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

CONTENTS

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

MONITORING REPORT
Version 01 20/06/2011

Yicheng Biomass Cogeneration Project in Hubei Province, China
Reference No. 3089
The 1st Monitoring Period:
30/11/2010-30/09/2011

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

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 tCO_2e 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 is registered on 30/11/2010.

The 1st monitoring period is chosen to be 30/11/2010-30/09/2011, and the project owner doesn't claim the emission reductions generated on the day of 30/11/2010. The total emission reductions achieved in this monitoring period (30/11/2010-30/09/2011) are 93,480 tCO_2e.

A.2. Project Participants

Name of Party involved (*)((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host)	Anneng (Yicheng) Biomass Thermo-Electricity Co. Ltd	No
Germany	Emissionshandels Gesellschaft Bavaria GmbH	No

A.3. Location of the project activity:

Yicheng City /Hubei Province/China

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

Its concrete coordinate at the gate of the power plant was north latitude of 31.6481° and east longitude of 112.7978°.

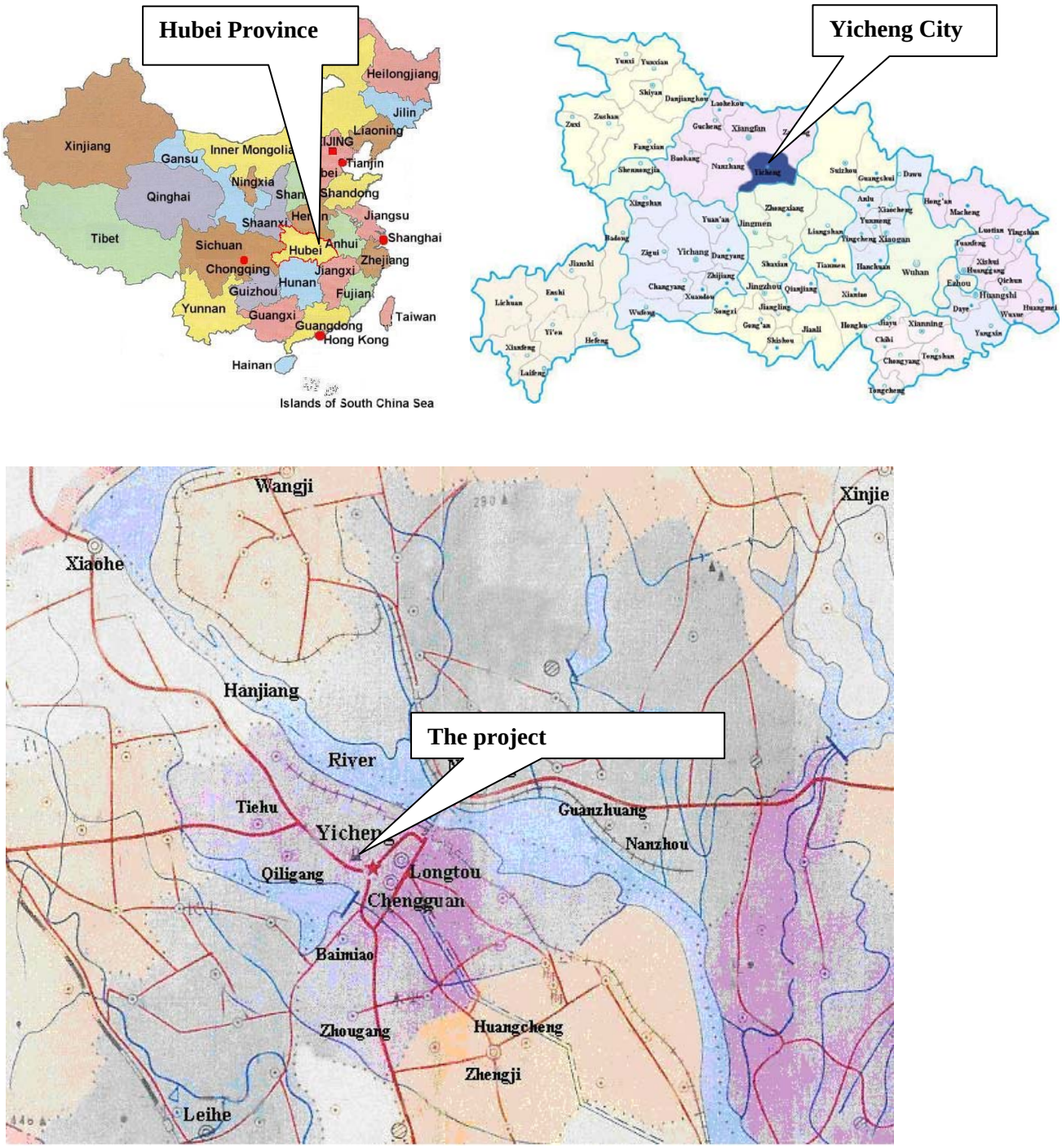

Figure 1 Location of the project

A.4. Technical description of the project

The project involves the installation of two 75 t/h biomass direct burning boilers, two 12 MW steam turbines and two 12MW 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 parameters of boilers, steam turbines and generators

