VERIFICATION AND CERTIFICATION REPORT

POYANG KAIDI BIOMASS POWER PROJECT

UNFCCC Ref. No.: 3056
Monitoring Period:
1 January 2012 to 30 June 2013

Report No.: CTI/NB-2013-1107
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Verification Organisation:	**Client:**
Shenzhen CTI International Certification Co., Ltd	Poyang Kaidi Green Energy Development Co., Ltd
Project Title:	**Report Number:**
Poyang Kaidi Biomass Power Project	CTI/NB-2013-1107
Monitoring period:	**Applied methodology/version:**
1 January 2012 to 30 June 2013	ACM0006, version 09

Summary:

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions reported for the "Poyang Kaidi Biomass Power Project" in China (UNFCCC Ref. No. 3056) for the period 1 January 2012 to 30 June 2013.

In our opinion, the GHG emission reductions reported for the project in the monitoring report (version 2.0 dated 28 June 2014) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0006 (version 09) and ACM0002 (version 10), and the monitoring plan contained in the Project Design Document (version 05 dated 22 August 2012).

CTI can confirm that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI is able to certify that emission reductions from Poyang Kaidi Biomass Power Project during the period 1 January 2012 to 30 June 2013 amount to 80,609 tCO_2e.

Since this monitoring period covers the 1st commitment period and 2nd commitment period, the actual GHG emission reductions achieved for the period up to 31 December 2012 (1st commitment period) and the period from 1 January 2013 onwards were provided respectively as follows:

Period up to 31 December 2012:	1 January 2012 to 31 December 2012
Emission reductions:	46,458 tCO_2e
Period from 1 January 2013 onwards:	1 January 2013 to 30 June 2013
Emission reductions:	34,151 tCO_2e

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Abbreviations

CAR	Corrective Action Request
CCPG	Central China Power Grid
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CTI	Shenzhen CTI International Certification Co., Ltd
DOE	Designated Operational Entity
EF	Emission Factor
ER	Emission Reduction
ETN	Electricity Transaction Note
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
MR	Monitoring Report
NCV	Net Calorific Value
PDD	Project Design Document
PPA	Power Purchase Agreement
PS	Project Standard
tCO_2e	Tonnes of CO_2 equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM Validation and Verification Standard

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1 INTRODUCTION

Poyang Kaidi Green Energy Development Co., Ltd has commissioned Shenzhen CTI International Certification Co., Ltd (CTI) to carry out the verification and certification of emission reductions reported for the "Poyang Kaidi Biomass Power Project" (the project) for the period 1 January 2012 to 30 June 2013. This report contains the findings from the verification and a certification statement for the certified emission reductions.

1.1 Objective

Verification is the periodic independent review and *ex post* determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined verification period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the "Poyang Kaidi Biomass Power Project" for the period 1 January 2012 to 30 June 2013.

1.2 Scope and criteria

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the PDD;
- The monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan, including compliance with any guidance provided by the Board regarding deviations from the provisions of a registered plan and/or methodology;
- The data and calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

1.3 CDM project Description and period covered

Project Parties:	China (host Party), Switzerland and the United Kingdom of Great Britain and Northern Ireland (other Party)
Project title:	Poyang Kaidi Biomass Power Project
UNFCCC registration No:	3056
UNFCCC registration date:	6 January 2011
Applied methodology:	ACM0006 (version 09) and ACM0002 (version 10)
Project Participants:	Poyang Kaidi Green Energy Development Co., Ltd from China

	Camco Clean Energy Plc. and Camco Carbon Limited from the United Kingdom of Great Britain and Northern Ireland
	Camco Clean Energy Plc. from Switzerland
Location of the project activity:	Poyang Industrial Park, Jiangxi Province, China
Project's crediting period:	6 January 2011 to 5 January 2018 (Renewable)
Period verified in this verification:	1 January 2012 to 30 June 2013

1.4 Methodology for determining emission reductions

The emission reductions are determined in accordance with the formulae given in the baseline and monitoring methodology ACM0006 (version 09) /43/ and ACM0002 (version 10) /44/ for the baseline Scenario 2.

According to the approved PDD (version 05 dated 22 August 2012) /28/, the project will not claim GHG emission reductions from displacing the heat that would otherwise be produced within Poyang Industry Area. Hence, the baseline emissions due to the displacement of heat ($ER_{heat,y}$) was not considered in the emission reduction calculation for the proposed project. The emission reductions (ER_y) by the project activity is therefore the difference between the baseline emissions through the displacement of electricity ($ER_{electricity,y}$) and baseline emissions due to natural decay or uncontrolled burning of biomass residues ($BE_{biomass,y}$), project emissions (PE_y) and emissions (L_y) due to leakage:

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

1.4.1 Baseline emissions

(1) Baseline emissions due to the displacement of electricity ($ER_{electricity,y}$)

$ER_{electricity,y}$ is calculated by multiplying the net quantity of increased electricity generated with biomass residues as a result of the project activity (EG_y) with the CO_2 baseline emission factor for the electricity displaced due to the project activity ($EF_{electricity,y}$):

$ER_{electricity,y} = EG_y * EF_{electricity,y}$

$EF_{electricity,y}$ is the emission factor of the grid, which was calculated *ex-ante* and will not be updated during the first crediting period. Since the baseline Scenario 2 was applied for the project activity in the PDD, EG_y corresponds to the net quantity of electricity generation in the project plant ($EG_y=EG_{project\ plant,y}$).

(2) Baseline emissions due to natural decay or uncontrolled burning of biomass residues ($BE_{biomass,y}$)

The biomass residue would have been burned in an uncontrolled manner or dumped and left to decay, generating significant methane emissions. As stated in the methodology, baseline emissions are calculated assuming, for both scenarios viz., natural decay and uncontrolled burning, that the biomass residues would be burnt in an uncontrolled manner. Therefore, the emissions can be calculated from the quantity of biomass residues ($BF_{PJ,k,y}$) that would not be used in absence of the project activity, with the net caloric value (NCV_k) and the appropriate emission factor for the uncontrolled burning ($EF_{burning,CH4,k,y}$).

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

1.4.2 Project emissions

The project emissions include emissions from transportation of biomass residues to the project site (PET_y), emissions from on-site consumption of fossil fuel by the project ($PEFF_y$), emissions from consumption of electricity ($PE_{EC,y}$), and methane emissions from combustion of biomass residues ($PE_{biomass,CH4,y}$):

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

(1) Project emissions from transportation of biomass residues to the project site (PET_y)

The emissions from the transport of biomass residues to the project site were calculated from the number of truck trips (N_y), average round trip distance (from and to) between the biomass residue fuel supply sites and the project site (AVD_y), average transportation from collection site to power plant and the CO_2 emission factor from fuel used for transportation ($EF_{km,CO2,y}$).

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

(2) Project emissions from on-site consumption of fossil fuel by the project ($PEFF_y$)

The on-site consumption of fossil fuels is from two sources: one is combusted as auxiliary fuel for boiler start up and another is from the diesel consumption for forklifts at collection sites and project site. According to the revised PDD, the emissions from fossil fuel consumed in the project plant will use the quantity of fossil fuel ($FC_{i,y}$) as well as its emission factor ($NCV_{i,y} \times EF_{CO2,i,y}$) according to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /46/.

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

(3) Project emissions from consumption of electricity ($PE_{EC,y}$)

The emissions ($PE_{EC,y}$) due to on-site consumption of electricity are calculated based on the quantify of electricity consumed ($EC_{PJ,j,y}$), emission factor for electricity generation ($\mathrm{FE_{EL,j,y}}$) and a factor to account for transmission losses ($\mathrm{TDL_{j,y}}$) according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /47/.

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

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

Accounting for the methane emissions in the baseline, methane emissions from the combustion in the project scenario use the quantity of biomass residues ($BF_{k,y}$) used in the project activity, the net caloric value (NCV_k) and the appropriate emission factor for the controlled burning in power plant ($EF_{CH4,BF}$).

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

1.4.3 Leakage

According to ACM0006 (version 09), the probable source identified for leakage is that the project diverts biomass from other users and thereby increases fossil fuel use. Approach L_2 was selected to demonstrate that the annual biomass requirement of the project activity is at least 25% larger than the biomass utilized in the region. In case of the leakage effects of a certain type of biomass residues used in the project activity cannot be ruled out with the mentioned above, leakage effects for the project activity shall be calculated as follow:

$$L_y = EF_{CO2,LE} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k$$

According to the PDD, the leakage from the project activity is zero in the ex-ante estimation of emission reduction calculation, as the surplus of biomass residues is far greater than the quantity of residues used by the project activity. The real situation of leakage will be monitored once the project owner begins collecting biomass residues.

1.5 Verification team

Based on the requirements of competency, experience and qualified sectoral scopes, CTI appointed a verification team in accordance with CTI's internal procedures. The qualification of each team member is detail in Appendix B to this report.

Function	Name	Technical competence	Task Performance*
Team Leader	Zhang Lei	1.1, 1.2, 4.1, 4.3, 4.4, 13.1, 13.2	☒DR ☒SV ☒RP ☐TR
Technical Reviewer	Lin Shunrong	1.2	☒DR ☐SV ☐RP ☒TR
Expert	Wang Dajiang	1.1	☒DR ☐SV ☐RP ☒TR

2 METHODOLOGY

CTI has assessed and determined that the implementation and operation of the project activity, and the steps taken to report emission reductions comply with the CDM criteria and relevant guidance provided by the Board. The assessment involved a document review of relevant documentation as well as an on-site visit(s).

2.1 Document review

The monitoring report was published on UNFCCC website on 25 April 2014. In addition to the monitoring report (version 1.0 dated 21 April 2014 and updated version 2.0 dated 28 June 2014) /1/, CTI reviewed:

- The approved PDD for the project activity /28/, including the monitoring plan and the corresponding validation report /29/;
- Previous verification /30/;
- Baseline and monitoring methodology ACM0006 (version 09) /43/ and ACM0002 (version 10) /44/ applied by the project;
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /40/ -/42//46/-/48/; and
- Other information and references relevant to the project activity /2/-/27/, /31/-/39/.

During the desk review, CTI has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:

- A review of the data and information presented to verify their completeness;

- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures; and
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

2.2 On-site assessment

On 20 May 2014, CTI visited Poyang Kaidi Green Energy Development Co., Ltd, and performed on-site assessment. The key personnel of the project were interviewed or assisted the verification team /49//50/.

