



Verified Carbon Standard

HENAN XINXIANG 24MW BIOMASS BASED COGENERATION PROJECT



Document Prepared By Shenzhen CTI International Certification Co., Ltd

Project Title	<i>Henan Xinxiang 24MW Biomass based Cogeneration Project</i>
Version	1.0
Report ID	CTI/NB-2021-0618

Report Title	<i>2nd periodical VCS ¹ Verification report for Henan Xinxiang 24MW Biomass based Cogeneration Project</i>
Client	<i>Climate Bridge (Shanghai) Ltd.</i>
Pages	55
Date of Issue	27-August-2021
Prepared By	<i>Shenzhen CTI International Certification Co., Ltd (CTI)</i>

¹ The project is undergoing its 3rd overall monitoring period and verification since the project's implementation with once in CDM Scheme and twice in VCS Scheme, and this monitoring period belongs to the 2nd periodical verification under VCS Scheme.

Contact	<i>Shenzhen CTI International Certification Co., Ltd</i> <i>F8-A CTI Building, No.4 LiuXianSan Road, Xin'an Street</i> <i>Bao'an District, Shen Zhen 518101, P. R. China</i> <i>Phone: +86-10-65580012</i> <i>https://www.cti-cert.org/</i>
Approved By	<i>Zhou Lu</i>
Work Carried Out By	<i>Zhang Lei (TL& verifier)</i> <i>Li Ziqi (TR)</i>

Summary:

- **A brief description of the verification and the project**

The project activity developed in Huixian County, Xinxiang City, Henan Province, P. R. China, is a project that generate clean form of electricity through renewable biomass. The installed capacity of the project activity is 24 MW, consisting of 2 sets of steam turbine and generator with unit capacity of 12 MW. The utilization of biomass residues is for cogeneration of power and heat, the average annual power delivered to the grid by the project is expected to be 126,709 MWh and the generation of heat with 909,200GJ/yr. Due to the project doesn't claim the emission reductions due to displacement of heat, hence, the Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants Central China Power Grid (CCPG) and CH₄ emissions will be reduced by avoiding dumping of biomass residues. The project started operation on 28-October-2009 and it was registered as a VCS project activity with the Ref. No. 1140.

- **The purpose and scope of verification**

The objective of the verification is to have an independent review ex-post determination by a VVB (Validation and Verification Body) of the monitored GHG emission reductions that have occurred as a result of the implementation of the project activity during a defined monitoring period.

- **The monitoring period**

This is the 2nd monitoring period² started from 01-January-2013 to 31-December-2017.

- **The method and criteria used for verification**

Verification is conducted using Shenzhen CTI International Certification Co., Ltd procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The verification team assessed the project activity's compliance against the VCS Version 4.1, the selected CDM methodology and the project monitoring report. The project is eligible under Project Scope 1. Energy (renewable/non-renewable). The verification criteria followed the guidance documents provided by VCS included the following:

VCS Version 4.1, VCS Program Guide Version 4.0 and the applied CDM methodology "ACM0006. Consolidated methodology for electricity generation from biomass residues in power and heat plants" (Version 10).

- **The number of findings raised during verification**

In the course of the verification, 6 Corrective Action Requests (CARs), 3 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

- **Any uncertainties associated with the verification**

There are no restrictions of uncertainty.

- **Summary of the verification conclusion**

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project, "Henan Xinxiang 24MW Biomass based Cogeneration Project" (No. 1140) with regard to the relevant requirements of VCS standard Version 4.1. CTI confirms all verification activities including objectives, scope and criteria, level of assurance, monitoring and monitoring report adhere to VCS Version 4.1 and all associated updated as documented in this report, are complete.

CTI concludes that the project activity "Henan Xinxiang 24MW Biomass based Cogeneration Project" in China, as described in the final version of the Monitoring Report, meets all relevant requirements for

² The project is undergoing its 3rd overall monitoring period and verification since the project's implementation with once in CDM Scheme and twice in VCS Scheme, and this is the 2nd monitoring period under VCS Scheme.

VCS verification activity and correctly applied the methodology ACM0006, version 10. Hence CTI is able to certify that the GHG emission reduction from the project during the monitoring period from 01-January-2013 to 31-December-2017 amount to 454,707 tCO₂e.

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1. INTRODUCTION

1.1 Objective

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project for the monitoring period from 01-January-2013 to 31-December-2017. The objective of verification is to have an independent review ex-post determination by a VVB of the monitored GHG emission reductions that have occurred as a result of the project activity implemented during a defined monitoring period. The evaluation is done against the requirements of the VCS Version 4.1 based on the monitoring report. In order to confirm that the GHG emission reductions sound reasonable and meet the identified criteria, the verification involves the assessment of monitoring plan conformance to VCS rules and applied methodology. Verification is requirement and is seen as necessary to provide assurance on the generation of VCU.

1.2 Scope and Criteria

The scope of the verification is to verify that: (a) the actual monitoring system and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; (b) the GHG emission reductions data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reductions data are free from material misstatement; (c) the reported GHG emissions data is sufficiently supported by evidence. Verification shall ensure that the reported GHG emission reductions are complete and accurate in accordance with the applicable VCS criteria in order to be certified. Verification is conducted using CTI procedures in line with the requirements specified in the VCS Program and ISO14064-3 requirements and applying auditing techniques. Verification team assessed and determines that the implementation and operation of the project activity, and steps to report GHG emission reductions comply with the VCS rules. The verification involved a document review of relevant documentation and interview with the project participants. Verification is not meant to provide any consultancy towards the project participants; however, stated request for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

All GHG sinks, sources and GHG emissions equal to or greater than 2% of the total GHG assertions are considered. The project as generated average of 90,892 VCUs per year, and therefore can be considered as a normal project per the VCS rules, in regards to its GHG emission reduction values, subject to a 2% materiality threshold.

The assessment was conducted to provide a reasonable level of assurance of compliance against the defined audit criteria and materiality threshold within the audit scope. Based on the audit findings the verification statement reasonably assures that the GHG assertion is materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the Project

The project is implemented by Xinxiang Tianjie Bio-Power Generation Co., Ltd., the main purpose of this project activity is to generate clean form of electricity through renewable biomass resource. The installed capacity of the project activity is 24 MW, consisting of 2 sets of steam turbine and generator with unit capacity of 12 MW. The utilization of biomass residues is for cogeneration of power and heat, the average annual power delivered to the grid by the project is expected to be 126,709 MWh and the generation of heat with 909,200GJ/yr. Due to the project doesn't claim the emission reductions due to displacement of heat, hence, the Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants Central China Power Grid (CCPG) and CH₄ emissions will be reduced by avoiding dumping of biomass residues. It's estimated that the project activity could achieve GHG emission reductions of 123,858 tCO_{2e} annually. The project activity is installed in Huixian County, Xinxiang City, Henan Province, People's Republic of China.

The project activity generates GHG emission reductions by generate clean form of electricity through renewable biomass resource, in the 2nd monitoring period from 01-January-2013 to 31-December-2017, the total verified carbon units (VCUs) achieved in the monitoring period are 454,707 tCO_{2e}, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer.

The project activity generates GHG emission reductions by replacing the electricity generated by fossil fuel fired power plants Central China Power Grid (CCPG) and CH₄ emissions will be reduced by avoiding dumping of biomass residues. Thus the project generates GHG emission reductions and produces financial, social and environmental benefits. The project has resulted in the local sustainable development as described in Section 1 of the Monitoring Report. The project was registered as a CDM project on 11-July-2011 with CDM Reference No. of 3054/50/ and further registered as a VCS project activity with the Ref. No. 1140 on 11-September-2013/47/and the emission reductions have been certified as verified carbon units (VCUs) for this monitoring period.

2. VERIFICATION PROCESS

2.1 Method and Criteria

A project specific Verification and monitoring plan was developed to guide the verification auditing process to ensure efficiency and effectiveness. The purpose of the verification is to present a risk assessment for determining the nature and extent of validation procedures necessary to ensure the risk of auditing error is reduced to a reasonable level. According to the ISO14064-3, the criteria are the policy, procedure or requirement used as reference against which evidence is compared. Therefore, verification of the monitoring plan and the reported project results were measured for compliance against the following criteria:

- VCS Standard, v4.1/40/
- VCS Program Guide, v4.0/39/
- VCS Program Definitions, v4.1/38/
- CDM methodology ACM0006 "Consolidated methodology for electricity generation from biomass residues in power and heat plants" (version 10)/27/

The verification process derived from all items in the verification criteria stated above. Field sampling and techniques based on the project parameters, scope and best professional judgement of the verification team in order to meet a reasonable level of assurance. The verification method of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- A desk review of the VCS Monitoring Report/1/ submitted by the client and additional supporting documents with the use of customized verification documents checklist
- Verification planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and related farmers, technicians
- Draft verification reporting
- Resolution of Corrective Action Requests (CARs) and Clarification Requests (CLs)
- Final verification reporting
- Technical review
- Final approval of the verification.

The verification process derived from all items in the verification criteria stated above. Field sampling and techniques based on the project parameters, scope and best professional judgement of the verification team in order to meet a reasonable level of assurance.

2.2 Document Review

The VCS MR/1/ and supporting background documents related to the project implementation were reviewed. Document review was conducted to ensure consistency with and identify any deviation from VCS program requirements. Desk review included an examination of the project details, data and parameters, and quantification of GHG emission reductions.

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the monitoring or to the basic conditions and technical data.

The references used in the course of this verification are summarized in Appendix 3.

The verification was performed basing on the documents check and site inspection/measurements, refer to the section 4 of this report for the verification process detail and corresponding documents review.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the verification process. Onsite interviews and information discussions were conducted with representatives from project implementer, operation staffs, local officers, residents and Project VCS development consultant. The interviews were performed by the verification team on-site (within the project area, in Huixian County, Xinxiang City, Henan Province, P. R. China) and the following is a list of the main interviewees and subject.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Wang	Qingjie	Xinxiang Tianjie Bio-Power Generation Co., Ltd./General Manager	12-August-2021	<ul style="list-style-type: none"> - Chronological description of the project activity with documents of key steps of the implementation. - Technical details of the project realization, designing, operational life time - ER calculation - Monitoring system and arrangements - Monitoring device - Calibration - QA/QC - Ownership - local stakeholder consultation - Training 	Zhang Lei
2.	Zhang	Jingwen	Xinxiang Tianjie Bio-Power Generation Co., Ltd./Duty Chief	12-August-2021		
3.	Wang	Yongdong	Xinxiang Tianjie Bio-Power Generation Co., Ltd./Duty Chief	12-August-2021		
4.	Zhang	Mahui	Wucun Management Office of Huixian City Market Supervision Administration/ Director	12-August-2021		

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
5.	Sun	Jinxun	Local resident	12-August-2021	<ul style="list-style-type: none"> - Stakeholder comments - Environmental aspects 	
6.	Cui	Yancheng		12-August-2021		
7.	Peng	Yumei	Climate Bridge (Shanghai) Ltd./ Project Manager	12-August-2021	<ul style="list-style-type: none"> - Monitoring period - Project activity starting date - Assumptions - ER calculation - Crediting period - Editorial issues of the VCS MR 	Zhang Lei

2.4 Site Inspections

The verification site inspection was conducted on 12-August-2021. A ground inspection of the project was conducted during the site visit and the verification team interviewed representatives from project implementer, operation staffs, local officers, residents and Project VCS development consultant

During the site inspection, the project location, main equipment, monitoring equipment and project implementation were inspected and document evidence were checked, details as following table,

Duration of on-site inspection: 12-August-2021				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening meeting Interview with representatives from PP	Office in Xinxiang Tianjie Bio-Power Generation Co., Ltd. in Huixian County, Xinxiang City, Henan Province, P.R. China	12-August-2021	Zhang Lei
2	On-site inspection of project	Project Area in Huixian County, Xinxiang City, Henan Province, P.R. China	12-August-2021	Zhang Lei
3	Documents check	Office in Xinxiang Tianjie Bio-Power Generation Co., Ltd. in Huixian County, Xinxiang City, Henan Province, P.R. China	12-August-2021	Zhang Lei
4	Finding Summary	Office in Xinxiang Tianjie Bio-Power Generation Co., Ltd. in Huixian County, Xinxiang City, Henan Province, P.R. China	12-August-2021	Zhang Lei
5	Close Meeting	Office in Xinxiang Tianjie Bio-Power Generation Co., Ltd. in Huixian County, Xinxiang City, Henan Province, P.R. China	12-August-2021	Zhang Lei

2.5 Resolution of Findings

Material discrepancies identified in the course of the validation are addressed either as CARs, CLs or FARs.

A Corrective Action Request (CAR) is established where:

The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

The VCS Version 4.1 requirements have not been met;

There is a risk that the emission reductions cannot be monitored or calculated.

A Clarification Request (CL) will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A Forward Action Request (FAR) will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in Appendix 4 of this report.

In the course of the verification, 6 Corrective Action Requests (CARs), 3 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in Appendix 4 of the report.

