15 MW BIOMASS RESIDUE BASED POWER PROJECT AT GHAZIPUR, INDIA

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Project Title	15 MW Biomass Residue Based Power Project at Ghazipur, India
Version	03
Report ID	30721

Report Title	15 MW Biomass Residue Based Power Project at Ghazipur, India
Client	EKI Energy Services Limited (PP:M/s Sukhbir Agro Energy Limited (SAEL))
Pages	35
Date of Issue	22-June-2022
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Summary:

Verification purpose: The project undertaken by Sukhbir Agro Energy Limited (SAEL) in Ghazipur district of Uttar Pradesh, India was registered with UNFCCC on 12-January-2010[1]. The project involved installation of a new 15 MW steam turbine to generate electricity that meets the in-house requirements and export surplus power to the national grid. The project uses rice husk, a by-product of paddy processing, as fuel. It has thus contributed to reduction of GHG emissions by displacing fossil fuel dominated grid-based electricity with biomass residue based renewable electricity.

Start date of the project activity is 14-February-2009. An undertaking has been submitted by PP for double counting confirming that no GHG reduction will be claimed in any other GHG mechanism for current monitoring period. Project activity undergoes continued operation and no major breakdown had taken place except routine maintenance/shutdown.

This is 2nd monitoring under VCS and covers this activity from 01-January-2012 to 31-December-2017(inclusive both days). During the Current Monitoring Period the project activity has supplied 507,887MWh of electricity to the national grid, and thus contributing to the GHG reductions 403,634 tCO_2e.

VCS crediting period is of 10 years. The start date of crediting period is 14-February-2009 and 13-February-2019 is the end date of the crediting period.

A risk-based approach has been followed to perform this verification activity. In the course of verification, 05 Corrective Action requests (CAR), 00 Clarification Requests (CLs) and 00 Forward action requests (FARs) were raised and successfully closed. The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided VVB with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred to as Applus+ Certification) has been appointed by "Sukhbir Agro Energy Limited" to perform the 2nd periodic verification of the "15 MW Biomass Residue Based Power Project at Ghazipur, India" under VCS standard 4.1 and VCS Program guide version 4. The objective of this verification activity is to have an independent third party for the assessment of the project design, monitoring report and Final Verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular; the project's baseline is assessed against applied methodologies "ACM0006 (version 6.2) - Consolidated methodology for electricity generation from biomass residues and ACM0002 (version 8) - Consolidated methodology for grid-connected electricity generation from renewable sources, The project's monitoring plan is assessed against the applied methodologies "ACM0006 (version 6.2) - Consolidated methodology for electricity generation from biomass residues. The

[1] https://cdm.unfccc.int/Projects/DB/RWTUV1245587342.33/view

project's compliance with the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS program guide 4 and standard, version 4.1

- CDM Validation and Verification Standard for project activities, version 03.0
- CDM Project Standard for project activities, version 03.0
- VCS standard version 4.1
- VCS program guide version 4

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified carbon units (VCUs).

The scope of the verification is the independent and objective review of the monitoring report (MR). The MR is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM Validation and Verification Standard for the project activities, version 03.0, review against registered VCS-PD and Final Validation report, CDM Project Standard for project activities, version 03.0 and VCS program guide, version 4 and standard version 4.1.

The assessment team has employed a risk-based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring report combined.

The only purpose of the verification is its usage during the issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. (Applus+ Certification) can't be held liable by any party for decisions made or not made based on the verification opinion, which will go beyond that purpose.

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for remote audit or document verifications. The entire documents checked/plant verification conducted to arrive at positive verification conclusions.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Hereinafter referred as Applus+ Certification) has been appointed by "EKI Energy Services Limited (PP: M/s Sukhbir Agro Energy Limited (SAEL))" to perform the 2nd periodic verification of the project entitled "15 MW Biomass Residue Based Power Project at Ghazipur, India" under VCS standard version 4.1 and program guide version 4. The objective of this verification activity is to have an independent third party for the assessment of the project design, monitoring report and final verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

The project's baseline plan is assessed against applied methodologies – ACM0006 (version 6.2) "Consolidated methodology for electricity generation from biomass residues" and ACM0002 (version 8) "Consolidated methodology for grid-connected electricity generation from renewable sources"

The project's monitoring plan is assessed against applied methodologies – ACM0006 (version 6.2) "Consolidated methodology for electricity generation from biomass residues"

The project's compliance with the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS program guide, version 4 and standard version 4.1., CDM Validation and Verification Standard for project activities, version 03.0, CDM Project Standard for project activities, version 03.0

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of estimated verified carbon units (VCUs).

1.2 Scope and Criteria

The scope is defined as an independent and objective review of the Monitoring report (MR) prepared as per the registered VCS-PD and registered approved methodologies ACM006 version 6.2 and ACM0002 version 8. The MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard, version 4.1 and VCS Program guide version 4, including the approved baseline and monitoring methodologies applied. The verification was based on the requirements in the CDM validation and verification standard for project activities, Version 03.0, CDM Project Standard for project activities, version 03.0 and VCS program guide, version 4 and standard version 4.1.

The verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the Monitoring report. In line with Guidelines for Application of materiality in verifications, the verification team has conducted a complete verification of all the information presented in the monitoring report and data monitored as presented in the emission reduction calculation spread sheet. There are no material errors, overestimation of ER, omission or misstatement. The verification team has reviewed all the documents like commissioning certificate, Energy generation records, fuel records etc.

1.3 Level of Assurance

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. The entire documents checked/Power plant verification conducted to arrive at positive verification conclusions.

1.4 Summary Description of the Project

The project undertaken by Sukhbir Agro Energy Limited (SAEL) in Ghazipur district of Uttar Pradesh, India was registered with UNFCCC on 12-January-2010. The project involved installation of a new 15 MW steam turbine to generate electricity that meets the in-house requirements and export surplus power to the national grid. The project uses rice husk, a by-product of paddy processing, as fuel. It has thus contributed to reduction of GHG emissions by displacing fossil fuel dominated grid based electricity with biomass residue based renewable electricity.

