



HYDROELECTRIC PROJECT IN KINNAUR DISTRICT IN HIMACHAL PRADESH

Document Prepared By



VKU Certification Pvt. Ltd.

Regd. Off: Flat No. 306, Sky Star, N-1, New Rani Bagh Khandwa Road, Indore, Madhya Pradesh, India - 452020

URL: <http://vkucertification.com> | e-mail: info@vkucertification.com

Project Title	Hydroelectric Project in Kinnaur District in Himachal Pradesh
Version	02
Report ID	VKU.VER.43.22_VCS_1742

Report Title	Hydroelectric Project in Kinnaur District in Himachal Pradesh
Client	EKI Energy Services Limited
Pages	88
Date of Issue	31-March-2023
Prepared By	VKU Certification Pvt. Ltd.
Contact	Regd. Off: Flat No. 306, Sky Star, N-1, New Rani Bagh Khandwa Road, Indore, Madhya Pradesh - 452020 URL: http://vkucertification.com e-mail: info@vkucertification.com
Approved By	Dr. Vikas Kumar Aharwal (Founder and Director) vikas.aharwal@vkucertification.com
Work Carried Out By	Team Leader cum Technical Expert TA 1.2- Vivek Kumar Ahirwar Validator/Verifier-Trainee- Niharika Kaushik Project Trainee- Anil Dhankar Technical Reviewer cum Technical Expert TA 1.2- Sanjay Kumar

Summary:

M/s VKU Certification Pvt. Ltd. (hereafter referred as VKU) was commissioned by M/s EKI Energy Services Limited (hereafter referred as EKI) has verified the greenhouse gas emission reductions reported for the project activity “Hydroelectric Project in Kinnaur District in Himachal Pradesh” (VCS ID 1742¹) in India, covering sixth monitoring period from 01-August -2021 to 31- July -2022 (Inclusive of both start and end dates) of fixed crediting period from 01-January-2013 to 31-December-2022 (Inclusive of both dates) with regard to the relevant requirements for VCS activities.

The purpose of the verification is to have an independent review of ex-post determination of the monitored reductions in GHG emission reductions and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data used to confirm the reductions in anthropogenic emissions by sources is sufficient, definitive and presented in a concise and transparent manner.

The verification scope of the project is:

- To verify that the project is implemented as described in the registered PDD/3/.
- To assess the project’s compliance with other relevant rules including the host country legislation.
- To confirm that the monitoring system is implemented and fully functional to generate verified carbon units without any double counting.
- To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.
- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- To verify that reported GHG emission data is sufficiently supported by evidence.

Verification was conducted using VKU’s procedures in line with the requirements specified in the VCS Program Guide version 4.2/4/, VCS Standard Version 4.3/5/, VCS Validation and Verification Manual version 3.2/6/, CDM M&P, the latest version of the CDM Validation and Verification Standard 3.0/7/, and relevant decisions of the COP/MOP and the CDM EB viz., 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, sustainability criteria along with VCS standard version 4.3 and applying standard auditing techniques. The verification consisted of desk review, on-site assessment and the resolution of outstanding issues

¹ <https://registry.verra.org/app/projectDetail/VCS/1742>

and the issuance of the final verification report and certification. The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS requirements to be certified.

VKU followed the rule-based approach to perform this verification. During verification, related to operation, monitoring and GHG emission reduction calculation of the VCS project activity in relation to all relevant VCS requirements for the project activity and the applied baseline and monitoring methodology and a total of 07 findings were raised, which includes: 05 Corrective Action Request (CARs); 02 Clarification Requests (CLs) and 00 Forward Action Requests (FARs). All the raised findings were successfully resolved/closed after necessary corrections/clarifications by the client. The same has been discussed in [Appendix B](#) of this verification report.

The verification team ensured that the reported emission reductions are complete and accurate in accordance with applicable VCS requirements to be certified therefore the verification team has detected no further uncertainties.

The GHG emission reductions were calculated based on the approved methodology ACM0002: Grid-connected electricity generation from renewable sources- version 12.1.0/8/ and Tool to calculate the emission factor for an electricity system; Version 2.0/17/ and the monitoring plan included in the registered VCS PD (version 02) dated 17-April-2018/3/ & registered (CDM PD version 04) /3/ dated 28-March-2012.

In conclusion, it is VKU's opinion that the project activity "Hydroelectric Project in Kinnaur District in Himachal Pradesh" (VCS ID 1742) in State: Himachal Pradesh, Country: India meets all relevant requirements for VCS standard version 4.3/5/and guidelines and correctly applies the baseline and monitoring methodology ACM0002: Grid-connected electricity generation from renewable sources- version 12.1.0/8/. The monitoring system is in place and the emission reductions are calculated without material misstatement.

Hence, VKU is able to certify that the emission reductions from the project during the Sixth monitoring period from 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates) under fixed crediting period (01-January-2013 to 31-December-2022) (Including both dates) amount to 3,032,920 tCO₂e.

CONTENTS

1	Introduction.....	6
1.1	Objective.....	6
1.2	Scope and Criteria	7
1.3	Level of Assurance.....	9
1.4	Summary Description of the Project	9
2	Verification Process.....	12
2.1	Method and Criteria.....	12
2.2	Document Review	12
2.3	Interviews	17
2.4	Site Inspections.....	19
2.5	Resolution of Findings	20
2.6	Eligibility for Validation Activities	21
3	Validation Findings.....	21
3.1	Participation under Other GHG Programs	21
3.2	Methodology Deviations.....	22
3.3	Project Description Deviations.....	22
3.4	Grouped Project	24
4	Verification Findings.....	25
4.1	Project Implementation Status	25
4.2	Safeguards	35
4.3	AFOLU-Specific Safeguards	37
4.4	Accuracy of GHG Emission Reduction and Removal Calculations	37
4.5	Quality of Evidence to Determine GHG Emission Reductions and Removals	41
4.6	Non-Permanence Risk Analysis.....	66
5	Verification Conclusion.....	66
	APPENDIX A: ABBREVIATIONS.....	68
	APPENDIX B: AUDIT FINDINGS.....	70
	APPENDIX C: COMPETENCE STATEMENTS.....	85

1 INTRODUCTION

1.1 Objective

M/s EKI Energy Services Limited (hereafter referred as EKI) Commissioned M/s VKU Certification Pvt Ltd (here after referred as VKU) to carry out sixth verification of the project “Hydroelectric Project in Kinnaur District in Himachal Pradesh” (VCS ID 1742) in India for the period from 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates) under fixed crediting period from 01-January-2013 to 31-December-2022 (Including both dates).

This report summarizes the findings of the verification of the project, performed based on VCS Requirements and UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting as per VKU's standard procedure for verification which is in line with VERRA standard version 4.3 for verification.

The agenda of the verification is to have an independent evaluation of a project activity by an accredited validation and verification body against the requirements of the VCS Program Guide Version 4.2 /4/, VCS standard version 4.3 /5/ and GHG program applied, on the basis of the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/.

This is the sixth verification of **fixed crediting period (01-January-2013 to 31-December-2022)** (Including both dates) for a period of twelve months i.e., from 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates). The project activity adopts fixed crediting period² of 10 years period as mentioned in section 1.6 of VCS PD version 02 dated 17-April-2018/3/

Crediting Period: 01-January-2013 to 31-December-2022, both dates including (fixed for 10 year)	
Periodic Verification No.	Monitoring Period
1 st in CDM	01-January-2013 to 31-January-2013 ³
2 nd in VCS	01-January-2014 to 31-August-2015 ⁴

² The project activity adopts fixed crediting period of 10 years period which is from 01-January-2013 to 31-December-2022 (As per registered VCS PD, version 02, dated 17-April-2018).

³ <https://cdm.unfccc.int/UserManagement/FileStorage/QDXPGRFK9B2ZW7L60NH43YIAVCE1TS>

⁴ https://registry.terra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=69199&IDKEY=jiofj09234rm9oq4jndsm a80vcalksdif98cxkjaf90823nmq3m95425421

3 rd in VCS	01-September-2015 to 31-December-2017 ⁵
4 th in VCS	01-January-2018 to 30-April-2020 ⁶
5 th in VCS	01-May-2020 to 31-July-2021 ⁷
6 th (Current Monitoring Period) in VCS	01-August-2021 to 31-July-2022

The verification will be performed by review of evidences & documents submitted to the VVB by PP, for the registered project activity to establish that:

- The project activity has been implemented and operated as per the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/ & MR /1/ and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place.
- Monitoring report and other supporting documents are complete.
- The data is recorded and stored as per the monitoring methodology i.e. (“ACM0002: Grid-connected electricity generation from renewable sources- version 12.1.0) /8/ and approved monitoring plan.

To confirm that the monitoring system is implemented and fully functional to generate Verified Carbon Units (VCUs) without any double counting/26/, and to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The scope of this verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from the” Hydroelectric Project in Kinnaur District in Himachal Pradesh”. The verification of this project was based on the validated & registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/ & monitoring report/1/ along with supporting documents submitted by the project proponent to the VKU verification team. The documents thus submitted to the VVB were reviewed against the following guidance & protocols:

- VCS Programme Guide (Version 4.2) /4/
- VCS Standard (Version 4.3) /5/

⁵https://registry.terra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=24631&IDKEY=f98klasmf8jflkasf8098afnasfkj98f0a9sfsakjflsakjf8da33966149

⁶https://registry.terra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=47454&IDKEY=liofj09234rm9oq4jndsma80vcalksdjf98cxkja90823nmq3865439066

⁷https://registry.terra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=56581&IDKEY=f903q4jsafkasjfu90amnmasdfkaidflnmdf9348r09dmfasdff78025199

- iii) VCS program Definitions (Version 4.3) /39/
- iv) VCS Registration & Issuance Process (Version 4.2) /40/
- v) CDM Approved methodology ACM0002 Version 12.1.0 /8/

The objectives also underline the following requirements:

- To assess the project's compliance with other relevant rules including the host country legislation.
- To confirm that the monitoring system is implemented and fully functional to generate verified carbon units without any double counting.
- To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.
- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- to evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- to verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate to be certified.

The project is assessed against the requirements of VCS standard version 4.3 /5/, VCS program guide version 4.2 /4/, VCS validation and verification manual version 3.2 /6/ and related rules and guidance. VKU has, based on the recommendations in the latest version of CDM Validation and Verification Standard/7/, VCS validation and verification manual and employed a rule-based approach (as criteria) in the verification, focusing on the identification of significant reporting rules and the reliability of project monitoring.

Verification is not meant to provide any consultancy towards the project proponents. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

The method and criteria used for verification consisted of the following phases:

- Desk review;
- Onsite interviews with stakeholders;
- VKU's Completeness/Quality Check & Final issuance of verification report

Resolution of outstanding issues and issuance of final verification report and applicable VCS Validation and Verification Deeds of Representation.

1.3 Level of Assurance

All the revisions of the verification report before being submitted to the client were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent VKU's procedure, with a reasonable level of assurance.

The verification report is based on the Monitoring report /1/, registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/ supporting documents /21/22/23/24/25/26/27/28/29/made available to the verification team and information collected through performing interviews on-site/33/

The technical review was performed by a technical reviewer(s) qualified in accordance with VKU's qualification procedure. The verification/assessment team and the technical reviewers consist of the following personnel:

Table No 01: The Assessment Team comprises of

Role/Qualification of Assessment Team	Last Name	Middle Name	First Name
VCS Team Leader, & Technical Expert TA 1.2	Ahirwar	Kumar	Vivek
Validator/Verifier-Trainee	Kaushik	NA	Niharika
Project Trainee	Dhankar	NA	Anil

Table No 02: The Technical Team comprises of:

Role/Qualification of Technical Team	Last Name	Middle Name	First Name
Technical Reviewer & Technical Expert TA 1.2	Kumar	NA	Sanjay

1.4 Summary Description of the Project

The project activity involves electricity generation by renewable source (Hydro energy) and supplying the generated electricity to the state grid system which is under the purview of the Unified Indian Electricity Grid of India located on the stretch of Satluj River between Village: Karcham and Wangtoo in the District of Kinnaur of Himachal Pradesh. This is a greenfield project activity i.e., there was no renewable energy-based electricity generation facility at site of this project and equivalent amount of electricity would have been supplied by fossil-fuel dominated grid – which is pre-project scenario as well as baseline scenario for this project activity. The

project activity ensures the reduction of greenhouse gas (GHG) emissions that are real, measurable, permanent, independently audited, unique, transparent, conservative and verifiable and also plays beneficial role in the mitigation of climate change.

The project activity is grid-connected hydro energy generation located in between Karcham and Wangtoo village of Kinnaur district in Himachal Pradesh state of India. JSW Hydro Energy Limited (formerly Himachal Baspa Power Company Ltd) are the Project Proponents of the project activity. The total capacity of the project activity when it got commissioned was 1045 MW. The 1st unit (250MW) of project was commissioned on 26-May-2011, The 2nd unit (250MW) of project was commissioned on 23-June-2011, The 3rd unit (250MW) of project was commissioned on 08-September-2011 and the 4th unit (250MW) of project was commissioned on 13-September-2011 and is functioning successfully since then and dates are verified against registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/ and commissioning certificates/27/.

The project activity is undergoing the sixth verification of **fixed crediting period (01-January-2013 to 31-December-2022)** (Including both dates) for a period of twelve months i.e., from 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates).

During onsite visit/33/ assessment team confirmed that the project capacity is enhanced and thus the same is notified in the MR/1/ According to the minutes of the authority meeting that took place on 30-March-2021, the CEA has approved an increase in the capacity of the Karcham Wangtoo Hydro Electric Project from 1000 MW to 1091 MW in two stages. The first stage involves an upgrade to 1045 MW, which includes a 10% continuous overload and a capacity of 261.25 MW for each unit. The second stage will see the project upgraded to 1091 MW, also with a 10% continuous overload. However, the Authority has decided to observe the performance of the project and its operating parameters for at least two monsoon seasons, starting from 7-July-2021, after the initial upgrade to 1045 MW. As the project is currently in its first stage, the operational capacity of the plant is presently 1045 MW. VKU Assessment verified the capacity enhancement from interviewing the site personnels/32/ and also from the letter issued to PP by Central Electricity Authority of India dated 29-April-2021/20/Hence VKU Assessment team confirmed the capacity from commissioning certificates/27/ along with the CEA Approval letter/20/ and thus confirm that plant is working efficiently under purview and strict jurisdiction⁸ of Central Electricity Authority of India.

Start date of this project activity is earliest date of commissioning of the 1st 250 MW plant unit (unit-1) involved in the project activity i.e., on 26-May-2011.

