



## Monitoring report form (Version 03.2)

### Monitoring report

<b>Title of the project activity</b>	Qichun Kaidi Biomass Power Project
<b>Reference number of the project activity</b>	3057
<b>Version number of the monitoring report</b>	1.0
<b>Completion date of the monitoring report</b>	11/10/2013
<b>Registration date of the project activity</b>	15/01/2011
<b>Monitoring period number and duration of this monitoring period</b>	The 2nd monitoring period, from 01/07/2011 to 31/12/2012
<b>Project participant(s)</b>	<b>United Kingdom of Great Britain and Northern Ireland</b> , involved indirectly authorized Participants: Camco International Limited, Camco Carbon Limited <b>Switzerland</b> , involved indirectly authorized Participants: Camco International Limited <b>project owner</b> , Qichun Kaidi Green Energy Development Co., Ltd
<b>Host Party(ies)</b>	China
<b>Sectoral scope(s) and applied methodology(ies)</b>	Energy industries (renewable - / non-renewable sources) ACM0006 (Version 09) – “Consolidated methodology electricity generation from biomass residues” “Combined tool to identify the baseline scenario and demonstrate additionality”. (Version 02.2) ACM0002 (Version 10) – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” “Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion” (Version02) “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 01) “Tool to calculate the emission factor for an electricity system” (Version 02)
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	175,872 tonnes CO <sub>2e</sub>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	125,959 tonnes CO <sub>2e</sub>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)</b>	189,266 tonnes CO <sub>2e</sub>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).</b>	0

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

>>

Qichun Kaidi Biomass Power Project (hereafter referred to as the project) is a biomass utilization project developed by Qichun Kaidi Green Energy Development Co., Ltd. (hereafter referred to as the Project Owner) and is located in Chidong Industrial Park, Qichun Economic Development District, Qichun County, Hubei Province, P.R. China. The project is designed to produce 126,720MWh of net electricity per year from burning biomass residues, displacing electricity generated by Central China Power Grid (CCPG), which is dominated by fossil fuel-fired power plants, and thus reducing greenhouse gas (CO<sub>2</sub>) emissions.

The project processes and burns biomass residue, of which rice husk, cotton straws, branches, barks, stumps and scrap wood are the biomass fuel. 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam turbines generator units are installed. Therefore, the total installed capacity of the Project is 24MW, and is estimated to achieve 116,715 tonnes of CO<sub>2</sub>e emissions reduction annually (version 5 CDM-PDD).

The project began to construct on 4 August 2008, and was put into operation since 01/04/2010. The project has been registered as a CDM project on 15/01/2011 (The version of registered PDD is version 4).

During current monitoring period (01/07/2011 to 31/12/2012), the project has achieved emission reductions of 125,959 tonnes CO<sub>2</sub>e.

### A.2. Location of project activity

>>

The project activity is located in Chidong Industrial Park, Qichun Economic Development District, Qichun County, Hubei Province, P.R. China.

The center of plant has geographical coordinates of 115°19'48" east longitude 30°07'48" north latitude.

Please refer to the following drawing for the geographic location of the project activity.

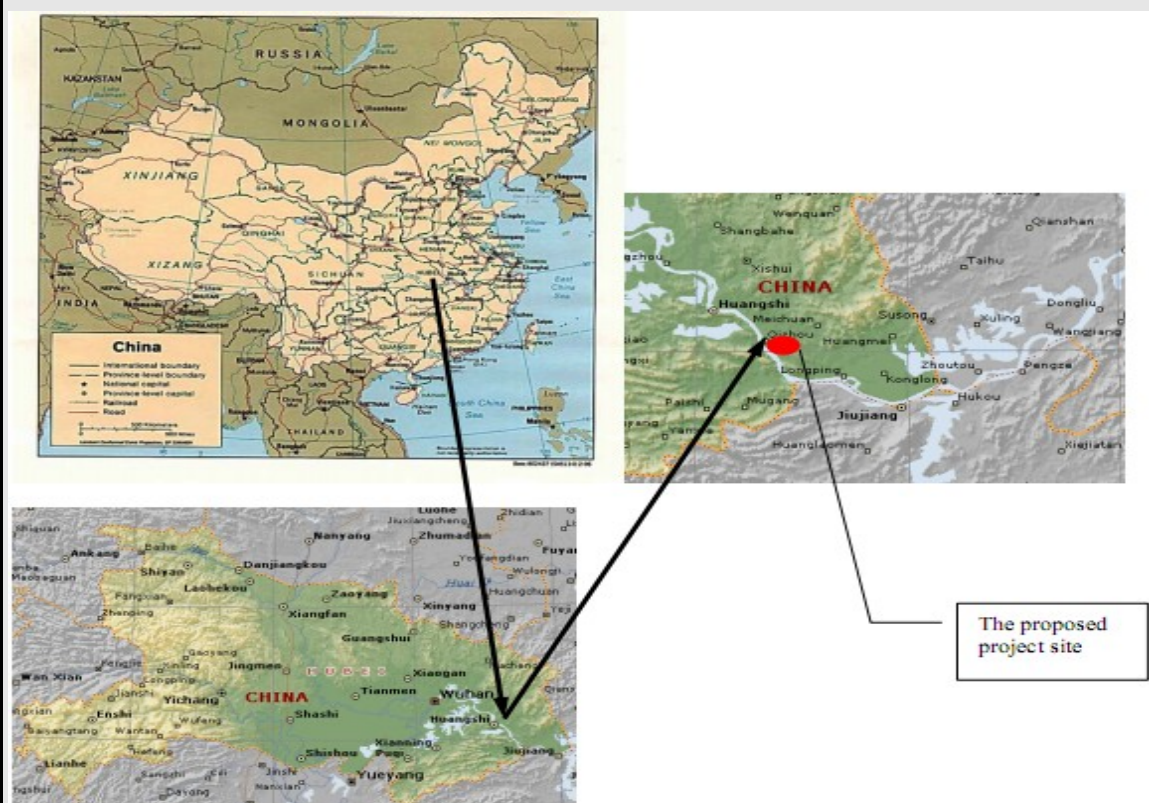


Figure 1: Map showing the location of the project site

**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)
Peoples' Republic of China (host)	Qichun Kaidi Green Energy Development Co., Ltd	No
United Kingdom of Great Britain and Northern Ireland	Camco International Limited	No
United Kingdom of Great Britain and Northern Ireland	Camco Carbon Limited	No
Switzerland	Camco International Limited	No

**A.4. Reference of applied methodology**

&gt;&gt;

1. ACM0006 (Version 09) – “Consolidated methodology electricity generation from biomass residues”
2. “Combined tool to identify the baseline scenario and demonstrate additionality”. (Version 02.2)
3. ACM0002 (Version 10) – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”
4. “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” (Version 02)
5. “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 01)
6. “Tool to calculate the emission factor for an electricity system” (Version 02)

For more information regarding the methodology, please refer to the link:

<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

**A.5. Crediting period of project activity**

&gt;&gt;

Crediting period: from 15/01/2011 to 14/01/2018(Renewable)

The start date of the crediting period is 15/01/2011.

This monitoring period: from 01/07/2011 to 31/12/2012.

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

&gt;&gt;

The project consists of one site, which began to construct on 4 August 2008, and put into operation since 01/04/2010. Please refer to the following table for details.

