literature at least annually
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	$EF_{CO2,diesel,y}$
Unit:	tC/TJ
Description:	CO_2 emission factor for diesel
Measured/ Calculated / Default:	Default
Source of data:	The table1.3 "default values of carbon content" Chapter 1 of 2006 IPCC Guidelines for national greenhouse gas inventories :default carbon content for diesel oil: 20.2 kg/GJ
Value(s) of monitored parameter:	0.07406667=20.2*44/12000
Monitoring equipment:	Review the appropriateness of the data
Measuring/ Reading/ Recording frequency:	Review the appropriateness of the data annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	$FF_{project\ plant,i,y}$
Unit:	ton/year
Description:	Quantity of fossil fuel type *i* combusted in the project plant during the year *y*.
Measured/ Calculated / Default:	Measured
Source of data:	Readings records

Value(s) of monitored parameter:	As stated in the registered PDD, according to the Explanation and Clarification for the Start-up way of the boiler provided by China City Environment Protection Engineering Limited Company and by the boiler manufacturer, the project will use the dry biomass to start up the boiler and the fossil fuels such as the diesel or natural gas won't be used. Furthermore, it is stated in the registered PDD that "This should include fossil fuels co-fired in the project plant but not any other fuel consumption at the project site that is attributable to the project activity (e.g. for mechanical preparation of the biomass residues)". In this monitoring period, the project indeed hasn't used the diesel to start up, thus 0 was combusted in the project plant.
Monitoring equipment:	Diesel monitoring meter
Measuring/ Reading/ Recording frequency:	Continuously measuring and monthly recording
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	$FF_{project\ site,i,y}$
Unit:	mass or volume unit per year
Description:	Quantity of fossil fuel type i combusted at the project site for other purposes that are attributable to the project activity during the year *y*
Measured/ Calculated / Default:	On-site measurements
Source of data:	Readings records
Value(s) of monitored parameter:	The monitoring and measurement result of $FF_{project\ site,i,y}$ in this monitoring period sums to be 194.96 tons. For details please see section E.2.2.2.
Monitoring equipment:	Diesel monitoring meters: Accuracy class: ＜±0.30%, and the industry standard of accuracy class is ±0.30%, so the accuracy class fully meets the industry standard. Calibration frequency: nearly once three months Date of calibration: 22/11/2011, 21/02/2012, 20/05/2012, 19/08/2012, 18/11/2012 Validity: valid to 17/02/2013
Measuring/ Reading/ Recording frequency:	Continuously measuring and monthly recording
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Cross-check the measurements with an annual energy balance that is based on purchased quantities and stock changes. The data from the invoices of diesel has been collected and the invoices have been submitted to DOE for cross check.

Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	$EG_{project\ plant,y}$
Unit:	MWh
Description:	Net quantity of electricity generated in the project plant during the year *y*
Measured/ Calculated / Default:	Measured
Source of data:	Meter readings records
Value(s) of monitored parameter:	

Period	Measurement from meters(A)	Data from sales Receipt of electricity exported to the Grid (B)	MIN of A and B(C=min(A,B))
2011-10-01 - 2011-10-31	14,455,106	14,455,106	14,455,106
2011-11-01 - 2011-11-30	11,578,959	13,309,750	11,578,959
2011-12-01 - 2011-12-31	7,909,432	7,893,796	7,893,796
2012-01-01 - 2012-01-31	4,454,822	4,428,947	4,428,947
2012-02-01 - 2012-02-29	7,367,354	7,364,338	7,364,338
2012-03-01 - 2012-03-31	7,951,944	7,951,944	7,951,944
2012-04-01 - 2012-04-30	12,038,208	12,038,208	12,038,208
2012-05-01 - 2012-05-31	15,324,586	15,324,586	15,324,586
2012-06-01 - 2012-06-30	12,524,518	12,514,518	12,514,518
2012-07-01 - 2012-07-31	10,970,437	10,970,437	10,970,437
2012-08-01 - 2012-08-31	12,066,957	12,066,957	12,066,957
2012-09-01 - 2012-09-30	14,395,479	14,384,392	14,384,392
2012-10-01 - 2012-10-31	15,511,515	15,511,515	15,511,515
2012-11-01 - 2012-11-30	15,859,872	15,859,872	15,859,872
2012-12-01 - 2012-12-31	11,739,832	11,739,832	11,739,832
Total	**174,149,021**	**175,814,198**	**174,083,407**

