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

CONTENTS

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

MONITORING REPORT
Version number: 1.0
Date 18/11/2011

Tongcheng Kaidi Biomass Power Project
Reference number: 3061
The 1st monitoring period: 06/01/2011- 30/06/2011

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

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Tongcheng Kaidi Biomass Power Project (hereafter referred to as the project) is a biomass utilization project developed by Tongcheng Kaidi Green Energy Development Co., Ltd. (hereafter referred to as the Project Owner) and is located in Tongcheng economic development district, Anhui Province, P.R. China. The project is designed to produce 126,720MWh of electricity per year from burning biomass residues, displacing electricity generated by Eastern China Power Grid (ECPG), 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, bamboo crumbs, branches, barks, sawdust and wood chips 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 the project is estimated to achieve 106,573 tonnes of CO_2e emissions reduction annually.

The project began to construct in May 2008, and was put into operation since 05/12/2009. The project has been registered as a CDM project on 06/01/2011 (The version of registered PDD is version 4).

During current monitoring period (06/01/2011-30/06/2011), the project has achieved emission reductions of 61, 980 tonnes CO_2e.

A.2. Project Participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Party involved wishes to be considered as project participant (Yes/No)
Peoples' Republic of China (host)	Tongcheng 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

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

A.3. Location of the project activity:

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The project activity is located in the Southwest of Tongcheng economic development Area, Anhui Province, P.R. China.

The centre of plant has geographical coordinates of 112° 57′ 12″ east longitude 31° 02′ 44″ 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