Activity	Date	
	1# Generator	2# Generator
Start of construction	04/08/2008	
Commissioning of core equipment	29/12/2009	28/03/2010
Operation of core equipment	27/04/2010	01/04/2010

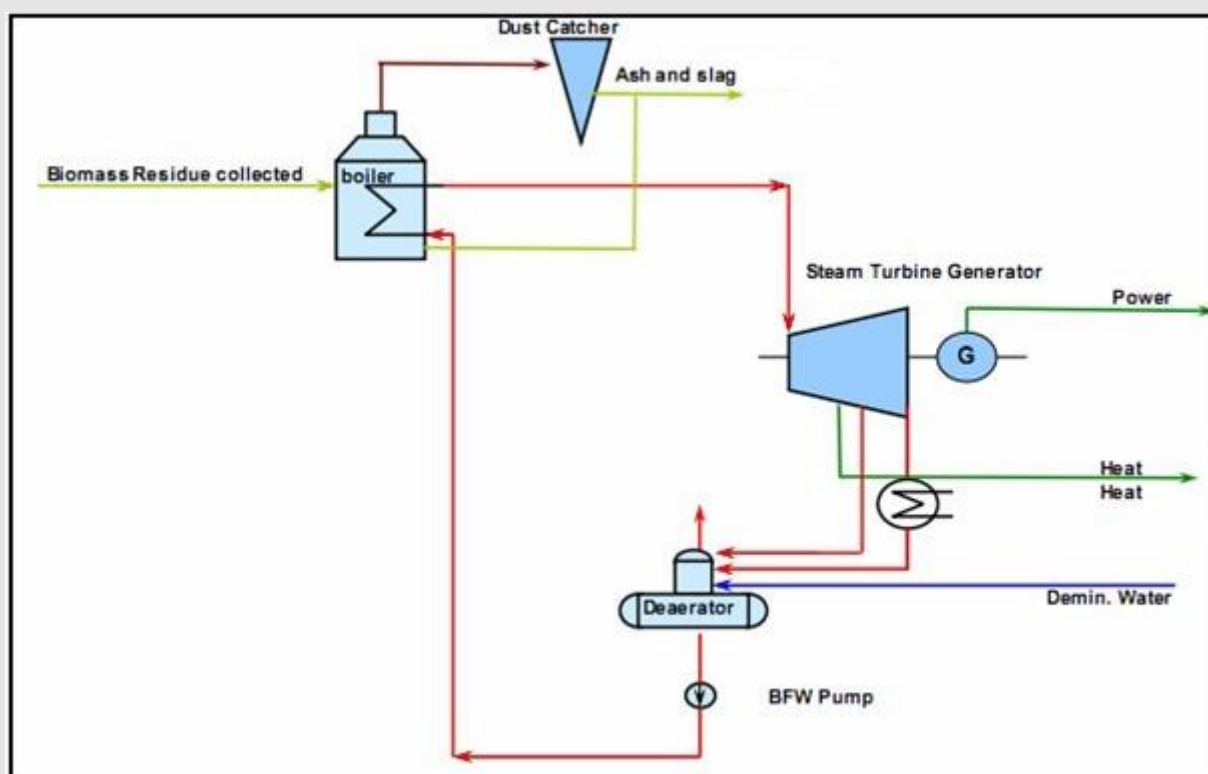
During current period, the project has been operating normally as described in the registered PDD. 1# steam turbine generator and 2# steam turbine generator were respectively shutdown 18 times and 16 times for maintenance.

The technology employed by the project is advanced domestic technology. The project installs two sets of 65t/h circulating fluid bed (CFB) boilers with medium temperature and sub-high pressure. At the same time, two 12MW steam turbines and two associated generators are applied in the project. The steam turbine employed is medium temperature and sub-high pressure extraction condensing steam turbine. The total installed capacity of the project is 24MW.

The key technical specifications of the boiler, turbine and generator are listed in the table below.

<b>BOILER</b>	
Manufacturer	Jiangxi Jianglian Energy and Environmental Protection Co., Ltd
Model	KG65-450/5.29-FSWZ- I
Type	Medium temperature and sub-high pressure Circulating Fluidized Bed
Maximum evaporation volume	65t/h
Rated steam pressure	5.29MPa
Rated steam temperature	450℃
Feed water temperature	153.2℃
Feed water pressure	5.72MPa
Efficiency	≥86 %
Quantity	2
<b>STEAM TURBINE</b>	
Manufacturer	NanJing Steam Turbine(Group) Co., Ltd
Model	C12-4.90/0.981-12/435℃
Type	Medium temperature and sub-high pressure extraction condensing steam turbine
Rated power	12MW
Main steam pressure	4.9MPa.a
Main steam temperature	435℃
Rate extraction steam volume	15t/h
Maxium Extraction steam volume when Rate electricity capacity is 6.59MW	45t/h
Quantity	2
<b>GENERATOR</b>	
Manufacturer	NanJing Steam Turbine(Group) Co., Ltd
Model	QFJ-15-2
Rated power	15MW
Rated voltage	10.5KV
Power factor	0.8
Efficiency	≥97%
Rated rotating speed	3000r/min
Rated frequency	50Hz
Quantity	2

The Flow Diagram of the Plant as follows:



## B.2. Post registration changes

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

>>

N/A

### B.2.2. Corrections

>>

N/A

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

>>

N/A

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

>>

The request for post-registration changes related to the change of biomass types of the project to the PDD was approved by EB on 25 Mar 2013.

Please refer to the link: <http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1256142179.69/view>

### B.2.5. Changes to start date of crediting period

>>

N/A

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

&gt;&gt;

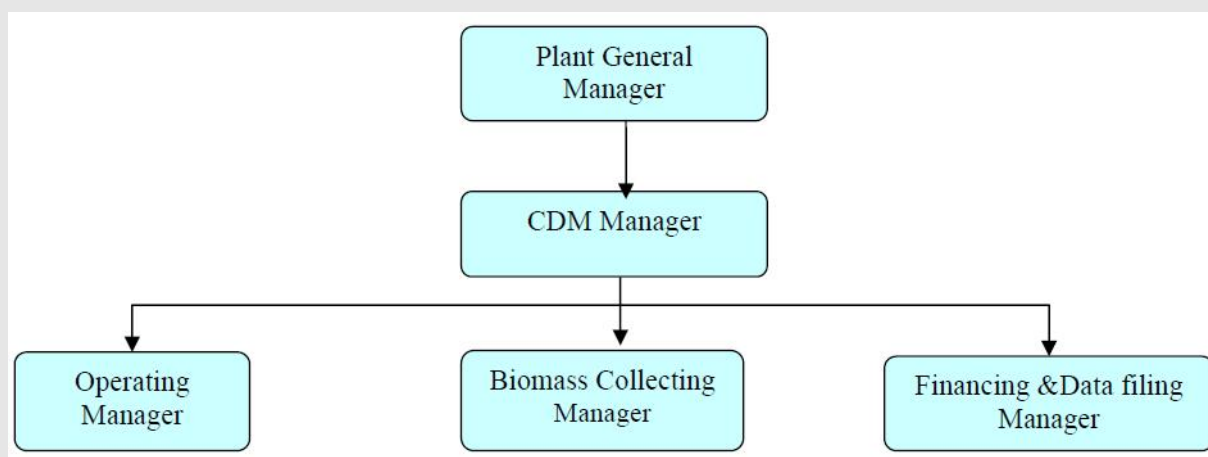
N/A

**SECTION C. Description of monitoring system**

&gt;&gt;

**1. The organizational structure, roles and responsibilities of personnel:**

In order to ensure monitoring of the project is in accordance with the monitoring plan and methodology, a specific CDM office had been established before the registration of the project. Figure 2 shows the organizational structure of the CDM office.

**Figure 2 Organizational structure of the CDM office**

The responsibilities of the sections are briefly described as following:

The plant manager is in charge of approving the monitoring report, appointing the CDM manager and the relevant monitoring team members and responsible for the monitoring outcome.

The CDM manager is responsible for liaising with DOE and the buyers, organizing the relevant training, reviewing all the documents related with the monitoring of the project, correcting any errors in time and acting as the quality supervisor of the monitoring process.

The Operating Manager is responsible for the monitoring associated with operation of the plant, the net electricity generation, the start-up diesel consumption and the dry biomass combusted. In addition, the Operating Manager supervises meter maintenance and manages the calibration process.

The Biomass Collecting Manager is responsible for the monitoring associated with biomass collection, the transportation emission, the mechanical biomass pre-treatment emissions and assisting the annual leakage analysis.

The Financing & Data filing Manager prepares the available original invoices or receipts associated with the whole monitoring process. Besides, the Financing & Data filing Manager collects the relevant data from the Operating Manager and the Biomass Collecting Manager, summarize the data, file the data and submit reports to the CDM manager in time.

The monitoring report is generated based on the monthly reports before each verification. The monitoring

report is reviewed by the office manager before submitted to DOE.

## **2. Monitoring system:**

### **2.1 Net electricity generation**

There is a gate way meter installed on the project site monitoring the electricity supplied to the grid and purchased from the grid. There is a back up meter installed at the project site monitoring the electricity supplied to the grid and purchased from the grid too.

In addition, a 10KV backup power supply is available in site in the early time of the project and the amount of electricity imported through this line is monitored and checked by the invoice if available.

The data of electricity supplied to the grid and purchased from the grid is measured and crosschecked by the invoices and the power transaction note if available.

### **2.2 Biomass residues consumption and moisture of the biomass residues**

The amount of biomass residues combusted in the boiler is monitored by the belt weigher. The moisture of the biomass residues combusted also is monitored by sampling continuously at fixed time period and analyzed daily. An energy balance is recorded monthly to assist verifying the biomass combusted

### **2.3 Fossil Fuel Consumption in the power plant**

For fossil fuel used for starting up, flow meters are equipped in the supply and return pipe to monitor the quantity of diesel consumption.

