5 MW BRAHM GANGA HYDRO – ELECTRIC PROJECT AT KULLU DISTRICT OF HIMACHAL PRADESH, INDIA

TÜV SÜD South Asia Pvt Ltd

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Summary:

TÜV SÜD South Asia Pvt. Ltd. has performed the third verification of the aforementioned VCS project activity. The verification is based on the currently valid documentation of the VCS and United Nations Framework Convention on Climate Change (UNFCCC).

The Verification has been conducted for the monitoring period 01-April-2016 to 01-April-2018.

The verification process includes three phases:

- Desk review of documents;
- On-site audit and follow-up interviews with the relevant personnel;
- Resolution of outstanding issues and the issuance of final verification report and opinion.

The project activity is 5 MW run of the river hydro power plant harnessing the potential of Brahm Ganga Nallah (Tributary of River Parbati) in Kullu District of Himachal Pradesh, India implemented by Harisons Hydel Construction Co. Private Limited (HHCCPL). The project comprises 2 X 2.5 MW Pelton wheel Turbines for the generation of clean electricity. The generated electricity is fed into Indian) grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

The project was initially implemented by Harisons Hydel Construction Co. Private Limited. The project activity was commissioned on 02 April 2008, which is the start date of the project activity.

The GHG credits from 01-April-2016 to 01-April-2018 will be claimed under VCS only. An undertaking from the project participant confirms that project will not claim any other scheme benefits for the concerned monitoring period.

2 Clarification Requests (CLs) and 2 Corrective Action Requests (CARs) have been raised during the course of verification process and has been successfully closed. No Forward Action Request (FAR) was raised during this monitoring period.

1 INTRODUCTION

1.1 Objective

TÜV SÜD has been commissioned by the aforementioned client to perform an independent verification assessment.

The objective of the verification work is to comply with the requirements of Verified Carbon Standards requirements. According to this assessment TÜV SÜD shall:

- ensure that the project activity has been implemented and operated as per the registered PDD, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- the project's baseline is assessed against "AMS 1.D - Version 15"
- the project's monitoring plan is assessed against "AMS 1.D - Version 15"
- ensure that the published MR and other supporting documents provided are complete, verifiable and in accordance with applicable VCS and CDM VVS requirements,
- ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- evaluate the data recorded and stored as per the applicable requirements.
- assessment of the sustainability monitoring parameters as per the VCS requirements

1.2 Scope and Criteria

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of VCS project activities, the scope is set by:

- VCS v4.0 requirements
- Clean Development Mechanism Validation and Verification Standard (VVS) for Project Activities v2.0
- Baselines and monitoring methodologies (including GHG inventories)
- Environmental issues relevant to the applicable sectoral scope
- Current technical and operational knowledge of the specific sectoral scope and information on best practice
- Stakeholder consultation and feedback

The verification process is not meant to provide any form of consulting for the project participant (PP). However, stated requests for clarifications, corrective actions, and/or forward actions may provide input for improvement of the project design.

1.3 Level of Assurance

The errors identified in the project are below the threshold limit of materiality and hence not material. The GHG emission reductions are calculated without material misstatements.

The VVB confirms that a reasonable level of assurance has been achieved during the verification process.

1.4 Summary Description of the Project

The purpose of the project activity is to generate energy electricity by the utilization of hydro power and further selling the generated energy to the respective Grid. In this process there is no consumption of any fossil fuel and hence it does not lead to any greenhouse gas emissions. Thus, electricity would be generated through sustainable means without causing any negative impact on the environment.

The project activity is 5 MW run of the river hydro power plant harnessing the potential of Brahm Ganga Nallah (Tributary of River Parbati) in Kullu District of Himachal Pradesh, India implemented by Harisons Hydel Construction Co. Private Limited (HHCCPL). The project comprises 2 X 2.5 MW Pelton wheel Turbines for the generation of clean electricity. The generated electricity is fed into Indian) grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The information provided by the project participants is assessed by applying the means of verification specified in the VCS v4, Toolkit and the VVS.

A competent assessment team is selected prior to the start of the verification. The team is selected to cover the technical area(s), sectoral scope(s) and relevant host country experience for evaluating the VCS project activity. Additionally, a competent Technical Reviewer or Technical Reviewer Team is appointed to conduct checks on quality and completeness.

The verification team performs first a desk review, followed by an on-site visit, which results in the formation of a draft report and a list of findings. The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB "Environment and energy" before submission to the VCS.

2.2 Document Review

The documents referred during the course of this verification are provided in Appendix 1.

2.3 Interviews

The VVB has not conducted the on-site inspection for this current monitoring period due to obligations imposed by COVID 19. However the VVB has ensured that reasonable level of assurance has been achieved as per Verra regulations on the relaxation of mandatory site visits by the VVB due to Covid-19. The VVB has conducted telephonic interviews and video calls to discuss with the client regarding the data and documents pertaining to the current verification period. The interviews and discussions were conducted successfully.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sood	Ghanshyam	Harisons Hydel Construction Co. (P) Limited (PP)	23/08/2021	Implementation of the project, O&M activities, Metering arrangements, Calibrations, JMR, On-going LSC. etc.	Eswar Murty
2	Nagarkar	Sachin	EKI Energy Services (PP representative)	23/08/2021	CDM Monitoring	Eswar Murty
3	Mishra	Dhriti	EKI Energy Services (PP representative)	23/08/2021	CDM Monitoring	Eswar Murty

2.4 Site Inspections

Please see 2.3

2.5 Resolution of Findings

CL from this verification

CL ID	01	Section no.		Date: 23/08/2021
Description of CAR				
PP to provide the commissioning certificate of the project in evidence to start date				
Project participant response				**Date:** 27/08/2021
As per commissioning certificate the project start date is 02-April-2008 and same is submitted to DoE				
Documentation provided by project participant				
Commissioning Certificate				
DOE assessment				**Date:** 17/09/2021
The commissioning certificate has been verified and confirmed by the audit team. Hence the issue is closed.				

CL ID	02	Section no.		Date: 23/08/2021
Description of CAR				
1. The JMR for month of April 2016 shows the start date of reading as 31/03/2016, whereas the monitoring period starts from 01/04/2016. PP to clarify how the corresponding generation is apportioned for the monitoring dates. 2. In most of the JMRs that were submitted, there seems to be overlap of start and end dates, PP to clarify how the double counting is avoided for calculation?				
Project participant response				**Date:** 27/08/2021
1. The measurement of generation takes place on end of every month at 12 pm. The value achieved represents the generation of present month and after 12 pm, generation figure is considered in next month. In this way, the generation value achieved after 12 pm of 30/31 of any said month would be considered in next month JMR but the generation date/date of reading would be of previous month. This clarifies that the generation achieved after 12 pm on 31/03/2016 till 12 pm of 30/04/2016 will be considered in April month and that is why no apportioning is required. In last JMR for April-2018 date of reading is from 31-03-2018 to 30-04-2018, whereas monitoring period ends on 01-04-2018. So, apportioning is done on that period which affected the ER number & same has been revised in MR version 2. 2. The recording of generation figure is done in end of every month at 12 pm. If we consider March-2016, at 12 pm on 31/03/2016 reading will be noted by electricity board & that figure would be considered in generation achieved during March-2016. The date of reading in this case would be 29/02/2016 (after 12 pm) to 31/03/2016 (before 12 pm). In next month i.e. in April-2016, the date of reading would be 31/03/2016 (after 12 pm) to 31/05/2016 (before 12 pm). It seems that 31/03/2016 is repeating in March as well as in April month but it is to be noted that in March-2016 only generation value till 12 pm is considered whereas in April-2016, generation after 12 pm will be considered. This clarifies that, date of reading might be overlap in two months but there is no double counting & in consecutive month the generation figure considered is taken at different time.				
Documentation provided by project participant				
JMRs				
DOE assessment				**Date:** 17/09/2021
The necessary apportioning has been done in the ER calculations for the overlap of the start and end dates. Same have been verified from the JMRs. Hence the issue is closed.				

