Monitoring report form
(Version 03.2)

Monitoring report

Title of the project activity	Biomass Power Generation Project by Everbright Alternative Energy (Dangshan) Limited
GS ID of the project activity	GS2420
UNFCCC Reference number of the project activity	4079
Version number of the monitoring report	01
Completion date of the monitoring report	15/01/2014
GS Registration date of the project activity	20/12/2013
UNFCCC Registration date of the project activity	08/08/2011
Monitoring period number and duration of this monitoring period	Monitoring period 01 under GS, Monitoring period 02 under UNFCC, 01/04/2012-31/03/2013 (both the two days included)
Project participant(s)	Everbright Alternative Energy (Dangshan) Limited (Project owner); Macquarie Bank Limited
Host Party(ies)	P.R.China
Sectoral scope(s) and applied methodology(ies)	Sectoral scope: Scope 1: Energy industries (renewable-/non-renewable sources) Selected methodology(ies): ACM0018 "Consolidated methodology for electricity generation from biomass residues in power-only plants"(version 02.0.0)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	162,647 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	161,419 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	127,686 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	33,733 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Biomass Power Generation Project by Everbright Alternative Energy (Dangshan) Limited (hereafter referred to as "the project") developed by Everbright Alternative Energy (Dangshan) Limited (hereafter referred to "the project owner") is a biomass utilization project located in Dangshan County, Anhui Province, China.

The project is to utilize branches and wood scrap to generate electricity and is expected to utilize 356,850 tonnes of biomass residues (with dry basis of 210,185 tons) annually in total[1]. The total installed capacity of the project is 30MW and is estimated to generate 234,000 MWh. The electricity generated by the project will supply to East China Power Grid and it would reduce emissions by replacing equivalent mainly fossil-fuel dominated grid connected electricity generation in the East China Power Grid (ECPG). Moreover, the project would reduce CH_4 emission as the biomass residues would be dumped or left to decay under aerobic conditions or burned in an uncontrolled manner in the absence of the proposed project. The estimated emission reductions are 162,647 tCO_2e per year.

The project adopts an advanced domestic technology. The power generating system consists of one 130t/h high pressure and high temperature biomass combustion boiler and one set of 30MW steam turbine and power generator. The biomass combustion boiler is made by Dragon Power Clean Tech Company Limited. The generator is made by Jinan Power Generation Equipment Plant, and the steam turbine is made by Qingdao Jieneng Steam Turbine Group Co., Ltd.

The construction of the project started on 26/09/2010. Power unit started the commercial operation on 22/09/2011.

The project was implemented as described in the GS PDD. During this monitoring period, the project had a good running, smooth data transfer and grid connection. Although the operation hour, auxiliary power ratio, biomass residues consumption, and net calorific value (NCV) and moisture content of biomass residue changed according to the procedure of Clean development mechanism project standard (PS), but the changes would not impact the additionality, scale of project and the applicability of the approved methodology. The total emission reductions achieved in this monitoring period are 161,419 tCO_2e, which is different with the amount in the CDM monitoring report for the correspondent CDM monitoring period (01/04/2012 to 31/03/2013), 176,188 tCO_2e. The reasons are as follows:

1. The versions of methodology (ACM0018) used in the monitoring report and the CDM monitoring report are different, and which are ACM0018 ver02.0.0 and ACM0018 ver01.2.0 separately. The project is applicable to both ACM0018 ver01.2.0 and ACM0018 ver02.0.0. However, there are some differences occurred by using ACM0018 ver02.0.0 and using ACM0018 ver01.2.0, which have some impact on the ER calculation and the monitored parameters of the project.

1) According to ACM0018 ver02.0.0, project participants shall determine CO_2 emissions resulting from transportation of the biomass residues to the project plant using the latest version of the tool "Project and leakage emissions from road transportation of freight", thus considering the Gold standard principle, the project adopts the tool "Project and leakage emissions from transportation of freight"(ver01.1.0) to determine the CO_2 emissions resulting from transportation of the biomass residues to the project plant ($PE_{TR,y}$). Please refer to section E for the concrete calculation process.

2) The parameters that need to be monitored to calculate the $PE_{TR,y}$ have been changed into $D_{f,m}$ and $FR_{f,m}$ from $BR_{TR,v}$, AVD_v, $EF_{km,v}$ and TL_v. Please refer to section D for the concrete information about the monitored parameters $D_{f,m}$ and $FR_{f,m}$.

3) In order to calculate the $PE_{TR,y}$, there also added a parameter $EF_{CO2,f}$ that is not monitored. Please refer

[1] 356,850 tonnes of biomass residues (with dry basis of 210,185 tons) is derived from the revised PDD which is based on the Post Registration Change. And it is calculated by the operation hours times the biomass residue consumed per hour (45.75ton/h, which is derived from the FSR), that is 7,800h*45.75ton/h=356,850ton. The details have been presented in the Regarding Post Registration Changes report of DOE.

to the section D for the concrete information about the parameter $EF_{CO2,f}$.

2. Considering the conservative principle, the data vintage of the emission factor is updated according to the 2012 Baseline Emission Factors for Regional Power Grids in China published by China DNA on Oct. 15, 2012, which result that the value of $EF_{grid,CM,y}$ is changed to 0.7566 tCO_2e/MWh from 0.7825 tCO_2e/MWh.

A.2. Location of project activity

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The proposed project is located in the north of the Anhui province, P. R. China. The geographical coordinates of the biomass power plant is latitude 34°24′56″N and longitude 116°24′56″E, which is got by mobile GPS apparatus.

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)**
P.R.China (host)	Everbright Alternative Energy (Dangshan) Limited (Project owner)	No
United Kingdom of Great Britain and Northern Ireland	Macquarie Bank Limited	No

A.4. Reference of applied methodology

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1. Baseline & Monitoring methodology:

ACM0018, “Consolidated methodology for electricity generation from biomass residues in power-only plants” (version 02.0.0).

2. Reference:

“Tool to calculate the emission factor for an electricity system”(version03.0.0);

“Emissions from solid waste disposal sites”(version06.0.1);

“Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” (version02);

“Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version01);

“Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (version03.0.1);

“Project and leakage emissions from transportation of freight” (version 01.1.0).

For more information about the methodology and tools, please refer to:

http://cdm.unfccc.int/methodologies/DB/3X5L4HPLWP1Y18LYZZM57A1IQ01VCC

A.5. Crediting period of project activity

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For the project, the renewable crediting period (7 years ×3) years is adopted. As per the GS rules, pre-registration credits can be claimed for two years prior to the GS registration. Therefore, the start date of the

GS crediting period is determined as 01/04/2012. The first crediting period under GS is from 01/04/2012 to 31/08/2018[2], and its length is approximate to 7 years.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The project is to collect and utilize branches and wood scrap for electricity generation, and the commercial operation of the power unit started on 22/09/2011. The technology employed by the proposed project is an advanced domestic technology. One biomass combustion boiler (capacity of 130t/h) with high temperature and high pressure，one 30MW steam turbine and generator is applied in the proposed project. The key technical specifications of boiler, turbine and generator are listed as follows:

Table B-1 Key Characteristics of Major Technology Employed by project activity

Biomass Boiler		
Model	High temperature and high pressure vibrating stoker	
Manufacturer	Dragon Power CleanTech Company Limited	
Steam flow rate	t/h	130
Steam pressure outlet	MPa	9.2
Steam temperature outlet	℃	540
Water temperature	℃	210
Designed boiler efficiency	%	89
Lifetime	Years	20

Condensing Steam Turbine			
Model		N30-8.83	
Manufacturer		Qingdao Jieneng Steam Turbine Group Co., Ltd	
Power		MW	30
Steam flow	Temperature	℃	535
	Pressure	MPa	8.83
	Quantity	t/h	114
RPM		r/min	3,000
Lifetime		Years	20

Generator	
Model	QFW-30-2
Manufacturer	Jinan Power Generation Equipment Plant

[2] The first crediting period under GS and UNFCCC ends on the same date. And the start date of the first crediting period under UNFCCC is 01/09/2011.

Power	MW	30
Voltage	kV	10.5
Frequency	Hz	50
Lifetime	years	20

The total installed capacity of the proposed project is 30MW and the power generation is estimated as 234,000MWh per year. The electricity supply is estimated about 217,620MWh and is transmitted to Longhai substation, and then connected to Anhui Provincial Power Grid which is an integral part of ECPG.

There are four types of the biomass residues, branches are from pear, apple and peach trees, other are the wood scraps. During the monitoring period, biomass processing stations collected the biomass residues from nearby farm land or wood panel boards plants and physical pre-treated at first, and then transported to the power plant by trucks. The biomass is fed into the boiler through conveyor belt.