Boilers	
Items	**Parameters**
Model	DGJ-75/9.8
Quantity	2
Manufacturer	Zigong Huaxi Energy Industrial Sharing 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	30years
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)	3000
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 30years
Generators	
Model	QF-12-2
Quantity	2
Manufacturer	Qingdao Jieneng Steam Turbines Group Sharing Co. Ltd
Rated capacity (MW)	12
Rated voltage (kV)	6.3
Capacity factor	0.8
Rated frequency (HZ)	50
Rated rotating speed (r/min)	3000
The efficiency	≥97%
Lifetime of the generators	No less than 30years

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 technical process diagram of the project is as follow:

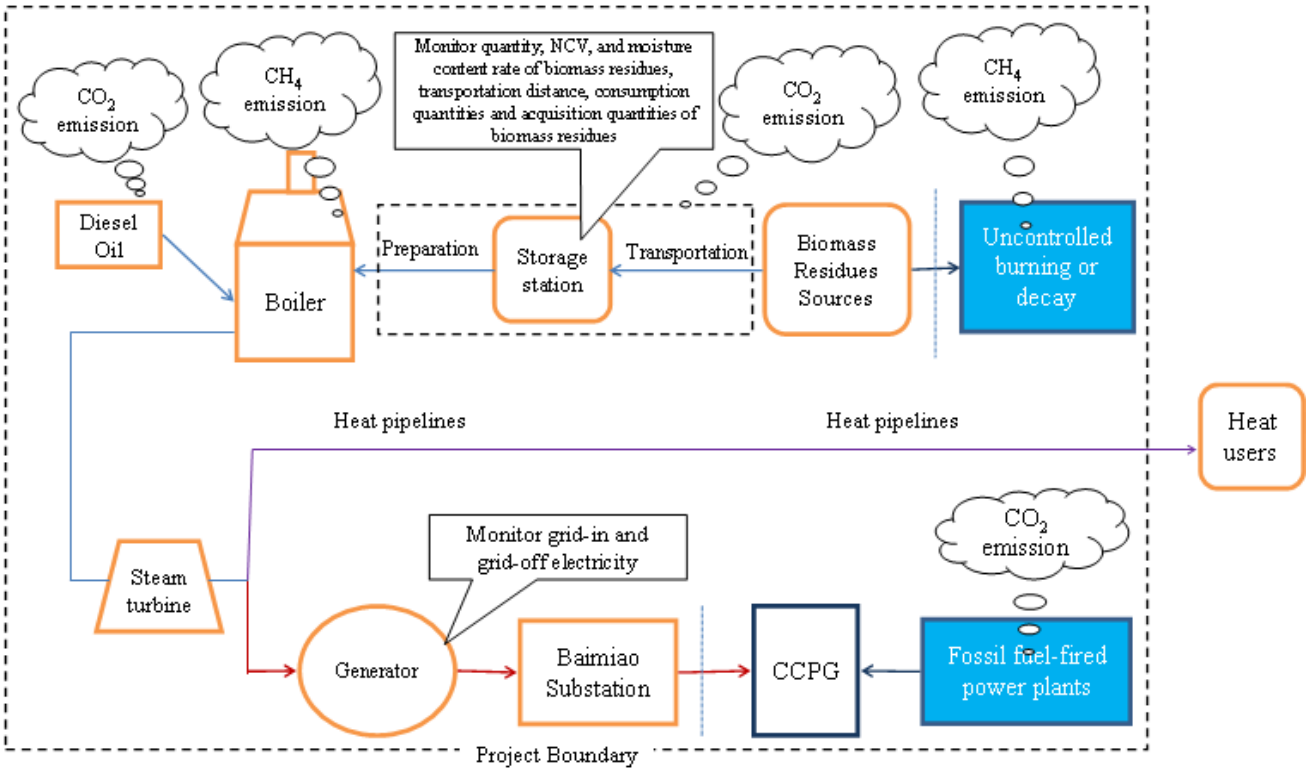

Figure 2 Technical process diagram

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

ACM0006 "Consolidated methodology for electricity generation from biomass residues in power and heat plants" (Version 10, EB52)

A.6. Registration date of the project activity:

30/11/2010 (The registered PDD: Version 05, completed on 20/11/2010)

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

30/11/2010-29/11/2017 (Renewable)

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

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SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

It installs two 75 t/h biomass direct burning boilers and two 12 MW steam turbines and two generators. 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.

