



# VERIFICATION REPORT

Camco Carbon Limited

Wuhe Kaidi Biomass Power Project

UNFCCC Ref. No: 3064

1<sup>st</sup> Monitoring Period: 15/01/2011-31/12/2011

Report No. 12012277

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

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<b>Approved by</b>	<b>Organizational Unit</b>			
SONG Tiedong	China Environmental United Certification Center Co., Ltd.			
<b>Client</b>				
Camco Carbon Limited				
<p>Summary:</p> <p>China Environmental United Certification Center Co., Ltd. (CEC) has performed the 1<sup>st</sup> verification of the project: Wuhe Kaidi Biomass Power Project with regard to the relevant requirements for CDM project activities. The UNFCCC reference No. of the project is 3064. The project reduces GHG emissions due to the generation of electricity by using of available biomass potential. This verification covers the period of 15/01/2011-31/12/2011.</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: 133,299.35 tCO<sub>2</sub>eq</p> <p>Project emissions: 8,551.34 tCO<sub>2</sub>eq</p> <p>Leakage: 0 tCO<sub>2</sub>eq</p> <p>Emission reductions: 124,748 tCO<sub>2</sub>eq (124,748 tCO<sub>2</sub>eq up to 31 Dec 2012, 0 tCO<sub>2</sub>eq 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
12012277	11/11/2013	02	57	
Report Title:				
Wuhe Kaidi Biomass Power Project				
Work Carried out by:				



CUI Xiaodong, XU Linghua, QIN Boya, LIU Yaotian, SONG Quanbo	distribution
Work Reviewed by:	<input type="checkbox"/> Unrestricted
YIN Yun, WANG Yanping	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 Center Co., Ltd.
CER	Certified Emission Reductions
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2eq</sub>	Carbon Dioxide equivalent
DOE	Designated Operational Entity
ECPG	East China Power Grid
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



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## 1 INTRODUCTION

Camco Carbon Limited has commissioned CEC to verify the emission reductions of the registered CDM project: Wuhe 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 15/01/2011-31/12/2011 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 revised 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 05.0). 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

<b>Title of Project Activity</b>	Wuhe Kaidi Biomass Power Project
<b>UNFCCC Registration Number</b>	3064
<b>Registration date of the project activity</b>	15/01/2011
<b>Crediting Period</b>	15/01/2011–14/01/2018 (renewable)
<b>Monitoring Period Covered in this Report</b>	15/01/2011-31/12/2011
<b>Project Participants</b>	China:Wuhe Kaidi Green Energy Development Co., Ltd; United Kingdom of Great Britain and Northern Ireland: Camco Clean Energy Plc.; Camco Carbon Limited; Switzerland: Camco Clean Energy Plc.;
<b>Location of the Project Activity</b>	Wuhe Economic and Technology Development Area, Mohekou Town, Bengbu City, Anhui Province, P.R. China. The coordinates are: 117°29'42" east longitude and 32°54'18"north latitude.

The Wuhe Kaidi Biomass Power Project is a biomass utilization project developed by Wuhe Kaidi Green Energy Development Co., Ltd. (hereafter is referred to as the Project Owner). The project is designed to produce 144,000MWh of electricity per year from burning biomass residues, displacing electricity generated by East China Power Grid (ECPG), which is dominated by fossil fuel-fired power plants, and thus reducing greenhouse gas (CO<sub>2</sub>) 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 291,000 tonnes (wet weight) of biomass residue annually, of which Rice husk, Maize straw, Wheat straw, Wood scrap and Barks are the main biomass fuel. 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam



turbines generator units will be installed. The total designed capacity of the Project is 24MW.

The project construction began in March 2008, and was put into operation since 26/08/2009. The project has been registered as a CDM project on 15/01/2011. The first crediting period is 15/01/2011-14/01/2018.