Monitoring equipment:	M5 and M6 (main meters) Accuracy class: both 0.2S Type: both MK6E Serial number: S/N:209151404 (For M5), S/N:209151403 (For M6) Calibration frequency: once a year Date of calibration: 22/08/2011, 20/06/2012 for both Validity: valid to 19/06/2013 for both M1,M2,M3, M4(backup meters) Accuracy class: 0.2S for all Type: DTSD341 for all Serial number: 20081167020074(For M1), 20081167020064(For M2), 9040060580297(For M3), 9040060580296(For M4) Calibration frequency: once a year Date of calibration: 22/08/2011, 20/06/2012 for all Validity: valid to 19/06/2013 for all
Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures:	The consistency of metered net electricity generation should be crosschecked with receipts from electricity sales (if available) and the quantity of fuels fired (e.g. check whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency that is comparable to previous years).
Purpose of data:	Calculation of baseline emissions
Additional comment:	None

Data / Parameter:	$EC_{1,PJ,y}$
Unit:	MWh
Description:	$EC_{1,PJ,y}$ in the formula of "Emission reductions due to displacement of electricity", and it means "the auxiliary electricity consumption by the project plant (e.g. for pumps, vans, etc)".
Measured/ Calculated / Default:	Measured
Source of data:	Meter readings records

Value(s) of monitored parameter:

Period	Measurement from meters(D)	Data from sales Receipt of electricity imported from the Grid (E)	MAX of D and E (F=max(D,E))
2011-10-01 - 2011-10-31	0	0	0
2011-11-01 - 2011-11-30	21, 000	21, 000	21, 000
2011-12-01 - 2011-12-31	0	0	0
2012-01-01 - 2012-01-31	0	0	0
2012-02-01 - 2012-02-29	86, 450	86, 450	86, 450
2012-03-01 - 2012-03-31	29, 050	29, 050	29, 050
2012-04-01 - 2012-04-30	22, 400	22, 400	22, 400
2012-05-01 - 2012-05-31	17, 850	17, 850	17, 850
2012-06-01 - 2012-06-30	0	0	0
2012-07-01 - 2012-07-31	4, 200	4, 200	4, 200
2012-08-01 - 2012-08-31	24, 850	24, 850	24, 850
2012-09-01 - 2012-09-30	0	0	0
2012-10-01 - 2012-10-31	0	0	0
2012-11-01 - 2012-11-30	30, 450	30, 450	30, 450
2012-12-01 - 2012-12-31	24, 150	24, 150	24, 150
Total	**260, 400**	**260, 400**	**260, 400**

Monitoring equipment:	M5 and M6 (main meters) Accuracy class: both 0.2S Type: both MK6E Serial number: S/N:209151404 (For M5), S/N:209151403 (For M6) Calibration frequency: once a year Date of calibration: 22/08/2011, 20/06/2012 for both Validity: valid to 19/06/2013 for both M1,M2,M3, M4(backup meters) Accuracy class: 0.2S for all Type: DTSD341 for all Serial number: 20081167020074(For M1), 20081167020064(For M2), 9040060580297(For M3), 9040060580296(For M4) Calibration frequency: once a year Date of calibration: 22/08/2011, 20/06/2012 for all Validity: valid to 19/06/2013 for all
Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Cross-check measurement results with invoices for purchased electricity if available
Purpose of data:	Calculation of baseline emissions

Additional comment:	None

Data / Parameter:	TDL_y
Unit:	%
Description:	The average technical distribution losses rate from power transmission site to power consumption site
Measured/ Calculated / Default:	Default
Source of data:	According to "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", adopt the default value
Value(s) of monitored parameter:	20%
Monitoring equipment:	Not applicable
Measuring/ Reading/ Recording frequency:	Not applicable
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	NCV_i
Unit:	GJ/t
Description:	Net calorific value of the fossil fuel type *i* (*i*: diesel)
Measured/ Calculated / Default:	Default
Source of data:	China Energy Statistical Yearbook (2011)
Value(s) of monitored parameter:	42.652
Monitoring equipment:	Review the appropriateness of the data annually
Measuring/ Reading/ Recording frequency:	Review the appropriateness of the data annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Project owner has checked the consistency of national data with default values by the IPCC, in table 1.2, Chapter 1, volum2 of IPCC 2006 manual, it stated that the Net Calorific Value of diesel is 0.043 TJ/tonne which differs little with updated China Energy Statistical Yearbook 2011. So, 42.652 GJ/ton was thought to be suitable and accurate.