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.

B.2. Revision of the monitoring plan

The monitoring plan is in accordance with the approved methodology applied by the project. No revision has been applied to the monitoring plan.

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

Monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. No request for deviation has been applied during this monitoring period.

B.4. Notification or request of approval of changes

There is no notification or request of approval of changes from the project activity as described in the registered CDM-PDD.

SECTION C. Description of the monitoring system

1. Data collection procedures

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

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:

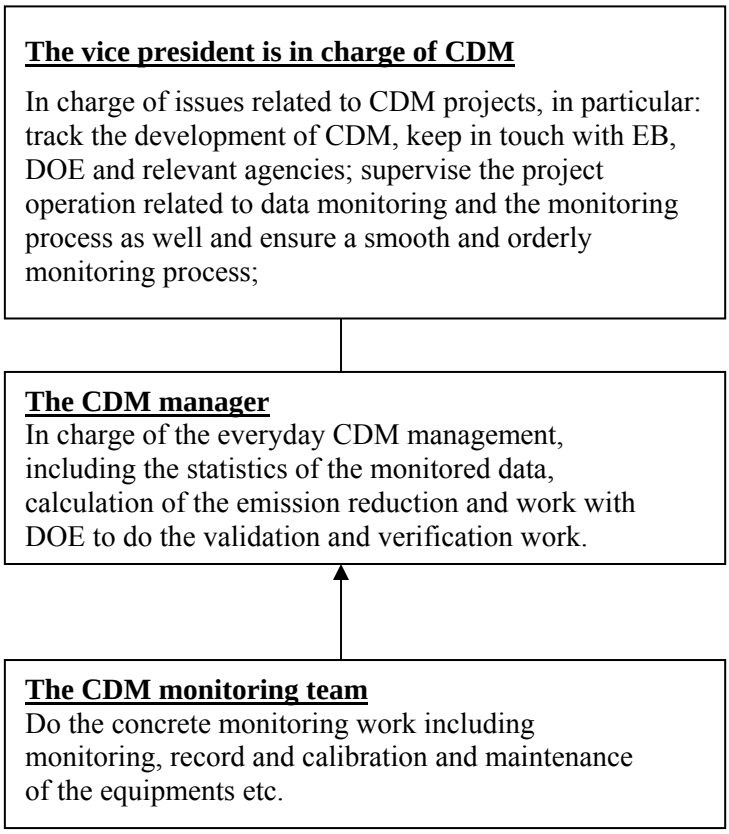

Figure 3 Organizational structure

3. Monitoring diagram

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 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 number	Accuracy
Anyi51(backup)	M1	Exit of #1 generator	Equipment cabinet	DTSD341	20081167020074	0.2S
Anyi71(backup)	M2	Exit of #2 generator	Equipment cabinet	DTSD341	20081167020064	0.2S
Anyi31(backup)	M3	High voltage side of #1 main transformer	Equipment cabinet	DTSD341	9040060580297	0.2S
Anyi32(backup)	M4	High voltage side of #2 main transformer	Equipment cabinet	DTSD341	9040060580296	0.2S
Anyi34(main)	M5	Ⅰ grid-connected line	35kv switch house	MK6E	S/N:209151404	0.2S
Anyi35(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:

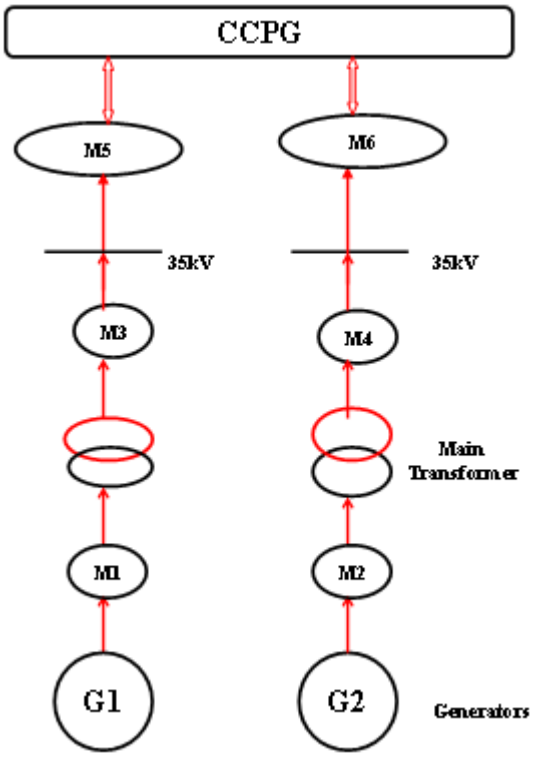

Figure 4 Monitoring system diagram of the electricity generation

3.2 The monitoring equipments for biomass

The monitoring equipment for the biomass quantities transported to the project site ($\mathbf{BF_{T,k,y}}$) and combusted in the project plant ($\mathbf{BF_{k,y}}$), 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 points	Model	Manufacturing number	Accuracy
#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.

