VERIFICATION REPORT OF15 MW BIOMASS RESIDUE BASED POWER PROJECT AT GHAZIPUR, INDIA.

Document Prepared By 4K Earth Science Private Limited

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Summary:

4K Earth Science Private Limited (4KES) has been contracted by, "Sukhbir Agro Energy Limited (SAEL)" to undertake verification and certification for the greenhouse gas (GHG) emission reductions reported from '15 MW Biomass Residue Based Power Project at Ghazipur, India' for the monitoring period 01st January 2018 to 13th February 2019 (inclusive of both days).

The project activity is a biomass residue based cogeneration plant, the total installed capacity is 15.00 MW. The project activity is located in Fatehullahpur Village, Ghazipur District of Uttar Pradesh State, India.

The rice husk is the main biomass residue fuel used to produce heat within the installed boiler and further the heat is converted into mechanical energy resulting in electricity production. The electricity generated from this power plant will be sold to the regional grid.

The management of 'Sukhbir Agro Energy Limited (SAEL)' are responsible for the preparation of the Electricity Generated data (monthly & yearly) and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report, Version 1.1, dated 08th March 2022 /02/.

The calculation and determination of GHG emission reductions from the project is the responsibility of the consultant 'EKI Energy Services Limited'. The development and maintenance of records and reporting procedures are in accordance with the registered Monitoring Plan or registered PD.

A risk-based approach has been followed to perform the 03rd verification of the project activity. In the course of the verification, 05 Corrective Action Requests (CARs), 09 Clarification Request (CL) and 00 Forward Action Request (FAR)[1] were raised based on the initial monitoring report version 1, dated: 19th January 2022 /01/ and subsequently closed after the necessary corrections were incorporated in the final monitoring report version 1.1, dated: 08th March 2022/02/.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 01st January 2018 to 13st February 2019 based on the reported emission reductions in the final monitoring report /02/.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, 4KES planned and performed the work to obtain the information and explanations that was considered necessary to provide sufficient evidence for us to give 'reasonable assurance' that this reported amount of GHG emission reductions for this current monitoring period is fairly stated.

[1] No FAR was raised during the course of this verification.

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1 INTRODUCTION

1.1 Objective

4K Earth Science Private Limited (4KES) has been contracted by, "Sukhbir Agro Energy Limited (SAEL)" to undertake verification and certification for the greenhouse gas (GHG) emission reductions reported from '15 MW Biomass Residue Based Power Project at Ghazipur, India' for the monitoring period 01st January 2018 to 13st February 2019 (inclusive of both dates). The VCS projects must undergo an independent third-party verification and certification of emission reductions as the basis for issuance of Voluntary Emission Reductions (VERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the project description (PD) and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan;
- To confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VERs/VCUs) without any double counting, and;
- To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

The new VCS standard (ver 4.2) , and Verification Template was revised on 20th January 2022 and effective date for using this template is 20th July 2022, hence the version 4.0 of the Verification Template has been used by the verification team.

1.2 Scope and Criteria

The scope of verification is to assess the claims and assumptions made in the VCS monitoring report (MR) against the VCS criteria, including but not limited to, VCS standard /03/, and Validation Verification Manual, Version 3.2 /04/ and Registration and Issuance Process, Version 4.0 /05/ and other relevant rules and requirements established for VCS project activities.

The Verification is not meant to provide any consulting towards the project participants. However, stated requests for clarification and/or correction actions request may have provided inputs for improvement of the project design.

1.3 Level of Assurance

The verification team verified the complete monitoring data for all the parameters of the monitoring plan and confirms that the reported emission reductions are free from any type of material errors. Therefore, 4KES confirms that the verification is conducted with '*reasonable level of assurance'* and the same is in line paragraph 4.1.18 (1) of the VCS standard, v4.1 /03/.

1.4 Summary Description of the Project

The project activity is a biomass based cogeneration plant, the project is located in the premises of an existing Rice Mill & Solvent Extraction Plant. The steam and electricity requirements (captive) approximately 2.00 MW are met by the project activity /cogeneration plant and the excess electricity is sold to Purvanchal Vidyut Vitran Nigam Limited (PVVNL). The PP and PVVNL have signed a long time Power Purchase Agreement (PPA) for selling the surplus electricity, the PPA was signed on 29th July 2006. The project activity is located in the premises where 40 TPH milling capacity Rice Mill for paddy processing and a 500 TPD Solvent Extraction Plant co-exists.

In the pre-project scenario, the electricity needs were met from the electricity sourced from the regional grid and steam requirements was fulfilled by a 10 TPH rice husk based boiler. The project activity comprises of 70TPH Boiler and 15 MW capacity extraction cum condensing type turbine generator and other equipment and auxiliaries which include:

i. Electro Static Precipitator (ESP),

ii. Cooling Tower,

iii. Feed water system,

iv. Ash handling system,

v. Raw water system and DM Plant and

vi. Electrical system with power evacuation network.

The project activity uses the locally available biomass residue as fuel viz., rice husk available in the rice mill after processing paddy. The PP has developed management systems to monitor, record, QA&QC measures and manage the project as per the registered monitoring plan (VCS PD).

As per the registered VCS PD & CDM PDD the project activity is designed to produce 84,586 MWh of electricity annually and resulting in average ex-ante emission reductions of 67,259 tCO_2e annually.

2 VERIFICATION PROCESS

The registered VCS project is undergoing third verification under VCS with Fixed Crediting period option, the approach adopted to ensure the quality of emission reductions is described in the subsequent sections of this report.

2.1 Method and Criteria

4KES assessed and determined whether the proposed implementation and operation of the project activity, and the steps taken to report emission reductions comply with the criteria and relevant guidance provided by the VCS Board. The validation/verification process consist of the following three phases;

- A desk review of the VCS PD and VCS MR.
- Follow up interviews with project stakeholders.
- The resolution of outstanding issues and issuance of final report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control before being submitted to the VERRA Secretariat for issuance of credits as per VCS standard version 4.1 /3/.

Duration of Verification:

Verification Contract	13/12/2021
Remote audit	06/01/2022
Findings raised	30/01/2022
Draft Verification Report	12/03/2022
Final Verification Report	14/03/2022

2.2 Document Review

The verification is performed primarily as a document review of the approved VCS PD /07/ and registered CDM PDD /08/, also the 1st Verification Monitoring Report /09/ along with Verification Report /10/ and associated documents as stated in detail in Appendix 1 of this report. The assessment is performed by a Verification Team using a protocol. The cross checks between information provided in the Monitoring Report, CDM PDD & VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations.

2.3 Interviews

Due to COVID-19 pandemic lockdown and restrictions on travel Verification team could not conduct the site visit. Since the date of closure of lockdown was uncertain due to the increase spread of COVID-19 and travel restrictions Verification Team did not conduct site visit for this project activity and also referring to COVID-19 Travel Guidance for Projects[2]. However, the verification team performed the Zoom remote interview with the PP and site personnel and project representative to assess the information and review the documents to achieve a reasonable level of assurance in the verification. This is in line with Section 4.1.2 of the VCS Standard, v4.1 /3/ which does not explicitly mandate site visits as part of the validation and verification process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications. No sampling procedures were adopted in document verification and all the document were cross checked to ensure conservative estimation of emission reduction. Kindly find below names of the persons interviewed (Zoom remote interview).