2.5.1 Forward Action Requests

This is the 2nd periodical verification, and there is no FAR raised in the 1st periodical verification report/5/ and validation report/4/.

2.6 Eligibility for Validation Activities

The VVB Shenzhen CTI International Certification Co., Ltd holds accreditation for both validation and verification for the relevant sectoral scope 1.

3. VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project started operation on 28-October-2009 and it was registered as a CDM project activity in UNFCCC with the Registration Ref. No. 3054 on 11-July-2011. And after gap validation joint with 1st periodic verification under VCS Program, it was registered as a VCS project and allocated with VCS ID 1140 on 11-September-2013/47/.

The project has sought the registration with the VCS Program and validation was conducted by VVB and has been successfully registered in VCS Program and via checking the CDM and VCS dedicated website of the project, CTI confirmed that GHG emission reductions of 153,838 tCO_{2e} generated from 28-October-2009 to 10-July-2011 (both first and last days included) by the project has been issued as VCU's under VCS program/47/ and GHG emission reductions of 186,473 tCO₂ generated from 11-July-2011 to 31-December-2012 (both first and last days included) by the project has been issued as CERs under CDM program/50/.

The verification team also checked the Gold Standard Registry/44/ and the Climate Action Reserve to determine if the project is producing other environmental credits. It was confirmed that the project is not listed on these registries and therefore there is no other environmental credit (for example renewable energy certificate) which has or will be produced by or obtained for the project.

Via on-site interview with the project implementer and checking the project dedicated UNFCCC website <https://cdm.unfccc.int/Projects/DB/RWTUV1256116990.83/view>, it is verified that the implementation of the project is consistent with the description in the Project Design Document (PDD) and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 01-January-2013 to 31-December-2017.

3.2 Methodology Deviations

There is no methodology deviation applied to this monitoring period.

3.3 Project Description Deviations

As per the MR and via on-site inspection and checking the related documents, below project description deviations have been identified and assessed by VVB,

- i. For the crediting period, via checking the VCS website/47/ of the project, CTI confirmed that the project is registered under VCS standard Version 3.3 and completed validation before 19-Mar-2020, hence, via the VCS standard 4.1/40/, "registered projects and projects that complete validation on or before 19-Mar-2020 remain eligible to apply the crediting period requirements under VCS standard Version 3.3 which shall be a maximum of ten years and may be renewed at most twice". Therefore, the first renewable crediting period of this project is updated from 28-October-2009~10-July-2011 to 28-October-2009~27-October-2019 which is verified as in line with the requirement of VCS standard 4.1/40/.

Furthermore, due to the project is registered as a CDM project (UNFCCC Ref. 3054) and the crediting period under CDM is 21 years (7*3 renewable), therefore the total length of VCS crediting period should be no more than 21 years which is from 28-October-2009 to 27-October-2030 and the project is not eligible for VCU issuance beyond 27-October-2030.

- ii. For the monitoring system, as per the PDD, to monitor the parameter $EG_{projectplant,y}$, two bi-directional electricity meters M1 (main meter) and M1' (back-up meter) with an accuracy of 0.5s installed at the import of the new Wucun electric transformer were used as gate-meters to monitor the exported ($EG_{export,y}$) and imported ($EG_{import,y}$) electricity since the project start operation. While on 02-June-2015, via checking the meter change/dismantle record/10/, CTI confirmed that the local grid company replaced the gate meters with two new bi-directional electricity meters with an accuracy of 0.2s which are more fit for the remote monitoring, and by checking the latest Power Purchase Agreement/18/ signed between the project owner and the grid company on 09-May-2016, CTI verified that the new gate meters have been installed at supply side of the project site due to the change of property rights of grid-connected line which have been agreed by both project owner and the grid company. It is found that the new meters have higher accuracy than the old ones which is verified as more accurate for monitoring the electricity exported and imported, hence it is confirmed that no influence on the ER calculation will be occurred due to the meter replacement and no change of the application of applied methodology.
- iii. For the monitoring system, as per the PDD, to monitor the parameter $EC_{P,j,y}$, the on-site electricity consumption at the stalk collection sites was measured by electricity meters installed by power grid company with an accuracy of 1.0s. Via checking the previous monitoring report and verification report/5/, CTI confirmed that there was only one stalk collection site was built to collect stalks since the start of the project, and the on-site electricity consumption at the stalk collection site was measured by an electricity mete (M2) installed on this collecting site by power grid company with an accuracy of 1.0s. However, via site inspection and meter change/dismantle record/10/, CTI verified that this stalk collection site has been closed on 10-March-2014 and after that all biomass is transported directly to the project site, therefore, M2 has been dismantled and the electricity consumed by the project activity is 0 from 10-March-2014 onward.
- iv. For the monitoring system, as per the PDD, to monitor the parameter $FF_{projectsite,diesel,y}$, a flow meter (F1) was used to measure the diesel consumption for ignition, however, during the actual operation of the project, no diesel is needed for the ignition as the biomass residues used in the project are easy to be burnt in the boiler. During the previous monitoring period from 28-Oct-2009 to 31-Dec-2012, the diesel consumption for ignition was 0 which has been verified by checking the previous verification report/5/, therefore the flow meter F1 has been dismantled on 02-Feb-2013 by the project owner which has been confirmed by checking the meter change/dismantle record/10/.

For the diesel used in forklifts, the consumption was determined by the records of diesel purchase and remained/16/ which will be cross-checked with diesel fuel purchase invoices/17/, the final conservative value was used for ER calculation.

The above deviations have not been identified as deviations in the first periodical verification process/5/ thus are considered as new deviations. And based on above assessment, CTI verified that these changes of deviation do not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario and no risk impact on the higher emission reduction calculation. Hence, there is no need to do the re-validation of the project.

3.4 Grouped Project

This section is not applicable as the project is not a grouped project.

4. VERIFICATION FINDINGS

4.1 Project Implementation Status

Through the onsite visit, interviewing the project developer and reviewing the project operation, it was confirmed that the project was implemented to generate clean form of electricity through renewable biomass residues. The installed capacity of the project activity is 24 MW, consisting of 2 sets of steam turbine and generator with unit capacity of 12 MW. The utilization of biomass residues is for cogeneration of power and heat, the average annual power delivered to the grid by the project is expected to be 126,709 MWh and the generation of heat with 909,200GJ/yr. Due to the project doesn't claim the emission reductions due to displacement of heat, hence, the Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants Central China Power Grid (CCPG) and CH₄ emissions will be reduced by avoiding dumping of biomass residues. It's estimated that the project activity could achieve GHG emission reductions of 123,858 tCO₂e annually. Via checking the MR/1/ and by site inspection, CTI verified that there are no changes on the key equipment and technology since the validation of the project.

On the basis of site visit and the reviewed project monitoring report and other supporting docs, it can be confirmed that w.r.t. the realized technology, as well as the monitoring and metering equipment, the project has been implemented and operated as applied methodology/27/ and monitoring plan described in the registered PDD/3/ except deviations assessed in the section 3.3 of this report.

This verification covers the period from 01-January-2013 to 31-December-2017 (including both days). The total consumption of biomass residues of the project were 201,175.84 tonnes of Maizestalk and 330,880.43 tonnes of Wastewood within the 50 kilometres radius range of the project site, the grid-connected electricity were 455,937.262 MWh, therefore, 454,707 tCO₂e emission reductions are achieved during this monitoring period.

The construction of the project started in June 2008 and the 1st turbine generator's commissioning time was 28-October-2009 and 2nd turbine generator's commissioning time was 17-January-2011 which are verified by site visit checking the commissioning approval from local power grid/24/ and 1st verification report/5/.

As part of the site visit the Verification Team was able to confirm that the project implementation is in accordance with the project description contained in the registered PDD/3/. There are no any material discrepancies between project implementation and the project description except deviations assessed in the section 3.3 of this report.

The project started operation on 28-October-2009 and it was registered as a CDM project activity in UNFCCC with the Registration Ref. No. 3054 on 11-July-2011. And after gap validation joint with 1st periodic verification under VCS Program, it was registered as a VCS project and allocated with VCS ID 1140 on 11-September-2013/47/.

The net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions. Via on-site interview with the project implementer and checking the project dedicated UNFCCC website https://cdm.unfccc.int/Projects/DB/RWTUV1256116990.83/view_, it is verified that the implementation

of the project is consistent with the description in the Project Design Document (PDD) and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 01-January-2013 to 31-December-2017.

Besides, based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO_{2e}/year which has been verified in the public website/48/, and it is confirmed that the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/49/. Hence, it is confirmed that the emission reductions will not be double counted.

The project was registered as a VCS project activity with the VCS Ref. No. 1140/47/, with 30 years renewable crediting period started from 28-October-2009 to 27-Oct-2030³ under VCS Program.

This monitoring period (01-January-2013 to 31-December-2017) is the 2nd monitoring period belongs to first 10-year crediting period from 28-October-2009 to 27-October-2019 (both days included).

Details of the project location are given in table 4-1 below:

Table 4-1: Project Location

No.	Project Location
Host Country	China
Region:	Henan Province
Project location address:	Huangli Village, Wucun Town, Huixian County of Xinxiang City
Latitude:	35° 19'50"N
Longitude:	113° 30'40"E

The location of the project site is verified with on-site investigation by GPS devices and confirmed by checking the map/43/.

Details of the project equipment technical parameters are given in table 4-2 below:

Table 4-2 Project equipment technical parameters

Boiler	
Type	YG-75/3.82-T
Quantity	2
Rated evaporative capacity	75t/h
Steam-gas pressure	3.821MPa
Water temperature	150 °C
Efficiency	83%
Manufacture	Jinan Boiler Group Co., Ltd.

³ Due to the project is registered as a CDM project (UNFCCC Ref. 3054) and the crediting period under CDM is 21 years (7*3 renewable), therefore the total length of VCS crediting period should be no more than 21 years which is from 28-October-2009 to 27-October-2030 and the project is not eligible for VCU issuance beyond 27-October-2030

Steam Turbine	
Type	C12-3.43/0.98
Quantity	2
Rated installed capacity	12MW
Inlet pressure	3.43MPa
Inlet temperature	435 °C
Rated steam flow	75t/h
Rated revolution	3,000r/min
Manufacture	China Changjiang Energy Corp (Group)
Generator	
Type	QF-15-2
Quantity	2
Rated power	15MW
Rated voltage	6300V
Rated power factor	0.8
Rated revolution	3,000r/min
Manufacture	China Changjiang Energy Corp (Group)

Via site inspection of the main equipment and checking the nameplate of the equipment/26/, CTI verified that the technical parameters listed in above table are correct and actual and consistent with PDD.

The approved consolidated methodology applied in the project activity is ACM0006 “Consolidated methodology for electricity generation from biomass residues in power and heat plants” (version 10)/27/. Also refers to the latest approved version of the following tools and guidelines:

- “Tool to calculate the emission factor for an electricity system” (version 02)/28/;
- “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” (version 02)/29/;
- “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01)/30/;
- “Combined tool to identify the baseline scenario and demonstrate additionality” (version 02.2)/31/;

Via on-site inspection and interview with the project implementer, CTI verified that the project contributes the sustainable development goal through the following aspects:

- SDG 7 Affordable and Clean Energy – *verified by checking the Emission Reduction Calculation sheet/2/;*
- SDG 8 Decent Work and Economic Growth– *verified by checking the employment contracts/22/ and monthly payroll to the plant staffs/23/;*
- SDG 13 Climate Action – *verified by checking the Emission Reduction Calculation sheet/2/.*

Via checking the validation report/4/ and previous verification report/5/, CTI verified that there were no any previously validated methodology deviations.

In conclusion, Verification Team was able to confirm that the project implementation is in accordance with the project description contained in the registered PDD/3/ except deviations assessed in the section 3.3 of this report.

CL 01, CAR 01, CAR 02 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.2 Safeguards

4.2.1 No Net Harm

The analysis of the potential environmental and socio-economic impacts of the project activity is described in MR/1/. The assessment is as below,

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation.

By checking Environmental Impact Assessment (EIA) Report/6/ for the project activity also Approval of EIA issued by Environment Protection Agency (EPA) of Henan Province/7/, the verification team confirm all environmental impacts has been analyzed and no net harm was detected.

Besides, no potential environment or social economic matter was found during the site visit. The project is renewable energy project and thus no net harm observed in air or water quality on-site thus no negative environmental and socio-economic impacts during this verification period.

Furthermore, via site inspection, CTI confirmed that the project using clean renewable energy to reduce greenhouse gas emissions and the environmental pollution. Meanwhile, the implementation of the project improved local socio-economic development through creating career opportunities and paying taxes which has been confirmed by site interview with local officer and resident.