If there is any fossil fuel used for the shredders, forklifts or any other machines for the mechanical biomass pre-treatment in the project site (including the biomass collection sites) is monitored by the diesel purchase and consumption log book.

The purchase receipt is used for cross-check. If there is any data missing or significant error exists, the entire quantity of fossil fuel purchased in a particular monitoring period would be considered as combusted in the power plant for conservativeness.

### **2.4 Transportation of Biomass residues**

The project developer of the proposed project structures a recording and monitoring system within the biomass residues supply and management system covering all the biomass collection sites established by the proposed project. Each time each truck transporting the biomass into the project site is counted and recorded in the log book. The transportation distance to the collection sites is recorded by company staffs at the sites and the data is recorded in the log books. The data on distance of fuel supply site from the plant can be verified by cross checking data records on the distances available with information from other sources (e.g. maps).

If data is missing for a particular round trip, the following backup data apply in their order:

- The round trip distance between the farthest biomass fuel supply site and the project plant is used.
- If the farthest biomass fuel supply site could not be verified, 200km would be used for conservativeness

### **2.5 Electricity consumed on site**

When the biomass residue is mechanically pre-treated, the proposed project needs a certain amount of electricity from grid. This amount is metered or calculated conservatively.

If the monitoring data is missing, or it is not feasible to install a dedicated meter to monitor this indicator, it is calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton). The electricity factor can be calculated as follows:

- 1) Collecting all the nameplates power (in kW) and capacity (t/h) of every straw crackers
- 2) Calculating the electricity factor corresponding to each cracker in kWh/t
- 3) Using the largest number as a conservative electricity factor for the calculation

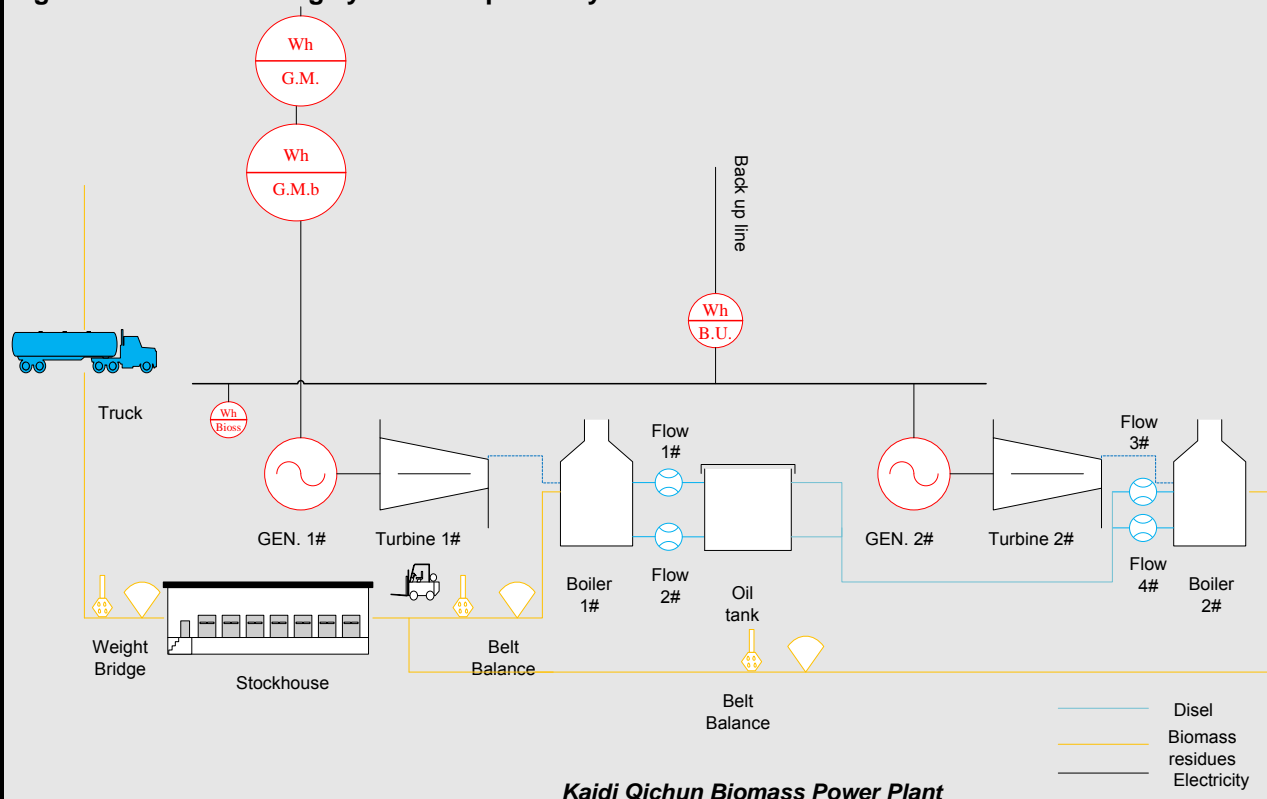
### **2.6 Leakage**

The project consumption and availabilities in the defined geographical area of each type of biomass residue not only the biomass types mentioned above but also other biomass residues utilized in the project is monitored to check the leakage effect brought by the operation of the proposed project. This is obtained from surveys or statistics from local agricultural bureau or other official public resource. If they are not available,



the project owner will ask specialized institute or consulting company to do biomass availability research.

**Figure 3: The monitoring system and power system connection**



### 3. Data collection procedures

The meters or monitoring equipment installed in the monitoring system have been calibrated by a certified Party in accordance with the manufacturer's recommendations and National Regulations for ensuring reliability of the system. Calibrations shall be evidenced with certificates of calibration for the relevant meter(s) issued by a qualified body. A calibration and error log have been maintained to provide transparency and sound management.

All the electronic and paper documents relevant to CDM must be archived for more than two years since the end of the crediting period.

### 4. Emergency procedures for the monitoring system

#### 4.1 Training

Members of staff who are involved in the CDM project will be given training on the CDM and reporting requirements, prior to registration of the project. New members of staff joining the CDM project team will also be given training in relation to their responsibilities. Full training procedures and a training plan will be detailed in the CDM Manual.

#### 4.2 Record Keeping and Internal Reporting Procedure

The data associated with the emission reduction will be kept for at least 2 years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

#### 4.3 Error Handling Procedure

In the event that a meter has lost calibration over the allowable error limit then this shall be corrected at the earliest opportunity and re-calibrated and the data recorded from this meter since the last successful



calibration shall be ignored.

The check of the CDM Project manager and then the third party verifier prior to issuance of the CERs is considered adequate for errors in the calculations. Where errors in the calculations are discovered by either of these Parties, the monitoring report shall be modified and the corrected version shall be resubmitted to the verifier.

#### 4.4 External Reporting Procedure

After signing by the CDM Project manager, the report is sent to the third party verifier who is contracted to verify the emissions reductions during the crediting period of the project.

#### 4.5 Procedure for corrective actions arising

The CDM manager is responsible for identifying corrective actions arising from the above procedures and for liaising with the purchaser, the third party verifiers and other stakeholders to take necessary steps to implement the corrective actions.

#### 4.6 Emergency procedures

In the unlikely event of an emergency, set procedures will be followed. Details of the procedures to be followed are described in the relevant Operation Manuals. The key points include:

- The Distributed Control System (DCS) will automatically shut off the boilers upon detecting an emergency.
- The operators can also remotely shut off the boilers if they find an emergency situation has occurred.

