Monitoring report form
(Version 04.0)

MONITORING REPORT	
Title of the project activity	Hunan Yueyang Kaidi Biomass Power Project
Reference number of the project activity	3065
Version number of the monitoring report	2.0
Completion date of the monitoring report	11/08/2014
Registration date of the project activity	31/12/2010
Monitoring period number and duration of this monitoring period	The 2nd monitoring period, from 01/01/2012 to 31/12/2013
Project participant(s)	United Kingdom of Great Britain and Northern Ireland , involved indirectly Authorized Participants: Camco Clean Energy Plc ; Camco Carbon Limited Switzerland , involved indirectly Authorized Participants: Camco Clean Energy Plc project owner: Yueyang Kaidi Green Energy Development Co., Ltd.
Host Party(ies)	China
Sectoral scope and selected methodology(ies), and where applicable, applied standardized baseline(s)	Sectoral scope: 1 : Energy industries (renewable - / non-renewable sources) Methodologies Used: ACM0002 ver. 10 - Consolidated methodology for grid-connected electricity generation from renewable sources ACM0006 ver. 9 - Consolidated methodology for electricity generation from biomass residues
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	244,758tonnes CO_2e (PDD of Version 5)
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	84,918 tonnes CO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	39,925 tonnes CO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	44,993 tonnes CO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Hunan Yueyang Kaidi Biomass Power Project (hereafter referred to as the project) is a biomass utilization project developed by Yueyang Kaidi Green Energy Development Co., Ltd. (hereafter referred to as the Project Owner) and is located in Economic Management Zone, Quyuan Management District, Yueyang City, Hunan Province, P.R.China. The project is designed to produce 253,440MWh 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_2) emissions.

The project processes and burns biomass residue, of which rice husk, rice straw, maize straw, wood chips, branches and barks are the biomass fuel. The project is designed as a total installation of 48MW, and will be built into two phases, each of them is 24MW. 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam turbines generator units are installed at the first phase. The second phase 24MW will be possibly constructed in 2014 .Therefore, the total installed capacity of the project is 24MW and the project is estimated to achieve 192,849tonnes of CO_2e emissions reduction annually (PDD of Version 5).

The project began to construct in February 2008, and was put into operation since 28/09/2009. The project has been registered as a CDM project on 31/12/2010 (The version of registered PDD is version 5). The crediting period is form 01/01/2011 to 31/12/2017 (Renewable).

During current monitoring period (01/01/2012-31/12/2013), the project has achieved emission reductions of 84,918tonnes CO_2e.

A.2. Location of project activity

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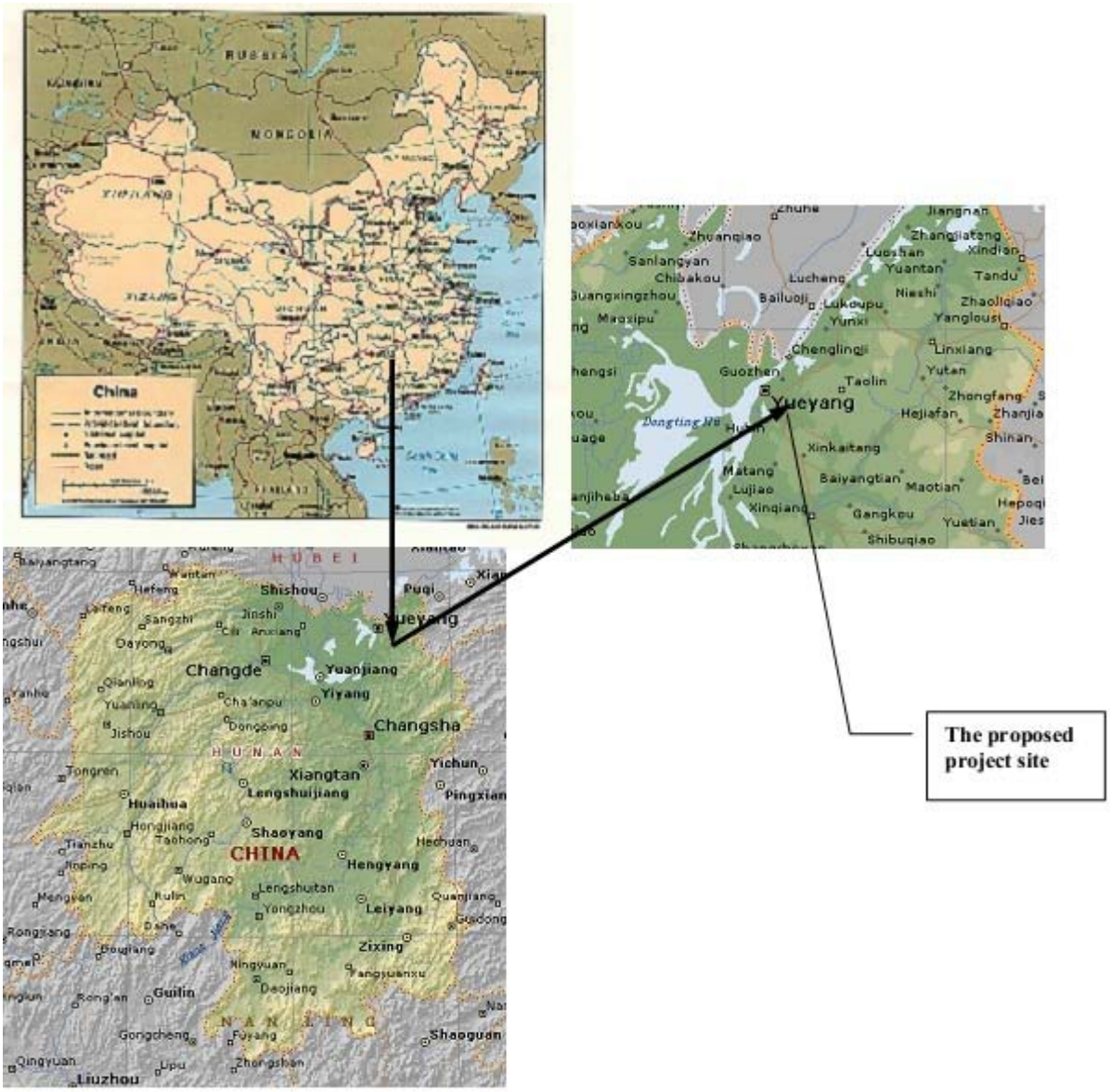
The project activity is located in the Economic Management Zone, Quyuan Management District, Yueyang City, Hunan Province, P.R. China.

The center of plant has geographical coordinates of 112°54´30″ east longitude 28°51´18″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)	Yueyang Kaidi Green Energy Development Co., Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Camco Clean Energy Plc	No
United Kingdom of Great Britain and Northern Ireland	Camco Carbon Limited	No
Switzerland	Camco Clean Energy Plc	No

A.4. Reference of applied methodology and standardized baseline

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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_2 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

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Crediting period: from 01/01/2011 to 31/12/2017(Renewable)
The start date of the crediting period is 01/01/2011
This monitoring period: 01/01/2012 –31/12/2013

A.6. Contact information of responsible persons/ entities

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Mr.XueFei
General Manager of CDM department, Carbon asset center，Sunshine Kaidi New Energy Group
(not project participants)
xuefei@kdpe.com.cn

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The project consists of one site, which began to construct on February 2008, and put into operation since 28/09/2009. Please refer to the following table for details.

Activity	Date	
	1# Generator	2# Generator
Start of construction	February 2008	
Operation of core equipment	28/09/2009	15/02/2010

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 14 times and 10 times for maintenance.

No events or situations, which may impact the applicability of the methodology, occurred during the current monitoring period.

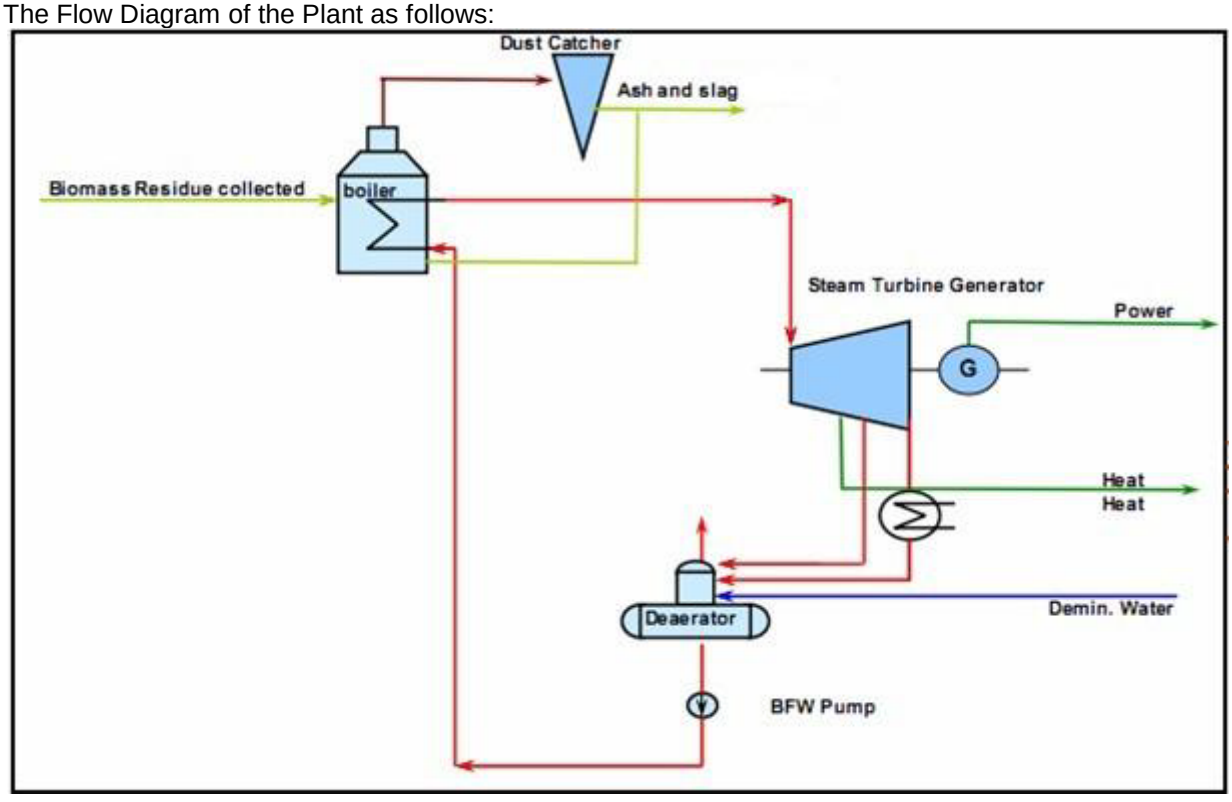
The technology employed by the project is advanced domestic technology. The project installs two sets of 65t/h circulating fluid bed (CFB) boilers with medium temperature and sub-high pressure. At the same time, two 12MW steam turbines and two associated generators are applied in the project .The steam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

BOILER	
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
STEAM TURBINE	
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
GENERATOR	
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, applied methodology or applied standardized baseline

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N/A

B.2.2. Corrections

>>
N/A

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

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N/A

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

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The request for post-registration changes to the PDD was approved by EB on 31Oct 2013.
Please refer to the link: http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1256216278.37/view

B.2.5. Changes to start date of crediting period

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N/A

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

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N/A

SECTION C. Description of monitoring system

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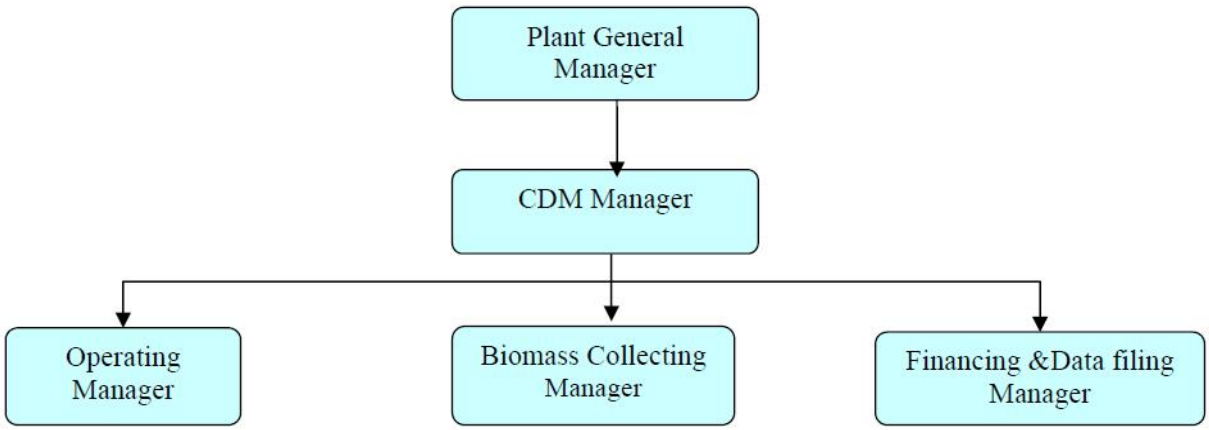
1. The organizational structure, roles and responsibilities of personnel:

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 liaisoning 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 Manger 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 Manger 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 double way meter installed on the project site monitoring the electricity supplied to the grid and purchased from the grid.

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.

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 is also monitored by sampled 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 project structures a recording and monitoring system within the biomass residues supply and management system covering all the biomass collection sites established by the 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 project needs a certain amount of electricity from grid. This amount is metered or calculated conservatively.

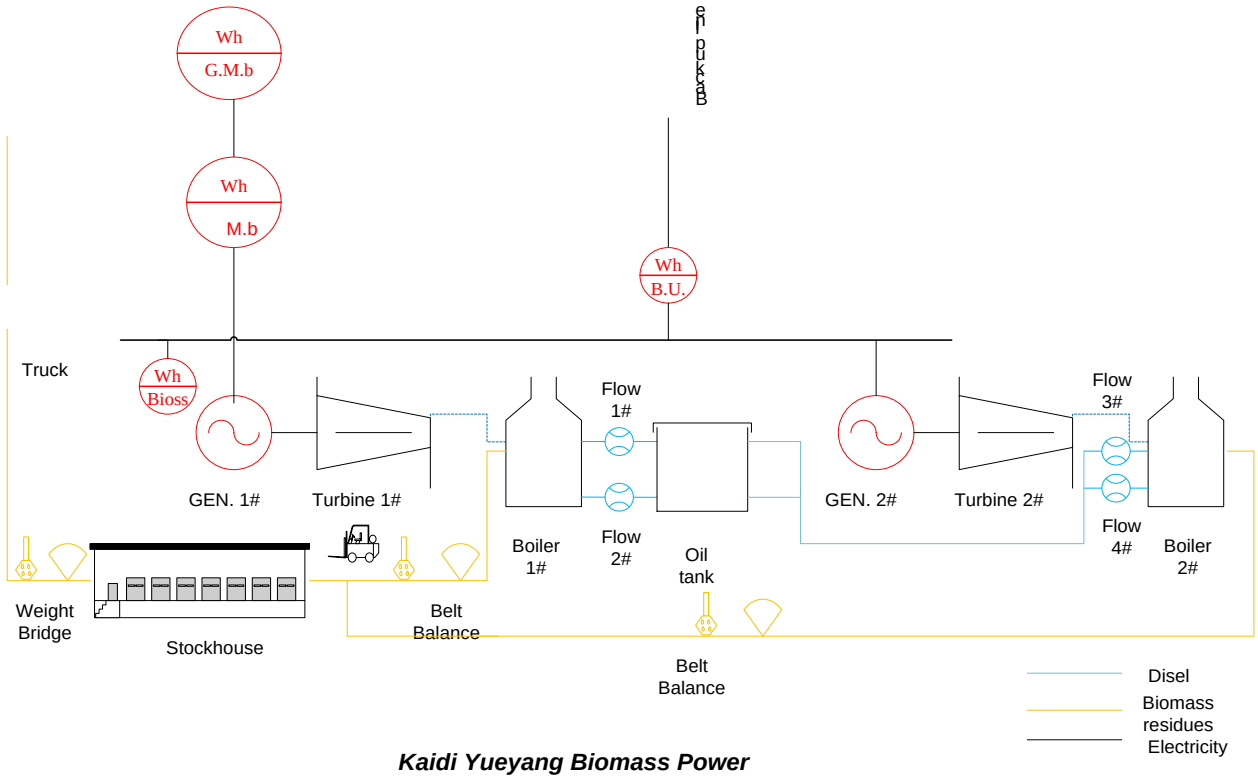
If the monitoring data is missing, or it is not feasible to install a dedicated meter to monitor this indicator, it is calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton). The electricity factor can be calculated as follows:

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 residues not only the biomass types mentioned above but also other biomass residues utilized in the project has been monitored to check the leakage effect brought by the operation of the 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



Kaidi Yueyang Biomass Power Plant

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 have been 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 have been

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

Data / Parameter:	**EFy**
Unit:	t CO_2e/MWh
Description:	Baseline emission factor of Central China Power Grid
Source of data:	The registered PDD Version 5
Value(s) applied):	0.9735
Purpose of data:	Baseline emission calculation
Additional comment:	--

Data / Parameter:	**GWP_{CH4}**
Unit:	t CO_2e/t CH_4
Description:	Global warming potential for CH_4

Source of data:	The registered PDD Version 5
Value(s) applied):	21；25
Purpose of data:	Baseline emission calculation
Additional comment:	Before 1 January 2013, 21 for the first commitment period is adopted, and from 1 January 2013 onwards 25 for the second commitment period is adopted.

Data / Parameter:	**$TDL_{j,y}$**
Unit:	%
Description:	Average technical transmission and distribution losses for providing electricity to source j in year y.
Source of data:	The registered PDD Version 5
Value(s) applied):	20
Purpose of data:	Project emission calculation
Additional comment:	--

Data / Parameter:	**$EF_{CH4,BF}$**
Unit:	t CH_4/GJ
Description:	CH_4 emission factor for controlled burning of the biomass residue in the project plant
Source of data:	The registered PDD Version 5
Value(s) applied):	41.1
Purpose of data:	Project emission calculation
Additional comment:	--

Data / Parameter:	**$NCVk*EF_{burning,CH4,k,y}$**
Unit:	t CH_4/tonne
Description:	CH_4 emission factor for uncontrolled burning of the biomass residue
Source of data:	The registered PDD Version 5
Value(s) applied):	0.001971
Purpose of data:	Baseline emission calculation
Additional comment:	--

D.2. Data and parameters monitored

Data / Parameter:	**$BF_{k,y}$**
Unit:	Tonnes 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	Monitored Data
Wood chips	tonne	25503.54
Rice husk	tonne	43422.80
Maize straws	tonne	5138.83
Barks	tonne	27563.76
Branches	tonne	39573.63
Rice straws	tonne	2290.78

Monitoring equipment:	

Meter name	Belt balance 1#	Belt balance 2#
Type/Model	ICS-ST4-1000	ICS-ST4-1000
Accuracy class	1%	1%
SN	0811114	0811113
First calibration date	17/10/2011	17/10/2011
Second calibration date	17/10/2012	17/10/2012
Last calibration date	17/10/2013	17/10/2013
Valid period	16/10/2014	16/10/2014
Calibration Frequency	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:	

Data / Parameter:	**Moisture content of the biomass residues**
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	FA214
Accuracy class	Ⅲ level	Ⅰ level
SN	145	2769
First calibration date	04/12/2011	04/12/2011
Valid period	03/12/2012	03/12/2012
Calibration Frequency	Once per year	Once per year
Meter name	Balance 3#	Balance 4#
Type/Model	LT2000B	FA214
Accuracy class	Ⅲ level	Ⅰ level
SN	28764	415
First calibration date	04/12/2012	04/12/2012
Lsat calibration date	03/12/2013	03/12/2013
Valid period	02/12/2014	02/12/2014
Calibration Frequency	Once per year	Once per year

Meter name	Dry Cabinet 1#	Dry Cabinet 2#
Type/Model	101-1B	101-1B
Accuracy class	±0.1℃	±0.1℃
SN	0912013	081216
First calibration date	26/12/2011	26/12/2011
Second calibration date	26/12/2012	26/12/2012
Last calibration date	25/12/2013	25/12/2013
Valid period	24/12/2014	24/12/2014
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:	For stable monitoring of moisture content of the biomass residues, the project owner has purchased and used new two balance (3#,4#) to replace the old two ones(1#,2#) to avoid the potential risk of equipment failures.

Data / Parameter:	**NCV_K**
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>17/12/2011</td><td>20/06/2012</td><td>25/10/2012</td></tr><tr><td>Wood chips</td><td>GJ/ton</td><td>12.07</td><td>11.69</td><td></td></tr><tr><td>Rice husk</td><td>GJ/ton</td><td>13.42</td><td>13.15</td><td></td></tr><tr><td>Maize straws</td><td>GJ/ton</td><td></td><td></td><td>11.22</td></tr><tr><td>Barks</td><td>GJ/ton</td><td>11.25</td><td>11.38</td><td></td></tr><tr><td>Branches</td><td>GJ/ton</td><td>11.58</td><td>11.42</td><td></td></tr><tr><td>Rice straws</td><td>GJ/ton</td><td></td><td>11.42</td><td></td></tr><tr><td>Type</td><td>Units</td><td>24/12/2012</td><td>15/06/2013</td><td></td></tr><tr><td>Wood chips</td><td>GJ/ton</td><td>11.83</td><td>11.74</td><td></td></tr><tr><td>Rice husk</td><td>GJ/ton</td><td>12.93</td><td>13.08</td><td></td></tr><tr><td>Maize straws</td><td>GJ/ton</td><td></td><td>11.31</td><td></td></tr><tr><td>Barks</td><td>GJ/ton</td><td>11.33</td><td>11.21</td><td></td></tr><tr><td>Branches</td><td>GJ/ton</td><td>11.45</td><td>11.52</td><td></td></tr><tr><td>Rice straws</td><td>GJ/ton</td><td></td><td>11.20</td><td></td></tr></table>
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:	Measured
Source of data:	On site records maintained in the log books
Value(s) of monitored parameter:	84.21
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: ➢ The round trip distance between the farthest biomass fuel supply site and the project plant will be used. ➢ If the farthest biomass fuel supply site could not be verified, 200km would be used for conservativeness.

Purpose of data:	Project emission
Additional comment:	--

Unit:	N_y
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:	25,167
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:	--

Data / Parameter:	$EF_{km,CO2}$
Unit:	tCO_2e/km
Description:	Average CO_2 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:	--

Data / Parameter:	$EF_{CO2,I,y}$
Unit:	$kg\ CO_2e/TJ$
Description:	CO_2 emission factor for fossil fuel type i (diesel)
Measured/ Calculated / Default:	Default

Source of data:	IPCC default value
Value(s) of monitored parameter:	74,100 IPCC 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:	--

Data / Parameter:	**NCVi**
Unit:	TJ/tonne
Description:	Net Calorific Value(NCVi) 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 2012,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:	--

Data / Parameter:	$\mathbf{FF}_{\text{project plant ,i, y}}$
Unit:	tonne
Description:	Quantity of fossil fuel type i(diesel) combusted in the project plant during year y
Measured/ Calculated / Default:	Measured
Source of data:	Flow meters
Value(s) of monitored parameter:	15.67tonnes

Monitoring equipment:	<table><tr><td>Meter name</td><td>Flow Meter 1#</td><td>Flow Meter 2#</td></tr><tr><td>Type/Model</td><td>LWY-10C</td><td>LWY-10C</td></tr><tr><td>Accuracy class</td><td>1.0</td><td>1.0</td></tr><tr><td>SN</td><td>L10111052</td><td>L10111053</td></tr><tr><td>First calibration date</td><td>15/11/2011</td><td>15/11/2011</td></tr><tr><td>Second calibration date</td><td>15/11/2012</td><td>15/11/2012</td></tr><tr><td>Last calibration date</td><td>15/11/2013</td><td>15/11/2013</td></tr><tr><td>Valid period</td><td>14/11/2014</td><td>14/11/2014</td></tr><tr><td>Calibration Frequency</td><td>Once per year</td><td>Once per year</td></tr></table> <table><tr><td>Meter name</td><td>Flow Meter 3#</td><td>Flow Meter 4#</td></tr><tr><td>Type/Model</td><td>LWY-10C</td><td>LWY-10C</td></tr><tr><td>Accuracy class</td><td>1.0</td><td>1.0</td></tr><tr><td>SN</td><td>L10111054</td><td>L10111056</td></tr><tr><td>First calibration date</td><td>15/11/2011</td><td>15/11/2011</td></tr><tr><td>Second calibration date</td><td>15/11/2012</td><td>15/11/2012</td></tr><tr><td>Last calibration date</td><td>15/11/2013</td><td>15/11/2013</td></tr><tr><td>Valid period</td><td>14/11/2014</td><td>14/11/2014</td></tr><tr><td>Calibration Frequency</td><td>Once per year</td><td>Once per year</td></tr></table>
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:	--

Data / Parameter:	$FF_{project\ site,i,y}$
Unit:	tonne
Description:	Quantity of fossil fuel type i combusted in the project site(including the collection sites) for other purposes that are attributable to the project activity during year y
Measured/ Calculated / Default:	Measured
Source of data:	On site consumption records maintained in the log books
Value(s) of monitored parameter:	114.87
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:	--