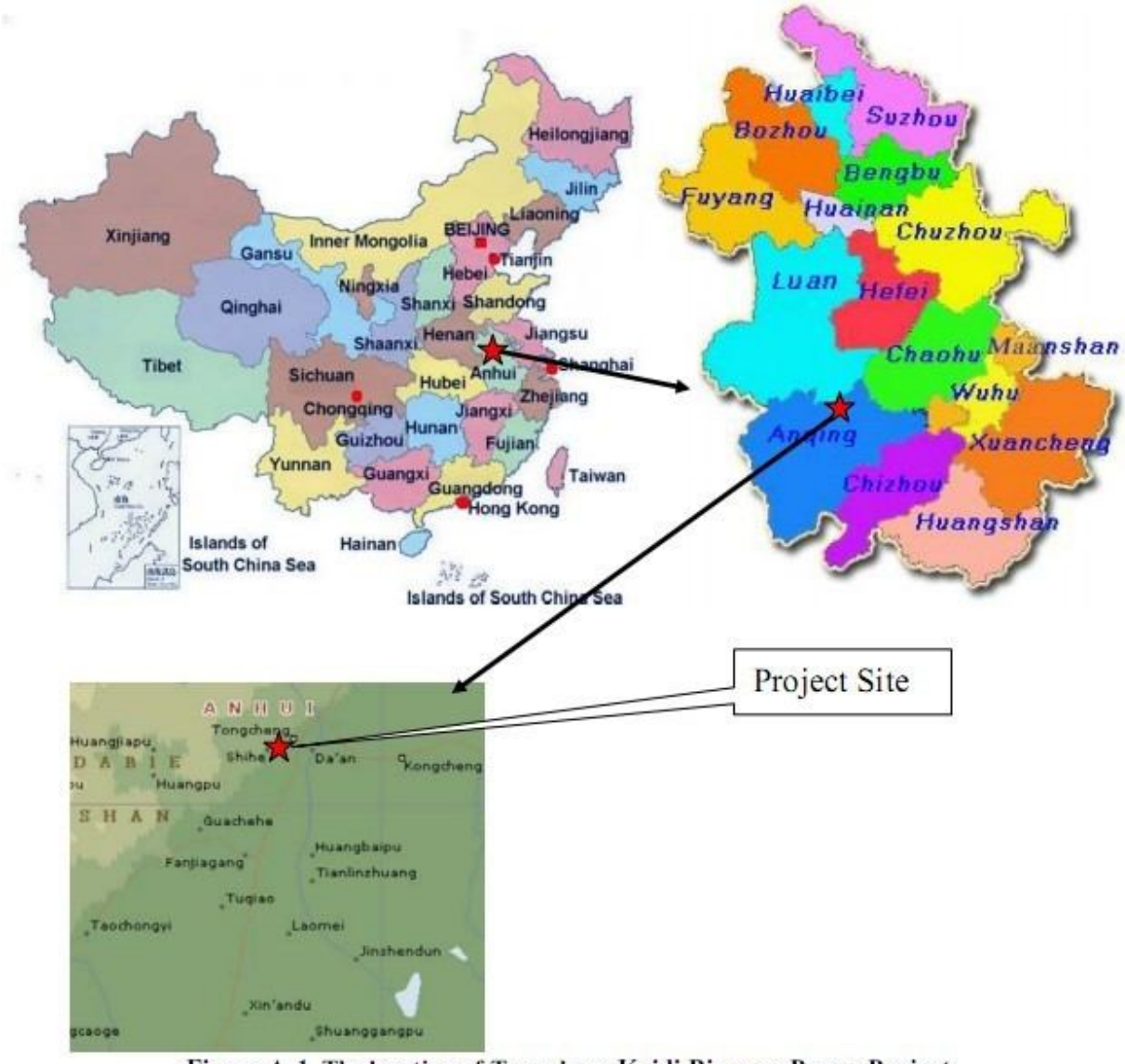

Figure A-1. The location of Tongcheng Kaidi Biomass Power Project

A.4. Technical description of the project

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The technology employed by the project is advanced domestic technology. The project installed 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 and the total efficiency of the plant is approximately 42%.

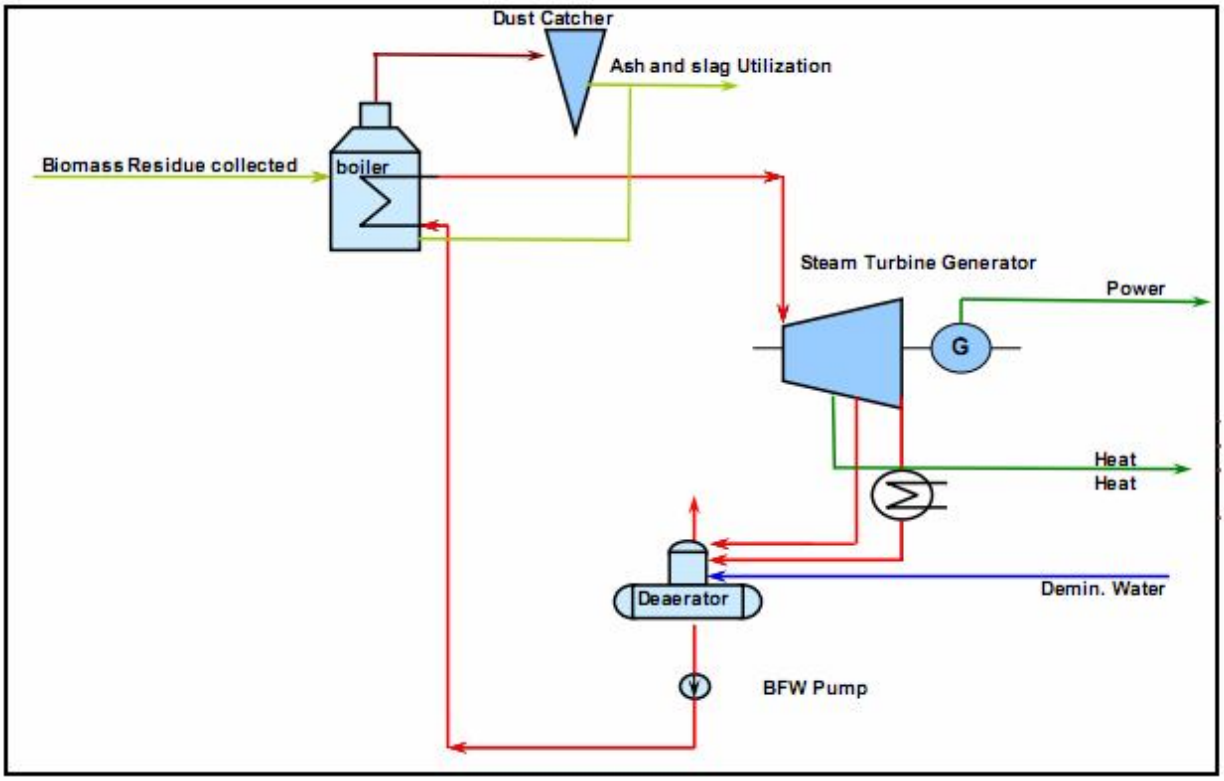
The key technical specifications of the boiler, turbine and generator are listed in the table below.