4.2.2 Local Stakeholder Consultation

A stakeholder survey was carried out by the project developer by carried out the stakeholders meeting on 03-March-2008 which was prior to the start date of the construction has been verified by checking the PDD/3/ and validation report/4/. Survey questionnaires were distributed to relevant personnel from the government, environmental protection bureau, local villagers, teachers, Yanguang Hongtai Bio-product Co., Ltd. (the primary heat consumer) and other relevant stakeholders by the Project owner, totally 51 copies of questionnaires were issued with 51 pieces of reply received. The stakeholders' background information and comments from questionnaires were summarized and recorded in the PDD/3/ and assessed in the validation report/4/. In summary, all stakeholders supported the project design and some of the stakeholders pointed out in the questionnaire that the project owner should strengthen the control about smoke, water and noise after this project activity put into production. The project owner has carried out measures in the EIA to reduce impact on the environment and pay attention to the follow-up solution control according to the comment of stakeholders, which solved possible noise pollution the stakeholders considered. Thus, there is no negative comments received during the project preparation stage, which has been verified by checking the PDD/3/ and validation report/4/.

During the implementation stage of this monitoring period, via checking the local stakeholder communication survey questionnaires/21/ and interview with the local officer and local residents during site visit, it is confirmed that the project developer carried out questionnaire survey for the local stakeholders including representatives from government, environmental protection bureau, local farmers, teachers and other relevant stakeholders to collect the relevant comments and suggestions in July 2013, May 2015 and September 2017 to collect any comments or inputs to the project implementation.

Via checking the filled 90 questionnaires (30 for each time), interview with the local officer and local resident during site visit, it is verified that all of them satisfied with the environment maintenance method for the project and there were no comments and issues from the local stakeholders during the implementation period. Hence there is no need to change the project design based on the stakeholder inputs and CTI confirmed that all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals which in compliance with the VCS requirements.

CL 02 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.3 AFOLU-Specific Safeguards

N.A.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Assessment of Data and parameters Available at Validation

By means of comparison of the MR/1/ and the ER calculation/2/ with the registered PDD/3/, the verification team has checked whether all parameters fixed ex-ante have been applied correctly.

The parameters that are fixed ex ante are following:

Parameters	Source of data	Values applied	Demonstration by Verification team
GWP_{CH4} - Global Warming Potential of methane	IPCC Fifth Assessment Report (AR5) as per VCS standard version 4.1	28 t CO ₂ e/t CH ₄	This is an ex-ante value but updated as per VERRA decisions, the value used in this monitoring period is derived from Fifth Assessment Report (AR5)/32/ as per VCS standard version 4.1/40/
EF_{grid,CM,y} - CO ₂ emission factor for the electricity displaced due to the project	China Electric Power Yearbook 2005~2007 according to the registered CDM PDD	0.9735 tCO ₂ e/MWh	This is an ex-ante fixed value as listed in the PDD/3/ and derived from China Electric Power Yearbook 2005~2007/41/ which has been verified during the validation process/4/.
EF_{km,CO2} - Average CO ₂ emission factor for the trucks during the year y	IPCC default value for the US heavy Duty Diesel Vehicle in uncontrolled condition (the	0.001097 t CO ₂ e/t km	This is an ex-ante fixed value as listed in the PDD/3/ which is a default value from IPCC/45/. PP has selected the conservative value for the US heavy Duty Diesel

	highest emission level) according to the registered CDM PDD		Vehicle in uncontrolled condition (the highest emission level) which has been verified during the validation process/4/.
NCV_{diesel,y} - The net calorific value (energy content) of diesel	Country-specific value according to the registered CDM PDD	42.652 GJ/t	This is an ex-ante fixed value as listed in the PDD/3/ which is a Country-specific value.
EF_{CO₂,diesel,y} - The CO ₂ emission factor of diesel in year y	IPCC default value according to the registered CDM PDD	0.0741 t CO ₂ /GJ	This is an ex-ante fixed value as listed in the PDD/3/ which is a default value from IPCC/45/.
TDL_y - Average technical transmission and distribution losses in the grid in year y for the voltage level at which electricity is obtained from the grid at the project site	Default value from Tool to Calculate Baseline, Project and/or Leakage Emissions from Electricity Consumption (version 01) according to the registered CDM PDD	20%	This is an ex-ante fixed value as listed in the PDD/3/ which is a default value from Tool to Calculate Baseline, Project and/or Leakage Emissions from Electricity Consumption (version 01)/30/
EF_{CH₄,BF} - The CH ₄ emission factor for the combustion of biomass residues in the project plant in year y	The CH ₄ emission factor for the combustion of biomass residues in the project plant in year y	0.0000411 tCH ₄ /GJ	This is an ex-ante fixed value as listed in the PDD/3/ which is a default value from applied methodology/27/.
NCV_K · EF_{burning,CH₄,k,y} - The CH ₄ emission factor for the combustion of biomass residues in the project plant in year y	The CH ₄ emission factor for the combustion of biomass residues in the project plant in year y	0.001971 tCH ₄ /t	This is an ex-ante fixed value as listed in the PDD/3/ which is a default value from applied methodology/27/.

In conclusion, the parameter fixed ex ante has been indicated in the registered PDD/3/. And the MR is checked as in line with the PDD/3/.

4.4.2 Assessment of Data and parameters Monitored

During the verification all relevant monitoring parameters as listed in PDD/3/ have been verified and summarized in the below table.

EG_{Projectplant,y}	Net quantity of electricity generated in the project plant during the year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes – MWh
Appropriate description?	Yes
Monitored Value?	455,937.262 for this monitoring period
Correct value provided?	Yes

Source clearly referenced? (appropriate?)	Yes-it is monitored by two bi-directional electricity meters M1 (measure meter) and M1' (check meter) installed at the import of the new Wucun electric transformer before 02-June-2015 and changed to two new meters at supply side of the project site which can measure the exported and imported electricity thus calculate the net quantity of electricity supplied by the project activity plant				
Choice of data correctly justified?	Yes -monitored by two bi-directional electricity meters which can measure electricity export ($EG_{\text{export},y}$) and import ($EG_{\text{import},y}$) electricity from the grid, then the net quantity of electricity generated in the project plant is calculated by difference of the two values.				
Measurement method and procedures correctly described?	Yes -monitored by two bi-directional electricity meters which can measure the electricity export ($EG_{\text{export},y}$) and import ($EG_{\text{import},y}$) electricity from the grid, and monitoring team was responsible for monitoring including monitoring, aggregating and processing original data, crosscheck and archiving of monitoring data, and the calibration and maintenance of the measuring equipment.				
Calculation method?	Yes -sum of monthly data				
Monitoring frequency correctly described?	Continuously measured by meter and monthly recorded/8/ - verified as per PDD/3/ and the applied methodology/27/ At 24:00 hr of the 23 rd day of each month, the monitoring team will record the bidirectional electricity meter's readings and complete Meter Reading Records/8/. The staff from power grid company issue the receipts from electricity sales and purchases/9/ according to the meter readings monthly.				
Monitoring equipment correctly described?	Bi-directional Electricity meters - verified as per PDD/3/ and the applied methodology/27/				
	Type	Serial number	Accuracy class	Date of calibration	Validity
	DTSD188s (old measure meter M1)	G014MS0 00391	0.5s	10-Nov-2012 03-Nov-2013 01-Nov-2014	09-Nov-2013 02-Nov-2014 31-Oct-2015
	DTSD188s (old check meter M1')	G014MS0 00383	0.5s	10-Nov-2012 03-Nov-2013 01-Nov-2014	09-Nov-2013 02-Nov-2014 31-Oct-2015
	DSZ188 (New measure meter M1)	47304-2-11301669	0.2S	07-May-2015 05-May-2016 06-Apr-2017	06-May-2016 04-May-2017 05-Apr-2018
	DSZ188 (New check meter M1')	47304-2-11301670	0.2S	07-May-2015 05-May-2016 06-Apr-2017	06-May-2016 04-May-2017 05-Apr-2018

	<p>Refer to section 3.3 of this report for assessment of the meter change which is identified as a deviation. And via the assessment and checking the meter change/dismantle record/10/, CTI confirmed that there is no impact to ER calculation by changing the meters and the meter readings are correctly recorded in the meter change/dismantle record/10/, so that the value of electricity was correctly recorded and calculated.</p> <p>The model, serial No., accuracy class and calibration information of the equipment used has been provided, the old electricity meters were calibrated by Electricity Measurement Center of Xinxiang Power Bureau, Henan Grid Co., Ltd/20/ annually and new electricity meters were calibrated by Henan Electric Power Company Measurement Center/20/ annually, which are confirmed in line with the frequency defined in PD as once in one year, by checking the calibration report/19/, it is confirmed that the calibration for this equipment was valid for this monitoring period.</p>
QA/QC procedure correctly described?	<p>Yes- the receipts from electricity sales and purchases/9/ have been used for cross-check and via comparing the receipts from electricity sales and purchases/9/ for this motoring period with the electricity meter reading records/8/, CTI verified that the values are consistent. Furthermore, PP has conducted a cross check about whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency that is comparable to previous years in the ER sheet/2/, via comparing the result for this monitoring period with previous years, CTI verified that the efficiency is reasonable.</p> <p>The calibration frequency of electricity meter with accuracy of 0.5s or 0.2s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448)/25/.</p>
Purpose of data?	BE calculation
Comments?	N/A

$BF_{k,y}$	Quantity of biomass residue type k combusted in the project plant during the year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes –Tons of dry matter
Appropriate description?	Yes
Monitored Value?	$BF_{Maizestalk,y}$ - 201,175.84 $BF_{Wastewood,y}$ - 330,880.43
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	<p>Yes– it is monitored by electronic belt weight installed at the feeding inlet of the boiler. Adjust for the moisture content in order to determine the quantity of dry biomass.</p> <p>For the moisture content value, refer to below assessment of table for parameter Moisture content of the biomass residues</p>
Choice of data correctly justified?	Yes –monitored by electronic belt weight installed at the feeding inlet of the boiler. Adjust for the moisture content in order to determine the quantity of dry biomass.
Measurement method and procedures correctly described?	<p>Yes –monitored by electronic belt weight installed at the feeding inlet of the boiler continuously. Adjust for the moisture content in order to determine the quantity of dry biomass.</p> <p>For consumption of biomass residues, the quantity (wet-basis) and type were measured and recorded in Monthly Report for Biomass Residues Consumption/11/. Then Quantity (tonnes on dry-basis) of</p>

	biomass residues were calculated based on Quantity (tonnes on wet-basis) of biomass residues and the moisture content (For the moisture content value, refer to below assessment of table for parameter Moisture content of the biomass residues) of the biomass residues accordingly and recorded in the Monthly Report for Biomass Residues Consumption/11/.																				
Calculation method?	Yes –sum of monthly data																				
Monitoring frequency correctly described?	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions - verified as per PDD and the applied methodology																				
Monitoring equipment correctly described?	<p>Electronic belt weight - verified as per PDD and the applied methodology</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Serial number</th> <th>Accuracy class</th> <th>Date of calibration</th> <th>Validity</th> </tr> </thead> <tbody> <tr> <td rowspan="6">ICS-17B-1400</td> <td rowspan="6">12060401</td> <td rowspan="6">0.5</td> <td>11-Dec-2012</td> <td>10-Dec-2013</td> </tr> <tr> <td>10-Dec-2013</td> <td>09-Dec-2014</td> </tr> <tr> <td>09-Dec-2014</td> <td>08-Dec-2015</td> </tr> <tr> <td>08-Dec-2015</td> <td>07-Dec-2016</td> </tr> <tr> <td>07-Dec-2016</td> <td>06-Dec-2017</td> </tr> <tr> <td>06-Dec-2017</td> <td>05-Dec-2018</td> </tr> </tbody> </table> <p>The model, serial No., accuracy class and calibration information of the equipment used has been provided, the devices were calibrated by Quality Technology Supervision and Cheking Testing Centre of Hui Xian City/20/ annually in line with the frequency defined in PDD as once in one year, by checking the calibration report/19/, it is confirmed that the calibrations for the equipment were valid for this monitoring period.</p>	Type	Serial number	Accuracy class	Date of calibration	Validity	ICS-17B-1400	12060401	0.5	11-Dec-2012	10-Dec-2013	10-Dec-2013	09-Dec-2014	09-Dec-2014	08-Dec-2015	08-Dec-2015	07-Dec-2016	07-Dec-2016	06-Dec-2017	06-Dec-2017	05-Dec-2018
Type	Serial number	Accuracy class	Date of calibration	Validity																	
ICS-17B-1400	12060401	0.5	11-Dec-2012	10-Dec-2013																	
			10-Dec-2013	09-Dec-2014																	
			09-Dec-2014	08-Dec-2015																	
			08-Dec-2015	07-Dec-2016																	
			07-Dec-2016	06-Dec-2017																	
			06-Dec-2017	05-Dec-2018																	
QA/QC procedure correctly described?	Yes- the energy balance for this monitoring period based on biomass residues purchased quantities and stock changes/13/ have been used for cross-check and via comparing the Monthly Report for Biomass Residues Consumption/11/ for this motoring period with the energy balance on biomass residues purchased quantities and stock changes /13/, CTI verified that the values in Monthly Report for Biomass Residues Consumption/11/ are reasonable.																				
Purpose of data?	BE calculation																				
Comments?	N/A																				