### **SECTION D. Data and parameters**

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

<b>Data / Parameter:</b>	$EF_y$
Unit:	t CO <sub>2</sub> e/MWh
Description:	Baseline emission factor of Central China Power Grid
Source of data:	The registered PDD Version 4
Value(s) applied:	0.9735
Purpose of data:	Baseline emission calculation
Additional comment:	--

<b>Data / Parameter:</b>	$GWP_{CH_4}$
Unit:	t CO <sub>2</sub> e/t CH <sub>4</sub>
Description:	Global warming potential for CH <sub>4</sub>
Source of data:	The registered PDD Version 4
Value(s) applied:	21
Purpose of data:	Baseline emission calculation
Additional comment:	--

<b>Data / Parameter:</b>	$TDL_{j,y}$
Unit:	%

Description:	Average technical transmission and distribution losses for providing electricity to source j in year y.
Source of data:	The registered PDD Version 4
Value(s) applied:	20
Purpose of data:	Project emission calculation
Additional comment:	--

<b>Data / Parameter:</b>	$EF_{CH_4,BF}$
Unit:	t CH <sub>4</sub> /GJ
Description:	CH <sub>4</sub> emission factor for controlled burning of the biomass residue in the project plant
Source of data:	The registered PDD Version 4
Value(s) applied:	41.1
Purpose of data:	Project emission calculation
Additional comment:	--

<b>Data / Parameter:</b>	$NCV_k * EF_{burning,CH_4,k,y}$
Unit:	t CH <sub>4</sub> /tonne
Description:	CH <sub>4</sub> emission factor for uncontrolled burning of the biomass residue
Source of data:	The registered PDD Version 4
Value(s) applied:	0.001971
Purpose of data:	Baseline emission calculation
Additional comment:	--

## D.2. Data and parameters monitored

Data / Parameter:	BF <sub>k, y</sub>		
Unit:	Tons of dry matter		
Description:	Quantity of each biomass residue type k combusted in the project plant in year, y.		
Measured/ Calculated / Default:	Measured		
Source of data:	On-site measurements		
Value(s) of monitored parameter:	Type	Units	Data
	Rice husk	tonne	71,787.78
	Cotton straws	tonne	8,831.53
	Branches	tonne	21,716.23
	Barks	tonne	41,050.14
	Stumps	tonne	6,252.38
	Scrap wood	tonne	56,207.64

Monitoring equipment:	Meter name	Belt balance 1#	Belt balance 2#
	Type/Model	ICS-ST4-1000	ICS-ST4-1000
	Accuracy	0.5%	0.5%
	SN	0903102	0903103
	1 <sup>st</sup> calibration date	10/12/2010	10/12/2010
	2 <sup>nd</sup> calibration date	05/01/2012	05/01/2012
	Last calibration date	04/01/2013	04/01/2013
	Valid period	03/01/2014	03/01/2014
	Calibration Frequency	Once per year	Once per year
Measuring/ Reading/ Recording frequency:	Daily measurement and recording		
Calculation method (if applicable):	Use weigh meters, adjust for the moisture content in order to determine the quantity of dry biomass		
QA/QC procedures:	The meter undergoes calibration/maintenance subject to appropriate industrial standards. Direct measurements at the plant site could be crosschecked with an annual energy balance that is based on purchased quantities and stock changes.		
Purpose of data:	Baseline and project emissions		
Additional comment:	-		
<b>Data / Parameter:</b>	<b>Moisture content of the biomass residues</b>		
Unit:	% water content		
Description:	Moisture content of the biomass residues		
Measured/ Calculated / Default:	Measured		
Source of data:	Measured by balance and dry cabinet		
Value(s) of monitored parameter:	Please refer to the spread sheet		

Monitoring equipment:	Meter name	Balance 1#	Balance 2#
	Type/Model	YB2001	FA2104
	Accuracy	1g	0.1mg
	SN	108	9121203
	1 <sup>st</sup> calibration date	/	06/01/2011
	2 <sup>nd</sup> calibration date	05/01/2012	05/01/2012
	Valid period	04/01/2013	04/01/2013
	Calibration Frequency	Once per year	Once per year
	Meter name	Dry Cabinet 1#	Dry Cabinet 2#
	Type/Model	DHG-9140A	101-1B
	Accuracy	0.1°C	0.1°C
	SN	1006328	081219
	1 <sup>st</sup> calibration date	06/01/2011	06/01/2011
	2 <sup>nd</sup> calibration date	05/01/2012	05/01/2012
	Valid period	04/01/2013	04/01/2013
	Calibration Frequency	Once per year	Once per year
	Measuring/ Reading/ Recording frequency:	Daily measurement and recording	
	Calculation method (if applicable):	--	
	QA/QC procedures:	The monitoring procedures in the laboratory of the plant is done according to authoritative guidance	
Purpose of data:	Baseline and project emissions		
Additional comment:	--		
Data / Parameter:	NCV <sub>k</sub>		
Unit:	GJ/ton of dry matter		
Description:	Net calorific value of each biomass residue of type k		
Measured/ Calculated / Default:	Measured		
Source of data:	Report from a reputed laboratory and according to relevant standards.		

Value(s) of monitored parameter:	<table><tr><td>Type</td><td>Units</td><td>Data</td><td>Test Date</td></tr><tr><td>Rice husk</td><td>MJ/Kg</td><td>12.99</td><td>07/07/2011</td></tr><tr><td>Cotton straws</td><td>MJ/Kg</td><td>11.25</td><td>02/12/2011</td></tr><tr><td>Branches</td><td>MJ/Kg</td><td>12.08</td><td>07/07/2011</td></tr><tr><td>Barks</td><td>MJ/Kg</td><td>11.85</td><td>07/07/2011</td></tr><tr><td>Stumps</td><td>MJ/Kg</td><td>12.49</td><td>07/07/2011</td></tr><tr><td>Scrap wood</td><td>MJ/Kg</td><td>11.16</td><td>07/07/2011</td></tr></table>				Type	Units	Data	Test Date	Rice husk	MJ/Kg	12.99	07/07/2011	Cotton straws	MJ/Kg	11.25	02/12/2011	Branches	MJ/Kg	12.08	07/07/2011	Barks	MJ/Kg	11.85	07/07/2011	Stumps	MJ/Kg	12.49	07/07/2011	Scrap wood	MJ/Kg	11.16	07/07/2011
	Type	Units	Data	Test Date																												
	Rice husk	MJ/Kg	12.99	07/07/2011																												
	Cotton straws	MJ/Kg	11.25	02/12/2011																												
	Branches	MJ/Kg	12.08	07/07/2011																												
	Barks	MJ/Kg	11.85	07/07/2011																												
	Stumps	MJ/Kg	12.49	07/07/2011																												
	Scrap wood	MJ/Kg	11.16	07/07/2011																												
	<table><tr><td>Type</td><td>Units</td><td>Data</td><td>Test Date</td></tr><tr><td>Rice husk</td><td>MJ/Kg</td><td>13.11</td><td>05/01/2012</td></tr><tr><td>Branches</td><td>MJ/Kg</td><td>12.33</td><td>05/01/2012</td></tr><tr><td>Barks</td><td>MJ/Kg</td><td>11.26</td><td>05/01/2012</td></tr><tr><td>Stumps</td><td>MJ/Kg</td><td>11.95</td><td>05/01/2012</td></tr><tr><td>Scrap wood</td><td>MJ/Kg</td><td>11.52</td><td>05/01/2012</td></tr></table>				Type	Units	Data	Test Date	Rice husk	MJ/Kg	13.11	05/01/2012	Branches	MJ/Kg	12.33	05/01/2012	Barks	MJ/Kg	11.26	05/01/2012	Stumps	MJ/Kg	11.95	05/01/2012	Scrap wood	MJ/Kg	11.52	05/01/2012				
	Type	Units	Data	Test Date																												
	Rice husk	MJ/Kg	13.11	05/01/2012																												
	Branches	MJ/Kg	12.33	05/01/2012																												
	Barks	MJ/Kg	11.26	05/01/2012																												
	Stumps	MJ/Kg	11.95	05/01/2012																												
	Scrap wood	MJ/Kg	11.52	05/01/2012																												
	<table><tr><td>Type</td><td>Units</td><td>Data</td><td>Test Date</td></tr><tr><td>Rice husk</td><td>MJ/Kg</td><td>12.86</td><td>02/07/2012</td></tr><tr><td>Barks</td><td>MJ/Kg</td><td>11.18</td><td>02/07/2012</td></tr><tr><td>Scrap wood</td><td>MJ/Kg</td><td>11.24</td><td>02/07/2012</td></tr></table>				Type	Units	Data	Test Date	Rice husk	MJ/Kg	12.86	02/07/2012	Barks	MJ/Kg	11.18	02/07/2012	Scrap wood	MJ/Kg	11.24	02/07/2012												
	Type	Units	Data	Test Date																												
	Rice husk	MJ/Kg	12.86	02/07/2012																												
	Barks	MJ/Kg	11.18	02/07/2012																												
Scrap wood	MJ/Kg	11.24	02/07/2012																													
Monitoring equipment:	N/A																															
Measuring/ Reading/ Recording frequency:	Six months, taking three samples for each measurement.																															
Calculation method (if applicable):	--																															
QA/QC procedures:	The consistency of the measurements is checked by comparing the measurement results with measurements from previous years, relevant data sources. If the measurement results differ significantly from previous measurements or other relevant data sources, Additional measurements are conducted.																															
Purpose of data:	Baseline emissions & project emission																															
Additional comment:	--																															