Purpose of data:	Calculation of project emissions
Additional comment:	None

Data / Parameter:	NCV_k
Unit:	GJ/t
Description:	Net calorific value of biomass residue type *k*
Measured/ Calculated / Default:	Measured
Source of data:	As for calculation of baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues, to use 0.0027 tCH_4 per ton of biomass as a default value for the product of NCV_k and $EF_{burning,CH4,k,y}$. As for calculation of methane emissions from combustion of biomass residues, the NCV must be monitored ex-ante.
Value(s) of monitored parameter:	As for calculation of baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues, to determine the CH_4 emission factor, project participants will use referenced default values. In the absence of more accurate information, it is recommended to use 0.0027 t CH4 per ton of biomass as a default value for the product of NCV_k and $EF_{burning,CH4,k,y}$. As for calculation of methane emissions from combustion of biomass residues, measurements shall be carried out at reputed laboratories and according to relevant international standards. Measure the NCV based on dry biomass. The measurements for NCV_k of biomass residues have been carried out at reputed laboratory (the national key laboratory on coal burning, Huazhong University of Science and Technology) and according to relevant international standards at least every six months. The three test reports in July 2011, January 2012 and July 2012 have been submitted to DOE. This parameter will have small changes during this monitoring period and the sum value or the average value for this has no meanings. Refer to in section E.2. The data from internal lab of the project is used for cross-check. According to the three test reports in July 2011, January 2012 and July 2012 by the national key laboratory on coal burning, Huazhong University of Science and Technology, the NCV_k is as follows: ● In the test report in July 2011: NCV_k for rice straw, rape stalk and cotton stalk respectively: 11.56, 13.01, 12.97 ● In the test report in January 2012: NCV_k for rice straw, rape stalk and cotton stalk respectively: 14.85; 14.99; 15.61; ● In the test report in July 2012: NCV_k for rice straw, rape stalk and cotton stalk respectively: 14.89; 15.67; 14.97; The above parameters have been adopted in section E.

Monitoring equipment:	The measurements for NCV_k of biomass residues have been carried out at reputed laboratory (the national key laboratory on coal burning, Huazhong University of Science and Technology) and according to relevant international standards at least every six months. The three test reports in July 2011, January 2012 and July 2012 have been submitted to DOE. The data from internal lab of the project is used for cross-check. The monitoring equipment of the internal lab of the project is as follows: Type: #1 calorimetric meter Accuracy class: 0.1S Serial number:1809099 Calibration frequency: once a year Date of calibration: 08/03/2011; 02/03/2012 Validity: valid to 01/03/2013
Measuring/ Reading/ Recording frequency:	As for the measurements for NCV_k of biomass residues carried out at reputed laboratory: at least every six months. As for internal lab of the project, during the operation day, when which kind of biomass is combusted, its NCV is monitored once on this day.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of baseline emissions and project emissions
Additional comment:	None

Data / Parameter:	$EF_{burning,CH4,k,y}$
Unit:	tCH_4/GJ
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
Value(s) of monitored parameter:	As for calculation of baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues, to determine the CH_4 emission factor, project participants will use referenced default values. In the absence of more accurate information, it is recommended to use 0.0027 t CH_4 per ton of biomass as a default value for the product of NCV_k and EFburning,$CH_{4,k,y}$.
Monitoring equipment:	Review of default values
Measuring/ Reading/ Recording frequency:	Review of default values: annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Value is from latest version of IPCC, so the uncertainty is low.
Purpose of data:	Calculation of baseline emissions
Additional comment:	None

Data / Parameter:	$BF_{utilized,k,y}$
Unit:	tons
Description:	Quantity of biomass residues of type k that are utilized for energy generation and as feedstock etc in the defined geographical region
Measured/ Calculated / Default:	Measured
Source of data:	Directly from the statistics issued by the local agriculture government
Value(s) of monitored parameter:	Refer to the table in section E.3 of the monitoring report
Monitoring equipment:	Not applicable
Measuring/ Reading/ Recording frequency:	Measured and recorded annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of leakage
Additional comment:	None

Data / Parameter:	$BF_{available,k,y}$
Unit:	tons
Description:	Quantity of biomass residues of type k available in the region
Measured/ Calculated / Default:	Measured
Source of data:	Directly from the statistics issued by the local agriculture government.
Value(s) of monitored parameter:	Refer to the table in section E.3 of the monitoring report
Monitoring equipment:	Not applicable
Measuring/ Reading/ Recording frequency:	Measured and recorded annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of leakage
Additional comment:	None

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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E.1.1. Emission reductions due to displacement of electricity