BE_{T,k,y}	Quantity of biomass residue type k that has been transported to the project site during the year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes –tons of dry matter
Appropriate description?	Yes
Monitored Value?	855,518.86
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes– it is monitored by weight meter installed in the gate of the project site and recorded by PP
Choice of data correctly justified?	Yes –monitored by weight meter installed in the gate of the project site
Measurement method and procedures correctly described?	<p>Yes –monitored by weight meter installed in the gate of the project site.</p> <p>For freight transported biomass residues, the total mass of each freight transported have been measured by weight meter and</p>

	recorded by PP in Monthly biomass residues transported statistics record/12/.																				
Calculation method?	Yes –sum of monthly data																				
Monitoring frequency correctly described?	Data monitored continuously and aggregated as appropriate - verified as per PDD and the applied methodology																				
Monitoring equipment correctly described?	<p>Weight meter - verified as per PDD and the applied methodology</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Serial number</th> <th>Accuracy class</th> <th>Date of calibration</th> <th>Validity</th> </tr> </thead> <tbody> <tr> <td rowspan="6">XK3190-A9 (SCS-80)</td> <td rowspan="6">0710430</td> <td rowspan="6">III</td> <td>12-Dec-2012</td> <td>11-Dec-2013</td> </tr> <tr> <td>08-Dec-2013</td> <td>07-Dec-2014</td> </tr> <tr> <td>05-Dec-2014</td> <td>04-Dec-2015</td> </tr> <tr> <td>03-Dec-2015</td> <td>02-Dec-2016</td> </tr> <tr> <td>02-Dec-2016</td> <td>01-Dec-2017</td> </tr> <tr> <td>01-Dec-2017</td> <td>30-Nov-2018</td> </tr> </tbody> </table> <p>The model, serial No., accuracy class and calibration information of the equipment used has been provided, the devices were calibrated by Quality Technology Supervision and Cheking Testing Centre of Hui Xian City/20/ annually in line with the frequency defined in PD as once in one year, by checking the calibration report/19/, it is confirmed that the calibrations for the equipment were valid for this monitoring period.</p>	Type	Serial number	Accuracy class	Date of calibration	Validity	XK3190-A9 (SCS-80)	0710430	III	12-Dec-2012	11-Dec-2013	08-Dec-2013	07-Dec-2014	05-Dec-2014	04-Dec-2015	03-Dec-2015	02-Dec-2016	02-Dec-2016	01-Dec-2017	01-Dec-2017	30-Nov-2018
Type	Serial number	Accuracy class	Date of calibration	Validity																	
XK3190-A9 (SCS-80)	0710430	III	12-Dec-2012	11-Dec-2013																	
			08-Dec-2013	07-Dec-2014																	
			05-Dec-2014	04-Dec-2015																	
			03-Dec-2015	02-Dec-2016																	
			02-Dec-2016	01-Dec-2017																	
			01-Dec-2017	30-Nov-2018																	
QA/QC procedure correctly described?	Yes- the energy balance for this monitoring period based on purchased quantities and stock changes/13/ have been used for cross-check and via comparing the Monthly biomass residues transported statistics record/12/ for this motoring period with the energy balance of purchased quantities and stock changes/13/, CTI verified that the values are consistent.																				
Purpose of data?	PE calculation																				
Comments?	N/A																				

Moisture content of the biomass residues	Moisture content of each biomass residues type k			
Title in line with Methodology?	Yes			
Data unit correctly expressed?	Yes –% Water content			
Appropriate description?	Yes			
Monitored Value?	Period		Maizestalk (%)	Wastewood (%)
	01-Jan-2013	31-Dec-2013	36.50%	40.42%
	01-Jan-2014	31-Dec-2014	39.43%	40.82%
	01-Jan-2015	31-Dec-2015	41.21%	48.45%
	01-Jan-2016	31-Dec-2016	26.03%	29.19%
	01-Jan-2017	31-Dec-2017	43.36%	34.88%
Correct value provided?	Yes			
Source clearly referenced? (appropriate?)	Yes– it is monitored by moisture analyzer installed in gate of the project site.			
Choice of data correctly justified?	Yes –monitored by moisture analyzer installed in gate of the project site.			
Measurement method and procedures correctly described?	Yes –monitored by moisture analyzer installed in gate of the project site. For each freight transported biomass residues, the moisture content of the biomass residues has been monitored continuously by using moisture analyzer and recorded in the Monthly biomass residues transported statistics record/12/.			

Calculation method?	Yes –The moisture content was monitored for each freight transported of biomass of homogeneous quality, using moisture analyzer. The mean values calculated monthly and used in the ER calculations.																				
Monitoring frequency correctly described?	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions - verified as per PDD and the applied methodology																				
Monitoring equipment correctly described?	Moisture analyzer - verified as per PDD and the applied methodology <table border="1"> <thead> <tr> <th>Type</th> <th>Serial number</th> <th>Accuracy class</th> <th>Date of calibration</th> <th>Validity</th> </tr> </thead> <tbody> <tr> <td rowspan="6">Sh-10A</td> <td rowspan="6">-</td> <td rowspan="6">0.2%</td> <td>07-May-2012</td> <td>06-May-2013</td> </tr> <tr> <td>25-Apr-2013</td> <td>24-Apr-2014</td> </tr> <tr> <td>23-Apr-2014</td> <td>22-Apr-2015</td> </tr> <tr> <td>21-Apr-2015</td> <td>20-Apr-2015</td> </tr> <tr> <td>15-Apr-2016</td> <td>14-Apr-2017</td> </tr> <tr> <td>13-Apr-2017</td> <td>12-Apr-2018</td> </tr> </tbody> </table>	Type	Serial number	Accuracy class	Date of calibration	Validity	Sh-10A	-	0.2%	07-May-2012	06-May-2013	25-Apr-2013	24-Apr-2014	23-Apr-2014	22-Apr-2015	21-Apr-2015	20-Apr-2015	15-Apr-2016	14-Apr-2017	13-Apr-2017	12-Apr-2018
Type	Serial number	Accuracy class	Date of calibration	Validity																	
Sh-10A	-	0.2%	07-May-2012	06-May-2013																	
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			15-Apr-2016	14-Apr-2017																	
			13-Apr-2017	12-Apr-2018																	
QA/QC procedure correctly described?	The model, serial No., accuracy class and calibration information of the equipment used has been provided, the devices were calibrated by Quality Technology Supervision and Cheking Testing Centre of Hui Xian City/20/ annually in line with the frequency defined in PD as once in one year, by checking the calibration report/19/, it is confirmed that the calibrations for the equipment were valid for this monitoring period.																				
Purpose of data?	Calculation of baseline and project emissions																				
Comments?	N/A																				

TLy	Average load of the trucks used in transportation of biomass during the year y																		
Title in line with Methodology?	Yes																		
Data unit correctly expressed?	Yes –t																		
Appropriate description?	Yes																		
Monitored Value?	<table border="1"> <thead> <tr> <th colspan="2">Period</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>01-Jan-2013</td> <td>31-Dec-2013</td> <td>10.98</td> </tr> <tr> <td>01-Jan-2014</td> <td>31-Dec-2014</td> <td>10.56</td> </tr> <tr> <td>01-Jan-2015</td> <td>31-Dec-2015</td> <td>9.22</td> </tr> <tr> <td>01-Jan-2016</td> <td>31-Dec-2016</td> <td>8.36</td> </tr> <tr> <td>01-Jan-2017</td> <td>31-Dec-2017</td> <td>14.35</td> </tr> </tbody> </table>	Period		Value	01-Jan-2013	31-Dec-2013	10.98	01-Jan-2014	31-Dec-2014	10.56	01-Jan-2015	31-Dec-2015	9.22	01-Jan-2016	31-Dec-2016	8.36	01-Jan-2017	31-Dec-2017	14.35
Period		Value																	
01-Jan-2013	31-Dec-2013	10.98																	
01-Jan-2014	31-Dec-2014	10.56																	
01-Jan-2015	31-Dec-2015	9.22																	
01-Jan-2016	31-Dec-2016	8.36																	
01-Jan-2017	31-Dec-2017	14.35																	
Correct value provided?	Yes																		
Source clearly referenced? (appropriate?)	Yes– it is from Monthly biomass residues transported statistics record/12/ recorded by PP.																		
Choice of data correctly justified?	Yes – Via checking the Monthly biomass residues transported statistics record/12/ recorded by PP during this monitoring period, CTI confirmed that the average load of the trucks used in transportation of biomass is calculated correctly and annual values provided is verified as correct.																		
Measurement method and procedures correctly described?	Yes – each load of the truck used in transportation of biomass have been recorded by project proponents during this monitoring period/12/ and the average truck load was determined by averaging the weights of each truck carrying biomass to the project plant annually and yearly data is finally calculated.																		
Calculation method?	N/A																		
Monitoring frequency correctly described?	Yes – Continuously recorded, and calculated annually																		

Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	Yes - Consistency has been confirmed by checking the Monthly biomass residues transported statistics record/12/.
Purpose of data?	PE calculation
Comments?	N/A

AVD_y	Average round trip distance (from and to) between biomass fuel supply sites and the project site during the year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes - km
Appropriate description?	Yes
Monitored Value?	50*2 for this monitoring period
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes - it is from Monthly biomass residues transported statistics record/12/ recorded by PP
Choice of data correctly justified?	Yes - Via checking the Monthly biomass residues transported statistics record/12/ recorded by PP during this monitoring period, CTI confirmed that no single trip road distance is more than 50km. As according to the law and regulation, the radius collection of every biomass project should be no more than 50 km. Therefore, it is most conservative to apply 50*2 as the value for ER calculation.
Measurement method and procedures correctly described?	Yes - the trip road distances for each vehicle have been recorded by PP during this monitoring period/12/ and no single trip road distance is more than 50km. Therefore, it is most conservative to apply 50*2 as the value for ER calculation.
Calculation method?	N/A
Monitoring frequency correctly described?	Yes - Continuously
Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	Yes - Consistency has been confirmed by checking the Monthly biomass residues transported statistics record/12/ comparing records distance in map/15/. For this monitoring period, no record of distance was more than 50km, so 50*2 round trip road distance used for ER calculation is verified as conservative.
Purpose of data?	PE calculation
Comments?	N/A

FF_{project plant,diesel,y}	Quantity of fossil fuel type <i>i</i> (diesel) combusted in the project plant during the year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes - t
Appropriate description?	Yes
Monitored Value?	0
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes- it is derived from on-site measurement
Choice of data correctly justified?	Yes -During the actual operation of the project, no diesel is needed for the ignition as the biomass residues used in the project are easy to be burnt in the boiler. During the previous monitoring period from 28-October-2009 to 31-December-2012, the diesel consumption for

	ignition was 0, therefore the flow meter F1 has been dismantled in 02-February-2013 by the project owner
Measurement method and procedures correctly described?	N/A
Calculation method?	N/A
Monitoring frequency correctly described?	Yes – Continuously
Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	N/A During the previous monitoring period from 28-October-2009 to 31-December-2012, the diesel consumption for ignition was 0, therefore the flow meter F1 has been dismantled in 02-February-2013 by the project owner. Refer to section 3.3 of this report for this deviation description.
Purpose of data?	PE calculation
Comments?	N/A

FF_{projectsite,diesel,y}	Quantity of diesel combusted at the project site for other purposes that are attributable to the project activity during the year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes – t
Appropriate description?	Yes
Monitored Value?	356.90
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes– it is derived from records of diesel purchase and remained/16/ and diesel fuel purchase invoices/17/
Choice of data correctly justified?	Yes –derived from diesel purchase and remained/16/ but not monitored by flow meters which is not in line with PD and methodology request, refer to the deviation description in section 3.3 of this report.
Measurement method and procedures correctly described?	Yes – The project did not use flow meter to monitor the quantity of diesel fuel for transporting by forklifts. Instead, the quantity of diesel fuel purchased which has been verified in the records of diesel purchase and remained/16/ and cross-checked with diesel fuel purchase invoices/17/ was used for ER calculation which is more conservative as there could be stock for diesel. Thus, the purchase invoices/17/ are provided to calculate the project emission for conservativeness for this monitoring period.
Calculation method?	Yes –sum of continuous recorded data
Monitoring frequency correctly described?	Yes – Continuously
Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	Yes- conservative values between records of diesel purchase and remained/16/ and diesel fuel purchase invoices/17/ used for ER calculation which is conservative as there could be stock for diesel.
Purpose of data?	PE calculation
Comments?	N/A