Data / Parameter:	AVDy
Unit:	km
Description:	Average round trip distance (from and to) between the biomass fuel supply sites and the project plant during the year y
Measured/ Calculated / Default:	Default
Source of data:	Take the furthest distance in registered PDD for conservativeness
Value(s) of monitored parameter:	120
Monitoring equipment:	N/A

Measuring/ Reading/ Recording frequency:	Each time every truck which transports biomass residue to the plant is counted and recorded in the log books. Monitoring frequency: Every trip
Calculation method (if applicable):	Aggregated monthly and taken the average
QA/QC procedures:	The data on distance of fuel supply site from the plant can be verified by cross checking data records on the distances available with information from other sources (e.g. maps). If data is missing for a particular round trip, the following backup data apply in their order: <ul style="list-style-type: none"> <li>➤ The round trip distance between the farthest biomass fuel supply site and the project plant will be used.</li> <li>➤ If the farthest biomass fuel supply site could not be verified, 200km would be used for conservativeness.</li> </ul>
Purpose of data:	Project emission
Additional comment:	--

<b>Data / Parameter:</b>	<b>Ny</b>
Unit:	--
Description:	Number of truck trips for the transportation of biomass
Measured/ Calculated / Default:	Measured
Source of data:	On site records maintained in the log books
Value(s) of monitored parameter:	26,148
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Each time every truck which transports biomass residue to the plant is counted and recorded in the log books. Monitoring frequency: Every trip
Calculation method (if applicable):	--
QA/QC procedures:	The consistency of the number of truck trips could be checked with the quantity of biomass combusted by the relation with previous years
Purpose of data:	Project emissions
Additional comment:	--

<b>Data / Parameter:</b>	<b>EF<sub>km,CO2</sub></b>
Unit:	tCO <sub>2</sub> e/km
Description:	Average CO <sub>2</sub> Emission Factor for transportation of biomass with trucks during year y

Measured/ Calculated / Default:	Default
Source of data:	IPCC default value
Value(s) of monitored parameter:	0.001097 Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories ( Table 1-32 on Page 1.75) of the Reference Manual (Estimated Emission Factors for US Heavy Duty Diesel Vehicles )
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Choose emission factors applicable for the truck types used from the literature in a conservative manner. The appropriateness of the data is reviewed annually
Calculation method (if applicable):	--
QA/QC procedures:	--
Purpose of data:	Project emission
Additional comment:	--

<b>Data / Parameter:</b>	<b>EF<sub>CO<sub>2</sub>,I,y</sub></b>
Unit:	kg CO <sub>2</sub> e/TJ
Description:	CO <sub>2</sub> emission factor for fossil fuel type i (diesel)
Measured/ Calculated / Default:	Default
Source of data:	IPCC default value
Value(s) of monitored parameter:	74,100IPCC 2006 default value (Volume2.Chapter2.P16) , diesel emission factor
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	The appropriateness of the data i reviewed annually
Calculation method (if applicable):	--
QA/QC procedures:	The plant is designed to use diesel at this stage. Should any other fossil fuel be used during operation, the same monitoring procedures apply.
Purpose of data:	Project emission
Additional comment:	--

<b>Data / Parameter:</b>	<b>NCV<sub>i</sub></b>
Unit:	TJ/tonne
Description:	Net Calorific Value(NCV <sub>i</sub> ) of fossil fuel type i(diesel)



Measured/ Calculated / Default:	Default
Source of data:	Reliable National Data
Value(s) of monitored parameter:	0.042652 China Energy Statistical Yearbook 2010,Diesel NCV
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	The appropriateness of the data is reviewed annually
Calculation method (if applicable):	--
QA/QC procedures:	The plant is designed to use diesel at this stage. Should any other fossil fuel be used during operation, the same monitoring procedures apply.
Purpose of data:	Project emission
Additional comment:	--

<b>Data / Parameter:</b>	<b>FF<sub>project plant ,i, y</sub></b>
Unit:	tonne
Description:	Quantity of fossil fuel type <i>i</i> (diesel) combusted in the project plant during year <i>y</i>
Measured/ Calculated / Default:	Measured
Source of data:	Flow meters
Value(s) of monitored parameter:	26.3

Monitoring equipment:	Meter name	Flow Meter 1#	Flow Meter 2#
	Type/Model	LWY-10C	LWY-10C
	Accuracy	1.0	1.0
	SN	08018	08042
	1 <sup>st</sup> calibration date	04/01/2011	04/01/2011
	2 <sup>nd</sup> calibration date	05/01/2012	05/01/2012
	Valid period	04/01/2013	04/01/2013
	Calibration Frequency	Once per year	Once per year
	Meter name	Flow Meter 3#	Flow Meter 4#
	Type/Model	LWY-10C	LWY-10C
	Accuracy	1.0	1.0
	SN	08070	08076
	1 <sup>st</sup> calibration date	04/01/2011	04/01/2011
	2 <sup>nd</sup> calibration date	05/01/2012	05/01/2012
	Valid period	04/01/2013	04/01/2013
	Calibration Frequency	Once per year	Once per year
Measuring/ Reading/ Recording frequency:	Read the fuel consumption data after boiler start-up every time and record accordingly. Monitoring frequency: continuously		
Calculation method (if applicable):	--		
QA/QC procedures:	The meters undergo calibration/maintenance subject to appropriate industrial standards. The measurements could be cross-checked by the purchased quantities and stock changes if available.		
Purpose of data:	Project emission		
Additional comment:	--		
<b>Data / Parameter:</b>	<b>FF<sub>project site,,i, y</sub></b>		
Unit:	tonne		
Description:	Quantity of fossil fuel type <i>i</i> combusted in the project site(including the collection sites) for other purposes that are attributable to the project activity during year <i>y</i>		
Measured/ Calculated / Default:	Measured		
Source of data:	On site consumption records maintained in the log books		
Value(s) of monitored parameter:	164.52		
Monitoring equipment:	N/A		

Measuring/ Reading/ Recording frequency:	Each time consumption of fossil fuel in the project is recorded on the log books. Monitoring frequency: continuously.	
Calculation method (if applicable):	The consumption of diesel is monitored using diesel purchase and consumption log book.	
QA/QC procedures:	The data is cross checked by the purchase receipts.	
Purpose of data:	Project emission	
Additional comment:	--	

<b>Data / Parameter:</b>	<b>EC<sub>PJ, y</sub></b>																	
Unit:	MWh																	
Description:	On-site electricity consumption(including the electricity consumption for the mechanical treatment of the biomass in the biomass collection sites and the project site) attributable to the project activity during the year y																	
Measured/ Calculated / Default:	Measured																	
Source of data:	On-site measurements by meter or calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton)																	
Value(s) of monitored parameter:	436.89																	
Monitoring equipment:	<table border="1"> <tr> <td>Meter name</td> <td>Meter for biomass</td> </tr> <tr> <td>Type/Model</td> <td>DSSD5</td> </tr> <tr> <td>Accuracy</td> <td>0.5</td> </tr> <tr> <td>SN</td> <td>000364</td> </tr> <tr> <td>1st calibration date</td> <td>05/01/2011</td> </tr> <tr> <td>2nd calibration date</td> <td>04/01/2012</td> </tr> <tr> <td>Valid period</td> <td>03/01/2013</td> </tr> <tr> <td>Calibration Frequency</td> <td>Once per year</td> </tr> </table>		Meter name	Meter for biomass	Type/Model	DSSD5	Accuracy	0.5	SN	000364	1st calibration date	05/01/2011	2nd calibration date	04/01/2012	Valid period	03/01/2013	Calibration Frequency	Once per year
Meter name	Meter for biomass																	
Type/Model	DSSD5																	
Accuracy	0.5																	
SN	000364																	
1st calibration date	05/01/2011																	
2nd calibration date	04/01/2012																	
Valid period	03/01/2013																	
Calibration Frequency	Once per year																	
Measuring/ Reading/ Recording frequency:	Daily measured and recorded accordingly. Monitoring frequency: continuously.																	