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
Main steam temperature	435℃
Rate extraction steam volume	15t/h
Maximum Extraction steam volume when Rate electricity capacity is 6.59MW	45t/h
Quantity	2
GENERATOR	
Manufacturer	NanJing Steam Turbine(Group) Co.,
Model	QFJ-15-2
Rated power	15MW[1]
Rated voltage	10.5KV
Power factor	0.8
Efficiency	≥97%
Rated rotating speed	3000r/min
Rated frequency	50Hz
Quantity	2

The electricity generated is transmitted through an 110kV transformer at the site to 220kV Tongcheng substation and then supplied to Anhui power grid, which is a sub-grid of the Eastern China Power Grid (ECPG). The project can therefore replace the equivalent capacity of power plants on the ECPG, which is predominantly made up of coal fired power plants.

The Flow Diagram of the Plant as follows:

[1] The generator is sized at 15MW and not 12MW to allow for possible peak generation and to avoid damage to the generation unit bu sudden load change in abnormal situations.



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

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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 CO2 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.6. Registration date of the project activity:

>>

06 Jan 11

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

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Crediting period: 06 Jan 11 – 05 Jan 18(Renewable)
The start date of the crediting period is 06 Jan 11.

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

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SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The project consists of one site, and has been implemented as described in the registered PDD. The project began to construct on 05/2008, and was put into operation since 05/12/2009. Please refer to the following table for details.

Activity	Date	
	1# Generator	2# Generator
Start of construction	05/2008	
Commissioning of core equipment	08/11/2009	27/01/2010
Operation of core equipment	05/12/2009	02/02/2010

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 10 times and 8 times for maintenance, including once overhaul from 25/05/2011 to 10/6/2011.

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

B.2. Revision of the monitoring plan

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N/A

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

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N/A

B.4. Notification or request of approval of changes

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N/A

SECTION C. Description of the monitoring system

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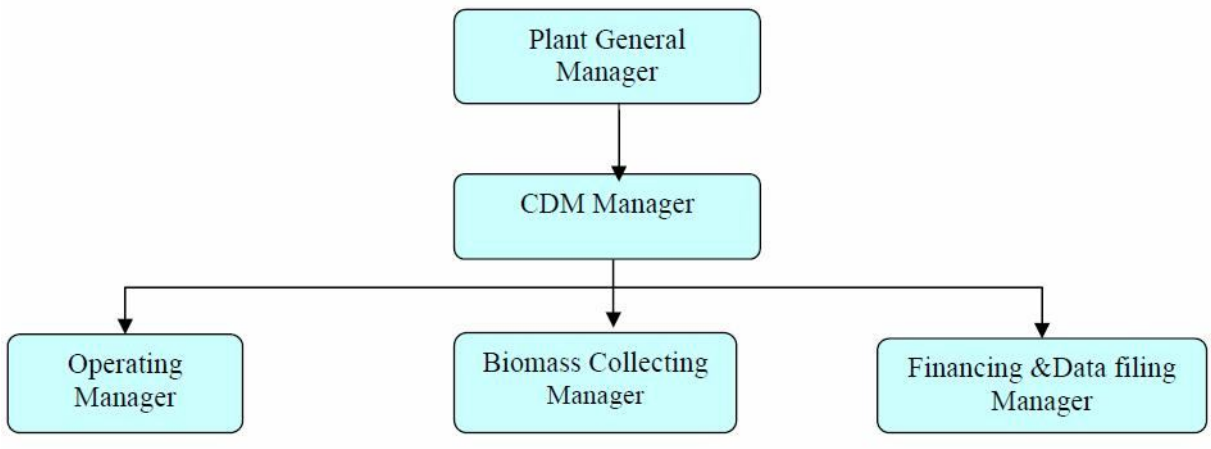
1. The organizational structure, roles and responsibilities of personnel:

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 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. The meters are all 0.5 double-way meters.

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.

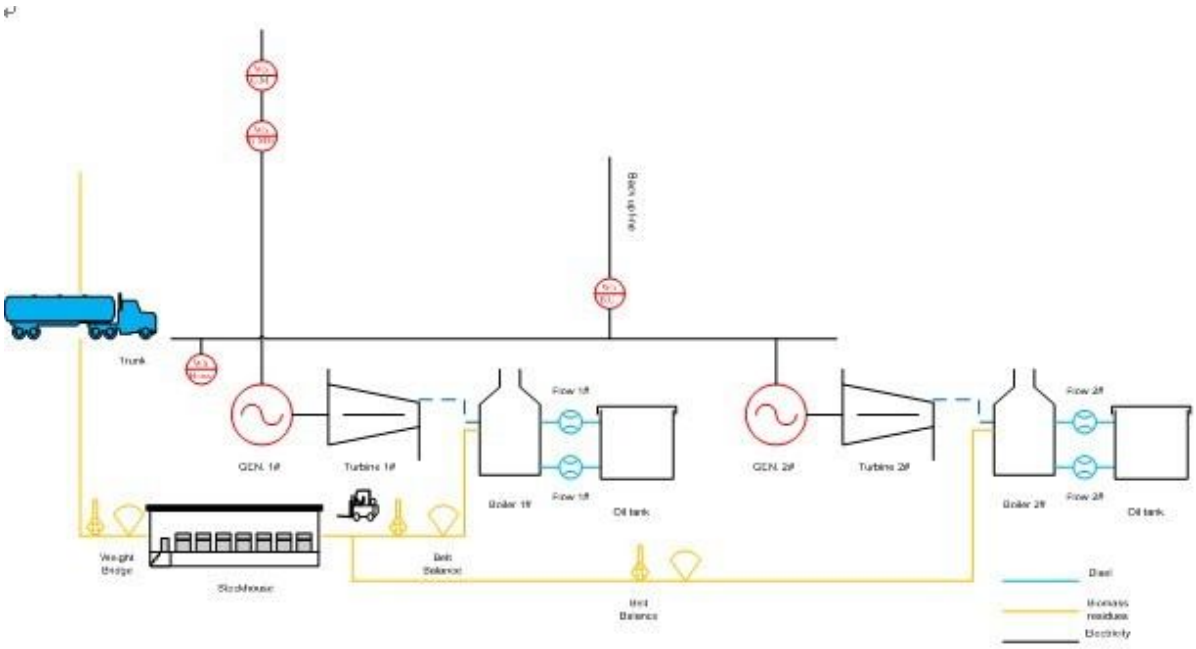
If the monitoring data is missing, or it is not feasible to install a dedicated meter to monitor this indicator, it is calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton). The electricity factor can be calculated as follows:

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



Tongcheng Kaidi 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 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

1. Parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
Data / Parameter:	EF_y
Data unit:	t CO_2e/MWh
Description:	Baseline emission factor of Central China Power Grid
Source of data used:	The registered PDD Version 4
Value(s) :	0.8888
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	--

Data / Parameter:	GWP_{CH4}
Data unit:	t CO_2e/t CH_4
Description:	Global warming potential for CH_4
Source of data used:	The registered PDD Version 4
Value(s) :	21
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	--

Data / Parameter:	$TDL_{j,y}$
Data unit:	%
Description:	Average technical transmission and distribution losses for providing electricity to source j in year y.
Source of data used:	The registered PDD Version 4
Value(s) :	20
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Additional comment:	--

Data / Parameter:	$EF_{CH4,BF}$
Data unit:	t CH_4/GJ
Description:	CH_4 emission factor for controlled burning of the biomass residue in the project plant
Source of data used:	The registered PDD Version 4
Value(s) :	41.1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Additional comment:	--

Data / Parameter:	NCV_k*$EF_{burning,CH4,k,y}$
Data unit:	t CH_4/tonne

Description:	CH4 emission factor for uncontrolled burning of the biomass residue
Source of data used:	The registered PDD Version 4
Value(s) :	0.001971
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	--

D.2. Data and parameters monitored	
Data / Parameter:	$BF_{k,y}$
Data 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 husks / tonne / 36,684.28 Sawdust / tonne / 14,717.31 Wood chips / tonne / 9,349.77 Barks / tonne / 27,938.54 Branches / tonne / 2,990.6 Bamboo crumbs / tonne / 6,662.12 total / tonne / 98,342.62
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Meter name / Belt Balance 1# / Belt Balance 2# Type/Model / 0.5 / 0.5 Accuracy / ICS-ST4-1000 / ICS-ST4-1000 SN / 811116 / 811107 Last calibration date / 06-Jan-11 / 06-Jan-11 valid Period / 05-Jan-12 / 05-Jan-12 Calibration frequency / once per year / once pre year
Measuring/ Reading/ Recording frequency:	Hourly measurement and monthly recording; 100% of data is monitored and electronically archived.
Calculation method (if applicable):	--
QA/QC procedures applied:	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.

Data / Parameter:	***Moisture content of the biomass residues***
Data 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
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Daily measurement and monthly recording; 100% of data is monitored and electronically archived.
Calculation method (if applicable):	--
QA/QC procedures applied:	The monitoring procedures in the laboratory of the plant is done according to authoritative instructions or guidance

Meter name	Balance	Dry cabinet
Type/Model	FA214	GF-9070A
Accuracy	I level	0.1℃
SN	2866	90701
Last calibration date	06-Dec-10	06-Dec-10
valid Period	05-Dec-11	05-Dec-11
Calibration frequency	once per year	once per year

Data / Parameter:	NCV_K
Data 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 international standards.
Value(s) of monitored parameter:	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions & project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Six months, taking three samples for each measurement.
Calculation method (if applicable):	--
QA/QC procedures applied:	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

Type	15/12/2010
	NCV(MJ)/kg
Rice husks	13.15
Sawdust	11.74
Wood chips	11.90
Barks	11.05
Branches	11.21
Bamboo crumbs	11.96

	sources, Additional measurements are conducted.

Data / Parameter:	AVD_y
Data 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:	82
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	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; Continuously
Calculation method (if applicable):	--
QA/QC procedures applied:	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.

Data / Parameter:	N_y
Data 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:	10,943
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	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: Continuously

Calculation method (if applicable):	--
QA/QC procedures applied:	The consistency of the number of truck trips could be checked with the quantity of biomass combusted by the relation with previous years

Data / Parameter:	EF_{km,CO_2}
Data 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)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	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 applied:	--

Data / Parameter:	$EF_{CO2,I,y}$
Data 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
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	The appropriateness of the data i reviewed annually
Calculation method (if applicable):	--

QA/QC procedures applied:	The plant is designed to use diesel at this stage. Should any other fossil fuel be used during operation, the same monitoring procedures apply.

Data / Parameter:	NCV_i
Data unit:	TJ/tonne
Description:	Net Calorific Value(NCV_i) 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 2007,Diesel NCV
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	The appropriateness of the data is reviewed annually
Calculation method (if applicable):	--
QA/QC procedures applied:	The plant is designed to use diesel at this stage. Should any other fossil fuel be used during operation, the same monitoring procedures apply.