Location	Zoom Meeting	
Dates	06/01/2022	
Key points discussed	**Name of person, interviewed**	**Designation, Organization**
Implementation, Monitoring, Operational data, Calibration, Data collection, QA/QC procedures, Calculation of		
	Saroj Sahu Abhisek Garg	SAEL and EKI Energy Services Pvt Ltd
	Ananya Malik	SAEL Site Personnel of Sukhbir Agro Energy Limited

[2] https://verra.org/covid-19-travel-guidance/ published on 18th March 2021

ERs, VCS requirements	Rajneesh Kr. Tripathi Hiralal Yadav Ashwani Garg Prince Gakhar	

2.4 Site Inspections

As detailed above, the intermittent lockdown due to COVID-19 third wave pandemic in India and travel restrictions, Verification team could not conduct the site visit. Since the date for revocation of travel restrictions on travel was not clear, the VVB could not perform physical verification of the site for this project activity. However, the verification team performed the Zoom remote interview with PP and site personnel and reviewed documents to achieve a reasonable level of assurance in the verification. This is in line with COVID-19 Travel Guidance for Projects and Section 4.1.2 of the VCS Standard, ver 4.1 which does not explicitly mandate site visits as part of the validation and verification process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications.

2.5 Resolution of Findings

Describe the process for the resolution of any findings (corrective actions and clarifications or other findings) raised by the verification team during the verification and, where applicable, outstanding forward action requests from the validation or previous verifications.

State the total number of corrective action requests, clarification requests and forward action requests and other findings raised during the verification.

Provide a summary of each finding, including the issues raised, the response(s) provided by the project proponent, and the final conclusions and any resulting changes to project documents. Unless this fits on one page, put all findings in an appendix.

The objective of this step is to identify, discuss and conclude on the issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions. This is done based on the desk review and Zoom remote interview. The verification team prepares and/or updates a verification protocol (internal document) that records the conformities and non-conformities, which may be of following types;

CAR (Corrective Action Request) is raised if one of the following occurs:

• Non-compliance with the monitoring plan, the methodology or the standardized baseline are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

• Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;

• Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

•Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised by the 4KES during verification shall be resolved prior to submitting the Request for Issuance. FAR (Forward Action Request) is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

During the Verification process, total 05 CARs and 09 CLs were raised and resolved satisfactorily. No FAR has been raised in the current verification. The list of CARs/CLs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix-II of this report.

2.5.1 Forward Action Requests

There were no Forward Action Requests (FARs) raised during the current verification.

2.6 Eligibility for Validation Activities

4KES conducted the verification activity, the validation was performed by the other VVB. 4KES has a valid UNFCCC accreditation in the sectoral scope from UNFCCC. The accreditation scope can be checked from the below URL:

http://cdm.unfccc.int/DOE/list/DOE.html?entityCode=E-0069

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The Project Proponent had opted issuance of GHG credits under VCS for the 1st monitoring period from 14th February 2009 to 11th January 2010 and for the current verification monitoring period starts from 01st January 2018 to 13th February 2019 (inclusive of both days). The end of crediting period for this project activity is 13th February 2019 (https://registry.verra.org/app/projectDetail/VCS/624) /11/.

The project is also registered as a CDM project with UNFCCC on 12th January 2011, reference no '2708' (https://cdm.unfccc.int/Projects/DB/RWTUV1245587342.33/view) /12/, the PP has submitted Request of Issuance of CERs under CDM, and the periods of claim are as follows:

i) 12th January 2010 to 31st December 2011 (CERs issued),

ii) 01st March 2012 to 13th February 2019 (monitoring report webhosted)

iii) 14th February 2019 to 11th January 2020 (monitoring report webhosted)

Sl No. ii of the claim made by PP under CDM is in conflict with current claim under VCS, the PP has chosen monitoring period starting from 01st March 2012 and ending on 13th February 2019 which corresponds to the current claim of issuance under VCS (period 01st January 2018 to 13th February 2019), this amounts to double counting hence the verification team raised CAR 02. The PP in response to CAR02 submitted a deceleration dated 31st January 2022 /13/ and affirmed through this deceleration that the PP will not claim 'Request for Issuance' under CDM for the current monitoring period "01st January 2018 to 13th February 2019" and assured that Request for Issuance under CDM for this monitoring period will be withdrawn upon submission of documents to VERRA requesting issuance under VCS.

The verification team raised corrective action request (CAR 03) since the information provided in the initial monitoring period did not contain details pertaining to CDM registration and one clarification request (CL 05) w.r.t delay in verification between the first and current monitoring period. The PP responded stating that the verification for the period 2010 to 2017 (up to 31st December 2017) under VCS is performed by other VVB and the same was under process. The verification team has accepted the response and hence CL09 was closed, details about closure of the CL05 is detailed in Appendix II of this report.

3.2 Methodology Deviations

The project activity has applied CDM approved methodology ACM0006, Version 6.2: 'Consolidated methodology for electricity generation from biomass residues' /14/. The project activity has met the all criteria and applicability conditions and has not resulted in methodology deviations. Hence this section is not applicable.

3.3 Project Description Deviations

The verification team confirms that the size /capacity of project, technical specifications and monitoring parameters have remained same / constant w.r.t the registered VCS PD & CDM PDD. The verification team reviewed the documents and was able to conclude that the project design, size and monitoring parameters are consistent and further through remote audit interview was able to affirm that there are no deviations to the project. Hence this section is not applicable.

3.4 Grouped Project

The project activity is not a grouped project or part of any grouped project. The verification team additionally checked the Host Country Approval /15/ accorded by the Host Party DNA which was obtained on 03rd September 2008, with Ref no: No.4/13/2008-CCC and ascertained that the project is a single project activity and not part of any group project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity is a biomass based co-generation project which involves using the biomass residues as a main source fuel to generate electricity and steam. The 70TPH boiler was commissioned in the month of December 2008 and turbine generator was commissioned on January 2009. Trial runs were conducted for a month and subsequently the plant was synchronized with the regional grid on 14th Feb 2009 /16/ the same was verified from the synchronisation certificate which was issued on 16th February 2009 by UP Power Transmission Corporation Limited. The capacity of the project activity was also cross checked and confirmed from the certificate as 15.00 MW.

The boiler inspection reports from the year 2017 to 2019 /17/ were made available to the verification team, the reports were the basis to confirm the boiler specifications with details presented in the registered VCS PD and CDM PDD. The turbine generator details were cross verified from the manufacturer specifications /18/ and photographs /19/. The project activity specific technical details were also discussed and confirmed during the remote audit interviews with Project Personnel of the PP.

Description	Parameters
No of boilers	One (1)
Makers	ISGEC John Thomson (IJT)
Type	Bi-drum, natural circulation, balanced draft, bottom supported, outdoor water tube type 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

The boiler is designed with following design codes:

- Pressure parts: IBR 1950 with latest amendments
- Piping: ANSI 31.1 & IBR 1950
- Boiler performance: ASME PTC 4.4 – Indirect Method

The Electrostatic Precipitator procured for installation at the downstream of boiler flue gases has been designed not only to meet the regulatory norms (150 ppm) of State Pollution Control Board but significantly decrease the SPM level before exhausting to atmosphere. It is expected to control SPM below 100 ppm.