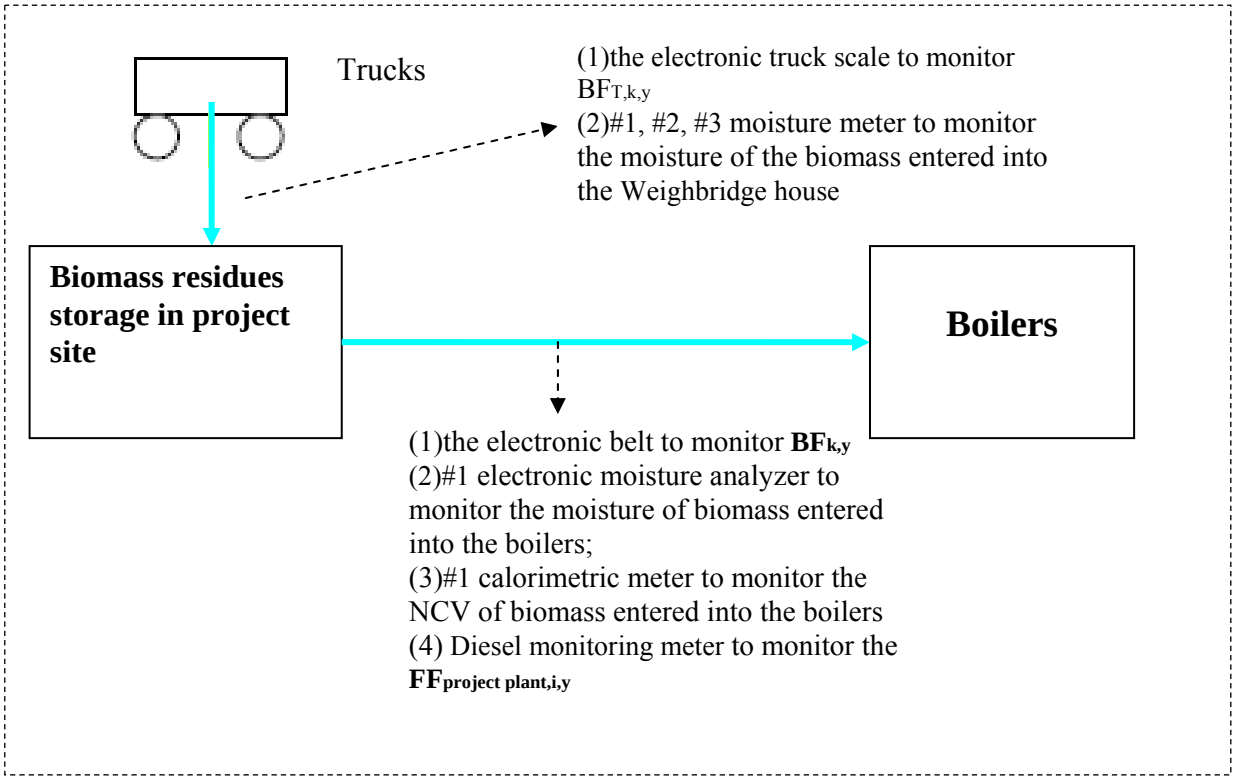

Figure 5 Monitoring system diagram of biomass utilization

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 determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	$EF_{grid, CM, y}$
Data unit:	tCO_2e/MWh
Description:	CM emission factor of CCPG
Source of data used:	The registered PDD (Version 05, completed on 20/11/2010)
Value(s) :	0.99695
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emission calculation
Additional comment:	Determined ex-ante and fixed for the first crediting period.