SAEL has installed a new 70 tonnes per hour (TPH) capacity travelling grate boiler and a new 15 MW extraction cum condensing turbine to generate electricity, along with all accessories and equipment's. The cogeneration system has been commissioned within the premises of a 40 TPH milling capacity Rice Mill for paddy processing and a 500 tonnes per day (TPD) Solvent Extraction Plant. At present a 10 TPH rice husk fired boiler meets the heat demand of facility and the electricity demand is met through supply from grid. After the implementation of the project activity the captive heat and electricity demand of the rice mill and solvent extraction plant has been met by the project activity. The surplus electricity from the project activity is exported to the national grid of India. The project operates during the season as well as off-season period of the rice mill. Rice husk is combusted for generation of electricity. In this project, part of the rice husk requirement is met by in-house generation of rice husk in the rice mill and the remaining quantity is procured from nearby areas.

During the Current Monitoring Period from 01-January-2012 to 31-December-2017 (First and last date included) the project activity has supplied 507,887 MWh of electricity, and thus contributing to the GHG reductions 403,634 tCO_2e.

2 VERIFICATIONPROCESS

2.1 Method and Criteria

Verification Process: The project assessment is based on the Clean Development Mechanism Validation and Verification Standard for project activities, version 03.0 and VCS standard 4.1 and VCS program guide, version 4 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

1. A desk review of the monitoring Report against the registered PD;
2. Follow-up interviews with project participant;
3. The resolution of outstanding issues and the issuance of the final verification report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. LGAI Technological Center, S.A. (Applus+ Certification) has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from verifying the identified criteria.

Appointment of the assessment team;

According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center S.A. (Applus+ Certification) has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center S.A. (Applus+ Certification) ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT)
- Technical Expert (TE)
- Technical Reviewer (TR)

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Pankaj Kumar	LA/TE	YES	YES	NA	YES
Denny Xue	TR	YES	YES	NA	NA

The complete list of CVs is included as Appendix 3 of this report.

Document review

The Monitoring Report version 1 submitted by the PP was reviewed against the approved methodology, registered CDM PDD, final validation report and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1.

Follow-up interviews

A remote audit was conducted by LGAI Technological Center S.A. (Applus+ Certification) who performed interviews, telephone conferences with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report in the below sections.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the Appendix 2.

The final MR Version 01.3 submitted by PP on 15-June-2022 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a verification of the final documentation including the final verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e., each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the project owners, the positive verification opinion and relevant documents are submitted to the VCS secretariat through the VCS web-platform.

2.2 Document Review

The verification audit was conducted remotely on 11-January-2022. During the remote audit, the project description, monitoring report and supporting documents were reviewed, cross checked and compared with identified and stated requirements. The details of the document observed during the verification process are listed below in appendix 1 of this report.

2.3 Interviews

A remote audit was conducted for the project activity on 11-January-2022. Remote audit was conducted due to ongoing COVID-19 pandemic situation in the entire country of India. Taking into account the rules of relevant national and local authorities (local to the VVB offices as well as to locality of the remote audits), World Health Organization (WHO) recommendations, policies of the VVB and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return). Moreover, The VCS Program does not explicitly mandate remote audits as part of the validation and verification process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications (per Section 4.1.2 of the VCS Standard, version 4.1

The VVB has taken alternative measures to reach reasonable level of assurance and conducted remote audit through Skype/Telephone with site personal & consultant (refer section 2.3) with the PP representative. This is also in line with the COVID-19 travel guidance for projects of VERRA.

Technical details & metering/monitoring arrangement verified through onsite photographs/name plates and calibration certificates shared by PP. All the documents were cross checked to ensure conservative estimation of emission reduction.

During the remote audit, the PP representatives were questioned about the implementation of the project activity. Several topics like the verification of commissioning date of equipments, generation records, and monitoring of the data and the error accountability were discussed. To cross check the information provided by PP, various documents like technical specifications, commissioning certificates, PPA, fuel purchase invoices, Plant records, Energy Generation Record sheets, invoice, calibration certificates etc. were also verified. The names of the persons interviewed during remote audit through skype & telephonic interview is given below;

Organization	Name of Persons/Designation	Topics discussed	Team Member
M/s Sukhbir Agro Energy Limited (SAEL)	Mr. Jasbir Singh	Project activity implementation Operation, Calibration, O&M practices, ENERGY GENERATION RECORDS etc. LSC mechanism Mechanical maintenance Electrical maintenance Project description Invoicing practices	Pankaj Kumar
M/s Sukhbir Agro Energy Limited (SAEL)	Mr. Abhishek Garg	Project activity implementation Operation, Calibration, O&M practices, ENERGY GENERATION RECORDS etc. LSC mechanism Mechanical maintenance Electrical maintenance Project description Invoicing practices	
EKI Energy	Saroj Sahoo, Consultant (EKIESL)	MR, ER calculations etc.	

During the remote audit, the PP representatives were questioned about the implementation of the project activity. Several topics like the verification of commissioning date of equipments, the generation, recording, and monitoring of the data and the error accountability were discussed. Various documents like the ENERGY GENERATION RECORDS sheets, plant records, invoices, on-site Photographs includes boiler nameplates, meter specifications, key technical specifications of the major equipment provided to assessment team were verified on skype video call to establish the current status and the implementation of the Project Activity.

2.4 Site Inspections

Remote Audit: 11-January-2022				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical	Remote audit (Through Skype)	11-January-2022	Pankaj Kumar

	description of the project and Monitoring. Assessment team also checked that whether the monitoring plan as described in the CDM PDD is actually practised onsite. Also, assessment team checked any change in host country criteria which may affect the baseline of the project activity.			