The boiler supplied by IJT has added advantage in terms of quick and easy ash removal process, high efficiency, quick response to load change, greater reliability, ease of maintenance and step less (smooth) change in grate speed.

Major Technical Parameters of Steam Turbine generator

The turbine is designed and manufactured according to following standards:

For turbine, it is GB/T5578-1985 "Technical specifications for stationery steam turbine" which is equivalent to IEC 34:

For Generators, it is GB/T6064-2002, "General technical specification for turbo generator", which is equivalent to IEC-34

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

DM Plant: This is single stream manually operated DM plant with flow rate of 6m³/hr.

The power is generated at 11 kV from the turbine generator. The power output from the turbine generators is stepped up to 132 kV at SAEL plant and then connected to the grid line.

The technology of biomass-based power generation is well established in India and the project doesn't involve any transfer of technology. The technology being used is environmentally safe and sound

For the monitoring parameters the PP presented the photographs of energy meters /19/ and calibration certificates /21/, /22/ & /23/ for the period ranging from 2017 to 2019. The monthly biomass stock report /24/ was submitted and the details were cross checked with data presented in the Monitoring Report and upon review of the data the verification team did not find any discrepancies and concluded that is meeting requirements stated in paragraph 3.21.3 of VCS standard /03/.

The monitoring parameters, accuracy of calculations, QA & QC procedures are detailed out in the subsequent sections of this verification report.

Verification team reviewed the documents, photographs and also conducted interviews to verify the accuracy of information presented in the registered VCS PD & CDM PDD. Additionally the verification team also accessed the monitoring report and verification report of the first verification. Based on the assessment the verification team is able to conclude that there were no deviations identified w.r.t the project design, size, baseline scenario and the project activity has been implemented, operated as per the registered VCS PD and CDM PDD.

4.2 Safeguards

4.2.1 No Net Harm

The project activity is a renewable biomass residue based power project, as per the registered PDD and MR.

There are no negative environmental impacts that arises as a result of the project activity. However, the following factors were analysed by the Project Participant for potential impacts and these are handled as per applicable statutory guidelines and are mentioned as follows:

1. Impact on Land. The ash generated from the project activity are disposed as per the state Pollution Control Board guidelines.
2. Impact on Water. UP Pollution Control Board (UPPCB) has identified the norms of water consent and SAEL ensures that waste water generated from the project activity will be treated to meet required limits before disposal.

3. Impact on Air. The project activity will lead 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.

4. Impact on 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.

The project activity has received the consent to establish from Uttar Pradesh Pollution Control Board (UPPCB). During the operation of the project activity yearly consents to operate /29/ are obtained with a stipulated time frame from the UPPCB for air and water pollution. The project operates within the stipulated limits set by the UPPCB and is monitored as part of the overall GHG emission reduction project compliance. The verification team cross checked the Consent and based on the assessment the verification team concludes that the Project Activity's has no negative impacts and the PP's approach is in line with paragraph 3.16.1 of VCS standard /3/.

4.2.2 Local Stakeholder Consultation

The local stakeholder consultation was held on 26th November 2006 which was prior to registration of this project activity with VCS. The local stakeholders were invited by distribution of handouts /pamphlets and sending individual letters and also the regulatory /statutory agencies were notified.

Based on minutes of meeting /30/ the verification team noted that the local stakeholders had expressed positive opinion about the project activity, no negative comments were recorded.

4.3 AFOLU-Specific Safeguards

The project activity falls under non-AFOLU projects category, hence this section is not applicable.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Data Parameters available at validation:

Data / Parameter	$EF_{electricity,y}$
Data unit	tCO_2 / MWh
Description	Combined margin (CM) value of CO_2 baseline emission factor for the grid electricity displaced due to the project activity during the year y
Source of data	Central Electricity Authority, India "CO_2 baseline database, version 4, Oct 2008)"

Value applied	0.80 tCO_2 / MWh
Purpose of Data	Used for Baseline emission calculations
DOE Justification	The combined margin (CM) for NEWNE Grid is calculated after determining the Build Margin and Operating Margin. Where: - OM is the average emission from all stations excluding the low cost/must run sources. - BM is the average emission of the 20% (by net generation) most recent capacity addition in the grid. - CM is a weighted average of the OM and BM (here weighted 50 : 50). The values are directly derived from CO_2 Baseline Database for the Indian Power Sector, published by Central Electricity Authority (CEA) a reputed organization under the purview of Ministry of Power, Government of India. https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_4.zip CEA has developed an emission baseline database by collating data from all the regional grids of India for prospective CDM projects. The database had calculated emission factors and these will be updated annually. CEA has calculated Combined margin (including inter-regional and cross-border electricity transfers) according to methodology ACM0002, version 08 /31/. The value has been fixed ex-ante, data used to determine CM was checked and confirmed by the verification team.

4.4.2 Data and Parameters Monitored

Data / Parameter	$EG_{project\ plant,\ y}$
Data unit	MWh per annum
Description	Net electrical energy generated by the project activity
Source of data	Electricity meter at generation point.
Frequency of monitoring/recording	Measuring Frequency – Hourly Recording Frequency – Hourly
Value monitored	92340
Monitoring equipment	The parameters gross generation ($EG_{Gross,y}$) and auxiliary consumption ($EG_{Aux,y}$ where, $EG_{Aux,y}$ = $EG_{Aux1,y}$ + $EG_{Aux2,y}$) are measured using energy meters EM-6, EM-3 & EM-4 respectively installed in the power plant.
Purpose of the data	Data used for baseline emission calculations

DOE Justification	Verification team assessed the following. The parameters gross generation ($EG_{Gross,y}$) and auxiliary consumption ($EG_{Aux,y}$ where, $EG_{Aux,y}$ = $EG_{Aux1,y}$ + $EG_{Aux2,y}$) are measured using energy meters EM-6, EM-3 & EM-4 respectively installed in the power plant. The Net electricity generation is calculated by subtracting auxiliary electricity consumption from gross electricity generation. $EG_{project\ plant,y} = EG_{Gross,y} - EG_{Aux,y}$ Where, $EG_{Aux,y} = EG_{Aux1,y} + EG_{Aux2,y}$ The meters are calibrated annually by an independent third party. The calibration certificates /21/,/22/ & /23/ for the period 2017, 2018 and 2019 were submitted by the PP. The validation team noted that the calibration is carried out by 'Bharthi Automation Pvt Ltd', this entity is accredited by "*National Accreditation Board for Testing and Calibration Laboratories (NABL)*" and recognized by the *Bureau of Indian Standards* (BIS). They are approved for electronic and electric materials. Based on the assessment the verification team is able to conclude that all the energy meters were calibrated as per the schedule (annual) and there was no delay in calibration of energy meters. Further it is confirmed that the data will be archived electronically.