Emission reductions due to the displacement of electricity are calculated as follows:

$$ER_{Electricity,y} = EG_y \times EF_y = (EG_{project\ plant,y} - EC_{1,PJ,y}) \times EF_y$$

Where:

$ER_{electricity,y}$	Emission reductions due to displacement of electricity during the year y (tCO_2e/yr)
EG_y	Net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year y (MWh)
EF_y	CO2 emission factor for the electricity displaced due to the project activity during the year y (tCO2/MWh)
$EG_{project\ plan,y}$	Net quantity of electricity generated in the project plant during the year y
$EC_{1,PJ,y}$	The auxiliary electricity consumption by the project plant

According to regulation by methodology ACM0006, the on-site electricity consumption attributable to the project activity ($EC_{PJ,y}$) should include all electricity consumption that is consumed by the project activity (e.g. for mechanical treatment of the biomass), except for auxiliary electricity consumption by the project plant (e.g. for pumps, vans, etc).The auxiliary electricity consumption by the project plant should be considered in the calculation of the net quantity of electricity generation in the project plant ($EG_{project\ plant,y}$). According to the above regulation by methodology ACM0006, $EC_{1,PJ,y}$ in the formula of "Emission reductions due to displacement of electricity" means "the auxiliary electricity consumption by the project plant (e.g. for pumps, vans, etc)". Thus the net quantity of increased electricity generation as a result of the project activity (EG_y) equals to the net quantity of electricity generated in the project plant ($EG_{Project\ Plant,\ y}$) minus the auxiliary electricity consumption by the project plant ($EC_{1,PJ,y}$).

Because the capacity of the project plant is more than 15MW, $EF_{grid,CM,y}$ is calculated as a combined margin (CM) of the CCPG, following the guidance in the section "Baselines" in methodology ACM0002 (version 11). And as per ACM0002 (version 11), the emission factor $EF_{grid,CM,y}$ is calculated according to "Tool to calculate the emission factor for an electricity system" (version 02). In the registered PDD of the project, $EF_{grid,CM,y}$ is determined ex ante as 0.99695 tCO_2/MWh, which will be fixed during the first crediting period.

During the monitoring period,

$$ER_{Electricity,y} = EG_y \times EF_y = (EG_{project\ plant,y} - EC_{1,PJ,y}) \times EF_y$$

= (174,083.407 MWh – 260.4 MWh)× 0.99695 tCO_2/MWh = 173,292.85 tCO_2e

E. 1.2. Emission reductions or increases due to displacement of heat ($ER_{Heat,y}$)

Because the project owner finally decided not to claim the emission reductions due to displacement of heat, this step is not applicable.

biomass residues

The calculation formula of baseline emission produced by biomass residues uncontrolled burning or aerobic decay is as below:

$$BE_{biomass,y} = GWP_{CH4} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k \cdot EF_{burning,CH4,k,y}$$

Where:

$BE_{biomass,y}$	Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO_2e/yr)
GWP_{CH4}	Global Warming Potential of methane valid for the commitment period (tCO_2e/tCH_4), which is 21 tCO_2e/tCH_4 for the crediting period
$BF_{PJ,k,y}$	Incremental quantity of biomass residue 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 residue type k (GJ/ton of dry matter or GJ/liter)
$EF_{burning,CH4,k,y}$	CH_4 emission factor for uncontrolled burning of the biomass residue type k during the year y (tCH_4/GJ)
k	Types of biomass residues for which the identified baseline scenario is B1 or B3 and for which leakage effects could be ruled out with one of the approaches L1, L2 or L3

It is recommended in methodology ACM0006 to use 0.0027 tCH_4/t of biomass as a default value for the product of NCV_k and $EF_{burning,CH4,k,y}$, and the uncertainty can be deemed to be greater than 100%, resulting in a conservativeness factor of 0.73. Thus, in this case an emission factor of 0.001971 tCH_4/t biomass should be used.

During the monitoring period,

$$BE_{biomass,y} = GWP_{CH4} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k \cdot EF_{burning,CH4,k,y}$$

= 21 tCO_2e/tCH_4 × (162,888.75 + 66,723.70 + 30,637.12) t biomass × 0.001971 tCH_4/t biomass
= 10,771.99 tCO_2e

E. 1.4. Total baseline emissions

The baseline emissions of the project are the sum of emission reductions due to displacement of electricity and baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues:

$$BE_y = ER_{electricity,y} + BE_{biomass,y}$$

Where:

$BE_{,y}$	Baseline emissions during the year y (tCO_2e/yr)
$ER_{electricity,y}$	Emission reductions due to displacement of electricity during the year y (tCO_2e/yr)
$BE_{biomass,y}$	Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO_2e/yr)

During the monitoring period,

$$BE_y = ER_{electricity,y} + BE_{biomass,y}$$

= 173,292.85 tCO_2e + 10,771.99 tCO_2e =184,064.84 tCO_2e

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

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Project emissions include CO_2 emissions from transportation of biomass residues to the project site (PET_y), CO_2 emissions from on-site consumption of fossil fuels due to the project activity (PE_{FFy}), CO_2 emissions from consumption of electricity ($PE_{EC,y}$), CH_4 emissions from the combustion of biomass residues ($PE_{Biomass,CH4,y}$),

Calculate as below:

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH4} \times (PE_{Biomass,CH4,y} + PE_{WW,CH4,y})$$

Where:

PET_y	CO_2 emissions during the year y due to transportation of biomass residues to the project plant (tCO_2)
$PEFF_{,y}$	CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility or other fossil fuel consumption at the project site that is attributable to the project activity (tCO_2)
$PE_{EC,y}$	CO_2 emissions during the year y due to electricity consumption at the project site that is attributable to the project activity (tCO_2)
GWP_{CH4}	Global Warming Potential for methane valid for the relevant commitment period
$PE_{Biomass,CH4,y}$	CH_4 emissions from the combustion of biomass residues during the year y (tCH_4)
$PE_{WW,CH4,y}$	CH_4 emissions from waste water generated from the treatment of biomass residues in the year y (tCH_4)

E.2.1. CO_2 emissions from transportation of biomass residues (PET_y)

Transporting biomass to the project site is normally done by trucks, which results in direct GHG emissions. Project participants choose the Option 1 listed in the ACM0006 to determine emissions: an approach based on distance and vehicle type.

$$PET_y = N_y \times AVD_y \times EF_{km,CO2,y}$$

Where:

PET_y	CO_2 emissions during the year *y* due to transport of the biomass residues to the project plant (tCO_2)
N_y	Number of truck trips during the year *y*
AVD_y	Average round trip distance (from and to) between the biomass residue fuel supply sites and the site of the project plant during the year *y* (km)
$EF_{km,CO2,y}$	Average CO_2 emission factor for the trucks measured during the year *y* (tCO_2/km)

N_y is monitored in the monitoring period, and the measurement result is as follows:

Table 4 PET_y

Period	N_y	AVD_y(km)	$EF_{km,CO2,y}$
2011-10-01 - 2011-10-31	2750		

2012-05-01 - 2012-05-31	1326	100	1.011×0.001
2012-06-01 - 2012-06-30	1487		
2012-07-01 - 2012-07-31	2294		
2012-08-01 - 2012-08-31	2268		
2012-09-01 - 2012-09-30	3348		
2012-10-01 - 2012-10-31	3440		
2012-11-01 - 2012-11-30	2967		
2012-12-01 - 2012-12-31	1921		
Total	38010		

$PET_y = N_y \times AVD_y \times EF_{km, CO2, y} = 38010 \times 100 \times 1.011 \times 0.001 = 3842.81\ tCO_2e$

Note: N_y is recorded continuously by project owner; the original records and the calculation process have been submitted to DOE. The value is also checked with the number of truck trips with the quantity of biomass combusted. The storage at the end of the monitoring period is 17,004.19 t which is less than that at the beginning, and consumed quantity (wet) during the monitoring period is 332,910.5 t, so the calculated average truck load is around 8.31 t. There are several suppliers with several kinds of transportation vehicles, and the supplied quantity of each time varies a lot, the actual range is around 3t to 13t, so the value is within normal range.

E.2.2. CO_2 emissions from on-site consumption of fossil fuels ($PEFF_y$)

E.2.2.1. As for $FF_{project\ plan,i,y}$

As stated in the registered PDD, according to the Explanation and Clarification for the Start-up way of the boiler provided by China City Environment Protection Engineering Limited Company and by the boiler manufacturer, the project will use the dry biomass to start up the boiler and the fossil fuels such as the diesel or natural gas won't be used.

Furthermore, it is stated in the registered PDD that "This ($FF_{project\ plant,i,y}$) should include fossil fuels co-fired in the project plant but not any other fuel consumption at the project site that is attributable to the project activity (e.g. for mechanical preparation of the biomass residues)".

In this monitoring period, according to the monitoring data, the project indeed hasn't used the diesel to start up. So, $FF_{project\ plant,i,y}$ in this monitoring period is zero.

E.2.2.2. As for $FF_{project\ site,i,y}$

$FF_{project\ site,i,y}$ (i is diesel) is monitored in the monitoring period, and the measurement result is as follows:

Table 5 $FF_{project\ site,i,y}$(ton)

Period	The monitoring data
2011-10-01 - 2011-10-31	10.31
2011-11-01 - 2011-11-30	17.33
2011-12-01 - 2011-12-31	7.10
2012-01-01 - 2012-01-31	4.55
2012-02-01 - 2012-02-29	7.01
2012-03-01 - 2012-03-31	8.17
2012-04-01 - 2012-04-30	13.91
2012-05-01 - 2012-05-31	17.06

2012-06-01 - 2012-06-30	15.06
2012-07-01 - 2012-07-31	13.40
2012-08-01 - 2012-08-31	14.03
2012-09-01 - 2012-09-30	16.65
2012-10-01 - 2012-10-31	17.73
2012-11-01 - 2012-11-30	18.71
2012-12-01 - 2012-12-31	13.95
Total	**194.96**

In order to be conservative, the maximum value of 194.96 tons has been adopted to calculate the ER.

So, $FF_{project\ site,i,y}$ in this monitoring period is 194.96 tons.

As per methodology ACM0006 (version 10), CO_2 emissions from on-site combustion of fossil fuels ($PEFF_y$) should be calculated using the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02). The CO_2 emissions from on-site consumption of fossil fuels (diesel) are calculated as follows:

$$PEFF_y = FF_{project,diesel,y} \times NCV_{diesel,y} \times EF_{diesel,y}$$

Where:

$PEFF_y$	CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility or other fossil fuel consumption at the project site that is attributable to the project activity (tCO_2e/yr)
$FF_{project\ plant,diesel,y}$	Quantity of diesel combusted in the biomass residue fired power plant during the year *y* (mass unit per year)
$FF_{project\ site,diesel,y}$	Quantity of diesel combusted at the project site for other purposes that are attributable to the project activity during the year *y* (mass unit per year)
$COEF_{diesel}$	the CO_2 emission factor for diesel (tCO_2/GJ)

The CO_2 emission coefficient $COEF_{diesel}$ is calculated based on net calorific value and CO_2 emission factor of diesel, as follows:

$$COEF_{diesel,y} = NCV_{diesel,y} \times EF_{diesel,y}$$

Where:

$COEF_{diesel,y}$	the CO_2 emission factor for diesel in year y (tCO_2/GJ)
$NCV_{diesel,y}$	the net calorific value of diesel in year y (GJ/ton)
$EF_{diesel,y}$	the CO_2 emission factor of diesel in year y (tCO_2/GJ)

Therefore,

$$PEFF_y = (FF_{projectplant,diesel,y} + FF_{projectsite,diesel,y}) \times NCV_{diesel,y} \times EF_{diesel,y}$$

During the monitoring period, the NCV of diesel(GJ/t) is 42.652, and the emission factor of diesel（tC/TJ）is 20.20, so $PEEF_y$ is calculated to be:

$$PEFF_y = (FF_{projectplant,diesel,y} + FF_{projectsite,diesel,y}) \times NCV_{diesel,y} \times EF_{diesel,y}$$

= (0+194.96) ton ×42.652 GJ/t×20.20 tC/TJ*44/12000=615.89 tCO_2e.

E.2.3. CO_2 emissions from electricity consumption ($PE_{EC,y}$)

According to regulation by methodology ACM0006, the calculation of the project emission due to electricity consumption should adopt the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01, EB39).

It can be calculated as follows:

$PE_{EC,y}=EC_{2,PJ,y}\times EF_{grid,CM,y}\times(1+TDL_y)$

Where:

$PE_{EC,y}$	CO_2 emissions from on-site electricity consumption attributable to the project activity. (tCO_2e/yr)
$EC_{2,PJ,y}$	On-site electricity consumption attributable to the project activity during the year *y* (MWh)
$EF_{grid,CM,y}$	CO_2 emission factor for grid electricity during the year *y* (tCO_2/MWh)
TDL_y	The average technical transmission and distribution losses in the CCPG in year y for the voltage level at which electricity is obtained from the CCPG at the project site

According to regulation by methodology ACM0006, the on-site electricity consumption attributable to the project activity ($EC_{2,PJ,y}$) should include all electricity consumption that is consumed by the project activity (e.g. for mechanical treatment of the biomass), except for auxiliary electricity consumption by the project plant (e.g. for pumps, vans, etc)($EC_{1,PJ,y}$).The auxiliary electricity consumption by the project plant ($EC_{1,PJ,y}$) should be considered in the calculation of the net quantity of electricity generation in the project plant ($EG_{project\ plant,y}$).