During the first monitoring period (15/01/2011-31/12/2011), the total net electricity supplied by the project amounted to 140,755.13 MWh, and the total emission reduction during this monitoring period is 124,748 tCO<sub>2</sub>eq. The actual emission reduction achieved is 124,748 tCO<sub>2</sub>eq up to 31 Dec 2012 and 0 tCO<sub>2</sub>eq 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 05.0 of the CDM VVS, issued by the Executive Board at 75th meeting on 04/10/2013. 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
CUI Xiaodong	Team Leader	Auditor	--	√
XU Linghua	Team Member	Auditor	--	√
LIU Yaotian	Team Member	Auditor	--	√
QIN Boya	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	√	---
WANG Yanping	Technical reviewer	---	---

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.

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.

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.

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).

Wang Yanping is a lead Greenhouse Gas(GHG) assessor. She worked for 17 years in the area of geography, meteorology & climatology, and ecological & environmental protection. Since 2008, she has completed various CEC CDM training courses as well as ISO14000 training courses, and has participated in over 20 validation/verification CDM projects in the areas of hydropower, wind power and biomass power generation. Besides CDM auditing, Dr. Wang has participated in the assessment of hydroelectric projects against the criteria set by the World Commission on Dams.



## 2.2 Document Review

The Monitoring Report (MR) version 01 dated 10/07/2012 was submitted by the PP which was made publicly available on 17/07/2012 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 01/08/2012, 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
Wuhe Kaidi Green Energy Development Co., Ltd; Camco Carbon Limited (Project participants)	<ul style="list-style-type: none"> <li>• Project design and implementation</li> <li>• Monitoring Plan</li> <li>• Monitoring data and Monitoring Report</li> <li>• GHG Calculations</li> </ul>
	<ul style="list-style-type: none"> <li>• Project design and implementation</li> <li>• Technical equipment, including calibration and operation</li> <li>• Monitoring Plan and management procedures</li> <li>• Monitoring data</li> <li>• Data uncertainty and residual risks (QA/QC)</li> </ul>

## 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 **5 Corrective Action Requests, 7 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 25/10/2010, 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, wheat straw, rice straw, maize straw and cotton straw” as described in the registered PDD to be the actual types of used biomass: rice husk, maize straw, wheat straw, wood scrap 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 13.7t.

Also, the name of manufacturer (NanJing Steam Turbine (Group) Co., Ltd) for generator in Table A-3 of registered PDD was mistyped as ‘Nanjing Steam Turbine (Group) Co.’, and it has been corrected in the updated PDD.

##### 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 East China Power Grid (ECPG). 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 planned in the revised PDD, the proposed project will process about 291,000 tonnes (wet) of biomass residue annually, of which rice husk, maize straw, wheat straw, wood scrap and barks are the main biomass fuel. All together 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam turbines generator units have been installed. The total installed capacity of the Project is 24MW. The annual equivalent operation hours at full load is estimated to be 6,000 hours with a net electricity generation of 126,720MWh and a net heat generation of 541,602GJ per year. The proposed project will not claim GHG emission reductions from displacing heat that would otherwise be produced from local area.

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 revised 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.

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

The project began to construct in March 2008, and was put into operation since 26/08/2009, before being registered as a CDM project on 15/01/2011.

CAR02 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. CAR02 was closed.

### **<Power System>**

The power transmission situation is also as per the revised registered PDD and monitoring plan. The electricity generated is transmitted through a 35kV transformer at the site to Mohekou 110kV substation and then supplied to Anhui power grid, and finally to the East China Power Grid (ECPG).



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.

#### <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 Mohekou Industrial Park.

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 Mohekou Industrial Park issued by Mohekou Industrial Park was submitted, which states that a heat supply plan is still under negotiation, and might be decided in 2015. CAR01 was closed.

#### <Monitoring System>

In order to measure the net quantity of increased electricity generated in the project plant, 4 electrical meters are installed to measure the net electricity supplied to the grid and purchased from the grid through the main transmission line, two are gate meters and the others are backup meters. 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 prove the average round trip distance between the biomass fuel supply sites and the project plant does not exceed 200km, monitor the on site records and maintained them 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 revised registered PDD and the MR, namely direct monitoring and using conservative value, please specify which method was used. The conservative value is chosen and checked to be correct. CL03 was closed.

#### <Calibration>

The monitoring equipment have been installed and calibrated in accordance with the revised registered PDD and national industry requirements. The calibration is in accordance with the information specified in monitoring plan of the revised 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	#1 Gate meter	#1 Backup meter	#2 Gate meter	#2 Backup meter	Meter 1#	Meter 2#
Type/Model	AINRTAL				DT862-4	
Accuracy level	0.2S				2.0	
SN	02081996	02081997	02081998	02081999	2011-82111 891	2009-08-10 545482
First calibration date	15/04/2010				-	19/08/2010
Calibration organization	Anhui Electric Power Measurement and Testing Center				Bengbu Institute of Metrology and Test	
Last calibration date	10/04/2011				21/01/2011	18/08/2011
Calibration organization	Anhui Electric Power Measurement and Testing Center				Bengbu Institute of Metrology and Test	



Valid period	09/04/2012	20/01/2012	17/08/2012
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-1000		FA214	T500	101-1B	
Accuracy level	0.5		I level	III level	1℃	
SN	0811115	0811116	107	120510 095103	100333 3	081226
Calibration date	07/01/2011		06/01/2011			
Calibration organization	Xuzhou Institute of Metrology and Test		Bengbu Institute of Metrology and Test			
Valid period	06/01/2012		05/01/2012			
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	ZYLWGY-10C			
Accuracy level	1.0			
SN	L1012033	L1012034	L1012032	L1012031
Calibration date	08/01/2011			
Calibration organization	Nanjing Supervision and Testing Institute			
Valid period	07/01/2012			
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. The situation of delayed calibration is identified, a CL was issued as below:

CL07 was raised: The Accuracy Class of Meter 1# and Meter 2# in the MR is different from the evidence found during the on-site visit, further clarification is required. PP revised the MR in accordance with the actual situation and the revised MR has been reviewed by the verification team. CL07 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 106,962 tCO<sub>2</sub>e, and the actual emission reduction achieved in this monitoring period is 124,748 tCO<sub>2</sub>e, which is 16.63% higher than the expectation of the revised registered PDD (version 05).

CAR05 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 15.5% higher than the ex-ante estimation in registered CDM PDD (Version 05) due to higher operation hours, which accounts for 94.4% of the differences above. As the project was just fully commissioned, the new facilities ensured the stable operation of the project activity. From 01/01/2010 to 31/12/2012, the electricity exported by the project is 98.68% of the ex-ante estimation in revised CDM PDD (Version 05).

The 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 3 years into considering, the net electricity generation of the project is 98.68% of the estimation in the PDD. The additionality of the project is not affected. The evidence of power generation from 2010 to 2012 was submitted to the verification team, the calculation result in the explanation was checked to be correct. CAR05 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 05) 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 CO<sub>2</sub> 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 05).

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. CAR05 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 <sub>k</sub>
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<sub>k</sub> 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 <sub>y</sub>
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 <sub>y</sub>
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 <sub>2e</sub> /km
Description	Average CO <sub>2</sub> 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 <sub>2e</sub> /TJ
Description	CO <sub>2</sub> 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 <sub>i</sub>
Data Unit	TJ/tonne
Description	Net Calorific Value(NCV <sub>i</sub> ) 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 (1#,2#,3#,4#) are calibrated every year.
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 Meter 1# was started since 23/01/2011, so no data of Meter 1# was available on 15-22/01/2011. 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 Bengbu Institute of Metrology and Test is 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"> <li>1) Collecting all the nameplates power (in kW) and capacity(t/h) of every straw crackers</li> <li>2) Calculating the electricity factor corresponding to each cracker in kWh/t</li> <li>3) Using the largest number as a conservative electricity factor for the calculation.</li> </ol> <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.</p> <p>The reading of the gate meter is monitored 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 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 and its backup 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 Anhui Electric Power Measurement and Testing Center is 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 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	<p>This parameter is reviewed annually by the project owner using Biomass Availability Reports.</p> <p>The verification team checked the Biomass Availability Reports, and cross-checked the information with project owner, local residence and biomass residue suppliers.</p>

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.

CAR03 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. CAR03 was closed.

CAR04 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. CAR04 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.

CL06 was raised: As the actual collection range of biomass residues is larger than the



boundary identified in the PDD, please analysis the available and utilized biomass residues in the actual collection range, and this post registration change needs to seek the EB's acceptance. The revision is checked to be correct. CL06 was closed.

Corresponding to the paragraph 235 and 236 of VVS version 05.0, 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 revised registered PDD and national industry requirements. The calibration is in accordance with the information specified in monitoring plan of the revised 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.

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

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

Where

$ER_y$  = Emissions reductions of the Project during the year y (tCO<sub>2</sub>/yr)

$ER_{heat,y}$  = Emission reductions due to displacement of heat during the year y (tCO<sub>2</sub>/yr)

$ER_{electricity,y}$  = Emission reductions due to displacement of electricity during the year y (tCO<sub>2</sub>/yr)

$BE_{biomass,y}$  = Baseline emissions due to natural decay or burning of anthropogenic source of biomass residues during the year y (tCO<sub>2</sub>/yr)

$PE_y$  = Project emissions during the year y (tCO<sub>2</sub>/yr)

$L_y$  = Leakage emissions during the year y (tCO<sub>2</sub>/yr)

The emission reductions due to displacement of heat will not be claimed as per the revised 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 husk	Maize straw	Wheat straw	Wood scrap	Barks
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Available Biomass(10,000t)	21.58	40.15	167.82	45	
Biomass Consumption other than the project (10,000t)	4.31	8.03	33.56	6.75	
Biomass Consumption in the project plant (10,000t)	6.35	2.17	0.10	2.10	21.12
Total used biomass Consumption(10,000t)	10.66	10.20	33.66	29.97	
Available Biomass/Total biomass utilised	202.40%	393.72%	498.53%	150.14%	
Available Biomass/Total biomass Utilized - 100%	102.40%	293.72%	398.53%	50.14%	

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 (tCO<sub>2</sub>/yr)

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

$EF_{\text{electricity},y}$  = CO<sub>2</sub> emission factor for the electricity displaced due to the Project during the year y (tCO<sub>2</sub>/MWh)

$ER_{\text{electricity},y} = 0.8888 \cdot 140,755.13 = 125,103.16 \text{ tCO}_2$

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

Where

$BE_{\text{biomass},y}$  : Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO<sub>2</sub>e/yr)

$GWP_{CH_4}$  : Global Warming Potential of methane valid for the commitment period (tCO<sub>2</sub>e/tCH<sub>4</sub>)

$BF_{PJ,k,y}$  : 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)

$EF_{\text{burning},CH_4,k,y}$  : CH<sub>4</sub> emission factor for uncontrolled burning of the biomass residue type k during the year y (tCH<sub>4</sub>/GJ)

$BE_{\text{biomass},y} = 21 \cdot 198,018.79 \cdot 0.001971 = 8,196.20 \text{ tCO}_2$

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



Where

$PET_y$  = CO<sub>2</sub> emissions during the year y due to transportation of the biomass residues to the project site (tCO<sub>2</sub>/yr)

$PEFF_y$  = CO<sub>2</sub> emissions during the year y due to fossil fuel consumption at the project site that is attributable to the project (tCO<sub>2</sub>/yr)

$PE_{EC,y}$  = CO<sub>2</sub> emissions during the year y due to electricity consumption at the project site that is attributable to the project (tCO<sub>2</sub>/yr)

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

$PE_{biomass,CH_4,y}$  = CH<sub>4</sub> emissions from the combustion of biomass residues during the year y (tCH<sub>4</sub>/yr)

$$PE_y = 4,889.33 + 410.57 + 1,332.21 + 91.87 \times 21 = 8,551.34 \text{ tCO}_2$$

According to the revised 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:

$$ER_y = BE_y - PE_y = ER_{electricity,y} + BE_{biomass,y} - PE_y = 125,103.16 + 8,196.20 - 8,551.34 = 124,748 \text{ tCO}_2$$

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 ECPG determined ex-ante in the revised 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 1<sup>st</sup> periodic verification of the project: Wuhe 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 15/01/2011-31/12/2011.

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 Wuhe 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 10/07/2012 and Monitoring Report version 02 dated 07/11/2013 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 1<sup>st</sup> 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: 133,299.35 tCO<sub>2</sub>eq

Project emissions: 8,551.34 tCO<sub>2</sub>eq

Leakage: 0 tCO<sub>2</sub>eq

**Emission reductions: 124,748 tCO<sub>2</sub>eq (124,748 tCO<sub>2</sub>eq up to 31 Dec 2012, 0 tCO<sub>2</sub>eq from 1 January 2013 onwards)**

Beijing, 11/11/2013

A handwritten signature in red ink, appearing to read 'CUI Xiaodong', is positioned above the name.

CUI Xiaodong

Verification Team Leader

Beijing, 14/11/2013

A handwritten signature in red ink, appearing to read 'SONG Tiedong', is positioned above the name.

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 Anhui Province, 02/12/2010
8. Power Purchase Agreement, Wuhe Kaidi Green Energy Development Co., Ltd and Anhui Power Grid, 07/2009
9. Daily Operation Record, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
10. Nameplate and technical parameters of boilers, steam turbines and generators
11. Calibration Certificates of the meters, Bengbu Institute of Metrology and Test
12. Calibration Certificates of the balances and dry cabinets, Bengbu Institute of Metrology and Test
13. Calibration Certificates of the flow meters, Nanjing Supervision and Testing Institute
14. Accreditation Certificate of Bengbu Institute of Metrology and Test, China National Accreditation Service for Conformity Assessment, 12/05/2010
15. Accreditation Certificate of Nanjing Supervision and Testing Institute, China National Accreditation Service for Conformity Assessment, 25/09/2008
16. Test report of biomass residues, Luoyang Coal Quality Test Center
17. Test report of biomass residues, Huazhong State Key Laboratory on Coal Combustion, University of Science and Technology
18. Certification of Luoyang Coal Quality Test Center, 11/08/2008
19. Test report of biomass residues, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
20. Biomass Availability Report, Wuhan Kaidi Electric Power Engineering Co., Ltd., 2011

and 2012

21. Biomass settlement record, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
22. Biomass consumption record, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
23. Biomass fuel analysis record, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
24. Biomass fuel purchase contracts and invoices, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
25. Diesel fuel consumption record, Wuhe Kaidi Biomass Power Project, 15/01/2011 to 31/12/2011
26. Diesel fuel purchase invoices, 15/01/2011 to 31/12/2011
27. Electricity generation and input record, settlement notice and invoice, 01/01/2010 to 31/12/2012
28. Electrical Dispatch and Operation Certificates of employees
29. DL/T 448-2000: Technical Administrative Code of Electric Energy Metering
30. JJG 1036-2008: Verification Regulation for Electronic Balance
34. JJG 555-1996: General Verification Regulation for Nonautomatic Weighing Instrument
35. JJG 443-2006: Verification Regulation of Fuel Dispenser
36. JJG 672-2001: Verification Regulation of the Bomb Calorimeter
37. 2006 IPCC Guidelines for National Greenhouse Gas Inventories
38. China Energy Statistical Yearbook 2012
39. Validation and Verification Standard, version 05.0
40. ACM0002 Consolidated methodology for grid-connected electricity generation from renewable sources, version 10
41. ACM0006 Consolidated methodology for electricity generation from biomass residues, version 9
42. Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2

43. Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, Version 02
44. Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01
45. Tool to calculate the emission factor for an electricity system, Version 02
46. 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 05.0)**

Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
<b>1. Compliance of the project implementation with the registered project design document:</b>	<b>VVS</b>	<b>IX.D.1</b>			
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	CAR01: According to the revised 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.	CAR01	OK
b Does any deviation or the proposed or actual changes in the implementation or operation of the project activity comply with the requirements of the Project Standard?	VVS	226	Yes. 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.	OK	OK
c Are all physical features of the CDM project activity proposed in the registered PDD in	VVS	227	Yes. Through on-site visit and document review, the verification is	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
place?			<p>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 East China Power Grid (ECPG). 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>		
d Have the project participants operated the CDM project activity as per the registered PDD or any approved revised PDD?	VVS	227	<p>As planed in the registered and revised PDD, the proposed project will process about 291,000 tonnes (wet) of biomass residue annually, of which Rice husk, Maize straw ,Wheat straw, Wood scrap and Bark are the main biomass fuel. All together 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam turbines generator units have been installed. The total installed capacity of the Project is 24MW. The annual equivalent operation hours at full load is estimated to be 6000 hours with a net electricity generation of 126,720MWh and a net heat generation of 541,602GJ per year.</p> <p>The expected operational lifetime of the Project is 20 years.</p>	CAR02	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			<p>The information is checked by related evidences, which is consistent with the revised registered PDD.</p> <p>The project began to construct in Mar. 2008, and was put into operation since 26/08/2009, before being registered as a CDM project on 15/01/2011.</p> <p>CAR02: 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 01/08/2012.</p> <p>The audit purpose and methodology were briefed in the opening meeting, main participants are:</p> <p>CUI Xiaodong, CEC, Verification Team Leader</p> <p>XU Linghua, CEC, Verification Team Auditor</p> <p>LIU Yaotian, CEC, Verification Team Auditor</p> <p>QIN Boya, CEC, Verification Team Auditor</p> <p>SONG Quanbo, CEC, Verification Team Auditor</p> <p>CAO Decai, WANG Haiquan, ZHANG Cuijun, DING Changai, ZHANG Tingting, Wuhe Kaidi Green Energy Development Co., Ltd</p> <p>ZHANG Yong, Camco Carbon Limited</p>	OK	OK
<b>2. Compliance of the monitoring plan with the monitoring methodology including</b>	<b>VVS</b>	<b>IX.D.2</b>			



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
<b><i>applicable tool(s).</i></b>					
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 05) 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:</p> <ul style="list-style-type: none"> <li>• “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 02.2);</li> <li>• “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” (Version 02);</li> <li>• “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 01); and</li> <li>• “Tool to calculate the emission factor for an electricity system” (Version 02).</li> </ul> <p>No deviation of methodology is needed.</p>	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
b Is the project implementation in accordance with the provisions of the registered PDD and/or an approved revised PDD?	VVS	230	Yes. The project is implemented in accordance with the provisions of the revised registered PDD.	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	N/A 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.	OK	OK
<b>3. Compliance of monitoring activities with the registered monitoring plan</b>	<b>VVS</b>	<b>IX.D.3</b>			
a Has the monitoring of parameters related to the GHG emissions reductions in the project activity been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised monitoring plan	VVS	233	Yes. 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 05).	OK	OK
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





Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
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	CAR03: The applied value of $NCV_i$ should be reviewed annually. Please make correction in the MR. CAR04: 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 the revised registered PDD and the MR, namely direct monitoring and using conservative value, please specify which method was used.	<del>CAR03</del> <del>CAR04</del> <del>CL01</del> <del>CL02</del> <del>CL03</del>	OK
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. CL06: As the actual collection range of biomass residues is larger than the boundary identified in the PDD, please	<del>CL04</del> <del>CL05</del> <del>CL06</del>	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			analysis the available and utilized biomass residues in the actual collection range, and this post registration change needs to seek the EB's acceptance.		
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 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	VVS	234	Yes. All the equipment used for monitoring in this project is accordance with the calibration frequency requirements in section 4 of the VVS and controlled and calibrated in accordance with the monitoring plan.	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
manufacturer's specification;					
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. CL07: The Accuracy Class of Meter 1# and Meter 2# in the MR is different from the evidence found during the on-site visit, further clarification is required.	CL07	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
<b>4. Compliance with the calibration frequency requirements for measuring instruments</b>	VVS	<b>IX.D.4</b>			
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	Yes. The calibration of those measuring equipments that have an impact on the claimed emission reductions is conducted by the project participants at a frequency specified in the applied monitoring methodology and the registered monitoring plan.	OK	OK
b If during verification of a certain monitoring period, has the calibration been delayed	VVS	238	No.	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
and has the calibration been implemented after the monitoring period in consideration(i.e. the results of delayed calibration are available)					
c If yes, is the following conservative approach adopted in the calculation of emission reductions?	VVS	238	N/A	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	N/A	OK	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	N/A	OK	OK
d Has the error adjustment been applied:	VVS	239	N/A	OK	OK
(i) In a conservative manner, such that the adjusted measured values of the	VVS	239	N/A	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
delayed calibration shall result in fewer claimed emission reductions;					
(ii) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.	VVS	239	N/A	OK	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	No.	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	N/A	OK	OK
f. Is it not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of project participants?	VVS	241	N/A	OK	OK
(i) If yes, were the requirements for post registration changes, in	VVS	241	N/A	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
section of E of the VVS followed?					
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
<b>5. Assessment of data and calculations of emission reductions</b>	<b>VVS</b>	<b>IX.D.5</b>			
a Are the data and calculations of GHG emission reductions achieved by/resulting from the project activity correctly applying the selected approved methodology?	VVS	244	According to the revised registered PDD and the monitoring report, the GHG emission reductions of the project are calculated as follows: $ER_y = ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y$ Where $ER_y$ = Emissions reductions of the Project during the year y (tCO <sub>2</sub> /yr) $ER_{heat,y}$ = Emission reductions due to displacement of heat	CAR05	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			<p>during the year y (tCO<sub>2</sub>/yr)</p> <p>ER<sub>electricity,y</sub> = Emission reductions due to displacement of electricity during the year y (tCO<sub>2</sub>/yr)</p> <p>BE<sub>biomass,y</sub> = Baseline emissions due to natural decay or burning of anthropogenic source of biomass residues during the year y (tCO<sub>2</sub>/yr)</p> <p>PE<sub>y</sub> = Project emissions during the year y (tCO<sub>2</sub>/yr)</p> <p>L<sub>y</sub> = Leakage emissions during the year y (tCO<sub>2</sub>/yr)</p> <p>The emission reductions due to displacement of heat will not be claimed as per the revised registered PDD. Therefore, the value of this parameters is zero.</p> <p>CAR05: 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 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	VVS	245	<p>Yes.</p> <p>A complete set of data for the specified monitoring period is 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.</p>	OK	OK



Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
Project Standard or submit a request for deviation prior to submitting the request for issuance, if appropriate).					
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
f Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	VVS	245	Yes.  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	OK	OK





Checklist Question	Ref.	§	Comments	Draft Concl.	Final Concl.
			verification report.		



**Table 2: Resolution of CAR/FAR/CL**

CL/CAR/FAR	Reference in table 1	Requests by verification team	Summary of project owner response	Comment
CAR01	1.a	According to the revised 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 Wuhe 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 Mohekou Industrial Park issued by Mohekou Industrial Park of Wuhe City was submitted, which states that a heat supply plan is under negotiation, and might be decided in 2015. CAR01 was closed.
CAR02	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	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



			<p>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.</p> <table><tr><td>Biomass Type</td><td>Rice husk</td><td>Maize straw</td><td>Wheat straw</td><td>Wood scrap</td><td>Barks</td></tr><tr><td>NCV(GJ/t)</td><td>13.45</td><td>12.35</td><td>12.23</td><td>12.26</td><td>10.11</td></tr><tr><td>Price from invoice (RMB/t)</td><td>330</td><td>250</td><td>260</td><td>280</td><td>260</td></tr><tr><td>Prices of biomass residues utilized on energy basis (RMB/GJ)</td><td>24.54</td><td>20.24</td><td>21.26</td><td>22.84</td><td>25.72</td></tr><tr><td>Registered PDD</td><td colspan="5">20.20 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	Maize straw	Wheat straw	Wood scrap	Barks	NCV(GJ/t)	13.45	12.35	12.23	12.26	10.11	Price from invoice (RMB/t)	330	250	260	280	260	Prices of biomass residues utilized on energy basis (RMB/GJ)	24.54	20.24	21.26	22.84	25.72	Registered PDD	20.20 RMB/GJ (lowest NCV in the PDD is conservatively used)					<p>demonstrate that the project additionality is not affected. The re-calculated IRR returns wrong value, so the NPV is used. The NPV of minus 378,363,218 RMB shows that the project is not 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</p>
Biomass Type	Rice husk	Maize straw	Wheat straw	Wood scrap	Barks																													
NCV(GJ/t)	13.45	12.35	12.23	12.26	10.11																													
Price from invoice (RMB/t)	330	250	260	280	260																													
Prices of biomass residues utilized on energy basis (RMB/GJ)	24.54	20.24	21.26	22.84	25.72																													
Registered PDD	20.20 RMB/GJ (lowest NCV in the PDD is conservatively used)																																	



				and confirmed that the applicability of methodology is not affected. CAR02 was closed.
CAR03	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. CAR03 was closed.
CAR04	3.c.i	The monitored value of $FF_{\text{project site, i, y}}$ in the MR is inconsistent with the evidence, please correct.	The $FF_{\text{project site, i, y}}$ was mistakenly calculated, and is corrected in the updated MR and ERs calculation sheet.	The revision is checked to be correct. CAR04 was closed.
CAR05	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 16.63% (17,786 tCO <sub>2</sub> e) higher than the ex-ante estimation in registered CDM-PDD, and the main reasons are below:  The electricity generation was 15.5% higher than the ex-ante estimation in revised CDM PDD (Version 05) due to higher operation hours, which accounts for 94.4% of the difference above. As the project was just fully commissioned, the new facilities ensured the stable operation of the project activity. From 01/01/2010 to 31/12/2012, the electricity exported by the project is 98.68% of the ex-ante estimation in revised CDM PDD (Version 05).	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 3 years (2010-2012) into considering, the net electricity generation of the project is only 98.68% of the estimation in the PDD. The additionality of the project is not affected. The evidence of net power generation in the year



				<p>2010 and 2012 was submitted to the verification team, the calculation 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>CAR05 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.	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.	The evidences are reviewed to be valid, the explanation is acceptable. CL01 was closed.
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.	The revision is checked to be correct. CL02 was closed.
CL03	3.c.i	Two different monitoring method of AVDy are stated	The conservative value was used as AVDy in accordance with revised registered PDD (version 05) in the revised MR.	The conservative value is checked to be correct. CL03



		in the revised registered PDD and the MR, namely direct monitoring and using conservative value, please specify which method was used.		was closed.
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.
CL06	3.c.ii	As the actual collection range of biomass residues is larger than the boundary identified in the PDD, please analysis the available and utilized biomass residues in the actual collection range, and this post registration	The PDD has been updated to reflect the real collection range (version 5.0), the available and utilized biomass residues in the actual collection range is analyzed.	The revised PDD has been checked to reflect the real collection and monitoring situation of the project. The available and utilized biomass residues in the actual collection range are analyzed in the availability reports. It is confirmed that after this change



		change needs to seek the EB's acceptance.		the project is still applicable to the methodology and the registered monitoring plan. CL06 was closed.
CL07	3.e	The Accuracy Class of Meter 1# and Meter 2# in the MR is different from the evidence found during the on-site visit, further clarification is required.	The Accuracy Class has been corrected in accordance with that in the nameplate and the calibration certificates of Meter 1# and Meter 2#.	The Accuracy Class of Meter 1# and Meter 2# has been reviewed in the updated MR and is consistent with the actual situation now. CL07 was closed.



**Appendix B: Certificate of Competence**

**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

XU Linghua

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', written in a cursive style.

A handwritten signature in black ink, appearing to read 'XU Linghua', written in a cursive style.

CDM Supervisor, Technical Director

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

ZHANG Ruizhi

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', written in a cursive style.

A handwritten signature in black ink, appearing to read 'Zhang Ruizhi', written in a cursive style.

CDM Supervisor, Technical Director

Project Implementation Management





Division

## 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'.

CDM Supervisor, Technical Director

XU Linghua

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

Quality Assurance Management Division

## 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'.

CDM Supervisor, Technical Director

XU Linghua

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

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', 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



## WANG Yanping

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, 15.1

Beijing, 01 Dec 2011

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is positioned below the name.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua', is positioned below the name.

Quality Assurance Management Division