



VERIFICATION REPORT

Camco Carbon Limited

Hunan Yueyang Kaidi Biomass Power Project

UNFCCC Ref. No: 3065

1st Monitoring Period: 01/01/2011-31/12/2011

Report No. 12012279

China Environmental United Certification Center Co., Ltd (CEC)

No.1 Yuhuinanlu, Chaoyang District, Beijing, China, 100029

www.mepcec.com



Date of First Issue	Project No.			
29/11/2012	12012279			
Approved by	Organizational Unit			
SONG Tiedong	China Environmental United Certification Center Co., Ltd.			
Client				
Camco Carbon Limited				
<p>Summary:</p> <p>China Environmental United Certification Center Co., Ltd. (CEC) has performed the 1st verification of the project: Hunan Yueyang Kaidi Biomass Power Project with regard to the relevant requirements for CDM project activities. The UNFCCC reference No. of the project is 3065. The project reduces GHG emissions due to the generation of electricity by using of available biomass potential. This verification covers the period of 01/01/2011-31/12/2011.</p> <p>The verification scope includes three phases: 1) desk review of the project design and the baseline and monitoring plan; 2) on-site visit and follow-up interviews with project stakeholders; 3) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from contract review to verification report and opinion, was conducted using CEC internal procedures. The first output of the verification process is a list of Corrective Action Requests and Clarification Requests. All CARs and CLs were successfully closed. The conclusions are presented in Section 3 and Appendix A.</p> <p>During the verification, some difference between project operation and the registered PDD (version 04) was found. Then the Project Participants revised the PDD. CEC validated the post registration changes of the registered PDD in accordance with the VVS, and submitted the validation report together with this verification report.</p> <p>Through document review and on-site visit, CEC is able to confirm that: The construction of the project is in accordance with the revised registered PDD; The monitoring plan complies with the monitoring methodologies; The actual monitoring complies with the monitoring plan; Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately; The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and relates to the valid and registered project baseline and monitoring, and its associated documents.</p> <p>Based on the information we have seen and evaluated, we confirm the following statement:</p> <p>Baseline emissions: 149,990.70 tCO₂eq</p> <p>Project emissions: 6,137.93 tCO₂eq</p> <p>Leakage: 0 tCO₂eq</p> <p>Emission reductions: 143,852 tCO₂eq (143,852 tCO₂eq up to 31 Dec 2012, 0 tCO₂eq from 1 January 2013 onwards)</p>				
Report No.	Date of this Revision	Rev. No.	Number of Page	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit <input type="checkbox"/> Limited
12012279	05/08/2013	02	60	
Report Title:				
Hunan Yueyang Kaidi Biomass Power Project				
Work Carried out by:				



QIN Boya, XU Linghua, LIU Yaotian, SONG Quanbo	distribution
Work Reviewed by:	<input type="checkbox"/> Unrestricted
YIN Yun, CUI Xiaodong	distribution



Abbreviations

Explain any abbreviations that have been used in the report here

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEC	China Environmental United Certification Co., Ltd.
CER	Certified Emission Reductions
CL	Clarification Request
CO ₂	Carbon Dioxide
CO _{2eq}	Carbon Dioxide equivalent
CCPG	Central China Power Grid
DOE	Designated Operational Entity
ETN	Electricity Transaction Note
FAR	Forward Action Request
GHG	Green House Gas (es)
MP	Monitoring Plan
MR	Monitoring Report
MRR	Monthly Reading Records
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PPA	Power Purchase Agreement
PS	Project Standard
QA/QC	Quality Assurance/Quality Control
VVS	Validation and Verification Standard
UNFCCC	United Nations Framework Convention on Climate Change



Table of Contents

1 INTRODUCTION.....	6
1.1 Objective	6
1.2 Scope.....	6
1.3 GHG Project Description	7
2 METHODOLOGY	9
2.1 Verification Personnel	9
2.2 Documents Review.....	10
2.3 On-site Assessment and Follow-up Interviews	11
2.4 Reporting of Findings	12
2.5 Internal Quality Control	12
3 VERIFICATION FINDINGS.....	14
3.1 FARs from Validation / Previous Verification	14
3.2 Compliance of Project Implementation with the Registered PDD	14
3.2.1 Post Registration Changes	14
3.2.2 Project Implementation	14
3.3 Compliance of monitoring plan with monitoring methodology including applicable tool (s)	21
3.4 Compliance of monitoring activities with the registered monitoring plan	22
3.5 Compliance with the calibration frequency requirements for measuring instruments	30
3.6 Implementation of sampling plan	30
3.7 Assessment of data and calculation of GHG emission reductions	30
3.8 Overview of results	32
4 VERIFICATION AND CERTIFICATION STATEMENT	34
5 REFERENCES.....	35
Appendix A: Verification Protocol	39
Appendix B: Certificate of Competence	59



1 INTRODUCTION

Camco Carbon Limited has commissioned CEC to verify the emission reductions of the registered CDM project: Hunan Yueyang Kaidi Biomass Power Project (hereafter referred to as the Project).

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. The GHG data for the monitoring period covering from 01/01/2011-31/12/2011 was verified in detailed manner applying the set of requirements, standard audit practices and principles as required under the CDM Validation and Verification Standard (VVS) of the UNFCCC.

1.1 Objective

The objective of the verification is the review and ex post determination by an independent entity of the GHG emission reductions. In carrying out the verification work, the DOE shall ensure that the project activity complies with the requirements of paragraph 62 of the CDM M&P, which includes:

- Determine whether the project activity has been implemented and operated as per the registered PDD or any approved revised PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Determine whether the monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for issuance of CERs, verifiable, and in accordance with applicable of CDM requirements;
- Determine whether actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan or any revised approved monitoring plan, and the approved methodology including applicable tool(s);
- Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

1.2 Scope

The verification is based on the submitted monitoring documentation, the registered PDD and the monitoring plan, the validation report, previous verification reports (if any), the applied monitoring methodology, the monitoring report to verify that it is as per the standard format, any other information and references relevant to the project activity's emission reductions (e.g. IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations). In addition to reviewing the monitoring documentation, the verification also determines whether the FARs identified during validation or previous verification(s) are addressed.



These documents are reviewed against the requirements of the Kyoto Protocol, the CDM Project Standard and related rules and guidance.

CEC has performed the verification based on the requirements in the CDM VVS (version 04.0). The principles of independence, ethical conduct, fair presentation and due professional care were combined with a conservative approach to establish a traceable and transparent verification opinion.

Only the verification activities undertaken after the publication of the monitoring report on the UNFCCC CDM website are used as a basis to conclude the verification and submit a request for issuance of CERs to the Board.

The verification considers both quantitative and qualitative information on emission reductions.

The verification is not meant to provide any consultancy towards the client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

1.3 GHG Project Description

Title of Project Activity	Hunan Yueyang Kaidi Biomass Power Project
UNFCCC Registration Number	3065
Registration date of the project activity	31/12/2010
Crediting Period	01/01/2011–31/12/2017 (renewable)
Monitoring Period Covered in this Report	01/01/2011-31/12/2011
Project Participants	China: Yueyang Kaidi Green Energy Development Co., Ltd; United Kingdom of Great Britain and Northern Ireland: Camco International Limited; Camco Carbon Limited; Switzerland: Camco International Limited;
Location of the Project Activity	Quyuan Management District, Yueyang City, Hunan Province, P.R. China The coordinates are: 112°54'30" east longitude and 28°51'18" north latitude.

The Hunan Yueyang Kaidi Biomass Power Project is a biomass utilization project developed by Yueyang Kaidi Green Energy Development Co., Ltd. (hereafter is referred to as the Project Owner). The project is designed to produce 253,440MWh of electricity per year from burning biomass residues, displacing electricity generated by Central China Power Grid (CCPG), which is dominated by fossil fuel-fired power plants, and thus reducing greenhouse gas (CO₂) emissions. The proposed project will not claim GHG emission reductions from displacing heat that would otherwise be produced from local area.

The proposed project will process about 486,000 tonnes (wet weight) of biomass residue annually, of which Rice husk, Rice straw, Maize straw, Wood chips, Branches and Barks are the main biomass fuel. 4 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 4 sets of



12MW steam turbines generator units will be installed. The total designed capacity of the Project is 48MW.

The construction of the project is separated in two phases, each of them is 24MW. 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam turbines generator units are already installed in the first phase. The second phase of the project hasn't been put into construction yet, which is planned to be constructed in 2014. Now with the installed capacity of 24MW, the project is estimated to achieve 121,840 tonnes of CO₂e emissions reduction annually during the first commitment period (2011-2012).

The project construction began in February 2008, and was put into operation since 28/09/2009. The project has been registered as a CDM project on 31/12/2010. The first crediting period is 01/01/2011-31/12/2017.

During the first monitoring period (01/01/2011-31/12/2011), the total net electricity supplied by the project amounted to 144,603.89 MWh, and the total emission reduction during this monitoring period is 143,852 tCO₂eq. The actual emission reduction achieved is 143,852 tCO₂eq up to 31 Dec 2012 and 0 tCO₂eq from 1 January 2013 onwards.

During the verification, some difference between project operation and the registered PDD (version 04) was found. Then the Project Participants revised the PDD, and CEC validated the post registration changes of the registered PDD in accordance with the VVS, and submitted the validation report together with this verification report.

Through document review and on-site visit, the validation team is able to confirm that the construction of the project is in accordance with the revised registered PDD (version 05).



2 METHODOLOGY

The overall verification process, from contract review to verification report and opinion, was conducted using CEC internal procedures.

In order to ensure transparency, a verification protocol was customized for the project, according to the version 04.0 of the CDM VVS, issued by the Executive Board at 70th meeting on 23/11/2012. The protocol shows, in a transparent manner, criteria, requirements, means of verification and the results from verifying the identified criteria. The completed verification protocol is enclosed in Appendix A to this report.

Standard auditing techniques have been adopted to assess the quality of information where no specific means of verification is specified. The verification team performs firstly a desk review, followed by an on-site assessment which results in a protocol including all the findings. The next step is to close out the findings through direct communication with the PPs and finally prepare the verification report. This verification report and other supporting documents then undergo an internal quality control by the relevant technical review department of CEC before submission to the CDM-EB.

2.1 Verification Personnel

According to the designation requirements on the verification team in the CDM accreditation standards of Executive Board, and following requirements from the technical scopes and professional characters in the sectoral scopes, CEC designated a project assessment team.

It is required that the assessment team collectively has the required competencies in the technical, methodological and sectoral aspects of specific CDM project activities.

The assessment team consists of the following members, the detailed personal information see Appendix B.

Table 1: List of verification team

Verification team	Role	Qualification	Specific scope	Participated in the on-site visit
QIN Boya	Team Leader	Auditor	√	√
XU Linghua	Team Member	Auditor	--	√
LIU Yaotian	Team Member	Auditor	--	√
SONG Quanbo	Team Member	Auditor	--	√

Table 2: List of technical reviewer

Technical reviewer	Role	Specific scope	Participated in the on-site visit
--------------------	------	----------------	-----------------------------------



YIN Yun	Technical reviewer	✓	---
CUI Xiaodong	Technical reviewer	---	---

Qin Boya is a lead Greenhouse Gas(GHG) assessor. She has attended various internal and external training courses on EMS, CDM related knowledge and low carbon development training since 2008. She has participated in and finished over 20 validation/verification CDM/VCS/GS project activities and programme of activities(PoAs) both in China and abroad in the areas of hydropower, wind power, biomass power generation as well as CFL distribution PoAs. Most of the projects are in sectoral scope 1 (energy industries), which gives her abundant experience in renewable energy sector. Besides CDM auditing, Ms.QIN has participated in the assessment of hydroelectric projects against the criteria set by the World Commission on Dams.

Xu Linghua is a lead Greenhouse Gas(GHG) assessor. Ms. Xu worked on environmental monitoring, waste water treatment, and quality control of the adhesive product for over 20 years. She is an experienced senior EMS auditor with over 10 years' accreditation organization working experience, who has completed various CEC CDM training courses and technology trainings. Ms. XU has participated in over 30 validation/verification CDM projects in the areas of hydropower, wind power and biomass power generation. Most of the projects are in sectoral scope 1 (energy industries), which gives her abundant experience in renewable energy sector.

Liu Yaotian is a lead Greenhouse Gas(GHG) assessor. She has attended extensive internal and external training courses on EMS, CDM and CDM related knowledge since 2006. She has participated in and finished over 20 validation/verification CDM/VCS projects in the areas of hydropower and wind power. Most of the projects are in sectoral scope 1 (energy industries), which gives her abundant experience in renewable energy sector.

Song Quanbo is a lead Greenhouse Gas(GHG) assessor. He worked in environmental protection research and EMS auditing area as a senior EMS auditor for over 10 years. He has involved in CDM work from 2009 and completed various CEC CDM training courses. Mr. Song has participated in several validation/verification CDM projects which are mainly in sectoral scope 1 (energy industries).

Yin Yun is a lead Greenhouse Gas(GHG) assessor. She worked in Metallurgical Industry for 17 years as technician and electric engineer, and later in technical management position for over 10 years. Since 2007, Ms. Yin has been involved in various CEC CDM training courses, and she is also a qualified senior EMS auditor, and has participated in over 30 validation/verification CDM projects in the areas of hydropower, wind power, waste heat recovery and biomass power generation, she has extensive experience in renewable energy sector in sectoral scope 1 (energy industries).

Cui Xiaodong is a lead Greenhouse Gas(GHG) assessor. He has attended various internal and external training courses on EMS, energy audit, CDM related knowledge and GHG accounting related courses since 2009. He has participated in and finished over 30 validation/verification CDM/VCS projects both in China and abroad in the areas of hydropower, wind power and biomass power generation.

2.2 Document Review

The Monitoring Report (MR) version 01 dated 18/07/2012 was submitted by the PP which was made publicly available on 20/07/2012 on the UNFCCC website before the verification activities started. The published MR was assessed based on all the relevant documents as listed earlier. The aim of the assessment in the desk review was to verify the completeness of the data and the information presented in the MR. The compliance check of the MR with respect to the monitoring plan described in the registered PDD and the applied methodology,



including applicable tools, was carried out. Particular attention was paid to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures. The 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 was also carried out. A complete list of all documents reviewed is available in Section 5 of this report.

During the verification, some difference between project operation and the registered PDD (version 04) was found. Then the Project Participants revised the PDD, and CEC validated the post registration changes of the registered PDD in accordance with the VVS, and submitted the validation report together with this verification report.

2.3 On-site Assessment and Follow-up Interviews

On 23/08/2012, CEC performed physical site inspection and on-site interviews with project stakeholders to:

- Confirm the implementation and operation of the registered project activity as per the registered PDD;
- Review the information flows for generating, aggregating and reporting the monitoring parameters;
- Determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;
- Cross-check between the information provided in the MR documentation and data from other sources such as plant logbooks, purchase records or similar data sources;
- Check the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s);
- Review the calculations and assumptions made in determining the GHG data and emission reductions;
- Identify if the quality control and quality assurance procedures are in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

Representatives of the PP and the consultant were interviewed. The main topics of the interviews are summarized in Table 3.

Table 3: Interview topics

Interviewed organization	Topics
Yueyang Kaidi Green Energy Development Co., Ltd; Camco Carbon Limited (Project participants)	<ul style="list-style-type: none"> • Project design and implementation • Monitoring Plan • Monitoring data and Monitoring Report • GHG Calculations



	<ul style="list-style-type: none"> • Project design and implementation • Technical equipment, including calibration and operation • Monitoring Plan and management procedures • Monitoring data • Data uncertainty and residual risks (QA/QC)
--	--

2.4 Reporting of Findings

According to the requirements of VVS, as an outcome of the verification process, the verification team can raise different types of findings. Findings established during the initial verification could either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are raised where:

- Non-compliance 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;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

Clarification Requests (CLs) are raised, where:

- Information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

Forward Action Requests (FARs) are raised, where:

- The monitoring and reporting require attention and/or adjustment for the next verification period.

To guarantee the transparency of the verification process, the issues raised are documented in more detail in the verification protocol in Appendix A.

2.5 Internal Quality Control

This final verification report including the initial findings underwent a technical review before being submitted to PP and requesting issuance of CERs of the project activity according to CEC internal procedure. The technical reviewers were not part of the verification team, and the technical review was independently of the verification team. The complete QA/QC procedure



applied to this verification report was as follows:

The initial draft verification report (DVR) after on-site visit was issued by CEC on 29/11/2012. After all CARs and CLs were closed, a draft final verification report (draft FVR) was issued. Then it was sent to technical review performed by two (2) technical reviewers according to CEC internal procedure. After reviewing and confirming by TRers, the draft FVR was finalized and then sent for completeness check carried out by Quality Assurance Management Division (QAD). After confirmed by QAD, the report was finally approved by the Chair of Board.

After confirmation of the PP, the verification report and certification report and relevant documents are submitted to the EB through the UNFCCC web-platform.



3 VERIFICATION FINDINGS

In the following sections, the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

The findings from the desk review of the original project activity documents and the findings from interviews during the follow up visit are summarized. The verification of the project resulted in **7 Corrective Action Requests, 5 Clarification Requests and 0 Forward Action Request**. PP responses to them and all are closed. A more detailed record of these findings can be found in the Verification Protocol in Appendix A.

The conclusions for verification subject are presented.

3.1 FARs from Validation / Previous Verification

The validation report, prepared by TUV Rheinland Group, version 03, dated 02/06/2010, notes neither open issues nor FARs.

3.2 Compliance of Project Implementation with the Registered PDD

3.2.1 Post Registration Changes

During this verification, some difference in project implementation was found with the registered PDD (version 04). Then the Project Participants updated the PDD (version 05). CEC validated revised PDD especially the post registration changes in accordance with the VVS, and submitted the validation report together with this verification report. The major changes are:

1. The types of biomass residues used in this monitoring period is changed from “rice husk, rice straw, oil seed rape straw, cotton straw, maize straw and wheat straw” as described in the registered PDD to be the actual types of used biomass: rice husk, rice straw, maize straw, wood chips, branches and barks;
2. The average loading capacity of the trucks used to transport the biomass is changed from the estimated value of 3t in the registered PDD to the actual value of 10.7t.

Also, the name of manufacturer (NanJing Steam Turbine (Group) Co., Ltd) for generator in Table A-2 of registered PDD was mistyped as ‘ Nanjing Steam Turbine(Group) Co.,’, and it has been corrected in the updated PDD.

The PDD was also revised in section A.4 to reflect that Camco International Limited was authorized by Switzerland to participate in this project. The request to also add Switzerland as Party involved in the project has been accepted by the UNFCCC on 05/05/2011.

3.2.2 Project Implementation

1) Implementation status



Through on-site visit and document review, the verification is able to confirm that all physical features of the proposed CDM project activity in the registered PDD are in place and that the project participants has installed the proposed CDM project activity as per the revised PDD (v05).

The project exports electricity to Central China Power Grid (CCPG). The records, such as plant operation record, monitoring readings, monitoring equipment calibration certificates and invoices, were checked by the verification team.

During this monitoring period, there are no changes of equipment, and no events occurred which may impact the applicability of the methodology.

2) Actual operation of the project activity

As planed in the revised PDD, the proposed project will process about 485,800 tonnes (wet) of biomass residue annually, of which Rice husk, Rice straw, Maize straw, Wood chips, Branches and Barks are the main biomass fuel. All together 4 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 4 sets of 12MW steam turbines generator units will be installed, which is equally divided into two phases. The total installed capacity of the Project is 48MW, with 24MW in each phase. The annual equivalent operation hours at full load is estimated to be 6000 hours with a net electricity generation of 253,440MWh and a net heat generation of 1,083,204GJ per year for the 48MW as a whole.

Through on-site visit and document review, the verification is able to confirm that all physical features of the proposed CDM project activity proposed in the registered PDD are in place and that the project participants has operated the proposed CDM project activity as per the revised PDD (v05). There are no major changes of key equipments.

All two sets of boilers and steam turbine generators of the first phase were installed as described in the registered PDD with the total installed capacity of 24MW.

The expected operational lifetime of the Project is 20 years. The information is checked by related evidences, which is consistent with the registered PDD.

The project began to construct in February 2008, and was put into operation since 28/09/2009, before being registered as a CDM project on 31/12/2010.

CAR03 was raised: The types of biomass residues used in this monitoring period are inconsistent with the registered PDD. This post registration change needs to seek the EB's acceptance. The PDD is revised to include the actual used biomass residues types, by onsite visit and document review, it is confirmed to be consistent with the actual situation.

The PP analyzed the change of biomass residue types by means of revised IRR calculation to demonstrate that the project additionality is not affected. The biomass residue availability analysis is also performed to demonstrate that the applied methodology is still applicable.

The verification team checked the analysis process and result, and confirmed that the applicability of methodology is not affected. CAR03 was closed.

<Power System>

The power transmission situation is also as per the registered PDD and monitoring plan. The electricity generated is transmitted through two 110kV outlet circuit, connected with Quyuan Substation and Hongjiapo Substation, and finally to the Central China Power Grid (CCPG). In



addition, a 10KV backup power supply is also available on site for emergency use of electricity.

CEC has verified the information and parameter of main installed facilities. Detailed information is listed in the below table.

Table 4 Information of facilities

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



Model	QFJ-15-2
Rated power	15MW
Rated voltage	10.5KV
Power factor	0.8
Efficiency	≥97%
Rated rotating speed	3000r/min
Rated frequency	50Hz
Quantity	2

No malfunction or change of equipment or overhaul happened during this monitoring period.

CAR02 was raised asking PP to demonstrate whether the delay of implementing the second phase of 24MW is a permanent change to the project design, and provide supporting evidence. The PP explained that the second phase has been delayed but not altered. And the second phase is possibly to be constructed in 2014. Under the situation of already constructed 24MW, the IRR calculation shows that the project is still additional. The explanation is consistent with the information obtained during on-site interview with local government officials. Related evidence named Statement of the Construction of the Second Phase was submitted, which states that a decision has been made to start the construction of the second phase in 2014. With the situation of 24MW, the re-calculated IRR result without CER income is 3.54% using original value of registered PDD, which is lower than the benchmark. The IRR calculation of 24MW is also conducted using the actual value of input parameters, the result is less than 0%. And the NPV is also calculated, the NPV result of minus 275,818,232 RMB shows that the project is still not financially attractive. The re-calculated project IRR spreadsheets were checked to be correct. CAR02 was closed.

<Heat Providing System>

As stated in the PDD, the proposed project will not claim GHG emission reductions from displacing heat that would otherwise be produced within Quyuan Management District.

CAR01 was raised asking PP to demonstrate whether the delay of implementing the heat supply to local area is a permanent change to the project design, and provide supporting evidence. The PP explained that the construction of heat supply piping network, the heat price is still at negotiation stage between the owner and the relevant parties (the heat users and the government). The explanation is consistent with the information obtained during on-site interview with local government officials. Related evidence named Statement of the Heat Supply Situation of Quyuan Management District issued by Quyuan Management District was submitted, which states that a heat supply plan is still under negotiation, and might be decided in 2014. CAR01 was closed.

<Monitoring System>

In order to measure the net quantity of increased electricity generated in the project plant, 2 electrical meters are installed to measure the net electricity supplied to the grid and purchased



from the grid through the main transmission line, one is gate meter and the other is backup meter. Another meter is installed in the 10KV backup power line to measure the electricity purchased from the 10kv backup transmission line. Besides the above meters, there are 2 more electrical meters installed on site to monitor on-site electricity consumption attributable to the project activity (including the electricity consumption for the mechanical treatment of the biomass in the biomass collection sites and the project site), the meters are Meter 1# and Meter 2#. All these meters have been properly installed, maintained, calibrated and recorded according to industry standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2000).

In order to monitor the quantity of each biomass residue type combusted in the project plant, 2 belt balances are installed. In order to monitor the moisture content of the biomass residues, 2 balances and 2 sets of dry cabinet are installed in the on-site laboratory. In order to monitor the net calorific value of each biomass residue type, report from a reputed laboratory every six months is used, taking three samples for each measurement. The consistency of the measurements is checked by comparing the measurement results with measurements from previous years and records of the on-site laboratory. It is determined that the results is comparable, no further test is needed.

In order to monitor the average round trip distance between the biomass fuel supply sites and the project plant, on site records are maintained in the log books based on the actual distance of each truck transportation. The number of truck trips for the transportation of biomass is also continuously recorded in the log books. The average CO₂ Emission Factor for transportation of biomass with trucks is derived from Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. The appropriateness of the data is reviewed by the verification team, and confirmed that the data is still suitable. The CO₂ emission factor for diesel is derived from IPCC 2006 default value. The appropriateness of the data is reviewed by the verification team, and confirmed that the data is still suitable.

The Net Calorific Value of diesel combusted in the project plant is derived from China Energy Statistical Yearbook. The appropriateness of the data is reviewed by the verification team, it is found to be 0.042652 TJ/t in China Energy Statistical Yearbook 2012, and it is confirmed that the applied data is still suitable. The quantity of diesel combusted in the project plant and for other purposes that are attributable to the project activity is continuously monitored by 4 volume flow meters.

The quantity of each biomass residues of type k that is available in the region is monitored by the annual survey reports based on the statistics from official public resource.

CL03 was raised: Two different monitoring method of AVDy are stated in the registered PDD and the MR, namely direct monitoring and using conservative value, please specify which method was used. The direct monitoring process is chosen, and monitored value is adopted in the updated MR and ERs calculation sheet. The calculation process using monitoring data is checked to be correct. CL03 was closed.

<Calibration>

The monitoring equipment have been installed and calibrated in accordance with the



registered PDD and national industry requirements. The calibration is in accordance with the information specified in monitoring plan of the registered PDD and the applied methodology. The calibration information of the equipment is summarized in the below tables.

Table 5 Calibration information of electrical meters

Meter name	Gate meter	Backup meter	10KV meter	Meter 1#	Meter 2#
Type/Model	MK6E		DSSD1008	DS862-4	DT862-4
Accuracy level	0.2S		0.5	2.0	
SN	208368473	208206500	0802876	86064245	90043215
First calibration date	07/12/2010			11/10/2010	21/02/2011
Calibration organization	Hunan Electric Power Company Test and Research Institute			Yueyang Measure Test and Calibration Center	
Last calibration date	04/12/2011		04/12/2011	08/10/2011	/
Calibration organization	Hunan Electric Power Company Test and Research Institute			Yueyang Measure Test and Calibration Center	
Valid period	03/12/2012		03/12/2012	07/10/2012	20/02/2012
Calibration frequency	Once per year				

Table 6 Calibration information of balances and dry cabinets

Meter name	Belt balance 1#	Belt balance 2#	Balance 1#	Balance 2#	Dry Cabinet 1#	Dry Cabinet 2#
Type/Model	ICS-ST4-1000		YB2001	FA214	101-1B	
Accuracy level	1.0		III level	I level	±0.1℃	
SN	0811114	0811113	145	2769	0912013	081216
First calibration date	18/10/2010		05/12/2010		09/12/2010	
Calibration organization	Hunan Institute of Metrology and Test					
Last calibration date	17/10/2011		04/12/2011		26/12/2011	
Calibration organization	Hunan Institute of Metrology and Test					
Valid period	16/10/2012		03/12/2012		25/12/2012	
Calibration frequency	Once per year					

Table 7 Calibration information of flow meters

Meter name	Flow Meter 1#	Flow Meter 2#	Flow Meter 3#	Flow Meter 4#
Type/Model	LWY-10C			
Accuracy level	1.0			
SN	08024	08036	08043	08029
Calibration date	19/11/2010			
Calibration organization	Changcheng Institute of Metrology and Measurement			



Valid period	18/11/2011
Calibration frequency	Once per year

Meter name	Flow Meter 5#	Flow Meter 6#	Flow Meter 7#	Flow Meter 8#
Type/Model	LWY-10C			
Accuracy level	1.0			
SN	L10111052	L10111053	L10111054	L10111056
Calibration date	15/11/2011			
Calibration organization	Changcheng Institute of Metrology and Measurement			
Valid period	14/11/2012			
Calibration frequency	Once per year			

The calibration information in the above table was confirmed through checking the original calibration reports and the qualification of the organizations carried out the calibrations. The valid period of the calibration certificates of all the monitoring equipment can cover this monitoring period except the Dry Cabinets. The situation of delayed calibration is identified, one CAR was issued and closed.

CAR06: The calibration of the dry cabinets does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.

The maximum value and the smallest value of every type of biomass during the monitoring period was adopted to calculate the biomass baseline emission and Biomass project emission respectively in December. The verification team confirmed that this method is conservative. The MR and ERs calculation spreadsheet are revised.

Considering the fact that the monitoring equipments are still functioning normally according to the latest calibration report, the verification team agreed with the treatment of using more conservative value to calculate the project emission. The data in the MR and ER calculation spreadsheet is checked with the original record and confirmed to be correct. CAR06 was closed.

3) Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD

The value for emission reduction estimated in ex-ante estimated by the revised registered PDD for the period corresponding to this monitoring period is 121,840 tCO₂e (121,840 tCO₂e annually for 24MW installed capacity of the first phase), and the actual emission reduction achieved in this monitoring period is 143,852 tCO₂e, which is 18.1% higher than the expectation of the revised registered PDD (version 05).

CAR07 was raised: Please further clarify the reason of emission reduction achieved during the monitoring period is higher than that estimated in the revised registered PDD (version 05).

The PP explained that the net electricity generation was 14.11% higher than the ex-ante estimation in registered CDM PDD (Version 5) due to higher operation hours, which accounts for 79% of the differences above. The main reason for higher operation hours is because the



current monitoring period happened to fall into a relatively stable operation period of the project activity as the project was just fully commissioned; the equipments were in good operation. If the project is assessed from 01/01/2011 to 31/12/2012, the net electricity generation of the project is only 73 % of the ex-ante estimation in registered CDM PDD (Version 5). Secondly, the PETy was 41% less than the ex-ante estimation in registered CDM PDD (Version 5), which accounts for 9% of the differences above. That's because the conservative value of AVDy(200km) was adopted in registered CDM PDD (Version 5), and the actual value of AVDy in monitoring period is much smaller.

The two main reason for the emission reduction achieved in this monitoring period higher than the estimation of the PDD is analyzed, and verified to be authentic. When putting a longer period of 2 years into considering, the net electricity generation of the project is only 73% of the estimation in the PDD. The additionality of the project is not affected. The evidence of power generation from 2011 to 2012 was submitted to the verification team, the calculation result in the explanation was checked to be correct. CAR07 was closed.

CL01 was raised: Please explain the reason of the monitored value of moisture and NCV of the biomass residues is different with that estimated in the registered PDD. PP explained that: The moisture and NCV of biomass in the registered PDD are sourced from the FSR, it is experimental, and based on a small amount of samples. The monitored value is the actual moisture of biomass residues, it based on the daily test for the biomass residues, and it is affected by the weather. Therefore, the monitored value of NCV has been adopted in the updated PDD. The evidences are reviewed to be valid, the explanation is acceptable. CL01 was closed.

3.3 Compliance of monitoring plan with monitoring methodology including applicable tool (s)

The registered PDD is revised after registration due to the post registration changes of project activity. By means of document review, on site verification and on site interview, CEC has validated all the changes of the revised PDD (version 5) and confirmed that the revised PDD including the monitoring plan complies with the applied methodologies: ACM0002 ver. 10 - Consolidated methodology for grid-connected electricity generation from renewable sources and ACM0006 ver. 9 - Consolidated methodology for electricity generation from biomass residues, the monitoring plan also complies with the tools referred to by the applied methodologies:

- “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 02.2);
- “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 02);
- “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 01); and
- “Tool to calculate the emission factor for an electricity system” (Version 02).

No deviation of methodology is needed.



3.4 Compliance of monitoring activities with the registered monitoring plan

The registered PDD is revised after registration due to the post registration changes of project activity. CEC has verified the reported data and procedures implemented by the PP during document review and on site verification and confirmed that: the monitoring actions have been carried out in accordance with the monitoring plan in the revised PDD (version 5).

The parameters required by the registered monitoring plan and the way verification team has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) are described below:

Table 6: The parameters required in the monitoring plan and verified by the DOE

Data/ Parameter	$BF_{k,y}$
Data Unit	Tons of dry matter
Description	Quantity of each biomass residue type k combusted in the project plant in year y.
Verified information flow	<p>The wet weight is continuously monitored and documented by weight meters Belt balance 1# and Belt balance 2#. The verification team checked the original record and monthly summary chart during the monitoring period and confirmed that the data is correct. The record is maintained by clearly separating each biomass residue type.</p> <p>The wet weight is then adjusted for the moisture content in order to determine the quantity of dry biomass. The verification method of moisture content is elaborated in the next table.</p> <p>The weight meters are calibrated every year. The verification team checked the calibration record, and confirm that it could cover the whole monitoring period.</p> <p>The data in MR and ER calculation spreadsheet is checked to be consistent with the evidence.</p>
Means of Verification/ Comments	Document review and on-site interview with project staff to confirm the monitoring action and information flow.
Cross-check	The reading of the weight of biomass residues is cross checked with annual energy balance that is based on energy input and output, including purchased quantities and stock changes of the biomass and the quantity of generated electricity.

Data/ Parameter	Moisture content of the biomass residues
Data Unit	% water content
Description	Moisture content of the biomass residues
Verified information	The data is continuously sampled and analyzed daily by the moisture analyzers in the laboratory of the plant. Mean values is calculated monthly.



flow	<p>The record is maintained by clearly separating each biomass residue type. The procedure followed by the laboratory of the plant is in accordance with authoritative instructions.</p> <p>The data in MR and ER calculation spreadsheet is checked to be consistent with the evidence.</p>
Means of Verification/ Comments	<p>Document review and on-site interview with project staff to confirm the monitoring action and information flow.</p> <p>The verification team checked the original record and monthly summary chart during the monitoring period and confirmed that the data is correct. The record is maintained by clearly separating each biomass residue type. The Balance 1#, Balance 2#, Dry Cabinet 1# and Dry Cabinet 2# are calibrated every year. The Balance 1# and Balance 2# are used to measure different indicators, so they are of different accuracy levels. The verification team checked the calibration record, and found that a relatively short period in the monitoring period could not be covered by the calibration reports of Dry Cabinets. So the maximum value and the smallest value of every type of biomass during the monitoring period was adopted to calculate the biomass baseline emission and Biomass project emission respectively in November and December. The verification team confirmed that this method is conservative. CAR06 was raised and closed.</p>
Cross-check	<p>The moisture content is cross-checked with the test reports of biomass residues issued by a reputed lab, Luoyang Coal Quality Test Center. The verification team checked the reports and confirm that the values are close. And it is confirmed that the applied value is valid, no additional measurements is needed. The verification team also checked the qualification of Luoyang Coal Quality Test Center, and confirm it is authentic.</p> <p>The value of the dry weight of biomass residues is cross checked with annual energy balance that is based on purchased quantities and stock changes.</p>

Data/ Parameter	NCV _k
Data Unit	GJ/ton of dry matter
Description	Net calorific value of each biomass residue of type k
Verified information flow	<p>The test of NCV of each biomass residue type is carried out at a reputed laboratory and according to relevant international standards. NCV_k is measured based on dry biomass. The frequency is every six months, with at least three samples for each measurement.</p> <p>The data in MR and ER calculation spreadsheet is checked to be consistent with the evidence.</p>
Means of Verification/ Comments	<p>Document review and on-site interview with project staff to confirm the monitoring action and information flow.</p> <p>The test reports of biomass residues issued by Luoyang Coal Quality Test</p>



	<p>Center and Huazhong State Key Laboratory on Coal Combustion, University of Science and Technology are checked, the correct value of each type of biomass residue type is applied in the calculation of the project with an update frequency of every six months.</p> <p>The qualifications of Luoyang Coal Quality Test Center and Huazhong State Key Laboratory on Coal Combustion, University of Science and Technology are also checked to be valid.</p>
Cross-check	<p>The consistency of the measurements is also cross-checked by comparing the measurement results with measurements from previous years. By comparing the result in each report, it could be concluded that the measurement results do not differ significantly, no additional measurements is needed.</p> <p>The verification team also cross-checked the test results of each biomass residue type performed by the on-site lab, the original record and monthly summary chart during the monitoring period are checked, and it is confirmed that the result does not differ much with that issued by the reputed lab. The record is maintained properly and clearly separating each biomass residue type.</p>

Data/ Parameter	AVD _y
Data Unit	Km
Description	Average round trip distance (from and to) between the biomass fuel supply sites and the project plant during the year y.
Verified information flow	The data is recorded and maintained in the on site log books, based on the information given by the truck driver of each time of transportation of biomass residues.
Means of Verification/ Comments	The verification team checked the original record and monthly summary chart during the monitoring period, and found that the data is consistent.
Cross-check	<p>The data is cross-checked by comparing with local map and interviewing major local biomass residue suppliers.</p> <p>The verification team also made some sample field checks for each type of biomass residue to cross-check the recorded data, and it is confirmed that the record data is correct.</p>

Data/ Parameter	N _y
Data Unit	-
Description	Number of truck trips for the transportation of biomass
Verified information flow	The data is recorded and maintained in the on-site log books, counted by staff of the project plant.



Means of Verification/ Comments	The verification team checked the original record and monthly summary chart during the monitoring period, and found that the data is consistent.
Cross-check	The data is cross-checked by interviewing major local biomass residue suppliers, it is confirmed that the record data is correct. The verification team also compared the number of truck trips with the total supplied quantity divided by average transport load of the trucks used by local biomass residue suppliers, and confirmed that the data is consistent.

Data/ Parameter	EF_{km,CO_2}
Data Unit	tCO _{2e} /km
Description	Average CO ₂ Emission Factor for transportation of biomass with trucks during year y.
Verified information flow	The data (0.001097) is from Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Table 1-32 on Page 1.75) of the Reference Manual (Estimated Emission Factors for US Heavy Duty Diesel Vehicles).
Means of Verification/ Comments	The emission factor applied by the project is chosen in a conservative manner. By checking related official publications, it is confirmed that the data is still the most updated available.
Cross-check	The emission factor applied by the project is chosen in a conservative manner. By checking related official publications, it is confirmed that the data is still the most updated available.

Data/ Parameter	$EF_{CO_2,i,y}$
Data Unit	kgCO _{2e} /TJ
Description	CO ₂ emission factor for fossil fuel type i (diesel)
Verified information flow	The data (74,100) is from IPCC 2006 default value (Volume2.Chapter2.P16), diesel emission factor.
Means of Verification/ Comments	The emission factor applied by the project is chosen in a conservative manner. By checking related official publications, it is confirmed that the data is still the most updated available.
Cross-check	The emission factor applied by the project is chosen in a conservative manner. By checking related official publications, it is confirmed that the data is still the most updated available.

Data/ Parameter	NCV _i
Data Unit	TJ/tonne
Description	Net Calorific Value(NCV _i) of fossil fuel type i(diesel)



Verified information flow	The data (0.042652) is from China Energy Statistical Yearbook 2012, Diesel NCV.
Means of Verification/ Comments	The emission factor applied by the project is chosen in a conservative manner. By checking related official publications, it is confirmed that the most updated available source is China Energy Statistical Yearbook 2012, however the value is still the same.
Cross-check	By checking related official publications, it is confirmed that the applied data is correct.

Data/ Parameter	$FF_{\text{project plant}, i, y}$
Data Unit	Tonnes
Description	Quantity of fossil fuel type i(diesel) combusted in the project plant during year y
Verified information flow	The consumption of diesel is monitored using volume flow meters and recorded by the project staff. The volume is then converted to the mass of diesel consumed using standard density of diesel (0.85 kg/litre).
Means of Verification/ Comments	The verification team checked the original record and monthly summary chart during the monitoring period, and found that the data is consistent. The flow meters are calibrated every year. Since 15/11/2011, the project owner installed four new Flow meters (5#,6#,7#,8#) to replace the old ones(1#,2#,3#,4#), this is checked by operation record.
Cross-check	The quantity is cross-checked by purchase invoices and stock change.

Data/ Parameter	$FF_{\text{project site}, i, y}$
Data Unit	Tonnes
Description	Quantity of fossil fuel type i combusted in the project site (including the collection sites) for other purposes that are attributable to the project activity during year y
Verified information flow	The consumed quantity of diesel is recorded and maintained in the on-site log books.
Means of Verification/ Comments	The verification team checked the original record and monthly summary chart during the monitoring period, and found that the data is consistent.
Cross-check	The quantity is cross-checked by purchase invoices and stock change.

Data/ Parameter	$EC_{PJ, y}$
Data Unit	MWh



Description	On-site electricity consumption (including the electricity consumption for the mechanical treatment of the biomass in the biomass collection sites and the project site) attributable to the project activity during the year y.
Verified information flow	<p>The electricity consumption for the mechanical treatment of the biomass in the biomass collection sites and the project site is measured by Meter 1# and Meter 2#.</p> <p>The reading of the meters is monitored continuously and recorded monthly by the PP. The verification team checked the daily operation record during the monitoring period and confirmed that the data is correct. It is confirmed that the using of the on-site mechanical treatment equipment was started since 01/03/2011, so no data of Meter 2# was available in Jan. and Feb. of 2011. And the calibration report on 21/02/2011 could cover this monitoring period.</p>
Means of Verification/ Comments	<p>Meter 1# and Meter 2# are calibrated every year. The verification team checked the calibration records, and confirmed that they could cover the whole monitoring period.</p> <p>The qualification of Hunan Electric Power Company Test and Research Institute and Yueyang Measure Test and Calibration Center are also checked by the verification team.</p> <p>The records and evidences are properly archived, which are checked to be complete.</p>
Cross-check	<p>If the on-site measurement by meter could not be carried out, the parameter could be calculated conservatively as the weight of straws smashed in tons and the electricity consumption factor (kWh/ton). The electricity factor can be calculated as follows:</p> <ol style="list-style-type: none"> 1) Collecting all the nameplates power (in kW) and capacity(t/h) of every straw crackers 2) Calculating the electricity factor corresponding to each cracker in kWh/t 3) Using the largest number as a conservative electricity factor for the calculation. <p>The data in MR and ER calculation spreadsheet is checked to be consistent with daily operation record.</p>

Data/ Parameter	$EG_{\text{project plant},y}$
Data Unit	MWh
Description	Net quantity of increased electricity generated in the project plant during the year y
Verified information flow	<p>The net power exported to the grid from the project through the main transmission line is measured by the gate meter. And the power imported to the project from the grid through the 10kv backup line is measured by the 10KV meter.</p> <p>The reading of the gate meter and the 10KV meter is monitored</p>



	<p>continuously and recorded monthly by the PP. The verification team checked the daily record during the monitoring period and confirmed that the data is correct.</p> <p>The reading of the gate meter and the 10KV meter is responsible by the grid company and the project owner every month. The verification team checked the monthly summary during the monitoring period and confirmed that the data is correct.</p> <p>After the amount of each month is determined, the grid company issues the invoice to the plant. The verification team checked the invoices during the monitoring period and confirmed that the amount is consistent with the record.</p> <p>The data in MR and ER calculation spreadsheet is checked to be consistent with the evidence.</p>
Means of Verification/ Comments	<p>The gate meter, its backup meter and the 10KV meter are calibrated every year. The verification team checked the calibration records, and confirmed that they could cover the whole monitoring period.</p> <p>The qualification of Hunan Electric Power Company Test and Research Institute and Yueyang Measure Test and Calibration Center are also checked by the verification team.</p> <p>The records and evidences are properly archived, which are checked to be complete.</p>
Cross-check	<p>A backup meter is prepared as the backup for the gate meter. When the gate meter is in trouble, the project owner employs the data monitored by the backup meter.</p> <p>The reading of the gate meter and 10KV meter is cross checked with daily record, monthly record and electricity purchase invoice by the verification team, the data is consistent.</p>

Data/ Parameter	-
Data Unit	Tons
Description	Quantity of each biomass residues of type k that are utilized in the defined geographical region
Verified information flow	<p>The data is derived from Biomass Availability Report, issued by a third party Wuhan Kaidi Electric Power Engineering Co., Ltd., based on statistics and surveys from local public source.</p> <p>The data in MR and ER calculation spreadsheet is checked to be consistent with the evidence.</p>
Means of Verification/ Comments	Document review and on-site interview with project staff to confirm the information flow.
Cross-check	This parameter is reviewed annually by the project owner using Biomass Availability Reports.



	The verification team checked the Biomass Availability Reports, and cross-checked the information with project owner, local residence and biomass residue suppliers.
--	--

Data/ Parameter	-
Data Unit	Tons
Description	Quantity of each biomass residues of type k that are available in the region
Verified information flow	The data is derived from Biomass Availability Report 2012, issued by a third party Wuhan Kaidi Electric Power Engineering Co., Ltd., based on statistics and surveys from local public source. The data in MR and ER calculation spreadsheet is checked to be consistent with the evidence.
Means of Verification/ Comments	Document review and on-site interview with project staff to confirm the information flow.
Cross-check	This parameter is reviewed annually by the project owner using Biomass Availability Reports. The verification team checked the Biomass Availability Reports, and cross-checked the information with project owner, local residence and biomass residue suppliers.

According to the applied methodology, there is no other external data required for determining the emission reductions of the project. There are no other monitoring aspects of the project activity that are not specified in the methodology. The emission factor of the first crediting period has been determined ex-ante in the registered PDD. The verification team has verified and confirmed that the emission factor used in the monitoring report is in compliance with the revised registered PDD.

The operational and management structure was checked via interviewing staffs of the plant, including the CDM manager, Operating Manager, Biomass Collecting Manager and Financing & Data filing Manager. The verification team confirms that the management system of the project is in place and the responsibilities are properly identified based on monitoring plan in the revised registered PDD and the MR for this period. Key parameters and date are measured and reviewed periodically as per the procedures in the revised registered PDD. And the key parameters are measured and reviewed periodically as per the procedures.

CAR04 was raised: The applied value of NCV_i should be reviewed annually. Please make correction in the MR. The data is reviewed annually by using the most updated official data. The applied value is valid. CAR04 was closed.

CAR05 was raised: The monitored value of $FF_{\text{project site, i, y}}$ in the MR is inconsistent with the evidence, please correct. The revision is checked to be correct. CAR05 was closed.

CL02 was raised: Please add the applied value of all parameters in section D.1 of MR. The revision is checked to be correct. CL02 was closed.



CL04 was raised: Please provide the annual survey reports of available and utilized biomass residues covering this monitoring period. The provided evidence is checked to be valid. The information in the MR is consistent with the evidence. CL04 was closed.

CL05 was raised: The word of “accuracy” in the MR means both the precision and the accuracy class, please make clarifications and corrections. The revision is checked to be correct. CL05 was closed.

Corresponding to the paragraph 232 and 235 of VVS version 04.0, CEC is able to confirm that the monitoring has been carried out in accordance with monitoring plan of the revised registered PDD. The monitored parameters have been verified against monitoring plan of the revised registered PDD and monitoring report, they are found to be complete and accurate.

3.5 Compliance with the calibration frequency requirements for measuring instruments

The monitoring equipment have been installed and calibrated in accordance with the registered PDD and national industry requirements. The calibration is in accordance with the information specified in monitoring plan of the registered PDD and the applied methodology. The calibration information of the equipment is summarized in table5 to table 7. The qualification of the calibrators has been verified substantially.

CAR06 was raised and closed. Detailed description please refer to section 3.2.2.

3.6 Implementation of sampling plan

The sampling method is not applicable to the project.

3.7 Assessment of data and calculation of GHG emission reductions

According to the registered PDD and the monitoring report, the GHG emission reductions of the project are calculated as follows:

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

Where

ER_y = Emissions reductions of the Project during the year y (tCO₂/yr)

$ER_{\text{heat},y}$ = Emission reductions due to displacement of heat during the year y (tCO₂/yr)

$ER_{\text{electricity},y}$ = Emission reductions due to displacement of electricity during the year y (tCO₂/yr)

$BE_{\text{biomass},y}$ = Baseline emissions due to natural decay or burning of anthropogenic source of biomass residues during the year y (tCO₂/yr)

PE_y = Project emissions during the year y (tCO₂/yr)

L_y = Leakage emissions during the year y (tCO₂/yr)

The emission reductions due to displacement of heat will not be claimed as per the registered PDD. Therefore, the value of this parameters is zero.

According to the Biomass Availability Report, the local available biomass supply is far more than the demand by the project. So according to the methodology, leakage emissions are zero. The detailed data in the report is as follows:



Table 8 Available Quantity of Biomass Residues in 2011 (wet weight)

Biomass type	Rice husks	Rice straws	Maize straws	Wood chips	Branches	Barks
Available Biomass(10,000t)	27.67	97.17	9.86	49.50		
Biomass Consumption other than the project (10,000t)	5.53	19.43	1.97	7.43		
Biomass Consumption in the project plant (10,000t)	12.23	0.46	0.63	10.30	2.93	4.08
Total used biomass Consumption(10,000t)	17.76	19.89	2.60	24.74		
Available Biomass/Total biomass utilised	156%	488%	379%	200%		
Available Biomass/Total biomass Utilized - 100%	56%	388%	279%	100%		

$$\text{So, } ER_y = ER_{\text{electricity},y} + BE_{\text{biomass},y} - PE_y$$

$$ER_{\text{electricity},y} = EG_y \cdot EF_{\text{electricity},y}$$

Where

$ER_{\text{electricity},y}$ = Emission reductions due to displacement of electricity during the year y (tCO₂/yr)

EG_y = Net quantity of increased electricity generation as a result of the Project (incremental to baseline generation) during the year y (MWh).

$EF_{\text{electricity},y}$ = CO₂ emission factor for the electricity displaced due to the Project during the year y (tCO₂/MWh)

$$ER_{\text{electricity},y} = 0.9735 \cdot 144,603.89 = 140,771.88 \text{ tCO}_2$$

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

Where

$BE_{\text{biomass},y}$: Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO₂e/yr)

GWP_{CH_4} : Global Warming Potential of methane valid for the commitment period (tCO₂e/tCH₄)

$BF_{PJ,k,y}$: Incremental quantity of biomass residue type k used as a result of the project activity in the project plant during the year y (tons of dry matter or litter), for this project, $BF_{PJ,k,y} = BF_{k,y}$

NCV_k : Net calorific value of the biomass residue type k (GJ/ton of dry matter or GJ/litter)

$EF_{\text{burning},CH_4,k,y}$: CH₄ emission factor for uncontrolled burning of the biomass residue type k during the year y (tCH₄/GJ)



$$BE_{\text{biomass},y} = 21 \times 222,725.16 \times 0.001971 = 9,218.82 \text{ tCO}_2$$

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

Where

PET_y = CO₂ emissions during the year y due to transportation of the biomass residues to the project site (tCO₂/yr)

$PEFF_y$ = CO₂ emissions during the year y due to fossil fuel consumption at the project site that is attributable to the project (tCO₂/yr)

$PE_{EC,y}$ = CO₂ emissions during the year y due to electricity consumption at the project site that is attributable to the project (tCO₂/yr)

GWP_{CH_4} = Global Warming Potential for methane valid for the relevant commitment period

$PE_{\text{biomass},CH_4,y}$ = CH₄ emissions from the combustion of biomass residues during the year y (tCH₄/yr)

$$PE_y = 2,913.85 + 457.01 + 456.61 + 110.02 \times 21 = 6137.93 \text{ tCO}_2$$

According to the registered PDD and monitoring report, a conservative manner is used to calculate the emission reduction. The whole calculation process is checked by the verification team. It is confirmed that the emission reductions in this verified period is:

$$ER_y = BE_y - PE_y = ER_{\text{electricity},y} + BE_{\text{biomass},y} - PE_y = 140,771.88 + 9,218.82 - 6137.93 = 143,852 \text{ tCO}_2$$

Corresponding to the paragraph 246 of VVS version 04.0, CEC has ensured that:

- The data used for the determination of the emission reductions are available and monitored in accordance with the registered monitoring plan without conservative assumption;
- The relevant commercial receipts have been cross checked and found consistent;
- The appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been properly followed the methodology and the registered monitoring plan;
- The emission factor of NCPG determined ex-ante in the registered PDD is applied in the monitoring report and the calculations have been justified.