2.5 Resolution of Findings

The objective of this phase of the verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification)'s positive conclusion on the project design and Monitoring report. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the Client and LGAI Technological Center S.A. (Applus+ Certification) to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 01.3 submitted by project owner on 15-June-2022 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	00	00
Description of project activity	00	01	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
Project boundary	00	00	00
Establishment and description of baseline scenario	00	00	00
Demonstration of additionality	00	00	00
Emission reductions	00	01	00
Calibration details	00	01	00
Monitoring plan	00	00	00
No Net harm assessment	00	00	00
Local stakeholder consultation	00	00	00
Others (please specify)- - Regarding double counting Declaration	00	02	00

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
- ER Sheet - Supporting documents			
Total	00	05	00

The list of findings and their resolution is presented in appendix 2 of this report.

2.5.1 Forward Action Requests

This is 2nd periodic verification of the project activity and no FAR was raised from previous verification or validation /and during this verification process.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification, as Applus+ Certification holds the accreditation for Validation of projects under this Sectoral Scope.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project activity is first registered under CDM (https://cdm.unfccc.int/Projects/DB/RWTUV1245587342.33/view) with fixed crediting period as 12-January-2010 to 11-January-2020. PP has verified and has issuance of CERs under CDM for the monitoring period – 12-January-2010 to 31-December-2011. The project activity was registered under VERRA (https://registry.verra.org/app/projectDetail/VCS/624) and VCUs were issued for pre CDM registration date period i.e. from date of grid synchronization of Project activity (14-February-2009) to a date before CDM Project registration date (11-January-2010). Current monitoring period start date is 01-January-2012 i. e. Immediate after end date of 1st monitoring period under CDM. PP has uploaded Monitoring report on UNFCCC CDM website for the period – 01-January-2012 to 13-February-2019 which matches current monitoring period under VCS. (https://cdm.unfccc.int/Projects/DB/RWTUV1245587342.33/view)

However, as per MR and undertaking provided, PP would not consider the credit monetization from any other mechanism for the current monitoring period. The undertaking is provided to confirm that there is no any double accounting for current monitoring period.

3.2 Methodology Deviations

The project activity has applied correct methodologies which are as per the registered CDM PDD and thus no deviation is sought regarding the methodology. The project complies with all the

requirement of the methodology and thus deviation to the methodology is not a requirement for the present project activity.

3.3 Project Description Deviations

This is 2nd monitoring period and no deviation in project description observed in previous verification, and no deviation applicable for current monitoring period as checked from VERRA website (https://registry.verra.org/app/projectDetail/VCS/624).

3.4 Grouped Project

The project does not involve any addition of new project activity and thus the project do not fall under grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the remote audit, it was concluded that the project is implemented as per CDM PDD and this is verified from the commissioning certificate, statutory clearances submitted. During the current monitoring period it was observed that no unforeseen situation evolved which can impact the operation of the project activity. The same was verified through the shutdown summary sheet of the project activity submitted. Scheduled maintenance was carried out as per the instruction of the manufacturer and the same is acceptable to the assessment team.

Project location is confirmed by the assessment team through interview with PP during remote audit and assessment of monitoring report. Assessment team also checked the technical details of the project site containing latitude and longitude of the project site and confirmed that the details as mentioned in the registered CDM PDD are correct.

The coordinates of project activity site, Village: Fatehullahpur, District: Ghazipur, State: Uttar Pradesh are,

Latitude – between 25° 19' and 25° 54' North

Longitude – between 83° 4' and 83° 58' East

The technical specifications have been verified during remote audit and also cross checked from the technical manuals of the Manufactures.

Technical specification of boiler:

Description	Parameters
No of boilers	One (1)
Makers	ISGEC John Thomson (IJT)

Type	Bi-drum, natural circulation, balanceddraft, bottom supported, outdoor water tubetype travelling grate
Steam flow at main steam stop valve outlet (100% BMCR)	70 TPH
Steam pressure at main steam stop valve outlet	67 kg/cm^2 (g)
Steam temperature at main steam stop valve outlet	490 +/- 5 deg C.
Feed water temperature at the economizer inlet	126 deg C
Design code for pressure parts	IBR

Technical Parameters of Steam Turbine generator

Description	Parameters
No of Turbine	One (1)
Makers	Qingdao Jieneng Power Station Engineering Co., Ltd (QJPS)
Type	Extraction cum condensing
Rated capacity of turbine	15 MW with 10TPH extraction at 2.5 ata
Steam conditions at turbine inlet pressure (abs)	64 kg/cm^2 (g)
Temperature	485 +/- 5 deg C.
Condenser operational pressure (ata)	0.106
Recommended temperature rise in the cooling tower (deg C)	9.6
Rating at the generator terminals (MW)	15
Electrical generator	One 11kV, 50Hz, 0.8 power factor

The start date of the project is 14-February-2009. This is the date when project was grid synchronized with Indian grid in line with VCS Standard version 4.1.

The commissioning and other key dates pertaining to the project are provided below.

Event description	Date	
	70 TPH Boiler	15 MW Turbine
Commissioning date	December, 2008	January, 2009
Trial run	January, 2009	February, 2009

Grid synchronization with UPPCL	14-February-2009

The assessment team confirmed through interview with O&M personal during remote audit that there are no changes into the project design during this monitoring period. It was found that the monitoring plan was implemented as per the requirement of the CDM PDD & approved monitoring Plan and applied methodologies. The organisational role and responsibility as mentioned in the registered CDM PDD is followed onsite. The calibration of energy meter is carried out as per the required frequency mentioned in the CDM PDD. All the emergency

preparedness as mentioned in the registered CDM PDD is followed onsite and no discrepancies were found regarding the same.

The Project participant contribution from the project activity towards sustainable development in accordance to host country as explained below:

Contribution to environmental well-being

The project activity results in GHG emission reduction in the project plant by utilizing biomass residues as fuel and displacing fossil fuel dominated grid electricity.

In addition to the reduction in carbon dioxide (CO_2) emissions the project implementation will result in reduction of other harmful gases (NO_x and SO_x) that arise from the combustion of coal used in power generation. The project will also lead to reduced ash generation since the ash content in rice husk is lower than that of Indian coal.