Data / Parameter	BF_y
Data unit	Tonnes of dry matter; MT
Description	Quantity of biomass residue (rice husk) combusted in the project activity during the year y
Source of data	Plant log records
Frequency of monitoring/recording	Continuous (as when received at site)
Value monitored	140484.6
Monitoring equipment	The amount of rice husk procured from outside is measured by 2 weigh bridges of capacity 40 MT & 100 MT which are installed at the factory gate. The amount of rice husk from internal source is measured as a percentage of paddy processed by the rice mill. The details of the weigh bridges used in the project activity are provided in the appendi-1.
Purpose of the data	Data used for baseline emission and project emission calculations

DOE Justification	The biomass required for this project is sourced from the internal Rice Mill and from external sources. The vehicles / trucks carrying the biomass procured from external sources are checked at the entry point for the quantity carried is verified at the weigh bridge (both loaded & unloaded) to determine the total amount of biomass procured. The amount of biomass residue (rice husk) form the internal source is measured as a percentage of paddy processed by the rice mill. The trip sheet / receipts are the basis for monitoring the number of truck trips and the average distance travelled to determine the project emissions. The measurement frequency is daily. The data of dry matter or the biomass combusted in the boilers are cross checked through an energy balance undertaken each year for the project activity. The biomass receipts, weigh bridge details and the energy balance workings were made available to the verification team. The data was checked and no discrepancy was identified by the verification team.

Data / Parameter	**Moisture content of biomass residues**
Data unit	% Water content
Description	Moisture content of biomass residue
Source of data	In house laboratory test reports and third party test reports
Frequency of monitoring/recording	Monitored continuously. Daily records are maintained with mean values calculated annually.
Value monitored	21.3%[3]
Monitoring equipment	-
Purpose of the data	The data is used to determine leakage emissions, if any. Leakage emissions due to competing use of biomass was found to be insignificant and thus ignored.
DOE Justification	Certificates for the period 2017 to 2019 /26/ were made available to the verification team. The average of moisture content for the current monitoring period has been calculated based on in house laboratory results , International Standard IS: 1350(P-1) 1970 R – 2002 is used in the determination of moisture content. The moisture content of biomass residue or rice husk were cross

[3] Average for the entire monitoring period

	checked from the Net Calorific Value (NCV) certificates issued by third party entity 'Idma Laboratories Limited' (a Government Approved Laboratory). The average moisture content calculation is checked and same is agreeable to the verification team.

Data / Parameter	AVD_y
Data unit	Km
Description	Average round trip distance (from and to) between biomass fuel supply sites and the project site
Source of data	Plant records
Frequency of monitoring/recording	Monitored continuously. Daily records are maintained with mean values calculated annually.
Value monitored	76.0
Monitoring equipment	Records are maintained at the factory gate. Recording is done when a truck loaded with biomass arrives at the factory gate.
Purpose of the data	Data used for project emission calculation
DOE Justification	The average no.of trips Factory records maintained at the factory gate at the time of receipt of biomass residues at factory gate. The trip sheets and trip register was the basis for calculating the average round trip distance between the project site and suppliers site. The trip details were checked by the verification team and the calculations were found to be correct.

Data / Parameter	N_y
Data unit	-
Description	Number of truck trips for the transportation of biomass.
Source of data	Plant records
Description of measurement methods and procedures to be applied	
Frequency of monitoring/recording	Monitored continuously. Daily records are maintained with mean values calculated annually.
Value monitored	6607
Monitoring equipment	Records are maintained at the factory gate. Recording is done as and when a truck loaded with biomass arrives at the factory gate
Purpose of the data	Data used for project emission calculation
DOE Justification	The verification team checked the trip sheet details along with

	vehicle entry info registry kept on the security guard office or entry point, were checked and no discrepancies were noted.

Data / Parameter	$EF_{km,CO2,y}$
Data unit	tCO_2/km
Description	Average CO_2 emission factor for the trucks during the year y
Source of data	IPCC default value
Frequency of monitoring/recording	Default values are used for calculation.
Value monitored	0.00044
Monitoring equipment	-
Purpose of the data	Data used for project emission calculation
DOE Justification	Default Value has been checked by the verification team. It is noted that the following formula is used to calculate the average CO_2 emission factor for the trucks during the year y. Average CO_2 emission factor for the trucks = Vehicle mileage x Density of diesel x NCV of diesel x CO_2 emission factor for diesel No discrepancy or data mismatch was identified by the verification team.

Data / Parameter	Quantity of biomass residues of type k that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region
Data unit	Tons
Description	Quantity of biomass residues of type k that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region
Source of data	Survey or statistics
Frequency of monitoring/recording	
Value monitored	1770209[4]
Monitoring equipment	
Purpose of the data	To calculate leakage emission (In case surplus of biomass, is less than the 25% of the total consumption of the biomass in the region (within 200 km radius

[4] For the year 2017-18

	of the project site) including the requirement of the project activity.
DOE Justification	The third party biomass assessment report of Sustainable Enviro Consultancy was submitted to the verification team. The assessment report covered the Ghazipur District and for the period April 2012 to March 2019. The report determines the crops grown in the entire district, biomass residues available and surplus biomass available in the region. The value is sourced for the period April 2017 to March 2018. The report and calculations were checked and confirmed by the Verification team and there were no discrepancy identified in the calculations and value reported.

Data / Parameter	Quantity of available biomass residues rice husk in the region of 200 Kms., and as defined in B.3 and Biomass Assessment Survey report.
Data unit	Tons
Description	Quantity of available biomass residues of type k in the region
Source of data	Survey or statistics
Frequency of monitoring/recording	
Value monitored	2950349[5]
Monitoring equipment	
Purpose of the data	To calculate leakage emission (In case surplus of biomass, is less than the 25% of the total consumption of the biomass in the region (within 200 km radius of the project site) including the requirement of the project activity)
DOE Justification	The third party biomass assessment report /28/ was checked by the verification team and the value applied here was matching the figures stated in the report. The data indicates that biomass residue is available on surplus in the region (Ghazipur District).

Data / Parameter	$EF_{Co2,LE}$
Data unit	tCO2/GJ
Description	CO2 emission factor of the most carbon intensive fuel used in the country

[5] For the year 2017-18

Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume2, Table 1.4, Page 1.23
Frequency of monitoring/recording	Annual
Value monitored	
Monitoring equipment	-
Purpose of the data	The data is used to determine leakage emissions, if any. Leakage emissions due to competing use of biomass was found to be insignificant and thus ignored.
DOE Justification	IPCC default value is applied correctly by the PP and there is no discrepancy in the application of the default value.

Data / Parameter	$Q_{project\ plant,\ y}$
Data unit	GJ
Description	Net quantity of heat generated from firing biomass in the project plant
Source of data	Steam Flow Logs
Frequency of monitoring/recording	Measuring Frequency – Hourly Recording Frequency – Daily
Value monitored	1080189
Monitoring equipment	The details of the steam flow meter used are provided in appendix-1
Purpose of the data	This parameter is not used emission reduction calculation.
DOE Justification	The steam generated from the boiler is recorded daily and the steam generated is cross checked with the total amount of biomass residue fired in the boiler. The steam flow meter is calibrated annually, the calibration of flow meters are carried out by 'Bharthi Automation Pvt Ltd', and this entity is accredited by "National Accreditation Board)" for Testing and Calibration Laboratories (NABL) and recognized by the *Bureau of Indian Standards (*BIS). The calibration certificates for the period 2017, 2018 and 2019 /27/ was submitted to the verification team, after the assessment of certificates it was concluded that flow meters were working satisfactorily and there was no delay in calibration.

Data / Parameter	NCV_k

Data unit	GJ/ton of dry matter
Description	Net Calorific value of biomass residue type k (rice husk)
Source of data	Measurements
Frequency of monitoring/recording	Daily records are maintained with mean values calculated annually.
Value monitored	3108
Monitoring equipment	NCV of rice husk is determined in an in-house laboratory. Standard testing procedure is followed.
Purpose of the data	Data used for project emission calculations
DOE Justification	NCV of rice husk is determined in an in-house laboratory. Standard testing procedure is followed. NCV test is carried out by an external /third party entity 'Idma Laboratories Limited' (a Government Approved Laboratory). The NCV of biomass residue ranges from 2,895 to 3,194 kCal/kg and the average NCV for the current monitoring period is worked out as 3108 kCal/kg, the same was checked and confirmed by the verification team.

Data / Parameter	E_{boiler}
Data unit	%
Description	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
Source of data	Higher value among (a) the measured efficiency and (b) manufacturer's information on the efficiency
Frequency of monitoring/recording	The higher value of the following is considered: a) Measured Efficiency (historic 3 years data) b) Manufacturer specification c) The thermal efficiency of 10 TPH Boiler for the last 3 years d) The designed efficiency as specified by the manufacturer is 80% As the designed efficiency is greater than the measured efficiency, the efficiency of the 10 TPH boiler is 80%.
Value monitored	75.0%
Monitoring equipment	
Purpose of the data	The data is not used in the determination of emission reduction.
DOE Justification	The boiler efficiency is determined through a Direct method (dividing the net heat generation by the energy content of the fuels fired during a representative time period).

[redacted]	The efficiency was in the range of 73.30% to 77.00% and the average boiler efficiency has been worked to be 75.00% for the current monitoring period. The boiler efficiency calculations were checked and confirmed by the verification team.

Based the assessment the parameters have been correctly monitored and there were no mismatch or material discrepancy identified by the Verification Team. The GHG emission reductions were calculated correctly on the basis of the 'Approved Consolidated methodology for electricity generation from biomass residues - Version 6.2, /14/ and meets the requirements stated paragraphs 3.15.1 and 3.15.3 of VCS Standard /3/.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Baseline Emissions

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 $ER_{biomass,y}$ are not been claimed, these are assumed as zero. Baseline emissions of the project activity are thus determined by the following equation:

$ER_{electricity,\ y} = EG_y . ER_{electricity,\ y}$

Where,

EG_y is the net quantity of electricity generation as a result of the project activity.

$ER_{electricity,\ y}$ is the CO_2 emission factor for the electricity displaced due to the project activity during the year y in tons CO_2/MWh

The CO2 emission factor for the displacement of electricity corresponds to the grid emission factor ($ER_{electricity,\ y} = EF_{grid}$).

The grid emission factor (EF_{grid}) has been fixed ex-ante for the project activity and the value as per of the registered PDD is 0.80 tCO_2/MWh. Baseline emission calculation for the monitoring period is as follows:

Baseline emission calculation for the monitoring period is as follows:

Years	Gross power generation (MWh)	Auxiliary Consumption (MWh)	Net power generation (MWh)	EG_y ($EG_{project\ plant,\ y}$)	$EF_{electricity,y}$	$ER_{electricity,y}$ (tCO_2)
2018	90701	9815	80886	80886	0.80	64708
2019	12880	1426	11454	11454	0.80	9163
Total	**103581**	**11241**	**92340**	**92340**		**73871**

Project Emissions

The only emissions attributed to the operation of the project activity are those from the transport of biomass residue (rice husk) to the project plant i.e. PE_y = PETy.

Rice husk procured are transported to the project site by trucks and the CO2 emissions resulting from transportation of rice husk to the project plant are calculated as per Option-1 on the basis of distance and the number of trips as:

$PET_y = N_y * AVD_y * EFkm, CO_2$

Where,

PET_y is CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr);

N_y is the number of truck trips during the period y;

AVD_y is the 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

$EFkm,CO_2$ is the average CO_2 emission factor for the trucks measured during the year y in t (CO2/km)

Project emission calculation for the monitoring period is as follows:

Years	N_y	AVD_y (km)	$EF_{km,CO2}$ (tCO_2/km)	PET_y (tCO_2)
2018	4898	72	0.00044	157
2019	1709	80	0.00044	60
Total	**6607**			**217**

Leakage

Based on biomass availability survey reports, it is found that there is a surplus of biomass, which is much more than the 25% of the total consumption of the biomass in the region (within 200 km radius of the project site) including the requirement of the project activity.

The verification team reviewed the third biomass assessment study /28/ prepared by Sustainable Enviro Consultancy demonstrates that the quantity of available biomass in the region is larger than 25% after considering the biomass residue utilization in the area; hence this source of leakage is not applicable to the project activity.

Emission reductions

The emission reductions estimated from the project activity are the difference between baseline emissions, project emissions and leakage emissions.

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2018	64708	157	0	64551
2019	9163	60	0	9103
Total	**73872**	**217**	**0**	**73654**

The actual emission reductions have been less by 2.27% when compared to the estimated emission reductions as per the registered PDD, the difference is 1,712 tCO_2e between the actual emission reductions and the estimated emission reductions in the registered PDD.

Conclusion:

Evidences (Documents & Zoom interviews) referred for verification of individual monitoring parameter and fixed parameters are defined in section 4.4 above. The Verification Team further confirm that, sufficient evidence covering the current monitoring period (01st January 2018 to 13st February 2019) and at the required frequency were available. A list of referred documents for verification is also included in Appendix 1 of this report.

4.6 Non-Permanence Risk Analysis

Not applicable, since this is a non- AFOLU project.

5 VERIFICATION CONCLUSION

4K Earth Science Pvt. Ltd (4KES), contracted by 'Sukhbir Agro Energy Limited (SAEL)', has performed the independent verification of the emission reductions for the VCS project activity (VCS ID- 624) titled: "15 MW Biomass Residue Based Power Project at Ghazipur, India" for the monitoring period: 01st January 2018 to 13th February 2019 (inclusive of both days) as reported in the Final Monitoring Report Version 1.1 /02/. The project proponent is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

4KES commenced the verification on the basis of the approved consolidated methodology ACM0006, Version 6.20, the monitoring plan contained in the registered CDM PDD /07 & supplementary VCS PD /08/ and VCS Standard version 4.1 /03/, Monitoring Report (Version 1.1, Dated: 08th March 2022) as per the process described under section 2 of this verification report.

4KES verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. 4KES planned and performed the verification by obtaining evidence and other information and explanations that 4KES considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions reported for the project activity for the period 01st January 2018 to 13th February 2019 are fairly stated in the Final Monitoring Report /02/. The GHG emission reductions were calculated correctly on the basis of approved consolidated methodology ACM0006 - 'Consolidated methodology electricity generation from biomass residues', Version 6.20 /14/, and the VCS standard 4.1.

Verification period: From 01st January 2018 to 13th February 2019 (inclusive of both days).

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)

2018	64708	157	0	64551
2019	9163	60	0	9103
Total	**73872**	**217**	**0**	**73654**

Approved by

Chandrakala R.



Director Date:14-March-2022

4K Earth Science Private Limited Place: Bangalore, India

APPENDIX I: List of Documents

Sl No	Documents / Web link
1	Monitoring Report, Version 1.0, Dt., 19th January 2022
2	Final Monitoring Report, Version 1.1, Dt., 08th March 2022
3	VCS Standard, Version 4.1, Dt., 22nd April 2021
4	Validation Verification Manual, Version 3.2
5	Registration and Issuance Process, Version 4.0
6	Power Purchase Agreement signed between SAEL and PVVNL on 29th July 2006
7	Registered CDM PDD, Version 05, 08th December 2009
8	Supplementary VCS PD, Version 01, 01st July 2010
9	1st Verification Monitoring Report, Version 02, Dt., 24th November 2010
10	1st Monitoring Period Verification Report No: 53601410 - 10/297 Dt.,05th July 2011
11	https://registry.verra.org/app/projectDetail/VCS/624
12	https://cdm.unfccc.int/Projects/DB/RWTUV1245587342.33/view
13	Double Counting deceleration dated 31st January 2022
14	AMC0006 - Consolidated methodology electricity generation from biomass residues, Version 6.2, Dt., 02nd August 2008
15	Host Country Approval, Dt., 03rd September 2008, with Ref no: No.4/13/2008-CCC
16	Certificate from UP Power Transmission Corporation Limited for synchronization of the plant with grid on 14th February 2009, certificate signed & issued on 16th February 2009
17	Deputy Director of Boilers, Uttar Pradesh (UP) State, India Boiler Registry No: UP6542 Year: 2017 , Dates of Inspection: 11/01/2017 Year: 2018 , Dates of Inspection: 24/07/2018 Year: 2019 , Dates of Inspection: 09/08/2019
18	Turbine Manufacturer Specifications issued by Qingdao Jieneng Power Station Engineering Co.,Ltd (QJPS)
19	Plant Photographs which comprised: Ash Handling, Cooling Tower, Control Room, ESP, Turbine and Weigh Bridge
20	Photographs Energy Meters - EM4 & EM 6
21	Calibration Certificates of EM3, EM4 & EM6 - from 2017 to 2019 EM 3: Certificate No: BA /2K17/142A/01, Dt., 11/082017 Certificate No: BA /2K18/186A/01., Dt., 10/08/2018 Certificate No: BA /BA/2K19/190A/01, Dt 04/8/2019
22	EM 4: Certificate No: BA /2K17/142A/02, Dt., 11/082017 Certificate No: BA /2K18/186A/02., Dt., 10/08/2018 Certificate No: BA /BA/2K19/190A/02, Dt 04/8/2019

23	EM 6: Certificate No: BA /2K17/142A/03, Dt., 11/082017 Certificate No: BA /2K18/186A/03, Dt., 10/08/2018 Certificate No: BA /BA/2K19/190A/03, Dt 04/8/2019
24	Biomass and Steam Data Info.xls (period 2018 to Feb 2019)
25	CEA Database, Version 4.0 https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_4.zip
26	Net Calorific Value Certificates: IDMA Laboratories Limited Year 2017: Ref No: D.No.IL/D 2791/17-18, Dt., 14/10/2017 Ref No: D.No.IL/D 6197/17-18, Dt., 22/12/2017 Year 2018: Ref No: D.No.IL/D 6733/18-19, Dt., 12/04/2018 Ref No: D.No.IL/D 3289/18-19, Dt., 07/10/2018 Ref No: D.No.IL/D 4706/18-19, Dt., 16/12/2018 Year 2019: Ref No: D.No.IL/D 122/19-20, Dt., 22/04/2019 Ref No: D.No.IL/D 2221/19-20, Dt., 05/10/2019 Ref No: D.No.IL/D 2921/19-20, Dt., 05/10/2019 Ref No: D.No.IL/D 5101/19-20, Dt., 06/12/2019
27	Calibration Certificates for Steam Flow Meter BA/2K19/101A/01, Dt., 01/05/2019 BA/2K18/400/01, Dt., 05/06/2018 BA/2K17/321A/01, Dt., 08/06/2017
28	Biomass Assessment Report, Dt., 03rd February 2022, prepared by 'Sustainable Enviro Consultancy'
29	Consent Order, issued by Uttar Pradesh Pollution Control Board (UPPCB), with ref no: 40333/UPPCB/Varanasi (UPPCBRO)/CTO/air/GHAZIPUR/2018, Dt., 15th December 2018
30	Minutes of Meeting - Local Stakeholder Consultation, Dt., 26th November 2006
31	ACM0002- Approved Consolidated methodology for grid-connected electricity generation from renewable sources, Version 8.0, Dt 28th November 2008
32	Emission Reduction Calculation Sheet

APPENDIX II: Verification Findings

Clarification requests, corrective action requests and forward action requests

~~Table 1.Remaining FAR from validation and/or previous verifications~~

~~FAR ID~~	~~xx~~	~~Section no.~~		~~Date: DD/MM/YYYY~~
~~Description of FAR~~				
~~Project participant response~~				~~Date: DD/MM/YYYY~~
~~Documentation provided by project participant~~				
~~DOE assessment~~				~~Date: DD/MM/YYYY~~

Table 2. CLs from this Verification

CL ID	01	Section no.	1.1	Date: 09/01/2022
Description of CL				
PP is requested to share (from 2017 to 2019) the following supporting's: 1. The regulatory consents for Air, Water and Hazardous waste. 2. Fuel purchase receipts (biomass used) and monthly fuel stock balance report. 3. Plant shift log books for operating parameters & planned and forced outages details. 4. Joint Meter Readings and Sales Invoices. 5. Clearances by the Inspector of Boilers. 6. Calibration reports for Energy Meters & Weigh Bridge. 7. Net Calorific Value report issued by Third Parties. 8. Commissioning certificate for the project issued by Punjab State Power Corporation. 9. Truck/Vehicle Trip Details. 10. Power Purchase Agreement.				
Project participant response				Date: 26/01/2022

1. Enclosed 2. Enclosed 3. The break down details are enclosed. The month wise monitoring parameters are included in the revised ER sheet. 4. Enclosed 5. Enclosed 6. Enclosed 7. The third party test reports are not required as per the registered PDD. 8. Enclosed 9. The monthly recorded values are included in the revised ER sheet. 10. Enclosed.
Documentation provided by project participant
As listed above.

DOE assessment	**Date: 05/02/2022**
The Verification Team has reviewed the following documents and response, hence CL 01 is closed. 1. The regulatory consents for Air, Water and Hazardous waste. 2. Fuel purchase receipts (biomass used) and monthly fuel stock balance report. 3. Plant shift log books for operating parameters & planned and forced outages details. 4. Joint Meter Readings and Sales Invoices. 5. Clearances by the Punjab State Inspector of Boilers. 6. Calibration reports for Energy Meters & Weigh Bridge. 7. Commissioning certificate for the project issued by Punjab State Power Corporation. 8. Truck/Vehicle Trip Details. 9. Power Purchase Agreement bw UBEPL & Punjab State Electricity Board.	

CL ID	02	**Section no.**	1. 9	**Date:** 09/01/2022
Description of CL				
Kindly submit the declaration for not claiming the issuance of CERs under CDM for the current monitoring period.				
Project participant response				**Date: 26/01/2022**
The declaration is submitted herewith.				
Documentation provided by project participant				
Declaration.				
DOE assessment				**Date: 05/02/2022**
Declaration dated 17th January 2022 has been checked and found to be acceptable, hence CL02 is closed.				

CL ID	03	Section no.	2.6	Date: 09/01/2022
Description of CL				
PP to submit the supporting's and affirm that there are no changes to equipment's / machineries which were mentioned in the CDM PDD & VCS PD at the time of Registration.				
Project participant response				**Date: 26/01/2022**
Latest boiler inspection certificates and the photographs of the equipment are submitted to support the same.				
Documentation provided by project participant				
Certificates and Photograhs				
DOE assessment				**Date: 05/02/2022**
The boiler inspection reports ranging from the year 2010 to 2021and photographs were submitted, the verification team also cross checked the following documents: - Verification report & monitoring for the 1st monitoring period - Validation report prior to registration with VCS, - Registered CDM PDD & VCS PD. Based on the documents submitted and review the verification team is able to conclude that there are no changes to equipment's / machineries which were mentioned in the CDM PDD & VCS PD at the time of Registration. The machineries & equipment are intact, hence CL03 is closed.				

CL ID	04	Section no.	3.1	Date: 09/01/2022
Description of CL				
PP is requested to share the manufacturer details of Boiler, Generator and Turbine along with Technical Specifications.				
Project participant response				**Date: 26/01/2022**
The photographs of the nameplates of boiler, generator and turbine mentioning technical specifications are submitted herewith.				
Documentation provided by project participant				
Photographs				
DOE assessment				**Date: 05/02/2022**

The technical specifications, photographs were checked and the same was also cross checked during the remote audit interview, the review process established that the Project Activity has been implemented as per the registered VCS PD & CDM PDD, hence CL 04 is closed.

CL ID	05	**Section no.**	3.1	**Date:** 09/01/2022
Description of CL				
PP is requested to share the photographs of nameplates of Boiler, Energy Meter, Generator and Turbine which should clearly have the following information: 1. Manufacturers name 2. Capacity 3. Rated Power (for Generator & Turbine) 4. Serial Nos / IBR No (Boiler) 5. Accuracy class of meter				
Project participant response				**Date: 26/01/2022**
The photographs are enclosed herewith.				
Documentation provided by project participant				
Photographs				
DOE assessment				**Date: 05/02/2022**
Photographs of the boiler, turbine generator and energy meters were submitted, the same was checked and confirmed, hence CL05 is closed				

CL ID	06	**Section no.**	3.1	**Date:** 09/01/2022
Description of CL				
PP to confirm that the project activity has been implemented & operated as per the information provided in registered CDM PDD & VCS PD. The plant has been in operation for more than 10 years, PP to submit the Boiler Inspection Reports / Chartered Engineer report and supporting's to determine the remaining life time of Boiler and Turbine.				
Project participant response				**Date: 26/01/2022**

The project has been implemented and operated as per the information provided in the CDM PD and VCS PD. The latest boiler inspection certificate dated 16/02/2021 submitted herewith confirms that the boiler is fit and permitted to be used under the provision of section 7/8 of the Indian Boiler Act no. V of 1923.
Documentation provided by project participant
All documents mentioned above.
DOE assessment **Date: 05/02/2022**
The boiler inspection reports along with the plant log book, maintenance schedule and photographs were submitted, the verification team also cross checked the following documents: - Verification report for the 1st monitoring period - Validation report submitted to VCS board, - Registered CDM PDD & VCS PD. Based on the documents submitted and review the verification team is able to conclude that the project activity has been implemented & operated as per the information provided in registered VCS PD & CDM PDD, hence CL06 is closed.

CL ID	07	**Section no.**	4.2	**Date:** 09/01/2022
Description of CL				
PP to clarify the billing cycle / date of JMR and the no. of days /period (first & last dates) claimed for ER calculations for the current monitoring period, since the start date of monitoring period is 01st March 2017 and last date is 29th October 2019.				
Project participant response				**Date: 26/01/2022**
The start date of the monitoring period, 01/03/2017 is also the start date of billing cycle for the JMR for the month of Mar 2017. However, the end date of the monitoring period is 29/10/2019 whereas the end date of the billing cycle for the month of Oct 2019 is 02/11/2019. In the initial version of MR and ER sheet, the entire generation as per the JMR for the month of Oct 2019 was considered which is wrong. *To subtract the generation for 4 additional days (i.e. 30/10/2019, 31/10/2019, 01/11/2019 and 02/11/2019), 4 times of highest recorded single day generation in the entire month, Oct 2019 as per the daily generation report recorded at the site has been considered. The calculation is included in the revised ER sheet.*				
Documentation provided by project participant				
NA				

DOE assessment	Date:05/02/2022
The PP has revised the calculations and has followed a conservative approach, as a result there is decrease in total no. of emission reductions which was claimed in the initial monitoring report whilst, 217,876 tCO_2e and in the revised final monitoring report the no. of emission reductions claimed is 216,660 tCO_2e. The monitoring report and revised emission reduction calculation sheet have been checked and found to be ok, hence CL07 is closed.	

CL ID	08	Section no.	4.2	Date: 09/01/2022
Description of CL				
The details of calibration has been provided up to 2017, PP to clarify whether: - there were any delay in calibration (from 2017 to 2019), - for the period of delay whether any error factor was considered by PP while computing Emission Reduction calculations.				
Project participant response				Date: 26/01/2022
The calibration details are incorporated appropriately in the revised MR being submitted herewith. *The calibration has been carried out regularly and at the appropriate intervals defined in the registered PDD. Therefore, no error is required to be accounted for computing emission reduction.*				
Documentation provided by project participant				
Calibration records				
DOE assessment				Date: 05/02/2022
Calibration Certificates have been submitted, the annual calibration of energy meters is performed by Bharthi Automation Private Limited. From the details mentioned in the certificates it can be concluded that there was no delay in calibration and process followed by the PP is meeting the requirements stated in paragraph 3.15.5 of the VCS Standard, Ver 4.1, based on satisfactory response and document review CL 08 is closed. However based on the calibration certificates it is noted there was difference in accuracy class of energy meters (main & check) earlier 0.5s currently 0.2s accuracy class meters, hence CAR05 is raised.				

CL ID	09	Section no.	5.4	Date: 09/01/2022
Description of CL				

The information on VCS website states that the last vintage issued was in 2012 & 2013 for the period 2009 to 2011. The current vintage period proposed to be claimed is between 01/03/2017 to 29/10/2019. PP to provide clarity on the delay for the current submission and whether the claim for issuance of VCUs were made for the vintage period the 2012 to 2017 (up to last date Feb 2017).	
Project participant response	**Date: 26/01/2022**
The VCS verification for the period 01/03/2011 to 28.02.2017 is being undertaken in parallel with this verification period by other DoE. The monitoring period had to split and the verification was to be done by different DoE to meet the requirement outlined vide clause no. 4.1.20 of the VCS Standard, v4.1 where states that a validation/verification body may not verify more than six consecutive years of a project's GHG emission reductions or removals.	
Documentation provided by project participant	
NA	
DOE assessment	**Date:05/02/2022**
The PP has affirmed that the process is continual and verification team based on the information available on VERRA and CDM website is able to conclude that the PP has made claims for request for issuances and there time delay or difference between the claim periods the same is agreeable, hence CL 09 is closed.	

Table 2. CARs from this Verification

CAR ID	01	Section no.	1.1	Date: 09/01/2022
Description of CAR				
The description states *"proposed CDM project activity is undertaken by Universal Biomass Energy Private Limited (UBEPL) in Muktsar district of Punjab, India",* the statement seems incorrect since the project is already commissioned and in operation.				
Project participant response				**Date: 26/01/2022**
The description is now revised appropriately in the revised MR.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:05/02/022**
The corrections have been incorporated in section 1.1 of the revised MR, the same is checked and confirmed, and hence CAR 01 is closed.				

CAR ID	02	Section no.	1.8	Date: 09/01/2022
Description of CAR				
The URL provided is general link to the AMS-ID methodology not the link to the Version 15. http://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X				
Project participant response				**Date: 26/01/2022**
The direct link to the methodology is now included in the revised MR.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date: 05/02/2022**
The revised link has been provided and the same is checked and found to be redirecting to the main methodology page, hence CAR 02 is closed.				

CAR ID	03	Section no.	4.2	Date: 09/01/2022

Description of CAR	
The current monitoring period ends on 29/10/2019. The details of calibration for energy meters have been provided only up to 2017.	
Project participant response	**Date: 26/01/2022**
The details of the calibration are incorporated appropriately in the revised MR and the calibration certificates are enclosed herewith.	
Documentation provided by project participant	
Calibration records	
DOE assessment	**Date: 05/02/2022**
The PP in Appendix I of revised MR has mentioned complete details calibration covering the entire monitoring period (2017 to 2019). The corrections have been checked and details are also cross checked with calibration certificates, the information provided in the MR are correct and there are no mismatch, hence CAR 03 is closed.	

CAR ID	04	Section no.	4.2	Date: 09/01/2022
Description of CAR				
There are multiple parameters which are monitored on daily basis, the MR is silent on the QA/QC procedures in the event of data discrepancies or mismatch.				
Project participant response				**Date: 26/01/2022**
The section 4.3 of the revised MR is elaborated to include the description for the same.				
Documentation provided by project participant				
Revised MR.				
DOE assessment				**Date: 05/02/2022**
The QA/QC procedures in revised MR contains the actions / procedures in the event of data discrepancies or mismatch have been detailed out as per the requirements stated in paragraph 3.15.2 of VCS Standard , Ver 4.1, the corrections are agreeable. Hence CAR 04 is closed.				

CAR ID	05	Section no.	4.2	Date: 10/02/2022
Description of CAR				

The calibration certificates for the period ranging from the year 2016 to 2019 have been submitted, from certificates it is noted that accuracy class of energy meters have changed from 0.5s to 0.2S. PP is requested to state the reason for change in energy meters.	
Project participant response	**Date:16/02/2022**
The age of existing energy meters were more than 7 years and since option for higher accuracy energy meters (0.2s) was available, it was decided to change meters from 0.5s to 0.2s. Due to this change there is no impact on the monitoring parameters – Export and Import.	
Documentation provided by project participant	
Meter details	
DOE assessment	**Date: 18/02/2022**
The old energy meters with 0.5s accuracy class (Main & Check) were replaced with higher accuracy class energy meters. The energy meters (Main & Check) are 2- Way Trivector Meters manufactured by L&T Electrical & Automation. Both energy meters are of 0.2s accuracy class, the 0.2s class of meter is that it would maintain its accuracy of an error of +/- 0.2%, even at very low loadings of the order of 20% of the rated value. The serial numbers of replaced energy meters are: Main Meter No: 13196703 Check Meter No: 12093212 The energy meters change does not affect the monitoring of the primary data whilst., electricity generated & exported to grid and electricity imported from grid for consumption. The change in energy meters also does not affect the process of data recording, the electricity readings are taken jointly by the PP and Punjab State Power Corporation Limited personnel. The Joint Meter Readings (JMR) forms the basis for determining the net electricity generated, payment and calculation of emission reductions. Based on satisfactory response, evidence and assessment CAR 05 is closed.	

~~Table 3. FAR from this Verification~~

~~FAR ID~~	~~01~~	~~Section no.~~	~~NA~~	~~Date: 09/01/2022~~
~~Description of FAR~~				
~~DOE assessment~~				~~Date: 09/01/2022~~

APPENDIX III: Team Competence

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Ma Paa Puratchikkanal**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		27-04-2021					
Authorized to work as Technical Expert for:							
Authorized Technical Area		**Sectoral Scope**		**TA Code**	**Technical Area within the scope**		
		Energy industries (renewable - / non-renewable sources)		1.1	Thermal energy generation		
		Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
		Energy demand		3.1	Energy demand		
		Construction		6.1	Construction		
		Waste handling and disposal		13.1	Solid waste and wastewater		
		Waste handling and disposal		13.2	Manure		
		Agriculture		15.1	Agriculture		
Authorized to work as Local Expert for:							
Country/Countries		India					
Compliance check by: Anand S. R.							

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Senthil Kumar**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		29-09-2021					
Authorized to work as Technical Expert for:							
Authorized Technical Area		**Sectoral Scope**		**TA Code**		**Technical Area within the scope**	
		Energy industries (renewable - / non-renewable sources)		1.1		Thermal energy generation	
		Energy industries (renewable - / non-renewable sources)		1.2		Renewables	
		Energy demand		3.1		Energy demand	
		Waste handling and disposal		13.1		Solid waste and wastewater	
		Waste handling and disposal		13.2		Manure	
Authorized to work as Local Expert for:							
Country/Countries		India					
Compliance check by: Anand S. R.							

APPENDIX IV: Abbreviations

ABBREVIATIONS	
ACM	Approved Consolidated Methodology
BG	Biogas
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CH4	Methane
CL	Clarification Request
CEA	Central Electricity Authority
CM	Combined Margin
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO_2	Carbon di Oxide
CPCB	Central Pollution Control Board
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ER	Emission Reduction
ESP	Electrostatic Precipitator
FAR	Forward Action Request
FICCI	Federation of Indian Chambers of Commerce and Industry
GHG	Greenhouse Gas(es)
GoI	Government of India
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
MP	Monitoring Plan
MW	Megawatt
OM	Operational Margin
SDG	Sustainable Development Goal
PD	Project Description
PDD	Project Design Document
PP	Project Participant
UPPCB	Uttar Pradesh Pollution Control Board
UNFCCC	United Nations Framework Convention for Climate Change
URL	Uniform Resource Locator
VCS	Voluntary Carbon Standard
VCUs	Voluntary Carbon Units
VER	Verified Emission Reduction
VVB	Validation and Verification Body
4KES	4K Earth Science Private Limited