D.2. Data and parameters monitored

Data / Parameter:	$BF_{k,y}$
Data 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

Source of data:	*Readings records by* #1 the electronic belt and #2 the electronic belt
Values of monitored parameter:	Refer to section E.1 and the data base[2]
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for baseline emission calculation and project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	● type: #1 the electronic belt and #2 the electronic belt ● accuracy class: 0.3S ● serial number:JB1400-1 and JB1400-2 ● calibration frequency: once a year ● date of calibration: 04/03/2010 (the first time), 04/03/2011 (the second time) ● validity: valid to 03/03/2012
Measuring/Reading/Recording frequency:	Continuously measured and monthly recorded
Calculation method (if applicable)	-
QA/QC procedures applied:	Crosscheck the measurements with an annual energy balance that is based on purchased quantities and stock changes

Data / Parameter:	$\mathbf{BF_{T,k,y}}$
Data 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
Source of data:	*Readings records by* #1 the electronic truck scale and #2 the electronic truck scale
Values of monitored parameter:	Refer to the data base
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	● type: #1 the electronic truck scale and #2 the electronic truck scale ● accuracy class: 0.3S ● serial number: 9050001, 11050003 ● calibration frequency: once a year ● date of calibration: As for 1#, 04/03/2010 (the first time), 04/03/2011 (the second time); As for 2#, 16/08/2011(the first time). [3] ● validity: As for 1#, valid to 04/03/2012; As for 2#, valid to 16/08/2012
Measuring/Reading/Recording frequency:	Continuously measured and monthly recorded
Calculation method (if	-

[2] The project owner sets up the data base of monitoring parameters based on the normal original monitoring data.

[3] Note: #1 the electronic truck scale was used firstly, and the #2 the electronic truck scale started the running since 17/08/2011

applicable)	
QA/QC procedures applied:	Crosscheck the measurements with an annual energy balance that is based on purchased quantities and stock changes

Data / Parameter:	**Moisture content of the biomass residues**
Data unit:	% Water content
Description:	Moisture content of biomass residue type *k*
Measured/Calculated/Default:	Measured
Source of data:	Readings records
Values of monitored parameter:	Refer to in section E.1 and the data base
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for baseline emission calculation and project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	(1)As for the moisture of the biomass entered into the Weighbridge house, it is monitored by #1, #2, #3 moisture meter: ● type: #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#, 08/03/2010 (the first time), 08/09/2010 (the second time), 08/03/2011 (the third time), 08/09/2011 (the fourth time); As for 2#, 3#, the same with 1#. ● validity: valid to 08/03/2012 (2)As for the moisture of biomass entered into the boilers[4]: ● type: #1 electronic moisture analyzer ● accuracy class: 0.1S ● serial number: 24208686 ● Type: MA150 ● calibration frequency: once half a year ● date of calibration: 09/03/2010 (the first time), 09/09/2010 (the second time), 09/03/2011 (the third time), 09/09/2011 (the fourth time); ● validity: valid to 09/03/2012
Measuring/Reading/Recording frequency:	Continuously measured and monthly recorded. During the operation day, when which kind of biomass is combusted, its moisture is monitored once this day.
Calculation method (if applicable)	The monthly simple mean value of each type of biomass is worked out.
QA/QC procedures applied:	

Data / Parameter:	**AVD_y**
Data unit:	km
Description:	Average round trip distance (from and to) between biomass fuel supply sites and the project site
Measured/Calculated/Default:	Records

[4] This parameter is used to calculate $BE_{biomass,y}$ and $PE_{Biomass,CH4,y}$ in the following section E.

Source of data:	Records by project participants
Values of monitored parameter:	45*2=90, To be conservative, the longest distance between biomass fuel supply sites and the project site is used.
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Check consistency of distance records provided by the truckers by comparing recorded distances with other information from other sources (e.g. maps)
Measuring/Reading/Recording frequency:	Continuously;
Calculation method (if applicable)	-
QA/QC procedures applied:	-

Data / Parameter:	N_y
Data unit:	-
Description:	Number of truck trips for the transportation of biomass.
Measured/Calculated/Default:	Records and calculated
Source of data:	Records by project participants
Values of monitored parameter:	Refer to in section E.2 and the data base
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	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)	-
QA/QC procedures applied:	-

Data / Parameter:	$EF_{km,CO2,y}$
Data 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
Values of monitored parameter:	1.011×10^{-3}
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation

Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Review the appropriateness of the data
Measuring/Reading/Recording frequency:	Review the appropriateness of the data annually.
Calculation method (if applicable)	NA
QA/QC procedures applied:	NA

Data / Parameter:	$EF_{CO2,diesel,y}$
Data unit:	tC/TJ
Description:	CO2 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: 20.2tC/TJ
Values of monitored parameter:	20.2tC/TJ
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Review the appropriateness of the data
Measuring/Reading/Recording frequency:	Review the appropriateness of the data annually.
Calculation method (if applicable)	NA
QA/QC procedures applied:	NA

Data / Parameter:	$\mathbf{FF_{project\ plant,i,y}}$
Data 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*
Values 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. 0 combusted in the project plant;

Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Diesel monitoring meter
Measuring/Reading/Recording frequency:	Continuously measuring and monthly recording
Calculation method (if applicable)	-
QA/QC procedures applied:	-