Data / Parameter:	$FF_{project\ plant,i,y}$
Data 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:	7.42 The value of diesel combusted in Jan is multiplied by 101% (the maximum possible error is 1%) according to the Guidelines for Assessing Compliance with the Calibration Frequency Requirements(V1,released on CDM EB52 meeting) for conservation.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	

Meter name	Flow Meter1#	Flow Meter1#	Flow Meter2#	Flow Meter2#
Type/Model	ZYLW GY-10C	ZYLW GY-10C	ZYLW GY-10C	ZYLW GY-10C
Accuracy	1	1	1	1

	SN	L10120 27	L10120 28	L10120 29	L10120 30
	Last calibration date	8-Jan-11	8-Jan-11	8-Jan-11	8-Jan-11
	Valid Period	7-Jan-12	7-Jan-12	7-Jan-12	7-Jan-12
	Calibration Frequency	once per year			
Measuring/ Reading/ Recording frequency:	Continuously				
Calculation method (if applicable):	--				
QA/QC procedures applied:	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.				

Data / Parameter:	$FF_{project\ site,i,y}$
Data 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:	72.46
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	The consumption of diesel is monitored using diesel purchase and consumption log book.
QA/QC procedures applied:	The data is cross checked by the purchase receipts.

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

<table>
<tr><td>Value(s) of monitored parameter:</td><td>139.29</td></tr>
<tr><td>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</td><td>Project emission</td></tr>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>
<table>
<tr><td>Meter name</td><td>Meter 1#</td><td>Meter 2#</td></tr>
<tr><td>Type/Model</td><td>DSSD1008</td><td>DSSD1008</td></tr>
<tr><td>Accuracy</td><td>0.5s</td><td>0.5s</td></tr>
<tr><td>SN</td><td>804927</td><td>804910</td></tr>
<tr><td>Last calibration date</td><td>5-Jan-11</td><td>5-Jan-11</td></tr>
<tr><td>Valid Period</td><td>4-Jan-12</td><td>4-Jan-12</td></tr>
<tr><td>Calibration Frequency</td><td colspan="2">once per year</td></tr>
</table>
</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>Continuously , aggregated at least annually</td></tr>
<tr><td>Calculation method (if applicable):</td><td>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.

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 annually</td></tr>
<tr><td>QA/QC procedures applied:</td><td>Cross-check measurement results with invoices for purchased electricity if available</td></tr>
</table>

Data / Parameter:	**$EG_{project\ plant,y}$**
Data 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:	67,868.081 The value of electricity supplied to the grid in Jan is multiplied by 99.8 % (the maximum possible error is 0.2 %), and the value of electricity purchased from the grid is multiplied by 100.2% according to the Guidelines for Assessing Compliance with the Calibration Frequency Requirements (V1, released on CDM

<table>
<tr><td></td><td>EB52 meeting) for conservation.</td></tr>
<tr><td>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</td><td>Baseline emission</td></tr>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>
<table>
<tr><td>Meter name</td><td>Gate meter</td><td>Backup Meter</td></tr>
<tr><td>Type/Model</td><td>AINRTAL</td><td>DSSD1008</td></tr>
<tr><td>Accuracy</td><td>0.2s</td><td>0.5s</td></tr>
<tr><td>SN</td><td>02082132</td><td>0804923</td></tr>
<tr><td>Last calibration date</td><td>10-Jan-11</td><td>5-Jan-11</td></tr>
<tr><td>Valid Period</td><td>9-Jan-12</td><td>4-Jan-12</td></tr>
<tr><td>Calibration Frequency</td><td colspan="2">Once per year</td></tr>
</table>
</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>Continuously</td></tr>
<tr><td>Calculation method (if applicable):</td><td>The net electricity equals to electricity supplied to the grid minus electricity purchased from the grid minus electricity purchased from the 10kv backup power.</td></tr>
<tr><td>QA/QC procedures applied:</td><td>The consistency of the data is cross-checked with receipts from electricity sales and 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.</td></tr>
</table>

Data / Parameter:	**--**
Data unit:	Tones
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
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures applied:	This parameter is reviewed annually according to the project

	data and official data.

Data / Parameter:	**--**
Data unit:	**Tones**
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
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures applied:	This parameter is reviewed annually according to the project data and official data.

2. Data monitored

The monitored parameters are given in the following table 1.

Table 1: Monitored Parameters

Parameter			Rice husk			Bamboo crumbs			Branches		
			$BF_{k,y}$	Moisture	NCV	$BF_{k,y}$	Moisture	NCV	$BF_{k,y}$	Moisture	NCV
Month	from	to	tonne	%	GJ/ton	Tonne	%	GJ/ton	tonne	%	GJ/ton
			A	B	C	D	E	F	G	H	I
Jan	06/01/2011	31/01/2011	6,035.96	16.58	13.15	0.00	0.00	11.96	562.90	33.49	11.21
Feb	01/02/2011	28/02/2011	4,858.49	15.13	13.15	494.39	31.07	11.96	948.74	33.76	11.21
Mar	01/03/2011	31/03/2011	10,598.40	15.36	13.15	2,289.32	29.56	11.96	906.94	36.45	11.21
Apr	01/04/2011	30/04/2011	9,043.70	14.92	13.15	2,491.80	33.72	11.96	858.49	35.68	11.21
May	01/05/2011	31/05/2011	7,204.44	11.55	13.15	2,027.78	23.50	11.96	1,294.80	33.64	11.21
Jun	01/06/2011	30/06/2011	5,106.36	12.10	13.15	2,128.51	29.25	11.96	0.00	0.00	11.21
Total			42,847.35			9,431.80			4,571.87		

Parameter			Barks			Sawdust			Wood chips		
			$BF_{k,y}$	Moisture	NCV	$BF_{k,y}$	Moisture	NCV	$BF_{k,y}$	Moisture	NCV
Month	from	to	Tonne	%	GJ/ton	tonne	%	GJ/ton	Tonne	%	GJ/ton
			J	K	L	M	N	O	P	Q	R
Jan	06/01/2011	31/01/2011	5,802.31	36.29	11.05	3,790.98	31.08	11.74	1,418.87	29.68	11.90
Feb	01/02/2011	28/02/2011	3,848.11	37.18	11.05	3,814.51	30.96	11.74	2,514.98	30.84	11.90
Mar	01/03/2011	31/03/2011	5,749.43	36.39	11.05	4111.66	31.64	11.74	1,245.40	30.83	11.90
Apr	01/04/2011	30/04/2011	10,869.35	33.69	11.05	3022.04	32.39	11.74	2,381.84	33.69	11.90
May	01/05/2011	31/05/2011	8,179.32	28.52	11.05	2326.08	23.50	11.74	3,587.10	24.72	11.90
Jun	01/06/2011	30/06/2011	7,385.88	30.77	11.05	4018.19	29.38	11.74	2,049.66	28.21	11.90
Total			41,834.40			21,083.46			13,197.85		

Parameter			VD_y	N_y	$F_{project\ plant,y}$	$FF_{project\ site,y}$	$EG_{project\ plant,y}$	$EC_{PI,y}$
Month	from	to	km	-	Tonnes	Tonnes	MWh	MWh
			S	T	U	V	W	X
Jan	06/01/2011	31/01/2011	171,860	2,052	2.16	13.51	8,529.461	27.23
Feb	01/02/2011	28/02/2011	76,716	993	1.53	9.16	8,164.332	20.27
Mar	01/03/2011	31/03/2011	165,650	2,027	1.48	9.09	12,361.272	31.91
Apr	01/04/2011	30/04/2011	194,438	2,382	0.73	12.56	13,973.388	15.00
May	01/05/2011	31/05/2011	202,124	2,437	0.77	14.49	13,817.892	20.55
Jun	01/06/2011	30/06/2011	86,494	1,052	0.75	13.65	11,021.736	24.32
Total			897,282	10,943	7.42	72.46	67,868.081	139.29

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

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 0.8888 tCO_2e/MWh (See registered PDD Version 4 available online at http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1256208994.65/view)

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

EG_y = 67,868.081MWh

Therefore,

$$ER_{electricity,y} = 67{,}868.081MWh \times 0.8888tCO_2e/MWh = 60{,}321.15tCO_2e$$

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

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

Where:

$BE_{biomass,y}$	Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO_2e/yr)
GWP_{CH4}	Global Warming Potential of methane valid for the commitment period (tCO_2e/tCH_4)
$BF_{PJ,k,y}$	Incremental quantity of biomass residue type k used as a result of the project activity in the project plant during the year y (tons of dry matter)
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

$$BE_{biomass,y} = 21tCO_2e/CH_4 \times 98{,}342.62t \times 0.001971tCH_4/t = 4{,}070.50tCO_2e$$

E.2. Project emissions calculation

>>

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:

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

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)

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

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,

$$PET_y = 10{,}943 \times \frac{897{,}282 km}{10{,}943} \times 0.001097 tCO_2 e / km = 984.32 tCO_2$$

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,

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

$$= (7.42t + 72.46t) \times 0.042652TJ/t \times 74{,}100kgCO_2e/TJ/1\times10^3 = 252.47tCO_2e$$

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,

$$PE_{EC,y} = 139.29MWh \times 0.8888tCO_2e/MWh \times (1 + 20\%) = 148.56tCO_2e$$

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_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,

$$PE_{biomass,CH4,y} = 41.1kgCH_4/TJ \cdot (36{,}684.28t \times 13.15GJ/t + 6{,}662.12t \times 11.96GJ/t$$
$$+ 2{,}990.6t \times 11.21GJ/t + 27{,}938.54t \times 11.05GJ/t + 14{,}717.31t \times 11.74GJ/t$$
$$+ 9.349.77t \times 11.90GJ/t)/1\times10^6 = 48.84tCH_4$$

According the data calculated above,

$$PE_y = 984.32tCO_2e + 252.47tCO_2e + 148.56tCO_2e + 21tCO_2e/tCH_4 \times 48.84tCH_4$$
$$= 2{,}411.02tCO_2e$$

E.3. Leakage calculation

>>

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						
	Rice husks (t)	Bamboo crumbs (t)	Sawdust (t)	Branches(t)	Barks(t)	Wood chips (t)
Available Biomass in the region	185,220.00	80,000.00	360,000.00			
Biomass utilized out of the project	18,522.00	16,000.00	72,000.00			
Biomass utilized by the project （06/01/2011~30/06/2011）	42,847.35	9,431.80	80,687.58			
Total biomass utilized, including the project	61,369.35	25,431.80	152,687.58			
Available Biomass/Total biomass utilized	301.81%	314.57%	235.78%			
Available Biomass/Total biomass utilized -100%	201.81%	214.57%	135.78%			
Abundant surplus? (more than 25%)	Yes	Yes	Yes			

Biomass utilized by the project (full year)	88,859.56	19,560.27	167,335.05
Total biomass utilized, including the project	107,381.56	35,560.27	239,335.05
Available Biomass/Total biomass utilized	172.49%	224.97%	215.14%
Available Biomass/Total biomass utilized -100%	72.49%	124.97%	115.14%
Abundant surplus? (more than 25%)	Yes	Yes	Yes

Biomass utilized by the project (full year)=Biomass utilized by the project （06/01/2011~30/06/2011） *365/176

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

E.4. Emission reductions calculation / table

>>

The emission reductions achieved is calculated by the following formulae:

$$ER_y = ER_{heat,y} + ER_{elcetricity,y} + BE_{biomass,y} - PE_y - L_y$$

$$= 0tCO_2e + 60{,}321.15tCO_2e + 4{,}070.50tCO_2e - 2{,}411.02tCO_2e - 0tCO_2e = 61{,}980tCO_2e$$

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

>>

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**51,389**[2]	**61,980**

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

>>

From the data shown in the above table, the actual emission reduction achieved during current monitoring period is 20.61% higher than the ex-ante estimation in registered CDM-PDD, the main reasons are below:

- The electricity generation was 11.08% higher than the ex-ante estimation in registered CDM PDD (Version 4) due to higher operation hours. As the project was just fully commissioned, the new facilities ensured the stable operation of the project activity.
- Project emissions were less than the ex-ante estimation in registered CDM PDD (Version 4).

The higher electricity generation has no impact on the additionality of the project activity as the sensitivity analysis of the project activity shows that the IRR will not exceeds benchmark until a 24% increase in operation hours.

[2] $51{,}389 tCO_2e = \frac{106{,}573 tCO_2e}{365 days} \times 176 days$

- - - - -

History of the document

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