EG_{PJ,y}	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				
Title in line with Methodology?	Yes				
Data unit correctly expressed?	Yes – MWh				
Appropriate description?	Yes				
Monitored Value?	307.48				
Correct value provided?	Yes				
Source clearly referenced? (appropriate?)	Yes– it is monitored by a bi-directional electricity meter M2 in a stalk collection site which can measure the on-site electricity consumption at the stalk collection site				
Choice of data correctly justified?	Yes –it is monitored by a bi-directional electricity meter M2 in a stalk collection site which can measure the on-site electricity consumption at the stalk collection site				
Measurement method and procedures correctly described?	Yes –it is monitored by a bi-directional electricity meter M2 in a stalk collection site which can measure the on-site electricity consumption at the stalk collection site, and monitoring team was responsible for monitoring and checks for regular calibration of electricity meter.				
Calculation method?	Yes –sum of monthly data				
Monitoring frequency correctly described?	Continuously measured by meter and monthly recorded/8/ - verified as per PDD and the applied methodology At 24:00 hr of the last day of each month, the staff from project owner record the bidirectional electricity meter's readings and complete Meter Reading Records/8/. The staff from power grid company issue the receipts from electricity purchases according to the meter readings monthly.				
Monitoring equipment correctly described?	Bi-directional Electricity meter - verified as per PDD and the applied methodology				
	Type	Serial number	Accuracy class	Date of calibration	Validity
	DTS72	KSE005040	1.0s	13-Oct-2012 11-Oct-2013	12-Oct-2013 10-Oct-2014
	Via checking the previous monitoring report and verification report/5/, CTI confirmed that there was only one stalk collection site was built to collect stalks since the start of the project, and the on-site electricity consumption at the stalk collection site was measured by an electricity mete (M2) installed on this collecting site by power grid company with an accuracy of 1.0s. However, via site inspection and checking the meter change/dismantle record/10/, CTI verified that this stalk collection site has been closed on 10-March-2014 and after that all biomass is transported directly to the project site, therefore, M2 has been dismantled and the electricity consumed by the project activity is 0 from 10-March-2014 onward. The model, serial No., accuracy class and calibration information of the equipment used has been provided, the electricity meter was calibrated by Electric Energy Metering Center of Xinxiang Power Supply Company of Henan Electric Power Company/20/ annually in line with the frequency defined in PDD as once in one year, by checking the calibration report/19/, it is confirmed that the calibration for this equipment was valid for this monitoring period.				
QA/QC procedure correctly described?	Yes- the receipts from electricity purchases/9/ have been used for cross-check and via comparing the receipts from electricity				

	<p>purchases/9/ for this motoring period before 10-March-2014 with the electricity meter reading records/8/, CTI verified that the values are consistent.</p> <p>The calibration frequency of electricity meter with accuracy of 1.0s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448)/25/</p>
Purpose of data?	PE calculation
Comments?	N/A

NCV_k	Net calorific value of biomass residue type k			
Title in line with Methodology?	Yes			
Data unit correctly expressed?	Yes –GJ/ton of dry matter			
Appropriate description?	Yes			
Monitored Value?	Period		<i>NCV_{Maizestalk}</i>	<i>NCV_{Wastewood}</i>
	01-Jan-2013	31-Dec-2013	14.96	13.52
			13.52	12.65
	01-Jan-2014	31-Dec-2014	12.13	14.17
			8.24	12.96
	01-Jan-2015	31-Dec-2015	13.73	13.29
			12.61	13.29
	01-Jan-2016	31-Dec-2016	13.38	13.9
		11.64	13.44	
01-Jan-2017	31-Dec-2017	13.64	13.99	
		10.73	13.4	
Correct value provided?	Yes			
Source clearly referenced? (appropriate?)	Yes– it is from Biomass NCV value test reports/33/ issued by Henan Coal Quality Supervision and Inspection Center			
Choice of data correctly justified?	Yes –the NCV values were analyzed by Henan Coal Quality Supervision and Inspection Center			
Measurement method and procedures correctly described?	Yes –the NCV values were analyzed by Henan Coal Quality Supervision and Inspection Center every six months, taking at least three samples for each measurement and Biomass NCV value test reports/33/ were issued			
Calculation method?	Yes –the annual values equals to the maximum of net calorific values of biomass residue measured every six months			
Monitoring frequency correctly described?	Measured every six months, taking at least three samples for each measurement			
Monitoring equipment correctly described?	N/A			
QA/QC procedure correctly described?	<p>The qualification of analysis party Henan Coal Quality Supervision and Inspection Center/20/ is checked and confirmed valid for this monitoring period.</p> <p>The values for this monitoring period are comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC.</p> <p>And via checking the measurements from previous years as listed in the verification report/5/ and IPCC value/45/, CTI confirmed that the values are reasonable.</p>			
Purpose of data?	PE calculation			
Comments?	N/A			

-	Quantity of each biomass residues type k that are utilized in the defined geographical region			
Title in line with Methodology?	Yes			
Data unit correctly expressed?	Yes - t			
Appropriate description?	Yes			
Monitored Value?	Period		Maizestalk	Wastewood
	01-Jan-2013	31-Dec-2013	283,493	197,458
	01-Jan-2014	31-Dec-2014	232,451	184,635
	01-Jan-2015	31-Dec-2015	193,661	159,894
	01-Jan-2016	31-Dec-2016	204,016	140,875
	01-Jan-2017	31-Dec-2017	214,524	208,118
Correct value provided?	Yes			
Source clearly referenced? (appropriate?)	Yes- derived from local statistical data of annual Biomass residues fuel special report of Hui Xian City/14/			
Choice of data correctly justified?	Yes -annual Biomass residues fuel special report of Hui Xian City/14/ are issued by Statistical Bureau of Hui Xian City which confirmed as local statistical data in line with the request in the PDD			
Measurement method and procedures correctly described?	N/A			
Calculation method?	N/A			
Monitoring frequency correctly described?	Yes - Annually			
Monitoring equipment correctly described?	N/A			
QA/QC procedure correctly described?	N/A			
Purpose of data?	LE determination			
Comments?	N/A			

-	Quantity of available biomass residues type k in the defined geographical region			
Title in line with Methodology?	Yes			
Data unit correctly expressed?	Yes - t			
Appropriate description?	Yes			
Monitored Value?	Period		Maizestalk	Wastewood
	01-Jan-2013	31-Dec-2013	383,900	257,900
	01-Jan-2014	31-Dec-2014	384,100	247,800
	01-Jan-2015	31-Dec-2015	379,300	240,000
	01-Jan-2016	31-Dec-2016	383,900	247,800
	01-Jan-2017	31-Dec-2017	384,000	268,700
Correct value provided?	Yes			
Source clearly referenced? (appropriate?)	Yes- derived from local statistical data of annual Biomass residues fuel special report of Hui Xian City/14/			
Choice of data correctly justified?	Yes -annual Biomass residues fuel special report of Hui Xian City/14/ are issued by Statistic Bureau of Hui Xian City which confirmed as local statistical data in line with the request in the PDD			
Measurement method and procedures correctly described?	N/A			
Calculation method?	N/A			

Monitoring frequency correctly described?	Yes - Annually
Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	N/A
Purpose of data?	LE determination
Comments?	N/A

In conclusion, CTI confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with PDD, applied methodology, all applicable standards and relevant requirements.

CAR 03, CAR 04, CAR 05, CAR 06 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.3 Assessment of in Compliance with monitoring plan

By means of comparison of the MR with the applied CDM methodology and all VCS standards' requirements.

The verification team has checked whether the monitoring implementation during this monitoring period is in compliance with the monitoring plan in PDD and related requirements of the applied methodology/tools.

The verification team has checked the monitoring system in MR against the applied methodology and monitoring plan of the PDD.

The monitoring system has been operated as per the monitoring plan in the PDD as in compliance with the latest applicable version of the methodology (ACM0006 version 10).

Data and parameters to be monitored as above tables are confirmed in line with the PDD and applied methodology, also corresponding to the formula used for ER calculation.

Monitoring structure

The PDD contains a diagram illustrating the Management structure of VCS monitoring to be implemented by the PP in order to implement the project activity. Via the MR and PDD, the monitoring team consists of the VCS Director, monitoring manager and monitoring team, and by site interview with the monitoring representatives, CTI confirmed that the roles of the monitoring team have been clearly defined and the responsibilities have been implemented by monitoring team sufficiently. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

Monitoring process

Data and parameters to be monitored as above tables in section 4.4.2 are confirmed in line with the methodology and tool, also corresponding to the formula used for ER calculation.

For the monitoring system and points of electricity, via on-site investigation, it is confirmed that the electricity monitoring system is installed to directly and continuously measure the electricity by the

project activity, two parameters ($EG_{\text{Projectplant},y}$ and $EG_{\text{PJ},y}$) are measured on-time by the bi-directional meters installed. The electricity generated is supplied to the grid under the Power Purchase Agreement/18/.

For the monitoring system and points of biomass residues includes quantity, moisture content and net calorific value of used biomass residues, Quantity of utilized biomass residues were measured by electronic belt weight installed at the feeding inlet of the boiler, the moisture content of biomass residues was measured by moisture analyzer installed in gate of the project site for the random sample when they are transported into the project site each time, the net calorific value of biomass residues was measured by sending the random sample to local Quality Testing Bureau for analysis every six months, taking at least three samples for each measurement.

For other parameters, refer to above tables in section 4.4.2 for detail assessment of the monitoring method and process.

All monitoring devices were calibrated by qualified third parties/20/ in line with the national calibration standard and applied methodology and PDD.

QA/QC

The QA/QC manager is in charge of calibration and maintenance of the instruments to ensure their accuracy and reliability. The accuracy of all the monitoring devices is in line with the related requirements as confirmed in the calibration report/19/. Calibration of equipment has been implemented periodically by qualified party/20/ according to national standards and rules/19/. All the records have been documented by the PP.

The monitoring team was trained for basic conception and management of the project activity by checking the training records/34/, specific staff collected the measured biomass residues and electricity data regularly and complete the corresponding records, keeping all the data collected as part of monitoring archived electronically.

Internal audit was conducted by QA/QC manager for cross check all the data as described in above tables in section 4.4.2.

Emergency procedure

Monitoring team will take actions to deal with missing data due to negligence and improper operation and maintain or will replace the broken monitoring devices if any malfunction, and specially for the electricity monitoring, if measure meter fail, the reading data from check meter will be used, also and the monitoring data will be calculated conservatively for emission calculations during the troubleshooting period.

By site interview with monitoring staff and experts and checking the related evidence for data/9/,/19/, CTI verified that no emergency situations have been occurred. Thus no emergency procedure was used for this monitoring period.

Based on above assessment, CTI verified that the monitoring system complies with the applied methodology and the monitoring plan and all applied procedures are completely in compliance to the methodology ACM0006 (version 10) and PDD.

CL 03 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.4 Compliance with the calibration frequency requirements for measuring instruments

During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the registered PDD/3/ and/or the applicable calibration standards.

The information of monitoring equipment used for monitoring in this monitoring period is listed in PDD and the calibration information has been assessed in above section 4.4.2 in each monitoring parameter table.

Furthermore, via checking the certificate of third party who conducted the calibration/20/, CTI confirmed that the third party get the related qualification.

In conclusion, the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan in PD. Based on that CTI can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.

4.4.5 Assessment of data and calculation of emission reductions or net removals

4.4.5.1 Calculation of baseline GHG emissions or removals

According to the methodology and registered PDD, there is no direct BE calculation formular but the ER is calculated as below

$$ER_y = ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y \quad (1)$$

Where:

ER_y	=	Emissions reductions of the project activity during the year y (tCO ₂ /yr)
$ER_{electricity,y}$	=	Emission reductions due to displacement of electricity during the year y (tCO ₂ /yr)
$ER_{heat,y}$	=	Emission reductions due to displacement of heat during the year y (tCO ₂ /yr)
$BE_{biomass,y}$	=	Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year y (tCO ₂ e/yr)
PE_y	=	Project emissions during the year y (tCO ₂ /yr)
L_y	=	Leakage emissions during the year y (tCO ₂ /yr)

Hence baseline emissions is considered in the MR including $ER_{heat,y}$, $ER_{electricity,y}$ and $BE_{biomass,y}$.

For $ER_{heat,y}$, this project does not claim for the emission reductions due to displacement of heat, so $ER_{heat,y} = 0$.