CAR from this verification

CAR ID	01	Section no.	1.6	Date: 23/08/2021
Description of CAR				
The end date of crediting period is wrongly mentioned in the MR. PP to make necessary revision and calculations accordingly.				
Project participant response				**Date:** 27/08/2021
The end date of crediting period is corrected to 01-April-2018 in the revised MR				
Documentation provided by project participant				
MR version 2				
DOE assessment				**Date:** 17/09/2021
The corrections has been made in the MR by PP. Hence the issue is closed.				

CAR ID	02	Section no.		Date: 23/08/2021
Description of CAR				
1. As per the MR, the calibration frequency for energy meters is mentioned as one year. However as per the information provided by PP, meters are replaced and calibrated once in every 6 months. PP to provide clear information in the MR. 2. The calibration details of check meter are not provided for the whole monitoring period.				
Project participant response				**Date:** 27/08/2021
1. As per the VCS Project description, the calibration frequency of energy meters is once in a year. However, state authority regularly changes the monitoring meters of project activity and provide the details of new and old meters in the respective month's JMR. A clear information is provided in the revised MR. 2. Calibration details of check meter is updated in revised MR and calibration certificate are provided to DoE.				
Documentation provided by project participant				
ER calculation sheet Calibration certificates of Check meter				
DOE assessment				**Date:** 17/09/2021
MR has been revised to provide clear information on the calibration frequency of energy meters and the replacement of these meters during the monitoring period. The calibration certificates have been checked and verified by the audit team. Hence the issue is closed.				

2.5.1 Forward Action Requests

This is 3rd periodic verification of the project activity and no FAR was raised from validation or previous verification

2.6 Eligibility for Validation Activities

This section is not applicable for present verification.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Project has not been registered under any other GHG program.

3.2 Project Description Deviations

There is a typo error related to turbine type in the current MR based upon actual site scenario. Francis turbine is mentioned instead of Pelton wheel type. The change having no impact on baseline emission calculation. The nature of change is permanent. .

3.3 Grouped Project

This is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the verification site visit it was concluded that the project is implemented as per the instruction of the registered VCS PD, Final VCS Validation report,. During the current monitoring period it was observed that no unforeseen situation evolved which can impact the operation 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.

The project activity is 5 MW run of the river hydro power plant harnessing the potential of Brahm Ganga Nallah (Tributary of River Parbati) in Kullu District of Himachal Pradesh, India implemented by Harisons Hydel Construction Co. Private Limited (HHCCPL). The project comprises 2 X 2.5 MW Pelton wheel Turbines for the generation of clean electricity. The generated electricity is fed into Indian) grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

To verify the implementation of project activity, technical specifications of Turbine/Generator, onsite operation & maintenance, monitoring & management practices; assessment team has conducted Skype video call/telephonic interviews with onsite in-charge, O&M team and also had a detail discussion with the PP representative and reviewed third party statutory documents i.e. Technical specifications by manufacturer, Commissioning certificates, Complete set of JMRs covering monitoring period, breakdown log, O&M schedule, grievance register and other relevant records. Same are also cross-checked with photographs/videos submitted by PP for current

monitoring period and previous CDM & VCS verifications and were found to be consistent with the description given in the registered VCS PD.

After remote interviews via Microsoft teams with concerned onsite persons, document reviews & site videos/photographs submitted by PP; assessment team concluded that the project activity is still implemented and operated in-line with the registered VCS PD. There is no change in the project design or operation and monitoring practices at site which can alter the applicability or additionality of the project activity. In addition to the interviews with PP, assessment team have checked the commissioning certificate and JMRs and found that the project activity is implemented as per the VCS PD and Monitoring report submitted by the PP for current monitoring period. Assessment team therefore of the opinion that project is implemented as described in the registered PD and there is no change in monitoring practices as well as all monitoring parameters as envisaged in the VCS PD & MR. All the monitored values are supported by the evidences i.e. JMRs and found that information provided in the MR is inline with the submitted evidences.

The audit team has checked all the commissioning certificates of WTGs to confirm the location and the implementation of the project.

Means of verification

Referring to VCS v4 and p.360, p.361, p.363 and p.364 of CDM VVS PA, v2.0, the below tables provide a summary on the verification of each monitoring parameter listed in the registered monitoring plan.

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity supplied by the project activity.
Source of data used:	Monthly Joint Meter Reading (JMR)
Means of verification/Comments:	This net electricity generation values are cross checked with JMR
Cross-check	Cross checked with the invoices raised to the grid authority

Compliance with the calibration frequency requirements for measuring instruments

As per the registered monitoring plan, the meters are to be calibrated annually. The audit team has checked the calibration certificates and confirmed that there was no delay in calibration of main meters. However the audit team observed that there was a delay in the calibration of check meter for 5.5 months. Since the ERs have been calculated based on the JMR and main meters, which do not have any delay, correction factor has not been applied. The same has been accepted by the audit team. The details of the calibration of meters are given in the table below.

Conclusion	The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. All parameters were monitored and determined as per the registered monitoring plan. Referring to p.360, p.361, p.363 and p.364 of CDM VVS PA, v2.0, VVB confirms through video call and telephonic interviews and from the document review, the actual monitoring system complies with the registered monitoring plan. The substantiation of this conformity on information flow for these parameters including the values in the monitoring reports is reported in the above section. During the verification, all relevant monitoring parameters of the registered monitoring plan have been verified with regard to the appropriateness of the verification method, the correctness of the values applied for ER calculation, the accuracy and applied QA/QC measures. After appropriate corrections, carried out by the project participant, it is confirmed that all monitoring parameters have been measured / determined without material misstatements and are in line with all applicable standards and relevant requirements. All parameters required to be monitored are recorded at the intervals required by the registered monitoring plan and the applied methodology. On the basis of review of source and nature of available evidences and records, the verification team confirms the quality of evidence for emission reduction provided is sufficient as per CDM VVS PA, v2.0.

Calibration of the meters

Sr No	Type	Serial Number	Make	Accuracy Class	Previous calibration date	Validity of calibration
1	Main	11071310	M/s L & T	0.2s	01/02/2016	31/01/2017
2	Main	15625796	M/s L & T	0.2s	19/09/2016	18/09/2017
3	Main	11071310	M/s L & T	0.2s	05/07/2017	04/07/2018
4	Main	15625796	M/s L & T	0.2s	05/02/2018	04/02/2019
5	Check	15625805	M/s L & T	0.2s	19/09/2016	18/09/2017
6	Check	11071309	M/s L & T	0.2s	05/07/2017	04/07/2018
7	Check	15625805	M/s L & T	0.2s	05/02/2018	04/02/2019

4.2 Safeguards

4.2.1 No Net Harm

The project do not have any negative environmental and social impacts.

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

This section is not applicable as this project activity is a non-AFOLU project activity.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The assessment of data and the calculation of baseline emission reduction in the MR and the ER excel sheet have been verified as per the following set of supporting documents: 1. Energy bills 2. Joint meter readings 3. VER spreadsheets 4. Sales Invoices
Conclusion	Calculations applied formulae and method for calculation of baseline emission are in accordance with the registered monitoring plan and are in line with the requirements of the applied methodology.

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

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the project activity. 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 registered monitoring plan
Conclusion	Project emissions are zero as per the requirement of the methodology and registered VCS PD.

Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the project activity. 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 registered monitoring plan
Conclusion	Leakage emissions are not applicable according to the applied methodology and registered VCS PD.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	No lack of evidence and missing data were detected during this monitoring period. All values as per the monitoring plan were crosschecked by the verification team against basic monitored data and the calculations were found to be correct. The verification team confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors, application of maximum permissible errors and default values are explicitly mentioned in the monitoring report. Hence the VVB confirms that the methods and formulae used to obtain the emissions are appropriate. No reporting risks have been identified for the data reported. Troubleshooting procedure, maintenance and calibration of monitoring equipment, monitoring measurements and reporting, record handling and maintenance, reviewing monitored data are available at the plant. All the monitored data are archived partially in electronic and paper form. The data will be kept for the whole crediting period and 2 years after the last crediting period thereby meeting the requirement of the monitoring plan.
Conclusion	The formulae and the methods referred in the MR and the emission reduction calculation spread sheet comply with the methods described in the registered PD. No lack of evidence and missing data were detected during this monitoring period. All values as per the monitoring plan were crosschecked by the verification team against basic monitored data and the GHG emission calculation is found correct. TUV SUD confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report. Calculations applied formulae and method for calculation of GHG emission are in accordance with the registered monitoring plan and are in line with the requirements of VCS, the applied methodology and p. 372, p.373 of CDM VVS PA ver 2.0.

4.6 Non-Permanence Risk Analysis

Not applicable

5 VERIFICATION CONCLUSION

The VVB confirms that

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the project design document approved by the VCS;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately.
- the monitoring system is in place and generates GHG emission reductions data;
- the monitoring plan in Monitoring Report is as per the VCS PD and monitoring plan approved by the VCS;
- the approved monitoring plan in the approved VCS PD is as per the applied methodology;
- There is an audit trail that contains the evidence and records that validate the stated figures.

Based on the information we have seen and evaluated, we confirm that the project activity achieved the verified amount of reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the project activity

Verification period: From 01-April-2016 to 01-April-2018

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)
2016	17,058	0	0	17,058
2017	19,588	0	0	19,588
2018	1,586	0	0	1,586
Total	**38, 232**	**0**	**0**	**38, 232**

APPENDIX 1: <DOCUMENTS REVIEWED>

No.	Author	Title	References to the document
1.	UNFCCC	CDM VVS for PA v2.0	-
2.	UNFCCC	AMS I.D. Ver.15	-
3.	Verra	VCS Standard v4.0	-
4.	VCS	Final VCS PD	Version 02 17/04/2018
5.	EKI Energy Services Ltd	Draft Monitoring report (3rd VCS Verification)	Version 01 10/08/2021
6.	EKI Energy Services Ltd	Final Monitoring report (3rd VCS Verification)	Version 02 27/08/2021
7.	EKI Energy Services Ltd	Emission Calculation sheet version 01	Version 01 10/08/2021
8.	EKI Energy Services Ltd	Revised Emission Calculation sheet version 02	Version 02 27/08/2021
9.	Harisons Hydel	The operational lifetime of the project activity from the manufacturer=(Technical specifications)	Manufacturer technical specifications
10.	Harisons Hydel	Plant Commissioning Certificate	02/04/2008
11.		Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in VCS: Verified Carbon Standard www.v-c-s.org	Reference link is provided.
12.		Tools/ guidelines used in the project activity • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool to calculate the emission factor for an electricity system • Glossary of CDM terms version 07 • VCS verification report template version 4.0	UNFCCC CDM web site
13.		JMR records for the complete monitoring period	2016-2018
14.		Invoices for the complete monitoring period	2016-2018
15.		Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period and double counting	-

16.	NA	Calibration certificate of all energy meters	2016-2018
17.	NA	Plant Shutdown data	2016-2018
18.	NA	Site photographs	-
19.	NA	GPS Coordinates	-
20.	NA	Single line diagram for metering arrangements	-

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