The detailed process flow diagram of the Project is shown below:

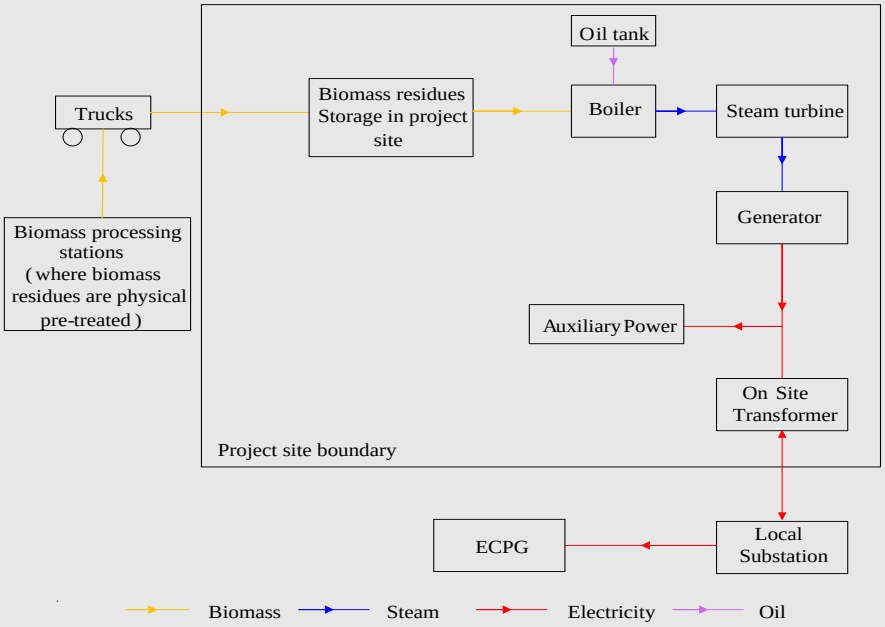

Figure B-1 The flow diagram of the project

The project is well operated and only normal basically maintenance was occurred during this monitoring period, which is listed in Table B-2. No events or situations occurred during the monitoring period, which may impact the applicability of the methodology.

Table B-2 Special events during this monitoring period

Duration	Event
26/01/2013-02/02/2013	Regular maintenance
06/03/2013-09/03/2013	Regular maintenance
16/03/2013-25/03/2013	Regular maintenance

B.2. Post registration changes

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

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There is no temporary deviation from registered monitoring plan or applied methodology for this monitoring period.

B.2.2. Corrections

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There is no correction for this monitoring period.

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

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There is no permanent change from registered monitoring plan and applied methodology for this monitoring period.

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

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There are four major permanent changes to project design of registered project activity occurred.

Change 1: Operation hour and auxiliary power ratio change, and higher power supplied.

After one and a half years' operation, Project owner found that the operation hours is higher than 6,500 hours under-estimated in registered PDD and is re-calculated to be 7,800 hours according to actual operation data in 2011/2012 and supplementary FSR. And the auxiliary power ratio of the project is re-calculated to be 7%. Then, the annually electricity supplied is re-calculated to be 217,620 MWh.

Change 2: Biomass residues consumption change and more biomass residues applied.

The actual biomass fuel consumption was high and the total biomass consumption is re-calculated to be 356,850 tons per year according to operation records of the power plant in 2011/2012 and supplementary FSR, which is 20% more than the value in registered PDD.

Change 3: Net calorific value ($NCV_{n,v}$) of biomass residue change.

According to feedstocks actually adopted in the project during the one and a half years' operation, the $NCV_{n,v}$ of the utilised biomass residue are higher than the values in registered PDD. The $NCV_{n,y}$ in actual operation has been 16.62GJ/tones for pear branches, 16.33GJ/tones for peach branches, 16.07GJ/tones for apple branches and 16.76GJ/tones for wood scrap.

Change 4: Moisture content of biomass residue change.

According to feedstocks actually adopted in the project during the one and a half years' operation, the moisture content of the utilised biomass residue are higher than the values in registered PDD. The moisture content in actual operation has been 40% for pear branches, 41% for peach branches, 40% for apple branches and 42% for wood scrap.

The four major changes occurred in project implementation stage have lead to the ER and NPV calculation changed in PDD, but have no impact on additionality, scale of project activity and the applicability of the baseline methodology. The baseline scenario still remains the same as the registered PDD. According to the paragraph 6 of Appendix 1 of "Clean development mechanism project standard" (ver.03.0), the changes do not require prior approval by the Board.

The post change has been approved by the EB on 24/12/2013.

B.2.5. Changes to start date of crediting period

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Not applicable.

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

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Not applicable.

SECTION C. Description of monitoring system

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The monitoring system is designed in accordance with the requirements of ACM0018"Consolidated methodology for electricity generation from biomass residues in power-only plants"(version 02.0.0).

1. Operational and management structure

Everbright Alternative Energy (Dangshan) Limited has established and maintained the appropriate monitoring and quality control systems, the responsibilities for carrying out these tasks are broadly elaborated in below:

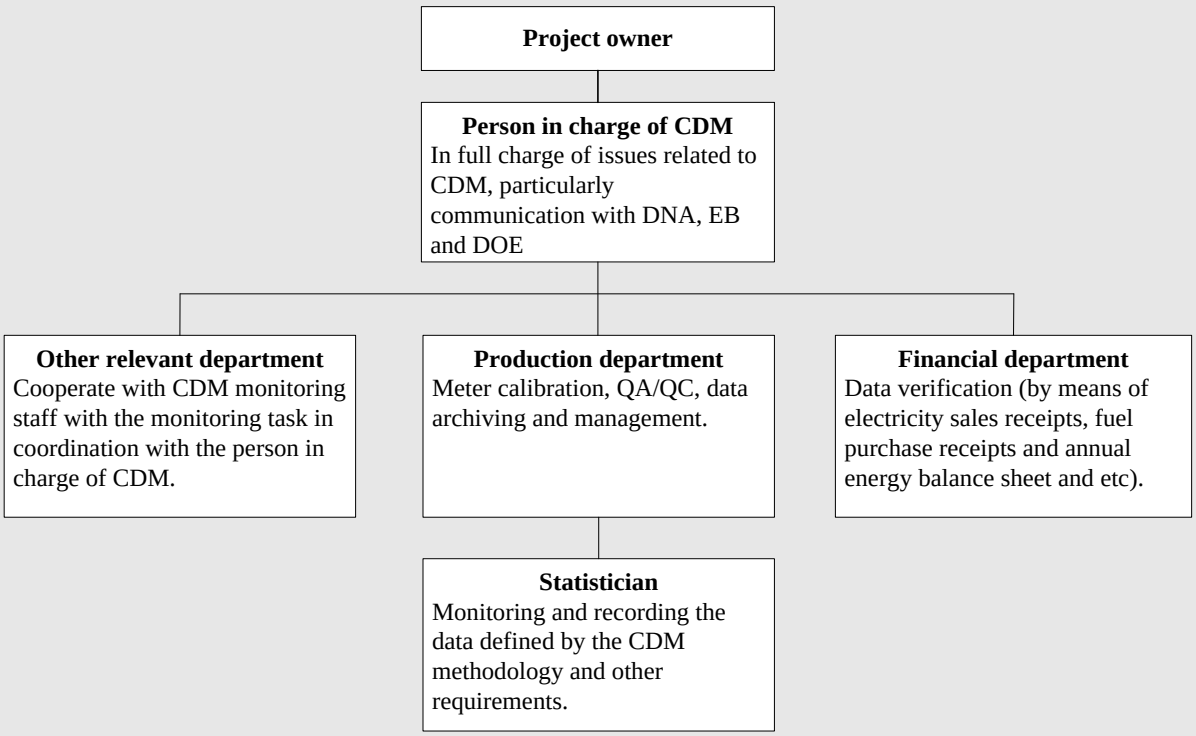

Figure C-1 Management Structure of Monitoring Plan

All the staffs had obtained the competence by corresponding training before working during this monitoring period of the proposed project.

2. Monitoring system and information flow

The monitoring system and power system connection is shown as follows:

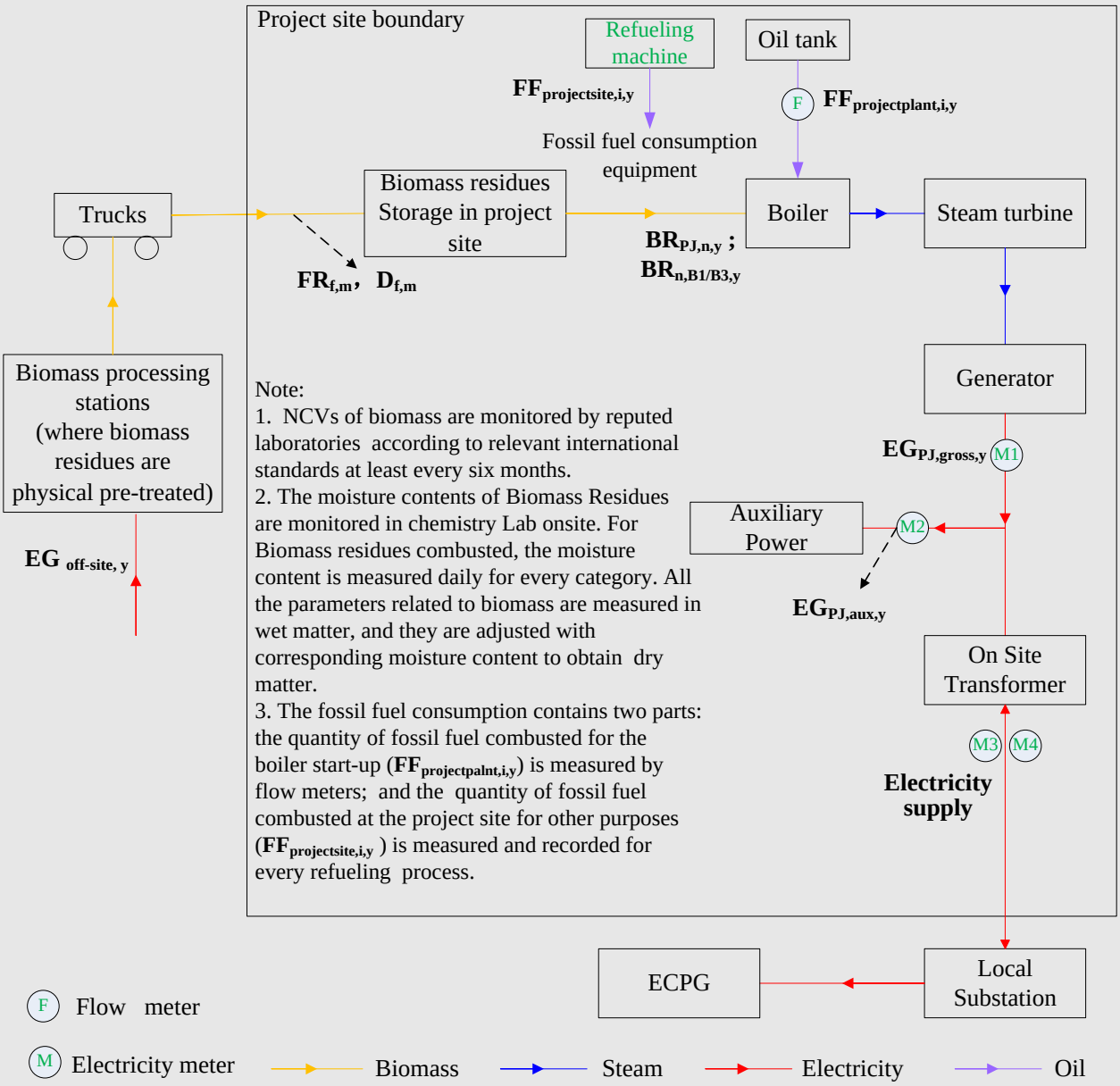

Figure C-2 Monitoring Diagram

3. Data collection and management procedures

The monitoring data such as all kinds of tables for different monitoring parameters are recorded and stored on site. Other documents such as purchase/sale receipts and the calibration reports of the monitoring equipment are kept by the relevant department manager.

1) Monitoring of Electricity Generation, Auxiliary and Off-site Electricity Consumption

For the monitoring of electricity generation and on-site auxiliary electricity consumption, the project owner defined the metering arrangements and the required quality control procedures to ensure accuracy. The metering equipment calibrated properly and checked annually for accuracy according to Technical Administrative Code of Electric Energy Metering (DL/T448-2000). Calibration is carried out at least annually by the Grid with the records being provided to the project owner, and these records are maintained by the project owner and the third party designated. For cross-check the electricity generation and auxiliary consumption, the invoice or the power transaction note of electricity supplied to the grid and purchased from

the grid will be provided to DOE during the verification.

The off-site electricity consumption is monitored by calibrated meters continuously in each and every biomass processing station. The metering equipment is properly calibrated and recorded monthly. For cross-check the off-site electricity consumption, the electricity purchased from the grid will be proved by the power company, and the related evidence will be provided to DOE during the verification.

2) Biomass Residues Monitoring

The biomass residues combusted is monitored by the electronic belt scale and adjust for the moisture content. The project owner conduct an energy balance analysis that is based on purchased quantities and stock changes to crosscheck the amounts of biomass residues combusted by the boilers. If significant difference among the monitored quantity and the crosschecked result by energy balance is identified, the project owner will conduct further check the original records to find out reasons and correct. If the significant difference can't be resolved, the most conservative value of biomass utilized by the proposed project will be applied as monitoring results.

The biomass residues transported to the project site is measured by the electronic truck scales installed at the entrance of the Project site. The project owner conduct an energy balance analysis that is based on purchased quantities and stock changes to crosscheck the amounts of biomass residues transported to the project site. If significant difference among the monitored quantity and the crosschecked result by energy balance is identified, the project owner will conduct further check the original records to find out reasons and correct. If the significant difference can't be resolved, the most conservative value of biomass utilized by the proposed project will be applied as monitoring results.

3)Fossil fuel consumption

Fossil fuel consumption by the boiler during operation are recorded and monitored during the operational period of the proposed project. The diesel for boiler start-ups is stored in barrels. And its consumption is metered through the flow meter. The purchase receipt will be used for cross-check.

For other monitored parameters, please refer to section D.2 for details.

4. Error disposal and emergency procedure

If any readings of the monitoring electricity meters M1 or/and M2 be inaccurate by more than the allowable error, the value derived from the invoice or the power transaction note of electricity supplied to grid and purchased from the grid (which is measured from the main electricity supply meter M3, Meter M4 is the back-up to M3) should be used as back-up. And the most conservative value shall be used for emission reduction calculation.

Ever if the emergency occurred for Meter M3, the measurement result of back-up supply meter M4 will be used for back-up. The information of meter M3 and meter M4 are shown in the following table:

Table C-1 The information of electricity supply meters

Electricity supply meter	Meter's information	
Meter M3	Type:	A1800
	Accuracy:	0.2S
	Serial number:	09963588
	Calibration frequency:	Annually
	Calibration validity:	Calibrated on 21/04/2011 valid to 20/04/2012 Calibrated on 19/04/2012 valid to 18/04/2013
Meter M4	Type:	A1800

		Accuracy:	0.2S
		Serial number:	10128471
		Calibration frequency:	Annually
		Calibration validity:	Calibrated on 21/04/2011 valid to 20/04/2012 Calibrated on 19/04/2012 valid to 18/04/2013

For measurement of amount of biomass residues, if any significant inconsistency is identified, the CDM manager should further check the original records to find out the reason and make corrections. If the significant discrepancy cannot be resolved, the most conservative value of biomass residues utilized by the project shall be applied as monitoring results.

If the emergency occurs, the Distributed Control System (DCS) will automatically shut off the boilers and no CER should be claimed until it has been recovered.

During this monitoring period, there are no meter failures or erroneous measurements happened.

5. Data archive and protection procedure

Specific staff is appointed by the project owner to take the overall responsibility for monitoring greenhouse gas emission reductions. And all the electronic and paper documents collected on parameters monitored under the project monitoring plan will be kept at least 2 years after the end of the whole 3*7 year crediting period.

6. Internal Review of Reported Results/Data

After the draft monitoring report, relevant data and documents required were prepared, an internal review meeting will be held to evaluate the quality and risks of monitoring report. The meeting will focus on

I. If the data collected satisfy the requirement of verification.

II. If the calculation process is correct, conservative and transparent.

III. If there are risks of CERs deduction existed and how to mitigate.

SECTION D. Data and parameters

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

(Copy this table for each piece of data and parameter.)

Data / Parameter:	GWP_{CH4}
Unit:	tCO_2e/tCH_4
Description:	Global warming potential for CH_4
Source of data:	2006 IPCC Guideline for National Greenhouse Gas Inventories
Value(s) applied):	21 for the first commitment period; 25 for the second commitment period
Purpose of data:	Calculation of baseline and project emissions
Additional comment:	During the monitoring period, the value of $\boldsymbol{GWP_{CH4}}$ is updated according to COP/MOP decision. And the updated value 25 is used for emission reduction calculation from 01/01/2013.

Data / Parameter:	$EF_{grid,CM,y}$
Unit:	tCO_2e/MWh

Description:	Combined Margin Emission Factor of ECPG
Source of data:	Calculated base on Chinese DNA's publication
Value(s) applied):	0.7566
Purpose of data:	Calculation of baseline and project emissions
Additional comment:	It is fixed during the first crediting period and should be updated in the second crediting period.

Data / Parameter:	$EF_{CO2,f}$
Unit:	g CO_2 / t km
Description:	Default CO_2 emission factor for freight transportation activity *f*
Source of data:	*"Project and leakage emissions from transportation of freight" (Ver01.1.0)*
Value(s) applied):	245
Purpose of data:	Calculation of project emissions
Additional comment:	-

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	Biomass residues categories and quantities used in the project activity
Unit:	- Type (i.e.branches and wood scrap.); - Source (obtained from an identified biomass residues producer, etc.); - Fate in the absence of the project activity (scenarios B1 & B3); - Use in the project scenario (scenarios P5); - Quantity (tonnes on dry-basis)
Description:	The quantities of which biomass residues categories are used in which installation(s) under the project activity should be updated every year of the crediting period as part of the monitoring plan so as to reflect the actual use of biomass residues in the project scenario. These updated values should be used for emissions reductions calculations. Along the crediting period, new categories of biomass residues (i.e. new types, new sources, with different fate) can be used in the project activity. In this case, a new line should be added to the table. If those new categories are of the type B1:,B2: or B3:, the baseline scenario for those types of biomass residues should be assessed using the procedures outlined in the guidance provided in the procedure for the selection of the baseline scenario and demonstration of additionality
Measured/ Calculated / Default:	Measured weight of wet matter Calculated weight of dry matter adjusted with moisture content
Source of data:	On-site measurements
Value(s) of monitored parameter:	Pear Branches: 44,281 tons on dry-basis Peach Branches: 44,163 tons on dry-basis Apple Branches: 14,803 tons on dry-basis Wood scrap: 112,737 tons on dry-basis
Monitoring equipment:	Equipment: Electronic Belt scale Type: ICS-1400

	Accuracy： Serial number： Calibration frequency： Calibration validity：	0.5 PD100471 Annually Calibrated on 28/08/2011 valid to 27/08/2012 Calibrated on 27/08/2012 valid to 26/08/2013
Measuring/ Reading/ Recording frequency:	Measuring continuously and Recording monthly.	
Calculation method (if applicable):	To calculate, the weight of wet biomass multiplies by (1-moisture content).	
QA/QC procedures:	The measurements recorded are crosschecked with an annual energy balance that is based on purchased quantities and stock changes.	
Purpose of data:	Calculation of baseline/project emissions	
Additional comment:	Every day the PP calculates the predicted quantities of each type biomass combusted for the next day. According to this calculation each type biomass are taken from the storage. Then next day it is started with one type only. When the first type biomass is feeded over, then the next type biomass is started. And at the same time, the worker record the combusted quantity of the first type biomass using the difference of the belt scale readings. The workers keep a close watch on feeding throat and belt scale to ensure no mix occurred. Based on this, each type of biomass fuel is determined.	