For $ER_{electricity,y}$, as per the PDD and applied methodology, it is calculated as below formular,

$$ER_{electricity,y} = EG_y \cdot EF_{electricity,y} = EG_{projectplant,y} \cdot EF_{electricity,y} \quad (2)$$

Where:

$EG_{projectplant,y}$	=	Net quantity of electricity generated in the project plant during the year y, MWh
$EF_{electricity,y}$	=	CO ₂ emission factor for the electricity displaced due to the project activity during the year y, tCO ₂ e/MWh, equal to $EF_{grid,CM,y}$

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $ER_{electricity,y}$ for this monitoring period as below table

Table 4-3 $ER_{electricity,y}$ calculation during this monitoring period

Year	$EG_{Projectplant,y}$ (MWh)	$EF_{electricity,y}$ (tCO ₂ e/MWh)	$ER_{electricity,y}$ (tCO ₂ e)
01-January-2013~31-December-2013	138,732.072	0.9735	135,055.67
01-January-2014~31-December-2014	101,427.254	0.9735	98,729.16
01-January-2015~31-December-2015	55,395.652	0.9735	53,737.92
01-January-2016~31-December-2016	59,613.986	0.9735	57,448.88
01-January-2017~31-December-2017	100,768.298	0.9735	97,180.13
Total	455,937.262	-	443,854.92

For $BE_{biomass,y}$, as per the PDD and applied methodology, it is calculated as below formular,

$$BE_{biomass,y} = GWP_{CH_4} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k \cdot EF_{burning,CH_4,k,y} \quad (3)$$

Where:

- GWP_{CH_4} = Global Warming Potential of methane valid for the commitment period, tCO₂e/ tCH₄
- $BF_{PJ,k,y}$ = Incremental quantity of biomass residue type k used as a result of the project activity in the project plant during the year y , tons of dry matter
- NCV_k = Net calorific value of the biomass residue type k , GJ/ tons of dry matter
- $EF_{burning,CH_4,k}$ = CH₄ emission factor for uncontrolled burning of the biomass residue type k during the year y , tCH₄/GJ

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $BE_{biomass,y}$ for this monitoring period as below table

Table 4-4 $BE_{biomass,y}$ calculation during this monitoring period

Year	GWP_{CH_4} (tCO ₂ e/tCH ₄)	$BF_{maizestalk,y}$ (t)	$BF_{wastewood,y}$ (t)	NCV_k^* $EF_{burning,CH_4,k,y}$ (tCH ₄ /t)	$BE_{biomass,y}$ (tCO ₂ e)
01-January-2013~31-December-2013	28	95,156.09	87,058.35	0.001971	10,056.05
01-January-2014~31-December-2014	28	44,260.02	71,934.61	0.001971	6,412.55
01-January-2015~31-December-2015	28	19,460.51	46,494.39	0.001971	3,639.92
01-January-2016~31-December-2016	28	15,895.65	28,075.39	0.001971	2,426.67
01-January-2017~31-December-2017	28	26,403.57	97,317.69	0.001971	6,827.93
Total	-	201,175.84	330,880.43	-	29,363.12

Hence, based on the formular (1), the total baseline emission for this monitoring period is calculated as

$ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y}$ which final results shown in below table

Table 4-5 Baseline Emission calculation during this monitoring period

Year	ER _{electricity,y} (tCO ₂ e)	ER _{heat,y} (tCO ₂ e)	BE _{biomss,y} (tCO ₂ e)	Baseline Emission (tCO ₂ e)
01-January-2013~31-December-2013	135,055.67	0	10,056.05	145,111
01-January-2014~31-December-2014	98,729.16	0	6,412.55	105,151
01-January-2015~31-December-2015	53,737.92	0	3,639.92	57,567
01-January-2016~31-December-2016	57,448.88	0	2,426.67	60,460
01-January-2017~31-December-2017	97,180.13	0	6,827.93	104,925
Total	443,854.92	0	29,363.12	473,214

In conclusion, the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in baseline GHG emissions have been justified. Appropriate GWP and emission factor values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified. It can be confirmed that the baseline emission calculation is overall correct.

4.4.5.2 Calculation of project GHG emissions or actual net GHG removals by sinks

According to the PDD and methodology, the project emissions within the project boundary is calculated on a seasonal basis using the following formula:

$$PE_y = PET_y + PEEF_y + PE_{EC,y} + GWP_{CH_4} \times PE_{biomass,CH_4,y} \quad (4)$$

Where:

PET_y	=	CO ₂ emissions during the year y due to transport of the biomass residues to the project plant (tCO ₂ /yr)
$PEEF_y$	=	CO ₂ emissions during the year y due to fossil fuels co-fired by the generation facility or other fossil fuel consumption at the project site that is attributable to the project activity (tCO ₂ /yr)
$PE_{EC,y}$	=	CO ₂ emissions during the year y due to electricity consumption at the project site that is attributable to the project activity (tCO ₂ /yr)
GWP_{CH_4}		Global Warming Potential of methane valid for the commitment period, tCO ₂ e/ tCH ₄
$PE_{Biomass,CH_4,y}$		CH ₄ emissions from the combustion of biomass residues during the year y (tCH ₄ /yr)

1. For PET_y , as per the PDD and applied methodology, it is calculated as below formular,

$$PET_y = \frac{\sum_k BF_{T,k,y}}{TL_y} \cdot AVD_y \cdot EF_{km,CO_2,y} \quad (5)$$

Where:

AVD_y	=	Average round trip distance (from and to) between the biomass residue fuel supply sites and the site of the project plant during the year y (km)
$EF_{km,CO_2,y}$	=	Average CO ₂ emission factor for the trucks measured during the year y (tCO ₂ /km)
$BF_{T,k,y}$	=	Quantity of biomass residue type k that has been transported to the project site during the year y (tons of dry matter or liter)
TL_y	=	Average truck load of the trucks used (tons or liter) during the year y

- k Types of biomass residues used in the project plant and that have been transported to the project plant in year y

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the PET_y for this monitoring period as below table

Table 4-6 PET_y calculation during this monitoring period

Year	$BF_{T,maizestalk,y}$ (t)	TL_y (t)	AVD_y (km)	$EF_{km,CO_2,y}$ (tCO ₂ /km)	PET_y (tCO _{2e})
01-January-2013~31-December-2013	277,836.30	10.98	100	0.001097	2,776
01-January-2014~31-December-2014	208,117.35	10.56	100	0.001097	2,162
01-January-2015~31-December-2015	101,722.50	9.22	100	0.001097	1,211
01-January-2016~31-December-2016	62,087.37	8.36	100	0.001097	815
01-January-2017~31-December-2017	205,755.34	14.35	100	0.001097	1,573
Total	855,518.86	-	-	-	8,537

2. For $PEFF_{y,i}$, as per the PDD and applied Tool to Calculate Project or Leakage CO₂ Emissions from Fossil Fuel Combustion(version 02)/29/, it is calculated as below formular,

$$PEFF_y = \sum_i (FF_{projectplant,i,y} + FF_{projectsite,i,y}) \cdot NCV_i \cdot EF_{CO_2,i,y} \quad (6)$$

Where:

- $FF_{projectplant,i,y}$ = Quantity of the fossil fuel i (diesel) combusted in the project plant during the year y , t;
- $FF_{projectsite,i,y}$ = Quantity of the fossil fuel i (diesel) combusted at the project site for other purposes that are attributable to the project activity during the year y , t;
- NCV_i = net calorific value of the fossil fuel i (diesel), GJ/t;
- $EF_{CO_2,i,y}$ = CO₂ emission factor for the fossil fuel i (diesel) during year y , tCO_{2e}/GJ

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $PEFF_y$ for this monitoring period as below table

Table 4-7 $PEFF_y$ calculation during this monitoring period

Year	$FF_{projectsite,diesel,y}$ (t)	$FF_{projectplant,diesel,y}$ (t)	$NCV_{diesel,y}$ (GJ/t)	$EF_{CO_2,diesel,y}$ (tCO ₂ /GJ)	$PEFF_y$ (tCO _{2e})
01-January-2013~31-December-2013	92.08	0	42.652	0.0741	291
01-January-2014~31-December-2014	88.965	0	42.652	0.0741	281
01-January-2015~31-December-2015	43.77	0	42.652	0.0741	138
01-January-2016~31-December-2016	33	0	42.652	0.0741	104
01-January-2017~31-December-2017	99.08	0	42.652	0.0741	313
Total	356.90	0	-	-	1,127

3. For $PE_{EC,y}$, as per the PDD and applied Tool to Calculate Baseline, Project and/or Leakage Emissions from Electricity Consumption (version 01)/30/, it is calculated as below formular,

$$PE_{EC,y} = EC_{PJ,y} \cdot EF_{grid,y} \cdot (1 + TDL_y) \quad (7)$$

Where:

- $EC_{PJ,y}$ = Quantity of electricity consumed by the project activity during the year y , MWh
 $EF_{grid,y}$ = CO₂ emission factor of CCGP during the year y , tCO_{2e}/MWh
 = Average technical transmission and distribution losses in the grid in year y for the voltage level at which electricity is obtained from the grid at the project site, %
 TDL_y

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $PE_{EC,y}$ for this monitoring period as below table

Table 4-8 $PE_{EC,y}$ calculation during this monitoring period

Year	$EC_{PJ,y}$ (MWh)	TDL_y (%)	$EF_{EL,y}$ (tCO _{2e} /MWh)	$PE_{EC,y}$ (tCO _{2e})
01-January-2013~31-December-2013	236.68	20%	0.9735	276
01-January-2014~31-December-2014	70.8	20%	0.9735	83
01-January-2015~31-December-2015	0	20%	0.9735	0
01-January-2016~31-December-2016	0	20%	0.9735	0
01-January-2017~31-December-2017	0	20%	0.9735	0
Total	307.48	-	-	359

4. For $PE_{Biomass,CH_4,y}$, as per the PDD and applied methodology, it is calculated as below formular,

$$PE_{biomass,CH_4,y} = EF_{CH_4,BF} \cdot \sum_k BF_{k,y} \cdot NCV_k \quad (8)$$

Where:

- $EF_{CH_4,BF}$ = CH₄ emission factor for the combustion of biomass residues in the project plant, tCH₄/GJ;
 $BF_{k,y}$ = Quantity of biomass residue type k combusted in the project plant during the year y , t
 NCV_k = Net calorific value of the biomass residue type k , GJ/t

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $PE_{Biomass,CH_4,y}$ for this monitoring period as below table

Table 4-9 $PE_{Biomass,CH_4,y}$ calculation during this monitoring period

Year	$BF_{maizestalk,y}$ (t)	$BF_{wastewood,y}$ (t)	$NCV_{maizestalk}$ (GJ/t)	$NCV_{wastewood}$ (GJ/t)	$EF_{CH_4,BF}$ (tCH ₄ /GJ)	$PE_{biomass,CH_4,y}$ (tCH ₄)
01-January-2013~31-December-2013	95,156.09	87,058.35	14.96	13.52	0.0000411	107
01-January-2014~31-December-2014	44,260.02	71,934.61	12.13	14.17	0.0000411	64
01-January-2015~31-December-2015	19,460.51	46,494.39	13.73	13.29	0.0000411	36
01-January-2016~31-December-2016	15,895.65	28,075.39	13.38	13.9	0.0000411	25
01-January-2017~31-December-2017	26,403.57	97,317.69	13.64	13.99	0.0000411	71

Total	201,175.84	330,880.43	-	-	-	303
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Hence, based on the formular (5), the total project emission for this monitoring period is calculated as

$PE_y = PET_y + PEEF_y + PE_{EC,y} + GWP_{CH4} \times PE_{biomass,CH4,y}$ which final results shown in below table

Table 4-10 PE_y calculation during this monitoring period

Year	PET_y (tCO _{2e})	$PEEF_y$ (tCO _{2e})	$PE_{EC,y}$ (tCO _{2e})	$GWP_{CH4} \times PE_{biomass,CH4,y}$ (tCO _{2e})	PE_y (tCO _{2e})
01-January-2013~31-December-2013	2,776	291	276	2,996	6,339
01-January-2014~31-December-2014	2,162	281	83	1,792	4,318
01-January-2015~31-December-2015	1,211	138	0	1,008	2,357
01-January-2016~31-December-2016	815	104	0	700	1,619
01-January-2017~31-December-2017	1,573	313	0	1,988	3,874
Total	8,537	1,127	359	8,484	18,507

In conclusion, the calculations of project GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized project. Any assumptions used in project GHG emissions have been justified. Appropriate GWP and emission factor values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified. It can be confirmed that the project emission calculation is overall correct.

4.4.5.3 Calculation of leakage GHG emissions

In accordance with ACM0006. version 10, registered PDD and validation report, the option L2 in methodology is used to demonstrate that the biomass residues used in the plant of this project will not increase fossil fuel consumption elsewhere and it is need to demonstrate that there is an abundant surplus of the biomass residue in the region of the project activity which is not utilized. For this purpose, demonstrate that the quantity of available biomass residue of type k in the region is at least 25% larger than the quantity of biomass residues of type k that are utilized (e.g. for energy generation or as feedstock), including the project plant.

For this monitoring period, via checking the annual biomass residues fuel special report of Hui Xian City from 2013 to 2017/14/, CTI confirmed that there is an abundant surplus of the type of biomass residue in the defined geographical boundary which is not utilized.

Based on the biomass residues quantities survey in the annual biomass residues fuel special report of Hui Xian City from 2013 to 2017/14/ and calculation as provide in MR, CTI verified that the quantity of each type of biomass residues available in the region is at least 25% larger than the quantity of biomass residues of that type which is utilized in the region.

Therefore, there is no leakage caused by the project activity for this monitoring period, i.e. $LE_y = 0$.

4.4.5.4 Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

The verification team has checked the MR includes a summary table of the emission reductions calculation.