As for the proposed project, there is none of electricity consumption that is consumed by the project activity (e.g. for mechanical treatment of the biomass), so $EC_{2,PJ,y}$ here is zero. The auxiliary electricity consumption by the project plant (e.g. for pumps, vans, etc)($EC_{1,PJ,y}$) has been considered in the calculation of the net quantity of electricity generation in the project plant (EGproject plant,y).

Therefore:

$PE_{EC,y}=EC_{2,PJ,y}\times EF_{grid,CM,y}\times(1+TDL_y)$

$= 0\ MWh\times 0.99695\ tCO_2e/MWh\times(1+20\%)=0\ tCO_2e$

E.2.4. Methane emissions from combustion of biomass residues ($PE_{Biomass,CH4,y}$)

The emissions can be calculated as follows:

$$PE_{Biomass,CH4,y} = EF_{CH4,BF}\cdot\sum_k BF_{k,y}\cdot NCV_k$$

Where:

$PE_{Biomass,CH4,y}$	CH_4 emissions from the combustion of biomass residues during the year y (tCH_4/yr)
$BF_{k,y}$	Quantity of biomass residue type k combusted in the project plant during the year y (tons of dry matter or liter)
NCV_k	Net calorific value of the biomass residue type k (GJ/ton of dry matter or GJ/liter)
$EF_{CH4,BF}$	CH_4 emission factor for the combustion of biomass residues in the project plant (tCH_4/GJ)

$BF_{k,y}$ and NCV_k was monitored and their measurement result is as follows:

Table 6 Biomass,CH4,y

Period	BF_1 (wet,ton)	$Mositure_1$	BF_1 (dry,ton)	NCV_1 （MJ/ton）	BF_2 (wet,ton)	$Mositure_2$	BF_2 (dry,ton)	NCV_2 （MJ/ton）	BF_3 (wet,ton)	$Mositure_3$	BF_3 (dry,ton)	NCV_3 （MJ/ton）	$\sum_k BF_{k,y} \cdot NCV_k$ (MJ)
2011-10-01 - 2011-10-31	9659.00	14.94%	8215.95	14084.05	11541.00	20.25%	9203.95	15826.36	0.00	/	0.00	/	261378772.37
2011-11-01 - 2011-11-30	17319.10	16.96%	14381.78	14256.82	8288.40	27.24%	6030.64	11541.11	0.00	/	0.00	/	274638735.63
2011-12-01 - 2011-12-31	14476.00	16.10%	12145.36	13938.22	3160.00	27.07%	2304.59	15256.30	0.00	/	0.00	/	204444241.32
2012-01-01 - 2012-01-31	4150.00	23.80%	3162.30	14318.14	7469.00	27.73%	5397.85	15856.78	0.00	/	0.00	/	130870715.37
2012-02-01 - 2012-02-29	11627.00	14.83%	9902.72	13300.90	4113.00	28.25%	2951.08	14618.37	0.00	/	0.00	/	174854976.71
2012-03-01 - 2012-03-31	6568.00	14.37%	5624.18	13862.20	7359.00	30.43%	5119.66	14895.58	0.00	/	0.00	/	154223735.81
2012-04-01 - 2012-04-30	14423.00	20.13%	11519.65	9584.65	5960.00	33.48%	3964.59	10198.06	0.00	/	0.00	/	150842961.42
2012-05-01 - 2012-05-31	15664.00	16.79%	13034.01	10741.07	2854.00	32.19%	1935.30	9363.79	9951.00	21.94%	7767.75	10687.81	241141222.03
2012-06-01 - 2012-06-30	18425.00	22.26%	14323.60	9669.14	0.00	/	0.00	/	6925.00	21.88%	5409.81	10808.77	196970237.39
2012-07-01 - 2012-07-31	13762.00	21.09%	10859.59	10397.44	0.00	/	0.00	/	12997.00	23.43%	9951.80	11124.98	223625587.35
2012-08-01 - 2012-08-31	4316.00	30.17%	3013.86	10855.55	7744.11	21.93%	6045.83	11885.54	9930.89	24.40%	7507.75	10341.57	182217004.66
2012-09-01 - 2012-09-30	26902.00	19.09%	21766.41	10616.92	0.00	/	0.00	/	0.00	/	0.00	/	231092214.55
2012-10-01 - 2012-10-31	9807.00	22.30%	7620.04	10293.40	17657.00	26.83%	12919.63	11033.17	0.00	/	0.00	/	220980549.37
2012-11-01 - 2012-11-30	28091.00	20.20%	22416.62	10455.82	0.00	/	0.00	/	0.00	/	0.00	/	234384122.82
2012-12-01 - 2012-12-31	6645.00	26.22%	4902.68	9563.56	15127.00	28.27%	10850.60	10210.11	0.00	/	0.00	/	157672873.86
Total	**201834.10**		**162888.75**		**91272.51**		**66723.70**		**39803.89**		**30637.12**		**3039337950.64**

Note: The biomass residue type in "BF_1"is rice straw, the biomass residue type in "BF_2"is cotton stalk and the biomass residue type in "BF_3"is rape stalk.

