3.5 MW SMALL HYDRO PROJECT IN HIMACHAL PRADESH

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Report Title	Verification Report for “3.5 MW Small Hydro Project In Himachal Pradesh”
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Summary:

LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted by EKI Energy Services Limited to conduct the verification of the project "3.5 MW Small Hydro Project In Himachal Pradesh", VCS ID 2033, against VCS Standard Version 4.1.

The verification includes confirming the implementation of the monitoring plan of the registered VCS PD and MR (Project ID 2033) and the application of the monitoring methodology as per AMS-I.D. ver. 18.0 "Grid Connected renewable electricity generation".

The project activity involves generation of electricity by using the renewable energy source (Hydro) supplying to the Indian Grid. The project is environmentally benign as it results in the reduction of emissions from grid connected fossil fuel-based power plants. Therefore, the project reduces greenhouse gas emissions and thereby contributes to sustainable development.

A risk based approach has been followed to perform this verification. In the course of verification, 04 Corrective Action request (CARs), 00 Forward Action Request (FAR) and 00 Clarification request (CLs) were raised and successfully closed.

The review of the project design documentation, monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, telephonic interviews and stakeholders have provided Applus+ Certification with sufficient evidence to validate the fulfillment of the stated criteria.

Applus+ Certification confirms that the project is implemented in accordance with the registered VCS- PD. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the emission reductions from the project activity "3.5 MW Small Hydro Project In Himachal Pradesh" in

Himachal Pradesh, India during the period 01-November-2019 to 31-August-2021 (including both days) amount to 19,788 tCO_2e.

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1 INTRODUCTION

1.1 Objective

Applus+ Certification has been contracted by Gaur Hydro Power Pvt. ltd(project proponent), to undertake the verification of the renewable energy project titled "3.5 MW Small Hydro Project In Himachal Pradesh" (VCS ID2033). The verifiers have reviewed the GHG data collected to date for the monitoring period from 01-November-2019 to 31-August-2021 (including both days) covered in this verification. The objective of this verification is a thorough and independent assessment of registered project activities against the applicable VCS requirement by the VVB. The verification process shall determine whether the proposed project activity complies with the requirements of latest VCS guidelines, applicability conditions of the selected methodology, relevant host country regulations and guidance issued by the VCS Board.

1.2 Scope and Criteria

The scope of the verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from "3.5 MW Small Hydro Project In Himachal Pradesh". The verification of this project was based on the registered project description/1.1,1.2/ & monitoring report /4/ and supporting documents submitted by the project proponent to the verification team. The documents were reviewed against the following guidance and protocols:

- VCS standard Version 4.1, dated 19-September-2019; updated: 22-April-2021 /15/
- Approved baseline and monitoring methodology AMS-I.D. ver. 18.0 "Grid Connected renewable electricity generation "/14/
- VCS Program Guide, Version 4.0, dated 19-September-2019 /16/
- CDM VVS for project activities version 03.0 /19/
- CDM PS for project activities version 03.0 /18/

The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Level of Assurance

The level of assurance of the verification report falls under reasonable assurance engagements as selected by the Client. 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.

1.4 Summary Description of the Project

The project activity is generation of electricity by using hydro-electricity generators. The energy generated is supplied to the Indian Grid /9/, which operates the national grid system. The project is environmentally benign as it results in the reduction of emissions from grid connected fossil fuel-based power plants. The project activity leads to reduction of greenhouse gas (GHG), as the energy is generated from renewable source. The emission reductions were real, measurable, and verifiable and plays a beneficial role in the mitigation of climate change. The project activity is 3.5 MW run of the river hydro power plant harnessing the potential of river Sarwari Nallah (a tributary of river Beas) and river Ravi respectively.

The Project activity involves installation of a run-of river hydropower plant system with capacity 3.5 MW/1.2/. The unit consists of three phase of capacity 2MW and 1.3 MW, resulting in net generation capacity of 3.5MW/18/.

The project activity run of the river hydro power project at Kullu district while Siunr Hydro Electric Project is located in Chamba district of Himachal Pradesh. The geographic coordinates of the project area are the following:

S. No.	Name of the Project Proponent	Latitude	Longitude
1.	Gaur Hydro Pvt Ltd.	31°57'34.9" N	77°03'55.2" E
2.	Gopal Hydro Pvt Ltd.	32°26'17.8"N	76°28'03.9"E

Location of the project was verified through Google Map (https://www.gps-coordinates.net/) as well as through sharing of live coordinates by onsite PP representatives and found consistent with the data provided in the registered VCS-PD/1.1/.

The project was commissioned in phases. The first project phase encompasses the installation ofa 2 MW generating unit by Gaur Hydro Power Pvt. Ltd. which was commissioned on 23/02/2018.A second 1.5 MW generating unit by Gopal Hydro Power Pro Pvt. Ltd. was commissioned on dated 05/05/2019./9/.

By document review and online interview with PP representative's present onsite of the project activity, the verification team confirms that all the components of installed technology are fully functional. The total emission reductions achieved under the monitoring period01-November-2019 to 31-August-2021 (including both days) amount to 19,788tCO_2e./5/.

2 VERIFICATIONPROCESS

The registered VCS project is undergoing fourth periodic verification under VCS, the approach adopted to ensure the quality of emission reductions is described in the following sections.

2.1 Method and Criteria

Verification was conducted using Applus+ Certification procedures in line with the requirements CDM validation and verification standard for project activities, Version 03.0 for the project activity and "VCS standard and program 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. The project activity does not fall under category "grouped projects", hence any sampling methods not to be employed by the validation/verification body for the verification of GHG emission reductions or removals generated by the project.

It is to be 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 verification process consists of the following three phases;

1) A desk review of the VCS PD and VCS MR
2) Telephonic interviews with project stakeholders
3) The resolution of outstanding issues and issuance of final report and opinion.

2.2 Document Review

The verification is performed primarily as a document review of the registered VCS PD/1.1/, previous MR and Verification report and associated documents as stated in details in appendix 1 of this document. The assessment is performed by a verification team referring the Applus+ Certification internal procedures in line with latest VCS requirements. The cross checks between information provided in the Monitoring report, 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 the current situation with the global COVID-19 pandemic scenario and country wide lock down in most of countries across the globe, an on-site inspection has not been performed by the assessment team. However, the representatives of the PPs and onsite staff of PP were interviewed online via Skype/WhatsApp on 09-November-2021 i.e. personnel responsible for monitoring of the project activity, data collection and management, and QA/QC procedure. The details of the people interviewed are mentioned in the table below:

S N	Name	Organization
1	Mr. Yugal Kishore Garg	Gaur Hydro Power Pvt. ltd
2	Mr. Prakash Kumar Sahu	EKI Energy Services Limited
3	Mr. Sachin Nagkar	EKI Energy Services Limited

The topics covered during interview ranges from general features and implementation of project to technical details of the project like calibration details, monitoring and measuring system and data collection, recording and archiving procedures. The assessment was drawn based on the feedback received during interview coupled with the review of supporting documents.

2.4 Site Inspections

As discussed in the above section, physical site inspection is not done for the current verification. However, to achieve a reasonable level of assurance, the assessment team has followed the alternative means to substantiate the verification criteria as described in the below table –

Assessment Criteria	Means of verification/source documents	Assessment opinion
Description of project activity	i. Commissioning certificates /9/ ii. PPA signed with SEB/10/ iii. Latest VCS verification report /2.1/. iv. Interview with PP	The information's with reference to project capacity, technology, plant equipment's and commissioning dates as

Assessment Criteria	Means of verification/source documents	Assessment opinion
	representatives on 09-November-2021	provided in section 1.1 of MR are found consistent with the documents.
Compliance of the project implementation with the registered project designdocument	i. Monthly JMRs signed by SEB and GHPPL/8/ ii. Geographical co-ordinates (Location of Project activity) verified through Google Map[1] as well as sharing of live location from PP representative onsite. iii. Latest VCS verification report /2.1/. iv. PPA signed with SEB /10/ v. Interview with PP representatives on 09-November-2021 vi. Latest photographs of major project equipment's installed at site (i.e. Turbine, generators, energy meters, weir intake, penstock, tailrace etc.)/18/	Verified documents indicated the following information: • Serial number of energy meters (Main and Check) • Capacity of project • Name of project participant (Ownership of the project activity) Location of power house is verified through Google Map. Daily generation records are verified on sample basis to check the operational status of project activity. Grid connectivity of the project is confirmed through the PPA. All the information's regarding the project implementation as discuss above are further verified through previous VCS verification report/2.1/ and found consistent.
Compliance of the registered monitoring plan with applied methodologies andstandardized baselines	i. Interview with PP representatives on 09-November-2021 ii. PPA signed with SEB /10/ iii. Monthly JMRs signed by SEB and GHPPL/8/ iv. Invoices raised by project developer to SEB/7/ v. Photograph of all the WTGs, energy meters installed at site and	The organizational structure, responsibilities and competencies of the personnel confirmed through interview with PP representatives. Frequency of monitoring of parameters listed under approved monitoring plan is verified through JMRs /Invoices.

[1] https://www.gps-coordinates.net/

Assessment Criteria	Means of verification/source documents	Assessment opinion
	screen shots of online monitoring system/18/	The methods used for measuring, recording, storing, aggregating, and reporting the data on monitored parameters are verified though PPA and interactions with site personnel. Procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mentioned in the MR is confirmed through interview with PP representativesand found satisfactory.
Compliance with the calibration frequency requirements for measuring instruments	i. Calibration certificates of energy meters/6/ ii. Monthly JMRs signed by SEB and GHPPL/8/ iii. PPA signed with UETCL/10/	Calibration frequency and energy meter specifications (Sr.No., make, accuracy class) is verified through calibration certificates, photographs of energy meters and further verified through monthly JMRs and found consistent. Responsibility of calibration and maintenance of energy meters is solely under control of SEB; this is verified through the PPA.
Assessment of data and calculation of emission reductions or net removals	i. Monthly JMRs signed by SEB and GHPPL/8/ ii. Invoices raised by project developer to SEB/7/ iii. Latest VCS verification report for last verification/2.1/	Monthly values of monitoring parameters used in ER calculation are verified through JMRs and cross verified with the invoices. Methods, formulae and emission factor for calculating baseline emissions have been followed are in accordance with the applied methodology /14/ and as described in the previous approved VCS verification report/2.1/.

It is noteworthy that no sampling plan for verification is applied as 100% data is verified for the current monitoring period. Most of the reference document referred by the assessment team (above table) are either issued /endorsed by grid utility (SEB) Power Grid Corporation of India Ltd., a government agency, hence is deemed authentic.

The assessment team has also used documents such as validation report/2.2/ and verification reports/2.1/ available publicly. Furthermore, the project activity already verified under VCS previously and currently undergoing 3rd VCS verification. Hence, based on the information's available through approved documents (VCS verifications), it can be confirmed that project is implemented and being operated as described in the registered PD/1.1/.

The assessment team has verified sufficient appropriate audit evidences, to reduce audit risk to an acceptably low level as requisite to achieve reasonable level of assurance for the current verification.

2.5 Resolution of Findings

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 Verification On-site assessment. 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 (CR) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CRs raised by the Applus+ Certification during verification shall be resolved prior to submitting a 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 current verification, 04 Corrective Action request (CARs) and 00 Clarification request (CRs) and 00 Forward Action Request (FARs) were raised and successfully closed.

All the findings that are raised and communicated to project participant during the verification are included under Appendix 3. The section also includes the response, if provided, by the project participants and an assessment by the verification team if it was closed out or otherwise.

2.5.1 Forward Action Requests

The project activity is undergoing fourth verification under VCS; there were no FARs raised during the previous verification. Also, no FAR is raised during the current verification.

2.6 Eligibility for Validation Activities

Not applicable.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Project is not registered with any other GHG programs.

3.2 Methodology Deviations

There is no methodology deviation identified during the current monitoring period.

3.3 Project Description Deviations

Not applicable.

3.4 Grouped Project

Not applicable. The project activity is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The Project activity is a run-of-river hydropower project having aggregated installed capacity of 3.5 MW that utilizes the natural flow of Riavi to generate electricity. The project location at Kullu district while Siunr Hydro Electric Project is located in Chamba district of Himachal Pradesh. There are four identical power units each having an installed capacity of 3.5 MW.
The project, being a run-of-river type Hydro-Power project, would generate power by utilizing the water diverted from the flow of river Riavij. The flow in the river Riavij is contributed by several nullahs and khuds and numerous glaciers. The diversion barrage of the project is located across river Riavij, one of the major tributaries of river Riavij, at Kullu and Chamba district respectively in the state of Himachal Pradesh.
Online interview with PP representatives of the project activity was carried out on 09-November-2021 by the verification team to check the implementation status of the project activity and the instrumentation installed for the project activity.

The PP has provided the photograph and plant log book to verification of no breakdown during the period 01-November-2019 to 31-August-2021. The same has been verified also through Interview with the personnel (plant operator) from the operation team and found to be correct, hence accepted.

Interview of the personnel was conducted by the verification team, which revealed that all the QA/QC procedures listed in the registered PD/1.2/ have been followed while operating the project activity.

All parameters stated in the monitoring plan in registered PD/1.2/ and the applied methodology/14/ has been fulfilled in the current monitoring report. All baseline emission parameters have been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further section of this report.

PP will not claim the carbon credits under any other GHG emission reduction scheme (including CDM) for the present monitoring period under VCS and PP has provided declaration on the same during this verification. Hence, there is no possibility of double counting.

Assessment team concludes the following:

- The implementation status of project activity was found to be in compliance with registered PD /1.2/
- VVB has conducted the online interviews with PP representative's present onsite to confirm the implementation status of the project.

- The commissioning date of the project activity was found to be accurately and consistently recorded.
- The actual operation of project activity was found to be following the flow diagram provided in revised PDD/1.2/.
- There was no increase in emission reduction from estimates made in revised PDD/1.2/, therefore no additional explanation was sought from PP regarding the same.
- The project is registered under VCS program with reference number 2033/13/

4.2 Safeguards

4.2.1 No Net Harm

This project activity will not involve any negative environmental or socio-economic impacts, as the generation of power is by using hydro which is a clean source of energy.

4.2.2 Local Stakeholder Consultation

Local stakeholder consultation has been conducted at the time of project registration. As confirmed by PP during interviews, for on-going stakeholders communication, PP has maintained feedback/complaint register at the site office. Local stakeholders can anytime lodge their grievances if any in the register over the operational life time of the project. During current monitoring period no grievance was received. Thus, assessment team is of the opinion that the ongoing stakeholder mechanism is adequate and appropriate.

4.3 AFOLU-Specific Safeguards

For non-AFOLU projects, this section is not required.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The project activity has been monitored as per the monitoring plan mentioned in registered PD/1.2/. All the deviations identified during the previous monitoring periods have been approved by VERRA. The verification team confirms that the flow of information (from data generation, aggregation, to recording, calculation and reporting for these parameters including the values) is as per the monitoring plan mentioned in PD/1.2/.

The assessment of each parameter identified in the project activity to calculate the GHG emission reductions have been done in the tables given below –

1. **Data/Parameter, Unit** Quantity of electricity exported to the grid in year y ($EG_{Export,y}$) in MWh

	Discussion and verification assessment
Purpose of data	Baseline emissions

<table>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>The quantity of net electricity generation supplied by the project plant to the grid are monitored from the bi-directional energy meter of accuracy class 0.2s.
Make - L & T
Accuracy class by energy meter – 0.2s
Calibration Frequency – Once in 5 years
Meter Installed by Power Grid (to monitor net energy generation)
<table>
<tr><th>Name of the SPVs</th><th>Site</th><th>Capacity (MW)</th><th>Main Meter Details</th><th>Check Meter Details</th><th>Calibration Date</th><th>Due date</th></tr>
<tr><td>Gaur Hydro Power Pvt. Ltd.</td><td>Dadka, Kullu</td><td>2.0</td><td>SL. No. : HPU06256 Make: Secure I Accuracy class: 0.2 s</td><td>SL. No. : HPU06255 Make: Secure</td><td>25-August-2018</td><td>24-August-2023</td></tr>
<tr><td rowspan="2">Gopal Power Pro Pvt. Ltd.</td><td rowspan="2">Garola, Chamba</td><td rowspan="2">1.5</td><td rowspan="2">SL. No. : 13193404 Make: L&T Accuracy class: 0.2 s</td><td rowspan="2">SL. No. : 13193345 Make: L & T</td><td>18-April-2019</td><td rowspan="2">22-January-2025</td></tr>
<tr><td>23-January-2020</td></tr>
</table></td></tr>
<tr><td>Measuring/ Reading/ Recording frequency</td><td>Continuous monitoring of electricity generation and import, monthly recording of net electricity export (Joint Meter Reading Reports)/8/</td></tr>
<tr><td>Data collection (from data generation, aggregation, to recording, calculation and reporting)</td><td>At the end of each month, the data from the monthly meter readings as provided in Joint Meter Reading Report/8/, will be added up to obtain the total monitoring period net electricity generation.
The revised PDD/1.2/ states that the calibration frequency of the equipment should as per the manufacturer specification i.e., once in five years. However, there is no delay in calibration has been observed as the calibration does not cover the present monitoring period. Therefore, it was accepted by the assessment team.</td></tr>
<tr><td>Verified value</td><td>21,693.83MWh</td></tr>
<tr><td>Cross checks</td><td>The verified values were crosschecked from the monthly invoices raised to SEB/7/. The values in Joint Meter reading reports/8/ and Invoices raised to SEB /7/are same.</td></tr>
<tr><td>QA/QC</td><td>The necessary QA/QC procedures are in place and the data management</td></tr>
</table>

procedures applied	system is effective and reliable.The technical details of the meters are specified in the MR/4/ are found consistent with calibration certificates/6/.

2. **Data/Parameter, Unit:** Quantity of electricity imported from the grid in year y ($EG_{Import, y}$) MWh

	Discussion and verification assessment
Purpose of data	Calculation of baseline emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The quantity of net electricity generation supplied by the project plant to the grid are monitored from the bi-directional energy meter of accuracy class 0.2s. Make - L & T Accuracy class by energy meter – 0.2s Calibration Frequency – Once in 5 years **Meter Installed by Power Grid (to monitor net energy generation)**

Name of the SPVs	Site	Capacity (MW)	Main Meter Details	Check Meter Details	Calibration Date	Due date
Gaur Hydro Power Pvt. Ltd.	Dadka, Kullu	2.0	SL. No. : HPU06256 Make: Secure I Accuracy class: 0.2 s	SL. No. : HPU06255 Make: Secure	25-August-2018	24-August-2023
Gopal Power Pro Pvt. Ltd.	Garola, Chamba	1.5	SL. No. : 13193404 Make: L&T Accuracy class: 0.2 s	SL. No. : 13193345 Make: L & T	18-April-2019 23-January-2020	22-January-2025

Measuring/ Reading/ Recording frequency	Continuous monitoring of electricity generation and import, monthly recording of net electricity export (Joint Meter Reading Reports)/8/
Data collection (from data generation, aggregation, to recording,	At the end of each month, the data from the monthly meter readings as provided in Joint Meter Reading Report/8/, will be added up to obtain the total monitoring period net electricity generation. The revised PDD/1.2/ states that the calibration frequency of the equipment should as per the manufacturer specification i.e., once in five years. However, there is no delay in calibration has been observed as the calibration does not cover the present monitoring period. Therefore, it was

calculation and reporting)	accepted by the assessment team.
Verified value	6.70MWh
Cross checks	The verified values were crosschecked from the monthly invoices raised to SEB/7/. The values in Joint Meter reading reports/8/ and Invoices raised to SEB /7/are same.
QA/QC procedures applied	The necessary QA/QC procedures are in place and the data management system is effective and reliable. The technical details of the meters are specified in the MR/4/ are found consistent with calibration certificates/6/.

3. Data/Parameter, Unit: Quantity of net electricity exported to the grid in year y ($EG_{PJ,y}$) MWh

<table>
<tr><td></td><td>Discussion and verification assessment</td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>The quantity of net electricity generation supplied by the project plant to the grid are monitored from the bi-directional energy meter of accuracy class 0.2s.
Make - L & T
Accuracy class by energy meter – 0.2s
Calibration Frequency – Once in 5 years
Meter Installed by Power Grid (to monitor net energy generation)
<table>
<tr><th>Name of the SPVs</th><th>Site</th><th>Capacity (MW)</th><th>Main Meter Details</th><th>Check Meter Details</th><th>Calibration Date</th><th>Due date</th></tr>
<tr><td>Gaur Hydro Power Pvt. Ltd.</td><td>Dadka, Kullu</td><td>2.0</td><td>SL. No. : HPU06256 Make: Secure I Accuracy class: 0.2 s</td><td>SL. No. : HPU06255 Make: Secure</td><td>25-August-2018</td><td>24-August-2023</td></tr>
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<tr><td>23-January-2020</td></tr>
</table></td></tr>
<tr><td>Measuring/ Reading/ Recording frequency</td><td>Continuous Metering, and monthly recording has been done.</td></tr>
</table>

Data collection (from data generation, aggregation, to recording, calculation and reporting)	At the end of each month, the data from the monthly meter readings as provided in Joint Meter Reading Report/8/, will be added up to obtain the total monitoring period net electricity generation. The VCS-PD/1.2/ states that the calibration frequency of the equipment should as per the manufacturer specification i.e., once in five years. However, there is no delay in calibration has been observed as the calibration does not cover the present monitoring period. Therefore, it was accepted by the assessment team.
Verified value	21,687.14
Cross checks	The verified values were crosschecked from the monthly invoices raised to SEB/7/. The values in Joint Meter reading reports/8/ and Invoices raised to SEB /7/are same.
QA/QC procedures applied	The necessary QA/QC procedures are in place and the data management system is effective and reliable. The technical details of the meters are specified in the MR/4/ are found consistent with calibration certificates/6/.

4. **Data/Parameter, Unit:** Quantity of Diesel consumed by the standby DG set in year y. ($FC_{diesel, y}$) m^2/tons

	Discussion and verification assessment
Purpose of data	Calculation of project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Frequency: Continuously monitored as levels in the diesel storage tanks is monitored by standard Dip-rod scale and daily recorded in log book. Recording frequency: monthly and aggregated annually Archiving Policy: Paper & Electronic
Measuring/Reading/ Recording frequency	Measurement Procedure: The diesel quantity available in the diesel storage tanks is recorded daily by PP in the plant log book. The diesel consumption has been recorded in the logbook in litres. However, based on the density of diesel of about 0.88 kg/litre, the diesel consumption in tons has been calculated for use in the equation to compute project emissions (PE) as mentioned in above section. Accuracy of the Measurement Method: To confirm the accuracy on measurement of quantity of diesel consumed in the project activity can be cross checked against the fuel purchase receipts. Responsibility: Log book has been maintained by the shift

	in charge and same has been cross checked by the General Manager of the project activity.
Data collection (from data generation, aggregation, to recording, calculation and reporting)	NA
Verified value	0.00066 kt (757 litres)
Cross checks	It has been directly monitored. Thus, calculation is not necessary for this project.
QA/QC procedures applied	The data recorded can be cross checked against the fuel purchase receipts.

The above-mentioned parameter was measured in accordance with the approved PDD/9/ and monitoring plan of the applied methodology/11/ as *ex-post*. The following parameters were directly taken from the approved PDD/9/ to calculate the emission reduction as *ex-ante* fixed:

a) **$EF_{OM,y}$** Operating Margin emission factor for erstwhile NEWNE regional grid. The value of the parameter is 0.9610 as per the registered PD/1.2/.

b) **$EF_{,BM,y}$** Build Margin emission factor for the erstwhile NEWNE regional grid.The value of the parameter is 0.8644 as per the registered PD/1.2/.

c) **$EF_{Grid, CM,y}$**: The parameter is CO2 emission factor of the grid. The value of the parameter is 0.9127 as per the registered PD/1.2/.

d) **$NCV_{Diesel,y}$**: GJ per mass or volume unit (e.g. GJ/m³, GJ/ton). The value of the parameter is 43.3 GJ/Ton as per registered PD/1.2/.

e) **$EF_{CO2, Diesel,y}$**:CO2 Emission Factor of Diesel. The value of the parameter is 74.8tCO_2/TJ

GHG Calculations:

The calculation of emission reduction has been done in accordance to the applied methodology/11/. As per the applied methodology, the values of project emission and leakages are considered as zero for the project activity. The equation used for calculation of baseline emission is given below:

Baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

Where,

BE_y = Baseline Emissions (tCO_2/year)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh/year)
$EF_{grid, CM, y}$ = Baseline Emission Factor (Combined margin CO_2 emission factor for grid)

Therefore, the baseline emissions can be calculated as:

BEy = EGPJ,y X EFgrid,y
= (21,693.83 – 6.70) X 0.9127
= 19,792 tCO2e. (Round down Value)

The Total baseline Emissions from (01-November-2019 to 31-August-2021)

= 19,792 tCO2e

Project emissions are calculated as follows:

Since one diesel generator is also being utilized to supply the emergency requirement for the project activity, diesel consumption is monitored in plant log records. Emissions resulting from usage of diesel in the backup diesel generator is accounted as project emissions based on the following equation as provided in the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" version.3[2]. CO_2 emissions from fossil fuel combustion in process are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

CO_2 emissions from fossil fuel combustion in process j are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

$$PE_{FC, j, y} = \sum FC_{i, j, y} \times COEF_{i, y}$$

Where:

$PE_{FC, j, y}$= Are the CO_2 emissions from diesel combustion in process j during the year y (tCO_2/yr);

$FC_{i, j, y}$ = Is the quantity of diesel combusted in process j during the year y (mass orvolume unit/yr);

$COEF_{i, y}$= Is the CO_2 emission coefficient of diesel in year y (tCO_2/mass or volume unit)

i = Are the fuel types combusted in process j during the year y

[2]https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf

The CO_2 emission coefficient $COEF_{i, y}$: PP has selected the option B as COEF (CO_2emission coefficient of fuel) testing facility for "Weighted average mass fraction of carbon in fuel type i in year y" under option A is not available to PP.

Option B: The CO_2 emission coefficient $COEF_{i, y}$ is calculated based on net calorific value and CO_2 emission factor of the diesel, as follows:

$$COEF_{i, y} = NCV_{diesel, y} \times EF_{co2, diesel, y}$$

Where:

$COEF_{i, y}$ = CO_2 emission coefficient of diesel in year y (tCO_2/mass or volume unit)

$NCV_{diesel, y}$= weighted average net calorific value of the diesel in year y (GJ/mass or volume unit)

$EF_{CO2, diesel, y}$ = weighted average CO2 emission factor of diesel in year y (tCO_2/GJ)

Hence, the project emissions for the proposed project activity can be calculated as follows:

$$PE_{diesel, j, y} = FC_{diesel, j, y} \times NCV_{diesel, y} \times EF_{co2, diesel, y}$$

Where,

$FC_{diesel, j, y}$ = quantity of diesel used during the year

$NCV_{diesel, y}$= weighted average net calorific value of diesel in year y

$EF_{co2, diesel, y}$ = weighted average CO_2 emission factor of fuel type diesel in year y

Hence for the Monitoring Period01-November-2019 to 31-August-2021.

$PE_{diesel, j, y}$ = = 4 tCO_2e

Leakages have been considered as zero for the project activity as per the applied methodology/14/.

Therefore,

Net Emission reductions = Baseline emissions - Project emissions – Leakage

= 19,792 – 4 – 0 =19,788 tCO_2e

The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed. The assumptions, emission factors and default values that were applied in the calculations are justified. All the data were made available and have monitored as per required monitoring frequency. The means of verification for the values of parameters, used for baseline emission calculation, is described above.

The estimated emission reduction for the current monitoring period is 26,547tCO_2e, whereas actual emission reductions achieved are 19,788tCO_2e, which is approximately 25.46% lower

than the estimated emission reductions. The calculation has been provided in ER sheet and same has been verified and found to be correct, hence accepted.

The PP has explained in MR hat the generation of electricity depends upon many other climatic conditions, which are not within the control of the project participant. The lower generation during the current verification period is low due to certain natural conditions like water flow etc. VVB has verified and confirm the same, hence, it is accepted.

In additional, the PP has explained in MR that the estimated emission reduction comparison with actual emission reductions based on operation days of each PP. Based on actual operational days, the estimation for operational days and actual emission reductions are compared and found that for the project activity the power generation was on a lower side and witnessed downfall in PLF This is found be correct and accepted by VVB team.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The project activity under consideration consists of a well-defined management structure which ensures the quality of data monitored. The project monitoring system and reporting procedure are well managed by State Electricity Board. The project facility has a dedicated team comprising of the members having vast standing experience in the said field of operations and the roles and responsibilities towards the project operation and management are well structured. The project activity ensures the data acquisition and data processing system in two parallel ways, one is automatically online registering procedure through online data logging and another is the manual logging procedure in the log book. The project activity employs trained personnel at project site as per the operational responsibility to monitor and archive data.

All the parameters used for the determination of the Emission Reductions are discussed in previous section of this report. All the data recorded are in compliance with the monitoring plan. During the interview with onsite personnel's the assessment team interviewed employees from all the departments for understanding the entire data flow system and ensures the robustness of the data corroboration procedure maintained in the SEB.

The emission reduction calculation for the project activity is estimated based on the electricity supplied by the TG sets installed at site. Monthly values of electricity generated inserted in the ER sheet was verified with the Joint Meter Reading Report/8/ and Invoices provided by the project proponent/7/. Since 100% data was verified, the team can ascertain that the values taken for emission reduction calculation are free from material errors.

4.6 Non-Permanence Risk Analysis

The data variable used for the calculation of emission reductions is the net electricity supplied by the project activity. The parameter has been monitored through electronic meters; therefore, the likelihood of error is purely systematic in nature. The energy meters have been calibrated by the Govt Agencies/6/. The monthly JMRs/8/ for the energy generated issued by the state utility have been submitted to the assessment team and 100% of the data has been verified.

Therefore, the assessment team confirms that the emission reductions are free from any omissions, misstatement and material errors.

5 VERIFICATION CONCLUSION

LGAI Technological Center, S.A. (also referred to as Applus+ Certification), contracted by Gaur Hydro Power Pvt. ltd, has performed the independent verification of the emission reductions for the VCS project activity (VCS ID- 2033) "3.5 MW Small Hydro Project In Himachal Pradesh" in India for the monitoring period 01-November-2019 to 31-August-2021 as reported in the Monitoring Report Version 02.0 dated 25- October-2021/4/. The GHPPL is responsible for the collection of data in accordance with the monitoring plan and responsible for 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

Applus+ Certification commenced the verification on the basis of the baseline and monitoring methodology AMS-I.D. ver. 18.0/14/, the monitoring plan contained in the approved VCSPD/1.2/ and VCS guidelines version 4.1, Monitoring Report Version 02.0 dated 25- October-2021/4/as per the process described under Section 2 of this report.

Applus+ Certification 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. Applus+ Certification planned and performed the verification by obtaining evidence and other information and explanations that Applus+ Certification 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 01-November-2019 to 31-August-2021 are fairly stated in the Monitoring Report Version 02.0 dated 25- October-2021/4/. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.D. ver. 18.0/14/, and the VCS standard 4.1.

Verification period:From01-November-2019 to 31-August-2021 (including 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)
01-November-2019 to 31-December-2019	983	1	0	982
01-January-2020 to 31-December-	13,576	2	0	13,574

2020 01-January-2021 – 31-August-2021				
01-January-2021 – 31-August-2021	5,233	1	0	5,232
Total	19,792	4	0	19,788

APPENDIX 1: DOCUMENT REFERENCES

S.No	Title of Document	Version	Date
1	Registered VCS-PD	02	22-12-2019
2	VCS Verification Report for third monitoring period from 23-02-2018 to 31-10-2019		
3.	VCS Monitoring Report (Draft)	01	21-10-2021
4.	VCS Monitoring Report (Final)	02	25-10-2021
5.	ER spread sheet (corresponding to the final monitoring report)	02	21-10-2021
6	Certificates of Calibration for all the meters belongs to project activity		
6	Calibration test report	-	25-08-2018 24-08-2023 18-04-2019 22-01-2025
7.	Invoices addressed to State Electricity Board (SEB) for this monitoring period	-	23/02/2018 and 05/05/2019
8.	Joint Monthly Meter Readings for this monitoring period	-	
9.	Commissioning certificate of Project activity	-	Unit I commissioned on 05/05/2019
10.	• Power Purchase Agreement • Subsequent amendment in PPA	-	27/011/2017
11.	Project Layout plan	-	-
13.	VCS webpage for the project, VCS ID 2033; https://registry.verra.org/app/projectDetail/VCS/2033	-	-
14.	AMS I.D: Grid connected renewable electricity generation	18	-
15.	VCS Standard	4.1	19-09-2019 updated: 22-April-2021
16.	VCS Program Guide	4.0	19-09-2019
17.	Latest photographs of major project equipment's installed at site (i.e. Turbine, generators, energy meters, weir intake, penstock, tailrace etc.)	-	09-11-2021
18.	CDM Project Standard for Project activity	03.0	09-09-2021
19.	CDM Validation and Verification Standard for Project activity	03.0	09-09-2021
20.	PP Self Declaration Letter	-	25-11-2021

APPENDIX 2: ABBREVIATIONS

Abbreviations	Full texts
CAR	Corrective Action Request
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
EB	Executive Board
EF	Emission Factor
EPC	Engineering ,Procurement and Construction
ER	Emission Reductions
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CR	Clarification Request
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GOI	Government of India
IPCC	Intergovernmental Panel on Climate Change
MGR	Monthly Generation Reports
MP	Monitoring Plan
MR	Monitoring Report
MWh	Megawatt hour
PD	Project Description
PP	Project Proponent
PS	Project Standard
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVB	Validation and Verification Body
VVS	Validation and Verification Standard

APPENDIX 3: FINDINGS OVERVIEW

Findings Overview Summary

Type	CAR	CL	FAR
Total Number raised	04	00	00

Remaining FAR from validation and/or previous verification

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

Table 1. CR from this verification

Table 2. CAR from this verification

CAR ID	01	Section no.	Page no 2	Date 15/11/2021
Description of CAR				
Table of content not correct in section 2. PP is requested to correct the same.				
Project participant response				Date :25/11/2021
Section 2, table of content has been revised.				
Documentation provided by project participant				
MR V2				
DOE assessment				Date: 26/11/2021
Table of content has been updated and same has been found correct in revised MR. Hence CAR#1 is closed.				

CAR ID	02	Section no.	B.1	Date 15/11/2021
Description of CAR				
Project participant mentioned the details regarding the technologies used in the project activity but to verify the same, no such document has been provided by the PP (i.e., technical equipment's details, Commissioning certificates, power purchase agreements, O&M agreement etc.) is provided to DOE team. Corrective action is sought for the same. PP is requested to provide the above documents to assessment team.				
Project participant response				**Date : 25/11/2021**
DPRs, Commissioning certificates, PPA and O&M documents are being provided for both the project participants.				
Documentation provided by project participant				
Commissioning certificate, PPA and O&M are being provided.				
DOE assessment				**Date: 26/11/2021**
All the supporting document has been submitted to assessment team and found as per the requirement. Hence CAR#02 is closed				

CAR ID	03	Section no.	E.3	Date :15/11/2021
Description of CAR				
The breakdown details of the power plant are provided in the MR. Further, supporting document regarding the breakdown details are not provided to the assessment team. PP is requested to provide the above documents to assessment team.				
Project participant response				**Date :25/11/2021**
There are very few and minor breakdown as the plant are newly commissioned. Therefore there is no breakdown reported during the monitoring period.				
Documentation provided by project participant				
MR V2				
DOE assessment				**Date: 26/11/2021**
PP has provided the justification and same has been confirm during the audit, the plant hasn't stop during this monitoring period. Hence no breakdown occurs. Hence CAR#3 is closed				

CAR ID	04	Section no.	D.2	Date :15/11/2021
Description of CAR				
The values as mentioned in the MR are reserved till supporting is submitted. Thus, PP are requested to submit JMR &Invoicesfor the complete monitoring period. PP is requested to provide the above documents to assessment team.				
Project participant response				**Date : 25/11/2021**
JMR &Invoicesfor the complete monitoring period has been submitted to DOE.				
Documentation provided by project participant				
JMR &Invoices				
DOE assessment				**Date: 26/11/2021**
PP has submitted the complete set of JMR &Invoicesfor the complete monitoring period and same has been check and found correct. Hence CAR#4 is closed.				

CAR ID	05	Section no.	D.2	Date :15/11/2021
Description of CAR				
The details of monitoring meters and its calibration are provided in the MR. Moreover, Calibration certificates for the complete monitoring period are also missing. As Actual ER sheet is not submitted the delayed calibrated period (if any) cannot be confirmed. Corrective action is raised for the same.				
Project participant response				**Date : 15/11/2021**
Calibration certificates covering the monitoring durations are being provided. Also, the revised ER sheets are being provided. PP hereby confirms that there is no calibration delay in the monitoring period.				
Documentation provided by project participant				
Calibration certificates, ER sheet, MR V2				
DOE assessment				**Date: 26/11/2021**
Calibration report are provided and same has been found in line with the requirement. Hence CAR#5 is closed.				

Table 3. FAR from this verification

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

APPENDIX 2: COMPETENCY STATEMENT

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

The composition of audit team shall be approved by the 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	Qualification	Coverage of scope	Coverage of technical Area	Financial aspect	Host country Experience	Attendance to the Assessment (remote)
Vivek Ahirwar	Lead Auditor (LA)	Yes (1)	Yes (1.2)	N/A	Yes	Yes
Vivek Ahirwar	Technical Expert (TE)	Yes (1)	Yes (1.2)	N/A	Yes	Yes
Simon Shen	Technical Reviewer (TR)	Yes (1)	Yes (1.2)	N/A	N/A	N/A

The curricula vitae of the VVB's team members are provided below:

Vivek Kumar Ahirwar is a BEE-Certified Energy Auditor by Govt of India with over eight years of relevant experience in energy efficiency, energy audit, thermal and electrical energy generation technology from renewable source and energy conservation in energy intensive industries, designated consumers and commercial buildings, implementation of energy conservation building codes, research, process and green building projects. He is a certified lead auditor for ISO 14001 EMS and 14064. He has experience under various categories of projects stating from renewable to waste to supercritical projects and WCD. He has successfully audited more than 100 GHG (CDM/VCS/GS) projects in different states across the India. He has done Mater in Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Bachelor of Engineering (Mechanical Engineering) from Govt. Engineering college, Rewa, RGPV, India.

Simon Shen (master degree in thermal energy engineering, bachelor degree in environmental engineering) is a lead auditor appointed by Applus+ certification for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ certification, he had been worked for TÜV SÜD as a GHG validator/verifier and ISO 9001/14001 lead auditor for 3.5 years.