During the on-site assessment, CTI has applied standard auditing techniques to assess the quality of information provided. The following aspects of the CDM project activity have been verified:

- An assessment of the implementation and operation of the registered project activity is as per the PDD for the project activity;
- A review of information flows for generating, aggregating and reporting the monitoring parameters; and
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;
- A cross-check between information provided in the monitoring report and data from other sources such as plant logbooks and electricity sale receipts;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology;
- A review of calculations and assumptions made in determining the GHG data and emission reductions; and
- An identification that quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

The data presented in the monitoring report were assessed by review of the detailed project documentation and production records, as well as by interviews with personnel from the project participant Poyang Kaidi Green Energy Development Co., Ltd and project consultant Sunshine Kaidi New Energy Group, and observation of collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results, to verify the correct application of the approved monitoring methodology and the determination of the emission reductions.

In addition all parameters required by the monitoring methodology ACM0006 (version 09) /43/ and ACM0002 (version 10) /44/, and the management system were assessed during the site visit.

2.3 Reporting of findings

The objective of this phase of the verification was to resolve any issues which needed be clarified prior to CTI's conclusion that i) the project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD, ii) the monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan and iii) the data and calculation of GHG emission reductions are correct.

A corrective action request (CAR) is issued, where:

i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
ii. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
iii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
iv. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

The verification team identified one CAR and one CL in this monitoring period, and no FAR was raised. The CAR and CL were satisfactorily addressed by the project participants in the revising monitoring report (refer to Appendix A for further details). All changes made to the monitoring report (version 2.0 dated 28 June 2014) are as a result of the verification findings.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the "Poyang Kaidi Biomass Power Project" for the period 1 January 2012 to 30 June 2013.

3.1 Remaining issues from previous validation/verification

This monitoring period 1 January 2012 to 30 June 2013 is the second verification of the project. No remaining issues were identified in the validation report /29/ or previous verification /30/.

3.2 Post registration changes

There were no post registration changes identified by CTI to this monitoring period. A post registration changes (including the changes of biomass types and the correction of the name of the manufactures of steam turbines and generators, the model type of boilers , the name of monitoring equipment for BFk,y and the frequency of the energy balance) has been requested in the first verification /30/ and approved by the CDM-EB on 7 February 2013, which was prior to the start of this verification and applicable to this verification.

3.3 Project implementation

The project is a biomass cogeneration plant, located in Poyang Industrial Park, Jiangxi Province of China. The electricity generated is delivered to the Central China Power Grid (CCPG) and the heat generated is proposed to be supplied to the plants in Poyang Industrial Park. The project activity was registered as CDM project on 6 January 2011. Hence, 6 January 2011 was identified as the starting date of crediting period, and the selected monitoring period 1 January 2012 to 30 June 2013 is within the first crediting period of 6 January 2011 to 5 January 2018.

During the site visit, CTI has verified that the cogeneration plant included the installation of two sets of 65 t/h CFB boilers with medium temperature and sub-high pressure, two sets of 12 MW condensing and extraction steam turbines, and two sets of 15 MW associated generators, and confirmed to be as per the revised PDD. The project activity started to operate on 31 January 2010. As stated in the revised PDD, the generator is sized at 15 MW and not 12 MW to allow for possible peak generation and to avoid damage to the generation unit by sudden load change in abnormal situations. It is also stated in the revised PDD that under conditions where there is no steam extraction, the steam turbines can theoretically generate at 15 MW, and the project activity still is additional due to the financial unattractiveness because the efficiency of the plant for power only is higher than the plant operating in cogeneration mode.

The biomass residues consumed by the project activity are directly sourced from agriculture and forestry residues. The collected biomass residues were transported by vehicles to biomass residue sheds at the project site before being burnt in the boilers for steam generation. In the PDD, the biomass residues proposed to be used by the project will be rice husk, bamboo crumbs, wood scraps, branches, barks and stumps. By checking the plant operation log /15/ and interviewing with the manager and operator /49/, CTI can confirm that within this monitoring period the biomass residues fired for power generation were rice husk, bamboo crumbs, wood scraps, branch, barks and stumps, which are in compliance with the biomass residue types stipulated in the revised PDD.

In the PDD, the heat generated by the project activity will be supplied to the plants in Poyang Industrial Park to meet the process demand. In the previous first verification /30/, it stated that the pipeline for heat extraction from the turbines was reserved. During the site visit, CTI found that the heat pipeline net was still under construction near the project plant. No heat generated by the project activity was supplied yet to the industrial user, and also for this monitoring period. By interviewing with project manager /49/, CTI noted the heat supply contract are still on the negotiation stage between the Poyang Kaidi Green Energy Development Co., Ltd and the heat user, and the heat from the project would be supplied after the completion of pipeline net construction and the negotiation of heat cost between project owner, heat users and Poyang Industrial Park. Therefore, CTI confirmed that there was not heat export by the project activity during this verification period. Such situation also can be confirmed by the statement issued by Poyang Economic Development District /3/. In the revised PDD, it has proved that the project activity without heat supply still is additional due to the financial unattractiveness. Furthermore, since the emission reductions from the displacement of heat has not been considered in the emission reduction calculation in the PDD, CTI confirmed that the project implementation without heat supply does not have negative effect on the emission reductions claimed in this monitoring period.

The control system at the power plant is automated and assures continuous operation, including monitoring on malfunction of equipment. By checking the daily operation and maintenance records /15/, there were 4 times and 7 times temporarily shutdowns for maintenance on 1# and 2# unit in this monitoring period, respectively. No retrofit/modification was found for the project activity by checking the plant operation log /15/ and interviewing with the manager and operator /49/. CTI confirmed that the plant was under a normal operation as expected in this monitoring period.

On-site training for the CDM related procedures including monitoring, recording and reporting was verified to be in place /12/ and their implementation was confirmed by interview with the key operators and observing the operation /49/.

As part of the site visit, CTI was able to confirm that the project implementation is in accordance with the project description contained in the PDD (version 05 dated 22 August 2012). The verification team confirmed through visual inspection and document review that all physical features of the proposed CDM project activity including data collection systems and storage systems have been implemented in accordance with the PDD.

3.4 Compliance of monitoring plan with monitoring methodology

CTI is able to confirm that the monitoring plan in the PDD (version 05 dated 22 August 2012) /28/ is in accordance with the approved methodology applied by the project activity, i.e. ACM0006 (version 09) /43/.

3.5 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the PDD (version 05 dated 22 August 2012) /28/. CTI confirms that all parameters stated in the monitoring plan are monitored and reported appropriately. All parameters required to be monitored by the monitoring plan as per the monitoring methodology ACM0006 (version 09) /43/, and the management system were assessed during the site visit. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data

generation, aggregation, recording, calculation and reporting) for these parameters is provided. The information flow for the each parameter in further verified in the following sections.

3.5.1 Factor and datum determined ex-ante

All reported factors determined *ex-ante* by the monitoring methodology ACM0006 (version 09) and indicated in the PDD (version 05 dated 22 August 2012) were assessed as follows:

a. Global warming potential for methane (GWP)

According to Annex 3 of EB69, "Standard for application of the global warming potential to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol" /45/, all emission reductions and removals achieved by CDM project activities in the second commitment period shall be calculated using the global warming potentials (GWPs) adopted by the Conference of the Parties serving as the meeting of the Parties at its seventh session in accordance with decision 4/CMP.7, and this requirement shall apply from 1 January 2013. The proposed monitoring period starts before 31 December 2012 and ends on 30 June 2013, hence covers the 1st commitment period and 2nd commitment period. The project activity is newly-built biomass cogeneration project. According to the PDD, the greenhouse gas CO_2 and CH_4 were included within the project boundary, and also considered in the emission reduction calculation. Hence, the verification team confirmed that in this monitoring period the IPCC default value of 21 tCO_2/tCH_4 and 25 tCO_2/tCH_4 is applied for the first commitment period (1 January 2012 to 31 December 2012) and the second commitment period (1 January 2013 to 30 June 2013), respectively /33/ /43/.

b. Average technical transmission and distribution losses for providing electricity to source j ($TDL_{j,y}$)

The default value of 20% is applied according to "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /43//47/.

c. Baseline emission factor of CCPG (EF_y)

In the PDD, the *ex-ante* determined emission factor 0.9735 tCO_2/MWh for the CCPG is applied during the first crediting period (including this monitoring period).

d. Methane emission factor for controlled burning of the biomass residue in the project plant ($EF_{CH4,BF}$)

In the PDD, the IPCC default value of 30 $kgCH_4/TJ$ /33/ is estimated ex-ante and applied during this crediting period. When the default CH_4 emission factor of 30 kg/TJ is used, the uncertainty is estimated to be 300%, resulting in a conservativeness factor of 1.37. Thus, in this case a CH_4 emission factor of 41.1 kg/TJ is used.

e. Methane emission factor for uncontrolled burning of the biomass residue (NCV_k*$EF_{burning,CH4,k,y}$)

According to the methodology ACM0006 (version 09), 0.0027 tCH_4/tone is recommended as the default value for the product of NCV_k and $EF_{burning,CH4,k,y}$ when more accurate information is absent. When 0.0027 tCH_4/tonne is used, the uncertainty is deemed greater than 100%, resulting in a conservativeness factor of 0.73. Hence, an emission factor of 0.001971 tCH_4/tonne is used for the emission reduction calculation.

3.5.2 Factors and datum monitored or calculated ex-post

The following data reported in the monitoring report has been assessed in detail:

a. Net calorific value of each biomass residue of type k (NCV_k)

The project participant committed the reputed laboratory Luoyang Coal inspection technique center /4/ to analyze the net calorific value of biomass residues, and the measurement took three samples and bases on dry biomass residues every six months. The following are the reported NCVs of each biomass residue, and verified by CTI against the testing reports /5/.

Biomass type	NCV tested on 3 January 2012 (GJ/ton)	NCV tested on 2 July 2012 (GJ/ton)	NCV tested on 3 January 2013 (GJ/ton)
Rice husk	13.51	13.22	12.98
Bamboo crumbs	10.52	11.04	10.71
Wood scraps	10.83	12.18	11.76
Branches	13.27	12.72	12.97
Barks	12.07	11.68	11.93
Stumps	11.07	11.25	11.16

b. Average round trip distance (from and to) between the biomass fuel supply sites and the project plant (AVD_y)

This amount is reported on daily log sheets /15/ and aggregated into monthly reports /16/. All the biomass residues are from the biomass residue collection stations. The verification team has assessed all daily log sheets and monthly reports and found the monthly total distance in the ER spreadsheet /2/ to be correct. During the site visit, CTI double checked the transportation distance with the local map for the biomass collection stations, and confirmed that the round trip distance recorded in the daily log sheets reflected to the practice. Hence, CTI confirmed that the reported AVD_y (50.24 km) in this monitoring period is reasonable.

c. Numbers of truck trips for the transportation of biomass (N_y)

The numbers of trucks into the plant are recorded on daily log sheets /15/ and aggregated into monthly reports /16/. The verification team has assessed all daily log sheets and monthly reports and found the monthly number for transportation in the ER spreadsheet /2/ to be correct. Hence, CTI confirmed that the reported N_y (21,238 trips) in this monitoring period is reasonable.

d. Average CO_2 emission factor for transportation of biomass with trucks ($EF_{km,CO2}$)

The IPCC default value of 0.001097 tCO_2/km from revised IPCC 1996 /32/ was applied for the average CO_2 emission factor of the diesel trucks in the PDD. CTI has checked the updated 2006 IPCC /33/ and was able to confirm no change for this value.

e. Net calorific value of the fossil fuel (NCV_i)

According to the monitoring plan in the PDD, the NCV of the diesel from China Energy Statistical Yearbook 2007 was applied in the emission reduction calculations. CTI checked the updated China Energy Statistical Yearbook 2010 and 2011 /31/ and was able to confirm no change for this value. Hence, the reported value 0.042652 TJ/tonne used in the emission reduction calculation is reasonable.

f. CO_2 emission factor for fossil fuel ($EF_{CO2,y}$)

In the PDD, the IPCC default value 74,100 $kgCO_2e$/TJ was applied for the CO_2 emission factor of the diesel sourced from 2006 IPCC in the estimated calculation of project emissions for fossil fuel consumption, and the CO_2 emission factor of fossil fuel (diesel) used in the project will be reviewed annually on its appropriateness /33/. According to the methodology

applied, the emissions from fossil fuel consumed in the project plant will use the quantity of fossil fuel ($FC_{i,y}$) as well as its emission factor ($NCV_{i,y} \times EF_{CO2,i,y}$) according to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /46/, in which it stated that IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in 2006 IPCC was applied for the CO_2 emission factor of fossil fuel. Hence, IPCC default values at the upper limit of the uncertainty at a 95% confidence interval 74,800 $kgCO_2e/TJ$ was applied for the CO_2 emission factor of the diesel in the calculation of project emissions for fossil fuel consumption. Since 2006 IPCC is the latest version till now, CTI considers that 74,800 $kgCO_2e/TJ$ /33/ applied for the CO_2 emission factor of the diesel is reasonable.

g. The quantity of biomass residues of type k that are utilized in the defined geographical region

The data is provided from the investigation report of local biomass resource by the accredited third party /26/, which has been listed in the table below.

h. The quantity of biomass residues of type k in the defined geographical region

CTI verified the data provided regarding the total production, availability and utilization of the biomass residues in the region from the investigation report /26/ for the biomass supply and demand in Poyang County where the project located from 1 January 2012 to 30 June 2013. The investigation of the biomass residues utilized shows that the quantity of available residues of the above mentioned biomass types in 60 km away from the project plant are all more than 25% larger than the quantity of total biomass utilised. Hence, according to ACM0006 (version 09), the leakage for the project activity is considered as zero. The detail data is indicated as follows:

Table 1: Biomass resources in 60 km radius from the plant in Poyang County in year 2012

Biomass Type	Rice husks	Bamboo crumbs	Wood scraps	Branches	Bark	Stumps
Total biomass generation in the region (kt)	304.00	63.00	510.00			
Biomass loss (kt)	30.40	6.30	51.00			
Available biomass in the region (kt)	273.60	56.70	459.00			
Biomass consumption other than the project (kt)	54.72	8.51	91.80			
Biomass consumption in the project (kt)	24.03	12.76	51.44			
Total biomass utilised, including the project (kt)	78.75	21.27	143.24			
Available biomass/Total biomass utilised	347%	267%	320%			

Table 2: Biomass resources in 60 km radius from the plant in Poyang County in year 2013

Biomass Type	Rice husks	Bamboo crumbs	Wood scraps	Branches	Bark	Stumps
Total biomass generation in the region (kt)	298.00	58.00	496.00			
Biomass loss (kt)	29.80	5.80	49.60			
Available biomass in the	268.20	52.20	446.40			

region (kt)			
Biomass consumption other than the project (kt)	53.64	7.83	89.28
Biomass consumption in the project (kt)	13.94	5.89	44.44
Total biomass utilised, including the project (kt)	67.58	13.72	133.72
Available biomass/Total biomass utilised	397%	381%	334%

* Except the biomass utilised by the project, other values are sourced from local investigate report of biomass residues where the project located issued by the FSR designer; the biomass utilised by the project are from the actual consumption within this monitoring period /26/.

The below tables describe for each parameter, which is to be measured according to the monitoring plan, how CTI has verified that i) the actual monitoring complies with the monitoring plan and that ii) data have been assessed to correctly support the emission reductions being claimed.

	Assessment/ Observation
Data / Parameter:	Net quantity of increased electricity generated in the project plant ($EG_{project\ plant,y}$)
Measuring frequency:	Continuously
Reporting frequency:	Monthly
Assessment of measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology.	The measuring frequency (continuously) is accordance with the monitoring plan and monitoring methodology. Since there is not specific requirement for reporting frequency in the monitoring plan and monitoring methodology, the reporting frequency (monthly) for this parameter did reflect to the monitoring practise.
Type of monitoring equipment:	Electricity meters
Assessment of accuracy and calibration of the monitoring equipment in accordance with the monitoring plan and monitoring methodology.	Gate meter /7/ Type/Model: ZMQ202C.4 SN: 94826500 Accuracy: 0.2S Calibration frequency: annual Calibration entity: Jiangxi Gan Northeast Power Company Electric Measurement Center Calibration date: 24 December 2011 and 24 December 2012 Calibration validity: 23 December 2013 Backup meter /7/ Type/Model: ZMQ202C.4 SN: 94826502 Accuracy: 0.2S Calibration frequency: annual Calibration entity: Jiangxi Gan Northeast Power Company Electric Measurement Center Calibration date: 24 December 2011 and 24 December 2012 Calibration validity: 23 December 2013

	10kV meter /7/ Type/Model: DSSD135 SN: 807341 Accuracy: 0.5 Calibration frequency: annual Calibration entity: Jiangxi Gan Northeast Power Company Electric Measurement Center Calibration date: 24 December 2011 and 24 December 2012 Calibration validity: 23 December 2013 In the revised PDD, it stated "The accuracy of all the meters will not be lower than 0.5%". The accuracy of 10 kV meter 0.5% is consistent with that. The gate meter and backup meter have higher accuracy level 0.2% than the value stipulated in the revised PDD, and also relevant national standard JJG596-1999 /35/. The PDD specified that "the calibration frequency is once a year". The calibration frequency of electricity meters is annual /7/, which meets the requirement from the PDD. CTI confirmed that the calibrations for the meters can cover the whole monitoring period 1 January 2012 to 30 June 2013.
Assessment of how to verify the reported values in the monitoring report.	The net electricity generation supplied to the grid is determined by the electricity supplied to the grid minus the electricity imported from the grid and minus the electricity imported from the 10 kV backup line. The amount of net electricity generated is determined by monitoring meter on the hourly and daily basis when the power plant is operating, and these daily readings /17/ are aggregated into monthly reports /16/. CTI has verified these values to be consistent with the information used in the ER spreadsheet /2/.
Assessment of how to cross-check the reported values with other available data.	The meter reading was recorded at the last day monthly jointly by the project owner and power company, which was the basis for the sales receipt. The monthly electricity export and import (from grid and 10kV backup line) /17/ was cross-checked with the monthly electricity sales receipt /21/. During the cross-check, the minimum values of electricity export to the grid by the project activity between the values in the receipts from electricity sales /21/ and original records /17/ are used in the emission reduction calculation, while the maximum values of electricity import from the grid and 10 kV backup line by the project activity between the values in the receipts and original records are used in the emission reduction calculation, which are

	conservative and reasonable by CTI.

	Assessment/ Observation
Data / Parameter:	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 ($EC_{PJ,y}$)
Measuring frequency:	Continuously
Reporting frequency:	Monthly
Assessment of measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology.	This on-site electricity consumption was referred to the electricity consumed for the biomass residues mechanical treatment by the project plant, which was stipulated in the PDD and the methodology applied. The electricity consumed by the project operation itself has been included as the self-consumption in the net quantity of electricity exported by the project. Since the biomass residues were transported to the project site and were treated on the project site, the biomass residues collection sites were used to collect and storage the biomass residues, not mechanical treatment, which was confirmed by CTI through visiting the biomass residues collection stations. The measuring frequency (continuously) is accordance with the monitoring plan and monitoring methodology. Since there is not specific requirement for reporting frequency in the monitoring plan and monitoring methodology, the reporting frequency (monthly) for this parameter did reflect to the monitoring practise. In the PDD, it stated "aggregated at least annually". Monthly report for electricity consumed on site was issued as the aggregated records, which was more frequent than the stipulation in the PDD. CTI considers that is reasonable.
Type of monitoring equipment:	Electricity meters
Assessment of accuracy and calibration of the monitoring equipment in accordance with the monitoring plan and monitoring methodology.	Meter 1# /7/ Type/Model: DSSD1008 SN: 0807105 Accuracy: 0.5S Calibration frequency: annual Calibration entity: Jiangxi Gan Northeast Power Company Electric Measurement Center Calibration date: 24 December 2011 and 24 December 2012 Calibration validity: 23 December 2013 Meter 2# /7/ Type/Model: DS862

	SN: 10073628 Accuracy: 2.0 Calibration frequency: annual Jiangxi Gan Northeast Power Company Electric Measurement Center Calibration date: 24 December 2011 and 24 December 2012 Calibration validity: 23 December 2013 In the PDD, for the electricity consumed on site it stated "The accuracy of the meter will not be lower than 0.5%". The accuracy of 1# meter 0.5S is consistent with that. The accuracy of power meter 2# is 2.0 which is lower than the accuracy of 0.5. As stated in the PDD: "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". Since the dedicated meters have not been installed to monitor the on-site electricity consumption, project participants select to calculate the on-site electricity consumption as the weight of straws smashed in tons and the electricity consumption factor. CTI considers that is conservative and acceptable, and the lower accuracy of meter 2# than estimation in the PDD did not have negative effect on the relevant emission reductions calculation, and no post-registration change is required for this. CTI can confirm that the on-site electricity consumption is consumed by two on-site crushers. By checking the nameplate and technical specification of these two crushers, the model types of them are BX2113 and Vermeer HG 365E and the electricity consumption factor of them are calculated to be 8.33333 kWh/t and 6.8044 kWh/t respectively according to their technical specification /28/. The larger value of 8.33333 kWh/t was used for the calculation for conservativeness. Considering the consumption quantity of wood scraps, stumps, branch and bark (95,883.33 tonne) in this monitoring period /18/, the on-site electricity consumption was calculated as 799.03 MWh. As the conservative principle, the on-site electricity consumption 799.03 MWh by calculation based on the electricity consumption factor was used in the calculation of project emissions due to the on-site electricity consumption. The PDD specified that "the calibration frequency is once a year". The calibration frequency of electricity meters is annual /7/, which meets the requirement from the PDD. CTI

	confirmed that the calibrations for the meters can cover the whole monitoring period 1 January 2012 to 30 June 2013.
Assessment of how to verify the reported values in the monitoring report.	CTI was able to confirm that using the largest number as a conservative electricity factor for the calculation
Assessment of how to cross-check the reported values with other available data.	In the PDD, it stated "Cross-check measurement results with invoices for purchased electricity if available". However, there were not invoices for purchased electricity from on-site consumption since on-site electricity consumption was the internal use to treat biomass residues as the part of auxiliary electricity consumption for the project. Hence, it is not available to use purchased invoices to cross-check the records of on-site electricity consumption. CTI has verified the quality assurance and quality control procedures from the project, and interviewed with the project implementation team. CTI confirmed that the project team is able to conduct the management and monitoring well, and recorded values are reasonable and acceptable.

	Assessment/ Observation
Data / Parameter:	Quantity of each biomass residue type k combusted in the project plan ($BF_{k,y}$)
Measuring frequency:	Continuously
Reporting frequency:	Monthly
Assessment of measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology.	The measuring frequency (continuously) is in accordance with the monitoring plan and monitoring methodology. Since there is not specific requirement for reporting frequency in the monitoring plan and monitoring methodology, the reporting frequency (monthly) for this parameter did reflect to the monitoring practise. In the PDD, it stated "energy balance will be prepared annually". The energy balance has been prepared and verified for this monitoring period /2/, which reflected to the annual frequency.
Type of monitoring equipment:	Belt weigher
Assessment of accuracy and calibration of the monitoring equipment in accordance with the monitoring plan and monitoring methodology.	Belt weigher 1# /9/ Type/Model: ICS-ST4-1000 SN: 0811109 Accuracy: 0.5% Calibration frequency: once per year Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 4 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 Belt weigher 2# /9/

	Type/Model: ICS-ST4-1000 SN: 0811112 Accuracy: 0.5% Calibration frequency: once per year Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 4 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 In the PDD, it stated "The accuracy of the belt weigher will not be lower than 1%". The actual accuracy of the belt weigher 0.5% is higher than the expectation, and which also meets the relevant industry standard JJG195-2002 /36/. The PDD specified that "the calibration frequency is once a year". The calibration frequency of the electricity meters is annual /9/, which meets the requirement from the PDD.
Assessment of how to verify the reported values in the monitoring report.	The amount is reported on daily log sheets and aggregated into monthly reports. The verification team has assessed all daily log sheets /18/ and the monthly reports /16/ and found them to be correct. The project has reported these data based on the records of belt balances at the entrance of the boilers, and the types of biomass residues are recorded at the same time. The measured values were adjusted to the quantity of dry biomass by the moisture content in order to determine the emission reduction calculations.
Assessment of how to cross-check the reported values with other available data.	The value is cross checked with an annual energy balance /2/, which was based on purchased quantities and stock changes. The conclusion from the energy balance reflected to the reasonable energy input and output.

	Assessment/ Observation
Data / Parameter:	Moisture content of the biomass residues
Measuring frequency:	Daily
Reporting frequency:	Monthly (mean value was reported annually)
Assessment of measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology.	The measuring and reporting frequency are in accordance with the monitoring plan and monitoring methodology.
Type of monitoring equipment:	Balance and dry cabinet
Assessment of accuracy and calibration of the monitoring equipment in accordance with the monitoring plan and monitoring methodology.	Balance 1# /10/ Type/Model: YB2001 SN: 0193 Accuracy: 0.1g Calibration frequency: annual Calibration entity: Hubei Institute of Metrology and Testing Technology

	Calibration date: 4 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 Dry cabinet 1# /10/ Type/Model: GZXGF-9123A SN: 2011133 Accuracy: 0.1℃ Calibration frequency: annual Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 4 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 Dry cabinet 2# /10/ Type/Model: 101-1B SN: 081211 Accuracy: 0.1℃ Calibration frequency: annual Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 4 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 There is not specific requirement for the accuracy level of the balances and dry cabinets in the PDD. The accuracy of the balances and dry cabinets meet requirement of the monitoring methodology and present good monitoring practice in China /37//38/. The PDD specified that "the calibration frequency is once a year". The calibration frequency of balances and dry cabinets is annual /10/, which meets the requirement from the relevant national standard /37//38/. CTI confirmed that the calibrations for the balance and dry cabinets can cover the whole monitoring period 1 January 2012 to 30 June 2013.
Assessment of how to verify the reported values in the monitoring report.	Moisture for all types of biomass residues is sampled and analyzed daily by the balance and dry cabinet in the laboratory of the plant, and mean value was calculated monthly for the calculation of emission reductions, which meets requirement of the PDD as "at least annually". The value is reported on daily log sheets /18/ and aggregated into monthly reports /16/.
Assessment of how to cross-check the reported values with other available data.	Not applicable.

	Assessment/ Observation
Data / Parameter:	Quantity of fossil fuel (diesel) combusted in the project plant ($FF_{project\ plant,y}$)
Measuring frequency:	Continuously
Reporting frequency:	Monthly
Assessment of measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology.	The measuring frequency (continuously) is accordance with the monitoring plan and monitoring methodology. Since there is not specific requirement for reporting frequency in the monitoring plan and monitoring methodology, the reporting frequency (monthly) for this parameter did reflect to the monitoring practise.
Type of monitoring equipment:	Flow meters
Assessment of accuracy and calibration of the monitoring equipment in accordance with the monitoring plan and monitoring methodology.	Flow meter 1# /11/ Type/Model: LWY-10C SN: 08020 Accuracy: 1.0% Calibration frequency: annual Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 3 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 Flow meter 2# /11/ Type/Model: LWY-10C SN: 07115 Accuracy: 1.0% Calibration frequency: annual Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 3 January 2011, 3 January 2012 and 2 January 2013 Calibration validity: 1 January 2014 Flow meter 3# /11/ Type/Model: LWY-10C SN: L1019012 Accuracy: 1.0% Calibration frequency: annual Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 3 January 2012 and 31 October 2013 Calibration validity: 30 October 2014 Flow meter 4# /11/ Type/Model: LWY-10C SN: L1019030 Accuracy: 1.0% Calibration frequency: annual

	Calibration entity: Hubei Institute of Metrology and Testing Technology Calibration date: 3 January 2012 and 31 October 2013 Calibration validity: 30 October 2014 In the PDD, it stated "The accuracy of the flow meter will not be lower than 1%". The actual accuracy of the flow meters 1.0% is the same as stipulated in the PDD and also meets relevant requirement of national standard /39/. The PDD specified that "the calibration frequency is once a year". The calibration frequency of flow meter 1# and 2# is annual /10/, which meets the requirement from the relevant national standard /39/. The flower meter 3# and 4# were calibrated on 3 January 2012 and 31 October 2013, respectively. It resulted in 181 days (1-2 January 2012 and 3 January to 30 June 2013) delay calibration for flow meter 3# and 4# within the monitoring period 1 January 2012 to 30 June 2013. Since there are calibrations unavailable to cover the whole monitoring period, the calibration frequency requirements for measuring instruments stipulated in the "CDM Validation and Verification Standard" /40/ has been used to assess the time gap of calibrations, i.e. applying the maximum permissible error (1%) of the instruments to increase the measured values taken for the project emissions from consumption of fossil fuel (diesel) in January 2012 and from January 2013 to June 2013 /2/, which is conservative and reasonable by CTI.
Assessment of how to verify the reported values in the monitoring report.	The diesel was used for start-up of boiler, which is monitored continuously by the volume flow meter and recorded monthly. The value is reported on daily log sheets /19/ and aggregated into monthly reports /16/. The consumption of diesel was monitored in volume and converted to the mass using the standard density of diesel (0.85 kg/liter) as per the PDD to calculate the project emissions from the diesel consumption.
Assessment of how to cross-check the reported values with other available data.	The quantity of diesel was cross-checked by the purchase receipt /22/ provided by the accounting department and the amount of stored fuel on site in the beginning and end of the monitoring period.
	Assessment/ Observation
Data / Parameter:	Quantity of fossil fuel combusted in the project site (including the collection sites) for other purposes that are attributable to the project activity ($FF_{project\ site,y}$)

Measuring frequency:	Continuously
Reporting frequency:	Monthly
Assessment of measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology.	The measuring frequency (continuously) is accordance with the monitoring plan and monitoring methodology. Since there is not specific requirement for reporting frequency in the monitoring plan and monitoring methodology, the reporting frequency (monthly) for this parameter did reflect to the monitoring practise
Type of monitoring equipment:	As stated in the PDD, the data sourced from the on-site consumption records maintained in the log books. Hence, no monitoring equipment is required.
Assessment of accuracy and calibration of the monitoring equipment in accordance with the monitoring plan and monitoring methodology.	The consumption of diesel was monitored by using diesel purchase and consumption log book.
Assessment of how to verify the reported values in the monitoring report.	The consumption of diesel (including consumption as auxiliary fuel for boiler start up and consumption for forklifts at collection sites and project site) was monitored by using diesel purchase and consumption log book /19/.
Assessment of how to cross-check the reported values with other available data.	The quantity is cross checked with diesel purchase receipt and stock change /22/.

3.5.3 Data management and control

All necessary documentations are collected, referenced and aggregated. The quality assurance and quality control procedures have been addressed in the CDM project management and monitoring manual /13/, including the organization structure with the responsibilities, personnel competencies, monitoring procedures and monitoring management. All monitoring devices have been calibrated and maintained periodically to ensure the accuracy of measurement. By interview with the staff /49/ and check records /12/ during on-site visit, it can be confirmed that the monitoring management system is in place.

3.5.4 Energy balance

According to the methodology ACM0006 (version 09) /43/, the energy balance for the power plant is required to cross check the biomass and auxiliary fuels consumption. CTI has checked the energy balance calculation spread sheet and confirmed the integrated electricity generation efficiency to be 21.40% /2/. Based on the relevant design information from the suppliers and equipment purchase agreement of boiler, generator and turbine /23/-/25/, the design efficiencies for these three equipment are 86%, 97% and 32% (32% is under pure condensing condition for steam turbine), respectively, which leads to an overall efficiency about 27% in theory for the set of boiler-turbine-generator. Considering the deviation between the actual operation and theoretical design value, CTI considers that the efficiency observed in this monitoring period for the project activity is reasonable.

Therefore, it is concluded that the monitoring system is appropriate and complete.

3.6 Assessment of data and calculation of emission reductions

CTI confirms that appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.

3.6.1 Baseline emissions

(1) Emission reductions ($ER_{electricity,y}$) due to displacement of electricity

The emission reductions ($ER_{electricity,y}$) due to displacement of electricity is the product of the *ex-ante* calculated grid emission factor ($EF_{electricity,y}$, in tCO_2/MWh) times the net electricity generation as a result of the project activity (EG_y in MWh), which will otherwise be supplied by the CCPG without the project activity:

$$ER_{electricity,y} = EG_y \times EF_{electricity,y}$$

The emission factor of the CCPG is determined *ex-ante* as 0.9735 tCO_2/MWh for the first crediting period. The net electricity delivered to the grid is 81,507.33 MWh /16/, which result in the baseline emission reductions 79,347 tCO_2e in this monitoring period.

(2) Emission reductions ($BE_{biomass,y}$) due to natural decay of anthropogenic sources of biomass residue

The emission reductions ($BR_{biomass,y}$) due to natural decay of anthropogenic sources of biomass residue during the year y is calculated as the product of the amount of biomass residues (dry basis) used ($BE_{biomass,CH4,y}$) multiplies the biomass net calorific value, methane emission factor and the global warning potential of methane:

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

According to the PDD and the methodology, the quantity of biomass residue is adjusted for the moisture content in order to determine the quantity of dry biomass. Hence, $BF_{PJ,k,y} = BF_{k,y}$, namely the quantity of biomass residues of type k combusted in the project plant during the year y (tonnes of dry matter). In the PDD, 0.001971 tCH_4/t is used as the product of NCV_k and $EF_{burning,CH4,k,y}$.

Since the monitoring period 1 January 2012 to 30 June 2013 covers the 1st commitment period and 2nd commitment period, 21 tCO_2e /t CH_4 is adopted to calculate the baseline emission from 1 January 2012 to 31 December 2012 and 25 tCO_2e /t CH_4 is adopted to calculate the baseline emission from 1 January 2013 to 30 June 2013.

Hence, the baseline emission reductions were 5,007 tCO_2e in this monitoring period.

(3) Baseline emissions due to the displacement of heat ($ER_{heat,y}$)

According to the PDD, the project will not claim GHG emission reductions from displacing heat. Hence, $ER_{heat,y} = 0$.

Therefore, the total baseline emissions reported in this monitoring period are 84,354 tCO_2e.

3.6.2 Project emissions

The project emissions include emissions from transportation of biomass residues to the project site (PET_y), emissions from on-site consumption of fossil fuel by the project ($PEFF_y$), emissions from consumption of electricity ($PE_{EC,y}$), and methane emissions from combustion of biomass residues ($PE_{biomass,CH4,y}$):

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

(1) Project emissions from transportation of biomass residues (PET_y)

The emissions from the transport of biomass residues to the project site were calculated from the number of truck trips (N_y), average round trip distance (from and to) between the biomass residue fuel supply sites and the project site (AVD_y), average transportation from collection site to power plant and the CO_2 emission factor from fuel used for transportation ($EF_{km,CO2,y}$).

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

The IPCC default value of 0.001097 tCO_2/km was applied for the average CO_2 emission factor ($EF_{km,CO2,y}$) of the diesel trucks /33/. The average round trip distance between the biomass fuel supply sites and the project site was reported as 50.24 km and the number of truck trips for the transportation of biomass residues was accounted as 21,238 trips in this monitoring period. Hence, the corresponding project emissions were calculated as 1,170.53 tCO_2e.

(2) Project emissions from on-site consumption of diesel by the project ($PEFF_y$)

The emission from on-site consumption of fossil fuels is calculated using the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /46/:

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

The consumption of diesel was monitored in volume and converted to the mass using the standard density of diesel (0.85 kg/liter) as per the PDD. The diesel combusted in the project plant, and diesel combusted at the collection sites and project site for other purposes that are attributable to the project activity, are both considered in the calculation. The diesel combusted in the project plant and diesel combusted at the collection sites and project site for other purposes that are attributable to the project activity are reported to be 8.74 tonne (10,227.06 liter) and 102.45 tonne (120,525.82 liter), respectively /2/.

As stated above, the IPCC default values at the upper limit of the uncertainty at a 95% confidence interval 74,800 $kgCO_2e$/TJ was applied for the CO_2 emission factor of the diesel in the calculation of project emissions for fossil fuel consumption /33/, and the net calorific value of diesel refers to latest reliable national data of China Energy Statistical Yearbook as 0.042652 TJ/t /31/. Hence, the project emissions were calculated as 354.71 tCO_2e.

(3) Project emissions from consumption of electricity ($PE_{EC,y}$)

The emissions ($PE_{EC,y}$) due to on-site consumption of electricity are calculated based on the quantify of electricity consumed, emission factor for electricity generation and a factor to account for transmission losses according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /47/:

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

As stated in the PDD, the data source of on-site electricity consumption can use the calculated conservatively as the weight of straws smashed in tonnes and the electricity consumption factor (kWh/tonne). CTI can confirm that the on-site electricity consumption is consumed by two on-site crushers. By checking the nameplate and technical specification of these two crushers, the model types of them are BX2113 and Vermeer HG365E and the electricity consumption factor of them are calculated to be 8.33333 kWh/t and 6.8044 kWh/t respectively according to their technical specification /28/. The larger value of 8.33333 kWh/t

was used for the calculation for conservativeness. Considering the consumption quantity of wood scraps, Stumps, branch and bark (95,883.33 tonne) in this monitoring period /18/, the on-site electricity consumption was calculated as 799.03 MWh. As the conservative principle, the on-site electricity consumption 799.03 MWh by calculation based on the electricity consumption factor was used in the calculation of project emissions due to the on-site electricity consumption.

Since the electricity consumption is purchased from the grid only, the power grid emission factor 0.9735 tCO_2/MWh is applied, and 20% was chosen as the default value of $TDL_{j,y}$ in line with the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".Hence, the project emissions are calculated as 933.42 tCO_2e.

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

The methane emissions from combustion of biomass residues in the project ($PE_{biomass,CH4,y}$) is determined as below:

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

According to the methodology ACM0006 (version 09), when the IPCC default methane emission factor of 30 $kgCH_4$/TJ for combustion of biomass residues is applied, the uncertainty of the methane emission factor is estimated to be 300%, resulting in a conservativeness factor of 1.37. Thus, the methane emission factor of 41.1 $kgCH_4$/TJ ($EF_{CH4,BF}$) is used in the emission reduction calculation. The quantity /16/ and NCV for each type of biomass residues /5/ used in the project were applied. Since the monitoring period 1 January 2012 to 30 June 2013 covers the 1st commitment period and 2nd commitment period, 21 tCO_2e /t CH_4 is adopted to calculate the baseline emission from 1 January 2012 to 31 December 2012 and 25 tCO_2e /t CH_4 is adopted to calculate the baseline emission from 1 January 2013 to 30 June 2013.

Hence, the project emissions due to methane emissions from combustion of biomass residues were calculated to be 1,286.22 tCO_2e.

Therefore, the total project emissions occurred in this monitoring period are calculated and verified to be 3,745 tCO_2e /2/.

3.6.3 Leakage

As stated in section 3.5.2, CTI confirms that the quantity of available biomass residue in the region is at least 25% larger than the quantity of biomass that is utilized in this monitoring period, including the project plant. Hence, the leakage for the project activity is considered as zero.

3.6.4 Emission reductions

As stated in Section 1.4 above, the emission reductions (ER_y) by the project activity is the difference between the baseline emissions through the displacement of electricity ($ER_{electricity,y}$) and baseline emissions due to natural decay or uncontrolled burning of biomass residues ($BE_{biomass,y}$), project emissions (PE_y) and emissions (L_y) due to leakage:

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

From Section 3.6.1 to 3.6.3, the following information has been achieved:

$ER_{electricity,y}$ = 79,347 tCO_2e

$BE_{biomass,y}$ = 5,007 tCO_2e

PE_y = 3,745 tCO_2e

L_y = 0 tCO_2e

Hence, the emission reductions (ER_y) by the project activity during this monitoring period are calculated and rounded-down to be 80,609 tCO_2e.

The emission reduction calculations have been based on actual monitored data of the plant and the estimation or default values in this monitoring period, from 1 January 2012 to 30 June 2013 which have been verified by CTI. Emission reduction calculations were presented in a worksheet /2/ and CTI has assessed the calculations to be complete and transparent.

3.6.5 Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

The emission reductions in this monitoring period are 80,609 tCO_2e in the period from 1 January 2012 to 30 June 2013 (i.e. 547 days). The annually expected emission reductions according to the PDD is 116,628 tCO_2e (i.e. 365 days), which corresponds to the emission reductions of 174,782 tCO_2e for this monitoring period (i.e. 547 days). Hence, the reported emission reductions are 53% lower than the estimation in the PDD.

By comparing the actual project emissions and baseline emissions assessed in section 3.6 against the estimated values in the PDD as below:

Items	**Actual value in this monitoring period**	**Estimated value in the PDD for this monitoring period**
Emission emissions (tCO_2e**)**	80,609	174,782
Baseline emissions (tCO_2e**)**	84,354	195,890
Displacement of electricity (tCO_2e)	79,347	184,874
Natural decay of anthropogenic sources of biomass residue (tCO_2e)	5,007	11,016
Project emissions (tCO_2e)	3,745	21,108

From the table above, CTI could find the baseline emissions reported are lower than the estimation in the PDD, and the main reason for lower emission reductions in this monitoring period is due to the low baseline emissions observed in this monitoring period. The low baseline emissions from displacement of electricity are because of less electricity supplied in this monitoring period. The reported electricity supplied in this monitoring period is 81,507.33 MWh, which is lower than the estimated value of 189,906 MWh for this monitoring period in the PDD (126,720 MWh on yearly basis). This is mainly due to the low operating hours in June, July, August and November 2012 because of the plant maintenance and shortage of biomass fuel, which can be confirmed by daily operation and maintenance records /15/. CTI considers that the electricity supplied by the project activity in this monitoring period is reasonable to reflect the operation practice.

Hence, CTI was able to confirm that the emission reductions claimed during this monitoring period 1 January 2012 to 30 June 2013 was reasonable.

3.7 Quality of evidence to determine emission reductions

All necessary documentations are collected, referenced and aggregated, which is easily accessible in hard-copy or electronic format. Measurements are performed by calibrated equipment, and the key data can also be cross-checked via other sources, such as records, receipts and inventory data. No assumptions are used that have any material influence on reported emission reductions.

CTI concludes that during this monitoring period, the evidences for determination of emission reductions are sufficient and reasonable, and the calculation of emission reductions is reliable.

3.8 Management and operational system

Poyang Kaidi Green Energy Development Co., Ltd is responsible for operation and routine maintenance of power plant under the CDM activity. The quality assurance and quality control procedures have been addressed in the CDM project management and monitoring manual /13/, including the organization structure with the responsibilities, personnel competencies, monitoring procedures and monitoring management. By interview with the staff /49/ and check records /12/ during on-site visit, it can be confirmed that the monitoring management system is implemented following the CDM project management and monitoring manual.

All monitoring devices have been calibrated and maintained periodically to ensure the accuracy of measurement. Calibration records of instruments used in measurements were made available during the verification visit and found to be valid for the entire period of the verification. Competence and training records of in-plant personnel engaged in measurement of plant parameters were presented during verification and found to be in order /12/. All data have been archived electronically and/or in hard copy, and will be kept for two years after the crediting period.

4 VERIFICATION AND CERTIFICATION STATEMENT

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions that have been reported for the CDM project activity 3056 "Poyang Kaidi Biomass Power Project" in China for the period 1 January 2012 to 30 June 2013.

The verification is based on the baseline and monitoring methodology ACM0006 (version 09) and ACM0002 (version 10), the validated and approved PDD (version 05 dated 22 August 2012) and the monitoring report (version 2.0 dated 28 June 2014). The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification and certification report.

The project participants are responsible for the collection, calculation and determination of the GHG data in accordance with the monitoring plan and the reporting of GHG emission reductions on the basis set out within the project monitoring report.

It is CTI's responsibility to provide an independent verification statement on the reported GHG emission reductions for the project. Based on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these, CTI planned and performed our work to obtain the information and explanations that we considered necessary to provide reasonable assurance that reported GHG emission reductions are fairly stated.

CTI can confirm that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI confirms the following statement:

Item	**Reporting period (1 January 2012 to 30 June 2013)**	**Period up to 31 December 2012 (1 January 2012 to 31 December 2012)**	**Period from 01 January 2013 onwards (01 January 2013 to 30 June 2013)**
Emission reductions (tCO_2e)	80,609	46,458	34,151

Zhang Lei

Mr. Zhang Lei
Team Leader
2 July 2014

Shunrong Lin

Ms. Lin Shunrong
Technical Reviewer
2 July 2014

5 REFERENCES

Documentation to verify the information provided by the project participants

/1/ Sunshine Kaidi New Energy Group: Monitoring Report for Poyang Kaidi Biomass Power Project, version 1.0 dated 21 April 2014 and version 2.0 dated 28 June 2014.

/2/ Sunshine Kaidi New Energy Group: Emission reduction calculation spreadsheet for Poyang Kaidi Biomass Power Project, version 1.0 dated 21 April 2014 and version 2.0 dated 28 June 2014.

/3/ Poyang Economic Development District: Statement of heat supply from Poyang Kaidi Biomass Power Project, dated 30 December 2013.

/4/ Henan Quality and Technical Supervision Bureau: Metrology accreditation certificate on Luoyang Coal Inspection Technique Center.

/5/ Luoyang Coal Inspection Technique Center: NCV testing reports for biomass residues, dated 3 January 2012, 2 July 2012 and 3 January 2013.

/6/ Jiangxi Province Quality and Technical Bureau: Laboratory accreditation certificate for Jiangxi Gan Northeast Power Company Electric Measurement Center

/7/ 6 Jiangxi Gan Northeast Power Company Electric Measurement Center: Calibration reports of electricity meters

- Gate meter (SN: 94826500), issued on 24 December 2011 and 24 December 2012;
- Backup meter (SN: 94826502), issued on 24 December 2011 and 24 December 2012;
- 10KV Meter (SN: 807341), issued on 24 December 2011 and 24 December 2012;
- Power Meter 1 (SN: 0807105), issued on 24 December 2011 and 24 December 2012;
- Power Meter 2 (SN: 10073628), issued on 24 December 2011 and 24 December 2012.

/8/ 7 China National Accreditation Service for Conformity Assessment: Laboratory accreditation certificate on Hubei Institute of Metrology and Testing Technology.

/9/ Hubei Institute of Metrology and Testing Technology: Calibration reports of belt weighters

- Belt weighter (SN: 0811109), issued on 4 January 2011, 3 January 2012 and 2 January 2013;
- Belt weighter (SN: 0811112), issued on 4 January 2011, 3 January 2012 and 2 January 2013.

/10/ Hubei Institute of Metrology and Testing Technology: Calibration reports of balances and dry cabinets

- Balance 1# (SN: 0193), issued on 4 January 2011, 3 January 2012 and 2 January 2013;
- Dry cabinet 1# (SN: 2011133), issued on 4 January 2011, 3 January 2012 and 2 January 2013;

- Dry cabinet 2# (SN: 081211), issued on 4 January 2011, 3 January 2012 and 2 January 2013.

/11/ Hubei Institute of Metrology and Testing Technology: Calibration reports of volume flow meters

- Flow meter 1# (SN: 08020), issued on 3 January 2011, 3 January 2012 and 2 January 2013;
- Flow meter 2# (SN: 07115), issued on 3 January 2011, 3 January 2012 and 2 January 2013.
- Flow meter 3# (SN: L1019012), issued on 3 January 2012 and 31 October 2013.
- Flow meter 4# (SN: L1019030), issued on 3 January 2012 and 31 October 2013.

/12/ Poyang Kaidi Green Energy Development Co., Ltd: Training record related to CDM activity, dated 5 March 2012.

/13/ Sunshine Kaidi New Energy Group: CDM monitoring and operating manual, November 2010.

/14/ Poyang Kaidi Green Energy Development Co., Ltd and Northeast of Jiangxi Province Power Supply Company: Power purchase agreement, dated 2012 and 2013.

/15/ Poyang Kaidi Green Energy Development Co., Ltd: Daily operational and maintenance records for the period January 2012 to June 2013.

/16/ Poyang Kaidi Green Energy Development Co., Ltd: Monthly reports of biomass residues consumption, electricity exported and imported (from grid and 10kV backup line), electricity consumption on site, diesel consumption for the period January 2012 to June 2013.

/17/ Poyang Kaidi Green Energy Development Co., Ltd: Original data record of electricity imported (from grid and 10kV backup line) and exported for the period January 2012 to June 2013.

/18/ Poyang Kaidi Green Energy Development Co., Ltd: Daily and monthly report of quantity and moisture of biomass residues for the period January 2012 to June 2013.
Poyang Kaidi Green Energy Development Co., Ltd: Daily record and monthly report of biomass transportation for the period January 2012 to June 2013.

/19/ Poyang Kaidi Green Energy Development Co., Ltd: Daily and monthly report of diesel consumption for on-site consumption and boiler start-up for the period January 2012 to June 2013.

/20/ Poyang Kaidi Green Energy Development Co., Ltd and Northeast of Jiangxi Province Power Supply Company: Electricity transaction note about electricity export and import, from January 2012 to June 2013.

/21/ Poyang Kaidi Green Energy Development Co., Ltd: Electricity sale invoice (export), from January 2012 to June 2013;
Northeast of Jiangxi Province Power Supply Company: Electricity sale invoice (import), from January 2012 to June 2013.

/22/ Poyang Lutian gas station: Invoices for diesel, from January 2012 to June 2013.

/23/ Wuhan Kaidi Electric Power Engineering Co., Ltd and Jiangxi Jianglian Energy and Environmental Protection Co., Ltd: Purchase contract of boiler, dated September 2007.

/24/ Wuhan Kaidi Electric Power Engineering Co., Ltd and Nanjing Steam Turbine (Group) Co., Ltd: Purchase contract of turbine, September 2007.

/25/ Wuhan Kaidi Electric Power Engineering Co., Ltd and Nanjing Steam Turbine (Group) Co., Ltd: Purchase contract of generator.

/26/ Wuhan Kaidi Power Engineering Co., Ltd: Investigation report for the biomass supply and demand in Poyang County in 2012, dated January 2014.
Wuhan Kaidi Power Engineering Co., Ltd: Investigation report for the biomass supply and demand in Poyang County in 2013, dated January 2014.

/27/ Poyang Kaidi Green Energy Development Co., Ltd and Balama Equipment Agency: Nameplate and technical specification of crushers.

/28/ Camco International Limited: CDM-PDD for project activity Poyang Kaidi Biomass Power Project, version 05 dated 22 August 2012.

/29/ TUV Rheinland Group: Validation Report, version 03 of 25 October 2010.

/30/ DNV: 1st Verification Report, version 01 dated 8 November 2012.

/31/ Department of Industry and Transport Statistics of National Statistics Bureau and Energy Bureau of NDRC of China: China Energy Statistical Yearbook 2010, 2011 and 2012.

/32/ IPCC: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Energy).

/33/ IPCC: 2006 IPCC guidelines for national greenhouse gas inventories reference manual, 2006.

/34/ General Administration of Quality Supervision, Inspection and Quarantine of People's Republic of China: Verification Regulation for Electronic Balance, JJG1036-2008, 20 February 2008.

/35/ Quality and Technical Inspection Bureau of the People's Republic of China: Verification regulation of electrical energy meters with electronics, JJG596-1999, 21 October 1999.

/36/ General Administration of Qaulity Supervision, Inspection and Quarantine of the People's Republic of China: Continuous totalizing automatic weighing instruments, JJG195-2002, 4 November 2002.

/37/ General Administration of Qaulity Supervision, Inspection and Quarantine of the People's Republic of China: Calibration specification for the equipment of the environmental testing for temperature and humidity, JJF1101-2003, 12 May 2003.

/38/ General Administration of Qaulity Supervision, Inspection and Quarantine of the People's Republic of China: Electronic balance, JJG1036-2008, 20 February 2008.

/39/ General Administration of Qaulity Supervision, Inspection and Quarantine of the People's Republic of China: Turbine flowmeter, JJG1037-2008, 25 March 2008.

Methodologies, tools and other guidance by the CDM Executive Board

/40/ CDM Executive Board: CDM Validation and Verification Standard, version 07.0.

/41/ CDM Executive Board: CDM Project Standard, version 07.0.

/42/ CDM Executive Board: CDM Project Cycle Procedure, version 07.0.

/43/ CDM Executive Board: Consolidated methodology electricity generation from biomass residues, ACM0006, version 09.

/44/ CDM Executive Board: Consolidated baseline methodology for grid-connected

electricity generation from renewable sources, ACM0002, version 10.

/45/ CDM Executive Board: Standard for application of the global warming potential to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol, Annex 3 of EB69, 13 September 2012.

/46/ CDM Executive Board: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, version 2.

/47/ CDM Executive Board: Tool to calculate baseline, project and/or leakage emissions from electricity consumption, version 1.

/48/ CDM Executive Board: Guideline-Completing the monitoring report form, version 4.0.

Persons interviewed

/49/ Poyang Kaidi Green Energy Development Co., Ltd:
Li Xiaobing, Manager of power generation department
Huang Ming, Manager of biomass residue fuel department
Lv Zhiping, Vice manager of power generation department

/50/ Sunshine Kaidi New Energy Group:
He Li, CDM manager

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APPENDIX A

CDM VERIFICATION PROTOCOL

Table 1: Verification requirements

Checklist questions	Ref.	MoV*	Verification findings	Draft Concl.	Final Concl.
1. General checklist					
1.1 Is the MR template valid?	/48/	DR	Yes. The latest version of MR template has been applied.	OK	OK
1.2 Have all open issues identified in the validation report and/or previous verification report been resolved by the project participant?	/29/ /30/	DR	This monitoring period 1 January 2012 to 30 June 2013 is the second verification of the project. No remaining issues were identified in the validation report or previous verification.	OK	OK
2. Verification Compliance					
2.1 Has the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD?	/28/	DR /I	As part of the site visit, CTI confirms that the project implementation is in accordance with the project description contained in revised PDD (version 05 of 22 August 2012). The verification team confirmed through visual inspection and document review that all physical features of the proposed CDM project activity including data collection systems and storage systems have been implemented in accordance with the revised PDD.	OK	OK
2.2 Has any deviation or the proposed or actual changes in the implementation or operation of the project activity? Does the change comply with the requirements of the Project Standard?	/28/ /30/	DR /I	There were no post registration changes identified by CTI to this monitoring period. A post registration changes (including the changes of biomass types and the change of manufacturer of steam turbine and generator for the project) has been requested in the first verification and approved by the CDM-EB on 7 February	OK	OK

			2013, which was prior to the start of this verification and applicable to this verification.		
2.3 If the project activity is implemented on a number of different locations, has the Monitoring report provided the verifiable starting dates for each site?	/28/	DR /I	The project is a biomass cogeneration plant, located in Poyang Industry Park, Jiangxi Province of China. There was only one project site.	OK	OK
3. Monitoring methodology					
3.1 Is the monitoring plan established in accordance with the monitoring methodology?	/28/ /43/	DR /I	CTI is able to confirm that the monitoring plan in the PDD (version 05 dated 22 August 2012) is in accordance with the approved methodology applied by the project activity, i.e. ACM0006 (version 09).	OK	OK
3.2 In case the implemented monitoring plan defers from the monitoring methodology, has any requests for revision to or deviation from the monitoring methodology been officially communicated to the CDM EB?	/28/ /43/	DR /I	There were no post registration changes identified by CTI to this monitoring period.	OK	OK
3.2.1 Have the above changes to the monitoring plan been approved by the CDM EB?	/28/ /43/	DR /I	There were no post registration changes identified by CTI to this monitoring period.	OK	OK
4. Monitoring plan					
4.1 Is monitoring established in full compliance with the monitoring plan, contained in the registered PDD (or new monitoring plan approved by the CDM EB)?	/28/ /43/	DR /I	The monitoring has been carried out in accordance with the monitoring plan contained in the PDD (version 05 dated 22 August 2012). CTI confirms that all parameters stated in the monitoring plan are monitored and reported appropriately. All parameters required to be monitored by the monitoring plan as per the monitoring	OK	OK

			methodology ACM0006 (version 09), and the management system were assessed during the site visit.		
4.2 Are all emission parameters monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions?	/28/ /43/	DR /I	All parameters required to be monitored by the monitoring plan as per the monitoring methodology ACM0006 (version 09), and the management system were assessed during the site visit.	OK	OK
4.2.1 Was the monitoring equipment for emission parameters controlled and monitoring results recorded as per approved frequency?	/9/ /10/ /28/ /43/	DR /I	The meters installed at the project site have been calibrated periodically as per the relevant industrial standard by the qualified third party to ensure the monitoring equipments' accuracy and in good conditions.	OK	OK
4.2.2 Was the monitoring equipment for emission parameters calibrated in accordance with QA&QC procedures described in the registered monitoring plan?	/11/ /28/ /43/	DR /I	For flow meter 3# and 4#, they were calibrated on 3 January 2012 and 31 October 2013, respectively. Their calibration frequency is annual, which resulted in 2 days (1 to 2 January 2012) and 179 days (3 January to 30 June 2013) delay calibration within the monitoring period 1 January 2012 to 30 June 2013. The calibration frequency cannot fulfil the requirement as described in the monitoring plan. The clarification shall be taken for the gaps of the calibration validity for these meters.	~~CL 1~~	OK
4.2.3 If during verification of a certain monitoring period, the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), how to	/11/ /28/ /43/	DR /I	Refer to section 4.2.2	~~CL 1~~	OK

calculate emission reductions in a conservative approach?					
4.2.4 In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, how to calculate emission reductions in a conservative approach?	/11/ /28/ /43/	DR /I	Refer to section 4.2.2	~~CL 1~~	OK
4.2.5 In cases, it is not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of project participants, how to calculate emission reductions in a conservative approach?	/11/ /28/ /43/	DR /I	Refer to section 4.2.2	~~CL 1~~	OK
4.2.6 In cases where neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, how to identify the calibration frequency?	/11/ /28/ /43/	DR /I	Refer to section 4.2.2	~~CL 1~~	OK
4.3 Were all monitoring parameters available and verifiable through the whole monitoring period?	/11/ /28/ /43/	DR /I	Refer to section 4.2.2	~~CL 1~~	OK
4.4 Was management and operation system established and operated in accordance with the monitoring plan?	/12/ /13/ /49/	DR /I	All necessary documentations are collected, referenced and aggregated, which is easily accessible in hard-copy or electronic format. Measurements are performed by calibrated equipment, and the key data can also be cross-checked via other sources, such as records, receipts and inventory data. No assumptions are used that have any material influence on	OK	OK

			reported emission reductions. CTI concludes that during this monitoring period, the evidences for determination of emission reductions are sufficient and reasonable, and the calculation of emission reductions is reliable.		
4.5 Was is it possible to verify that involved management and operation personal is fully aware of the responsibilities and perform all operations according to the registered monitoring plan and internally developed manuals?	/12/ /13/ /49/	DR /I	Poyang Kaidi Green Energy Development Co., Ltd is responsible for operation and routine maintenance of power plant under the CDM activity. The quality assurance and quality control procedures have been addressed in the CDM project management and monitoring manual, including the organization structure with the responsibilities, personnel competencies, monitoring procedures and monitoring management. By interview with the staff and check records during on-site visit, it can be confirmed that the monitoring management system is implemented following the CDM project management and monitoring manual.	OK	OK
5. Parameters					
5.1 **Monitored parameter** Title: $EG_{project\ plant,y}$ Indication: Net quantity of increased electricity generated in the project plant	/2/ /16/ /17/ /21/ /28/	DR /I	The net electricity generation supplied to the grid is determined by the electricity supplied to the grid minus the electricity imported from the grid and minus the electricity imported from the 10 kV backup line. The amount of net electricity generated is determined by monitoring meter on the hourly and daily basis when the power plant is operating, and these daily readings are aggregated into monthly	OK	OK

			reports. CTI has verified these values to be consistent with the information used in the ER spreadsheet.		
Monitored parameter Title: $EC_{PJ,y}$ Indication: 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	/2/ /16/ /17/	DR /I	CTI was able to confirm that using the largest number as a conservative electricity factor for the calculation	OK	OK
Monitored parameter Title: $BF_{k,y}$ Indication: Quantity of each biomass residue type k combusted in the project plan	/2/ /16/ /18/	DR /I	The amount is reported on daily log sheets and aggregated into monthly reports. The verification team has assessed all daily log sheets and the monthly reports and found them to be correct. The project has reported these data based on the records of belt balances at the entrance of the boilers, and the types of biomass residues are recorded at the same time. The measured values were adjusted to the quantity of dry biomass by the moisture content in order to determine the emission reduction calculations. The value is cross checked with an annual energy balance, which was based on purchased quantities and stock changes. The conclusion from the energy balance reflected to the reasonable energy input and output.	OK	OK
Monitored parameter Title: - Indication: Moisture content of the biomass	/2/ /16/ /18/	DR /I	Moisture for all types of biomass residues is sampled and analyzed daily by the balance and dry cabinet in the laboratory of the plant, and mean value was	OK	OK

residues			calculated monthly for the calculation of emission reductions, which meets requirement of the PDD as "at least annually". The value is reported on daily log sheets and aggregated into monthly reports.		
Monitored parameter Title: $FF_{project\ plant,y}$ Indication: Quantity of fossil fuel (diesel) combusted in the project plant	/16/ /19/ /22/	DR /I	The diesel was used for start-up of boiler, which is monitored continuously by the volume flow meter and recorded monthly. The value is reported on daily log sheets and aggregated into monthly reports. The consumption of diesel was monitored in volume and converted to the mass using the standard density of diesel (0.85 kg/liter) as per the PDD to calculate the project emissions from the diesel consumption. The quantity of diesel was cross-checked by the purchase receipt provided by the accounting department and the amount of stored fuel on site in the beginning and end of the monitoring period.	OK	OK
Monitored parameter Title: $FF_{project\ site,y}$ Indication: Quantity of fossil fuel combusted in the project site (including the collection sites) for other purposes that are attributable to the project activity	/19/ /22/	DR /I	The consumption of diesel (including consumption as auxiliary fuel for boiler start up and consumption for forklifts at collection sites and project site) was monitored by using diesel purchase and consumption log book. The quantity is cross checked with diesel purchase receipt and stock change.	OK	OK
Monitored parameter Title: NCV_k	/1/ /2/	DR /I	The project participant committed the reputed laboratory Luoyang Coal Inspection Technique Center Luoyang City	~~CAR 1~~	OK

Indication: Net calorific value of each biomass residue of type k	/5/		Coal Quality Test Centre to analyze the net calorific value of biomass residues, and the measurement took three samples and bases on dry biomass residues every six months. The following are the reported NCVs of each biomass residue, and verified by CTI against the testing reports. The unit of NCV_K shall be corrected to GJ/ton in D.2 of the MR.		
Monitored parameter Title: AVD_y Indication: Average round trip distance (from and to) between the biomass fuel supply sites and the project plant (AVD_y)	/2/ /15/ /16/	DR /I	This amount is reported on daily log sheets and aggregated into monthly reports. All the biomass residues are from the biomass residue collection stations. The verification team has assessed all daily log sheets and monthly reports and found the monthly total distance in the ER spreadsheet to be correct. During the site visit, CTI double checked the transportation distance with the local map for the biomass collection stations, and confirmed that the round trip distance recorded in the daily log sheets reflected to the practice.	OK	OK
Monitored parameter Title: N_y Indication: Numbers of truck trips for the transportation of biomass	/2/ /15/ /16/	DR /I	The numbers of trucks into the plant are recorded on daily log sheets and aggregated into monthly reports. The verification team has assessed all daily log sheets and monthly reports and found the monthly number for transportation in the ER spreadsheet to be correct.	OK	OK
Monitored parameter Title: $EF_{km,CO2}$ Indication: Average CO_2 emission factor for	/32/ /33/	DR /I	The IPCC default value of 0.001097 tCO_2/km from revised IPCC 1996 was applied for the average CO_2 emission factor of the diesel trucks in the PDD. CTI	OK	OK

transportation of biomass with trucks			has checked the updated 2006 IPCC and was able to confirm no change for this value.		
Monitored parameter Title: NCV_i Indication: Net calorific value of the fossil fuel	/31/	DR /I	According to the monitoring plan in the PDD, the NCV of the diesel from China Energy Statistical Yearbook 2007 was applied in the emission reduction calculations. CTI checked the updated China Energy Statistical Yearbook 2010 and 2011 and was able to confirm no change for this value. Hence, the reported value 0.042652 TJ/tonne used in the emission reduction calculation is reasonable.	OK	OK
Monitored parameter Title: $EF_{CO2,y}$ Indication: CO_2 emission factor for fossil fuel	/33/	DR /I	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval 74,800 kgCO_2e/TJ was applied for the CO_2 emission factor of the diesel in the calculation of project emissions for fossil fuel consumption.	OK	OK
Monitored parameter Title: - Indication: The quantity of biomass residues of type k that are utilized in the defined geographical region	/26/	DR /I	The data is provided from the investigation report of local biomass resource by the accredited third party. The investigation of the biomass residues utilized shows that the quantity of available residues of the biomass types are all more than 25% larger than the quantity of total biomass utilised.	OK	OK
Monitored parameter Title: - Indication: The quantity of biomass residues of type k in the defined geographical region	/26/	DR /I	CTI verified the data provided regarding the total production, availability and utilization of the biomass residues in the region from the investigation report for the biomass supply and demand in Poyang	OK	OK

			County where the project located. The investigation of the biomass residues utilized shows that the quantity of available residues of the biomass types are all more than 25% larger than the quantity of total biomass utilised.		
5.2 **Ex-ante parameter** Title: GWP Indication: Global warming potential for methane	/33/ /45/	DR	The proposed monitoring period starts before 31 December 2012 and ends on 30 June 2013, hence covers the 1st commitment period and 2nd commitment period. The project activity is newly-built biomass cogeneration project. According to the PDD, the greenhouse gas CO_2 and CH_4 were included within the project boundary, and also considered in the emission reduction calculation. Hence, in this monitoring period the IPCC default value of 21 tCO_2/tCH_4 and 25 tCO_2/tCH_4 is applied for the first commitment period (1 January 2012 to 31 December 2012) and the second commitment period (1 January 2013 to 30 June 2013), respectively.	OK	OK
Ex-ante parameter Title: $TDL_{j,y}$ Indication: Average technical transmission and distribution losses for providing electricity to source j	/43/ /47/	DR	The default value of 20% is applied according to "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".	OK	OK
Ex-ante parameter Title: EF_y Indication: Baseline emission factor of CCPG	/28/	DR	In the PDD, the ex-ante determined emission factor 0.9735 tCO_2/MWh for the CCPG is applied during the first crediting period (including this monitoring period).	OK	OK

	Ex-ante parameter Title: $EF_{CH4,BF}$ Indication: Methane emission factor for controlled burning of the biomass residue in the project plant	/33/	DR	In the PDD, the IPCC default value of 30 $kgCH_4/TJ$ is estimated ex-ante and applied during this crediting period. When the default CH_4 emission factor of 30 kg/TJ is used, the uncertainty is estimated to be 300%, resulting in a conservativeness factor of 1.37. Thus, in this case a CH_4 emission factor of 41.1 kg/TJ is used.	OK	OK
	Ex-ante parameter Title: NCV_k*$EF_{burning,CH4,k,y}$ Indication: Methane emission factor for uncontrolled burning of the biomass residue	/43/	DR	According to the methodology ACM0006 (version 09), 0.0027 tCH_4/tone is recommended as the default value for the product of NCV_k and $EF_{burning,CH4,k,y}$ when more accurate information is absent. When 0.0027 tCH_4/tonne is used, the uncertainty is deemed greater than 100%, resulting in a conservativeness factor of 0.73. Hence, an emission factor of 0.001971 tCH_4/tonne is used for the emission reduction calculation.	OK	OK
6.	**Calculations**					
6.1	Have all the calculations related to the baseline emissions been carried according to the formulae and methods described in the registered PDD and applied methodology?	/1/ /2/ /28/ /43/	DR /I	The baseline emissions include emission reductions ($ER_{electricity,y}$) due to displacement of electricity and emission reductions ($BR_{biomass,y}$) due to natural decay of anthropogenic sources of biomass residue. The project will not claim GHG emission reductions from displacing heat. CTI confirmed the calculations of the baseline emissions have been carried according to the formulae and methods described in the PDD and applied methodology, appropriate methods and formulae for calculating baseline	OK	OK

			emissions have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.		
6.2 Have all the calculations related to the project emissions been carried according to the formulae and methods described in the registered PDD and applied methodology?	/1/ /2/ /28/ /43/	DR	The project emissions include emissions from transportation of biomass residues to the project site (PET_y), emissions from on-site consumption of fossil fuel by the project ($PEFF_y$), emissions from consumption of electricity ($PE_{EC,y}$), and methane emissions from combustion of biomass residues ($PE_{biomass,CH4,y}$). CTI confirmed the calculations of the baseline emissions have been carried according to the formulae and methods described in the PDD and applied methodology, appropriate methods and formulae for calculating baseline emissions have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.	OK	OK
6.3 Have all the calculations related to the leakage emissions been carried according to the formulae and methods described in the registered PDD and applied methodology?	/1/ /2/ /26/	DR	CTI confirms that the quantity of available biomass residue in the region is at least 25% larger than the quantity of biomass that is utilized, including the project plant. Hence, the leakage for the project activity is considered as zero.	OK	OK

Table 2 Resolution of corrective action requests and clarification requests

CAR/CL requests by verification team	Responses from project participant	Verification team conclusion
CAR 1: The following typo errors in the MR shall be corrected: The unit of NCV_K shall be corrected to GJ/ton in D.2 of the MR.	The unit of NCV_K is corrected to GJ/ton in D.2 of the revised MR.	OK. The relevant corrections have been made in the updated MR and verified by CTI. CAR 1 is closed.
CL 1: For flow meter 3# and 4#, they were calibrated on 3 January 2012 and 31 October 2013, respectively. Their calibration frequency is annually, which resulted in 181 days (1 to 2 January 2012 and 3 January to 30 June 2013) delay calibration within the monitoring period 1 January 2012 to 30 June 2013. The calibration frequency cannot fulfil the requirement as described in the monitoring plan. The clarification shall be taken for the gaps of the calibration validity for these meters.	The calibration of Flow meter 3# and Flow meter 4# was delayed from 1 January 2012 to 2 January 2012 and 3 January 2013 to 30 June 2013. The monitoring data of the meter during this period will be calculated conservatively. The accuracy of Flow meter 3# and Flow meter 4# is 1.0%, so the maximum permissible error is ±1.0%. According to "CDM validation and verification standard", and for the sake of conservative, the value of $FF_{project\ plant,i,y}$ during the whole month (from 01 January 2012 to 31 January 2012 and January 2013 to June 2013) will be multiplied by 101.0% to calculate the project emission.	OK. The flower meter 3# and 4# were calibrated on 3 January 2012 and 31 October 2013, respectively. It resulted in 181 days (1-2 January 2012 and 3 January to 30 June 2013) delay calibration for flow meter 3# and 4# within the monitoring period 1 January 2012 to 30 June 2013. Since there are calibrations unavailable to cover the whole monitoring period, the calibration frequency requirements for measuring instruments stipulated in the "CDM Validation and Verification Standard" has been used to assess the time gap of calibrations, i.e. applying the maximum permissible error (1%) of the instruments to increase the measured values taken for the project emissions from consumption of fossil fuel (diesel) in January 2012 and from January 2013 to June 2013, which is conservative and reasonable by CTI. CL 1 is closed.

Table 3 Forward action requests from this verification

Forward action request by verification team	Summary of project participant response	Verification team conclusion

Forward action request by verification team	Summary of project participant response	Verification team conclusion
NA	NA	NA

Table 4 Forward action requests from previous verification

Forward action request by verification team	Summary of project participant response	Verification team conclusion
NA	NA	NA

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APPENDIX B

CERTIFICATE OF COMPETENCE

CERTIFICATE OF APPOINTMENT

Mr. Zhang Lei
Born on 03/12/1981

Satisfies the requirements of the Certification Body of CTI and is hereby appointed as:

Qualification as						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	05/05/2013	05/05/2013	05/05/2013	05/05/2013	05/05/2013	05/05/2013

Qualification in the scope and technical area		
Scope	Technical area	Date
SS 1: Energy industries (renewable/nonrenewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	01/03/2014
	TA 1.2: Energy generation from renewable energy sources	05/05/2013
SS 4: Manufacturing industries	TA 4.1: Cement TA 4.3: Iron and steel TA 4.4: Refinery	05/05/2013
SS 13: Waste handling and disposal	TA 13.1: Waste handling and disposal	05/05/2013
	TA 13.2: Animal waste management	05/05/2013

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:
Lin Wu
Technical competent manager
Shenzhen, 01/03/2014

CERTIFICATE OF APPOINTMENT

Ms. Lin Shunrong
Born on 19/11/1977

Satisfies the requirements of the Certification Body of CTI and is hereby appointed as:

Qualification as						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	01/03/2013	01/03/2013	01/03/2013	01/07/2013	01/12/2013	01/03/2013

Qualification in the scope and technical area		
Scope	Technical area	Date
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources	01/03/2013

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:
Lin Wu
Technical competent manager
Shenzhen, 01/12/2013

CERTIFICATE OF APPOINTMENT

Mr. Wang Dajiang
Born on 30/08/1971

Satisfies the requirements of the Certification Body of CTI and is hereby appointed as:

Qualification as						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	-	-	-	-	-	01/08/2012

Qualification in the scope and technical area		
Scope	Technical area	Date
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	01/08/2012

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:
Rowena JIAO
Technical competent manager
Shenzhen, 01/08/2012

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