⁸ The Approval letter from the CEA, dated 29-April-2021, contains a directive to JSW Hydro Energy Ltd. from the authority. The directive emphasizes the importance of regular reporting, on a monthly and annual basis, to both the CEA and the state government, using a specified format that will be forwarded separately. Additionally, the CEA may direct further inspections of HRT/TRT and turbine underwater parts by an independent team to assess their condition, if required.

The Ministry of Power has approved a Retrofit project in two phases, totalling 1,045 MW and 1,091 MW, respectively, with the Central Electricity Authority's approval. The second phase will be implemented after reviewing the performance of the first phase for at least two monsoon seasons. The CEA letter/20/ regarding the approval is being submitted to VVB. The first phase trial run began in July 2021, with generation starting in August 2021. Currently, electricity reports are produced based on the 1,045 MW capacity, with no new units being added. The retrofit activities are considered a project design deviation, and the sensitivity parameter outlined in the registered PDD/3/ is used to assess additionality.

After conducting a comparison between the actual annual generation and the estimated generation in the registered Project Design Document (PDD)/3/, it has been observed that despite an increase in capacity of 4.50%, the actual annual generation is still lower than the estimated generation by -3.04%. Furthermore, according to the registered sensitivity analysis, it is unlikely that the increase in generation will exceed 5% within the project's context, which would result in an Internal Rate of Return (IRR) of 10.29%, still below the benchmark. As a result, the registered additionality is not violated, as despite the increased capacity, the actual generation remains below the estimated values. For the same Deviation has been requested by PP for capacity enhancement for the project activity, same can be referred in section 3.3 of this report.

As per MR/1/, the electricity generated from the project is supplied to the state grid system which is under the purview of the Unified Indian Grid which is confirmed from registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/ daily performance report prepared by plant team and issued by NRPC site to PTC India/23/ and, last verification report/10/ and interview with PP/32/. The plant team prepares the generation schedule on a daily basis. After deducting the transmission losses, auxillary power consumption, and 12.12% free power to Government of Himachal Pradesh (home state), the remaining electricity is distributed based on the Power Sale Agreements (PSAs) of four Indian states - Punjab, Uttar Pradesh, Haryana, and Rajasthan, with PTC India/21/. Furthermore, the distribution is also carried out on a short-term basis at power exchanges, after fulfilling contractual commitments. /41/

This information was verified during on site assessment /33/and found to be in line with the details provided in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) /3/ dated 28-March-2012/3/. The total emission reductions achieved in this monitoring period i.e., from of 01-August-2021 to 31-July-2022 (first and last days included) is 3,032,920 tCO₂e. The net electricity generated by the project activity that was evacuated to the grid during the current monitoring period (6th monitoring period) of 01-August-2021 to 31-July-2022 (inclusive of both the dates) is 3,776,517.32 MWh.

2 VERIFICATION PROCESS

The registered VCS project is undergoing 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 VKU's procedures in line with the requirements specified in the VCS Requirements, i.e., VCS Program Guide Version 4.2 /4/, VCS standard document version 4.3 /5/. The project activity does not fall under category "grouped projects", hence no sampling methods was employed by the validation/verification body i.e. VKU Team for the verification of GHG emission reductions or removals generated by the project. The GHG emission reductions are based on the approved Baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 12.1.0/8/

During onsite visit/30/verification team reviewed 100% data for all the Hydro Turbines involved in this project at site and hence no sampling is involved.

Scope: 01 Energy Industries (renewable- and non-renewable sources) Title: "Grid Connected Renewable Electricity Generation".

The verification consisted of the following three phases.

- Document review;
- On-site assessment including Interviews and actual project scenario;
- Resolution of any Material Discrepancy, Completeness Check and the issuance of the final verification report and certification

The following sections outline each step in more detail.

2.2 Document Review

The VCS monitoring report for "Hydroelectric Project in Kinnaur District in Himachal Pradesh" version 1.0 of 08-November-2022, version 2.0 of 30-January-2023 and final Version 3.0 of 17-March-2023 the emission reduction calculations spreadsheet version 1.0 of 08-November-2022, version 2.0 of 30-January-2023 and final Version 3.0 of 17-March-2023 were assessed as part of the verification. In addition, the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/in particular the baseline estimations and the monitoring plan for the project was reviewed.

Table No: 03 Lists of the documentation that was reviewed during the verification:

/1/	EKI: VCS monitoring report for "Hydroelectric Project in Kinnaur District in Himachal Pradesh" in India,
-----	--

	• Version 01 of 08-November-2022 • Version 02 of 30-January-2023 • Version 03 of 17-March-2023
/2/	EKI: Emission Reduction Calculation Spreadsheet, • Version 01 of 08-November-2022 • Version 02 of 30-January-2023 • Version 03 of 17-March-2023
/3/	<u>EKI: Registered VCS PD for the project ‘Hydroelectric Project in Kinnaur District in Himachal Pradesh’ version 2.0 dated 17-April-2018</u> <u>Registered CDM PDD for project ‘Hydroelectric Project in Kinnaur District in Himachal Pradesh’ version 04 dated 28-March-2012</u>
/4/	VCS: VCS Program Guide, version 4.2 of 22-June-2022
/5/	VCS: VCS Standard, version 4.3 of 22-June-2022
/6/	Validation and verification manual version 3.2 dated 19-October-2016
/7/	CDM Validation and Verification Standard version 3.0 dated 09-September-2021
/8/	CDM Executive Board: Baseline and Monitoring Methodology “ACM0002: Grid-connected electricity generation from renewable sources- version 12.1.0
/9/	<u>TUV NORD: Validation Report: Hydroelectric Project in Kinnaur District in Himachal Pradesh, Version 02, dated 17-April-2018</u>
/10/	<u>LGAI Technological Center, S.A (Applus+ Certification): VCS Verification Report “Hydroelectric Project in Kinnaur District in Himachal Pradesh” for monitoring period: 01-May-2020 to 31-July-2021 (including both days), Version 02.1 of 28-September-2021</u>
/11/	VERRA: Project search: https://verra.org/verra-standards-and-programs/
/12/	UNFCCC: Project search: https://cdm.unfccc.int/Projects/projsearch.html
/13/	REC website Renewable Energy Certificate Registry of INDIA (Renewable Energy Certificate Registry of INDIA - Registered RE Generator List (recregistryindia.nic.in))
/14/	The International REC Standard Foundation <u>I-REC Standard - The International REC Standard Foundation (irecstandard.org)</u>

/15/	Gold Standard Foundation: https://registry.goldstandard.org/projects?q=&page=1
/16/	EIA Report Volume I & II prepared by National Environmental Engineering Research Institute Nehru Marg, Nagpur dated September, 2005 EIA NOTIFICATION dated 14-September-2006; https://moef.gov.in/wp-content/uploads/2018/03/so1533.pdf
/17/	Tool to calculate the emission factor for an electricity system. Version 02
/18/	CO₂ Baseline Database for the Indian Power Sector User Guide Version 4.0
/19/	Central Electricity Authority (Installation and Operation of Meters) Regulations Notified on 17-March-2006 No. 502/70/CEA/DP&D Amendments Notified on 26-June-2010 No. 502/6/2009/DP&D/D-I https://cea.nic.in/wp-content/uploads/2020/02/meter_reg.pdf Metering Regulations Archives - Central Electricity Authority (cea.nic.in)
/20/	Central Electricity Authority Approval Directive for capacity upgradation from 1000 MW to 1045 MW
/21/	Power Purchase Agreements signed between Jaypee Karcham Hydro Corporation Limited (Now JSW Hydro Energy Ltd) and Power Trading Corporation of India Limited dated 21-March-2006 in New Delhi Power Sale Agreement signed between PTC India Limited (formerly known as Power Trading Corporation of India Limited) & Punjab State Electricity Board dated 01-September-2006 Power Sale Agreement signed between PTC India Limited (formerly known as Power Trading Corporation of India Limited) & Uttar Pradesh Power Corporation Limited dated 13-September-2006 Power Sale Agreement signed between PTC India Limited (formerly known as Power Trading Corporation of India Limited) & Haryana Power Generation Corporation Limited (HPGCL) dated 21-September-2006 Power Sale Agreement signed between PTC India Limited (formerly known as Power Trading Corporation of India Limited) & (Jaipur Vidyut Vitran Nigam Limited & Ajmer Vidyut Vitran Nigam Limited & Jodhpur Vidyut Vitran Nigam Limited) dated 27-September-2006

	Settlement Agreement dated 05-August-2013 entered between PTC & JSW Hydro Energy Ltd. (formerly HBPL & JPL) and CERC (Terms and Conditions of Tariff) Regulations, 2019 Please note that supply of power to respective DISCOMS is through PTC India Limited (PTC) - For State UP i.e., Supply of power to Uttar Pradesh Power Corporation Limited through PTC India Limited (PTC) - For State Rajasthan i.e., Supply of Power to Rajasthan Discoms Power Procurement Centre (RDPPC) (Jaipur Vidyut Vitran Nigam Limited, Ajmer Vidyut Vitran Nigam Limited) - For State Punjab i.e., Supply of Power to Punjab State Power Corporation Limited (PSPCL) through PTC India Limited (PTC) - For State Haryana i.e., Supply of Power to Haryana Power Purchase Centre (HPPC) through PTC India Limited (PTC)
/22/	Certificates of Calibration for all the energy meters for the project activity active during current monitoring period (01-August-2021 to 31-July-2022, inclusive of both start and end dates) issued by Power Grid Corporation of India Limited Calibration reports for energy meters issue date by Power Grid Corporation of India Limited: 04-December-2020
/23/	Daily Performance Report prepared by Plant team employing Supervisory Control and Data Acquisition (SCADA) system which are shared with PTC India Limited on daily basis & later used for preparation of Invoices as per Regional Energy Account (REA) issued by the Northern Regional Power Committee (NRPC) site.
/24/	Trial Run Certificate at Karcham-Wangtoo for upgraded capacity from 1000 MW to 1045 MW dated 08-July-2021
/25/	Invoice issued by PP to Power Trading Corporation of India Limited (PTC India Ltd) for electricity distribution to respective States i.e. Punjab//Haryana//Uttar Pradesh//Rajasthan
/26/	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the current verification period (01-August-2021 to 31-July-2022, inclusive of both start and end dates) dated 20-December-2022
/27/	Commissioning Certificates of all four Hydro Units (Turbine) of the project activity as confirmed by PP to M/s Power System Operation Corporation Limited, Northern Regional Load Despatch Centre

/28/	Technical Specifications of Hydro Units of Karcham-Wangtoo Hydroelectric Project as specified by manufacturer Voith Hydro.
/29/	Grievance Register/Grievance-Resolution Letters present on project implemented site, More information related to the same has been included in Section 4.2.2 of this report
/30/	<u>GPS Map Camera: Geotag Photos & Add GPS Location</u>
/31/	GPS Google earth software used for Location; <u>Google Earth</u>
/32/	Personnel Interviews and Focussed Group Discussions during onsite visit dated (18-November-2022; Friday) detailed in <u>section 2.3</u> of this report.as recorded by VVB i.e. VKU Certification Pvt Ltd during onsite visit in a form called as VKU.F46W. Attendance Sheet of Onsite Audit
/33/	Onsite visit on (18-November-2022; Friday) to Project implemented site i.e. District of Kinnaur of Himachal Pradesh, Country: India Photographs and attendance sheet (F46W. Attendance Sheet of Onsite audit)
/34/	Breakdown Details for the current Monitoring Period (01-August-2021 to 31-July-2022, inclusive of both start and end dates) provided by the PP based on their internal audited records (Please Refer Appendix 2 of MR. PP has submitted the Breakdown Details in an Excel Sheet
/35/	Training Records of all the sessions related to awareness programs, safety or project specific undertaken at site by PP.
/36/	Declaration of Ownership Rights of the project activity dated 03-March-2021
/37/	Certificate of Incorporation pursuant to change of name issued by Office of Registrar of Companies, Ministry of Corporate Affairs, Government of India, dated 11-September-2018 at Chandigarh, India
/38/	Declaration of Agency & Communications Agreement by JSW Hydro Energy Limited (Registry User) & EKI Energy Services Limited (Authorized Representative) dated 01-September-2021
/39/	<u>VCS program Definitions (Version 4.3)</u>
/40/	VCS Registration & Issuance Process (Version 4.2)
/41/	Open Access (Bilateral Transaction) Application for Scheduling between Adani Electricity Mumbai Limited & KWHPS JSW Hydro Energy Limited, HP

2.3 Interviews

An on-site inspection/33/ was performed by the assessment team. However, the representatives of the PP and O&M Team were interviewed personally by assessment team on **18-November-2022** 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.

Location: District- Kinnaur of State- Himachal Pradesh, Country- India.

Table no: 04: Details of Personnel Interview

S.no	Name	Designation	Topic of Discussion
1	Vikas Gupta	JSWHEL Baspa 2 HEP	Implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and monitoring along with QA/QC
2	Manik Kumar	JSWHEL Baspa 2 HEP, AGM	
3	Vikas Sharma	Manager (Billing)	Daily Generation Schedule preparation i.e (Daily Performance Report) & invoicing procedure to PTC India as per NRPC, calibration, grievance mechanism, Management practices, data storage, QA/QC
4	Suresh Yadav	Asst. Manager (O&M Baspa)	SCADA, Breakdown details and maintenance of generation records Data recording, management and archiving procedure
6	Ajay Nath	JSWHEL, (GM)	Execution of the project, technical description of the project and Monitoring, CSR activities.
7	Ramakrishnan	Asst. Manager (O&M Baspa)	SCADA, Breakdown details and maintenance of generation records Data recording, management and archiving procedure
8	Saurabh Yadav	Asst. Manager (O&M Baspa)	

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, emergency procedures, internal audit and archiving procedures. The assessment was based on the feedback received during onsite interview coupled with the documentation.

During Onsite Visit/33/, Assessment team also interviewed the local stakeholders/32/ involved in the projects to verify the implementation of CSR activities, process of grievance resolution as claimed and mentioned in the Monitoring report/1/ (refer section 1.11, & 2.2 of MR/1/) by the PP. The assessment team confirmed the sustainable development claims and assessed the socio-economic impact of the project on the local community. They also checked the records and observed that the PP provided opportunities for the locals to express their opinions and grievances, with efforts to resolve any issues through consultation with stakeholders. Assessment team thus verified all the above statements via focussed group discussions and personal interview/32/ with stakeholders as tabulated below:

Table no: 05: Details of Personnel Interview/Focussed Group Discussion with Stakeholders

S.no	Name	Designation	Category	Topic of Discussion
1	Suresh Kumar Negi	Dy. Manager (HR)	Local Stakeholder	- Execution of Project activity and its impact on the economic, social and environmental parameters on the local people of the area & around the situated project activity - The ongoing communication procedure and the address of their grievance mechanism followed by the project proponent - Scope and generation of employment in the locality due to the implementation of said project activity in the area. - The ongoing CSR activities Implemented by the project activities. - The ongoing trainings provided to the locals for self-employment.
2	Yogesh Mudta	Dy. GM(HR)		
3	Vishal Lalit	Design consultant (In CSR & charkha activities)		
4	Ganesh Dutt	Program Lead (Shikhar & CSR Activities)		
5	Gulab Singh	Sr. Supervisor (CSR)		
6	Hosiar Singh	Supervisor (CSR)		
7	Sunil Kumar	Jnr. Executive (CSR)		

8	Kanwar Singh	Sr. Manager (CSR)		
9	Mukesh Kumar	Data Entry Operator		
10	Sita Devi	Data Entry Operator		

The above stated information regarding the Interview with site personnel/32/ was recorded by VKU's Assessment Team in a form called as VKU.F46W. Attendance Sheet of Onsite audit/32/ & there were no negative comments received during the stakeholder consultation interview conducted on site and more detail is enlisted in the [section 4.2.2](#) below.