Summary of emission reductions during the monitoring period,

$$ER_y = BE_y - PE_y - LE_y \quad (9)$$

Hence, the emission reductions during this monitoring period are summarized in the table below

Table 4-11 Emission Reductions Calculation during this monitoring period

Parameters Period	Baseline Emissions BE_y	Project Emissions PE_y	Leakage Emissions LE_y	Net GHG emission reductions or removals ER
	(tCO _{2e})	(tCO _{2e})	(tCO _{2e})	(tCO _{2e})
01-January-2013~31-December-2013	145,111	6,339	0	138,772
01-January-2014~31-December-2014	105,151	4,318	0	100,833
01-January-2015~31-December-2015	57,567	2,357	0	55,210
01-January-2016~31-December-2016	60,460	1,619	0	58,841
01-January-2017~31-December-2017	104,925	3,874	0	101,051
Total	473,214	18,507	0	454,707

All the figures as per the monitoring report were cross-checked by the verification team against basic monitored data. Refer to section 4.4.1 and 4.4.2 of this report for assessment details.

Via checking the values in MR/1/ against the ER calculation sheet/2/, CTI confirmed that the emission reductions calculation is overall correct.

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

The comparison of actual values of the monitoring period with the estimations in the registered PDD has been carried out by VVB.

As per the PDD, VVB confirmed that monitoring period covered totally 1,826 days, the ex-ante calculation of ER was estimated as 123,858 tCO_{2e}/ 365 d×1,826d=619,629 tCO_{2e}. The actual emission reductions in this monitoring period are 454,707 tCO_{2e}, which is 26.62% less than the estimation in the registered PDD. Via interview with the PP and checking the data of biomass residues and electricity, CTI confirmed that the project was shut down for 335 days due to adjustment and implement of the company internal rules and regulations and normal maintenance and debugging in total during this monitoring period by checking the shutting down instruction/35/ and Equity Transfer Agreement/36/ and for this monitoring period which verified that the actual operation days of the project are 1,491 days which is 18.35% lower than 1,826 days. Thus, the fluctuation is at normal level.

PP has listed the comparison result in the MR/1/ and ER sheet/2/, and the related reason has been clarified in the MR which is verified by CTI as correct and reasonable.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer to section 4.4 above for the detail assessment of each monitoring parameters and Appendix 3 for the supporting evidence used to determine the GHG emission reductions.

For each reported data, the evidence is provided and verified as sufficient and quality is appropriate. Also, the cross-checks have been performed on the reported data with different source of evidence. The information flow from data generation and aggregation, to recording, calculation and final transposition into the monitoring report has been assessed by VVB in section 4.4 for each parameter and also the calibration have been conducted as per the frequency of monitoring equipment defined in the registered PDD.

Therefore, it is concluded that the evidence provided are verified as sufficient and quality is appropriate and thus the evidence can be used to determine the GHG emission reductions and removals for this monitoring period.

4.6 Non-Permanence Risk Analysis

N/A

5. VERIFICATION CONCLUSION

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 2nd periodic verification of the project activity Henan Xinxiang 24MW Biomass based Cogeneration Project, VCS Ref. No. 1140 for the period 01-January-2013 to 31-December-2017, with regard to the relevant requirements for VCS Version 4.1.

Based on the documented evidence and corroborated by an on-site assessment, CTI can confirm that:

- the project has been implemented and operated as per the registered PDD;
- there is no project description deviation identified for this monitoring period;
- the project complies with the verification criteria for projects set out in VCS Version 4.1;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirement;
- the monitoring is in place as per the applied monitoring methodology;
- the monitoring complies with the monitoring plan in the validated PDD;

It is certified that the GHG emission reductions from the project during the monitoring period amount as follows:

Verification period: From 01-January-2013 to 31-December-2017

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline Emissions <i>BE_y</i>	Project Emissions <i>PE_y</i>	Leakage Emissions <i>LE_y</i>	Net GHG emission reductions or removals <i>ER</i>
	(tCO _{2e})	(tCO _{2e})	(tCO _{2e})	(tCO _{2e})
01-January-2013~31-December-2013	145,111	6,339	0	138,772
01-January-2014~31-December-2014	105,151	4,318	0	100,833
01-January-2015~31-December-2015	57,567	2,357	0	55,210
01-January-2016~31-December-2016	60,460	1,619	0	58,841
01-January-2017~31-December-2017	104,925	3,874	0	101,051
Total	473,214	18,507	0	454,707



Zhang Lei
CTI
Verification Team Leader
27-August-2021



Zhou Lu
CTI
Final Approval
27-August-2021

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CCER	China Certified Emission Reduction
CCPG	Central China Power Grid
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Certification Program // Crediting Period
DverR	Draft Verification Report
EIA	Environmental Impact Assessment
ER	Emission Reduction
ETS	Emission Trading Scheme
FAR	Forward Action Request
FverR	Final Verification Report
GHG	Greenhouse gas(es)
GS	Gold Standard
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PD	Project Description
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVB	Validation/Verification Body

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Mr. Ziqi LI

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	√	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	TA 11.1: Emissions of fluorinated gases
	TA 11.2: Refrigerant gas production
SS 12: Solvents use	TA 12.1: Chemical industry
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

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

Approved by: *Wu Lin*
 Wu LIN
 Technical Competent Manager
 Shenzhen, 01/01/2021

Mr. Lei ZHANG

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	√	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater

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

Approved by: *Wu Lin*
 Wu LIN
 Technical Competent Manager
 Shenzhen, 01/01/2021

APPENDIX 3: DOCUMENTS REVIEWED OR REFERENCED

No	Author	Title	References to the document	Provider
1.	Climate Bridge (Shanghai) Ltd.	Monitoring Report	Monitoring Report for the 2 nd monitoring period Draft version 1.0, dated 01-August-2021 Final version 1.1, dated 24-August-2021	Project Owner
2.	Climate Bridge (Shanghai) Ltd.	Emission Reduction Calculation Sheet	Emission Reduction Calculation sheets (related to MR) Draft version 1.0, dated 01-August-2021 Final version 1.1, dated 24-August-2021	Project Owner
3.	Climate Bridge (Shanghai) Ltd.	Project Design Document	CDM latest approved Project Design Document (PDD) for the project, version 10, dated 05-March-2013	Project Owner
4.	TÜV NORD	Validation report	CDM Validation report for the project, Rev No. 4, dated 07-July-2011	VERRA website
5.	TÜV Rheinland (China) Ltd.	Previous Verification docs	1 st VCS and 1 st CDM verification reports and MRs for the project	CDM and VERRA website
6.	Beijing Xinguohuan Environmental Technical Development Co., Ltd.	EIA	Environmental Impact Assessment (EIA) Report dated in March 2008	PP
7.	Environment Protection Agency (EPA) of Henan Province	Approval of EIA	Approval of EIA issued on 12-June-2008	PP
8.	PP	Meter Reading Records	Meter Reading Records for EG _{export,y} , EG _{import,y} and EG _{PJ,y} for this monitoring period	PP
9.	PP and local grid company	Receipts of electricity sales and purchases	Monthly Receipts from electricity sales and purchases covering this monitoring period	PP
10.	PP and local grid company	Meter change/dismantle record	Meter change/dismantle record for gate meters, M2 and F1	PP
11.	PP	Monthly Report for Biomass Residues Consumption	Monthly Report for Biomass Residues Consumption covering this monitoring period	PP
12.	PP	Monthly biomass residues transported	Monthly biomass residues transported statistics record including source, freight No., freight type, freight load,	PP

No	Author	Title	References to the document	Provider
		statistics record	biomass residue type, biomass residue quantities, moisture value, transportation distance,	
13.	PP	Energy balance	Energy balance for this monitoring period based on biomass residues purchased quantities and stock changes	PP
14.	Statistical Bureau of Hui Xian City	Biomass resources survey report	Annual Biomass residues fuel special report of Hui Xian City from 2013 to 2017	PP
15.	Map	Distance in map	Distance in map	PP
16.	PP	Records of diesel purchase and remained	Records of diesel purchase and remained covering this monitoring period	PP
17.	PP and local diesel suppliers	Diesel fuel purchase invoices	Diesel fuel purchase invoices signed between PP and local diesel suppliers	PP
18.	PP and Henan grid company	Power Purchase Agreement	Power Purchase Agreement dated in Sep 2018 valid for this monitoring period	PP
19.	Electric Energy Metering Center of Xinxiang Power Supply Company of Henan Electric Power Company	Calibration report	Calibration report for electricity meters of M1 and M1' (old) with validity covering this monitoring period	PP
	Henan Electric Power Company Measurement Center		Calibration report for electricity meters of M1 and M1' (new) with validity covering this monitoring period	
	Electric Energy Metering Center of Xinxiang Power Supply Company of Henan Electric Power Company		Calibration report for electricity meters of M2 with validity before it was dismantled	
	Quality Technology Supervision and Cheking Testing Centre of Hui Xian City		Calibration report for Electronic belt weight with validity covering this monitoring period	
			Calibration report for Weight meter with validity covering this monitoring period	
			Calibration report for Moisture analyzer with validity covering this monitoring period	
20.	Quality and Technical Supervision Bureau of Henan	Certificate of Metrological Authorization	Certificate of Metrological Authorization of Henan Electric Power Company Measurement Center 1. valid from 22-February-2012 to 21-February-2016	PP

No	Author	Title	References to the document	Provider
			2. valid from 22-February-2016 to 21-February-2021	
	Quality and Technical Supervision Bureau of Xinxiang City		Certificate of Metrological Authorization of Electric Energy Metering Center of Xinxiang Power Supply Company of Henan Electric Power Company 1. valid from 12-March-2008 to 11-March-2013 2. valid from 26-February-2013 to 25-February-2018	
	Xinxiang City Market Supervision Administration		Certificate of Metrological Authorization of Quality Technology Supervision and Cheking Testing Centre of Hui Xian City 1. valid from 07-February-2011 to 06-February-2016 2. valid from 02-February-2016 to 01-February-2021	PP
21.	Project Owner and local stakeholder	Local stakeholder consultation records	local stakeholder communication survey questionnaires	Project Owner
22.	PP and staffs	Employment contracts	Employment contracts	PP
23.	PP	Payroll	Monthly payroll to the plant staffs	PP
24.	Henan Power Grid Company	Commissioning approval	Commissioning approval from Henan Power Grid Company dated 17-January-2011	PP
25.	National Energy Bureau	DL/T 448-2000 and DL/T 448-2016	Technical Administrative Code of Electric Energy Metering (DL/T 448-2000 and DL/T 448-2016)	Public website
26.	On-site Validation team	Photographs of Project Site	Photographs of project area, main equipment, monitoring devices, control room, fuel storage, etc. taken by verification team during the on-site verification	On-site Verification team
27.	UNFCCC	Applied methodology	Approved CDM methodology ACM0006: "Consolidated methodology for electricity generation from biomass residues in power and heat plants" (version 10)	UNFCCC Website
28.	UNFCCC	Tool	"Tool to calculate the emission factor for an electricity system" (version 02)	UNFCCC Website
29.	UNFCCC	Tool	"Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion" (version 02)	UNFCCC Website
30.	UNFCCC	Tool	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01)	UNFCCC Website

No	Author	Title	References to the document	Provider
31.	UNFCCC	Tool	“Combined tool to identify the baseline scenario and demonstrate additionality” (version 02.2)	UNFCCC Website
32.	IPCC	AR5	IPCC Fifth Assessment Report (AR5)	IPCC website
33.	Henan Coal Quality Supervision and Inspection Center	NCV value	NCV value test reports	PP
34.	PP	Training records	Training records for operation and monitoring team	PP
35.	PP	Shutting down instruction	Shutting down instruction dated 06-July-2021	PP
36.	PP	Equity Transfer Agreement	Equity Transfer Agreement dated 14-August-2015	PP
37.	VERRA	Registration and Issuance Process version 4.0	Registration and Issuance Process version 4.0	VCS website
38.	VERRA	VCS Program Definitions	VCS Program Definitions, v4.1	VCS website
39.	VERRA	VCS Program Guide	VCS Program Guide, v4.0	VCS website
40.	VERRA	VCS Standard	VCS Standard, v4.1	VCS website
41.	National Government	China Electric Power Yearbook	China Electric Power Yearbook 2005~2007	Website
42.	China CER Exchange Info-platform	China CER	http://cdm.ccchina.org.cn/ccer.aspx	Website
43.	Google	Google Earth Map	earth.google.com	Website
44.	GS	Gold Standard	http://www.goldstandard.org/	Website
45.	Intergovernmental Panel on Climate Change	IPCC Guidelines	2016 IPCC Guidelines for National Greenhouse Gas Inventories: work book	www.ipcc-nggip.iges.or.jp
46.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Website
47.	VCS	VCS	https://verra.org/project/vcs-program/ https://registry.verra.org/app/projectDetail/VCS/1140	Website
48.	Ministry of Ecology and Environment of China	China cap & trade scheme	http://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html	Public Website
49.	Ministry of Ecology and Environment of China	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
50.	UNFCCC	CDM dedicated website for project	https://cdm.unfccc.int/Projects/DB/RWTUV1256116990.83/view	UNFCCC Website