Calculation method (if applicable):	<p>When the biomass residue is mechanically pretreated, the proposed project needs a certain amount of electricity from grid. This amount could be metered or calculated conservatively.</p> <p>If the monitoring data is missing, or it is not feasible to install a dedicated meter to monitor this indicator, it will be calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton). The electricity factor can be calculated as follows:</p> <ol style="list-style-type: none"> <li>1) Collecting all the nameplates power (in kW) and capacity(t/h) of every straw crackers</li> <li>2) Calculating the electricity factor corresponding to each cracker in kWh/t</li> <li>3) Using the largest number as a conservative electricity factor for the calculation</li> </ol> <p>Monitoring frequency: Continuously, aggregated at least monthly.</p>																																		
QA/QC procedures:	Cross-check measurement results with invoices for purchased electricity if available																																		
Purpose of data:	Project emission																																		
Additional comment:	--																																		
<b>Data / Parameter:</b>	<b>EG<sub>project plant,y</sub></b>																																		
Unit:	MWh																																		
Description:	Net quantity of increased electricity generated in the project plant during the year y																																		
Measured/ Calculated / Default:	Measured																																		
Source of data:	On-site measurements																																		
Value(s) of monitored parameter:	127,332.34																																		
Monitoring equipment:	<table border="1"> <tr> <th>Meter name</th><th>Gate meter</th><th>Gate meter(backup )</th><th>Backup line meter</th></tr> <tr> <td>Type/Model</td><td>MK6E</td><td>DTSD546</td><td>DSSD1008</td></tr> <tr> <td>Accuracy</td><td>0.2S</td><td>0.5S</td><td>0.5</td></tr> <tr> <td>SN</td><td>209151171</td><td>080510045379</td><td>801269</td></tr> <tr> <td>1st calibration date</td><td>05/01/2011</td><td>05/01/2011</td><td>05/01/2011</td></tr> <tr> <td>2nd calibration date</td><td>04/01/2012</td><td>04/01/2012</td><td>04/01/2012</td></tr> <tr> <td>Valid period</td><td>03/01/2013</td><td>03/01/2013</td><td>03/01/2013</td></tr> <tr> <td>Calibration Frequency</td><td>Once per year</td><td>Once per year</td><td>Once per year</td></tr> </table>			Meter name	Gate meter	Gate meter(backup )	Backup line meter	Type/Model	MK6E	DTSD546	DSSD1008	Accuracy	0.2S	0.5S	0.5	SN	209151171	080510045379	801269	1st calibration date	05/01/2011	05/01/2011	05/01/2011	2nd calibration date	04/01/2012	04/01/2012	04/01/2012	Valid period	03/01/2013	03/01/2013	03/01/2013	Calibration Frequency	Once per year	Once per year	Once per year
Meter name	Gate meter	Gate meter(backup )	Backup line meter																																
Type/Model	MK6E	DTSD546	DSSD1008																																
Accuracy	0.2S	0.5S	0.5																																
SN	209151171	080510045379	801269																																
1st calibration date	05/01/2011	05/01/2011	05/01/2011																																
2nd calibration date	04/01/2012	04/01/2012	04/01/2012																																
Valid period	03/01/2013	03/01/2013	03/01/2013																																
Calibration Frequency	Once per year	Once per year	Once per year																																

Measuring/ Reading/ Recording frequency:	Daily measured and recorded accordingly. Monitoring frequency: continuously.
Calculation method (if applicable):	The net electricity equals to electricity supplied to the grid minus electricity purchased from the grid minus electricity purchased from the 10kv backup power.
QA/QC procedures:	The consistency of the data is cross-checked with receipts from electricity sales and purchase invoices, if available; and the quantity of fuels fired to see whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency.
Purpose of data:	Baseline emission
Additional comment:	--

<b>Data / Parameter:</b>	--
Unit:	Tonnes
Description:	Quantity of each biomass residues type k that are utilized in the defined geographical region
Measured/ Calculated / Default:	Measured
Source of data:	Surveys or Statistics
Value(s) of monitored parameter:	Please refer to Section E.3
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures:	This parameter is reviewed annually according to the project data and official data.
Purpose of data:	Leakage
Additional comment:	--

<b>Data / Parameter:</b>	--
Unit:	Tonnes
Description:	Quantity of each biomass residues type k that are available in the region
Measured/ Calculated / Default:	Measured
Source of data:	Surveys or Statistics

Value(s) of monitored parameter:	Please refer to Section E.3
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures:	This parameter is reviewed annually according to the project data and official data.
Purpose of data:	Leakage
Additional comment:	--

The monitored parameters are given in the following table 1.

		Rice husk			Cotton straws		
		BF <sub>k,y</sub>	Moisture	NCV	BF <sub>k,y</sub>	Moisture	NCV
		tonne	%	GJ/ton	Tonne	%	GJ/ton
from	to	A	B	C	D	E	F
01/07/2011	31/07/2011	7,921	13.38	12.99	-		
01/08/2011	31/08/2011	7,973	13.46	12.99	-		
01/09/2011	30/09/2011	11,660	13.53	12.99	-		
01/10/2011	31/10/2011	9,308	14.11	12.99	-		
01/11/2011	30/11/2011	6,003	13.97	12.99	-		
01/12/2011	31/12/2011	3,178	13.18	12.99	1,927	30.93	11.25
01/01/2012	31/01/2012	-			3,759	30.84	11.25
01/02/2012	29/02/2012	-			1,596	29.70	11.25
01/03/2012	31/03/2012	2,394	13.43	13.11	2,172	29.19	11.25
01/04/2012	30/04/2012	2,371	14.69	13.11	1,761	30.91	11.25
01/05/2012	31/05/2012	3,188	13.25	13.11	1,462	29.93	11.25
01/06/2012	30/06/2012	2,869	13.60	13.11	-		
01/07/2012	31/07/2012	-			-		
01/08/2012	31/08/2012	-			-		
01/09/2012	30/09/2012	5,493	13.89	12.86	-		
01/10/2012	31/10/2012	9,182	12.53	12.86	-		
01/11/2012	30/11/2012	8,138	13.25	12.86	-		
01/12/2012	31/12/2012	3,293	12.96	12.86	-		
		<b>82,971</b>	-	-	<b>12,677</b>	-	-

		Branches			Barks		
		BF <sub>k,y</sub>	Moisture	NCV	BF <sub>k,y</sub>	Moisture	NCV
		tonne	%	GJ/ton	Tonne	%	GJ/ton
from	to	G	H	I	J	K	L
01/07/2011	31/07/2011	1,511	35.56	12.08	7,073	36.02	11.85

01/08/2011	31/08/2011	-			11,732	40.87	11.85
01/09/2011	30/09/2011	-			3,290	38.47	11.85
01/10/2011	31/10/2011	1,643	28.60	12.08	2,578	39.93	11.85
01/11/2011	30/11/2011	1,397	30.64	12.08	2,899	39.56	11.85
01/12/2011	31/12/2011	6,666	29.76	12.08	12,349	40.78	11.85
01/01/2012	31/01/2012	4,717	31.25	12.33	7,133	41.24	11.26
01/02/2012	29/02/2012	4,895	29.07	12.33	-		
01/03/2012	31/03/2012	2,347	30.83	12.33	5,116	40.14	11.26
01/04/2012	30/04/2012	4,147	29.55	12.33	5,706	40.42	11.26
01/05/2012	31/05/2012	3,854	31.02	12.33	1,729	41.92	11.26
01/06/2012	30/06/2012	-			1,256	39.14	11.26
01/07/2012	31/07/2012	-			-		
01/08/2012	31/08/2012	-			-		
01/09/2012	30/09/2012	-			-		
01/10/2012	31/10/2012	-			-		
01/11/2012	30/11/2012	-			2,342	39.86	11.18
01/12/2012	31/12/2012	-			5,116	39.00	11.18
		<b>31,177</b>	-	-	<b>68,319.00</b>	-	-

		Stumps			Scrap wood		
		BF <sub>k,y</sub>	Moisture	NCV	BF <sub>k,y</sub>	Moisture	NCV
		tonne	%	GJ/ton	Tonne	%	GJ/ton
from	to	M	N	O	P	Q	R
01/07/2011	31/07/2011	-		12.49	7,635	40.05	11.16
01/08/2011	31/08/2011	-		12.49	6,440	38.13	11.16
01/09/2011	30/09/2011	-		12.49	10,761	37.99	11.16
01/10/2011	31/10/2011	815.00	28.90	12.49	13,588	39.89	11.16
01/11/2011	30/11/2011	517.00	29.40	12.49	12,286	38.98	11.16
01/12/2011	31/12/2011	3,617.00	30.23	12.49	8,958	41.74	11.16
01/01/2012	31/01/2012	-	-	11.95	5,387	38.98	11.52
01/02/2012	29/02/2012	4,057.00	31.37	11.95	1,722	39.39	11.52
01/03/2012	31/03/2012	-	-	11.95	982	40.77	11.52
01/04/2012	30/04/2012	-	-	11.95	-		
01/05/2012	31/05/2012	-	-	11.95	9,564	39.92	11.52
01/06/2012	30/06/2012	-	-	11.95	-		
01/07/2012	31/07/2012	-	-		-		
01/08/2012	31/08/2012	-	-		-		
01/09/2012	30/09/2012	-	-		1,522	38.24	11.24
01/10/2012	31/10/2012	-	-		4,687	40.14	11.24
01/11/2012	30/11/2012	-	-		2,083	40.37	11.24
01/12/2012	31/12/2012	-	-		7,500	40.76	11.24
		9,006	-	-	93,115	-	-