Contribution to socio-economic well - being

The project activity results in direct and indirect employment opportunities for local persons towards installation, operation and maintenance of the project activity.

The project activity results in increased business opportunities for local contractors and suppliers during the various phases. Also, the collection and transportation of biomass residue involves manpower requirement throughout the year, thereby creating an opportunity for employment generation. This contributes towards improvement of the local economic structure and the social status of the people involved, clearly indicating positive socio-economic impact in the local area.

Contribution to technological well-being

In the state of Uttar Pradesh, biomass residue-based power projects are primarily been dominated by bagasse based cogeneration projects in the sugar mills. There are very few other biomass residues based grid connected power projects in the state.[1] Uttar Pradesh state is the second largest producer of rice in the country (approximately 13.38% of the India production[2]) and despite this rice husk based power generation is still not actively prevalent in the state. The installation of project activity significantly contributes towards technological well being in the region by promoting similar projects.

The technology being used in the project activity represents the environmentally safe technology for the application of power generation. The equipment being supplied for the project activity is from well-established equipment manufacturers. Installation of such plant at SAEL substantially upgrades the technological level of the industry, introducing superior skills and competencies.

The project is not involved in any other form of GHG emission program and VCUs generated from this verification will not be used for other trading program to avoid any kind of double counting. The same is confirmed by the PP during the verification remote audit. Assessment team also conducted independent review regarding the same and found that the statement of the PP is accurate and project is not involved in any other kind of GHG trading for the present verifications/monitoring period.

The assessment team observed that the project is in line with the registered CDM PDD and applied methodologies and thus no clarification/deviation is sought. 05 CAR was raised during the verification process. Please refer below Appendix 2 for the detail closure of the CARs.

Assessment team confirms following during the verification remote audit:

1. Start date of the project is 14-February-2009.
2. An undertaking letter has been submitted by PP for no double counting with any other GHG program. PP also has given a written declaration that project will not claim other form of GHG credit for the concerned monitoring period.
3. Assessment team confirms that this is the 2nd monitoring under VCS and covers the activity from 01-January-2012 to 31-December-2017(inclusive of both dates). VCS crediting period is of 10 years with 14-February-2009 as the start date and crediting period end date as 13-February-2019.
4. GHG credits from 01-January-2012 to 31-December-2017 will be claimed under VCS only. At any point of time during the crediting period, the project proponent will abide by the "Double Counting".
5. Assessment team checked and found that the Project proponent of the project activity is as below for the current monitoring period:

	Sukhbir Agro Energy Limited
	Mr. Abhishek Garg
	Sr. Manager
	Village: Fatehullahpur, Varanasi Gorakhpur Highway
	9810912563
	ghaziapur@sukhniragroenergy.com

VVB also confirmed that EKIESL is other entity as verified from VERRA registry with details as below:

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Mr. Saroj Sahoo
Title	Deputy General Manager
Address	EnKing Embassy, Office No. 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Near brilliant Convention Centre, Indore- 452010 Madhya Pradesh, India
Telephone	+91 7506167848
Email	saroj@enkingint.org

6. The quantified emission reduction calculation for the monitoring period is correct and conservative. Assessment team also compared actual VER with the estimated VER and found

that the actual VCUs are 403,634 tCO_2e which is almost the same as the estimated emission reductions i .e. 403,554 tCO_2e during this monitoring period.

Finding: CAR 01, 02 and 03 were raised and successfully closed. Please refer appendix 3 for more information.

4.2 Safeguards

4.2.1 No Net Harm

No potential environment or socio-economic matter was found during the discussion with PP during remote audit. The project is renewable energy project and thus no negative impact observed onsite as confirmed by PP during remote audit.

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. The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013 clearly mentioned that biomass residue-based power project activity operations do not result in direct air pollution, noise pollution.

However, assessment team still conducted the No net harm assessment for some of the parameters and the result is described below:

Sr. No.	Indicator	Assessment team opinion
1	Air quality	The project activity leads to reduction of GHG emission and also the particulate emission is reduced to permissible limits by use of an ESP. Vent through stacks is also controlled as per State Pollution Board Guidelines and consent conditions. Adequate measures were taken to mitigate the envisaged impacts like spraying water on the road side to reduce dust level etc. This was confirmed by the local stakeholders. Therefore, it is validated that mitigation measures were robustly implemented on ground for air quality issues project will have a positive impact on air quality.
2	Soil condition	The ash generated from the project activity are disposed as per the state Pollution Control Board guidelines. For mitigating the impacts during construction, various mitigation measures were taken which is validated from the plant records of PP and the interview with local villagers. It was also confirmed that, the vegetation planted at project site helps to reduce soil erosion. The same is confirmed during the discussion with stakeholders during remote audit. Therefore, it can be concluded that the project has no effect on soil conditions during its operation because it has no waste coming out.

Sr. No.	Indicator	Assessment team opinion
3	Water Pollution	UP Pollution Control Board (UPPCB) has identified the norms of water consent and SAEL ensures that waste water generated from the project activity treated to meet required limits before disposal. The project site is not on the migration route of migratory bird nor is the project affecting aquatic life. With the implementation of Project, the green cover has increased at the Project site; the biodiversity in the vicinity will be improved with the vegetation improvement.
4	Ecology	The project activity does not have any harmful impact on the ecology. There are no nearby forests, or zones high on biodiversity, or other sensitive locations around the factory that may be affected negatively due to the project. Further, no harmful impact is caused on the aquatic ecology as well as on the local vegetation. Individuals working in high noise zones is provided adequate gadgets for protection. Therefore, it can be concluded that the project has no effect on environment during its operation because it has no waste coming out.

4.2.2 Local Stakeholder Consultation

All the stakeholders are happy with the implementation and operation of the project activity and no negative comments envisaged for the project activity. There was no change in project description form the CDM PDD. Complaint/suggestion/feedback register is maintained at site as a part of ongoing communication with stakeholders in line with clause 3.16.17 of VCS Standard, version 4.1 and appropriate actions taken time to time by PP. Assessment team confirmed the same during the remote audit and document review i.e., grievance register.

4.3 AFOLU-Specific Safeguards

Not applicable

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the CDM PDD and MR.
Findings	CAR 04 was raised and closed successfully.
Conclusion	As per the registered PDD and applied methodology, Formula used to calculate achieved emission reduction is as follow; $ER_y = ER_{heat,y} + ER_{electrcity,y} + BE_{biomass,y} - PE_y - L_y$

	However, after simplification, formula is :- $ER_y = ER_{electrcity,y} - PE_y$ Baseline emissions of the project activity constitutes emission reductions from displacement of electricity ($ER_{electricity,y}$) alone and not emission reductions due to heat generation ($ER_{heat,y}$) and emissions reductions from biomass decay ($ER_{biomass,y}$). As $ER_{heat,y}$ and $ER_{biomass,y}$ is not been claimed, these are assumed as zero. Baseline emissions of the project activity are thus determined by the following equation: Formula Used:- $ER_{electricity,\ y} = EG_y \ . \ EF_{electricity,\ y}$ Where; EG_y = net quantity of electricity generation as a result of the project activity $EF_{electricity,y}$ = CO_2 emission factor for the electricity displaced due to the project activity during the year y in tCO_2/MWh Ex-ante parameters: The grid emission factor ($EF_{electricity,\ y}$) i.e., 0.80 tCO_2/MWh is sourced from the registered CDM PDD and is based on Central Electricity Authority, India "CO_2 baseline database, version 4, October 2008)". The same is used for calculation of emission reductions. Monitored Parameters $\mathbf{EG_{projectplant,y}}$ - Net electrical energy generated by the project activity. The value monitored is 507,887 MWh. The verification team has checked the entire monthly Energy generation records applicable for the monitoring period as per the project activity applied for verifications and found the monitoring parameter is monitored and recorded as per the monitoring plan in the registered CDM PDD. The net electricity supplied by project activity to grid is calculated by subtracting total electricity imported by project from grid from total electricity delivered by project to grid. The verification team has reviewed the emission reduction sheet and monitoring report data with the energy generation reports and found all the values are consistent. Also same is cross checked with quantity of biomass fired found correct. Other parameters monitored and their values were cross checked with the plant log/ records and found to be correct and values in the ER sheet are consistent with the plant records. These parameters are as below: $\mathbf{BF_y}$ = Quantity of biomass residue (rice husk) combusted in the project activity during the year y in MT. Biomass procured from outside is measured at the site through 2 weighbridges of 40 MT and 100 MT. The rice husk generated through internal

	process is measured as a % of paddy processed by the mill. These values recorded in the plant log book. Same was verified in remote audit and through submitted documents. The monitored value is 769,576 MT. **Moisture content of biomass residues** = The parameter is measured in % Water content and the monitored value is 14.23% which is average for the complete monitoring period. The parameter is measured in the in-house laboratory and through external laboratory analysis once in 6 months. The parameter is measured continuously and daily recorded in the plant logbook which were checked during remote audit along with the analysis reports. **AVD_y** = Average round trip distance (from and to) between biomass fuel supply sites andthe project site in km. The monitored value is annual average value of plant log records kept at the factory gate which were checked during remote audit. The monitored value is 95.9 km. **N_y** = Number of truck trips for the transportation of biomass. The monitored value is maintained in the plant log records kept at the factory gate which were checked during remote audit. The monitored value is 62,807 nos. **$EF_{km,CO2,y}$** = Average CO_2 emission factor for the trucks during the year y in tCO_2/km. The value is considered from IPCC report which is acceptable. The monitored value is 0.00044 tCO_2/km Quantity of biomass residues of type k that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region = The parameter is measured in tons and is based on the third party survey which was checked and found appropriate. The monitored value is 156,431 tons. Quantity of available biomass residues rice husk in the region of 200Kms. And as defined in B.3 and Biomass Assessment Survey report. = The parameter is measured in tons and is based on the third-party survey which was checked and found appropriate. The monitored value is 981,234 tons. **$EF_{Co2,LE}$** = This parameter is measured as CO_2 emission factor of the most carbon intensive fuel used in the country. The value is not taken as no leakage is considered. which is acceptable. **$Q_{project\ plant,\ y}$** = Net quantity of heat generated from firing biomass in the project plant in GJ. The steam generated is measured through steam flow meter and is recorded in steam logbooks which were checked during remote audit. The monitored value is 6,712,601 GJ. **NCV_k** = Net Calorific value of biomass residue type k (rice husk) in GJ/ton. The parameter is measured in the in-house laboratory and through external laboratory analysis once in 6 months. The parameter is measured continuously and daily

recorded in the plant logbook which were checked during remote audit along with analysis reports. The monitored value is 3,202 GJ/ton.

ε_{boiler} = Average net energy efficiency of heat generation in the boiler that would generate heat in the absence of the project activity. Under the project activity this would be the 10 TPH boiler in %. PP has to consider the highest value between measured efficiency over the last 3 years of operation and designed efficiency as defined by the manufacturer. The values for which are 75.1% and 80% respectively. The last 3-year operational data and technical specifications by the boiler manufacturer were checked to confirm the said values and found appropriate. The monitored value is 80%.

The calculation of baseline emissions is as below,

Years	Gross power generation (MWh)	Auxiliary Consumption (MWh)	Net power generation (MWh)	$EG_y(EG_{project\ plant,\ y})$	$EF_{electricity,y}$	$ER_{electricity,y}$ (tCO2)
2012	106,941	9,879	97,063	97,063	0.80	77,650
2013	85,878	8,381	77,496	77,496	0.80	61,996
2014	72,590	7,530	65,060	65,060	0.80	52,048
2015	99,175	9,325	89,850	89,850	0.80	71,880
2016	106,440	12,280	94,160	94,160	0.80	75,328
2017	94,595	10,337	84,258	84,258	0.80	67,406
Total	**565,619**	**57,732**	**507,887**	**507,887**		**406,308**

Project emissions: The emission due to transportation of biomass is considered as project emission in the project. The emission due to transportation is calculated based on the number of trips, average round trip distance, vehicle mileage and the emission factor of diesel.

The possible project emissions account only due to transportation of biomass residue to project site. The following equation is used to calculate the total project emissions of the project activity during the monitoring period:

$PE_y = PET_y$

$PETy = Ny * AVDy * EF_{km,CO2}$

Where,
PET_y = C_{O2} emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr);
Ny = number of truck trips during the period y;
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); and

EFkm,C_{O2} = average CO_2 emission factor for the trucks measured during the year y in t (CO_2/km)

All the above parameters to calculate project emission determined from plant records which maintains the record of no. of trucks and average round trip distance covered by trucks for transportation of biomass.

The calculation of project emission is tabulated as below.

Years	N_y	AVD_y (km)	$EF_{km,CO2}$ (tCO_2/km)	PET_y (tCO_2)
2012	10,834	144.3	0.00044	689
2013	9,191	100.1	0.00044	405
2014	9,334	97.9	0.00044	402
2015	6,890	81.8	0.00044	249
2016	11,018	55.8	0.00044	271
2017	15,540	96.2	0.00044	658
Total	**62,807**			**2,674**

The estimated project emission in the monitoring period is PEy = 2,674 tCO_2.

All the input values considered for calculation of project emission due to transportation of biomass are provided in the ER sheet Which was verified by VVB as correct.

Thus, Emission Reductions are:
The emission reductions (ER_y) by the Project activity during a given year y is the difference between baseline emissions (BE_y), project activity emissions (PE_y) and leakage, as follows

$ER_y = ER_{electrcity,y} - PE_y$
$= 406,308 - 2,674$
$= 403,634\ tCO_2e$

VVB confirmed that GHG reductions and removals have been quantified correctly and in line with monitoring procedure in CDM PDD and applied methodology.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the shutdown/break down log for the monitoring period. During the verification of remote audit, the energy meters are also checked. The Calibration details of the monitoring meters are also checked with calibration certificates.
Findings	CAR 05 was raised and closed successfully.
Conclusion	The project activity has installed the metering system which includes the separate meter for gross generation and 2 energy meters for auxillary

	consumption monitoring. The latest state of art monitoring and control equipment that measure, record and control the various monitoring parameters. These meters record parameters including electricity exported & imported. Moreover, the meters are located at the grid connected point are of accuracy class of 0.5s (energy meter used for gross generation monitoring) and 1s (energy meter used for auxiliary consumption monitoring) for project activity applied for verification. The Net electricity supplied to the grid is then calculated from export and import values. The electricity Export, Import and Net electricity exported to the grid are cross checked from the quantity of biomass fired. Hence assessment team confirmed that the value of net electricity exported to the grid as used in emission reduction calculation is correct. Calibration of all the meters is done as per the registered CDM PDD. Assessment team has checked the calibration certificate and found that meters are calibrated as per calibration frequency mentioned in registered CDM PDD. It is reported that the data will be kept for 2 years following the end of the crediting period or till the last issuance of VERs for the project activity whichever occurs later. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the remote audit. Remote audit and interview with site personnel also confirms that the operational and organizational chart as mentioned in registered CDM PDD is as per the site practice and thus assessment team confirms that the details are correct. The shutdown / break down reports are checked and found that the plant undergone scheduled maintenance and break down. Assessment team checked the routine maintenance log book and confirmed that it does not have any impact on project design and monitoring procedures. No unforced error observed. Assessment team confirmed that data/ information used for determining GHG reductions and removals were sufficient in quantity and of appropriate quality. Calibration certificates of meters/ QA/QC procedure checked and found to be appropriate.

4.6 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Not applicable	Not applicable	Not applicable	Not applicable

5 VERIFICATION CONCLUSIONS

Applus+ Certification has been engaged by EKI Energy Services Limited (PP: M/s Sukhbir Agro Energy Limited (SAEL)) to perform the 2nd periodic verification of the "15 MW Biomass Residue Based Power Project at Ghazipur, India"

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out within the project's Monitoring Plan in the CDM PDD and MR and the approved methodologies.

Our Verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS Standard version 4.1. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the CDM PDD
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.
- A reasonable level of assurance was achieved during the verification.
- No limitation observed for the present verification

Verification period: From 01-Jan-2012 to 31-Dec-2017(first and last date included).

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

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
2012	77,650	689	0	76,961
2013	61,996	405	0	61,591
2014	52,048	402	0	51,646
2015	71,880	249	0	71,631
2016	75,328	271	0	75,057

2017	67,406	658	0	66,748
Total	406,308	2,674	0	403,634

The estimated emission reductions for the current monitoring period is 403,554 tCO_2e, whereas actual emission reductions achieved are 403,634 tCO_2e, which is almost the same as the estimated emission reductions. As actual VCUs are almost the same than estimated value for the MP, VVB confirmed the value is conservative and acceptable.

APPENDIX I: DOCUMENTS REVIEWED DURING VERIFICATION

No.	Author	Title	References to the document	Provider
1.	NA	Grid synchronization certificate	Commissioning of the biomass residue-based plant	Project participant
2.	NA	Contract of the other entity with the DOE	Contract of the other entity with the DOE	Project participant
3.	NA	Technical specifications	Technical specifications of Biomass residue-based Power project manufactured	Project participant
4.	NA	Registered CDM PDD and validation report	https://cdm.unfccc.int/Projects/DB/RWTUV1245587342.33/view	UNFCCC
5.	NA	Registered VCS PD and validation report	https://registry.verra.org/app/projectDetail/VCS/624	VERRA
6.	NA	1st monitoring report and verification report for the same	https://registry.verra.org/app/projectDetail/VCS/624	VERRA
7.	NA	Initial Monitoring report Final Monitoring report	Version 01, dated 29-December-2021 Version 01.3 dated 15-June-2022	Project participant
8.	NA	Emission Calculation sheet	Version 1, dated 29/12/2021	Project participant
9.	NA	Tools/ guidelines used in the project activity • UNFCCC Methodology: ACM0006 version 6.2 & ACM0002 version 8 • VCS verification report template Version 4.0 • VCS Standard, version 4.1	UNFCCC CDM web site VERRA website	UNFCCC & VERRA
10.	NA	Calibration details of the project activity undergoing verification	Calibration certificates	Project participant
11.	NA	Energy generation reports and fuel purchase / consumption records for the complete monitoring period	Plant log book / fuel purchase invoices	Project participant
12.	NA	Shut down/Break down details of the complete monitoring period	Log Sheet	Project participant
13.	NA	VCS Declaration	Declaration from PP for Participation under Other GHG Programs	Project participant
14.	NA	Stakeholder Grievances recorded during monitoring period	Grievance register	Project participant

APPENDIX CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS(CAR/CL/FAR)

CAR ID	01	Section no.	4.1	Date : 12/01/2022
Description of CAR				
1. PP is requested to mention start date and end date of the monitoring period of the project activity in the excel sheet. 2. In ER sheet, under month column, years mentioned. PP shall provide start date and end date in dd/mm/yyyy format 3. In section 1.1, regional grid is mentioned, which seems to be incorrect. Corrective action sought. 4. PP is requested to mention Google map showing the location of the project activity in section 1.7 of the Monitoring report. 5. PP shall mention methodology link in section 1.8 of the monitoring report for the verification.				
Project participant response				**Date :** 27/01/2022
1. The start date and end date of the monitoring period are now included in the emission reduction calculation sheet. 2. The column is now corrected. The start date and end date of the monitoring period are now mentioned. 3. The mention of regional grid is now corrected. 4. The maps are now included in the revised monitoring report. 5. The methodology links are now included in section 1.8 of the revised monitoring report.				
Documentation provided by project participant				
Revised monitoring report				
DOE assessment				**Date:** 29/01/2022
1. PP has now mentioned monitoring period as 01/01/2012 to 31/12/2017 in the worksheet – 'ER Cal' which is checked and accepted. This part of CAR is closed. 2. PP has now corrected and mentioned months under the said column which is checked and accepted. Also, PP has now provided start and end date of monitoring period in dd/mm/yyyy format which is accepted. This part of CAR is closed. 3. PP has now corrected and mentioned matinal grid instead of regional grid in the section 1.1 of revised VCS MR which is appropriate. This part of CAR is closed. 4. PP has revised section 1.7 to include google map depicting Project location which is appropriate. This part of CAR is closed. 5. Section 1.6 of revised MR now provides web links of the methodology used which are working and correct. This part of CAR is closed. **CAR 1 is closed.**				

CAR ID	02	Section no.	4.1	Date : 12/01/2022
Description of CAR				
PP shall provide an undertaking for no double counting of emission reduction in any other mechanism.				
Project participant response				**Date:** 27/01/2022
The undertaking to declare that there is no double counting is being submitted herewith.				
Documentation provided by project participant				
Undertaking to declare there is no double counting.				
DOE assessment				**Date:** 29/01/2022
PP has submitted undertaking dated 10/01/2022 which confirms that no double counting of emission reduction will happen under any other mechanism which is appropriate and accepted. **CAR 02 is closed.**				

CAR ID	03	Section no.	4.1	Date : 12/01/2022
Description of CAR				
1. PP shall provide latest copies of Consent to Operate and boiler inspection certificate issued by PSPCB and Boiler inspectorate valid through the current monitoring period 2. Details of ongoing stakeholders' consultation mechanism is provided in section 2.2 of the MR in line with VCS guidelines to complete MR. However, PP also requested to submit records of ongoing local stakeholder consultation including grievance register etc.				
Project participant response				**Date :** 27/01/2022
1. The copies of boiler inspection certificate and consent are being submitted herewith. *2. The copy of grievance register is being submitted herewith.*				
Documentation provided by project participant				
• *The boiler inspection certificates dated 23/08/2012/23/08/2013, 20/08/201, 10/09/2015 and 09/09/2017* • *Copy of grievance register*				
DOE assessment				**Date:** 29/01/2022
1. PP has submitted consent to operate and boiler inspection certificates valid through the current monitoring period which are checked and accepted. **CAR 03 is closed.** 2. PP has submitted records of grievances register which were checked to confirm that no negative concern was raised during current monitoring period. This part of **CAR is closed.**				

CAR ID	04	Section no.	4.4	Date : 12/01/2022
Description of CAR				
1. Value of Emission factor not mentioned in sec. 4.1 2. PP requested to submit copies of plant log book/ records, steam flow logs, laboratory report for NCV and moisture content of biomass residues for the complete monitoring period. 3. PP is requested to provide the web link to check the CEA database in section 4.2 of monitoring report. 4. In sec. 5.1, calculation of baseline emission not provided 5. In sec. 5.2, calculation for project emission not provided 6. PP shall also provide copies of ENERGY GENERATION RECORDSs and invoices for entire monitoring period along with calibration certificates of energy meters, weighbridge and other applicable monitoring equipment.				