Data / Parameter:	$BR_{PJ,n,y}$	
Unit:	tonnes on dry-basis	
Description:	Quantity of biomass residues of category n used in power plant which are located at the project site and included in the project boundary in year y	
Measured/ Calculated / Default:	Measured weight of wet matter Calculated weight of dry matter adjusted with moisture content	
Source of data:	On-site measurements	
Value(s) of monitored parameter:	Pear Branches: 44,281 tons on dry-basis Peach Branches: 44,163 tons on dry-basis Apple Branches: 14,803 tons on dry-basis Wood scrap: 112,737 tons on dry-basis	
Monitoring equipment:	Equipment： Type： Accuracy： Serial number： Calibration frequency： Calibration validity：	Electronic Belt scale ICS-1400 0.5 PD100471 Annually Calibrated on 28/08/2011 valid to 27/08/2012 Calibrated on 27/08/2012 valid to 26/08/2013
Measuring/ Reading/ Recording frequency:	Measuring continuously and Recording monthly.	

Calculation method (if applicable):	To calculate $BR_{PJ,n,y}$, the weight of wet biomass multiplies by (1-moisture content).
QA/QC procedures:	The measurements recorded are crosschecked with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of baseline/project emissions
Additional comment:	Every day the PP calculates the predicted quantities of each type biomass combusted for the next day. According to this calculation each type biomass are taken from the storage. Then next day it is started with one type only. When the first type biomass is fed over, then the next type biomass is started. And at the same time, the worker record the combusted quantity of the first type biomass using the difference of the belt scale readings. The workers keep a close watch on feeding throat and belt scale to ensure no mix occurred. Based on this, each type of biomass fuel is determined.

Data / Parameter:	$BR_{n,B1/B3,y}$
Unit:	tons of dry matter
Description:	Amount of biomass residues category n used in the project plant(s) included in the project boundary in year y for which B1 or B3 has been identified as the most plausible baseline scenario
Measured/ Calculated / Default:	Measured weight of wet matter Calculated weight of dry matter adjusted with moisture content
Source of data:	On-site measurements
Value(s) of monitored parameter:	Pear Branches: 44,281 tons on dry-basis Peach Branches: 44,163 tons on dry-basis Apple Branches: 14,803 tons on dry-basis Wood scrap: 112,737 tons on dry-basis
Monitoring equipment:	Equipment: Electronic Belt scale Type: ICS-1400 Accuracy : 0.5 Serial number: PD100471 Calibration frequency: Annually Calibration validity: Calibrated on 28/08/2011 valid to 27/08/2012 Calibrated on 27/08/2012 valid to 26/08/2013
Measuring/ Reading/ Recording frequency:	Measuring continuously and Recording monthly.
Calculation method (if applicable):	To calculate $BR_{n,B1/B3,y}$, the weight of wet biomass multiplies by (1-moisture content).
QA/QC procedures:	The measurements recorded are crosschecked with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of baseline/project emissions
Additional comment:	Every day the PP calculates the predicted quantities of each type biomass combusted for the next day. According to this calculation each type biomass are taken from the storage. Then next day it is started with one type only. When the first type biomass is fed over, then the next type biomass is started. And at the same time,

	the worker record the combusted quantity of the first type biomass using the difference of the belt scale readings. The workers keep a close watch on feeding throat and belt scale to ensure no mix occurred. Based on this, each type of biomass fuel is determined.

Data / Parameter:	For biomass residues categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario
Unit:	tonnes
Description:	- Quantity of available biomass residues of type n in the region - Quantity of biomass residues of type n that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region - Availability of a surplus of biomass residues type n (which can not be sold or utilized) at the ultimate supplier to the project and a representative sample of other suppliers in the defined geographical region
Measured/ Calculated / Default:	Default
Source of data:	Survey and statistics
Value(s) of monitored parameter:	(see table below)
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	N/A
Calculation method (if applicable):	N/A
QA/QC procedures:	The statistic of utilized biomass in the region is based on the biomass investigation report, which is composed by local official department. In the report, there are planting area and estimated agriculture output for crosscheck. Uncertainty level is low, the data is reliable.
Purpose of data:	Calculation of leakage
Additional comment:	-

Unit: tonnes	Pear Branches	Peach Branches	Apple Branches	Wood scrap residues
Available Biomass residues	482,366	225,135	162,267	333,000
Other Use (family cooking)	24,118	11,257	8,113	16,650
Project Use	75,071	75,595	25,436	206,956
Total biomass utilized	99,189	86,852	33,549	223,606
Available Biomass/Total biomass utilized-100%	386%	159%	384%	49%
Abundant surplus? (More than 25%)	Yes	Yes	Yes	Yes

Data / Parameter:	$FR_{f,m}$
Unit:	tonnes
Description:	Total mass of freight transported in freight transportation activity *f* in monitoring period m
Measured/ Calculated / Default:	Measured
Source of data:	On-site measurements
Value(s) of monitored parameter:	Pear Branches: 79,535 tons Peach Branches: 77,263 tons Apple Branches: 28,411 tons Wood scrap: 246,292 tons
Monitoring equipment:	Equipment: Electronic Truck scales 1# and 2#[3] Type: SCS-2CS-100 SCS-12CS-50 Accuracy: Class III Class III Serial number: Q1893-6LM QOS750-3421 Calibration frequency: Once half a year Calibration validity: Calibrated on 01/03/2012 valid to 31/08/2012 Calibrated on 31/08/2012 valid to 01/03/2013 Calibrated on 01/03/2013 valid to 31/08/2013
Measuring/ Reading/ Recording frequency:	Measuring for each truck load and Recording monthly. And each truck transported one type of the biomass residues per time.
Calculation method (if applicable):	N/A
QA/QC procedures:	The measurements recorded are crosschecked with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of project emissions
Additional comment:	-

Data / Parameter:	$EG_{PJ,gross,y}$
Unit:	MWh
Description:	Gross quantity of electricity generated in the power plant which is located at the project site and included in the project boundary in year y
Measured/ Calculated / Default:	Measured by M1
Source of data:	On-site measurements
Value(s) of monitored	237,611

[3] The two electronic truck scales is used to measure every truck load transported to project site, one of which measures the gross weight and the other measures the tare weight, and the truck load is calculated as the difference of these two figures.

parameter:	
Monitoring equipment:	Equipment: Electricity meter M1 Type: A1350C Accuracy : 0.5S Serial number: 201000080001 Calibration frequency: Annually Calibration validity: Calibrated on 18/08/2011 valid to 17/08/2012 Calibrated on 16/08/2012 valid to 15/08/2013
Measuring/ Reading/ Recording frequency:	Measuring continuously and Recording monthly.
Calculation method (if applicable):	N/A
QA/QC procedures:	The meter is calibrated annually for accuracy according to relevant industrial standard. And the electricity generation and auxiliary consumption are crosschecked with electricity sales and electricity purchasing record.
Purpose of data:	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	$EG_{PJ,aux,y}$
Unit:	MWh
Description:	Total auxiliary electricity consumption required for the operation of the power plant at the project site
Measured/ Calculated / Default:	Measured by M2
Source of data:	On-site measurements
Value(s) of monitored parameter:	15,776
Monitoring equipment:	Equipment: Electricity meter M2 Type: DTSD2818-BR Accuracy : 0.5 Serial number: 4131390822 Calibration frequency: Annually Calibration validity: Calibrated on 09/08/2011 valid to 08/08/2012 Calibrated on 07/08/2012 valid to 06/08/2013
Measuring/ Reading/ Recording frequency:	Measuring continuously and Recording monthly.
Calculation method (if applicable):	N/A
QA/QC procedures:	The meter is calibrated annually for accuracy according to relevant industrial standard. And the electricity generation and auxiliary consumption are crosschecked with electricity sales and electricity purchasing record.
Purpose of data:	Calculation of baseline emissions

Additional comment:	The total auxiliary electricity consumption, including the electricity consumption for the project operation and the electricity import from the grid when the downtime, can be measured and aggregated by the electricity meter M2 continuously.

Data / Parameter:	$EG_{off\text{-}site,\ y}$
Unit:	MWh
Description:	Gross quantity of electricity consumed off-site in year y
Measured/ Calculated / Default:	Measured
Source of data:	Each and every biomass processing station site measurement
Value(s) of monitored parameter:	1,850
Monitoring equipment:	For all meters listed following[4], the calibration is valid for one year and the related calibration is implemented annually.

No.	Type	Accuracy	Serial number	Calibration on
1	DTS211	1.0	2009-1121027	15/06/2011 14/06/2012
2	DSZY331	1.0	3100049890	01/02/2012 31/01/2013
3	DT862-4	2.0	12090435904	20/11/2011 19/11/2012
4	DT862-4	2.0	10151319	23/05/2011 22/05/2012
5	DTSD532	1.0	00000084	01/07/2011 30/06/2012
6	DTS607	1.0	969178	05/06/2011 04/06/2012
7	DT862-4	2.0	10602374	15/10/2011 14/10/2012
8	DT862-4	2.0	12040101775	03/01/2012 02/01/2013
9	DTS607	1.0	312233	26/08/2011 25/08/2012
10	DTS607	1.0	206-917131	20/01/2012 19/01/2013
11	DTZY341	1.0	0300557643	20/08/2011 19/08/2012
12	DTZY22	1.0	0400222066	03/08/2011 02/08/2012
13	DTS75	1.0	08954678	05/07/2011 04/07/2012
14	DTS75	1.0	08936097	26/04/2011 25/04/2012
15	DTZY22-G	1.0	1501042281	26/02/2012 25/02/2013
16	DTZY341	1.0	1524595637	16/09/2011 15/09/2012

[4] The processing stations will be adjusted by PP according to the acquisition situation of biomass residues in actual year, and the information of the monitoring equipment for $EG_{off\text{-}site,y}$ will be adjusted appropriately in the next monitoring period according to the actual situation.

	17	DTS794	2.0	639335	31/07/2011 30/07/2012
	18	DD862-4	2.0	10805003 10888663 10889150	20/06/2011 19/06/2012
	19	DDS71	2.0	JE0569409 JE0570040 JE0570039	20/08/2011 19/08/2012
	20	DDS26	2.0	010207303241 010207301601 010207303404	20/08/2011 19/08/2012
	21	DDS71	2.0	118209 118210 118211	05/09/2011 04/09/2012
	22	DDS71	2.0	168804 168805 168866	15/06/2011 14/06/2012
	23	DDS71	2.0	133293 133304 133372	30/06/2011 29/06/2012
	24	DDS71	2.0	017305 017318 017401	01/08/2011 31/07/2012
	25	DDS71	2.0	139789 171805 173787	08/01/2012 07/01/2013
	26	DDS71	2.0	124507 124510 124517	15/01/2012 14/01/2013

Measuring/ Reading/ Recording frequency:	Measuring continuously and Recording annually.
Calculation method (if applicable):	N/A
QA/QC procedures:	The meter is calibrated appropriately for accuracy according to relevant industrial standard. And the electricity consumption is crosschecked with electricity purchasing record.
Purpose of data:	Calculation of project emissions
Additional comment:	-

Data / Parameter:	$NCV_{n,y}$
Unit:	GJ/tones on dry-basis
Description:	Net calorific value of biomass residue category n in year y
Measured/ Calculated / Default:	Measured
Source of data:	Report from a reputed laboratory and according to national standard *Testing Methods for Heat Value of Biomass Fuels NY/T12-1985.*

Value(s) of monitored parameter:	Biomass type	Measured on 03/03/2012	Measured on 03/09/2012	Measured on 03/03/2013
	Pear Branches	16.46	17.27	16.31

	Peach Branches: 15.74 / 18.03 / 15.83 Apple Branches: 14.52 / 17.64 / 17.60 Wood scrap: 16.70 / 17.58 / 16.06
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	At least every six months, taking at least three samples for each measurement.
Calculation method (if applicable):	N/A
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. The comparing result is shown in the following table:

Item	$NCV_{n,y}$ in this monitoring period	Average $NCV_{n,y}$ in this monitoring period	$NCV_{n,y}$ in the 1st monitoring period	IPCC	CESY 2011
Pear	16.46 17.27 16.31	16.68	16.46	15.6 (7.9~31)	16.726
Peach	15.74 18.03 15.83	16.53	15.74	15.6 (7.9~31)	16.726
Apple	14.52 17.64 17.60	16.59	14.52	15.6 (7.9~31)	16.726
Wood scrap	16.70 17.58 16.06	16.78	16.70	15.6 (7.9~31)	16.726

It is found that, except for apple branches, the NCVs in this monitoring period are nearly the same with the 1st monitoring period. Although the NCV of Apple branches is a little more than the 1st monitoring period value, however all the NCV values monitored in this monitoring period are near to the IPCC value and the national value in China Energy Statistical Yearbook 2011(CESY 2011). Hence, the values are considered as reasonable.

Purpose of data:	Calculation of project emissions
Additional comment:	- Each time (every 6 months) measurement result is used for the latter six months' ER calculation.

Data / Parameter:	$NCV_{n,y} \cdot EF_{BR,n,y}$
Unit:	tCH_4/tones
Description:	
Measured/ Calculated /	Default

Default:	
Source of data:	IPCC 2006 Default Value; ACM0018
Value(s) of monitored parameter:	0.001971 The default CH_4 emission factor of 0.0027tCH_4/t biomass is used, the uncertainty can be deemed to be greater than 100%, resulting in a conservativeness factor of 0.73. Thus, in this case an emission factor of 0.001971tCH_4/t biomass should be used.
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Purpose of data:	Calculation of baseline emissions
Additional comment:	The value of 0.001971 is calculated by the default value of IPCC and the conservativeness factor of methodology ACM0018. And it will be updated along with the IPCC update.

Data / Parameter:	**Moisture content of the biomass residues**
Unit:	%
Description:	Moisture content of the biomass residues type k
Measured/ Calculated / Default:	Measured
Source of data:	On-site measurements via laboratorial analysis
Value(s)[5] of monitored parameter:	Pear Branches: 41.01% Peach Branches: 41.58% Apple Branches: 41.80% Wood scrap: 45.53%
Monitoring equipment:	Equipment: Dry cabinet 1# & 2# Type: FT101A（）P-2 FT101A（）P-4 Accuracy : 1℃ 1℃ Serial number: 1009888 10111097 Calibration frequency: Annually Calibration validity: Calibrated on 05/08/2011 valid to 04/08/2012 Calibrated on 04/08/2012 valid to 03/08/2013 Equipment: Electronic balance Type: TP-5200 Accuracy : 0.001g Serial number: 92902 Calibration frequency: Annually

[5] The values presented are the weighted everage values calculated based on monthly moisture content and monthly quantity of the biomass transported and combusted during this monitoring period, and the values are not used for CER calculation. The monthly weighted average moisture content of the biomass transported and combusted are used for CER calculation.

	Calibration validity: Calibrated on 05/08/2011 valid to 04/08/2012 Calibrated on 04/08/2012 valid to 03/08/2013
Measuring/ Reading/ Recording frequency:	For moisture content of biomass combusted on project site, measuring and recording daily, and calculate monthly weighted average value for CER calculation.
Calculation method (if applicable):	N/A
QA/QC procedures:	The equipments used onsite have been calibrated periodically according to relevant standards.
Purpose of data:	Calculation of baseline/project emissions
Additional comment:	-

Data / Parameter:	$D_{f,m}$
Unit:	Km
Description:	Return trip distance between the origin and destination of freight transportation activity f in monitoring period m
Measured/ Calculated / Default:	Default
Source of data:	Registered PDD
Value(s) of monitored parameter:	100
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Recording for every truck load.
Calculation method (if applicable):	N/A
QA/QC procedures:	PP checks consistency of distance records provided by the truckers by comparing the distances sourced from maps.
Purpose of data:	Calculation of project emissions
Additional comment:	The value is sourced from registered PDD. PP recorded the distance for each biomass truck delivered to ensure all the single trip distances are within 50km during this monitoring period. According to the actual values of the truck delivered single trip distance, all of them are less than 50km. Thus, the distance of 50km*2 used for $PE_{TR,y}$ calculation is conservative.

Data / Parameter:	$FF_{projectplant,i,y}$
Unit:	Tons/yr
Description:	Quantity of fossil fuel type i combusted in the biomass residue fired power plant during the year y
Measured/ Calculated / Default:	Measured
Source of data:	On-site measurements
Value(s) of	0

monitored parameter:	
Monitoring equipment:	Equipment: Flow meter Type: LC-12/A Accuracy : 0.5 Serial number: 11.031 & 11.032 Calibration frequency: Annually Calibration validity: Calibrated on 10/08/2011 valid to 09/08/2012 Calibrated on 09/08/2012 valid to 08/08/2013
Measuring/ Reading/ Recording frequency:	Continuously measurement and record at least annually.
Calculation method (if applicable):	To calculate $FF_{projectplant,i,y}$, the volume of diesel consumed which is calculated as the difference reading of the flow meter with serial number 11.031 and the flow meter with serial number 11.032 multiply by the density of diesel.
QA/QC procedures:	The measurement record is cross-checked with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of project emissions
Additional comment:	-

Data / Parameter:	$FF_{projectsite,i,y}$
Unit:	Tons/yr
Description:	Quantity of fossil fuel type i combusted at the project site for other purposes that are attributable to the project activity during the year y
Measured/ Calculated / Default:	Measured
Source of data:	On-site measurements
Value(s) of monitored parameter:	149
Monitoring equipment:	Equipment: Refueling machine Type: CS46J2222G Accuracy : 0.3% Serial number: WCFN800055 Calibration frequency: Every four months Calibration validity: Calibrated on 04/02/2012 valid to 03/06/2012 Calibrated on 02/06/2012 valid to 01/10/2012 Calibrated on 30/09/2012 valid to 29/01/2013 Calibrated on 28/01/2013 valid to 27/05/2013
Measuring/ Reading/ Recording frequency:	Measuring and Recording for every refueling process.

Calculation method (if applicable):	To calculate $FF_{projectsite,i,y}$, the volume of diesel consumed multiplies by the density of diesel.
QA/QC procedures:	The measurement record is cross-checked with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data:	Calculation of project emissions
Additional comment:	-

Data / Parameter:	$NCV_{i,y}$
Unit:	GJ/t
Description:	Net calorific value of the fossil fuel type i
Measured/ Calculated / Default:	Default
Source of data:	China Energy Statistical Yearbook 2011, Diesel NCV
Value(s) of monitored parameter:	42.652 for diesel
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	N/A
Calculation method (if applicable):	N/A
QA/QC procedures:	PP has checked the updated China Energy Statistical Yearbook 2011, and the value of $NCV_{i,y}$ for diesel is the same with that in registered PDD.
Purpose of data:	Calculation of project emissions
Additional comment:	-

Data / Parameter:	$EF_{CH4,BR}$
Unit:	tCH_4/GJ
Description:	CH_4 emission factor for the combustion of biomass residues in the project plant
Measured/ Calculated / Default:	Default
Source of data:	IPCC 2006 Default Value; ACM0018
Value(s) of monitored parameter:	4.11×10^{-5} Where the default CH_4 emission factor of 30kg/TJ is used, the uncertainty is estimated to be 300%, resulting in a conservativeness factor of 1.37. Thus, in this case the value of this parameter is: $EF_{CH4,BF}$=30*1.37=41.1kg/TJ
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	N/A
Calculation method	N/A

(if applicable):	
QA/QC procedures:	IPCC2006 is the updated version, so the value is available.
Purpose of data:	Calculation of project emissions
Additional comment:	-

Data / Parameter:	$COEF_i$
Unit:	tCO_2/GJ
Description:	CO_2 emission factor for fossil fuel type i
Measured/ Calculated / Default:	Default
Source of data:	IPCC 2006 Default Value (Volume2.Chapter2.P16)
Value(s) of monitored parameter:	0.0741 for diesel
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	N/A
Calculation method (if applicable):	N/A
QA/QC procedures:	IPCC2006 is the updated version, so the value is available.
Purpose of data:	Calculation of project emissions
Additional comment:	-

D.3. Implementation of sampling plan

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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

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The GHG emission reductions of the project are from two major sources: CO_2 emission reductions through the substitution of electricity generation in ECPG, CH_4 emission reductions from a reduction of direct dumping or uncontrolled burning of biomass.

Based on the description of the methodology and registered PDD, the emission reductions by the project activity during a given year y can be calculated as follows:

$$BE_y = BE_{EL,y} + BE_{BR,y} \quad (1)$$

Where:

BE_y	=	Baseline emissions in year y (tCO_2e)
$BE_{BL,v}$	=	Baseline emissions due to generation of electricity in year y (tCO_2)
$BE_{BR,y}$	=	Baseline emissions due to uncontrolled burning or decay of biomass residues in year y (tCO_2)

1. Baseline emissions due to generation of electricity ($BE_{EL,y}$)

Baseline emissions from electricity generation are calculated based on the net quantity of electricity generated at the project site under the project scenario ($EG_{PJ,v}$) and a baseline emission factor ($EF_{BL,EL,v}$) which expresses the weighted average CO_2 intensity of electricity generation in the baseline, as follows:

$$BE_{EL,y} = EG_{PJ,y} \bullet EF_{BL,EL,y} \quad (2)$$

Where:

$BE_{EL,y}$	=	Baseline emissions due to generation of electricity in year y (tCO_2)
$EG_{PJ,y}$	=	Net quantity of electricity generated in the power plant which is located at the project site and included in the project boundary in year y (MWh)
$EF_{BL,EL,v}$	=	Emission factor for electricity generation in the baseline in year y (tCO_2/MWh)

1.1: Determination of $EG_{PJ,y}$

The net quantity of electricity generated in the power plant which is located at the project site and included in the project boundary ($EG_{PJ,y}$) is determined as the difference between the gross electricity generation at the project site ($EG_{PJ,gross,v}$) and the auxiliary electricity consumption required for the operation of the power plant at the project site ($EG_{PJ,aux,v}$), as follows:

$$EG_{PJ,y} = EG_{PJ,gross,y} - EG_{PJ,aux,y} \quad (3)$$

Where:

$EG_{PJ,y}$	=	Net quantity of electricity generated in the power plant which is located at the project site and included in the project boundary in year y (MWh)
$EG_{PJ,gross,y}$	=	Gross quantity of electricity generated in the power plant which is located at the project site and included in the project boundary in year y (MWh)
$EG_{PJ,aux,y}$	=	All electricity required on-site for the operation of equipment related to the preparation, processing, storage and transport of biomass residues (e.g. for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.) and electricity required for the operation of the power plant which is located at the project site and included in the project boundary (e.g. for pumps, fans, cooling towers, instrumentation and control, etc.)(MWh)

1.2: Determination of $EF_{BL,EL,y}$

The Project will achieve greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from the business-as-usual scenario electricity generation of those fossil fuel-fired power plants connected into the ECPG. Therefore, according to ACM0018 and registered PDD, $EF_{BL,EL,y} = EF_{grid,CM,y}$.

The emission factor electricity $EF_{grid,CM,v}$ of the grid is represented as a combination of the Operating Margin and the Build Margin, and was fixed for the first crediting period in the PDD. The Operating Margin emission factor $EF_{grid,OM,v}$ was calculated in the PDD as $0.82436tCO_2e/MWh$. The Build Margin emission factor $EF_{grid,BM,v}$ was calculated as $0.6889tCO_2e/MWh$. Where the weights W_{OM} and W_{BM} take 0.5 and 0.5 respectively as default in the first crediting period. Therefore the combined baseline emission factor:

$$EF_{grid,CM,y} = EF_{BL,EL,y} = 0.82436tCO_2e/MWh \times 0.5 + 0.6889tCO_2e/MWh \times 0.5 = 0.7566\,tCO_2e/MWh$$

The net electricity generation of the project is monitored through the onsite electric energy meters. With the

emissions factor fixed for the crediting period, $BE_{EL,v}$ was calculated below.

Table E-1 Monitored electricity data and calculation of $BE_{EL,y}$

Period	$EG_{PJ,gross,y}$ MWh	$EG_{PJ,aux,y}$ MWh	$EG_{PJ,y}$ MWh	$EF_{BL,EL,y}$ tCO_2e/MWh	$BE_{EL,y}$ tCO_2
01/04/2012-30/04/2012	21,132	1,367	19,766	0.7566	14,955
01/05/2012-31/05/2012	22,201	1,488	20,713	0.7566	15,672
01/06/2012-30/06/2012	18,487	1,321	17,166	0.7566	12,988
01/07/2012-31/07/2012	22,106	1,562	20,544	0.7566	15,544
01/08/2012-31/08/2012	20,971	1,526	19,446	0.7566	14,713
01/09/2012-30/09/2012	16,771	1,194	15,577	0.7566	11,786
01/10/2012-31/10/2012	22,531	1,351	21,180	0.7566	16,025
01/11/2012-30/11/2012	21,891	1,321	20,570	0.7566	15,563
01/12/2012-31/12/2012	22,297	1,350	20,947	0.7566	15,848
01/01/2013-31/01/2013	17,587	1,129	16,458	0.7566	12,452
01/02/2013-28/02/2013	18,355	1,214	17,141	0.7566	12,969
01/03/2013-31/03/2013	13,281	953	12,328	0.7566	9,327
Total	237,611	15,776	221,835	-	167,841

2. Baseline emissions due to uncontrolled burning or decay of biomass residues ($BE_{BR,v}$)

The project participants, using ACM0018 (version02.0.0), established in the PDD that methane emissions would occur in the baseline scenario. As the baseline scenario for biomass residue use has been identified as B1 and B3, then the methane emissions can be calculated by multiplying the quantity of biomass that would not be use in the absence of the project activity with the net calorific value and an appropriate emission factor.

Baseline emissions due to uncontrolled burning or decay of biomass residues are calculated under the following equation:

$$BE_{BR,B1/B3,y} = GWP_{CH4} \cdot \sum_{n} BR_{n,B1/B3,y} \cdot NCV_{n,y} \cdot EF_{BR,n,y} \quad (4)$$

Where:

$BE_{BR,B1/B3,y}$	=	Baseline emissions due to uncontrolled burning or anaerobic decay of biomass residues in year y (tCO_2)
GWP_{CH4}	=	Global Warming Potential of methane valid for the commitment period (tCO_2/tCH_4)
$BR_{n,B1/B3,y}$	=	Amount of biomass residues category n used in the project plant(s) included in the project boundary in year y for which B1 or B3 has been identified as the most plausible baseline scenario (tonnes on dry-basis)
$NCV_{n,y}$	=	Net calorific value of the biomass residues category n in year y (GJ/tonnes on drybasis)
$EF_{BR,n,y}$	=	CH4 emission factor for uncontrolled burning of the biomass residues category n during the year y (tCH_4/GJ)
n	=	Categories of biomass residues

In the absence of more accurate information, it is recommended to use 0.0027 t CH_4 per ton of biomass as default value for the product of NCV_k and $EF_{burning,CH4,k,y}$. Then the uncertainty can be deemed to be greater than 100%, resulting in a conservativeness factor of 0.73. Thus, in this case an emission factor of 0.001971 tCH_4/t biomass should be used. The calculation sheet of $BE_{BR,y}$ is shown in Table E-2 of the Annex 1.

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

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According to ACM0018 (version 02.0.0), the project emissions are calculated as follows:

$$PE_y = PE_{FF,y} + PE_{EL,y} + PE_{TR,y} + PE_{BR,y} + PE_{ww,y} \quad (5)$$

Where:

PE_y	=	Project emissions during year y (tCO_2e)
$PE_{FF,y}$	=	Emissions during the year y due to fossil fuel consumption (tCO_2)
$PE_{EL,y}$	=	Emission during the year y due to electricity consumed off-site for the processing of biomass residues (tCO_2)
$PE_{TR,y}$	=	Emissions during the year y due to transport of the biomass residues to the project plant (tCO_2)
$PE_{BR,y}$	=	Emissions from the combustion of biomass residues during the year y (tCO_2e)
$PE_{WW,y}$	=	Emissions from wastewater generated from the treatment of biomass residues in year y (tCO_2e)

According to the registered PDD, $PE_{WW,y}$=0, therefore the project emission can be simplified as:

$$PE_y = PE_{FF,y} + PE_{EL,y} + PE_{TR,y} + PE_{BR,y} \quad (6)$$

1. Carbon dioxide emissions due to fossil fuel consumption ($PE_{FF,y}$)

According to ACM0018 (version 02.0.0), CO_2 emissions from on-site combustion of fossil fuels ($PE_{FF,y}$) should be calculated using the latest approved version of the " Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion". As per the tool, CO_2 emission considering this part is calculated as follows:

$$PE_{FF,y} = \sum_i \left(FF_{projectplant,i,y} + FF_{projectsite,i,y}\right) \cdot NCV_i \cdot COEF_i \quad (7)$$

where:

$FF_{projectplant,i,y}$	=	Quantity of fossil fuel type i combusted in the biomass residue fired power plant during the year y (tons per year)
$FF_{projectsite,i,y}$	=	Quantity of fossil fuel type i combusted at the project site for other purposes that are attributable to the project activity during the year y (tons per year)
NCV_i	=	Net calorific value of fossil fuel type i (GJ / ton)
$COEF_i$	=	CO_2 emission factor for fossil fuel type i (tCO_2e/GJ)

There is only diesel combusted at the project site during inner operational process, and the volume of diesel combusted is measured by flow meters and refueling machine. The mass quantity of diesel is calculated by multiplying the volume of diesel with the density. And the density is determined as 0.85kg/liter diesel

according to *GB19147-2009 Automobile diesel fuels*.

Table E-3 Monitored diesel consumption data and calculation of $PE_{FF,y}$

Period	$FF_{projectplant,i,y}$ tons	$FF_{projectsite,i,y}$ tons	NCV_i GJ / ton	$COEF_i$ tCO_2e/GJ	$PE_{FF,y}$ tCO_2
01/04/2012-30/04/2012	0	13	42.652	0.0741	42
01/05/2012-31/05/2012	0	14	42.652	0.0741	43
01/06/2012-30/06/2012	0	10	42.652	0.0741	33
01/07/2012-31/07/2012	0	11	42.652	0.0741	36
01/08/2012-31/08/2012	0	12	42.652	0.0741	39
01/09/2012-30/09/2012	0	13	42.652	0.0741	41
01/10/2012-31/10/2012	0	15	42.652	0.0741	47
01/11/2012-30/11/2012	0	14	42.652	0.0741	45
01/12/2012-31/12/2012	0	12	42.652	0.0741	39
01/01/2013-31/01/2013	0	13	42.652	0.0741	41
01/02/2013-28/02/2013	0	9	42.652	0.0741	27
01/03/2013-31/03/2013	0	12	42.652	0.0741	39
Total	0	149	-	-	471

2. Carbon dioxide emissions due to electricity consumed off-site ($PE_{EL,y}$)

According to the methodology, CO_2 emissions from off-site electricity consumption ($PE_{EL,y}$) should be calculated using the latest approved version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". The equation is listed below:

$$PE_{EL,y} = EG_{offsite,y} \times EF_{PJ,EL,y} \quad (8)$$

Where:

$EG_{offsite,y}$ = Quantity of electricity required for the operation of equipment related to the off-site preparation, processing, storage and transportation of biomass residues (e.g. for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.).

$EF_{PJ,ELy}$ = Emission factor for electricity in year y (tCO_2/MWh). As the off-site electricity is from grid, therefore it equals to $EF_{grid,CM,y}$.

For biomass processing stations, the electricity meters are calibrated by authorised institute regularly, the project owner collected electricity consumption data summarised below for $PE_{EL,y}$ calculation.

Table E-4 Monitored electricity consumption data and calculation of $PE_{EL,y}$

Period	$EG_{offsite,y}$ MWh	$EF_{PJ,EL,y}$ tCO_2e/MWh	$PE_{EL,y}$ tCO_2
01/04/2012-30/04/2012	217	0.7566	165
01/05/2012-31/05/2012	276	0.7566	209
01/06/2012-30/06/2012	123	0.7566	93
01/07/2012-31/07/2012	167	0.7566	126
01/08/2012-31/08/2012	141	0.7566	106

01/09/2012-30/09/2012	110	0.7566	83
01/10/2012-31/10/2012	134	0.7566	101
01/11/2012-30/11/2012	175	0.7566	133
01/12/2012-31/12/2012	88	0.7566	67
01/01/2013-31/01/2013	110	0.7566	83
01/02/2013-28/02/2013	110	0.7566	84
01/03/2013-31/03/2013	198	0.7566	150
Total	1,850	-	1,400

3. Carbon dioxide emissions due to transport of the biomass residues ($PE_{TR,y}$)

For the project, transportation is undertaken by vehicles. According to consolidated methodology ACM0018, project participants shall determine CO_2 emissions resulting from transportation of the biomass residues to the project plant using the latest version of the tool "Project and leakage emissions from road transportation of freight", thus the proposed project adopts the tool "Project and leakage emissions from transportation of freight"(ver01.1.0) to determine the CO_2 emissions resulting from transportation of the biomass residues to the project plant ($PE_{TR,y}$).

"*Project and leakage emissions from transportation of freight*" gives two options for $PE_{TR,y}$ calculation: monitoring fuel consumption (Option A) or using conservative default values (Option B). In this document, project participants choose Option B for $PE_{TR,y}$ calculation, therefore, $PE_{TR,y}$ are determined as follows:

$$PE_{TR,y} = PE_{TR,m} = \sum D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6} \quad (9)$$

Where:

$PE_{TR,y}$ = Project emission from transportation of the biomass residues to the project plant in year y (t CO_2)

$PE_{TR,m}$ = Project emission from transportation of freight monitoring period m (t CO_2)

$D_{f,m}$ = Return trip distance between the origin and destination of freight transportation activity f in monitoring period m (km)

$FR_{f,m}$ = Total mass of freight transported in freight transportation activity *f* in monitoring period m (t)

$EF_{CO2,f}$ = Default CO_2 emission factor for freight transportation activity *f* (g CO_2/t km)

f = Freight transportation activities conducted in the project activity in monitoring period m

The calculation sheet of $PE_{TR,y}$ is shown in Table E-5 of the Annex 1.

4. Carbon dioxide emissions due to the combustion of biomass residues ($PE_{BR,y}$)

It was established in the PDD that the emissions can be calculated from the quantity of biomass that would not be used in absence of the project activity, with the net caloric value and the appropriate emissions factor, as follows:

$$PE_{BR,y} = GWP_{CH4} \cdot EF_{CH4,BR} \cdot \sum_{n} BR_{PJ,n,y} \cdot NCV_{n,y} \quad (10)$$

Where:

$PE_{BR,y}$ = Emissions from the combustion of biomass residues during the year y (tCO_2)

GWP_{CH4} = Global Warming Potential for methane valid for the relevant commitment period

(tCO_2/tCH_4)

$EF_{CH4,BR}$	=	CH_4 emission factor for the combustion of biomass residues in the project plant (tCH_4/GJ)
$BR_{PJ,n,y}$	=	Quantity of biomass residues of category n used in power plant which is located at the project site and included in the project boundary in year y (tonnes on dry-basis/yr)
$NCV_{n,y}$	=	Net calorific value of the biomass residues category n in year y (GJ/tonnes on dry-basis)

According to ACM0018(version 02.0.0), the default CH_4 emission factor of 30kg/TJ is used, the uncertainty is estimated to be 300%, resulting in a conservativeness factor of 1.37. Thus, in this case the value of this parameter is: $EF_{CH4,BR}$=30*1.37=41.1kg/TJ, i.e. 0.0411tCH_4/TJ.

The calculation sheet of $PE_{BR,y}$ is shown in Table E-6 of the Annex 1.

E.3. Calculation of leakage

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The baseline scenario of the project is B1&B3 during this monitoring period with the abundant surplus of each kind of biomass in the region larger than 25%. According to methodology ACM0018 (version 02.0.0), the leakage effects do not need to be addressed.

$LE_y = 0$

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	177,145	15,726	0	161,419

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)	162,647	161,419

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

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The actual emission reductions achieved during this monitoring period are 161,419 tCO_2e, which is about 0.76% lower than the estimation in the registered 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)	127,686	33,733

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Annex 1

Table E-2 Monitored biomass consumption data and calculation of $BE_{BR,y}$

Period	01/04/2012-30/04/2012	01/05/2012-31/05/2012	01/06/2012-30/06/2012	01/07/2012-31/07/2012	01/08/2012-31/08/2012	01/09/2012-30/09/2012	01/10/2012-31/10/2012	01/11/2012-30/11/2012	01/12/2012-31/12/2012	01/01/2013-31/01/2013	01/02/2013-28/02/2013	01/03/2013-31/03/2013	Total
$BR_{C,Pear,y}$ (tonnes on wet)	6,215	4,128	10,784	25,125	27,531	0	0	0	0	32	744	512	75,071
$Moisture_{C,Pear,y}$ (%)	41.28	41.30	41.28	40.75	41.03	0.00	0.00	0.00	0.00	41.10	41.36	41.56	41.01
$BR_{C,Pear,y}$ (tonnes on dry)	3,649.45	2,423.14	6,332.36	14,886.56	16,235.03	0.00	0.00	0.00	0.00	18.85	436.28	299.21	44,281
$BR_{C,Peach,y}$ (tonnes on wet)	17,003	15,607	9,796	1,184	1,711	478	450	2,585	3,800	5,460	11,130	6,391	75,595
$Moisture_{C,Peach,y}$ (%)	41.52	41.66	42.09	40.56	41.54	43.42	43.33	43.54	43.76	41.10	40.64	40.65	41.58
$BR_{C,Peach,y}$ (tonnes on dry)	9,943.35	9,105.12	5,672.86	703.77	1,000.25	270.45	255.02	1,459.49	2,137.12	3,215.94	6,606.77	3,793.06	44,163
$BR_{C,Apple,y}$ (tonnes on wet)	3,826	3,275	2,189	1,957	714	1,852	4,664	1,252	1,668	1,213	998	1,828	25,436
$Moisture_{C,Apple,y}$ (%)	41.41	41.50	38.73	39.69	41.31	44.23	43.39	43.11	43.51	40.99	40.99	41.33	41.80
$BR_{C,Apple,y}$ (tonnes on dry)	2,241.65	1,915.88	1,341.20	1,180.27	419.05	1,032.86	2,640.29	712.26	942.25	715.79	588.92	1,072.49	14,803
$BR_{C,Wood\ scrap,y}$ (tonnes on wet)	5,158	9,188	3,511	6,965	8,024	30,354	31,457	30,155	29,866	22,175	17,187	12,916	206,956
$Moisture_{C,Wood\ scrap,y}$ (%)	44.43	43.99	46.26	48.80	49.10	45.77	46.15	46.07	46.54	43.40	43.68	43.27	45.53
$BR_{C,Wood\ scrap,y}$	2,866.30	5,146.20	1,886.81	3,566.08	4,084.22	16,460.97	16,939.59	16,262.59	15,966.36	12,551.05	9,679.72	7,327.25	112,737

(tonnes on dry)													
$BR_{n,B1/B3,y}$ (tonnes on dry)	18,700.76	18,590.33	15,233.24	20,336.68	21,738.54	17,764.29	19,834.90	18,434.35	19,045.74	16,501.63	17,311.69	12,492.01	215,984
$NCV_{n,y}$* $EF_{BR,n,y}$ (tCH_4/tonnes)	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	0.001971	-
GWP_{CH4} (tCO_2/tCH_4)	21	21	21	21	21	21	21	21	21	25	25	25	-
$BE_{BR,y}$ (tCO_2)	774	769	631	842	900	735	821	763	788	813	853	616	9,305

Table E-5 Monitored data for transport emissions and calculation of $PE_{TR,y}$

Period	01/04/2012-30/04/2012	01/05/2012-31/05/2012	01/06/2012-30/06/2012	01/07/2012-31/07/2012	01/08/2012-31/08/2012	01/09/2012-30/09/2012	01/10/2012-31/10/2012	01/11/2012-30/11/2012	01/12/2012-31/12/2012	01/01/2013-31/01/2013	01/02/2013-28/02/2013	01/03/2013-31/03/2013	Total
$FR_{f,m,Pear}$ (tonnes on wet)	14,951.72	15,926.86	7,097.38	18,338.20	14,172.58	0.00	0.00	0.00	0.00	771.94	194.64	8,081.82	79,535
$FR_{f,m,Peach}$ (tonnes on wet)	9,791.36	10,185.96	4,832.74	8,243.90	7,171.28	6,844.16	4,827.62	5,924.52	4,458.08	4,214.14	3,779.48	6,989.54	77,263
$FR_{f,m,Apple}$ (tonnes on wet)	4,128.02	3,053.24	1,990.02	151.86	499.46	6,599.76	1,471.70	1,420.74	1,828.76	3,303.66	1,460.20	2,503.56	28,411
$FR_{f,m,Wood\ scrap}$ (tonnes on wet)	26,411.52	23,983.01	18,153.54	20,130.00	17,807.46	22,500.08	19,928.98	25,117.18	19,887.50	21,610.92	15,328.28	15,433.86	246,292
$FR_{f,m}$ (tonnes on wet)	55,282.62	53,149.07	32,073.68	46,863.96	39,650.78	35,944.00	26,228.30	32,462.44	26,174.34	29,900.66	20,762.60	33,008.78	431,501.23
$D_{f,m}$ (km)	100	100	100	100	100	100	100	100	100	100	100	100	-
$EF_{CO2,f}$ (g CO_2/t km)	245	245	245	245	245	245	245	245	245	245	245	245	-

$PE_{TR,y}$ (tCO_2)	1,354	1,302	786	1,148	971	881	643	795	641	733	509	809	10,572

Table E-6 Monitored data for biomass combustion and calculation of $PE_{BR,y}$

Period	01/04/2012-30/04/2012	01/05/2012-31/05/2012	01/06/2012-30/06/2012	01/07/2012-31/07/2012	01/08/2012-31/08/2012	01/09/2012-30/09/2012	01/10/2012-31/10/2012	01/11/2012-30/11/2012	01/12/2012-31/12/2012	01/01/2013-31/01/2013	01/02/2013-28/02/2013	01/03/2013-31/03/2013	Total
$BR_{PJ,Pear,y}$ (tonnes on wet)	6,215	4,128	10,784	25,125	27,531	0	0	0	0	32	744	512	75,071
$Moisture_{PJ,Pear,y}$(%)	41.28	41.30	41.28	40.75	41.03	0.00	0.00	0.00	0.00	41.10	41.36	41.56	41.01
$BR_{PJ,Pear,y}$ (tonnes on dry)	3,649.45	2,423.14	6,332.36	14,886.56	16,235.03	0.00	0.00	0.00	0.00	18.85	436.28	299.21	44,281
$NCV_{Pear,y}$ GJ/tonnes on dry	16.46	16.46	16.46	16.46	16.46	17.27	17.27	17.27	17.27	17.27	17.27	16.31	-
$BR_{PJ,Peach,y}$ (tonnes on wet)	17,003	15,607	9,796	1,184	1,711	478	450	2,585	3,800	5,460	11,130	6,391	75,595
$Moisture_{PJ,Peach,y}$ (%)	41.52	41.66	42.09	40.56	41.54	43.42	43.33	43.54	43.76	41.10	40.64	40.65	41.58
$BR_{PJ,Peach,y}$ (tonnes on dry)	9,943.35	9,105.12	5,672.86	703.77	1,000.25	270.45	255.02	1,459.49	2,137.12	3,215.94	6,606.77	3,793.06	44,163
$NCV_{Peach,y}$ GJ/tonnes on dry	15.74	15.74	15.74	15.74	15.74	18.03	18.03	18.03	18.03	18.03	18.03	15.83	-
$BR_{PJ,Apple,y}$ (tonnes on wet)	3,826	3,275	2,189	1,957	714	1,852	4,664	1,252	1,668	1,213	998	1,828	25,436
$Moisture_{PJ,Apple,y}$ (%)	41.41	41.50	38.73	39.69	41.31	44.23	43.39	43.11	43.51	40.99	40.99	41.33	41.80
$BR_{PJ,Apple,y}$ (tonnes on dry)	2,241.65	1,915.88	1,341.20	1,180.27	419.05	1,032.86	2,640.29	712.26	942.25	715.79	588.92	1,072.49	14,803
$NCV_{Apple,y}$	14.52	14.52	14.52	14.52	14.52	17.64	17.64	17.64	17.64	17.64	17.64	17.60	-

GJ/tonnes on dry													
$BR_{PJ,Wood\ scrap,y}$ (tonnes on wet)	5,158	9,188	3,511	6,965	8,024	30,354	31,457	30,155	29,866	22,175	17,187	12,916	206,956
$Moisture_{PJ,Wood\ scrap,y}$(%)	44.43	43.99	46.26	48.80	49.10	45.77	46.15	46.07	46.54	43.40	43.68	43.27	45.53
$BR_{PJ,Wood\ scrap,y}$ (tonnes on dry)	2,866.30	5,146.20	1,886.81	3,566.08	4,084.22	16,460.97	16,939.59	16,262.59	15,966.36	12,551.05	9,679.72	7,327.25	112,737
$NCV_{Wood\ scrap,y}$ GJ/tonnes on dry	16.70	16.70	16.70	16.70	16.70	17.58	17.58	17.58	17.58	17.58	17.58	16.06	-
$EF_{CH4,BR}$ (tCH_4/GJ)	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	0.0000411	-
GWP_{CH4} (tCO_2/tCH_4)	21	21	21	21	21	21	21	21	21	25	25	25	-
$PE_{BR,y}$ (tCO_2)	256	256	211	287	308	270	301	280	290	300	316	207	3,283

Document information

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03.2	5 November 2013	Editorial revision to correct table in page 1.
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