Data source of NCV: the three test reports in July 2011, January 2012 and July 2012 by the national key laboratory on coal burning, Huazhong University of Science and Technology.

As per methodology ACM0006, the default CH_4 emission factor for all biomass utilized in the project activity is 30 kg CH_4/TJ, the uncertainty is then estimated to be 300%, resulting in a conservativeness factor of 1.37.

The corresponding project emission is as below:

$$PE_{Biomass,CH4,y} = EF_{CH4,BF} \cdot \sum_k BF_{k,y} \cdot NCV_k$$

$= 30 \times 1.37 \times 3{,}039{,}337{,}950.64 / 1{,}000{,}000 / 1{,}000$
$= 124.917$ tCH4

E.2.5. Methane emissions from waste water treatment ($PE_{WW,CH4,y}$)

According to the analysis in B.6.1 in the registered PDD, no waste water treatment is involved in the project activity. As a result, the emissions are zero.

E.2.6. Total project emissions

Project emissions include CO_2 emissions from transportation of biomass residues to the project site (PET_y), CO_2 emissions from on-site consumption of fossil fuels due to the project activity ($PEFF_y$), CO_2 emissions from consumption of electricity ($PE_{EC,y}$), and CH_4 emissions from the combustion of biomass residues ($PE_{WW,CH4,y}$):

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH4} \times (PE_{Biomass,CH4,y} + PE_{WW,CH4,y})$$

Where:

PET_y	CO_2 emissions during the year y due to transportation of biomass residues to the project plant (tCO_2)
$PEFF_{,y}$	CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility or other fossil fuel consumption at the project site that is attributable to the project activity (tCO_2)
$PE_{EC,y}$	CO_2 emissions during the year y due to electricity consumption at the project site that is attributable to the project activity (tCO_2)
GWP_{CH4}	Global Warming Potential for methane valid for the relevant commitment period
$PE_{Biomass,CH4,y}$	CH_4 emissions from the combustion of biomass residues during the year y (tCH_4)
$PE_{WW,CH4,y}$	CH_4 emissions from waste water generated from the treatment of biomass residues in the year y (tCH_4)

During the monitoring period,

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH4} \times (PE_{Biomass,CH4,y} + PE_{WW,CH4,y})$$

$= 3842.81\ tCO_2 + 615.89\ tCO_2 + 0\ tCO_2 + 21\ tCO_2e/tCH_4 \times (124.917\ tCH_4 + 0\ tCH_4) = 7{,}081.96\ tCO_2$

E.3. Calculation of leakage

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A detailed survey of the biomass supply/demand situation in the area has been arranged. According to the Statistics issued by Yicheng City Agriculture Bureau, the acquisition quantity and consumption quantity of biomass in Yicheng City are shown as below:

Table 7 Available and utilized quantity of Biomass residues

Type of biomass residues	Rice straw	Rape stalk	Cotton stalk	Total
1. Available quantity (10000 t)	56.72	11.13	16.73	84.58
2.Quantity utilized (10000t)	30.38	4.90	10.71	45.99
2.1 Quantity to be utilized at the project plant in this monitoring period(10000t)	20.18	3.98	9.13	33.29
2.2 Quantity utilized for other purposes (10000 t)	10.20	0.92	1.58	12.70
3. Ratio of available quantity vs. quantity utilized	1.87	2.27	1.56	

From the above, it is known that the biomass supply is far more than the demand by the project. The conclusion is the biomass supply to the project is sufficient and will not lead to the displacement of the current use of biomass as a fuel.

As shown above, it meets the requirement of L2 in the registered PDD. So, L_y is zero.

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_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	184,064.84	7,081.96	0	176,983

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 CO_2e)	179,477	176,983

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

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As the actual emission reductions achieved during the current monitoring period are lower than stated in the registered PDD of the project, this section is skipped.

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 CO_2e)	176,983	0

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Document information

Version	*Date*	*Description*
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.

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