Data / Parameter:	**$EG_{project\ plant,y}$**
Data 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
Values of monitored parameter:	Refer to in section E.1 and the data base
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	M5 and M6 (main meter) ● accuracy class: 0.2S, 0.2S ● Type: MK6E, MK6E ● serial number: S/N:209151404, S/N:209151403 ● calibration frequency: once a year ● date of calibration: 22/12/2009 (the first time), 22/12/2010 (the second time) ● validity: valid to 22/12/2011 M1,M2,M3, M4(backup meter) ● 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: 24/02/2010 (the first time), 24/02/2011 (the second time) for all ● validity: valid to 24/02/2012
Measuring/Reading/Recording frequency:	Continuously measured and monthly recorded
Calculation method (if applicable)	-
QA/QC procedures applied:	The consistency of metered net electricity generation should be cross-checked 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).

Data / Parameter:	**$EC_{PJ,y}$**

Data unit:	MWh
Description:	On-site electricity consumption attributable to the project activity imported from CCPG during the year *y*
Measured/Calculated/Default:	Measured
Source of data:	Meter readings records
Values of monitored parameter:	Refer to in section E.2 and the data base
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	M5 and M6 (main meter) ● accuracy class: 0.2S, 0.2S ● Type: MK6E, MK6E ● serial number: S/N:209151404, S/N:209151403 ● calibration frequency: once a year ● date of calibration: 22/12/2009 (the first time), 22/12/2010 (the second time) ● validity: valid to 22/12/2011 M1,M2,M3, M4(backup meter) ● 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: 24/02/2010 (the first time), 24/02/2011 (the second time) for all ● validity: valid to 24/02/2012
Measuring/Reading/Recording frequency:	Continuously measured and monthly recorded
Calculation method (if applicable)	-
QA/QC procedures applied:	Cross-check measurement results with invoices for purchased electricity if available.

Data / Parameter:	**TDL_y**
Data 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
Values of monitored parameter:	20%
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of	NA

last calibration, validity)	
Measuring/Reading/Recording frequency:	NA
Calculation method (if applicable)	NA
QA/QC procedures applied:	NA

Data / Parameter:	**NCV_i**
Data 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 (2007)
Values of monitored parameter:	42.652
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Review the appropriateness of the data annually
Measuring/Reading/Recording frequency:	Review the appropriateness of the data annually
Calculation method (if applicable)	NA
QA/QC procedures applied:	PO 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 2008 p383. So, 42.652 GJ/ton was thought to be suitable and accurate.

Data / Parameter:	NCV_k
Data 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 tCH4 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.
Values 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 CH4 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. Refer to in section E.1.

Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for Baseline and project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	● type: #1 calorimetric meter ● accuracy class: 0.1S ● serial number:1809099 ● calibration frequency: once a year ● date of calibration:09/03/2010 (the first), 08/03/2011 (the second) ● validity: valid to 08/03/2012
Measuring/Reading/Recording frequency:	During the operation day, when which kind of biomass is combusted, its NCV is monitored once this day.
Calculation method (if applicable)	The monthly simple mean value of each type of biomass is worked out.
QA/QC procedures applied:	-

Data / Parameter:	**$EF_{burning,CH4,k,y}$**
Data 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
Values 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 CH4 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 $EF_{burning,CH4,k,y}$.
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for Baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Review of default values
Measuring/Reading/Recording frequency:	Review of default values: annually
Calculation method (if applicable)	NA
QA/QC procedures applied:	Value is from latest version of IPCC, so the uncertainty is low.

Data / Parameter:	$BF_{utilized,k,y}$
Data unit:	Tones
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:	Directly from the statistics issued by the local agriculture government.
Source of data:	Directly from the statistics issued by the local agriculture government.
Values of monitored parameter:	Refer to in section E.3
Indicate what the data are used for	Used for leakage emission calculation

(Baseline/Project/Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/Reading/Recording frequency:	Monitoring frequency: Annually
Calculation method (if applicable)	-
QA/QC procedures applied:	-

Data / Parameter:	$BF_{available,k,y}$
Data unit:	Tones
Description:	Quantity of biomass residues of type *k* available in the region
Measured/Calculated/Default:	Directly from the statistics issued by the local agriculture government.
Source of data:	Directly from the statistics issued by the local agriculture government.
Values of monitored parameter:	Refer to in section E.3
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Used for leakage emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/Reading/Recording frequency:	Monitoring frequency: Annually
Calculation method (if applicable)	-
QA/QC procedures applied:	-

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

According to the registered PDD, the baseline emissions (BE_y) is consistent of the following three parts:

Emission reductions due to displacement of electricity

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

The detailed calculation procedure is described below:

Table 4 $EG_{project\ plant,y}$ in the monitoring period

Period	**Measurement from meters(kWh)**	**Data from sales Receipt of**	**MIN of A and B(kWh)**

		electricity exported to the Grid(kWh)	
	A	B	C=min(A,B)
December 2010	8498196	8471266.5	8471266.5
January 2011	10017294	10002306.5	10002306.5
February 2011	6708618	6726006	6708618
March 2011	11119248	10883058	10883058
April 2011	8837682	8072452	8072452
May 2011	10012128	10012128	10012128
June 2011	7731276	7731276	7731276
July 2011	7103796	7103796	7103796
August 2011	11094472	11094472	11094472
September 2011	12469884	12469884	12469884
Total	93592594	92566645	92549257

Table5 $ER_{Electricity, y}$

$EG_{project\ plant,y}$	$EC_{PJ,y}$	EG_{y}	$EF_{grid, CM, y}$	$ER_{Electricity, y}$
MWh	MWh	MWh	tCO2e/MWh	tCO2e
92549.257	0	92549.257	0.99695	**92,267**

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.

$ER_{Heat,y}=0$

Baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of 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)
$BF_{PJ,k,y}$ = 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 L_1, L_2 or L_3

It is recommended in methodology ACM0006 to use 0.0027 tCH4/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.

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

Table 6 $\sum_k BF_{PJ,k,y}$

Period	$BF_{1(wet,ton)}$	Mositure1	$BF_{1(dry,ton)}$	$BF_{2(wet,ton)}$	Mositure2	$BF_{2(dry,ton)}$	$BF_{3(wet,ton)}$	Mositure3	$BF_{3(dry,ton)}$
December 2010	15890.40	16.62%	13249.42	0.00		0.00	0.00		0.00
January 2011	0.00		0.00	2533.60	20.87%	2004.84	13671.28	12.96%	11899.48
February 2011	0.00		0.00	7776.80	19.82%	6235.44	0.00		0.00
March 2011	14516.80	17.33%	12001.04	0.00		0.00	0.00		0.00
April 2011	1130.00	16.97%	938.24	10565.80	20.90%	8357.55	0.00		0.00
May 2011	15746.20	16.99%	13070.92	0.00		0.00	0.00		0.00
June 2011	0.00		0.00	10049.00	21.70%	7868.37	0.00		0.00
July 2011	0.00		0.00	11086.00	19.86%	8884.32	0.00		0.00
August 2011	14733.00	13.88%	12688.06	8497.00	20.30%	6772.11	0.00		0.00
September 2011	14293.45	19.09%	11564.83	7775.00	22.85%	5998.41	970.55	18.02%	795.66
Sub-total			**63512.50**			**46121.03**			**12695.14**
Total									**122328.68**

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

$$= 21 \times 122328.68 \times 0.0027 \times 0.73$$

$$= 5063 tCO2e$$

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

E.2. Project emissions calculation

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 ($PE_{EC,y}$), 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)

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:

Table7 *PET y*

Period	Ny	AVDy(km)	EFkm,CO2,y
December 2010	4239	90	1.011×0.001
January 2011	2487		
February 2011	502		
March 2011	1159		
April 2011	803		
May 2011	784		
June 2011	605		
July 2011	633		

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

Period	Ny	AVDy(km)	EFkm,CO2,y
August 2011	2940		
September 2011	5294		
Total	19446		

$PET\ y = N\ y \times AVD\ y \times EF_{km,CO2,y}$ =19446×90×1.011×0.001 = 1,769 tCO2e

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

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($\mathbf{FF_{project\ plant,i,y}}$) 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.

$$PEFF_y = FF_{\text{projectplant,diesel,y}} \times NCV_{diesel,y} \times EF_{diesel,y} = \mathbf{0}$$

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:

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

$EC_{PJ,y}$ is monitored in this period and the its measurement is as follows, and $EF_{grid,CM,y}$ is fixed ex-ante and TDL_y is 20%.

Table8 $PE_{EC,y}$

Period	Measurement from meters(kWh)	Data from sales Receipt of electricity imported from the Grid(kWh)	MAX of D and E(kWh)	$EF_{grid,CM,v}$ (tCO2e/MWh)	TDL_y
	D	E	F=MAX(D,E)		
December 2010	13300	13300	13300		
January 2011	45500	45500	45500		
February 2011	75600	75600	75600	0.99695	20%
March 2011	53550	53550	53550		
April 2011	31500	31500	31500		
May 2011	18550	18550	18550		
June 2011	37100	37100	37100		
July 2011	36050	36050	36050		

August 2011	40950	40950	40950		
September 2011	39900	39900	39900		
Total	392000	392000	392000		