<table>
<tr><td>Data / Parameter:</td><td>$EC_{PJ, y}$</td></tr>
<tr><td>Unit:</td><td>MWh</td></tr>
<tr><td>Description:</td><td>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</td></tr>
<tr><td>Measured/
Calculated /
Default:</td><td>Measured</td></tr>
<tr><td>Source of data:</td><td>On-site measurements by meter or calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton)</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>139.39</td></tr>
<tr><td>Monitoring equipment:</td><td>
<table>
<tr><td>Meter name</td><td>Meter 1#</td><td>Meter 2#</td></tr>
<tr><td>Type/Model</td><td>DS862-4</td><td>DT862-4</td></tr>
<tr><td>Accuracy class</td><td>2.0</td><td>2.0</td></tr>
<tr><td>SN</td><td>86064245</td><td>90043215</td></tr>
<tr><td>First calibration date</td><td>08/10/2011</td><td>21/02/2011</td></tr>
<tr><td>Second calibration date</td><td>07/10/2012</td><td>20/02/2012</td></tr>
<tr><td>Last calibration date</td><td></td><td>19/02/2013</td></tr>
<tr><td>Valid period</td><td>06/10/2013</td><td>18/02/2014</td></tr>
<tr><td>Calibration Frequency</td><td>Once per year</td><td>Once per year</td></tr>
</table>
<table>
<tr><td>Meter name</td><td>Meter 3#</td><td>Meter 4#</td></tr>
<tr><td>Type/Model</td><td>DTSD3366</td><td>DTSD3366</td></tr>
<tr><td>Accuracy class</td><td>0.5s</td><td>0.5s</td></tr>
<tr><td>SN</td><td>125254102301</td><td>125254102234</td></tr>
<tr><td>First calibration date</td><td>30/09/2013</td><td>30/09/2013</td></tr>
<tr><td>Valid period</td><td>29/09/2014</td><td>29/09/2014</td></tr>
<tr><td>Calibration Frequency</td><td>Once per year</td><td>Once per year</td></tr>
</table>
</td></tr>
<tr><td>Measuring/
Reading/
Recording frequency:</td><td>Daily measured and recorded accordingly.
Monitoring frequency: continuously.</td></tr>
<tr><td>Calculation method
(if applicable):</td><td>When the biomass residue is mechanically pretreated, the project needs a certain amount of electricity from grid. This amount could be 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 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:
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

Monitoring frequency: Continuously, aggregated at least monthly.</td></tr>
<tr><td>QA/QC procedures:</td><td>Cross-check measurement results with invoices for purchased electricity if available</td></tr>
<tr><td>Purpose of data:</td><td>Project emission</td></tr>
<tr><td>Additional comment:</td><td>For stable monitoring of on-site electricity consumption, the project owner has purchased and installed new two meter (3#,4#) to replace the old two ones(1#,2#) to avoid the potential risk of equipment failures.</td></tr>
</table>

Data / Parameter:	$EG_{project\ plant,y}$
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:	85182.86MWh
Monitoring equipment:	

Meter name	Gate meter	Backup meter	10KV meter
Type/Model	MK6E	MK6E	DSSD1008
Accuracy class	0.2S	0.2S	0.5
SN	208368473	208206500	0802876
First calibration date	04/12/2011	04/12/2011	04/12/2011
Last calibration date	30/09/2013	30/09/2013	30/09/2013
Valid period	29/09/2014	29/09/2014	29/09/2014
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:	Applying the maximum permissible error 0.2% of the instrument gate meter to the measured to/from grid electricity values taken from Dce2012 to Sep 2013 due to delayed calibration. Hence, the quantity of electricity supplied to the grid monitored from Dce 2012 to Sep 2013 is multiplied by 99.8%, the quantity of electricity purchased from the grid is multiplied by 100.2%.As the same way, the electricity purchased from10kv backup power is multiplied by 100.5% due to the maximum permissible error 0.5% of the instrument 10KV meter from Dce 2012 to Sep 2013 .Therefore, the net quantity of increased electricity generated in the project plant is calculated as 85182.86MWh for calculation baseline emissions.

Data / Parameter:	--
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:	Biomass Availability Report of Yueyang project, 2012 Biomass Availability Report of Yueyang project, 2013

Value(s) of monitored parameter:	Rice husk: 5.80 *10^4t Straws:23.97 *10^4t rice straw and1.97*10^4t maize straw Forestry residues: 7.43*10^4t (2012) Rice husk: 5.62 *10^4t Straws:23.24 *10^4t rice straw and1.95*10^4t maize straw Forestry residues: 7.43*10^4t (2013)
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:	--

Data / Parameter:	**--**
Unit:	Tonnes
Description:	Quantity of each biomass residues type k that are available in the region
Measured/ Calculated / Default:	Measured
Source of data:	Biomass Availability Report of Yueyang project, 2012 Biomass Availability Report of Yueyang project, 2013
Value(s) of monitored parameter:	Rice husk: 29.01*10^4t Straws: 119.87*10^4t rice straw and 9.87*10^4t maize straw Forestry residues: 49.5*10^4t (2012) Rice husk: 28.12*10^4t Straws: 116.19*10^4t rice straw and 9.77*10^4t maize straw Forestry residues: 49.5*10^4t (2013)
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.

Parameter			Rice husk			Rice straws		
			$BF_{k,y\ (wet)}$	Moisture	NCV	$BF_{k,y\ (wet)}$	Moisture	NCV
Month	from	to	Tonne	%	GJ/ton	Tonne	%	GJ/ton
			A	B	C	D	E	F
Jan	01/01/2012	31/01/2012	4631.51	14.82	13.42	0.00	0.00	0.00
Feb	01/02/2012	29/02/2012	5594.18	14.85	13.42	0.00	0.00	0.00

Mar	01/03/2012	31/03/2012	4695.67	14.73	13.42	0.00	0.00	0.00
Apr	01/04/2012	30/04/2012	2145.32	14.51	13.42	0.00	0.00	0.00
May	01/05/2012	31/05/2012	1350.70	13.54	13.42	0.00	0.00	0.00
Jun	01/06/2012	30/06/2012	121.68	13.42	13.42	0.00	0.00	0.00
Jul	01/07/2012	31/07/2012	243.90	13.62	13.15	0.00	0.00	0.00
Agu	01/08/2012	31/08/2012	45.25	13.43	13.15	0.00	0.00	0.00
Sep	01/09/2012	30/09/2012	1861.89	14.61	13.15	0.00	0.00	0.00
Oct	01/10/2012	31/10/2012	2352.74	14.51	13.15	0.00	0.00	0.00
Nov	01/11/2012	30/11/2012	644.00	14.65	13.15	0.00	0.00	0.00
Dec	01/12/2012	31/12/2012	2817.88	14.77	13.15	0.00	0.00	0.00
Jan	01/01/2013	31/01/2013	1741.49	13.87	12.93	0.00	0.00	0.00
Feb	01/02/2013	28/02/2013	1817.14	14.21	12.93	0.00	0.00	0.00
Mar	01/03/2013	31/03/2013	6803.66	14.51	12.93	0.00	0.00	0.00
Apr	01/04/2013	30/04/2013	79.00	13.94	12.93	0.00	0.00	0.00
May	01/05/2013	31/05/2013	1452.00	15.03	12.93	0.00	0.00	0.00
Jun	01/06/2013	30/06/2013	0.00	0.00	12.93	0.00	0.00	0.00
Jul	01/07/2013	31/07/2013	0.00	0.00	13.08	0.00	0.00	0.00
Aug	01/08/2013	31/08/2013	2142.00	14.42	13.08	1723.00	25.32	11.20
Sep	01/09/2013	30/09/2013	2229.00	13.02	13.08	1410.00	27.15	11.20
Oct	01/10/2013	31/10/2013	121.00	14.88	13.08	0.00	0.00	0.00
Nov	01/11/2013	30/11/2013	3748.00	13.48	13.08	0.00	0.00	0.00
Dec	01/12/2013	31/12/2013	4393.00	14.27	13.08	0.00	0.00	0.00
Total			51031.01	-	-	3133.00	-	-

Parameter			Maize straw			Wood chips		
			$BF_{k,y\ (wet)}$	Moisture	NCV	$BF_{k,y\ (wet)}$	Moisture	NCV
Month	from	to	tonne	%	GJ/ton	tonne	%	GJ/ton
			G	H	I	J	K	L
Jan	01/01/2012	31/01/2012	0.00	0.00	0.00	4726.16	32.67	12.07
Feb	01/02/2012	29/02/2012	0.00	0.00	0.00	5506.53	32.48	12.07
Mar	01/03/2012	31/03/2012	0.00	0.00	0.00	1503.68	32.71	12.07
Apr	01/04/2012	30/04/2012	0.00	0.00	0.00	2826.41	32.28	12.07
May	01/05/2012	31/05/2012	0.00	0.00	0.00	0.00	0.00	12.07
Jun	01/06/2012	30/06/2012	0.00	0.00	0.00	0.00	0.00	12.07
Jul	01/07/2012	31/07/2012	0.00	0.00	0.00	75.50	30.02	11.69
Agu	01/08/2012	31/08/2012	0.00	0.00	0.00	0.00	0.00	11.69
Sep	01/09/2012	30/09/2012	0.00	0.00	0.00	0.00	0.00	11.69
Oct	01/10/2012	31/10/2012	0.00	0.00	0.00	260.00	33.54	11.69
Nov	01/11/2012	30/11/2012	0.00	0.00	0.00	0.00	0.00	11.69
Dec	01/12/2012	31/12/2012	335.67	30.95	11.22	1593.27	33.19	11.69
Jan	01/01/2013	31/01/2013	369	29.85	11.22	1652.00	31.56	11.83
Feb	01/02/2013	28/02/2013	0.00	0.00	0.00	2318.33	31.71	11.83
Mar	01/03/2013	31/03/2013	0.00	0.00	0.00	3050.58	32.65	11.83
Apr	01/04/2013	30/04/2013	0.00	0.00	0.00	547.52	33.96	11.83
May	01/05/2013	31/05/2013	0.00	0.00	0.00	1769.00	34.32	11.83
Jun	01/06/2013	30/06/2013	0.00	0.00	0.00	0.00	0.00	11.83
Jul	01/07/2013	31/07/2013	0.00	0.00	0.00	0.00	0.00	11.74
Aug	01/08/2013	31/08/2013	0.00	0.00	0.00	1465.00	35.21	11.74

Sep	01/09/2013	30/09/2013	0.00	0.00	0.00	2735.00	33.86	11.74
Oct	01/10/2013	31/10/2013	0.00	0.00	0.00	433.00	32.03	11.74
Nov	01/11/2013	30/11/2013	3604.26	32.74	11.31	3437.58	33.95	11.74
Dec	01/12/2013	31/12/2013	3459.31	34.21	11.31	4445.58	34.12	11.74
Total			7768.24	-	-	38345.14	-	-

Parameter			Branches			Barks		
			BFk,y（wet）	Moisture	NCV	BFk,y（wet）	Moisture	NCV
Month	from	to	tonne	%	GJ/ton	Tonne	%	GJ/ton
			M	N	O	P	Q	R
Jan	01/01/2012	31/01/2012	5640.09	33.78	11.58	1901.24	35.53	11.25
Feb	01/02/2012	29/02/2012	4757.66	32.51	11.58	3667.63	35.42	11.25
Mar	01/03/2012	31/03/2012	5764.49	30.63	11.58	3570.16	36.69	11.25
Apr	01/04/2012	30/04/2012	3468.92	33.38	11.58	5585.35	34.84	11.25
May	01/05/2012	31/05/2012	2239.67	31.72	11.58	2193.75	37.53	11.25
Jun	01/06/2012	30/06/2012	75.32	33.37	11.58	413.00	36.35	11.25
Jul	01/07/2012	31/07/2012	1007.00	33.83	11.42	175.30	34.13	11.38
Agu	01/08/2012	31/08/2012	134.00	30.33	11.42	155.00	33.71	11.38
Sep	01/09/2012	30/09/2012	4233.52	32.63	11.42	1428.01	32.46	11.38
Oct	01/10/2012	31/10/2012	2405.75	31.72	11.42	1487.48	30.71	11.38
Nov	01/11/2012	30/11/2012	3407.00	33.13	11.42	737.00	30.71	11.38
Dec	01/12/2012	31/12/2012	3965.84	32.67	11.42	1545.03	33.86	11.38
Jan	01/01/2013	31/01/2013	1697.10	31.12	11.45	1500.39	35.75	11.33
Feb	01/02/2013	28/02/2013	3407.00	32.88	11.45	2443.53	35.83	11.33
Mar	01/03/2013	31/03/2013	0.00	0.00	11.45	1199.50	31.63	11.33
Apr	01/04/2013	30/04/2013	0.00	0.00	11.45	880.48	31.01	11.33
May	01/05/2013	31/05/2013	1807.00	30.04	11.45	1194.00	30.01	11.33
Jun	01/06/2013	30/06/2013	0.00	0.00	11.45	0.00	0.00	11.33
Jul	01/07/2013	31/07/2013	0.00	0.00	11.52	0.00	0.00	11.21
Aug	01/08/2013	31/08/2013	4044.00	33.31	11.52	2333.00	34.96	11.21
Sep	01/09/2013	30/09/2013	2985.00	34.06	11.52	1812.00	31.05	11.21
Oct	01/10/2013	31/10/2013	521.00	33.13	11.52	517.00	36.11	11.21
Nov	01/11/2013	30/11/2013	3376.82	34.45	11.52	3734.81	33.58	11.21
Dec	01/12/2013	31/12/2013	4125.88	32.49	11.52	3623.23	32.07	11.21
Total			59063.06	-	-	42096.89	-	-

Parameter			VD_y	N_y	$FF_{project\ plant,i,y}$	$FF_{project\ site,i,y}$
Month	from	to	km	-	Tonnes	Tonnes
			S	T	U	V
Jan	01/01/2012	31/01/2012	126,776	1,750	3.34	10.09
Feb	01/02/2012	29/02/2012	142,880	1,705	0.38	9.18
Mar	01/03/2012	31/03/2012	159,572	1,654	0.68	9.11
Apr	01/04/2012	30/04/2012	110,042	1,356	0.00	1.70
May	01/05/2012	31/05/2012	82,288	1,193	2.47	2.14
Jun	01/06/2012	30/06/2012	4,792	108	1.70	1.37
Jul	01/07/2012	31/07/2012	1,954	21	0.63	0.72

Agu	01/08/2012	31/08/2012	22,014	258	0.37	1.07
Sep	01/09/2012	30/09/2012	30,298	401	1.33	1.41
Oct	01/10/2012	31/10/2012	43,362	641	0.52	2.14
Nov	01/11/2012	30/11/2012	62,966	838	0.45	5.01
Dec	01/12/2012	31/12/2012	130,944	1,442	0.00	1.91
Jan	01/01/2013	31/01/2013	118,140	1,528	0.27	1.54
Feb	01/02/2013	28/02/2013	24,370	283	0.00	5.55
Mar	01/03/2013	31/03/2013	71,620	936	0.43	7.64
Apr	01/04/2013	30/04/2013	94,410	1,175	0.49	4.23
May	01/05/2013	31/05/2013	54,570	1,059	0.00	6.06
Jun	01/06/2013	30/06/2013	40,444	903	0.47	2.07
Jul	01/07/2013	31/07/2013	3,994	59	0.00	1.67
Aug	01/08/2013	31/08/2013	11,252	374	1.01	5.87
Sep	01/09/2013	30/09/2013	95,682	1,031	0.00	6.78
Oct	01/10/2013	31/10/2013	143,606	1,610	0.34	3.94
Nov	01/11/2013	30/11/2013	243,008	2,201	0.46	10.34
Dec	01/12/2013	31/12/2013	300,292	2,641	0.33	13.32
Total			2,119,276	25,167	15.67	114.87

Parameter			$EG_{export,y}$	$EG_{import\ 110kv,y}$	$EG_{import\ 10kv,y}$	$Ec_{PJ1,y}$	$Ec_{PJ2,y}$	$EC_{PJ,y}$
Month	from	to	MWh	MWh	MWh	MWh	MWh	MWh
			W	X	Y	Z	AA	AB=AA+Z
Jan	01/01/2012	31/01/2012	7274.12	25.34	184.74	4.60	0.00	4.60
Feb	01/02/2012	29/02/2012	8457.77	4.09	491.91	3.86	0.00	3.86
Mar	01/03/2012	31/03/2012	5875.58	1.32	151.02	4.14	0.00	4.14
Apr	01/04/2012	30/04/2012	5388.11	0.00	436.20	4.22	0.00	4.22
May	01/05/2012	31/05/2012	1572.12	22.84	178.41	2.78	0.00	2.78
Jun	01/06/2012	30/06/2012	110.88	67.32	12.12	1.58	0.00	1.58
Jul	01/07/2012	31/07/2012	589.78	54.78	24.90	2.24	0.00	2.24
Agu	01/08/2012	31/08/2012	30.10	48.84	36.09	2.46	0.00	2.46
Sep	01/09/2012	30/09/2012	2889.74	76.30	0.00	6.16	0.00	6.16
Oct	01/10/2012	31/10/2012	3200.60	46.73	0.81	5.4	0.00	5.40
Nov	01/11/2012	30/11/2012	2101.18	46.20	8.97	6.38	0.00	6.38
Dec	01/12/2012	31/12/2012	4546.74	40.66	118.98	8.58	0.00	8.58
Jan	01/01/2013	31/01/2013	2755.37	68.11	0.00	5.56	0.00	5.56
Feb	01/02/2013	28/02/2013	4543.84	27.32	0.00	4.16	0.00	4.16
Mar	01/03/2013	31/03/2013	4870.54	20.59	0.00	10.06	0.00	10.06
Apr	01/04/2013	30/04/2013	788.17	67.06	15.84	5.96	0.00	5.96
May	01/05/2013	31/05/2013	2487.80	56.10	0.00	10.68	0.00	10.68
Jun	01/06/2013	30/06/2013	0.00	54.12	0.00	4.24	0.00	4.24
Jul	01/07/2013	31/07/2013	0.00	79.86	2.76	2.32	0.00	2.32
Aug	01/08/2013	31/08/2013	5010.98	47.65	0.00	3.26	0.00	3.26
Sep	01/09/2013	30/09/2013	4312.04	27.98	0.00	9.04	0.00	9.04
Oct	01/10/2013	31/10/2013	825.13	29.04	40.98	6.45	3.23	9.68
Nov	01/11/2013	30/11/2013	8558.22	0.00	0.00	9.25	2.36	11.61
Dec	01/12/2013	31/12/2013	11717.24	0.00	46.92	7.9	2.52	10.42

Total	87,906.06	912.25	1,750.65	131.28	8.11	139.39

D.3. Implementation of sampling plan

>>
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

>>
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_2/yr)
EGy	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_2 emission factor for the electricity displaced due to the project activity during the year y (tCO_2/MWh), which is 0.9735 tCO_2e/MWh (See registered PDD Version 5 available online at http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1256216278.37/view)

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

EG_y =85182.86MWh

Therefore,

$$ER_{electricity,y} = 85182.86MWh \times 0.9735tCO_2e / MWh = 82925.51tCO_2e$$

b) Emission reductions or increases due to displacement of heat

Since the emission reductions were not claimed for heating, the $ER_{heat,y}$ =0

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

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

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)
NCV_k	Net calorific value of the biomass residue type k (GJ/ton of dry matter)
$EF_{burning,CH4,k,y}$	CH_4 emission factor for uncontrolled burning of the biomass residue type k during the year y (tCH_4/GJ)
k	Types of biomass residues for which the identified baseline scenario is B1 or B3 and for which leakage effects could be ruled out with one of the approaches L1, L2 or L3 described in the leakage section

$BE_{biomass,y}$ = 21tCO_2e / tCH_4 × 73881.24t × 0.001971tCH_4 / t + 25tCO_2e / tCH_4 × 70443.94t × 0.001971tCH_4 / t
= 6529.14tCO_2e

So, the baseline emission reduction is:
$BEy=ER_{elctricity,y} + ER_{heat,y} + BE_{biomass,y} = 82952.51+0+6529.14 = 89,454.66 tCO_2e$

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_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 ($PE_{EC,y}$),
- Where this emission source is included in the project boundary and relevant: CH4 emissions from the combustion of biomass residues ($PE_{Biomass,CH4,y}$),
- Where waste water from the treatment of biomass residues degrades under anaerobic conditions: CH_4 emissions from waste water.

Project emissions are calculated as follows:

$$PE_y=PET_y+PEFF_y+PE_{EC,y}+GWP_{CH4} \times PE_{biomass,CH4,y}$$

Where:

PET_y	CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr)
$PEFF_y$	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/yr)
$PE_{EC,y}$	CO_2 emissions during the year y due to electricity consumption at the project site that is attributable to the project activity (tCO_2/yr)
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/yr)

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

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

Where:

PET_y	CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr)
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)

Therefore,

$$PET_y = 25167 \times 84.21 \times 0.001097 tCO_2e/km = 2324.85 tCO_2e$$

b) Carbon dioxide emissions from on-site consumption of fossil fuels ($PEFF_y$)

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

Where:

$PE_{FC,j,y}$	Are the CO_2 emissions from fossil fuel combustion in process j during the year y (tCO_2/yr);
$FC_{i,j,y}$	Is the quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);
$COEF_{i,y}$	Is the CO_2 emission coefficient of fuel type i in year y (tCO_2/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_2 emission coefficient of fuel type i in year y (tCO_2/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_2 emission factor of fuel type i in year y (tCO_2/GJ)
i	Are the fuel types combusted in process j during the year y

Therefore,

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

$$= (15.67 + 114.87)\ t \times 0.042652 TJ/t \times 74{,}100 kgCO_2e/TJ/(1\times 10^3) = 412.60 tCO_2e$$

c) CO_2 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:

$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)
$EF_{EL,j,y}$	Emission factor for electricity generation for source j in year y (tCO_2/MWh)
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y

Therefore,

$$PE_{EC,y} = 139.39 MWh \times 0.9735 tCO_2e/MWh \times (1 + 20\%) = 162.84 tCO_2e$$

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

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

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_4 emission factor for the combustion of biomass residues in the project plant (tCH4/GJ), according to ACM0006,Version 9, the $EF_{CH4,BF}$=41.1 kg CH_4/TJ

Therefore,

$$PE_{biomass,CH4,y} = 41.1 kgCH_4/TJ \times 894.16 Gj/1\times 10^6 = 36.75 tCH_4\ (01/01/2012 \text{---} 31/12/2012)$$

$$PE_{biomass,CH4,y} = 41.1 kgCH_4/TJ \times 841.11 Gj/1\times 10^6 = 34.57 tCH_4\ (01/01/2013 \text{---} 31/12/2013)$$

According the data calculated above,

$$PE_y = 2324.85 tCO_2e + 412.72 tCO_2e + 162.84 tCO_2e +$$

$$21 tCO_2e/tCH_4 \times 36.75 tCH_4 + 25 tCO_2e/tCH_4 \times 34.57 tCH_4 = 4536.22 tCO_2e$$

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 (tonne) 01/01/2012-/31/12/2012

Biomass type	Rice Husk	Straw		Forestry residues		
		Rice Straw	Maize Straw	Wood chip	Branch	Bark
Available Biomass(10,000t)	29.01	119.87	9.87	49.50		
Biomass Consumption other than the project (10,000t)	5.80	23.97	1.97	7.43		
Biomass Consumption in the project plant (10,000t)	2.65	0.00	0.03	1.65	3.71	2.29
Total used biomass Consumption(10,000t)	8.45	23.97	2.01	15.07		
Available Biomass/Total biomass utilised	343%	500%	492%	328%		
Available Biomass/Total biomass Utilized - 100%	243%	400%	392%	228%		
Leakage? (if it is more than 25%,No; if not,Yes)	**No**	**No**	**No**	**No**		

Demonstration of abundant surplus of biomass availability (tonne) 01/01/2013-/31/12/2013

Biomass type	Rice Husk	Straw		Forestry residues		
		Rice Straw	Maize Straw	Wood chip	Branch	Bark
Available Biomass(10,000t)	28.12	116.19	9.77	49.50		
Biomass Consumption other than the project (10,000t)	5.62	23.24	1.95	7.43		
Biomass Consumption in the project plant (10,000t)	2.45	0.31	0.74	2.19	2.20	1.92
Total used biomass Consumption(10,000t)	8.08	23.55	2.70	13.73		
Available Biomass/Total biomass utilised	348%	493%	362%	361%		
Available Biomass/Total biomass Utilized - 100%	248%	393%	262%	261%		
Leakage? (if it is more than 25%,No; if not,Yes)	**No**	**No**	**No**	**No**		

From the data in the above table, that the leakage of the project within the project boundary is zero, i.e. L_y = 0 tCO_2e.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	89454.66	4536.22	0	84918(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_2e)	244758	84918

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

>>

The actual emission reduction achieved during current monitoring period is 65.31% (84918tCO_2e) less than the ex-ante estimation in registered CDM-PDD

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

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	39925	44993

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Appendix1. The Energy Balance for Yueyang 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 18.25%

Table4. The Energy Balance for Yueyang Kaidi Biomass Project (01/01/2012-31/12/2013)

	$BF_{k,y}$（ton）(dry base)	NCV_k(TJ/t)	Energy(TJ)
Rice husk	43683.04	0.013145	574.214
Rice straws	2313.92	0.011200	25.916
Maize straws	5190.74	0.011265	58.474
Wood chips	25659.62	0.011833	303.618
Branches	39770.44	0.011493	457.062
Barks	27707.43	0.011293	312.886
Fossil Fuel	15.67	0.042652	0.669
Total			1732.837
Electricity exported（TJ）			316.251
Efficiency			18.25%

Energy Balance：

$E_{total}=E_{biomasss}+E_{fossil\ fuel}$ =1732.837TJ
Electricity exported=316.251 TJ
Efficiency= Electricity exported/ E_{total} =18.25%

Appendix2. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☑ Project participant ☐ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Yueyang Kaidi Green Energy Development Co., Ltd.
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Project participant and/or responsible person/ entity	☑ Project participant ☐ Responsible person/ entity for completing the CDM-MR-FORM
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Direct fax	
Direct tel.	
Personal e-mail	

Project participant and/or responsible person/ entity	☑ Project participant ☐ Responsible person/ entity for completing the CDM-MR-FORM
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Direct tel.	
Personal e-mail	

Project participant and/or responsible person/ entity	☐ Project participant ☑ Responsible person/ entity for completing the CDM-MR-FORM
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Document information

Version	*Date*	*Description*
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net 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).
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