	VD <sub>y</sub>	N <sub>y</sub>	FF <sub>project plant,i,y</sub>	FF <sub>project site,i,y</sub>
--	-----------------	----------------	---------------------------------	--------------------------------



from	to	km	-	Tonnes	Tonnes
		S=T*120	T	U	V
01/07/2011	31/07/2011	236,040	1,967	4.70	9.74
01/08/2011	31/08/2011	213,480	1,779	0.80	12.07
01/09/2011	30/09/2011	264,120	2,201	2.00	12.93
01/10/2011	31/10/2011	258,960	2,158	0.40	12.49
01/11/2011	30/11/2011	324,000	2,700	3.30	11.38
01/12/2011	31/12/2011	397,200	3,310	0.70	11.09
01/01/2012	31/01/2012	152,160	1,268	2.50	12.62
01/02/2012	29/02/2012	161,880	1,349	3.80	4.32
01/03/2012	31/03/2012	133,440	1,112	1.72	8.59
01/04/2012	30/04/2012	147,960	1,233	1.42	10.24
01/05/2012	31/05/2012	183,600	1,530	0.92	11.01
01/06/2012	30/06/2012	30,960	258	0.00	3.81
01/07/2012	31/07/2012	240	2	0.00	0.87
01/08/2012	31/08/2012	45,240	377	0.00	1.43
01/09/2012	30/09/2012	144,600	1,205	1.88	7.73
01/10/2012	31/10/2012	151,560	1,263	0.50	12.12
01/11/2012	30/11/2012	128,760	1,073	1.06	9.79
01/12/2012	31/12/2012	163,560	1,363	0.60	12.28
		3,137,760	26,148.00	26.30	164.52

		EG <sub>expored,y</sub>	EG <sub>impored,1 10KV· y</sub>	EG <sub>impored,10K V,y</sub>	EG <sub>project plant,y</sub>	EC <sub>PJ,y</sub>
from	MWh	MWh	MWh	MWh	MWh	MWh
		W	X	Y	Z	AA
01/07/2011	31/07/2011	10,341.67	11.22	76.86	10,253.59	10,341.67
01/08/2011	31/08/2011	10,877.21	0.05	61.32	10,815.84	10,877.21
01/09/2011	30/09/2011	11,356.20	5.20	31.32	11,319.70	11,356.20
01/10/2011	31/10/2011	12,196.17	4.45	111.06	12,080.66	12,196.17
01/11/2011	30/11/2011	9,038.95	20.64	88.92	8,929.39	9,038.95
01/12/2011	31/12/2011	13,649.50	0.32	83.40	13,565.78	13,649.50
01/01/2012	31/01/2012	7,396.63	49.88	80.64	7,266.11	7,396.63
01/02/2012	29/02/2012	3,458.99	42.09	46.80	3,370.10	3,458.99
01/03/2012	31/03/2012	5,258.91	34.15	45.60	5,179.16	5,258.91
01/04/2012	30/04/2012	5,987.34	18.82	0.00	5,968.51	5,987.34
01/05/2012	31/05/2012	7,657.50	27.71	34.44	7,595.36	7,657.50
01/06/2012	30/06/2012	2,056.59	63.23	78.90	1,914.46	2,056.59
01/07/2012	31/07/2012	-	42.95	56.64	-99.59	-
01/08/2012	31/08/2012	-	51.59	27.60	-79.19	-
01/09/2012	30/09/2012	4,426.25	67.07	8.34	4,350.84	4,426.25
01/10/2012	31/10/2012	9,406.98	-	56.58	9,350.40	9,406.98
01/11/2012	30/11/2012	7,319.66	3.08	65.58	7,251.01	7,319.66
01/12/2012	31/12/2012	8,341.70	-	41.46	8,300.24	8,341.70
		128,770.25	442.45	995.46	127,332.37	128,770.25

**D.3. Implementation of sampling plan**

&gt;&gt;

N/A

**SECTION E. Calculation of emission reductions or GHG removals by sinks****E.1. Calculation of baseline emissions or baseline net GHG removals by sinks**

&gt;&gt;

Baseline emissions are calculated as:

- a) Emission reduction due to displacement of electricity

$$ER_{electricity,y} = EG_y \times EF_{electricity,y} \quad (1)$$

Where:

$ER_{electricity,y}$	Emission reductions due to displacement of electricity during the year y (tCO <sub>2</sub> /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)
$EF_{electricity,y}$	CO <sub>2</sub> emission factor for the electricity displaced due to the project activity during the year y (tCO <sub>2</sub> /MWh), which is 0.9735 tCO <sub>2</sub> e/MWh (See registered PDD Version 5 available online at <a href="http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1256142179.69/view">http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1256142179.69/view</a> )

During the current monitoring period, the net electricity supplied to the grid is:

$$EG_y = 127,332.34 \text{ MWh}$$

Therefore,

$$ER_{electricity,y} = 127,332.34 \text{ MWh} \times 0.9735 \text{ tCO}_2\text{e} / \text{MWh} = 123,958.03 \text{ tCO}_2\text{e}$$

- b) Emission reductions or increases due to displacement of heat

Since there is no steam is supplied to user, so the  $ER_{heat,y} = 0$ 

- c) Baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues

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

Where:

$BE_{biomass,y}$	Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO <sub>2</sub> e/yr)
$GWP_{CH_4}$	Global Warming Potential of methane valid for the commitment period (tCO <sub>2</sub> e/tCH <sub>4</sub> )
$BF_{PJ,k,y}$	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)
$NCV_k$	Net calorific value of the biomass residue type k (GJ/ton of dry matter)
$EF_{burning,CH_4,k,y}$	CH <sub>4</sub> emission factor for uncontrolled burning of the biomass residue type k during the year y (tCH <sub>4</sub> /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 described in the leakage section

$$BE_{biomass,y} = 21 \text{ tCO}_2\text{e} / \text{tCH}_4 \times 205,845.70 \text{ t} \times 0.00197 \text{ tCH}_4 / \text{t} = 8,520.16 \text{ tCO}_2\text{e}$$

So, the baseline emission reduction is:

$$BE_y = ER_{electricity,y} + ER_{heat,y} + BE_{biomass,y} = 123,958.03 + 0 + 8,520.16 = 132,478.19 \text{ tCO}_2\text{e}$$

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

>>

According to methodology ACM0006 version9, the emissions of the project within the project boundary include:

- CO<sub>2</sub> emissions from transportation of biomass residues to the project site (PET<sub>y</sub>),
- CO<sub>2</sub> emissions from on-site consumption of fossil fuels due to the project activity (PEFF<sub>y</sub>),
- CO<sub>2</sub> emissions from consumption of electricity (PE<sub>EC,y</sub>),
- Where this emission source is included in the project boundary and relevant: CH<sub>4</sub> emissions from the combustion of biomass residues (PE<sub>Biomass,CH<sub>4</sub>,y</sub>),
- Where waste water from the treatment of biomass residues degrades under anaerobic conditions: CH<sub>4</sub> emissions from waste water.