3.8 Overview of results

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out.

On site assessment was granted to all installations of the plant which are relevant for the project performance and the monitoring activities.

There are no open issues regarding the implementation of the project activity and the steps to claim emission reductions which might not be in compliance with the UNFCCC criteria and



relevant guidance provided by the COP/MOP and the CDM EB.



4 VERIFICATION AND CERTIFICATION STATEMENT

Camco Carbon Limited has commissioned China Environmental United Certification Center Co., Ltd. (CEC) to carry out the 1st periodic verification of the project: Hunan Yueyang Kaidi Biomass Power Project, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to the generation of electricity by using of available biomass residue potential. This verification covers the period of 01/01/2011-31/12/2011.

The verification is based on the validated revised registered PDD and monitoring report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB and COP/MOP. The scope of this engagement covers the verification and certification of GHG emission reductions generated by this project during the reporting period mentioned above.

The project participants are responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of Hunan Yueyang Kaidi Biomass Power Project on the basis set out within the project Monitoring Plan indicated in the revised registered PDD. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

CEC verified the Monitoring Report version 01 dated 18/07/2012 and Monitoring Report version 02 dated 22/07/2013 and confirms that:

- The project is implemented and operated in accordance with the validated revised registered PDD;
- The monitoring plan complies with the applied monitoring methodologies and the actual monitoring complies with the monitoring plan, including compliance with any guidance provide by the Board;
- The data and calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

As the result of the 1st periodic verification, CEC confirms that the GHG emission reductions are calculated without material misstatement. Based on the information we have seen and evaluated, we confirm that the project has achieved emission reductions in the above reporting period as follows:

Baseline emissions: 149,990.70t CO₂eq

Project emissions: 6,137.93 tCO₂eq

Leakage: 0 tCO₂eq

Emission reductions: 143,852 tCO₂eq (143,852 tCO₂eq up to 31 Dec 2012, 0 tCO₂eq from 1 January 2013 onwards)

Beijing, 05/08/2013

QIN Boya

Verification Team Leader

Beijing, 08/08/2013

SONG Tiedong

Chairman of Board

5 REFERENCES

1. Monitoring Report, version 01 and version 02
2. Project Design Document, version 04 and version 05
3. Validation Report, version 03, TÜV Rheinland Japan Ltd.
4. Assessment Opinion on Post-registration Changes, version 01, CEC
5. Emission Calculation Spreadsheet version 01 and version 02
6. Energy Balance Calculation version 01 and version 02
7. Business License, Bureau of Business of Yueyang City, 12/02/2007
8. Power Purchase Agreement, Yueyang Kaidi Green Energy Development Co., Ltd and Hunan Power Grid, 30/07/2010
9. Daily Operation Record, Hunan Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
10. Nameplate and technical parameters of boilers, steam turbines and generators
11. Calibration Certificates of the meters, Hunan Electric Power Company Test and Research Institute
12. Calibration Certificates of the meters, Yueyang Measure Test and Calibration Center
13. Calibration Certificates of the balances and dry cabinets, Hunan Institute of Metrology and Test
14. Calibration Certificates of the flow meters, Changcheng Institute of Metrology and Measurement
15. Accreditation Certificate of Hunan Electric Power Company Test and Research Institute, China National Accreditation Service for Conformity Assessment, 01/12/2007
16. Accreditation Certificate of Yueyang Measure Test and Calibration Center, China National Accreditation Service for Conformity Assessment, 20/10/2008
17. Accreditation Certificate of Hunan Institute of Metrology and Test, China National Accreditation Service for Conformity Assessment, 01/12/2010
18. Test report of biomass residues, Luoyang Coal Quality Test Center
19. Test report of biomass residues, Huazhong State Key Laboratory on Coal Combustion, University of Science and Technology
20. Certification of Luoyang Coal Quality Test Center, 11/08/2008
21. Certification of Huazhong State Key Laboratory on Coal Combustion

22. Test report of biomass residues, Hunan Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
23. Biomass Availability Report, Wuhan Kaidi Electric Power Engineering Co., Ltd., 2011 and 2012
24. Biomass settlement record, Hunan Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
25. Biomass consumption record, Hunan Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
26. Biomass fuel analysis record, Hunan Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
27. Biomass fuel purchase contracts and invoices, Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
28. Diesel fuel consumption record, Hunan Yueyang Kaidi Biomass Power Project, 01/01/2011 to 31/12/2011
29. Diesel fuel purchase invoices, 01/01/2011 to 31/12/2011
30. Electricity generation and input record, settlement notice and invoice, 01/01/2011 to 31/12/2012
31. Electrical Dispatch and Operation Certificates of employees
32. DL/T 448-2000: Technical Administrative Code of Electric Energy Metering
33. JJG 1036-2008: Calibration Regulation for Electronic Balance
34. JJG 555-1996: General Calibration Regulation for Nonautomatic Weighing Instrument
35. JJG 443-2006: Calibration Regulation of Fuel Dispenser
36. JJG 672-2001: Calibration Regulation of Bomb Calorimeter
37. JJG 195-2002: Calibration Regulation of Belt Balance
38. 2006 IPCC Guidelines for National Greenhouse Gas Inventories
39. China Energy Statistical Yearbook 2012
40. Validation and Verification Standard, version 04.0
41. ACM0002 Consolidated methodology for grid-connected electricity generation from renewable sources, version 10
42. ACM0006 Consolidated methodology for electricity generation from biomass residues, version 9
43. Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2



44. Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, Version 02
45. Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01
46. Tool to calculate the emission factor for an electricity system, Version 02
47. Standard for application of the global warming potentials to Clean Development Mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol, version 01.0





Appendix A: Verification Protocol

Table 1 Verification requirements based on the Clean Development Mechanism Validation and Verification Standard (version 04.0)

Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
1. Compliance of the project implementation with the registered project design document:	VVS	IX.D.1			
a Is the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD; or	VVS	226	<p>CAR01: According to the registered PDD, the project would be a co-generation project. However it is confirmed by interviewing with project owner that until now the supply of heat has not been carried out yet. Please demonstrate whether this delay is permanent change to the project design, and provide supporting evidence.</p> <p>CAR02: It was stated in the PDD that the project is built into two phases, each of them is 24MW. The second phase will begin one year after the first phase begins stable operation. However during the interview with the project owner, it is confirmed that until now the construction of the second phase has not been planned yet. Please demonstrate whether this delay is permanent change to the project design, and provide supporting evidence.</p>	<p>CAR01</p> <p>CAR02</p>	OK
b Does any deviation or the proposed or	VVS	226	Yes.	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
actual changes in the implementation or operation of the project activity comply with the requirements of the Project Standard?			During this verification, some difference in project implementation was found with the registered PDD (version 04). Then the Project Participants updated the PDD (version 05). CEC validated the revised PDD especially the post registration changes in accordance with the VVS and PS, and submitted the validation report together with this verification report.		
c Are all physical features of the CDM project activity proposed in the registered PDD in place?	VVS	227	<p>Yes.</p> <p>Through on-site visit and document review, the verification is able to confirm that all physical features of the proposed CDM project activity in the registered PDD are in place and that the project participants has installed the proposed CDM project activity as per the revised PDD (v05).</p> <p>The project exports electricity to Central China Power Grid (CCPG). The records, such as plant operation record, monitoring readings, monitoring equipment calibration certificates and invoices, were checked by the verification team.</p> <p>During this monitoring period, there are no changes of equipments, and no events occurred which may impact the applicability of the methodology.</p>	OK	OK
d Have the project participants operated the CDM project activity as per the registered PDD or any approved revised PDD?	VVS	227	As planed in the registered and revised PDD, the proposed project will process about 486,000 tonnes (wet) of biomass residue annually, of which Rice husk, Rice straw, Maize	CAR03	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			<p>straw ,Wood chips, Branches and Barks are the main biomass fuel. All together 4 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 4 sets of 12MW steam turbines generator units will be installed, which is equally divided into two phases. The total installed capacity of the Project is 48MW, with 24MW in each phase. The annual equivalent operation hours at full load is estimated to be 6000 hours with a net electricity generation of 253,440MWh and a net heat generation of 1,083,204GJ per year for the 48MW as a whole. All two sets of boilers and steam turbine generators of the first phase were installed as described in the registered PDD with the total installed capacity of 24MW.</p> <p>The expected operational lifetime of the Project is 20 years. The information is checked by related evidences, which is consistent with the registered PDD.</p> <p>The project began to construct in Feb. 2008, and was put into operation since 28/09/2009, before being registered as a CDM project on 31/12/2010.</p> <p>CAR03: The types of biomass residues used in this monitoring period are inconsistent with the registered PDD. This post registration change needs to seek the EB's acceptance.</p>		
e Is an on-site visit conducted? And if not, justify the rationale of the decision.	VVS	227	<p>Yes.</p> <p>The on-site verification was conducted on 23/08/2012.</p>	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			<p>The audit purpose and methodology were briefed in the opening meeting, main participants are:</p> <p>QIN Boya, CEC, Verification Team Leader</p> <p>XU Linghua, CEC, Verification Team Auditor</p> <p>LIU Yaotian, CEC, Verification Team Auditor</p> <p>SONG Quanbo, CEC, Verification Team Auditor</p> <p>LI Jing, HU Jin, MENG Qinghuan, LU Chengdong, LUO Shuding, YUAN Zhang, Yueyang Kaidi Green Energy Development Co., Ltd</p> <p>ZHANG Yong, Camco Carbon Limited</p>		
2. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s).	VVS	IX.D.2			
a Is the monitoring plan of the project activity in accordance with the applied methodology including applicable tool(s)?	VVS	229	<p>Yes.</p> <p>The registered PDD is revised after registration due to the post registration changes of project activity. By means of document review, on site verification and on site interview, CEC has validated all the changes of the revised PDD (version 5) and confirmed that the revised PDD including the monitoring plan complies with the applied methodologies: ACM0002 ver. 10 - Consolidated methodology for grid-connected electricity generation from renewable sources and ACM0006 ver. 9 - Consolidated methodology for electricity generation from biomass residues, the monitoring</p>	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			<p>plan also complies with the tools referred to by the applied methodologies:</p> <ul style="list-style-type: none"> • “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 02.2); • “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” (Version 02); • “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 01); and • “Tool to calculate the emission factor for an electricity system” (Version 02). <p>No deviation of methodology is needed.</p>		
b Is the project implementation in accordance with the provisions of the registered PDD and/or an approved revised PDD?	VVS	230	<p>Yes.</p> <p>The project is implemented in accordance with the provisions of the revised registered PDD.</p>	OK	OK
c Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?	VVS	231	<p>N/A</p> <p>According to the applied methodologies, there is no other external data required for determining the emission reductions of the project. There are no other monitoring aspects of the project activity that are not specified in the methodology.</p>	OK	OK
3. Compliance of monitoring activities with the registered monitoring plan	VVS	IX.D.3			
a Has the monitoring of parameters related to the GHG emissions reductions in the	VVS	233	<p>Yes.</p> <p>The registered PDD is revised after registration due to the</p>	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
project activity been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised monitoring plan			post registration changes of project activity. CEC has verified the reported data and procedures implemented by the PP during document review and on site verification and confirmed that: the monitoring actions have been carried out in accordance with the monitoring plan in the revised PDD (version 5).		
b Has the monitoring plan been properly implemented and followed by the project participants?	VVS	234	Yes. The MP has been properly implemented and followed by the project participants (PP). This is confirmed by document review and on-site visit.	OK	OK
c Have all parameters stated in the monitoring plan and relevant Board decisions been monitored and updated as applicable, including:	VVS	234	Yes. Please refer to the below verification result.	OK	OK
i. Project emission parameters	VVS	234	CAR04: The applied value of NCV_i should be reviewed annually. Please make correction in the MR. CAR05: The monitored value of $FF_{\text{project site, i, y}}$ in the MR is inconsistent with the evidence, please correct. CL01: Please explain the reason of the monitored value of moisture and NCV of the biomass residues is different with that estimated in the registered PDD. CL02: Please add the applied value of all parameters in section D.1 of MR. CL03: Two different monitoring method of AVD_y are stated in	CAR04 CAR05 CL01 CL02 CL03	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			the registered PDD and the MR, namely direct monitoring and using conservative value, please specify which method was used.		
ii. Baseline emission parameters	VVS	234	CL04: Please provide the annual survey reports of available and utilized biomass residues covering this monitoring period. CL05: The word of “accuracy” in the MR means both the precision and the accuracy class, please make clarifications and corrections.	CL04 CL05	OK
iii. Leakage parameters	VVS	234	In accordance with the applied methodologies, the project does not need to consider the leakage.	OK	OK
iv. Management and operational system: Whether the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan	VVS	234	Yes. The operational and management structure was checked via interviewing staffs of the plant, including the CDM manager, Operating Manger, Biomass Collecting Manager and Financing &Data filing Manager. The verification team confirms that the management system of the project is in place and the responsibilities are properly identified based on monitoring plan in the revised registered PDD and the MR for this period. Key parameters and date are measured and reviewed periodically as per the procedures in the revised registered PDD. And the key parameters are measured and reviewed periodically as per the procedures.	OK	OK
d Is the equipment used for monitoring in accordance with calibration frequency	VVS	234	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture	CAR06	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
requirements in section 4 of the VVS. and controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification;			of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.		
e Are monitoring results consistently recorded as per approved frequency?	VVS	234	Yes. The monitoring results and related evidence are recorded and archived as per approved frequency.	OK	OK
f Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or the revised monitoring plan?	VVS	234	Yes. The verification team interviewed with relative personnel, and confirms that the QA/QC procedures have been applied by the project in accordance with the monitoring plan. Detailed verification process is elaborated in section 3.4 of the verification report.	OK	OK
4. Compliance with the calibration frequency requirements for measuring instruments	VVS	IX.D.4			
a Is the calibration of those measuring equipments that have an impact on the claimed emission reductions conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan?	VVS	237	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
b If during verification of a certain monitoring period, has the calibration been delayed and has the calibration been implemented after the monitoring period in consideration(i.e. the results of delayed calibration are available)	VVS	238	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK
c If yes, is the following conservative approach adopted in the calculation of emission reductions?	VVS	238	Please see the below description.	OK	OK
a) Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration ,if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or	VVS	238	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK
b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment.	VVS	238	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
d Has the error adjustment been applied:	VVS	239	Please see the below description.	OK	OK
(i) In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions;	VVS	239	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK
(ii) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.	VVS	239	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK
e Are the results of the delayed calibration not available or has the calibration not been conducted at the time of verification?	VVS	240	Please see the below description.	OK	OK
(i) If yes, prior to finalizing verification, is the project participants requested to conduct the required calibration, and have the project participants calculated the emission reductions conservatively using the approach mentioned in paragraph 4c above:	VVS	240	CAR06: The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value.	CAR06	OK
f. Is it not possible for the project participants to conduct the calibration at a frequency	VVS	241	N/A	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
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?					
(i) If yes, were the requirements for post registration changes, in section of E of the VVS followed?	VVS	241	N/A	OK	OK
g. Does the monitoring methodology or the monitoring plan specify any requirements for calibration frequency for measuring equipments?	VVS	242	Yes. The monitoring plan specifies that the calibration frequency is annually.	OK	OK
(i) If no, are the equipments calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification?	VVS	242	N/A	OK	OK
(ii) If neither local/national standards nor the manufacturer's specification are available, is international standards used?	VVS	242	N/A	OK	OK
5. Assessment of data and calculations of emission reductions	VVS	IX.D.5			
a Are the data and calculations of GHG emission reductions achieved by/resulting	VVS	244	According to the registered PDD and the monitoring report, the GHG emission reductions of the project are calculated as	CAR07	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
from the project activity correctly applying the selected approved methodology?			<p>follows:</p> $ER_y = ER_{\text{heat},y} + ER_{\text{electricity},y} + BE_{\text{biomass},y} - PE_y - L_y$ <p>Where</p> <p>ER_y = Emissions reductions of the Project during the year y (tCO₂/yr)</p> <p>$ER_{\text{heat},y}$ = Emission reductions due to displacement of heat during the year y (tCO₂/yr)</p> <p>$ER_{\text{electricity},y}$ = Emission reductions due to displacement of electricity during the year y (tCO₂/yr)</p> <p>$BE_{\text{biomass},y}$ = Baseline emissions due to natural decay or burning of anthropogenic source of biomass residues during the year y (tCO₂/yr)</p> <p>PE_y = Project emissions during the year y (tCO₂/yr)</p> <p>L_y = Leakage emissions during the year y (tCO₂/yr)</p> <p>The emission reductions due to displacement of heat will not be claimed as per the registered PDD. Therefore, the value of this parameters is zero.</p> <p>CAR07: Please further clarify the reason of emission reduction achieved during the monitoring period is higher than that estimated in the revised registered PDD (version 05).</p>		
b Is a complete set of data for the specified monitoring period available? (If only partial	VVS	245	<p>Yes.</p> <p>A complete set of data for the specified monitoring period is</p>	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall either raise a CAR for the project participants to comply with the requirements of appendix I of the Project Standard or submit a request for deviation prior to submitting the request for issuance, if appropriate).			available. The verification team checked all the data and related evidence, and confirmed that the calculation is correct. Detailed verification process is available in section 3.4 of the verification report.		
c Has information provided in the monitoring report been cross-checked with other sources such as plant logbooks, inventories, purchase records, laboratory analysis?	VVS	245	Yes. The verification team checked all the data and cross-checked with related evidence and information. It is confirmed that the information is consistent. Detailed verification process is available in section 3.4 of the verification report.	OK	OK
d Have calculations of baseline emissions, project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	VVS	245	Yes. The calculations of baseline emissions, project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document. The ER calculation spreadsheet and MR is checked to be correct.	OK	OK
e Have any assumptions used in emission calculations been justified?	VVS	245	There is no any assumption in emission calculations.	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
f Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	VVS	245	<p>Yes.</p> <p>The appropriate emission factors, IPCC default values and other reference values have been correctly applied. It is confirmed that the applied value is correct and most updated. Detailed verification process is available in section 3.4 of the verification report.</p>	OK	OK



Table 2: Resolution of CAR/FAR/CL

CL/ CAR /FAR	Reference in table 1	Requests by verification team	Summary of project owner response	Comment
CAR 01	1.a	According to the registered PDD, the project would be a co-generation project. However it is confirmed by interviewing with project owner that until now the supply of heat has not been carried out yet. Please demonstrate whether this delay is permanent change to the project design, and provide supporting evidence.	The pipeline for heat extraction from the turbines has been installed but no heat generated by the project activity was supplied to the industrial user. The construction of heat supply piping network, the heat price is still at negotiation stage between the Yueyang Kaidi Green Energy Development Co., Ltd and the relevant parties (the heat users and the government).	The explanation is consistent with the information obtained during on-site interview with local government officials. Related evidence named Statement of the Heat Supply Situation of Qu Yuan Management District issued by Qu Yuan Management District of Yueyang City was submitted, which states that a heat supply plan is under negotiation, and might be decided in 2014. CAR01 was closed.
CAR 02	1.a	It was stated in the PDD that the project is built into two phases, each of them is 24MW. The second phase will begin one year after the first phase begins stable operation. However during the interview with the project owner, it is confirmed that until now the construction of the second	PP has confirmed that the second phase had been deferred, not relinquished. And the second phase will possibly be constructed in 2014. Under the situation of already constructed 24MW, the IRR calculation shows that the project is still additional.	The explanation is consistent with the information obtained during on-site interview with local government officials. Related evidence named Statement of the Construction of the Second Phase was submitted, which states that a decision has been made to start the construction of the second phase in 2014. With the situation of 24MW, the re-calculated IRR result



		phase has not been planned yet. Please demonstrate whether this delay is permanent change to the project design, and provide supporting evidence.		without CER income is 3.54% using original value of registered PDD, which is lower than the benchmark. The IRR calculation of 24MW is also conducted using the actual value of input parameters, the result is less than 0%. And the NPV is also calculated, the NPV result of minus 275,818,232 RMB shows that the project is still not financially attractive. The re-calculated project IRR spreadsheets were checked to be correct. CAR02 was closed.
CAR 03	1.d	The types of biomass residues used in this monitoring period are inconsistent with the registered PDD. This post registration change needs to seek the EB's acceptance.	PP has realized the inconsistency of the biomass residues type. The PDD has been updated to reflect the real operation situation (version 5.0) According to the biomass fuel invoices and the net calorific values for biomass residues, all the prices for the biomass residues utilized by the project are higher on an energy basis than those used in the registered PDD. The project IRR considering actual biomass residue prices is recalculated and demonstrated to be lower than the one anticipated in the registered PDD. Therefore, we can easily confirm that using other biomass residue types does not impact the conclusion in the registered PDD of the proposed project that the project is additional.	The PDD is revised to include the actual used biomass residues types, by onsite visit and document review, it is confirmed to be consistent with the actual situation. The PP analyzed the change of biomass residue types by means of re-calculated IRR to demonstrate that the project additionality is not affected. The re-calculated IRR returns wrong value, so the NPV is used. The NPV of minus 511,091,870 RMB shows that the project is not



			<table><tr><td>Biomass Type</td><td>Rice husk</td><td>Rice straw</td><td>Maize straw</td><td>Wood chips</td><td>Branches</td><td>Barks</td></tr><tr><td>NCV(GJ/t)</td><td>12.86</td><td>11.18</td><td>11.35</td><td>11.26</td><td>11.29</td><td>11.32</td></tr><tr><td>Price from invoice (RMB/t)</td><td>330</td><td>298</td><td>294</td><td>312</td><td>300</td><td>275</td></tr><tr><td>Prices of biomass residues utilized on energy basis (RMB/GJ)</td><td>25.66</td><td>26.65</td><td>25.90</td><td>27.71</td><td>26.57</td><td>24.29</td></tr><tr><td>Registered PDD</td><td colspan="6">23.142 RMB/GJ (lowest NCV in the PDD is conservatively used)</td></tr></table> <p>The updated demonstration of abundant surplus of biomass availability is also added in the revised PDD.</p>	Biomass Type	Rice husk	Rice straw	Maize straw	Wood chips	Branches	Barks	NCV(GJ/t)	12.86	11.18	11.35	11.26	11.29	11.32	Price from invoice (RMB/t)	330	298	294	312	300	275	Prices of biomass residues utilized on energy basis (RMB/GJ)	25.66	26.65	25.90	27.71	26.57	24.29	Registered PDD	23.142 RMB/GJ (lowest NCV in the PDD is conservatively used)						<p>financially attractive. The IRR re-calculation spreadsheet is provided and the calculation process is checked to be correct.</p> <p>The biomass residue availability analysis is shown in table B-14 of the revised PDD. The result shows that the biomass residue is abundant in local area. The data applied in the analysis is from the updated Biomass Availability Report using actual value of the year 2010. Considering that the project started operation in 2010, the application of updated data is appropriate.</p> <p>The verification team checked the analysis process and result, and confirmed that the applicability of methodology is not affected. CAR03 was closed.</p>
Biomass Type	Rice husk	Rice straw	Maize straw	Wood chips	Branches	Barks																																	
NCV(GJ/t)	12.86	11.18	11.35	11.26	11.29	11.32																																	
Price from invoice (RMB/t)	330	298	294	312	300	275																																	
Prices of biomass residues utilized on energy basis (RMB/GJ)	25.66	26.65	25.90	27.71	26.57	24.29																																	
Registered PDD	23.142 RMB/GJ (lowest NCV in the PDD is conservatively used)																																						
CAR 04	3.c.i	The applied value of NCV_i should be reviewed annually. Please make correction in the MR.	According to China Energy Statistical Yearbook 2012, the parameter remains to be 0.042652 TJ/tonne, please refer to Section D.2 of the updated MR, parameter NCV_i .	The data is reviewed annually by using the most updated official data. The applied value is valid. CAR04 was closed.																																			
CAR 05	3.c.i	The monitored value of $FF_{\text{project site, i, y}}$ of February in the MR is	The $FF_{\text{project site, i, y}}$ for February was mistakenly calculated, and is corrected in the updated MR and ERs calculation sheet.	The revision is checked to be correct. CAR05 was closed.																																			



		inconsistent with the evidence, please correct.		
CAR 06	3.d	The calibration of dryers does not cover the period of 08/12/2011 to 25/12/2011, please adjust the result of moisture of biomass residues, maintain the conservativeness and credibility of monitoring by applying the most conservative value. Similar situation is identified for the flow meters.	The maximum value and the smallest value of every type of biomass during the monitoring period was adopted to calculate the biomass baseline emission and Biomass project emission respectively in December in the updated MR and ERs calculation sheet.	Considering the fact that the monitoring equipments are still functioning normally according to the latest calibration reports, the verification team agreed with the treatment of using more conservative value to calculate the project emission. The data in the MR and ER calculation spreadsheet is checked with the original record and confirmed to be correct. CAR06 was closed.
CAR 07	5.a	Please further clarify the reason of emission reduction achieved during the monitoring period is higher than that estimated in the revised registered PDD (version 05).	The actual emission reduction achieved during current monitoring period is 18.1% (22,012 tCO ₂ e) higher than the ex-ante estimation in registered CDM-PDD, and the main reasons are below: 1) The net electricity generation was 14.11% higher than the ex-ante estimation in registered CDM PDD (Version 5) due to higher operation hours, which accounts for 79% of the differences above. The main reason for higher operation hours is because the current monitoring period happened to fall into a relatively stable operation period of the project activity as the project was just fully commissioned; the equipments were in good operation. If the project is assessed from 01/01/2011 to 31/12/2012, the performance of the project is only 73 % of the	The reason for the emission reduction achieved in this monitoring period higher than the estimation of the PDD is analyzed, and verified to be the reality. When putting a longer period of 2 years into considering, the net electricity generation of the project is only 73% of the estimation in the PDD. The additionality of the project is not affected. The evidence of net power generation in the year 2011 and 2012 was submitted to the verification team, the calculation



			<p>ex-ante estimation in registered CDM PDD (Version 5)</p> <p>2) PETy was 41% less than the ex-ante estimation in registered CDM PDD (Version 5), which accounts for 9% of the differences above. That's because the conservative value of AVDy(200km) was adopted, and the actual value of AVDy in monitoring period is much smaller.</p>	<p>result in the explanation was checked to be correct.</p> <p>The emission from biomass transportation of actual situation and the estimation of the PDD was checked, the calculation is also correct.</p> <p>CAR07 was closed.</p>
CL01	3.c.i	Please explain the reason of the monitored value of moisture and NCV of the biomass residues is different with that estimated in the registered PDD.	<p>The moisture and NCV of biomass in the registered PDD are sourced from the FSR, it is experimental, and based on a small amount of samples. The monitored value is the actual moisture of biomass residues, it based on the daily test for the biomass residues, and it is affected by the weather. Therefore, the monitored value of NCV has been adopted in the updated PDD. Besides, when using the actual NCV and biomass residue consumption value to recalculate the IRR of the project, the IRR is still below the benchmark, so the additionality is not affected.</p>	<p>The evidences are reviewed to be valid, the explanation is acceptable.</p> <p>CL01 was closed.</p>
CL02	3.c.i	Please add the applied value of all parameters in section D.1 of MR.	It has been corrected in the Section D.1 of the updated MR.	<p>The revision is checked to be correct.</p> <p>CL02 was closed.</p>
CL03	3.c.i	Two different monitoring method of AVDy are stated in the registered PDD and the MR, namely direct monitoring and using conservative value, please specify which method	The direct monitoring value is adopted in the updated MR and ERs calculation sheet.	<p>The calculation process using monitoring data is checked to be correct. CL03 was closed.</p>



		was used.		
CL04	3.c.ii	Please provide the annual survey reports of available and utilized biomass residues covering this monitoring period.	A biomass resources collection report which is issued by a reputed third institute has been provided.	The provided evidence is checked to be valid, the information in the MR is consistent with the evidence. CL04 was closed.
CL05	3.c.ii	The word of "accuracy" in the MR means both the precision and the accuracy class, please make clarifications and corrections.	It has been corrected in the Section D.2 of the updated MR.	The revision is checked to be correct. CL05 was closed.



Appendix B: Certificate of Competence

QIN Boya

Qualification in accordance with CEC-4001C-B/8 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area (s): 1.1,1.2

Beijing, 12 May 2012

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is written over a faint rectangular grid.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'XU Linghua', is written over a faint rectangular grid.

Quality Assurance Management Division

XU Linghua

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2, 5.1, 11.1, 12.1, 13.1

Beijing, 01 Dec 2011

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is written over a faint rectangular grid.

CDM Supervisor, Technical Director
Division

ZHANG Ruizhi

A handwritten signature in black ink, appearing to read 'Zhang Ruizhi', is written over a faint rectangular grid.

Project Implementation Management



LIU Yaotian

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2

Beijing, 01 Dec 2011

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is written over a light blue grid background.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua', is written over a light blue grid background.

Quality Assurance Management Division

SONG Quanbo

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 13.2, 15.2

Beijing, 01 Dec 2011

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is written over a light blue grid background.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua', is written over a light blue grid background.

Quality Assurance Management Division



YIN Yun

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.1, 1.2, 2.2, 3.1

Beijing, 01 Dec 2011

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan'.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua'.

Quality Assurance Management Division

CUI Xiaodong

Qualification in accordance with CEC-4001C-B/8 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area (s): 1.2

Beijing, 27 Jun 2012

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan'.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua'.

Quality Assurance Management Division