Project participant response	Date: 27/01/2022
1. The value of emission factor is now mentioned in the revised MR. 2. The records sought are enclosed here with. 3. The web link for the CEA database is included in the revised MR. 4. The calculation of baseline emission in included in section 5.1 of the revised MR. 5. The calculation of project emission in included in section 5.1 of the revised MR. 6. The documents sought are enclosed here with.	
Documentation provided by project participant	
• Revised monitoring report • Log books records. • Sample ENERGY GENERATION RECORDS and Invoices • Details and calibration certificates of Energy meters and Weigh Bridge.	
DOE assessment	**Date:** 29/01/2022
1. Value of emission factor is now mentioned in the revised MR section 4.1 which is appropriate. Hence, this part of CAR is closed. 2. PP has submitted copies of plant log book/ records, steam flow logs, laboratory report for NCV and moisture content of biomass residues for the complete monitoring period which were checked and found correct. Hence, this part of CAR is closed. 3. PP has now inserted web link for CEA database in the revised MR which is checked. Hence, this part of CAR is closed. 4. PP has now provided calculation of baseline emissions in section 5.1 of revised MR which is checked and confirmed. Hence, this part of CAR is closed. 5. PP has now provided calculation of Project emissions in section 5.2 of revised MR which is checked and confirmed. Hence, this part of CAR is closed. 6. PP has now submitted copies of ENERGY GENERATION RECORDSs and invoices for entire monitoring period along with calibration certificates of energy meters and weighbridge. ENERGY GENERATION RECORDS and invoices were checked to confirm values considered for emission reduction calculations and the values were found correct. Energy meter calibration certificates were cross checked to confirm that no delayed calibration is observed and same was confirmed in the case of weighbridge used for fuel weight monitoring. Hence, this part of CAR is closed. **CAR 04 is closed.**	

CAR ID	05	Section no.	4.5	Date : 12/01/2022
Description of CAR				
1. PP requested to mention calibration details along with copies of the calibration certificates covering complete monitoring period. 2. PP is requested to provide break down details of the project activity in the MR.				
Project participant response				**Date :** 27/01/2022
1. The calibration certificates are enclosed herewith 2. The break down details are provided herewith				
Documentation provided by project participant				
Calibration certificates and breakdown sheet				
DOE assessment				**Date :** 29/01/2022

1. PP has now provided calibration details in appendix 1 of revised MR. The details provided were cross checked against calibration certificates submitted to confirm that no delayed calibration is observed. Hence, this part of **CAR is closed.**
2. PP has submitted shutdown/breakdown details. The same were checked to confirm no unexpected breakdown were observed during current monitoring period except for routine periodic operation and maintenance related outage. The document was checked and accepted. Since, shutdown details provided are large in number due to the length of the monitoring period, PP has not presented them in the revised MR which is accepted. **CAR 05 is closed.**

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verificationfindings
1.	Lead Auditor/Technical Expert	OR	Kumar	Pankaj	TQC-Outsourced entity	Yes	No	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Xue	Denny	Applus+ Certification
2.	Approver	IR	Calle de Miguel	Agustin	Applus+ Certification

Short CVs of the Team:

1. **Pankaj Kumar** worked as team leader – Bihar for South Asia Climate Proofing and Growth Development (CPGD) – Climate Change Innovation Programme (CCIP) supported by DFID that seeks to mainstream climate change resilience into planning and budgeting at the national and sub-national level in India, Pakistan, Nepal, and Afghanistan. Pankaj Kumar has worked previously with IL&FS Infrastructure Development Corporation and BUIDCO (Bihar Urban Infrastructure Development Corporation), Govt. Of Bihar as Environmental Specialist for WB & ADB funded projects. Prior to this, he worked with Carbon Check (UNFCCC accredited DoE), Johannesburg, RSA as Team Leader for validation, verification of around 100 GHG projects in Asia, Africa, USA, Asia Pacific & Americas. Pankaj is accredited Lead Auditor, Validator, Verifier and Technical Expert for Sectoral Scope/Technical Area – 1.1, 1.2, 3.1 & 13.1 by

UNFCCC DoE (Designated Operational Entity), APPLUS, Spain. He is also member of task force on climate change & human health, Health Department, GoB and on roster of UNICEF's WASH experts.

He is an experienced, qualified and result oriented Environment Professional having more than 14 yrs. Of relevant experience in Climate Change (Mitigation &Adaptation), Environmental Due Diligence, Disaster Risk Reduction, Validation and Verification of GHG project under CDM, Verified Carbon Standard, Gold Standard & Social Carbon Standard, Brazil. He provides technical support for environmental investigative, consultative and remedial projects involving air, water and soil, Waste management, EIA, Environmental Compliance, ISO 14001, OHSAS 18001, GHG accounting (ISO 14064) and Carbon foot printing

Pankaj Kumar is Masters in Environment Management from Forest Research Institute (University), I.C.F.R.E, Dehradun, which is Centre of Excellence in South East Asia for Forestry education & research and PGDEL from National Law School of India University, Bangalore (India).

2. **Mr. Denny Xue** (Master's Degree in Environmental Engineering, Bachelor's Degree in Thermal Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project assessment, auditing and technical review. He has more than 6 years of work experience in CDM/GS4GG/VCS project assessment and technical review with Applus+. Before he joined Applus+ LGAI, he has been working for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification Request
CM	Combined Margin
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS

Details of the Energy Meters used:

Meter ID no.	Meter Sr. No.	Make/ Model	Acc. Class	Date of calibration (validity – annual)						
M6	20070325010057/2008	WASION/DSSD33 1	0.5 s	22-August-2011	22-August-2012	19-August-2013	16-August-2014	14-August-2015	13-August-2016	11-August-2017
M3	144917/135263-1008	Conzerv/6400	1	22-August-2011	22-August-2012	19-August-2013	16-August-2014	14-August-2015	13-August-2016	11-August-2017
M4	144917/135265/1008	Conzerv/6400	1	22-August-2011	22-August-2012	19-August-2013	16-August-2014	14-August-2015	13-August-2016	11-August-2017

Details of Weigh Bridge:

Capacity	Serial No.	Accuracy class	Date of calibration					
40 Tons	0411032K	Class III	20-May-2011	19-May-2012	08- May-2015	08- May - 2016	30- May-2017	-
100 Tons	2001732	Class III		17-December-2011	12-December-2013	08-December-2014	03-March-2016	03-March-2017

Details of Steam Flow Meter:

Make	Model	Serial number		Date of calibration					
YOKOGAWA	EJA 110 A	91H542351	24-August-2011	22-August-2012	19-August-2013	16-August - 2014	14-August - 2015	13-August-2016	11-August-2017