Project emissions are calculated as follows:

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

Where:

PET <sub>y</sub>	CO <sub>2</sub> emissions during the year y due to transport of the biomass residues to the project plant (tCO <sub>2</sub> /yr)
PEFF <sub>y</sub>	CO <sub>2</sub> 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 <sub>2</sub> /yr)
PE <sub>EC,y</sub>	CO <sub>2</sub> emissions during the year y due to electricity consumption at the project site that is attributable to the project activity (tCO <sub>2</sub> /yr)
GWP <sub>CH<sub>4</sub></sub>	Global Warming Potential for methane valid for the relevant commitment period
PE <sub>Biomass,CH<sub>4</sub>,y</sub>	CH <sub>4</sub> emissions from the combustion of biomass residues during the year y (tCH <sub>4</sub> /yr)

- a) Carbon dioxide emissions from combustion of fossil fuels for transportation of biomass residues to the project plant (PET<sub>y</sub>)

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

Where:

PET <sub>y</sub>	CO <sub>2</sub> emissions during the year y due to transport of the biomass residues to the project plant (tCO <sub>2</sub> /yr)
N <sub>y</sub>	Number of truck trips during the year y
AVD <sub>y</sub>	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 <sub>km,CO<sub>2</sub>,y</sub>	Average CO <sub>2</sub> emission factor for the trucks measured during the year y (tCO <sub>2</sub> /km)

Therefore,

$$PET_y = 26,148 \times 120 \times 0.001097 tCO_2e / km = 3,442.12 tCO_2e$$

- b) Carbon dioxide emissions from on-site consumption of fossil fuels (PEFF<sub>y</sub>)

$$PEFF_y = PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$$

Where:

PE <sub>FC,i,y</sub>	Are the CO <sub>2</sub> emissions from fossil fuel combustion in process j during the year y (tCO <sub>2</sub> /yr);
FC <sub>i,i,y</sub>	Is the quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);
COEF <sub>i,y</sub>	Is the CO <sub>2</sub> emission coefficient of fuel type i in year y (tCO <sub>2</sub> /mass or volume unit)
i	Are the fuel types combusted in process j during the year y

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where:

$COEF_{i,y}$  Is the CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit)  
 $NCV_{i,y}$  Is the weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)  
 $EF_{CO2,i,y}$  Is the weighted average CO<sub>2</sub> emission factor of fuel type i in year y (tCO<sub>2</sub>/GJ)  
 i Are the fuel types combusted in process j during the year y

Therefore,

$$PEFF_y = \sum_i FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,y}$$

$$= (26.3 + 164.52) \text{ t} \times 0.042652 \text{ TJ} / \text{t} \times 74,100 \text{ kgCO}_2 \text{e} / \text{TJ} / 1 \times 10^3 = 603.09 \text{ tCO}_2 \text{e}$$

c) CO<sub>2</sub> emissions from electricity consumption ( $PE_{EC,y}$ )

$$PE_{EC,y} = \sum_i EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Where:

$EC_{PJ,i,y}$  Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)  
 $EF_{EL,i,y}$  Emission factor for electricity generation for source j in year y (tCO<sub>2</sub>/MWh)  
 $TDL_{i,y}$  Average technical transmission and distribution losses for providing electricity to source j in year y

Therefore,

$$PE_{EC,y} = 436.89 \text{ MWh} \times 0.9735 \text{ tCO}_2 \text{e} / \text{MWh} \times (1 + 20\%) = 510.37 \text{ tCO}_2 \text{e}$$

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

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

Where:

$BF_{k,y}$  Quantity of biomass residue type k combusted in the project plant during the year y (tons of dry matter)  
 $NCV_k$  Net calorific value of the biomass residue type k (GJ/ton of dry matter)  
 $EF_{CH4,BF}$  CH<sub>4</sub> emission factor for the combustion of biomass residues in the project plant (tCH<sub>4</sub>/GJ), according to ACM0006, Version 9, the  $EF_{CH4,BF} = 41.1 \text{ kg CH}_4 / \text{TJ}$

Therefore,

$$PE_{biomass,CH4,y} = 41.1 \text{ kgCH}_4 / \text{TJ} \cdot 93,801,906 / 1 \times 10^6 = 93.51 \text{ tCH}_4$$

According the data calculated above,

$$PE_y = 3442.12 \text{ tCO}_2 \text{e} + 603.09 \text{ tCO}_2 \text{e} + 510.37 \text{ tCO}_2 \text{e} + 21 \text{ tCO}_2 \text{e} / \text{tCH}_4 \times 93.51 \text{ tCH}_4$$

$$= 6,519.26 \text{ tCO}_2 \text{e}$$

### E.3. Calculation of leakage

>>

According to methodology ACM0006 version 9, the main potential source of leakage for this project activity is an increase in emissions from fossil fuel combustion or other sources due to diversion of biomass residues from other uses to the project plant as a result of the project activity. Changes in carbon stocks in the LULUCF sector are expected to be insignificant since this methodology is limited to biomass residues.

A statistic is issued by a reputed institute on the biomass availability, and the data are as followed:

### Demonstration of abundant surplus of biomass availability in 2011

Biomass Type	Rice husks	cotton straws	Branches	barks	stump s	scrap wood
Total biomass generation in the region(10,000t)	24.72	2.41	60.00			
Biomass loss(10,000t)	2.47	0.36	6.00			
Available Biomass in the region (10,000t)	22.25	2.05	54.00			
Biomass consumption other than the project (10,000t)	3.34	0.31	8.10			
Biomass consumption in the project(10,000t) <sup>1</sup>	8.46	0.75	1.69	7.14	0.82	9.69
Total biomass consumption (10,000t)	11.80	1.05	27.45			
Available Biomass/Total biomass consumption	188.59%	194.43%	196.74%			
Available Biomass/Total biomass consumption -100%	88.59%	94.43%	96.74%			
Leakage or not? (if it is more than 25%, no leakage; if not, yes)	No	No	No			

### Demonstration of abundant surplus of biomass availability in 2012

Biomass Type	Rice husks	cotton straws	Branches	barks	stumps	scrap wood
Total biomass generation in the region(10,000t)	21.24	2.69	60.00			
Biomass loss(10,000t)	2.12	0.40	6.00			
Available Biomass in the region (10,000t)	19.12	2.29	54.00			
Biomass consumption other than the project (10,000t)	2.87	0.34	8.10			
Biomass consumption in the project(10,000t)	3.69	1.08	2.00	2.84	0.41	3.34
Total biomass consumption (10,000t)	6.56	1.42	16.69			
Available Biomass/Total biomass consumption	291.39%	161.25%	323.62%			
Available Biomass/Total biomass consumption -100%	191.39%	61.25%	223.62%			
Leakage or not? (if it is more than 25%, no leakage; if not, yes)	No	No	No			

From the data in the above table, that the leakage of the project within the project boundary is zero, i.e. LE<sub>v</sub> = 0 tCO<sub>2</sub>e.

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

<sup>1</sup> The total biomass consumption covers the whole year of 2011.

Item	Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO <sub>2</sub> e)
Total	132,478.19	6,519.26	0	125,959 (rounded down )

**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 <sub>2</sub> e)	175,872 <sup>2</sup>	125,959

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

>>

From the data shown in the above table, the actual emission reduction achieved during current monitoring period is 28.38% lower than the ex-ante estimation in registered CDM-PDD (version 05).

**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 <sub>2</sub> e)	189,266 <sup>3</sup>	0

<sup>2</sup>  $175,872 \text{ tCO}_2\text{e} = \frac{116,715 \text{ tCO}_2\text{e}}{365 \text{ days}} \times 550 \text{ days}$

<sup>3</sup>  $189,266 \text{ t CO}_2\text{e} = 63,307 \text{ t CO}_2\text{e}(\text{form } 15/01/2011 \text{ to } 30/06/2011) + 125,959 \text{ t CO}_2\text{e}(\text{form } 01/07/2011 \text{ to } 31/12/2012)$

**Annex 1: The Energy Balance for Qichun Kaidi Biomass Project**

The total inputs of biomass residues combusted and useful output of electricity from the project are shown below. From this data the conversion efficiency of the project in this monitoring period is calculated as 18.69%

Table 4. The Energy Balance for Qichun Kaidi Biomass Project (01/07/2011-31/12/2012)

	BF <sub>k,y</sub> (ton) (dry base)	NCV <sub>k</sub> (GJ/t)	Energy(GJ)
Rice husk	71,787.78	12.99	932,318.18
Cotton straws	8,831.53	11.25	99,354.68
Branches	21,716.23	12.22	265,348.22
Barks	41,050.14	11.52	472,897.62
Stumps	6,252.38	12.36	77,248.18
Scrap wood	56,207.64	11.24	631,773.83
Fossil Fuel	26.30	42.652	1,121.75
Total			2,480,062.45
Electricity Exported (GJ)			463,572.90
Efficiency			18.69%

Energy Balance:

$$E_{\text{total}} = E_{\text{biomass}} + E_{\text{fossil fuel}} = 2480062.45 \text{ GJ}$$

$$\text{Electricity exported} = 463,572.90 \text{ GJ}$$

$$\text{Efficiency} = \text{Electricity exported} / E_{\text{total}} = 18.69\%$$

- - - - -



## Document information

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