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

$= 392\ MWh\times 0.99695\ tCO_2e/MWh\times(1+20\%)=469\ tCO_2e$

4. Methane emissions from combustion of biomass residues

The emissions can be calculated as follows:

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

Where:

$BF_{k,y}$ = 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:

Table9 $PE_{Biomass,CH4,y}$

Period	$BF_{1(wet,ton)}$	Moisture1	$BF_{1(dry,ton)}$	NCV1 (MJ/ton)	$BF_{2(wet,ton)}$	Moisture2	$BF_{2(dry,ton)}$	NCV2 (MJ/ton)	$BF_{3(wet,ton)}$	Moisture3	$BF_{3(dry,ton)}$	NCV3 (MJ/ton)	$\sum_k BF_{k,y} \cdot NCV_k$ (MJ)
December 2010	15890.40	16.62%	13249.42	14560.00	0.00		0.00		0.00		0.00		192911489.97
January 2011	0.00		0.00		2533.60	20.87%	2004.84	15847.29	13671.28	12.96%	11899.48	14188.36	200605380.14
February 2011	0.00		0.00		7776.80	19.82%	6235.44	16618.26	0.00		0.00		103622133.89
March 2011	14516.80	17.33%	12001.04	14722.89	0.00		0.00		0.00		0.00		176689970.60
April 2011	1130.00	16.97%	938.24	13321.84	10565.80	20.90%	8357.55	16365.98	0.00		0.00		149278529.98
May 2011	15746.20	16.99%	13070.92	14755.10	0.00		0.00		0.00		0.00		192862740.84
June 2011	0.00		0.00		10049.00	21.70%	7868.37	16267.21	0.00		0.00		127996378.35
July 2011	0.00		0.00		11086.00	19.86%	8884.32	16454.39	0.00		0.00		146186072.75
August 2011	14733.00	13.88%	12688.06	14664.48	8497.00	20.30%	6772.11	16563.31	0.00		0.00		298232336.96
September 2011	14293.45	19.09%	11564.83	14906.34	7775.00	22.85%	5998.41	15781.81	970.55	18.02%	795.66	15265.72	279201375.59
Total													**1867586409.06**

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

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 ×1.37×1867586409.06 /1,000,000/1,000
= 76.76 tCH4

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

According to the analysis in B6.1 in the registered PDD, no waste water treatment is involved in the project activity. As a result, the emissions are zero.

Conclusively,

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH4} \cdot PE_{Biomass,Ch4,y}$$

=1769+469 +21*76.76 =3850 tCO2e

E.3. Leakage calculation

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 10 Available and utilized quantity of Biomass residues

Type of biomass residues	rice straw	rape stalk	Cotton stalk	Total
1. Available quantity (10000 t)	42.5	9.45	10.36	62.31
2.Quantity utilized (10000t)	15.73	6.53	2.66	24.92
2.1 Quantity to be utilized at the project plant in this monitoring period (10000t)	7.63	5.83	1.46	14.92
2.2 Quantity utilized for other purposes (10000 t)	8.1	0.7	1.2	10
3. Ratio of available quantity vs. quantity utilized	2.70	1.45	3.89	

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.So, L_y is zero.

E.4. Emission reductions calculation / table

The emission reduction of the project is decided by the following formula:

$$ER_y = ER_{Heat,y} + ER_{Electricity,y} + BE_{Biomass,y} - PE_y - L_y$$

Based on the above sections, the result is as follows:

Table11 Emission reductions (tCO_2e)

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

Period	$ER_{heat,y}$	$ER_{electricity,y}$	$BE_{biomass,y}$	PEy	Ly	ERy
March 2010-October 2010	0	92,267	5,063	3,850	0	93,480

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

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	143033*305/365=119,521	93,480

Note: The annual emission reductions estimated in the registered PDD is 143,033 tCO_2e, and the days from 30/11/2010-30/09/2011 is 305days.

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

The actual emission reductions are less than the estimated value in the registered PDD due to lack of technical manpower, and much downtime and restarts happened to the power generation unit, and the both units don't operate with the estimated operation hours in the registered PDD in this monitoring period.

Annex 1: The energy balance calculation for the verification period

The total inputs of biomass 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 18.14%.

Table 12. The energy input and electricity generation in the project activity in this period

		Energy(TJ)
input	biomass combusted(TJ)	**1867.59**
	Electricity imported(TJ)	392MWh*0.0036TJ/MWh=1.41
	total	1869
output	Electricity exported(TJ)	92549.257MWh*0.0036TJ/MWh=333.18
	Efficiency	17.83%

History of the monitoring report

Version	Date	Nature of revision
01	18/09/2011	Initial adoption for GSP

History of the document

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