No	Author	Title	References to the document	Provider
51.	VERRA	Monitoring Report Template	VCS- Monitoring-Report -Template-v4.0	VERRA

APPENDIX 4: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	N/A	Section no.		Date:
Description of FAR				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

Table 2. CL from this verification

CL ID	01	Section no.	1.1	Date : 16/08/2021
Description of CL				
In section 1.1,				
<ol style="list-style-type: none"> It is observed that the two sets of equipment of the project was not put into operation at same time. The time need to be clarified respectively. PP has stated the CDM registration timeline in this section, however related information for VCS is not clarified. 				
Project participant response				Date : 24/08/2021
<ol style="list-style-type: none"> The operation of the first turbine-generator was started on 28-Oct-2009 and the operation of the second turbine-generator was started on 17-Jan-2011. This description has been clarified in the updated MR. The project has been registered as a VCS project (VCS ID 1140) based on the current registered CDM PDD (version 10, dated 05- Mar-2013) on 11-Sep-2013, and the first monitoring report from 28-Oct-2009 to 10-Jul-2011 has been verified by TÜV Rheinland (China) Ltd. on 11-Sep-2013. And the current registered CDM PDD (version 10, dated 05- Mar-2013) and first monitoring report (version 02, dated 30- Aug-2013) are used as basic documents for this verification. This description has been clarified in the updated MR. 				
Documentation provided by project participant				
/1/- version 2.0				
/24/				
VVB assessment				Date: 27/08/2021
<ol style="list-style-type: none"> The revised MR is checked, CTI confirmed that the time has been provided respectively. The construction of the project started in June 2008 and the 1st turbine generator's commissioning time was 28-October-2009 and 2nd turbine generator's commissioning time was 17-January-2011 which are verified by site visit checking the commissioning approval from local power grid/24/ and 1st verification report/5/. The revised MR is checked, CTI confirmed that the related information for VCS has been clarified. The project started operation on 28-October-2009 and it was registered as a CDM project activity in UNFCCC with the Registration Ref. No. 3054 on 11-July-2011. And after gap validation joint with 1st periodic verification under VCS Program, it was registered as a VCS project and allocated with VCS ID 1140 on 11-September-2013/47/. 				

CL 01 is closed.

CL ID	02	Section no.	2.2	Date : 16/08/2021
Description of CL				
The information of Local Stakeholder Consultation during the project implementation stage is not complete due to only the information of year 2017 was provided, while the survey results for 2013 and 2015 are not clarified.				
Project participant response				Date : 24/08/2021
The survey results for 2013 and 2015 have been clarified in the updated MR.				
Documentation provided by project participant				
/1/- version 2.0 /21/				
VVB assessment				Date: 27/08/2021
The revised MR is checked, CTI confirmed that the survey results for both year 2013 and 2015 have been added. During the implementation stage of this monitoring period, via checking the local stakeholder communication survey questionnaires/21/ and interview with the local officer and local residents during site visit, it is confirmed that the project developer carried out questionnaire survey for the local stakeholders including representatives from government, environmental protection bureau, local farmers, teachers and other relevant stakeholders to collect the relevant comments and suggestions in July 2013, May 2015 and September 2017 to collect any comments or inputs to the project implementation. Via checking the filled 90 questionnaires (30 for each time), interview with the local officer and local resident during site visit, it is verified that all of them satisfied with the environment maintenance method for the project and there were no comments and issues from the local stakeholders during the implementation period. Hence there is no need to change the project design based on the stakeholder inputs and CTI confirmed that all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals which in compliance with the VCS requirements. CL 02 is closed.				

CL ID	03	Section no.	4.3	Date : 16/08/2021
Description of CAR				
The emergency procedure is not clarified in section 4.3 and if any emergency happened during this monitoring period is not clarified.				
Project participant response				Date : 24/08/2021
The emergency procedure has been added in section 4.3, and there is no emergency happened during this monitoring period which has been clarified in the updated MR.				
Documentation provided by project participant				
/1/- version 2.0 /9/ /19/				
VVB assessment				Date: 27/08/2021

The revised MR is checked, CTI confirmed that the emergency procedure is added. Monitoring team will take actions to deal with missing data due to negligence and improper operation and maintain or will replace the broken monitoring devices if any malfunction, and specially for the electricity monitoring, if measure meter fail, the reading data from check meter will be used, also and the monitoring data will be calculated conservatively for emission calculations during the troubleshooting period.

By site interview with monitoring staff and experts and checking the related evidence for data/9/,/19/, CTI verified that no emergency situations have been occurred. Thus no emergency procedure was used for this monitoring period.

Based on above assessment, CTI verified that the monitoring system complies with the applied methodology and the monitoring plan and all applied procedures are completely in compliance to the methodology ACM0006 (version 10) and PDD.

CL 03 is closed.

Table 3. CAR from this verification

CAR ID	01	Section no.	1.9	Date : 16/08/2021
Description of CAR				
The VCU's issuance quantities are not provided in the section 1.9.				
Project participant response				Date : 24/08/2021
The VCU's issuance quantities have been provided in the section 1.9 of the updated MR.				
Documentation provided by project participant				
/1/- version 2.0				
VVB assessment				Date: 27/08/2021
The revised MR is checked, CTI confirmed that the VCU's issuance quantities have been added. The project has sought the registration with the VCS Program and validation was conducted by VVB and has been successfully registered in VCS Program and via checking the CDM and VCS dedicated website of the project, CTI confirmed that GHG emission reductions of 153,838 tCO _{2e} generated from 28-October-2009 to 10-July-2011 (both first and last days included) by the project has been issued as VCUs under VCS program/47/.				
CAR 01 is closed.				

CAR ID	02	Section no.	3.1	Date : 16/08/2021
Description of CAR				
PP has stated that project was shut down for 335 days due to normal maintenance and debugging in total during this monitoring period, however, the exact shut down time period is not provided and the reason is not clarified in detail. Revision is requested.				
Project participant response				Date : 24/08/2021
The project was shut down for 31 days in February 2014, 99 days in June, October, November and December of 2015, 175 days in January, February, March, April, May and August of 2016 and 30 days in July 2017, during this monitoring period, the total time of shutdown is 335 days. The project was shut down for period from 24-Nov-2015 to 23-May-2016 (182 days), the main reason is that adjustment and implement of the company internal rules and regulations due to change of shareholding of Xinxiang Tianjie Bio-Power Generation Co., Ltd. The remaining 153 days of the shutdown time due to normal overhaul and debugging. During this monitoring period, neither emergencies happened to the monitoring system, nor events or situations occurred, which may impact the applicability of the methodology.				
This revision has been added in the updated MR.				
Documentation provided by project participant				
/1/- version 2.0				
/35/				
/36/				
VVB assessment				Date: 27/08/2021

The revised MR is checked, CTI confirmed that the exact shut down time period is provided and reason for each time is provided.

Via interview with the PP and checking the data of biomass residues and electricity, CTI confirmed that the project was shut down for 335 days due to adjustment and implement of the company internal rules and regulations and normal maintenance and debugging in total during this monitoring period by checking the shutting down instruction/35/ and Equity Transfer Agreement/36/ and for this monitoring period which verified that the actual operation days of the project are 1,491 days.

CAR 02 is closed.

CAR ID	03	Section no.	4.2	Date : 16/08/2021
Description of CAR				
For monitored parameter $EG_{Projectplant,y}$				
<ol style="list-style-type: none"> The measuring parameters are not listed in MR as per the PDD. The actual cross check result of whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency that is comparable to previous years is not provided for this monitoring period. 				
Project participant response				Date : 24/08/2021
For monitored parameter $EG_{Projectplant,y}$				
<ol style="list-style-type: none"> The measuring parameters have been listed in the updated MR as per the PDD. During the first VCS monitoring period, the power generation efficiency is 18.70%. Though power generation efficiency is the 22.52% in this monitoring period higher than previous years, the value is reasonable due to the unstable performance in the initial operation of the project and improvement of conversion efficiency in this monitoring period. This statement has been provided in the updated MR. 				
Documentation provided by project participant				
/1/- version 2.0				
/9/				
/8/				
VVB assessment				Date: 27/08/2021
<ol style="list-style-type: none"> The revised MR is checked, CTI confirmed that the measuring parameters are listed in MR as per the PDD. The revised MR is checked, CTI confirmed that the actual cross check result has been provided. The receipts from electricity sales and purchases/9/ have been used for cross-check and via comparing the receipts from electricity sales and purchases/9/ for this motoring period with the electricity meter reading records/8/, CTI verified that the values are consistent. Furthermore, PP has conducted a cross check about whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency that is comparable to previous years in the ER sheet/2/, via comparing the result for this monitoring period with previous years, CTI verified that the efficiency is reasonable. 				
CAR 03 is closed.				

CAR ID	04	Section no.	4.2	Date : 16/08/2021
Description of CAR				
For monitored parameter $BF_{k,y}$				
<ol style="list-style-type: none"> The measurement methods and procedures applied are not clear. Purpose of data is missing. 				
Project participant response				Date : 24/08/2021
For monitored parameter $BF_{k,y}$				
<ol style="list-style-type: none"> The measurement methods and procedures applied have been provided in the updated MR. Purpose of data have been added in the updated MR. 				
Documentation provided by project participant				

/1/- version 2.0	
/11/	
/9/	
/8/	
VVB assessment	Date: 27/08/2021
<p>1. The revised MR is checked, CTI confirmed that the measurement methods and procedures applied is provided. It is monitored by electronic belt weight installed at the feeding inlet of the boiler continuously. Adjust for the moisture content in order to determine the quantity of dry biomass. For consumption of biomass residues, the quantity (wet-basis) and type were measured and recorded in Monthly Report for Biomass Residues Consumption/11/. Then Quantity (tonnes on dry-basis) of biomass residues were calculated based on Quantity (tonnes on wet-basis) of biomass residues and the moisture content (For the moisture content value, refer to below assessment of table for parameter Moisture content of the biomass residues) of the biomass residues accordingly and recorded in the Monthly Report for Biomass Residues Consumption/11/. The revised MR is checked, CTI confirmed that the receipts from electricity purchases/9/ have been used for cross-check and via comparing the receipts from electricity purchases/9/ for this motoring period with the electricity meter reading records/8/, CTI verified that the values are consistent.</p> <p>2. The revised MR is checked, CTI confirmed that the purpose of data is added and confirmed as correct.</p> <p>CAR 04 is closed.</p>	

CAR ID	05	Section no.	4.2	Date : 16/08/2021
Description of CAR				
For monitored parameter $BF_{T,k,y}$, the measurement methods and procedures applied are not clear.				
Project participant response				Date : 24/08/2021
For monitored parameter $BF_{T,k,y}$, the measurement methods and procedures applied have been provided in the updated MR.				
Documentation provided by project participant				
/1/- version 2.0				
/12/				
VVB assessment				Date: 27/08/2021
<p>The revised MR is checked, CTI confirmed that the measurement methods and procedures applied is provided. It is monitored by weight meter installed in the gate of the project site. For freight transported biomass residues, the total mass of each freight transported have been measured by weight meter and recorded by PP in Monthly biomass residues transported statistics record/12/.</p> <p>CAR 05 is closed.</p>				

CAR ID	06	Section no.	4.2	Date : 16/08/2021
Description of CAR				
For monitored parameter NCV_k ,				
<ol style="list-style-type: none"> 1. The measurement methods and procedures applied are not related to this monitoring period. 2. PP stated that the NCV was measured every six months, however, the values provided in both MR and ER sheet are annual value, the NCV values from test are not provided and how to calculate the annual value is not specified. 				
Project participant response				Date : 24/08/2021
For monitored parameter NCV_k ,				
<ol style="list-style-type: none"> 1. The relevant measurement methods and procedures applied in this monitoring period have been added in the updated MR. 2. The annual net calorific value equals to the maximum of net calorific values of biomass residue measured every six months which are listed in monitored table of parameter NCV_k in the updated MR. 				
Documentation provided by project participant				

/1/- version 2.0	
/33/	
VVB assessment	Date: 27/08/2021
<ol style="list-style-type: none"> 1. The revised MR is checked, CTI confirmed that the measurement methods and procedures applied are related to this monitoring period. The NCV values were analyzed by Henan Coal Quality Supervision and Inspection Center every six months, taking at least three samples for each measurement and Biomass NCV value test reports/33/ were issued. 2. The revised MR is checked, CTI confirmed that the annual values equals to the maximum of net calorific values of biomass residue measured every six months which are listed in monitored table of parameter NCV_k in the updated MR. 	
CAR 06 is closed.	

Table 4. FAR from this verification

FAR ID	N/A	Section No.	-	Date: -
Description of FAR				
Project participant response				Date: -
Documentation provided by project participant				
VVB assessment				Date: