# BIOMASS BASED POWER GENERATION PLANT AT VILLAGE CHANNU, PUNJAB

Document Prepared By: LGAI Technological Center, S.A. (Applus+ Certification)

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| **Version** | *02* |
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| **Report Title** | *Biomass Based Power Generation Plant at Village Channu, Punjab* |
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| **Work Carried Out By** | *Pankaj Kumar- Lead Auditor/Technical expert* |

**Summary:**

*Verification purpose: This project activity generates clean form of electricity through Biomass residue based power source. Universal Biomass Energy Private Limited (UBEPL) has set up a 14.50 MW biomass residue based power project in the Muktsar District, Punjab state of India. The electricity generated from the project activity is supplied to the Indian electricity grid as per Power Purchase Agreement signed with the PP and Punjab State Power Corporation Ltd. (PSPCL).*

*Start date of the project activity is 30/10/2009. 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.*

*This is 2nd monitoring under VCS and covers this activity from 01/03/2011 to 28/02/2017 (inclusive both days). During the Current Monitoring Period the project activity has supplied 473,872 MWh of electricity to the national grid, and thus contributing to the GHG reductions 394,873t$CO_2$e.*

*Thus, VCS crediting period is of 10 years. The start date of crediting period is 30/10/2009 and 29/10/2019 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, 07 Corrective Action requests (CAR), 00 Clarification Requests (CLs) and 01 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 "Universal Biomass Energy Private Limited" to perform the 2nd periodic verification of the "Biomass Based Power Generation Plant at Village Channu, Punjab" under VCS standard 4.1 and guideline version 4.0. 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 "AMS-I.D "Grid connected renewable electricity generation" version 15"*
- *the project's monitoring plan is assessed against "AMS-I.D "Grid connected renewable electricity generation" version 15"*
- *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 guideline 4.0 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*
- *CDM project cycle procedure for project activities, version 03.0*
- *VCS standard, version 4.1*
- *VCS guideline, version 4.0*

*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 verified emission reductions (VERs).*

*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 PD and Final Validation report, CDM Project Standard for project activities, version 03.0; CDM Project Cycle Procedure for project activities, version 03.0 and VCS program guideline, version 4.0 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.*

# 1 INTRODUCTION

## 1.1 Objective

LGAI Technological Center S.A. (Hereinafter referred as Applus+ Certification) has been appointed by "Universal Biomass Energy Private Limited (UBEPL)" to perform the 2nd periodic verification of the project entitled "Biomass Based Power Generation Plant at Village Channu, Punjab" under VCS standard version 4.1 and guideline version 4.0. 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 "AMS-I.D "Grid connected renewable electricity generation" version 15"**
- **the project's monitoring plan is assessed against "AMS-I.D "Grid connected renewable electricity generation" version 15"**
- **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 guideline, version 4.0 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**
- **CDM project cycle procedure for project activities, version 03.0**
- **VCS standard, version 4.1**
- **VCS guideline, version 4.0**

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 emission reductions (VERs).

## 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 PD and registered approved methodology AMS-I.D "Grid connected renewable electricity generation" version 15. 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 guideline version 4.0, including the approved baseline and monitoring methodology AMS-I.D "Grid connected renewable electricity generation" version 15. 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, CDM

project cycle procedure for project activities, version 03.0 and VCS program guideline, version 4.0 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. It invoices follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, overestimation of ER, omission or misstatement. The verification team has reviewed all the documents like commissioning certificates, Joint Balance Sheet, invoices 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 main purpose of this project activity is to generate clean form of electricity through Biomass residue based power source. Universal Biomass Energy Private Limited (UBEPL) has set up 14.50 MW of biomass residue based power project in Muktsar District, Punjab state of India. The electricity generated from the project activity is supplied to Indian electricity grid. The commissioning dates and locations of all plant is mentioned in section 4.1.

The Project activity is a Biomass residue based power energy, a renewable energy generation and the electricity generated by the project activity is exported to the Indian electricity grid. The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The PP has entered into long term power purchase agreement with Punjab State Power Corporation Ltd. (PSPCL). The electricity generated by the project activity is supplied to the Indian electricity grid.

During the Current Monitoring Period from 01/03/2011 to 28/02/2017 (First and last date included) the project activity has supplied 473,872 MWh of electricity, and thus contributing to the GHG reductions 394,873 $tCO_2e$.

# 2 VERIFICATION PROCESS

## 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 guideline, version 4.0 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:

I. **A desk review of the monitoring Report against the registered PD;**
II. **Follow-up interviews with project participant;**
III. **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 PD, 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 02 submitted by PP on 05/01/2022 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 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 08/01/2022. Remote audit was conducted due to ongoing COVID-19 pandemic situation in the entire state of India. Taking into account the rules of relevant national and local authorities (local to the DOE offices as well as to locality of the site visits), World Health Organization (WHO) recommendations, policies of the DOE and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return). Moreover, The VCS Program 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 (per Section 4.1.2 of the VCS Standard, v4.1.

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 meters, the generation, recording, 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, JMR sheets, invoice, calibration certificates, s, 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 |
|---|---|---|---|
| Universal Biomass Energy Private Limited (UBEPL) | Mr. Jasbir Singh | Project activity implementation<br>Operation, Calibration, O&M practices, JMR etc.<br>LSC mechanism<br>Mechanical maintenance<br>Electrical maintenance | Pankaj Kumar |

| Organization | Name of Persons/Designation | Topics discussed | Team Member |
|---|---|---|---|
| | | Project description<br>Invoicing practices | |
| Universal Biomass Energy Private Limited (UBEPL) | Mr. Abhishek Garg | Project activity implementation<br>Operation, Calibration, O&M practices, JMR etc.<br>LSC mechanism<br>Mechanical maintenance<br>Electrical maintenance<br>Project description<br>Invoicing practices | |
| EKI Energy | Saroj Sahoo, Consultant (EKIESL) | MR, ER calculations etc. | |

During the remote audit, the PP representatives/ O & M personal were questioned about the implementation of the project activity. Several topics like the verification of commissioning date of meters, the generation, recording, and monitoring of the data and the error accountability were discussed. Various documents like the log sheets, plant records, on-site Photographs includes TG set name plates, meter specifications, key technical specifications of the major equipment like Boiler, Turbines etc. 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: 08/01/2022 | | | | |
|---|---|---|---|---|
| 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 description of the project and Monitoring.<br>Assessment team also checked that whether the monitoring plan as described in the VCS PD is actually practised onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity. | Remote audit ( Through Skype) | 08/01/2022 | Pankaj Kumar |

## 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 verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 02 submitted by project owners on 05/01/2022 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 | 00 | 00 |
| Application of selected baseline and monitoring methodology and selected standardized baseline | | | |
| - Applicability of methodology and standardized baseline | 00 | 01 | 00 |

| Areas of verification findings | No. of CL | No. of CAR | No. of FAR |
|---|---|---|---|
| - 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 | 01 |
| Demonstration of additionality | 00 | 00 | 00 |
| Emission reductions | 00 | 01 | 00 |
| Calibration details | 00 | 01 | 00 |
| Monitoring plan | 00 | 01 | 00 |
| No Net harm assessment | 00 | 00 | 00 |
| Local stakeholder consultation | 00 | 00 | 00 |
| Others (please specify)-<br>-Matter related to double counting Declaration<br>- ER Sheet<br>-PPA Agreement<br>-Country's DNA | 00 | 03 | 00 |
| **Total** | **00** | **07** | **01** |

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 one FAR was raised from previous validation or/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 was registered under VERRA (https://registry.verra.org/app/projectDetail/VCS/650) and VERs were issued from previous monitoring periods under VCS mechanism. As per MR and undertaking provided, PP would not consider the credit from any other mechanism for the current monitoring plan. The undertaking is provided to confirm that there is no any double accounting for current monitoring period. Further, Assessment team confirms that the project activity is not participating in any other form of environmental credits.

## 3.2 Methodology Deviations

The project activity used AMS-I.D "Grid connected renewable electricity generation" version 15 which is as per the registered VCS PD 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 verifications, and no deviation applicable for current monitoring period as checked from VERRA website (https://registry.verra.org/app/projectDetail/VCS/650)

## 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 remote audit it was concluded that the project is implemented as per the instruction of the VCS PD and this is verified from the commissioning certificate. 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 breakdown summary sheet of the project activity. 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 PD are correct.

The coordinates of project activity site, Village: Channu (Tehsil Malout) are:

Latitude: 30 degree 07' 15.95"N to 30 degree 07' 21.38"N

Altitude: 164 Metres above mean sea level.

The technical specifications have been verified during remote audit as well as with the technical specifications of TG sets/ Boilers and also cross checked from the technical manual of the Manufactures.

Technical specification of boiler and turbine generator confirmed as follows:

**Major Technical Parameters of the Boiler**

| 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 | 475 +/- 5 deg C. |
| Feed water temperature at the economizer inlet | 126 deg C |
| Design code for pressure parts | IBR IWT-6212 |

**Major Technical Parameters of the Steam Turbine Generator**

| Description | Parameters |
|---|---|
| No of Turbine | One (1) |
| Makers | Qingdao Jieneng Power Station Engineering |

| | |
|---|---|
| | Co., Ltd (QJPS) |
| Type | Condensing |
| Rated capacity of turbine | 14.5 MW with 10TPH extraction at 2.5 ata |
| Steam conditions at turbine inlet pressure (g) | 64.5281 kg/cm$^2$ |
| Temperature | 485 deg C. |
| Condenser operational pressure | 0.0098 M Pascal |
| Designed temperature drop in the cooling tower (deg C) | 10 |
| Rating at the generator terminals (MW) | 14.50 |
| Electrical generator | Jinan Power Equipment Factory |

The start date of the project is 30/10/2009. This is connected to Indian grid in line with the approved VCS PD and VCS Standard version 4.1.

The assessment team confirmed through interview with O&M personal during site visit 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 VCS PD & approved monitoring Plan and applied methodology AMS-I.D Version 15 "Grid-connected electricity generation from renewable sources". The organisational role and responsibility as mentioned in the registered VCS PD is followed onsite. The calibration of energy meter is done as per the required frequency mentioned in the VCS PD. All the emergency preparedness as mentioned in the registered VCS PD 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:

**Social well-being:**

- The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.

**Economic well-being:**

- **The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state.**

The project is not involved in any other form of GHG emission program and VERs 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 PD and applied methodology and thus no clarification/deviation is sought. 07 CAR was raised during the verification process. Please refer below Appendix 2 for the detail closure of the CAR

Assessment team confirms following during the verification remote audit:

1. Start date of the project is 30/10/2009 (as per VCS PD).
2. An undertaking letter dated: 03/01/2022 has been submitted by PP for double counting with any other GHG program. PP also has given a written declaration that project has not claimed 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 01/03/2011 to 28/02/2017 (inclusive of both dates). Thus, VCS crediting period should be maximum of 10 years till end date of VCS crediting period. 30/10/2009 is the start date and crediting period end on 29/10/2019.
   The GHG credits from 01/03/2011 to 28/02/2017 will be claimed under VCS only. At any point of time during the crediting period, the project proponent will abide by the "Double Counting".
4. Assessment team checked and found that the Project proponent of the project activity is as below for the current monitoring period:

| | |
|---|---|
| Organization name | Universal Biomass Energy Private Limited (UBEPL) |
| Contact person | Mr. Jasbir Singh |
| Title | Director |
| Address | Giddarbaha-Lambi Road, Village: Channu District: Muktsar, Punjab Post-152107 |
| Telephone | +911637241501 |
| Email | universalbiomass@rediffmail.com |

VVB also confirmed that EKIESL is other entity as verified from VERRA registry.

5. 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 VER is 394,873 $tCO_2e$ which is 12.20% less than the estimated emission reduction 449,756 $tCO_2e$ during this monitoring period which is due to climatic conditions and low PLF attained by the biomass residue based power plant during the current monitoring period.

## 4.2 Safeguards

### 4.2.1 No Net Harm

No potential environment or socio-economic matter was found during the discussion with PP during site visit. 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. This report 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:

| SL.NO | Indicator | Assessment team opinion |
|---|---|---|
| 1 | Air quality | The project generates clean energy which replaces the fossil fuel intensive electricity generation.<br>PP has installed Electro Static Precipitators (ESP) to reduce the air pollution and all emission from stacks are in line with guidelines prescribed by State Pollution Control Board. 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. |
| 3 | Soil condition | Fly ash generating from power plant is disposed in line with SPCB guidelines and Fly ash notification. Fly ash is being used for brick making which was confirmed during remote audit<br>It was also confirmed that, the vegetation done at site helps for soil erosion. The same is confirmed during the discussion with stakeholders during remote audit.<br>Therefore, it can be concluded that the project has no effect on soil conditions during its operation because it has no waste coming out. |
| 4 | Ecology | VVB confirmed that project area is not situated in ecologically sensitive zone or any biodiversity hotspots. No water bodt near to project site , hence no harm caused to aquatic ecology as well. |
| 5 | Employment Generation | The project activity employed local population as skilled workers as well as security guards which were envisaged during the validation remote audit. The personnel employed by the project activity are also provided trainings and exposed to various awareness programs therefore a positive indicator has been accepted. |

### 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 VCS PD. 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, ver. 4.1 and appropriate actions taken time to time by PP. Assessment team confirmed the same during remote audit and document review i.e. grievance register etc.

## 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 VCS PD and MR.** |
| **Findings** | **CAR 06 was raised and closed successfully.** |
| **Conclusion** | **Baseline emission: The baseline Emissions for a given year is calculated by multiplying the energy baseline (EB) with the regional grid emission factor of the grid.**<br>**Formula Used:-**<br>$BE_y = EG_y \times EF_y$<br>Where;<br>$BE_y$ = Baseline emission in $tCO_2e$<br>$EG_y$ =Net electricity supplied per annum in the project activity in MWh<br>**$EF_y$ is the $CO_2$ emission factor of the southern grid**<br>**Ex-ante parameters"**<br>**The grid emission factor i.e. 0.84 $tCO_2$/MWh is sourced from the VCS registered PDD. The same is used for calculation of emission reductions. In addition to this, other ex-ante parameters which are soured from the VCS registered PDD are provide below:**<br><br>**$EF_{grid,OM,y}$ - Operating Margin $CO_2$ emission factor in year y. The value monitored is 1.01 $tCO_2$/MWh.**<br>**$EF_{grid,BM,y}$ - Build Margin $CO_2$ emission factor in year y. The value monitored is 0.68 $tCO_2$/MWh.** |

Monitored Parameters

$EG_{facility,y}$- Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh. The value monitored is 473,872 MWh.

The verification team has checked the entire monthly Joint metering report applicable for the monitoring period as per the project activity applied for verifications and found the monitoring parameters are monitored and recorded as per the monitoring plan in the registered VCS PD. 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 crosschecked the emission reduction sheet and monitoring report data with the Joint balance sheet and sales invoice bills and found all the values are matching.

Parameters $Qy_{,cottonstalk}$, $Qy_{,mustardstalk}$, $BF_{k,y,\ cottonstalk}$, $BF_{k,y,mustardstalk}$ also monitored and its value 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 not used for baseline emission calculation.

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:

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

Where,

PETy is CO2 emissions during the year *y* due to transport of the biomass residues to the project plant($tCO_2/yr$)

- Ny is Number of Truck trips per during the monitoring period
- AVDy is Average round trip distance (from and to) between the biomass residue fuel supply sites and the site of the project plant during the monitoring period (km)
- $EF_{km,CO2}$ is Average CO2 emission factor for the trucks measured during the year, *y*(tCO2/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.

| Year | Total number of trucks received | Avg. distance travelled km/trip | Project Emission (PEy) (tCO2) |
|---|---|---|---|
| 2011 | 9498 | 79.5 | 333 |
| 2012 | 12198 | 78.4 | 421 |
| 2013 | 16404 | 80.4 | 581 |
| 2014 | 17545 | 78.0 | 603 |
| 2015 | 15672 | 79.1 | 546 |
| 2016 | 18834 | 77.2 | 640 |
| 2017 | 1438 | 82.0 | 52 |
| Total | 91589 | | 3,176 |

The estimated project emission in the monitoring period is PEy = 3,176$tCO_2$.
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.

Leakage: According to AMS-I.D., the leakage is zero since the technology utilized is new and not transferred from another project activity.
In line with the attachment C to Appendix B, VVB confirmed that the project activity utilizes only cotton stalk and mustard stalk (biomass residue), the implementation of project activity did not lead to shifting of pre-project activities.
The only possible source of leakage in the project activity can be competing uses of biomass - The biomass residue may in the absence of the project activity be used elsewhere, for the same or a different purpose. VVB verified the biomass residue assessment report prepared by 3rd party .The biomass assessment study 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 neglected.

$LE_y = 0$

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<br>ERy = BEy – PEy – LEy<br>= 398,049 -3,176-0<br>=394,873<br><br>VVB confirmed that GHG reductions and removals have been quantified correctly and in line with monitoring procedure in VCS PD and applied methodology. |

## 4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

| | |
|---|---|
| Means of verification | The verification team checked the break down log for the monitoring period. During the verification of site visit, the energy meters are also checked. The Calibration details of the monitoring meters are also checked with calibration certificates. |
| Findings | CAR 07 was raised and closed successfully. |
| Conclusion | The project activity has installed the metering system which includes the main system and a back-up system that measure, record and control the various monitoring parameters. The back-up system would be used in case of failing of the main meter. 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 0.2s for new meters replaced on 05/03/2014. Previous meters have accuracy class of 0.5s . Accuracy class of new meters is more conservative than previous one, hence accepted by verification team for project activity applied for verification.<br>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 sales invoices raised to respective a state utility which is in line with Methodology requirement for small scale project activity. Hence assessment team confirmed that the value of net electricity exported to the grid as used in emission reduction calculation is correct.<br>The main meter reading is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of PSPCL and PP representative. In the event of failure of main meter, the check meter will be used in monitoring the electricity data.<br>Calibration of all the meters is done as per the VCS PD. Assessment team has checked the calibration certificate and found that meters are calibrated as per calibration frequency mentioned in VCS PD. Meters replaced on 05/03/2014 |

| | |
|---|---|
| | hence no delay in calibration.<br>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.<br>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 site remote audit.<br>Site visit and interview with site personnel also confirms that the operational and organizational chart as mentioned in VCS PD is as per the site practice and thus assessment team confirms that the details are correct.<br>The break down log is checked and found that the plant undergone scheduled maintenance and break down. VVB checked the breakdown and routine maintenance log book and confirmed that it does not have any impact on project design and monitoring procedures. No unforced error observed.<br>VVB 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 Universal Biomass Energy Private Limited (UBEPL) to perform the 2nd periodic verification of the "Biomass Based Power Generation Plant at Village Channu, Punjab"

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 VCS PD and MR and the approved methodology AMS-I.D Version 15 "Grid-connected electricity generation from renewable sources".

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 PD
- 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 01/03/2011 to 28/02/2017 (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) |
|---|---|---|---|---|
| 01-March-2011 to 31-December-2011 | *49,957* | *333* | *0* | *49,624* |
| 01-January-2012 to 31-Decemebr-2012 | *61,020* | *421* | *0* | *60,599* |
| 01-January-2013 to 31-December-2013 | *61,037* | *581* | *0* | *60,456* |
| 01-January-2014 to 31-December- 2014 | *67,056* | *603* | *0* | *66,453* |
| 01-January-2015 to 31-December- 2015 | *72,811* | *546* | *0* | *72,265* |
| 01-January-2016 to 31-December- 2016 | *71,710* | *640* | *0* | *71,070* |
| 01-January-2017 to 28-February- 2014 | *14,458* | *52* | *0* | *14,406* |
| **Total** | *398,049* | *3,176* | *0* | ***394,873*** |

The estimated emission reduction achieved from the project activity for the current monitoring period is 449,756 $tCO_2e$, whereas actual emission reductions achieved are 394,873 $tCO_2e$, which is 12.20% less than the estimated emission reductions. This is due to climatic conditions and less PLF attained by the plant during the current monitoring period. As actual VERs are less 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 | Commissioning 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 projects manufactured | Project participant |
| 4. | NA | Power Purchase agreement for the project activity | PPAs | Project participant |
| 5. | NA | Approved Joint VCS PD&MR | -- | VERRA |
| 6. | NA | VCS validation report | -- | VERRA |
| 7. | NA | Initial Monitoring report<br>Final Monitoring report | Version 01, dated 07/12/2021<br>Version 02, dated 05/01/2022 | Project participant |
| 8. | NA | Emission Calculation sheet | Version 1, dated 07/12/2021 | Project participant |
| 9. | NA | Emission Calculation sheet | Version 02, dated 05/01/2022 | Project participant |
| 10. | NA | Tools/ guidelines used in the project activity<br>• UNFCCC Methodology: AMS I.D Version 15<br>• VCS verification report template Version 4.0<br>• VCS Standard, version 4.1 | UNFCCC CDM web site<br>VERRA website | UNFCCC & VERRA |
| 11. | NA | Calibration details of the project activity undergoing verification | Calibration certificates | Project participant |
| 12. | NA | JMR records+ Invoices for the | Joint balance sheet copies | Project |

| No. | Author | Title | References to the document | Provider |
|---|---|---|---|---|
| | | complete monitoring period | Sales Invoices for the complete Monitoring period | participant |
| 13. | NA | PPA Agreements | Power purchase Agreement between PP and PSPCL dated 24/01/2011 | Project participant |
| 14. | NA | Break down details of the complete monitoring period | Log Sheet | Project participant |
| 15. | NA | VCS Declaration | Declaration dated 03/01/2022 from PP for Participation under Other GHG Programs | Project participant |

# APPENDIX 2: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS (CAR/CL/FAR)

| **CAR ID** | 01 | **Section no.** | 1.1/1.2/1.11 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **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.<br>2. PP shall mention correct nomenclature of grid throughout the MR as now NEWNE grid is no more existing and integrated into national grid.<br>3. PP is requested to check typo errors in section 1.2 of the monitoring report.<br>4. The link provided to verify the methodology of the project is not functional. Hence, PP is requested to provide functional weblink. | | | | |
| **Project participant response** | | | | **Date:** 05/01/2022 |
| 1. The start and end date of the monitoring period is now included in the ER sheet.<br>2. The name of the grid is now corrected in the revised MR being submitted.<br>3. The same is now corrected.<br>4. The functional weblink is now provided. | | | | |
| **Documentation provided by project participant** | | | | |
| ER sheet, Revised MR Version 02 | | | | |
| **DOE assessment** | | | | **Date:** 07/01/2022 |
| 1. PP has now provided the duration of the monitoring period of the project in the ER sheet. The same is checked by VVB and found correct. Hence, **comment closed.**<br>2. PP has made the revisión in the MR Version 02 dated 05/01/2022. Hence, **comment closed.**<br>3. PP has made requisite revisión in Sec. 1.2 of the MR Version 02 dated 05/01/2022. Hence, **comment closed.**<br>4. PP has now provided the functional weblink of the applied methodology to the project activity. The same is checked by VVB and found correct. Hence, **comment closed.** | | | | |

| **CAR ID** | 02 | **Section no.** | 1.10 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| PP shall provide an undertaking for no double counting of emission reduction in any other mechanism. | | | | |
| **Project participant response** | | | | **Date:** 05/01/2022 |
| A declaration to this effect is being submitted herewith. | | | | |
| **Documentation provided by project participant** | | | | |
| *Signed Declaration for no double counting* | | | | |
| **DOE assessment** | | | | **Date:** 07/01/2022 |

| |
|---|
| PP has now provided the declaration certificate for no double counting, which is checked by the DOE. Hence, **comment closed**. |

| **CAR ID** | 03 | **Section no.** | 1.11 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| In section 1.11 the country's DNA seems to be wrong. Corrective action sought. | | | | |
| **Project participant response** | | | | **Date:** 05/01/2022 |
| The same is now corrected in the revised MR. | | | | |
| **Documentation provided by project participant** | | | | |
| Revised MR, Ver. 2.1 | | | | |
| **DOE assessment** | | | | **Date:** 07/01/2022 |
| PP has corrected the name of the country's DNA in Sec. 1.11 of the revised MR Ver.02 dated 05/01/2021. Hence, **comment closed**. | | | | |

| **CAR ID** | 04 | **Section no.** | 2.1, 2.2 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **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<br>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:** 05/01/2022 |
| 1. All the consents and approvals of the Project received are being submitted herewith.<br>2. The copy of grievance register is being submitted herewith. | | | | |
| **Documentation provided by project participant** | | | | |
| Consents and approvals of the project<br>Grievance register | | | | |
| **DOE assessment** | | | | **Date:** 07/01/2022 |
| 1. PP has now provided copy of all consents and approvals applicable to the project activity to the VVB. Hence, **comment closed.**<br>2. PP has now provided a copy of Grievance Register to the VVB. Hence, **comment closed.** | | | | |

| **CAR ID** | 05 | **Section no.** | 3.1 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| PP is requested to complete section 3.1 i.e. "Implementation Status of the Project Activity" of the monitoring report. | | | | |
| **Project participant response** | | | | **Date:** 05/01/2022 |
| The implementation status of the Project has been elaborated in the revised MR. | | | | |
| **Documentation provided by project participant** | | | | |
| Revised MR | | | | |
| **DOE assessment** | | | | **Date:** 07/01/2022 |

PP has elaborated the details of implementation of the project activity in the revised MR Ver.02 dated 05/01/2021. Hence, **comment closed**.

| **CAR ID** | 06 | **Section no.** | 4/5.1 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| 1. PP requested to submit copies of plant log book/ records for $Qy_{,cottonstalk}$, $Qy_{,mustardstalk}$, $BF_{k,y,cottonstalk}$, $BF_{k,y,mustardstalk}$, $AVD_y$ and $N_y$ for the complete monitoring period.<br>2. PP is requested to provide the web link to check the CEA database in section 4.2 of monitoring report.<br>3. In sec. 5.1, calculation of baseline emission not provided<br>4. In sec. 5.2, calculation for project emission not provided<br>5. PP shall also provide copies of JMRs and invoices for entire monitoring period along with calibration certificates of energy meters, weighbridge and other applicable monitoring equipment. | | | | |
| **Project participant response** | | | | **Date:** 05/01/2022 |
| 1. The records of the parameters are being submitted herewith.<br>2. The weblink of the CEA database is now incorporated in the revised MR.<br>3. The calculation of baseline emission is now included in sec 5.1 of the revised MR<br>4. The calculation of Project emission reduction is now included in sec 5.2 of the revised MR.<br>5. All the document sought are being submitted herewith. | | | | |
| **Documentation provided by project participant** | | | | |
| Revised MR, Ver. 2.1, Plant records, JMR, Invoices | | | | |
| **DOE assessment** | | | | **Date:** 07/01/2022 |
| 1. PP has now provided copies of plant log book/ records for checking of parameters, found correct by VVB. Hence, **comment closed**.<br>2. PP has now provided functional weblink of CEA database, which is checked by VVB. Hence, **Comment closed**.<br>3. PP has now provided the calculation of baselines emissions in Sec. 5.1 of the revised MR Version 02 dated 05/01/2022. The same is checked by VVB and found correct. Hence, **comment closed**.<br>4. PP has now provided the calculation of project emissions in Sec. 5.2 of the revised MR Version 02 dated 05/01/2022. The same is checked by VVB and found correct. Hence, **comment closed**.<br>5. PP has now submitted JMR/Invoices for the entire monitoring period, which is checked by VVB. Hence, **comment closed**. | | | | |

| **CAR ID** | 07 | **Section no.** | 4.5 | **Date:** 03/01/2022 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| 1. PP requested to mention calibration details along with copies of the calibration certificates covering complete monitoring period.<br>2. PP is requested to provide break down details of the project activity in the MR. | | | | |
| **Project participant response** | | | | **Date:** 05/01/2022 |

| |
|---|
| 1. The calibration details and certificates covering the entire monitoring report are being submitted herewith.<br>2. The breakdown details are being submitted herewith. |
| **Documentation provided by project participant** |
| Calibration certificates<br>Revised MR Version 02 |
| **DOE assessment** \| **Date:** 07/01/2022 |
| 1. PP has now submitted the calibration certificates, which is checked by VVB and found correct. Hence, **comment closed**.<br>2. PP has now submitted the plant breakdown details for the entire monitoring period, which is checked by VVB and found satisfactory. Hence, **comment closed**. |

| FAR ID | 01 | Section no. | 4.5 | Date: 03/01/2022 |
|---|---|---|---|---|
| Description of CAR | | | | |
| "As per the biomass assessment study the surplus mustard stalk availability in the districts Muktsar, Bhatinda & Ferozepur of Punjab is zero. And hence the PP decided to procure required mustard stalk from the neighbouring districts of Hanumangarh, in state of Rajasthan and Sirsa in state of Haryana.<br><br>Hence the verification team need to check whether the entire mustard stalk procured during the monitoring period are from Hanumangarh district of Rajasthan and Sirsa district of Haryana. If not, then leakage calculation should be applied appropriately"<br><br>With refer to the above FAR raised in validation report, please justify the same for this monitoring period with supporting documents | | | | |
| Project participant response | | | | Date: 05/01/2022 |

| |
|---|
| The plant located at Channu is in southern part of Muktsar district of Punjab. It has Sirsa district of Haryana and Hanumangrh district of Rajasthan adjoining it. The procurement centres are located along the Inter district/Inter-state boundaries which are situated at a distance within the radius of 30-40 kms from the plant site. The local farmers bring their produce to the procurement centers for further transportation to the plant. The details of the collection centers could be verified from the fuel procurement receipts. Further, the trip distance of the vehicle used from the transportation of the biomass fuel also show that the biomass is transported from a distance of 30-40 kms from the project site.<br><br>As undertaking in this regard is submitted herewith to declare that entire quantity of mustard stalks used in the project during the monitoring period has been procured from the collection centres located in Hanumangarh district of Rajasthan and Sirsa district of Haryana. |
| Documentation provided by project participant |
| An undertaking by PP |

| | |
|---|---|
| DOE assessment | Date: 07/01/2022 |
| VVB checked and verified the undertaking submitted by PP and also confirmed the distance of procurement centre in Hanumangarh district are less than 50 km, hence leakage assessment not required. | |

# 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) | Verification findings |
| 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 |
| CMS | Central Monitoring System |
| $CO_2$ | 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 |
| PSEB | Punjab State Electricity Board |
| PSPCL | Punjab State Power Corporation Limited |

# APPENDIX 5: CALIBRATION DETAILS

Details of the energy meters used in monitoring, of the parameter, Quantity of Electricity exported to the grid by the project during the monitoring period are furnished as below.

| Meters | Type | Accuracy class | Serial number | Calibration date | | |
|---|---|---|---|---|---|---|
| Main Meter | Trivector meter of L & T | 0.5s | 8043957 | 06-10-2011 | 04-10-2012 | 28-09-2013 |
| Check meter | Trivector meter of L & T | 0.5s | 8043951 | 08-10-2011 | 04-10-2012 | 28-09-2013 |
| | | | | | | |
| Main meter | Trivector meter of L & T | 0.2s | 13196703 | 05-10-2014 | 09-05-2015 | 07-05-2016 |
| Main meter | Trivector meter of L & T | 0.2s | 12093212 | 05-10-2014 | 09-05-2015 | 07-05-2016 |

Details of the weigh bridge used to measure quantity of the biomass are as below.

| Serial Number | Model Number | Tolerance Value | Calibration date | | | | |
|---|---|---|---|---|---|---|---|
| 2008-043 | FSD-501 | 10 Kg | 12-07-2012 | 09-07-2013 | 08-07-2014 | 01-07-2015 | 14-06-2016 |

Note : Meters replaced on 05/03/2014