2.4 Site Inspections

Site Location visited:

Location: District- Kinnaur, Himachal Pradesh state in India. Further the coordinates along with longitude and latitude is mentioned in [section 4.1](#) of this report.

An On-site visit was undertaken by the verification team to the project location identified in the MR/1/ at Village - Karcham and Wangtoo of District - Kinnaur in State - Himachal Pradesh of India on 18-November-2022; Friday, to carry out the following;

- An assessment of the implementation and operation of the registered project activity as per the registered VCS PD version 02 dated 17-April-2018/3/, CDM PDD version 04 dated 28-March-2012 and VCS MR/1/;
- A review of information flows used to generate, aggregating and reporting the monitoring parameters;
- Interviews/32/ with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/
- A cross check between information provided in the monitoring report and data from other sources such as plant daily performance reports, inventories, purchase records or similar data sources;

- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ the applied methodology including applicable tool(s), and where applicable, the applied standardized baseline;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve any outstanding issues which need to be clarified for VKU's positive conclusion on the project description. To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria. The verification protocol consists of three situations in tables; the different columns in these tables are described below.

A corrective action request (CAR) is raised if one of the following occurs:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- Issues identified in a FAR during previous assessment i.e., in validation or verification report to be cross verified during verification have not been resolved by the project participants.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

A forward action request is also raised in cases where any required deviation/information is not fulfilled in current verification and thus needs to be taken up in consequent verification for better transparency thus holding the applicability of the methodology eligible to the project activity and there is no impact of the same on additionality, baseline scenario & emission reduction calculation of project.

In summary, **02 CLs and 05 CARs** were raised during this verification which were closed successfully and details are provided under [Appendix B](#) of this report.

2.5.1 Forward Action Requests

Based on the review of the VCS Validation Report/9/ and previous VCS Verification Report /10/, no FAR was raised during Validation and previous Verification which needs to be closed during

this verification and ***no FAR has been raised during current verification, (01-August-2021 to 31-July-2022, inclusive of both start and end dates)***

2.6 Eligibility for Validation Activities

VKU has not undertaken any validation activities as part of the verification and does not hold accreditation for validation of any relevant sectoral scope Hence this section is not applicable.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project has not applied under any other GHG program except VCS for the current monitoring period, 01-August-2021 to 31-July-2022 (inclusive of both dates). The project is registered under VCS with project ID: 1742⁹ and under CDM with registration ID 4993¹⁰. This was confirmed by checking VERRA registry website and CDM registry website and similar exercise was performed for GS/GCC/UCR registries with similar project title/capacity and Project Proponents but the assessment team was not able to trace any such project registered under any of the above stated registries or under any other similar mechanisms except CDM. This was supported from the declaration/26/ submitted by PP in which they claimed that same GHG emission reductions of the project from VCS for the current monitoring period will not be claimed under other registries except VCS. Similar exercise of independently searching for such project registration or claim for current monitoring period was performed for other GHG related benefits such as REC and I-REC benefits and based on both independent assessment and declaration submitted by PP/26/, the assessment team accepted the claim that there is no double counting from this project activity for current monitoring period. Thus, ensuring emission reduction generated from the project activity will not be double counted hence accepted by the assessment team. The details of the registries checked are as follows:

- 1) <https://www.recregistryindia.nic.in/>
- 2) <http://cdm.unfccc.int/>
- 3) <http://www.goldstandard.org/>
- 4) <https://verra.org/verra-standards-and-programs/>.
- 5) [I-REC Standard - The International REC Standard Foundation \(irecstandard.org\)](http://irecstandard.org/)
- 6) <https://cri.nccf.in/>
- 7) [International Carbon Registry - International Carbon Registry](http://internationalcarbonregistry.com/)
- 8) [GCC PROJECTS PORTAL \(globalcarboncouncil.com\)](http://globalcarboncouncil.com/)

⁹ <https://registry.verra.org/app/projectDetail/VCS/1742>

¹⁰ [CDM: Hydroelectric Project in Kinnaur District in Himachal Pradesh \(unfccc.int\)](http://cdm.unfccc.int/)

Rejection by other GHG programs

The Project is not rejected by other GHG programs. A declaration/26/ for the same is checked and found correct by the assessment team. Also, assessment team independently verified with the following registries and checked projects from the PP matching the same project design and found that no such project either exists or were rejected by the registries.

The details of the registries checked are as follows:

- 1) <https://www.recregistryindia.nic.in/>
- 2) <http://cdm.unfccc.int/>
- 3) <http://www.goldstandard.org/>
- 4) <https://verra.org/verra-standards-and-programs/>.
- 5) I-REC Standard - The International REC Standard Foundation (irecstandard.org)
- 6) <https://cri.nccf.in/>
- 7) [International Carbon Registry - International Carbon Registry](#)
- 8) [GCC PROJECTS PORTAL \(globalcarboncouncil.com\)](#)

3.2 Methodology Deviations

There is no methodology deviation identified during the current monitoring period. Also, there were no methodology deviations identified during the validation /9/ and previous verification/10/.

3.3 Project Description Deviations

1. The following deviation was reported during the monitoring period of 01-January-2018 to 31-October-2020, and will be considered in subsequent verifications:

1.1.Deviation 1:

Starting on 01-September-2015, the responsibility for project activities was transferred to the Himachal Baspa Power Company Ltd, which changed its name to JSW Hydro Energy Limited on 01-September-2018. The necessary documentation to reflect the company name change/37/ and updates to the communication agreement with VCS/38/ was provided by PP. The deviation in project ownership and name change was approved in the 4th verification report Version 02, covering the monitoring period from 01-January-2018 to 30-April-2020¹¹. Hence VKU conclude that it is found to be correct and acceptable.

2. Current verification (Monitoring Period: 01-August-2021 to 31-July 2022) include the following deviations:

¹¹https://registry.verra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=47454&IDKEY=liofj09234rm9oq4jndsm a80vcalksdj98cxkjaf90823nmq3865439066 section 3.3 page 15

2.1. Deviation 2:

The Central Electricity Authority (CEA) and Ministry of Power have granted approval for a two-phase retrofit of a project with a total capacity of 1,045 MW. The initial phase, which began in July 2021, encompasses upgrades to 1,045 MW, while the second phase, subject to a review of the initial upgrade's performance after at least two monsoon seasons, will lead to further upgrading to 1,091 MW. The CEA has submitted a letter outlining the retrofit approval to VVB. Electricity production reports are now based on the upgraded capacity of 1,045 MW, equivalent to 261.25 MW per unit, with any surplus electricity generated exported on a short-term basis to power exchanges. As the retrofit activities do not involve the addition of new units, they are classified as a project design deviation, and sensitivity parameters are being evaluated to determine their additionality in accordance with the registered Project Design Document (PDD)/3/

	Registered	Actual New Capacity	Percentage Change
Capacity (MW)	1000	1045	4.50%
Generation as per PDD	4,463,880	4,328,244.9	-3.04%

As per registered CDM PDD Version 04 dated 28-03-2012 page 28.

	Benchmark	11.45%	
IRR Variation	-10%	0%	10%
Generation	10.81%	9.80%	8.80%

When compared to registered PDD/3/, it is observed that with an increase of 4.50% capacity, the actual annual increased generation is still -3.04% lower than the estimated generation in registered PD. As per registered sensitivity analysis, an increase in generation is not likely to exceed 5% in the project context, which would result in an IRR of 10.29%, which remains lesser than the benchmark. With increased capacity, the actual generation is below the estimated values, therefore the registered additionality is not breached.

The project description deviation doesn't impact the applicability of the methodology, additionality and baseline scenario, emission reduction calculation of project. The nature of deviation is permanent Hence as per registered PDD/3/ referring to section of sensitivity analysis on page 31 mentions that as the anticipated average actual annual energy generation increase, compared to the design annual energy generation, will not exceed 5%. A 10% increase in such generation is unlikely to occur within the project activity's context. Thus, the sensitivity analysis for determining Internal Rate of Return (IRR) has been conducted by considering a range of generation variation of +5% and -10%, which is the scenario with the highest likelihood of occurrence. However, as per the "Guidance on the

Assessment of Investment Analysis," the sensitivity analysis has also been conducted covering the recommended range of variation in generation of +10% and -10%.. VKU conclude that it is found to be correct and acceptable.

2.2. Deviation 3:

To achieve more precise detection, the monitoring report has revised the Karcham-Wangtoo Hydroelectric Plant (KWHEP) location's Longitude (E) and Latitude (N) values. The methodology's applicability, additionality, or the suitability of the base case scenario are unaffected by the deviation. The Karcham-Wangtoo Hydroelectric Plant's coordinates have been updated and are now listed as.

Longitude (E): 78°00'53.3"

Latitude (N): 31°32'27.6"

The nature of deviation is permanent.

The project location was verified by the assessment team through Google earth/31/ during desk review and GPS map camera software/30/ during onsite visit /33/ and hence found to be correct. VKU thus states that the above requested deviation is verified and found to be correct, the same can be verified or checked using this link [Google Earth](#) Hence VKU conclude that it is found to be correct and acceptable.

3.4 Grouped Project

This is not a grouped project. Therefore, this section is Not Applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The now upgraded capacity 1045 MW hydro project, Karcham-Wangtoo hydroelectric Project (run-of-the-river development) envisages construction of a dam on Satluj river at Karcham, a diversion tunnel, intake tunnel, underground sedimentation chambers, head race tunnel, underground power house at Wangtoo and tail race tunnel.

The project will operate in Northern Regional grid & will meet the energy requirements of northern states. Karcham-Wangtoo Hydroelectric Project utilizes a gross head of 295 m for power generation and comprises 98 m high (above deepest foundation level) concrete gravity diversion dam, four intakes and four underground sedimentation chambers having size 505 m (L) x 16 m (W) x 28 m (D) each, 17.2 km long and 10.48 m dia finished circular concrete lined Head Race Tunnel (HRT) for design discharge of 417 cumecs, 16/27 m dia and 184 m high surge shaft, four steel 1-10 lined pressure shafts of 4.75 m dia and each 290.5 m in length, a 143 m(L) X 21m(W) X 49 m(H) underground power station, and a 909 m long Tail Race Tunnel and outfall works. The power station will have installed capacity of 1045 MW (4 units of 261.25 MW each) with four vertical axis Francis Turbines for 275.93 m design head. The assessment team confirmed the above specifications during site-visit with name plates placed on site/33/ and by interviewing the site personnels/32/ regarding the plant layout.

During the onsite audit /33/ with PP representative, it was concluded that the project is implemented as per the requirement of the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ and approved monitoring plan. During the current monitoring period,

It was observed that there was no unforeseen incident/event evolved which can impact the operation of the project activity except the **scheduled maintenance and service breakdowns calculated as 7.33 hours /34/**. Consequently, there have been no substantial repercussions of plant breakdown on the project activity's reduction of GHG emissions or the project activity's monitoring method. Reasons for breakdown include:

1. Breakdown due the malfunctioning in main-1 relay for 02.30 Hrs with generation loss of 3450 MWh.
2. Breakdown due to Wangtoo GIS HPPTCL Both circuit to kala Amb tripped for 2.03 Hrs with generation loss of 0.672 MWh
3. Scheduled shutdown as per protocol for Sorang to KalaAmb-1 feeder switch to shutdown and KalaAmb feeder -2 was already in open condition. SPS-6 condition fulfilled and SPS initiate the trip command and tripped two unit of KW. SPS and High speed rally rested Sorang to KalaAmb feeder restored and both Unit of KW normalised at 19:45 Hrs, with generation loss of 370 MWh
4. Scheduled shutdown as per protocol for Signal Testing and connection tightening is carrying out at Wangtoo & at 9:45 hrs. SPS and feeders normalised and unit synch with grid, with generation loss of 90 MWh

5. Breakdown due to High wind velocity observe in Shalabaag region, unit-1&3 partial s/d due to SPS-2 and Bus dead sps-4 and at Wangtoo GIS due to SPS-2 for 01.25 Hrs with generation loss of 547 MWh

To account a total breakdown loss as per the breakdown details provided by PP to VVB can be computed as 4457.672 MWh after breakdown of **07 Hours and 33 minutes**.

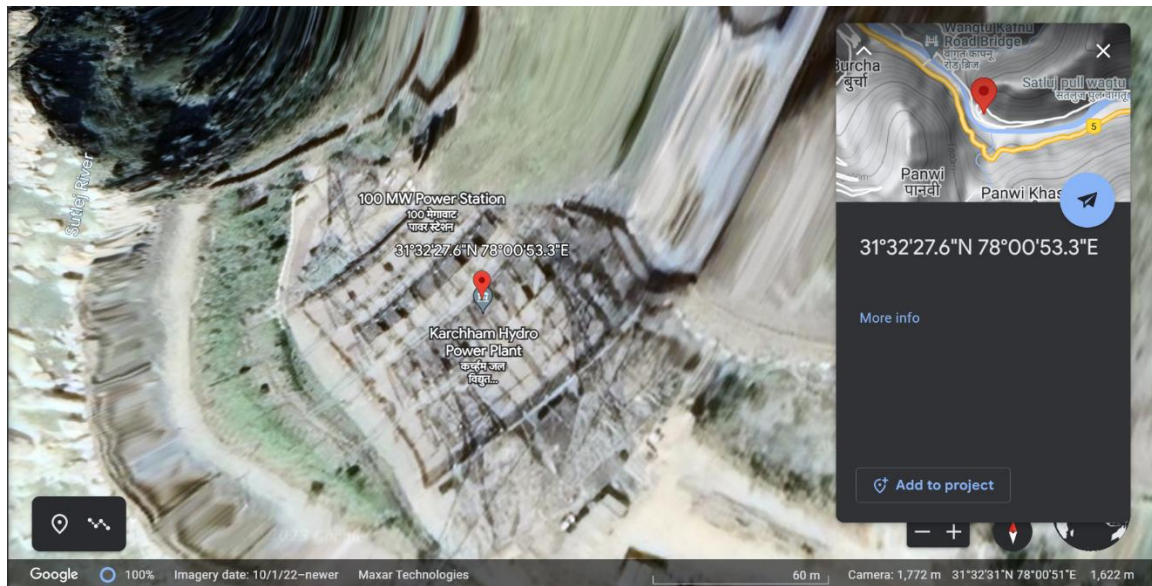
Plant Site	Breakdown hours
Village; Karcham & Wangtoo District: Kinnaur State: Himachal Pradesh Country: India	07 Hours and 33 minutes

The project underwent continuous operation and only scheduled maintenance and service breakdowns as per the manufactures specification which is acceptable to the assessment team as verified during the interview with PP personnel/32/ field engineers/Junior engineers/Assistant manager present at site during onsite visit/33/. Moreover, there is no major unforeseen incident which can affect the applicability of the methodology and thus the same is acceptable to the assessment team.

All of the four units were in operation throughout the current monitoring period, and the project activity generated 3,776.517.32 MWh of energy, resulting in 3,032,920 tCO_{2e} GHG reductions. The estimated emission reduction for the present monitoring period is 3,185,569 tCO_{2e}, however the achieved emission reductions are 3,032,920 tCO_{2e} (round down value), or around 4.79% less than the estimated emission reductions.

The actual VCUs is 4.79% lower than the estimated VCUs. This variation is majorly due to the variations in water flow which is mainly dependent rainfall and other parameters including grid availability – these factors are not in the control of project proponent.

Figure 01: Location of the project as verified through Google Earth/31/



Project location is confirmed by the assessment team through the Google earth/31/ during the desk review. During the on-site visit of the project, assessment team confirmed that the latitudes and longitudes as mentioned in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ does not reflect project location when checked on GPS Google Earth software/31/. Then PP requested for **deviation** that reflect the exact latitudes and longitudes of project activity are mentioned below:

Karcham and Wangtoo village of Kinnaur district in Himachal Pradesh state of India.

Latitudes - 31°32'27.6"N

Longitudes - 78°00'53.3"E.

Starting date of the operation of the project activity is commissioned on 26-May-2011 which is the date of commissioning/commercial operation of the 1st (250 MW) Unit. Assessment team checked the commissioning certificate /27/ and confirmed that the Dates of Commission for the all four units are correct. Assessment team also confirmed during the onsite audit/33/ that there is no change in project design except **deviation** requested which has been elaborated with reference to previous verification/10/and VCS standard version 4.3 /5/ in section 3.2.2 of the MR and section 3.3 of this report. The project is implemented as per the description provided in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/

Table No: 06 Commissioning dates of hydroelectric units are given below:

Unit	Capacity	Date of Commissioning
Unit 1	250 MW	26-May-2011
Unit 2	250 MW	23-June-2011
Unit 3	250 MW	08-September-2011

Unit 4	250 MW	13-September-2011
--------	--------	-------------------

The Technical parameters were verified by the VKU assessment team with the name plates present onsite/33/ as well as with the technical specifications also cross checked from the technical manual of the Manufacturers/28/ submitted to the VVB by PP. Assessment team confirms that the technical parameters are consistent with the VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/

Table No: 07 Major technical specifications of the project activity are as follows:

The power generating equipment installed in the project activity is:	
Turbines	4 Francis turbines, 255 MW/347000MHP
Make	Andritz VA Tech Hydro
Generators	4 semi-umbrella vertical synchronous generators, 277.70 MVA
Speed	214.30 rpm
The Project activity is a run-of-river hydropower project that utilizes the natural flow of Satluj to generate electricity and the major components involved are as following:	
1. River diversion works	
2. Diversion dam	
3. Intake and sedimentation chambers	
4. Head race tunnel	
5. Surge shaft	
6. Pressure shafts and penstocks	
7. Power house complex for housing 4 x 250 MW generating units	
8. Tail race Tunnel	

Table No: 08 The design features of the project components are presented in the following table:

LOCATION	
State	Himachal Pradesh
District	Kinnaur
River	Satluj

Vicinity	Dam near village Karcham and Power House near village Wangtoo on NH-22 about 186 km from Shimla, immediately U/S of 1500 MW NathpaJhakri H.E.P.
HYDROLOGY	
1. Catchment area at Dam site	48755 Sq.Km
2. Snow catchment	38760 Sq. Km
3. Max. observed av. 10 days discharge	1870.48 cumec
4. Design Flood: PMF	6744 cumec
5. Average run off in 90% availability year	9413m cum
6. Average run off in 50% mean year	12148m cum
7. Discharge for 90% availability	80.8 cumec
8. Discharge for 50% availability	176.0 cumec
9. Percent availability corresponding to design discharge of 421 cumec	32.38%
RIVER DIVERSION WORK	
1. Diversion tunnel	
i) Size	10.15m (lined) and 10.75m (unlined) with invert lining modified horse shoe section
ii) Length	541m (i/c 93m inlet & outlet structure)
2. Cofferdams	Rock fill with concrete wall
i) Upstream	16.50m high
ii) Downstream	5.50m high
DIVERSION DAM	
1. Type	Concrete gravity
2. Top of dam	EL. 1813.00m

3.Height	88.00m
4. Total length at Top	182.00m
5. No. of blocks	10
6. Minimum River bed level at dam axis	EL.1777.00m
7. Deepest foundation level	EL.1725.00m
8. Maximum Pond level (FRL)	EL.1810.00m
9.Minimum Pond level (MDDL)	EL.1799.00m
10. Maximum water level (MWL)	1812.40m
11. Live storage capacity	544.97 Ha-m
STILLING BASIN (ENERGY DESPINES)	
1.Length	95.00m
2. Floor level	1765.00m
3. Sill elevation	1776.50m
MAIN SPILLWAY (SLUICES)	
1.Location	Block no. 4 to 7 of Dam
2. No. of bays	4
3. Crest elevation	1778.00m
4. Thickness of intermediate piers	8m
5. Size of each gate	10m (W) x 10.50M (H)
6. Type of gates	Radial Gates (Top sealing type)
7. Discharge capacity of Sluices	8123 cumec at FRL with all gates Fully raised
AUXILIARY SPILLWAY	
1. Location	Block nos. 5 & 6
2. No. of bay	1
3. Width of bay	6.00m
4. Crest elevation	1807.00m

5. Size of gate	6m (W) x 3.30m (H)
6. Type of gate	Fixed wheel gate
7. Maximum discharge capacity	150 cumec at EL. 1813.00m 53 cumec at EL. 1810.00m
8. Ski-jump bucket lip elevation	1788.843m
INTAKE	
1. No. of intake bays	4
2. Size of each bay at trash racks	16m (W) x 18.50m (H)
3. Orientation with respect to Dam axis	110o
4. Crest elevation	1793.00m
5. Invert Level of Intake	1789.00m
6. Discharge through each intake bay	126.25 cumec for 1000 MW output
7. No. of gates	4
8. Size of each gate	7.5m (W) x 4.0m (H)
9. Size of intake tunnels	6.0m dia circular concrete lined
10. Length of intake tunnels	317m, 365m, 414m & 462m
SEDIMENTATION CHAMBERS	
1. Particle size to be excluded	+0.2mm and above
2. No. of chambers	4
3. Width of each chamber	18.00m
4. Depth of each chamber	30.25m
5. Length of each chamber	424m + 70m transitions
6. Flushing discharge for 1000 MW	84.2 cumec
7. Fall velocity of 0.2mm particles	2.3 cm/sec.
8. Size of flushing duct at start	1.0m (W) x 0.80m (H) steel lined

9. Size of flushing duct at end	2.0m (W) x 2.3m (H) steel lined
10. Design discharge & average Velocity through each chamber for 1000 MW output	Q (cumec): 126.25, V(m/sec): 0.235
POWER GENERATION	
1. Installed capacity	1000 MW
2. Annual generation (90% dependable year)	4131.06 GWh
3. Plant load factor (90% dependable year)	47.16%

The assessment team confirmed through onsite visit/33/ with PP representative that there is no proposed or actual change to the project design during this monitoring period. It was observed that the monitoring plan was implemented as per the VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/and applied methodology ACM0002, Version 12.1.0/8/. The organizational role and responsibility as mentioned in the registered PDD /3/ is followed onsite. Meters are calibrated as per calibration frequency in registered PD/3/. All the emergency preparedness as mentioned in MR/1/ are followed onsite and no discrepancies were found regarding the same.

Assessment team concludes the following:

- There are no material discrepancies between project implementation and the project description provided in the registered PDD /3/.
- The monitoring plan is implemented completely and monitoring system (i.e., process and schedule for obtaining, recording, compiling and analysing the monitored data and parameters) is appropriate.
- There are no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology/8/.
- The GHG emission reductions or removals generated by the project have not been included in any emissions trading program or any other mechanism that includes GHG allowance trading/26/.
- The project has not received or sought any other form of environmental credit, or has become eligible to do so since validation/9/ or previous verification/10/

- f) The project is registered under VCS¹² and CDM¹³, however PP has submitted the declaration/26/stating, they will not claim same GHG emission reductions of the project from CDM or any other GHG programme for the current monitoring period when project is seeking to get GHG emission reduction from VCS. Audit team also checked the REC/13/ Mechanism database of India and I-REC/14/ mechanism database found that the project activity is not accredited / registered under REC or I-REC mechanism which was verified from the (Renewable Energy Certificate Registry of India¹⁴ /13/REC)/(International-Renewable Energy Certificate Standard Standard) I-REC¹⁵/14/ website and same was verified by checking in other GHG programs including GS Registry, CDM, GCC, UCR & CR-I, however PP has submitted the declaration/26/ for the same.
- g) The project activity complies with indicators for **sustainable development** in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under **section 1.11 of MR/1/**. Assessment team has verified the same during on site visit/33/ and found all the indicators to be effective and applicable for the project activity.

As per the VCS Standard Version 4.3, projects registered on or after 20-January-2023, must demonstrate contributions to a minimum of three Sustainable Development Goals (SDGs). Projects registered with VERRA before this date must show contributions to three SDGs by 20-January-2025¹⁷, as stated in the Quarter 1 VCS Program Update released on 20-January-2022. This is project's sixth periodic Verification for the Monitoring Period 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates), is registered before 20-January-2023, so the Project Proponent (PP) must demonstrate contributions to at least three SDGs by 20-January-2025. For the current monitoring period, the PP is voluntarily showing contributions to three SDGs, as indicated below:

The project activity has implemented activities that results in 3 SDG Contributions; 7.2, 4.4 & 13.0

1. **7.2 i.e. (Renewable energy share in the total final energy consumption)** As a part of this project activity lifetime, 3,776,517.32 MWh renewable electricity has been supplied to Indian grid that helps to strengthen the renewable energy share in the energy mix. VVB has referred previous verification reports /10/ monitoring report for current monitoring period/1/ & emission reduction sheet/2/ which were cross checked from /daily performance reports/23/&Invoices/25/ submitted to the VVB for current monitoring period thus found the above claimed renewable electricity supplied to Indian grid is correct.

¹² <https://registry.terra.org/app/projectDetail/VCS/1742>

¹³ [CDM: Hydroelectric Project in Kinnaur District in Himachal Pradesh \(unfccc.int\)](#)

¹⁴ <https://www.recregistryindia.nic.in/>

¹⁵ [I-REC Standard - The International REC Standard Foundation \(irecstandard.org\)](#)

2. **13.0 i.e. (Tonnes of greenhouse gas emissions avoided or removed)** Due to installation of this project activity PP has prevented the release of 3,032,920 tCO₂ into the atmosphere. Thus, proving that the project generates eco-friendly, GHG free power which contributes to sustainable development of the region. VVB has referred previous verification reports /10/ monitoring report for current monitoring period/1/ & emission reduction sheet/2/ which were cross checked from /daily performance reports/23/&Invoices/25/ submitted to the VVB for current monitoring period thus found the above claimed renewable electricity supplied to Indian grid is correct.
3. **4.4 i.e., (Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill)** Together with the technology supplier, the Project proponent organized 45 ¹⁶ training during current monitoring period 01-August-2021 to 31-July-2022 (inclusive of both dates). Training related to soft and technical skills specific to Hydro Project. Trainings include project specific training, awareness training & safety trainings like Community based disaster risk reduction for biomedical waste management, Job safety analysis, 10 JSW Critical rules, Environment and waste management, Mechanical Workshop etc.

In view of the information as verified above the VKU assessment team is able to conclude that the project has been implemented as described in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/and MR /1/.

All the above stated information was verified by VKU Certification assessment team during onsite visit/33/ at the project implemented site and also by interviewing the site personnel and by conducting focussed group discussion with them /32/.

There are no potential harmful socio-economic and environmental effects in the project activities. The net impact under environmental pollution category is positive as all necessary abatement measures are adopted and periodically monitored. No potential negative environmental and socio-economic impacts in the project activity. The project activity does not have any major adverse impacts on environment during its construction or operational phase. VVB has assessed the project activity on site and confirms that there were no negative environmental and socio-economic impacts observed during current monitoring period as all necessary measures were found in place which was confirmed during site visit /33/

¹⁶ VKU Assessment Team verified the same during onsite visit and by interviewing the site personnel/30/ PP has also submitted the training records as supporting evidence for the same, the same is recorded by VKU's Assessment Team in a form called as VKU.F46W. Attendance Sheet of Onsite audit/32/

4.2 Safeguards

4.2.1 No Net Harm

The Karcham-Wangtoo hydroelectric project in India had some environmental impacts during the construction phase, but those impacts expected to be limited and temporary. The air and noise environment around the project area was affected during the construction phase due to the plying of trucks and other transport vehicles, and the use of construction machinery, but these effects were sporadic and limited. However, during the operational phase, the vehicular traffic as well as the operation of other equipment were minimized, and there was no expected rise in the existing background levels of air pollutants. The noise levels during construction remained within the standards promulgated by the Occupational Safety and Health Administration (OSHA), and workers exposed to these noise levels are not expected to be adversely affected.

In terms of water environment, the project is expected to release a minimum of 6.8 cumecs of water from the dam at all times in river Satluj during lean season from environmental consideration. Disinfection of water sources is recommended for safe potable water, and total water requirement for domestic use during the construction phase is 0.42 mld, of which 0.34 mld will be generated as domestic wastewater from workers' camps of Karcham and Wangtoo. The river Satluj shall be able to carry the sediments during monsoons, and there is no expected accumulation of silt in the downstream of dam. The intake takes only 521.25 cumecs, and the rest of the water will be released through sluice spillway provided in the dam with crest at El.1778.

In terms of land environment, the accessibility to the area has improved due to road widening, which have led to increased tourism activities generating employment and earnings. Project officials has taken decision to keep all the employees on permanent basis working at the project activity. Soil erosion, erosion intensity, and landslides in the project area are minimized through site-specific engineering measures. The promotion of in-situ moisture conservation and an increase in the productivity of all types of land may be achieved through afforestation. This is a voluntary project activity doesn't contribute to achieving any nationally stated sustainable development priorities.

In terms of biological environment, the direct impacts on wild vegetation per se are considered to be of moderate localized significance and are not likely to have an adverse impact. Fishing is not practiced in the stretch of the river between Karcham and Wangtoo, and hence the impact on fisheries is insignificant. The floral biodiversity is moderate, and it is not expected to degrade since the submergence area is very small and confined to a narrow river stretch.

There are no potential harmful socio-economic and environmental effects in the project activities. The net impact under environmental pollution category is positive as all necessary abatement measures are adopted and periodically monitored. No potential negative environmental and socio-economic impacts in the project activity. The project activity does not have any major adverse impacts on environment during its construction or operational phase. VVB has assessed

the project activity on site and confirms that there were no negative environmental and socio-economic impacts observed during current monitoring period as all necessary measures were found in place which was confirmed during site visit /33/

4.2.2 Local Stakeholder Consultation

The Project is already registered with VCS and VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/; sections 2.2 of MR/1/ describe the Local Stakeholder Consultation Process as in-line with VCS requirement. There were no additional significant objections or comments made by the stakeholders as part of ongoing feedback, and they were completely in favour of establishing these kinds of projects in the area.

Before starting the project activity, the project proponent conducted extensive stakeholder consultation, including identifying the stakeholders and engaging them in various phases and through different media such as focus group discussions, social mapping, and fieldwork. The stakeholders included local individuals from all segments of the community, and the project proponent collaborated with several local NGOs to involve them in the project, address their concerns and suggestions, and implement strategies to resolve any issues. This process is ongoing and takes place throughout the year. In the current monitoring period, the project proponent has engaged with the local stakeholders through various Corporate Social Responsibility (CSR) activities such as the Charkha and Shikhar programs, as identified during onsite visit/33/ and interview and focused group discussions with stakeholder and site personnels/32/ for the same was tabulated in VKU.F46W. Attendance Sheet of Onsite audit/32/ and the people interviewed are mentioned in [Table no 05](#) of this report.

The Charkha program aims to empower local women by providing them with training and employment opportunities in handloom crafting, utilizing traditional techniques to create various items. Women who complete the training can sell their creations through the program and receive certificates for their accomplishments, thus contributing to their economic stability and preserving traditional handloom techniques. In contrast, the Shikhar program focuses on promoting physical fitness and sports among young students, particularly in high altitude boxing academies. The program provides students with fellowships, training, nutrition, medical check-ups, and head coaches to mentor and guide them, with the overall goal of enhancing health and well-being.

Moreover, the project proponent has established a grievance register/29/ at their plant site office, allowing the local community to report complaints and grievances. These grievances are also digitally recorded through an email process, and the company provides the option of receiving letters from the community for suggestions, comments, or complaints. This system facilitates transparent communication between the company and the community, ensuring that grievances are promptly and appropriately addressed.

VVB confirmed the implementation of the CSR activities and the process of grievance resolution mechanism/29/ by conducting personal interview & focussed group discussions/32/ with the

respective in charges for CSR and grievance resolution (refer the Table:02 Local Stakeholder's Interviewed in section 02 of this report).

4.3 AFOLU-Specific Safeguards

As the project comes under the category of NON-AFOLU projects therefore this section does not apply for this verification. Hence Not Applicable.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The project monitoring has been carried in accordance with the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ and the monitoring report/1/. It involves total 4 parameter to be monitored;

1) EG facility, y (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr);

2) TEGy Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.)

3) Cap PJ (Installed capacity of the hydro power plant after the implementation of the project activity)

4) A_{PJ} (Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) according to the monitoring plan and monitoring report/1/.

The parameter EG facility, y value is sourced from Daily performance reports/23/and Invoices/25/, Proper calibrated meters of 0.2s accuracy class installed at site regularly monitor the import and export value which is monthly aggregated in daily performance report & invoices, the parameter TEGy value is sourced from Daily performance reports/23/. Proper calibrated meters of 0.2s accuracy class installed at site regularly monitor the gross generation value which is daily aggregated in daily performance reports/23/, the parameter Cap PJ value is sourced from the commissioning certificates and CEA approval letter for uprating the capacity of Karcham-Wangtoo hydro-electric plant/20/, the parameter A_{PJ} is calculated from measured value obtain by actual surveys conducted at project site. ER sheet/2/ prepared by PP has been reviewed by assessment team thoroughly by cross checking the values of daily performance report and Invoices/25/ submitted by PP and found correct including all the formulae and conversions and aggregations.

The monitoring plan laid in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ is being followed at the site/33/. The assessment team has verified the information flow (from data generation, aggregation, to recording, calculation and reporting for these parameters including the values)

in the MR/1/. The emission reductions are based on the net electricity generated and exported from the project. PP has provided all the sufficient data for current monitoring period. The values of the parameter net electricity generation supplied to the grid by each phase used in deriving the GHG emission reduction could be very well correlated between the data sets and ER spreadsheet/2/ provided by PP. The verification of each monitoring parameter has been discussed later in section 4.5.

The calculation method and formulae used in calculating baseline emission is in compliance to the methodology used i.e., ACM0002 Version 12.1.0 /8/.

According to applicable methodology ACM0002 page 11¹⁷ under section II of Baseline Methodology Procedure with further description under paragraph about Leakage emissions mentions that Leakage emissions (for current monitoring period 01-August-2021 to 31-July-2022, including both the days) potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected. Since project activity is a Hydro power project and no other kind of fossil fuel has been used in the current monitoring period on site thus no leakage emission is considered according to the methodology used.

$$LE_y = 0$$

For Project emissions are considered zero due to non-presence of the reservoir.

The calculation for the same is as follows:

According to the chosen baseline methodology ACM0002 version 12.1.0/8/, for hydro power project activities that result in new reservoirs and hydro power project activities that result in the increase of existing reservoirs, project proponents determine project emissions, as follows:

- a) If the power density (PD) of power plant is greater than 4 W/m² and less than or equal to 10 W/m².

$$\text{Project Emissions (PE}_y\text{)} = (\text{EF}_{\text{RES}} * \text{EG}_y) / 1000$$

Where:

PE_y = Emission from reservoir expressed as tCO₂e/year

EF_{RES} = Default emission factor for emissions from reservoirs, and the default value as per EB23 is 90 Kg CO₂e /MWh.

¹⁷ <https://cdm.unfccc.int/UserManagement/FileStorage/4W1SCKX3EMPO6AYGRJUTD7BQ8IVN0H>

EG_y = Electricity produced by the hydroelectric power project in year y, in MWh

a) If the power density of the project is greater than 10 W/m^2 , $PE_y = 0$

The power density of the project activity is calculated as follows:

$$PD = (Cap_{PJ} - Cap_{BL}) / (A_{PJ} - A_{BL})$$

PD = Power density of the project activity, in W/m^2

Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W).

Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W).

For new hydro power plants, this value is zero. A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2). A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

This project activity being a greenfield project, $Cap_{BL} = 0$ and $A_{BL} = 0$

$$\text{Hence, } PD = (1045 \times 1000 \times 1000) / 553,758 = 1887.10 \text{ W/m}^2$$

Since the power density of the project is greater than 10 W/m^2 , Project Emissions (PE_y) = 0.

$$PE_y = 0 \text{ tCO}_2\text{e}$$

Parameters	Value	Unit of Measurement
Capacity	1045	MW
Running Hours	24	Hours
Reservoir area	553,758	Ha

The above calculation is in line with the methodology/8/ which is also underlined in registered PD/3/ & page no 7 and Page no 08 of ACM0002 methodology thus confirm the same, VKU assessment team hence conclude that PP has used correct formulae and project emissions are calculated correctly which are within the limits as specified by the methodology ACM0002 version 12.1.0 /8/

GHG Calculations:

The calculation of emission reduction has been done in accordance with the applied methodology used i.e., ACM0002 Version 12.1.0 /8/. 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:

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

Where,

BE_y = Baseline Emissions (tCO₂/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)

$EF_{gridCM,y}$ = Baseline Emission Factor (Combined margin CO₂ emission factor for grid)

The project activity being a greenfield project, $EG_{PJ,y} = EG_{facility,y}$ = Net electricity exported to grid by the project activity (MWh/year)

Therefore, the baseline emissions for Year 2021 (from 01-August- 2021 till 31-December-2021)

$$= 1,723,689.06 \text{ MWh} * 0.8031 \text{ tCO}_2/\text{MWh}$$

$$= 1,384,294 \text{ tCO}_2\text{e (Round down Value)}$$

Therefore, the baseline emissions for Year 2022 (from 01-January 2022 till 31-July- 2022)

$$= 2,052,828.26 \text{ MWh} * 0.8031 \text{ tCO}_2/\text{MWh}$$

$$= 1,648,626 \text{ tCO}_2\text{e (Round down Value)}$$

$$\text{The Total baseline Emissions} = 1,384,294 + 1,648,626 = 3,032,920 \text{ tCO}_2\text{e}$$

All of the 4 units were in operation throughout the current monitoring period, and the project activity generated 3,776,517.32 MWh of energy, resulting in 3,032,920 tCO₂e GHG reductions.

The estimated emission reduction for the present monitoring period is 3,185,569 tCO₂e, however the achieved emission reductions are 3,032,920 tCO₂e (round down value), or around 4.79% lower than the estimated emission reductions.

In section 5.4 of MR/1/ calculations has been stated. Which can be further cross checked as compiled in ER/2/ which has been verified by the assessment team from daily performance report/23/ and cross checked from invoices/25/. Plant team prepare the generation schedule on a daily basis. Now after decreasing the auxiliary power consumption & 12.12% free power to Government of Himachal Pradesh (Home state), the balance quantum is divided as per PSA /21/ signed between PTC India & four Indian states i.e. Punjab, UP, Haryana and Rajasthan (invoices/25/ submitted to PP to assessment team for all four Indian stated). Furthermore, the distribution is also carried out on a short-term basis at power exchanges, after fulfilling contractual commitments /41/. The Plant Team sent a schedule to PTC India limited on a daily basis. Plant team prepared the monthly energy sheet on the basis of the Daily Generation Schedule and sent it to the billing department. Now the billing team prepare the invoice/25/ as per Regional Energy Account (REA) issued by the Northern Regional Power Committee (NRPC) site and sent it to PTC for billing. KWHEP has Four Units (261.25 MW each) capacity which generates electricity. It is transferred through four outgoing feeders, Kacham- Jhakri circuit-1 & 2 and Karcham- Wangtoo circuit-1 & Circuit-2. All feeders exclusive to the project activity are

connected to the grid. PP has submitted all the evidences like Daily performance report/23/and Invoices issued to PTC India Ltd/25/ to VVB for verification and assessment of ER Sheet/2/

Hence VVB can state that the calculation method and formulae used in calculating baseline emission is following the methodology used i.e., ACM0002: “Grid-connected electricity generation from renewable sources- version 12.1.0” /8/. Since project activity is a hydro power project, and no other kind of fossil fuel has been used in the current monitoring period on site. Leakage emissions (for current monitoring period 01-August-2021 to 31-July-2022, including both the days) potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected as per methodology (version 12.1.0 /8/ page 11 section II), thus leakage emission have been considered as zero.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

During the verification, all relevant documents were checked to assess the correctness and quality of data submitted by the project proponents, which are used to determine emission reductions.

All records needed for monitoring are archived in line with the requirements of the registered monitoring plan. No significant, lack of evidence and missing data were detected during verification. Hence, the verification team confirms that the monitoring system ensures required quality of the monitoring system to ensure the quality of the monitored data. All internal data are subjected to QA/QC measures.

There is total 4 parameter to be monitored;

- 1) EG facility, y (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr);
- 2) TEGy Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.)
- 3) Cap PJ (Installed capacity of the hydro power plant after the implementation of the project activity)
- 4) APJ (Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) according to the monitoring plan and monitoring report/1/.

The below table describe how the **EG facility, y** (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr); that is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the

monitoring plan, monitoring data has been thoroughly assessed and that the calibration requirements are met: -

Table No: 09 Assessment of Parameter EG_{facility,y} (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr);

Parameter	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr);	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Continuous monitoring and monthly recording for net electricity generation. The electrical power supplied to the grid is measured in megawatt hours (MWh) and determined using the energy meter installed by the State Electricity Board (SEB) at the Pothead yard for both export and import to the Abdullahapur and Jhakri grids. Each grid has two lines that facilitate the transfer of electricity. The actual energy generated is calculated as the difference between the two successive day meter readings, which is then multiplied by a predetermined multiplying factor. This methodology is employed for the preparation of the Daily Performance Report (DPR). The plant team prepares the generation schedule on a daily basis. After Now reducing the auxiliary power consumption and free 12.12% power to the Government of Himachal Pradesh (GoHP), the balance quantum is divided as per PSA /21/ signed between PTC India & four Indian states i.e., DISCOMS e. Punjab, UP, Haryana and Rajasthan (invoices/25/ submitted to PP to assessment team for all four Indian states). Furthermore, the distribution is also carried out on a short-term basis at power exchanges, after fulfilling contractual commitments /41/. the remaining power is allocated in accordance with the Power Sale Agreement (PSA) of the four Indian states, namely Punjab, Uttar Pradesh, Haryana, and Rajasthan with PTC India.

		The electricity generated by the hydro project plant/unit and supplied to the grid is calculated as the net amount. This value is cross-checked with the result obtained by subtracting the auxiliary consumption from the gross generation. Additionally, the net electricity export value is verified by cross-checking with the electricity sales invoices./25/ The VCUs are calculated focusing on the monitoring and energy distribution as per PPA/21/. In ER Sheet/2/ VKU assessment team verified the ER calculation by referring the above auxiliary energy consumption, which was also verified during onsite visit/33/ and interview with site personnels/32/ where VKU assessment team checked all 100% data onsite to minimize any error and hence it is concluded that the value of net generation is continuously monitored and apart from monthly recording for net electricity generation, there is generation schedule records for each day.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ and monitoring methodology/8/. & there is no deviation from the stated procedures in the registered monitoring plan. This was verified by assessment team during desk review and by Team Leader during onsite visit and interviews/32/ with site personnel.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated. However, the quantity of net electricity generation supplied by the project plant/unit to the grid in year y is continuously measured, and recorded by the

		metering system includes a main meter and a back-up check meter of accuracy class 0.2s. All meter data is automatically recorded and is submitted to Northern Region Load Dispatch Centre (NRLDC) on weekly basis. The details of meters and calibration details are provided in APPENDIX 1 of MR/1/.
	Is accuracy of the monitoring equipment is stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes, the accuracy of the monitoring equipment used to measure the input values such as import and export to calculate net electricity generation value is 0.2s which is as per the registered PD/3/ which is as per the norm defined in the PPA/21/.The monitoring equipment used to measure the input values such as import and export is highly accurate with a precision of 0.2s, as per the registered PD/3/ and in accordance with the norms defined in the PPA/21/. Additionally, each meter is capable of displaying various parameters, which can be accessed on-demand and stored for a period of ten (10) days. These parameters include: a. The average frequency for each successive 15-minute block, as a two-digit code ranging from 00 to 99, indicating frequency from 49.0 to 51.0 Hz. b. The net Wh transmittal during each successive 15-minute block, up to the second decimal, with a plus or minus sign. c. The cumulative Wh transmittal at each midnight, in six digits including one decimal. d. The cumulative VARh transmittal at voltages above 103% of the nominal voltage at the interconnection point, at each midnight, in six digits including one decimal. e. The cumulative VARh transmittal at voltages below 97% of the nominal voltage at the interconnection point, at each midnight, in six digits including one decimal. f. The date and time blocks of failure of voltage transformer supply on any phase, indicated by a star (*) mark. which is defined

		as per the registered PD/3/ and as per page no 45 & 46 paragraph 8.2.1 of PPA/21/
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy of monitoring equipment's is valid for the entire range which is per registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/
	Calibration frequency /interval:	The calibration frequency is once in 2 tariff years as per page no 46 paragraph 8.2.2 of PPA/21/ and also outlined in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ is in accordance with the national standards i.e., Clause 18 of Central Electricity Authority (Installation and Operation of Meters)/19 ¹⁸ /.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is once in 2 tariff years as per page no 46 paragraph 8.2.2 of PPA/21/ and also outlined in the registered VCS Project Description version 02 dated 17-April-2018 & registered (CDM PD version 04) dated 28-March-2012/3/ is in accordance with the national standards i.e., Clause 18 of Central Electricity Authority (Installation and Operation of Meters)/19 ¹⁹ /. In the PPA itself the accepted calibration frequency is once in every two years/21/ verified through onsite present field staff/32/, which is in line with VCS Standard version 4.3 /5/ calibrations requirements are as per the registered monitoring plan.
	Is the calibration of measuring equipment	Yes, Calibration certificates /22/ of the measuring equipment's is carried out by

¹⁸ Regulations Notified on 17-March-2006 No. 502/70/CEA/DP&D Amendments Notified on 26-June-2010 No. 502/6/2009/DP&D/D-I

¹⁹ Regulations Notified on 17-March-2006 No. 502/70/CEA/DP&D Amendments Notified on 26-June-2010 No. 502/6/2009/DP&D/D-I

	carried out by an accredited person or institution?	calibrated by Regional Test Laboratory Jalandhar & certified by Power Grid Corporation of India Limited (PGCIL) or replaced by a new and tested meter. All the main meters and check meters are tested by PGCIL (Power Grid Corporation of India Limited) on a periodic basis. In case of any faulty readings observed appropriate corrective action will be taken. If the error is found beyond the permissible limits, the PP will inform the respective agency so as to immediately rectify the error in the instrument, which was confirmed during onsite visit while interviewing/32/ the site personnel at project site/PP/Consultant
	Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibration is valid for the whole reporting period and there are no any delays in the calibration as per registered monitoring plan/3/ and calibration frequency identified in PPA/21/ and as per calibration certificates.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately for current monitoring as per the registered monitoring plan and VCS VVS manual version 3.2/6/& as per page no 46 paragraph 8.2.2 of PPA/21/
	How were the values in the monitoring report verified?	Cumulative value of $EG_{facility,y}$ for entire monitoring period is reported in the monitoring report/1/, and monthly values in the ER calculation sheet/2/. The monthly values were verified from the daily performance report/23/ and cross checked from invoices/25/ thus found to be consistent. Value of this parameter for the current monitoring period was verified as 3,776,517.32 MWh.
	If applicable, has the reported data been cross-	The monthly reported values of $EG_{facility,y}$ were further cross checked with the monthly invoices /25/ raised by the PP to respective

	checked with other available data?	state utility, Daily Performance Report /23/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	On site/33/ personnel interview/32/ with the project stakeholder and site personnels of the project activity confirms that the necessary QA/QC procedures are in place and the data management system is effective and reliable.
	In case project proponents have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL#02, CAR#03 & CAR#05 were raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. The emission reduction calculation for the project activity is estimated based on the electricity supplied by the project. Since 100% data was verified, the team can ascertain that the values taken for emission reduction calculation are free from material errors.	

Second Data & Parameter monitored is as follows:

The below table describe how the parameter 'TEGy Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.), that is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the monitoring plan, monitoring data has been thoroughly assessed and that the calibration requirements are met:-

Table No: 10 Assessment of Parameter TEGy Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y)

Parameter	TEGy Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y)	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Hourly measurement and monthly recording by energy meter. The total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads is in MWh is measured at the Project activity site. (Pothead Yard) For cross check of net generation
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the registered PD/3/ and monitoring methodology/8/. Thus, there is no deviation from the stated procedures in the registered monitoring plan. This was verified by assessment team during desk review and by Team Leader during onsite visit and interviews/32/ with site personnel.
	Monitoring equipment	Monitoring equipment used for continuously measuring, and recording the Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y. includes a main meter and a back-up check meter of accuracy class 0.2s. All meter data is automatically recorded and is submitted to Northern Region Load Dispatch Centre (NRLDC) on weekly basis. The details of meters and calibration details are provided in APPENDIX 1 of MR/1/.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does	Yes, the accuracy of the monitoring equipment used to measure the input values such as import and export to calculate Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.

	the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	is 0.2s which is as per the registered PD/3/ which is as per the norm defined in the PPA/21/. Also, The monitoring equipment used to measure the input values such as import and export is highly accurate with a precision of 0.2s, as per the registered PD/3/ and in accordance with the norms defined in the PPA/21/. Additionally, each meter is capable of displaying various parameters, which can be accessed on-demand and stored for a period of ten (10) days. These parameters include: a. The average frequency for each successive 15-minute block, as a two-digit code ranging from 00 to 99, indicating frequency from 49.0 to 51.0 Hz. b. The net Wh transmittal during each successive 15-minute block, up to the second decimal, with a plus or minus sign. c. The cumulative Wh transmittal at each midnight, in six digits including one decimal. d. The cumulative VArh transmittal at voltages above 103% of the nominal voltage at the interconnection point, at each midnight, in six digits including one decimal. e. The cumulative VArh transmittal at voltages below 97% of the nominal voltage at the interconnection point, at each midnight, in six digits including one decimal. f. The date and time blocks of failure of voltage transformer supply on any phase, indicated by a star (*) mark. which is defined as per the registered PD/3/ and as per page no 45 & 46 paragraph 8.2.1 of PPA/21/
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy of monitoring equipment's is valid for the entire current monitoring period 01-August-2021 to 31-July-2022 (inclusive of both dates) which is per registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/
	Calibration frequency /interval:	The calibration frequency is once in 2 tariff years as per page no 46 paragraph 8.2.2 of

		PPA/21/ and also outlined in the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ is in accordance with the national standards i.e., Clause 18 of Central Electricity Authority (Installation and Operation of Meters)/19 ²⁰ /.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is once in 2 tariff years as per page no 46 paragraph 8.2.2 of PPA/21/ and also outlined in the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ is in accordance with the national standards i.e., Clause 18 of Central Electricity Authority (Installation and Operation of Meters)/19 ²¹ /. In the PPA itself the accepted calibration frequency is once in every two years/21/ verified through onsite present field staff/32/, which is in line with VCS Standard version 4.3 /5/ calibrations requirements are as per the registered monitoring plan.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes, Calibration certificates /22/ of the measuring equipment's is carried out by calibrated by Regional Test Laboratory Jalandhar & certified by Power Grid Corporation of India Limited (PGCIL) or replaced by a new and tested meter. All the main meters and check meters are tested by PGCIL (Power Grid Corporation of India Limited) on a periodic basis. In case of any faulty readings observed appropriate corrective action will be taken. If the error is found beyond the permissible limits, the PP will

²⁰ Regulations Notified on 17-March-2006 No. 502/70/CEA/DP&D Amendments Notified on 26-June-2010 No. 502/6/2009/DP&D/D-I

²¹ Regulations Notified on 17-March-2006 No. 502/70/CEA/DP&D Amendments Notified on 26-June-2010 No. 502/6/2009/DP&D/D-I

		inform the respective agency so as to immediately rectify the error in the instrument, which was confirmed during onsite visit while interviewing/32/ the site personnel at project site/PP/Consultant								
	Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibration is valid for the whole reporting period 01-August-2021 to 31-July-2022 (inclusive of both dates) and there are no any delays in the calibration as per registered monitoring plan/3/ and calibration frequency identified in PPA/21/ and as per calibration certificates /22/								
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately for current monitoring as per the registered monitoring plan and VCS VVS manual version 3.2/6/& as per page no 46 paragraph 8.2.2 of PPA/21/								
	How were the values in the monitoring report verified?	Cumulative value of TEG_y for entire monitoring period 01-August-2021 to 31-July-2022 (inclusive of both dates) is reported in the monitoring report/1/, and monthly values in the ER calculation sheet/2/ in MU. The monthly values were verified from the daily performance report/23/ and cross checked from invoices/25/ thus found to be consistent. Value of this parameter for the current monitoring period was verified as 4,328,244.9 <table><tr><th>Year</th><th>Total Electricity Generation (MWh)</th></tr><tr><td>2021</td><td>1,975,125.87</td></tr><tr><td>2022</td><td>2,353,119.03</td></tr><tr><td>Total</td><td>4,328,244.9</td></tr></table> MWh.	Year	Total Electricity Generation (MWh)	2021	1,975,125.87	2022	2,353,119.03	Total	4,328,244.9
Year	Total Electricity Generation (MWh)									
2021	1,975,125.87									
2022	2,353,119.03									
Total	4,328,244.9									
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of TEG _y were further cross checked with the monthly invoices /25/ raised by the PP to respective								

		state utility, Daily Performance Report /23/ and found to be consistent
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	On site personnel interview/32/ with the project stakeholder of the project activity confirms that the necessary QA/QC procedures are in place and the data management system is effective and reliable.
	In case project proponents have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL#02, CAR#03 & CAR#05 were raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. The emission reduction calculation for the project activity is estimated based on the electricity supplied by the project. Since 100% data was verified, the team can ascertain that the values taken for emission reduction calculation are free from material errors.	

Third Data & Parameter monitored is as follows:

The below table describe how the parameter Cap PJ (Installed capacity of the hydro power plant after the implementation of the project activity) that is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the monitoring plan, monitoring data has been thoroughly assessed.

Table No: 11 Assessment of Parameter Cap PJ (Installed capacity of the hydro power plant after the implementation of the project activity)

Parameter	Cap _{PJ} (Installed capacity of the hydro power plant after the implementation of the project activity)
------------------	--

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The Cap _{PP} was verified through the technical specification sheet /28/ and Commissioning Certificate /22/ of the turbines installed in project activity.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ and monitoring methodology/8/. However there has been a capacity upgradation from 1000 MW to 1045 MW. PP obtained approval from the Ministry of Power's Central Electricity Authority (CEA)/20/ to <u>deviate</u> from the project's original capacity. The retrofit activities were approved in two stages, with the initial upgrade increasing capacity to 1,045 MW, the first phase of the trial run/24/ commenced in July 2021, and electricity generation commenced in August 2021. For subsequent monitoring periods, the project's electricity reports will reflect the 1,045 MW capacity since no new units were added, and the retrofit activities are classified as a project design deviation. In evaluating additionality, the sensitivity parameter specified in the registered PDD/3/ is being applied.
	Monitoring equipment	Not applicable since project capacity was confirmed from technical specification sheet /28/ and Commissioning Certificate /22/ of the turbines installed in project activity.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does	Not applicable to this parameter, as no monitoring equipment is put to use, project capacity was confirmed from technical specification sheet /28/ and Commissioning Certificate /22/ of the turbines installed in project activity.

	the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable to this parameter
	Calibration frequency /interval:	Not applicable to this parameter
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Not applicable to this parameter
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable to this parameter
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable to this parameter
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable to this parameter

	How were the values in the monitoring report verified?	Cumulative value of Cap_{PJ} for entire monitoring period is reported in the monitoring report/1/. The values were verified from the Commissioning Certificate /22/ issued by Power Grid Corporation Limited and found to be consistent. Value of this parameter for the current monitoring period was verified as $261.25 \times 4 \times 10^6$ W.
	If applicable, has the reported data been cross-checked with other available data?	The Cap_{PJ} was be verified through the technical specification sheet /28/ and Commissioning Certificate /27/ of the turbines installed in project activity and for capacity upgradation approval letter obtained by PP from the Ministry of Power's Central Electricity Authority (CEA)/20/ also Assessment team confirmed the capacity from the name plates during site visit/33/ and by interviewing the site personnel/32/
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	However, for this parameter relevant supporting documents have been submitted by PP to VKU /20/22/24/28. On site personnel interview/28/ with the project stakeholder of the project activity confirms that the necessary QA/QC procedures that are in place and the data management system is effective and reliable.
	In case project proponents have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CAR#05 was raised and resolved	

Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. The emission reduction calculation for the project activity is estimated based on the electricity supplied by the project. Since 100% data was verified, the team can ascertain that the values taken for emission reduction calculation are free from material errors.
-------------------	--

Fourth Data & Parameter monitored is as follows:

The below table describe how the parameter A_{PJ} (Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) according to the monitoring plan and monitoring report/1/that is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the monitoring plan, monitoring data has been thoroughly assessed:

Table No: 12 Assessment of Parameter A_{PJ} (Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) according to the monitoring plan and monitoring report/1/.

Parameter	A_{PJ} (Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) according to the monitoring plan and monitoring report/1/.	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Measured by actual surveys conducted at project site As the reservoir provides only the diurnal storage, the area considered is for the condition when the reservoir is full. There are no seasonal fluctuations in the reservoir. Yes. The reporting frequency is in line with the monitoring plan as outlined in the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ and monitoring methodology/9/. Thus, there is no deviation from the stated procedures in the registered monitoring plan. This was

		verified by assessment team during desk review and by Team Leader during onsite visit and interviews with site personnel/32/.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated. Topographic Survey is done to calculate this parameter. The parameter is calculated using stream profile and valley cross sections
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	No monitoring equipment is used as this parameter is calculated by doing Topographic Survey, calculated using stream profile and valley cross sections
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	No monitoring equipment is used as this parameter is calculated which is per registered PD/3/
	Calibration frequency /interval:	No monitoring equipment is used as this parameter is calculated so calibration is not required.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	No monitoring equipment is used as this parameter is calculated so calibration is not required.

	Is the calibration of measuring equipment carried out by an accredited person or institution?	No monitoring equipment is used as this parameter is calculated so calibration is not required.
	Is(are) calibration(s) valid for the whole reporting period?	No monitoring equipment is used as this parameter is calculated so calibration is not required.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	No monitoring equipment is used as this parameter is calculated so calibration is not required.
	How were the values in the monitoring report verified?	Cumulative value of A_{PJ} for entire monitoring period is reported in the monitoring report/1/. Value of this parameter for the current monitoring period was verified as 553,758 as in October 2022.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensure correct transfer of data and reporting of emission reductions & Necessary QA-QC procedures required are As per IS 5477 (Part 1): 1999 (reaffirmed 2004) – Fixing the capacities of reservoirs – Methods – Part I – General Requirements (1st revision)
	In case project proponents have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by	No such issues.

	Appendix 1 to the CDM Project Standard?	
Findings	CAR#05 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. The emission reduction calculation for the project activity is estimated based on the electricity supplied by the project. Since 100% data was verified, the team can ascertain that the values taken for emission reduction calculation are free from material errors.	

Table No: 13 Data and Parameters Available at Validation or Ex-ante parameters:

Parameter	Unit	Description	Value
$EF_{grid,OM,y}$	tCO ₂ /MWh ²²	Operating Margin CO ₂ Emission Factor in year y	1.0086 tCO ₂ /MWh is consistent with the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ Referred from <u>CO₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority Version 4.0/18/</u>
$EF_{grid,BM,y}$	tCO ₂ /MWh	Build Margin CO ₂ Emission Factor in year y	0.5977 tCO ₂ /MWh is consistent with the registered VCS Project

²² (A unit conversion has been performed to convert GWh to MWh)

			Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ Referred from <u>CO₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority Version 4.0/18/</u>
EF_{grid,CM,y}	tCO ₂ /MWh	Combined Margin CO ₂ Emission Factor in year y	0.8031 tCO ₂ /MWh is consistent with the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/
A_{BL}	m ²	Area of the reservoir (m ²) measured in the surface of the water, before the implementation of the project activity, when the reservoir is full.	0, For new reservoirs, this value is zero, is consistent with the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/
Cap_{BL}	W	Installed capacity of the hydro power plant before the implementation of the project activity.	0, For new hydro power plants, this value is zero, is consistent with the registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/

Calibration of meters/22/:

During the verification assessment of the project activity, accuracy of all the metering have been checked and found appropriate. The installation and working conditions of the meters were checked during the site inspection and were found to be satisfactory. Details of meters are provided in below table:

Table No: 14 Calibration details of Feeder meters: The calibration details of meters installed by Power Grid for measurement of net electricity export are as below. There are six feeder lines

involved for the electricity export. Considering the two years calibration frequency, there is no delay in calibration for current monitoring period.

Sr No	Location	Type	Serial Number	Make	Accuracy Class	Previous Calibration date	Calibration date	Due date of calibration
1	Feeder-1	Main	NP8526A	L & T	0.2s	29-November-2018	08-November-2020	07-November-2022
2	Feeder-2	Main	NP8530A	L & T	0.2s	29-November-2018	08-November-2020	07-November-2022
3	Feeder-3	Main	NP8528A ²³	L & T	0.2s	29-November-2018	08-November-2020	07-November-2022
4	Feeder-3	Main	WR2178A ²⁴	L & T	0.2s	-	15-February-2022	14-February-2024
5	Feeder-4	Main	NP8529A	L & T	0.2s	29-November-2018	08-November-2020	07-November-2022
6	Feeder-5	Main	NP8527A	L & T	0.2s	29-November-2018	08-November-2020	07-November-2022
7	Feeder-6	Main	NP8546A	L & T	0.2s	29-November-2018	08-November-2020	07-November-2022
8	Feeder-1	Check	NP8400A	L & T	0.2s	30-November-2018	09-November-2020	08-November-2022

²³ This Meter has been changed on 15/02/2022 (provided in serial no. 4 of Meter Installed by Power Grid), meter is calibrated and valid till 14/02/2024. Hence Meter serial no. is changed from NP8528A to WR2178A with meter make L&T, Model ER300P.

²⁴ The details provided for feeder 3 main meter is replaced on 15/02/2022 and new meter serial number is WR2178A.

9	Feeder-2	Check	NP8401A	L & T	0.2s	30-November-2018	09-November-2020	08-November-2022
10	Feeder-3	Check	NP8402A	L & T	0.2s	30-November-2018	09-November-2020	08-November-2022
11	Feeder-4	Check	NP8403A	L & T	0.2s	30-November-2018	09-November-2020	08-November-2022
12	Feeder-5	Check	NP8548A	L & T	0.2s	30-November-2018	09-November-2020	08-November-2022
13	Feeder-6	Check	NP8547A	L & T	0.2s	30-November-2018	09-November-2020	08-November-2022

Table No: 15 Meter installed for Units at 15.75kV side (to monitor Total Generation)

Serial No.	Unit No.	Type (Main/Check)	Serial No.	Make	Accuracy class	Current Calibration Date	Next Calibration Due Date
1	Unit-1	Main	LT0175B	L & T	0.2s	10-November-2020	09-November-2022
2		Check	LT0176B	L & T	0.2s	10-November-2020	09-November-2022
3	Unit-2	Main	LT0177B	L & T	0.2s	10-November-2020	09-November-2022
4		Check	LT0178B	L & T	0.2s	10-November-2020	09-November-2022
5	Unit-3	Main	LT0179B	L & T	0.2s	10-November-2020	09-November-2022
6		Check	LT0180B	L & T	0.2s	10-November-2020	09-November-2022

7	Unit-4	Main	LT0181B	L & T	0.2s	10-November-2020	09-November-2022
8		Check	LT0182B	L & T	0.2s	10-November-2020	09-November-2022

As the calibration frequency of the meter is once in two years (as per PPA/21), the calibration reports are valid during the current monitoring period and there is no delay in the calibration. This is verified by assessment team from the calibration certificates/22/ submitted by the PP

The energy meter calibration certificates/22/ are checked and found that the calibration details provided in the MR /1/ are correct. From the verification of above table, verification team also confirms that the energy meter calibrations are valid for the complete monitoring period i.e., from 01-August-2021 to 31-July-2022, including both the start and end dates.

During onsite visit /33/ the verification team checked all the meters and confirmed that the meters were working satisfactorily. Also, the calibration of meters is completely under purview of Regional Test Laboratory Jalandhar & certified by Power Grid Corporation of India Limited (PGCIL) and PP has no control over the same as confirmed through interviews of site personnel /32/ and PPA signed by the PP with Power Trading Corporation Limited (PTC India) /21/.

Hence it can be concluded that the approach followed by the PP is conservative and in line with the guidelines provided under paragraph 3.4.2 of VVS version 3.2./5/

The registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/ & MR /1/ and site audit observations confirm that the metering equipment are sealed and maintained by the state utility & Power Grid Corporation of India Limited (PGCIL).

The company has installed meters of a static type, in accordance with the latest IEC-687/IEC-62053-22 and Indian Electricity Grid Code Regulations. Each circuit of outgoing transmission lines have a set of main and check meters to record frequency quantities of active and reactive energy for energy exported to and imported from the grid during settlement periods. The company keeps one spare set of tested, calibrated and sealed meters. All meters are sealed in the presence of the Central Transmission Utility (Project State Utility) and the Company, with the seal remaining intact unless broken for testing and calibration by a testing laboratory. Measuring instrument accuracy class requirements are 0.2% for Wh measurement of meters, 2% for KVARh measurement of meters, and 0.5% for current and voltage transformers. The company performs test and calibrate all meters and associated circuits at least once every two tariff years or when the difference between the readings of the main meter and corresponding check meter exceeds 0.4%. The company bears the cost of testing and calibration and provide seven days' notice for authorized representatives of other parties to witness the testing and calibration.

While interviewing the site personnels/32/ the operational & maintenance team it was noted that If the Main Meter is within the permissible limit of error but the corresponding Check Meter

is not, the Monthly bill will be based on the Main Meter reading. If the Main Meter is not within the permissible limit of error but the corresponding Check Meter is, the bill will be based on the Check Meter reading until the Main Meter is repaired or replaced. If both meters are not within the permissible limit of error, they will be replaced with a tested and calibrated meter. The project activity has not experienced any meter inaccuracies during the current monitoring period. If during any testing and calibration, a Main Meter and corresponding Check meter are both found to be beyond zero-point two percent (0.2%) permissible limit of error, either both the Meters or at least the Main meter shall be replaced forthwith with a spare tested calibrated meter. However, during the current verification and onsite visit/33/ of the it was noted that project activity does not involve any such inaccuracy of meters during current monitoring period. Only there has been a meter replacement has been done on 15-February-2022 (provided in Table no: 14 of Serial no. 4 of Meter Installed by Power Grid), meter is calibrated and valid till 14-February-2024. Hence Meter serial no. is changed from NP8528A to WR2178A with meter make L&T, Model ER300P.

The assessment team has verified the monthly Daily Performance Report/23/ prepared by plant team as per Regional Energy Account (REA) & issued by the Northern Regional Power Committee (NRPC) site & Invoices/25/issued to respective state Discoms by PP confirmed that only the data recorded through main meters is used to calculate net electricity supplied to the grid consequently for ER calculations recorded in ER sheet /2/

In view of the above discussion the VKU assessment team is able to confirm that evidence used to determine the GHG reductions and removals are sufficient and appropriate with respect to quality and quantity.

GHG Calculations:

The emission reduction as per the applied methodology equals the baseline emissions (project emissions and leakage emissions for such project activities is considered zero). The formula provided for the calculation of baseline emissions is:

$$BE_y = EG_{\text{facility},y} * EF_{\text{grid,CM},yr}$$

Where:

BE_y : Baseline emissions in year y (tCO₂e/yr)

$EG_{\text{facility},y}$: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh/yr)

$EF_{\text{grid,CM},y}$: Combined margin CO₂emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂e/MWh)

The project activity being a greenfield project, $EG_{PJ,y} = EG_{\text{facility}}$ = Net electricity exported to grid by the project activity (MWh/year)

Parameter	Unit	Value
EG _{facility, y}	MWh	3,776,517.32
EF _{grid, CM, y}	tCO ₂ e	0.8031
BE _y	=	3,776,517.32 * 0.8031
	=	3,032,920 (Round down value)

The verification team attests to the correctness of the formulas and methodologies used to compute baseline emissions. The applied default values, emission factors, and assumptions in the calculations are all reasonable.

The assumptions, emission factors and default values that were applied in the calculations are justified. The actual emission reduction achieved during the current monitoring period are 4.79% lower than the estimated ERs in the registered PDD/3/. We as VVB accepted this as this is mainly due to the variations in water flow which is mainly dependent rainfall and other parameters including grid availability – these factors are not in the control of project proponent.

The lower generation during the current verification period is hence due to certain natural conditions and hence acceptable as per registered VCS Project Description version 02 & registered (CDM PD version 04) dated 28-March-2012/3/

Furthermore, the additionality of the project is unaffected by lower generation of 4.79% from the estimated value in registered CDM PDD/3/. Hence the 4.79% actual lower emission reduction achieved during the current monitoring period neither affects additionality nor there is any deviation from the registered monitoring plan, which was verified by the VVB during onsite visit.

The electricity produced by a hydroelectric plant relies on the amount of water passing through it, and changes in water availability can have an impact on its output. The supply of water may be influenced by factors like drought or changes in rainfall patterns, which can, in turn, affect the amount of electricity generated. The fluctuation in the water flow, which is primarily dependent on rainfall and other factors such as grid availability, is not under the control of the project proponent. Hence, it is acceptable to the VVB.

All the data were made available to the assessment team by PP during site visit/33/ and as supporting evidences which have been monitored as per required monitoring frequency. The means of verification for the values of parameters, used for baseline emission calculation, is described above.

VKU is of the opinion that this method of calculation of emission reductions is accurate and results in conservative estimation of emission reduction and is in line with the applicable VCS requirements.

4.6 Non-Permanence Risk Analysis

There is no non-permanence risk that could lead to material errors, omissions or misstatements rating determined by the project proponent for the project activity and no risk was identified in the audit/verification plan hence not applicable.

5 VERIFICATION CONCLUSION

VKU Certification Pvt. Ltd. has performed the 6th verification of the fixed crediting period (01-January-2013 to 31-December-2022 which is inclusive of both dates) reported for the project activity “Hydroelectric Project in Kinnaur District in Himachal Pradesh” in India, VCS Registry Project ID 1742, for the monitoring period 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates), with regard to the relevant requirements for VCS activities.

The project proponents of the “Hydroelectric Project in Kinnaur District in Himachal Pradesh” project is responsible for:

- a) The preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the monitoring plan contained in the registered VCS PD version 2.0 of 17-April-2018 & CDM PDD version 04 dated 28-March-2012 /3/
- b) The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project.

It is the responsibility of VKU to express an independent verification opinion about the project’s conformity with the requirements of VCS Standard version 4.3/5/ and GHG program applied, on the reported greenhouse gas emission reductions from the project.

Based on documented evidence and corroborated by an on-site assessment, VKU can confirm that:

- The project has been implemented and operated as per the VCS PD version 2.0 of 17-April-2018 & CDM PDD version 04 dated 28-March-2012 /3/
- The monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS Standard version 4.3/5/ requirements;
- The monitoring is in place as per the applied baseline and monitoring methodology;
- The monitoring plan in the registered VCS PD version 2.0 of 17-April-2018 & CDM PDD version 04 dated 28-March-2012 /3/ is as per the applied baseline and monitoring methodology.

VKU 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. VKU Certification

planned and performed the verification by obtaining evidence and other information and explanations that VKU Certification considered necessary to give **reasonable assurance** that reported GHG emission reductions are fairly stated.

It is VKU's opinion that the GHG emission reduction stated in the monitoring report version 03 of 17-March-2023 for the "Hydroelectric Project in Kinnaur District in Himachal Pradesh" in India for the period 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates) are fairly stated. The GHG emission reductions are calculated on the basis of approved methodology ACM0002 version 12.1.0/8/ and the monitoring plan included in the registered VCS PD version 2.0 of 17-April-2018 & CDM PDD version 04 dated 28-March-2012 /3/

Hence VKU is able to certify that the emission reduction from the project during the monitoring period 01-August-2021 to 31-July-2022 (Inclusive of both start and end dates) amounts to 3,452,502 tCO₂e.

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

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
For Year 2021 01-August-2021 to 31-December-2021	1,384,294	0	0	1,384,294
For Year 2022 01-January-2022 to 31-July-2022	1,648,626	0	0	1,648,626
Total	3,032,920	0	0	3,032,920

APPENDIX A: ABBREVIATIONS

Abbreviations	Full texts
BE	Baseline Emissions
HPSEB	Himachal Pradesh State Electricity Board
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EF	Emission Factor
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
NRLDC	Northern Regional Load Dispatch Centre
NRPC	Northern Regional Power Committee

ODA	Official Development Assistance
PDD	Project Design Document
PD	Power Density
PE	Project Emission
PGCIL	Power Grid Corporation of India Limited)
PP(s)	Project Proponent(s)
PPA	Power Purchase Agreement
PSA	Power Sale Agreement
PTC	Power Trading Corporation of India Limited
Ref.	Document Reference
SLDC	State Load Dispatch Centre
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VCU	Verified Carbon Unit
VKU	VKU Certification Ltd.
VVS	Validation and Verification Standard
VVB	Validation and verification body

APPENDIX B: AUDIT FINDINGS

CAR: Corrective Action Request: 05

CL: Clarification Request: 02

FAR: Forward Action Request: 00

Type	Date	15-December-2022
CL#01	Reference	Section: 01/DR/OSV Section: 02/DR/OSV
Description of the Non-Conformance		
In section 1.10 of MR: PP is requested to mention in the MR that if this project has applied under REC mechanism, as it was not mentioned in PD and which is as per guidance to fill MR, If Yes then provide details, If No then provide justification in the MR. In section 1.10 of MR: Assessment team was not able to trace the undertaking in the documents submitted by the PP to the VVB. In section 1.11 of MR: As identified during onsite visit about the social wellbeing activities implemented at site; PP to incorporate about the decision to keep all the employees on permanent basis working at the project activity. In section 1.11 of MR: PP to justify if they are applying for sustainable development contributions. In section 2.2 of MR: PP is requested to elaborate on the CSR activities undertaken by the PP; As identified on site visit PP to incorporate and elaborate about the activities Charkha and Shikhar that support women empowerment and children welfare in the project located region In section 2.2 of MR: PP to update about the method of recording grievance at site and also submit evidences for the same.		
1 st Response from PP	Date	30-January-2023
- Information added to section 1.10 of revised MR. - Undertaking is being provided - Social wellbeing activities are carried at the site and on a regular intervals temporary employees are converted to permanent employment. Contract employees are eligible to avail almost all the facilities that are being availed by the permanent ones. - PP is applying for sustainable contributions and taking benefits of SDG, 4.1, 7.2 and 13. Explanation added to section 1.11 of the revised MR. - The PP has been actively involved in a number of CSR initiatives, including the Charkha and Shikhar programs. The Charkha program is designed to empower women by providing them with training and employment opportunities in the field of handloom crafting. The Shikhar program promotes sports and physical activity among kids in the community by providing training and resources. Detailed explanation has been provided in Section 2.2 of MR - Section 2.2 has been update and the grievance log book has been submitted to VVB.		
1 st Assessment by Audit Team	Status	Open
	Date	01-March-2023
For section 1.10 of MR: Assessment Team confirms that PP has mentioned in the MR that this project has not applied under REC mechanism, as it was not mentioned in PD and which is as per guidance to fill MR. For section 1.10 of MR: Assessment team was not able to trace the undertaking in the documents submitted by the PP to the VVB. [OPEN]		

3. **For section 1.11 of MR:** Assessment Team confirms that as identified during onsite visit about the social wellbeing activities implemented at site; PP has enlisted the SDGs achieved in section 1.11 of MR

4. **For section 1.11 of MR:** PP has justified if they are applying for sustainable development contributions.

5. **For section 2.2 of MR:** PP has elaborated the CSR activities undertaken by the PP; As identified on site visit PP has included and elaborated about the activities Charkha and Shikhar that support women empowerment and children welfare in the project located region

6. **For section 2.2 of MR:** PP has updated about the method of recording grievance at site and has also submitted evidences for the same

CL#01 Open

2ndResponse from PP			Date	17/03/2023
2. Undertaking letter has now been submitted to the assessment team for reference.				
2ndAssessment by Audit Team	Status	Closed	Date	20-March-2023

2. **For section 1.10 of MR:** Assessment team verified the undertaking in the documents submitted by the PP to the VVB stating that PP will not claim & have not claimed any GHG credits under UNFCCC CDM or any other GHG mechanism during the current monitoring period

Hence CL#01 closed

Type	Date	15-December-2022
CL#02	Reference	Section 03/DR/OSV Section: 04/DR/OSV Section: ER SHEET/DR/OSV
Description of the Non Conformance		
1. In section 3.2 of MR: Assessment Team was not able to trace any shut down in the MR version 01 dated 08-11-2022, PP is requested to add the same in the appendix below in this particular report. 2. In section 3.2 of MR: In order to define the transparency of project deviations as described in this part, PP is required to provide the dates for the Monitoring period, the crediting period number, and the number of periodic verifications during which the deviation was requested and approved. PP to include a reference for the verification report mentioned here. 3. In section 4.2 of MR: PP to Specify the measurement methods and procedures, any standards or protocols to be followed, and the person/entity responsible for the measurement. Include any relevant information regarding the accuracy of the measurements (e.g., accuracy associated with meter equipment or laboratory tests). 4. In section 4.2 of MR: PP is requested to show us evidence that contain the values of gross generation and auxiliary consumption like log book records or some other primary documents. 5. In section 4.2 of MR: PP is requested to submit the Daily Performance Report? for current monitoring period as mentioned. 6. In ER SHEET: PP is requested to explain why the ER Sheet is already commented and not revised before submitting to the VVB for assessment.		

1st Response from PP		Date	30-January-2023
1. Shutdown details has been now attached in Appendix 02 of MR. 2. Reference of the verification report has been provided in MR and verification number is mentioned in the MR. Please note that project activity is of fixed crediting period. Monitoring references are added in section 1.6 of the revised MR. 3. Responsible team mentioned in the revised section 4.3 of MR. Recording frequencies by the meter along with meter details is being mentioned in section 4.3 of revised MR. All the meters are tested by Regional Test Laboratory Jalandhar & certified by PGCIL (Power Grid Corporation of India Limited) 4. Daily Performance Report (DPR) contains the gross generation and total energy exported. So, auxiliary consumption is calculated by subtracting the energy exported with gross generation and detailed calculation is shown in ER sheet. The DPR is the primary data source and the cross check can be done via billing invoices. 5. Daily Performance Report is provided to VVB. 6. Correction has been done and the revised ER sheet is submitted to VVB.			
1stAssessment by Audit Team	Status	Date	01-March-2023
1. For section 3.2 of MR: Assessment Team confirms that PP has added the shutdown details in the MR, PP has also added the same in the appendix below in this particular report. 2. For section 3.2 of MR: Assessment Team confirms that PP has provided the dates for the Monitoring period, the crediting period number, and the number of periodic verifications during which the deviation was requested and approved. 3. For section 4.2 of MR: Assessment Team confirms that PP has specified the measurement methods and procedures, any standards or protocols to be followed, and the person/entity responsible for the measurement. PP has also incorporated meter related details. 4. For section 4.2 of MR: PP has submitted relevant invoices and DPRs to show us evidence that contain the values of gross generation and auxiliary consumption 5. For section 4.2 of MR: PP has submitted the Daily Performance Report for current monitoring period as mentioned. 6. For ER SHEET: PP has corrected the required changes in ER Sheet. Hence CL#02 Closed			

Type	Date	15-December-2022
CAR#01	Reference	Section 01/DR/OSV
Description of the Non Conformance		
1. In Section 1.1 of MR: The font used in the footnotes is not as per VCS guideline to fill MR version 4.1 2. In Section 1.1 of MR: PP is requested to revise/correct the plant capacity, since the capacity defined in the project description is not consistent with plant capacity on site which was found during the onsite visit. 3. In Section 1.1 of MR: PP to incorporate the commissioning details of all the turbines installed at project site. As the PP has submitted the Commissioning certificates of all the four units to the VVB which was also verified during onsite visit. So PP to include them all. 4. In Section 1.3 & 1.4 of MR: PP is requested to explain why the rows of the table are extended to extreme ends of the monitoring report.		

5. In Section 1.5 of MR: PP to ensure that proper gaps are maintained while writing a report.					
1 st Response from PP			Date	30-January-2023	
1. Font used in Footnotes is now aligned with VCS template guidelines 2. Plant capacity is now revised in Section 1.1 of MR and also CEA approval certificate has been submitted to VVB as evidence. The deviation along with justification has been added. 3. PP has included commissioning dates of all the turbines in Section 1.1 of MR. 4. Correction has been made in table and now it is aligned. 5. Report is now aligned with proper format.					
1 st Assessment Team	by Audit Team	Status	Open	Date	01-March-2023
1. For Section 1.1 of MR: The font used in the footnotes is not as per VCS guideline to fill MR version 4.1[OPEN] 2. For Section 1.1 of MR: PP has revised/corrected the plant capacity, since the capacity defined in the project description is revised and upgraded from 1000 MW to 1045 MW of capacity which was found during the onsite visit. Assessment Team hence confirms that PP has taken a deviation regarding the same and has updated the MR 3. For Section 1.1 of MR: Assessment Team confirms that PP has incorporated the commissioning details of all the turbines installed at project site. Also, the PP has submitted the Commissioning certificates of all the four units to the VVB which was also verified during onsite visit. 4. For Section 1.3 & 1.4 of MR: PP has made the editorial corrections in the MR. 5. For Section 1.5 of MR: PP has ensured that proper gaps are maintained and relevant editorial corrections are made. Hence CAR#01 open					
2 nd Response from PP			Date	17-March-2023	
1. Font size used in the footnotes are now as per the VCS guidelines MR version 4.1.					
2 nd Assessment Team	by Audit Team	Status	Closed	Date	20-March-2023
For Section 1.1 of MR: PP has now made font used in footnotes consistent with VCS guideline to fill MR version 4.1, hence acceptable to VKU. Therefore CAR#01 is closed					

Type	Date	15-December-2022
CAR#02	Reference	Section 01/DR/OSV Section: 02/DR/OSV Section: 03/DR/OSV
Description of the Non Conformance		
- In Section 1.6 of MR: PP is requested to specify the number of crediting period. - In section 1.10 of MR: PP to revise the font used in the footnotes and make it consistent with the VCS guidelines to fill MR - In section 1.11 of MR: PP to mention about the free electricity share with Himachal Pradesh government from the net electricity supplied to the grid. - In section (Sustainable Development Contribution Table) of MR: PP is requested to update this section as per project activity. This section does not contain information		

regarding the project activity as implemented. PP to ensure that the MR is filled properly; as this section has not been edited as per Project information.						
5. In section (Sustainable Development Contribution Table) of MR: PP to submit Evidence of the project's SD contributions as appendices to this report required as per guidelines to fill VCS MR Template version 4.1						
6. In section 2.1 of MR: PP is requested to avoid the discussion of other projects of the PP in the description of this project i.e. VCS_1742						
7. In section 2.1 of MR: PP to submit the EIA report that is referred here						
8. In section 3.1 of MR: PP is requested to include information about the operation of the project activity(s) during this monitoring period, including any information on events that may impact the GHG emission reductions or removals and monitoring crucially required as per guidelines to fill VCS MR template version 4.1						
9. In section 3.2 of MR: In order to define the transparency of project deviations as described in this part, PP is required to provide the dates for the Monitoring period, the crediting period number, and the number of periodic verifications during which the deviation was requested and approved. PP to include a reference for the verification report mentioned here.						
1 st Response from PP				Date	30-January-2023	
1. Fixed Crediting period is taken and the same has been mentioned in Section 1.6 of MR.						
2. Fonts in footnotes is now corrected and aligned with MR guidelines.						
3. PP is providing 12.1295% of free energy to state and same has been mentioned in MR and ER.						
4. Section 1.11 is now updated as per the project SDG contributions.						
5. All the evidence for SDG 7.2 (Invoice, Detailed performance report), for SDG 4.4(training records) and for SDG 13(Detailed ER calculation) has been submitted to VVB.						
6. It has been removed and corrected.						
7. EIA report attached.						
8. For the current monitoring period, plant is running continuously and no such events occurred that impact the GHG emissions reduction or removals. Scheduled Shutdown has been taken for maintenance purpose only and detail of the same is attached in Appendix 02 of MR.						
9. Monitoring Period number and reference of the MR in which deviation has been approved is provided in footnote of Section 3.2 of MR.						
1 st Assessment by Audit		Status	Open	Date	01-March-2023	
Team						
1. For Section 1.6 of MR: PP has specified the number of crediting period.						
2. For section 1.10 of MR: PP to revise the font used in the footnotes and make it consistent with the VCS guidelines to fill MR [OPEN]						
3. For section 1.11 of MR: PP has mentioned about the free electricity share with Himachal Pradesh government from the net electricity supplied to the grid.						
4. For section (Sustainable Development Contribution Table) of MR: PP has updated this section as per project activity.						
5. For section (Sustainable Development Contribution Table) of MR: PP has submitted the evidences of the project's SD contributions as appendices to this report required as per guidelines to fill VCS MR Template version 4.1						
6. For section 2.1 of MR: PP has made relevant corrections as verified by the Verification Team						
7. For section 2.1 of MR: PP has submitted the EIA report to the VVB						
8. For section 3.1 of MR: PP has included the information about the operation of the project activity(s) during this monitoring period, including any information on events that may impact the GHG emission reductions or removals and monitoring crucially required as per guidelines to fill VCS MR template version 4.1 but PP to provide brief description						

about the implementation of project activity. PP to include information about the type of project and process of generation of energy through this project. [OPEN]

9. For section 3.2 of MR: PP has mentioned about the Monitoring Period number and reference of the MR in which deviation has been approved is provided in footnote of Section 3.2 of MR.

Hence CAR#02 Open

2 nd Response from PP	Date	17-March-2023		
2. Fonts used in the footnotes are now updated as per the VCS guidelines to fill MR. 8. The brief description about the implementation of the project activity has been incorporated in the MR along with the information about the type of project and process of generation of energy through project.				
2 nd Assessment by Audit Team	Status	Closed	Date	20-March-2023

1. For section 1.10 of MR: PP has revised the font used in the footnotes and made consistent with the VCS guidelines to fill MR, which is acceptable as per VCS guidelines.

8 For section 3.1 of MR: PP has included the information about the operation of the project activity(s) during this monitoring period, including any information on events that may impact the GHG emission reductions or removals and monitoring crucially required as per guidelines to fill VCS MR template version 4.1 & now PP ha provided detailed information about the implementation of project activity.

Therefore CAR#02 is closed.

Type	Date	15-December-2022
CAR#03	Reference	Section 04/DR
Description of the Non Conformance		
1. In section 4.1 of MR: PP is requested to mention the unit mentioned in the registered PD version 02. PP to incorporate the unit in which the calculation for estimating VCUs is done to maintain transparency w.r.t to registered PD 2. In section 4.2 of MR: PP is requested to define the source of data in the section as prescribed in VCS MR version 4.1 3. In section 4.2 of MR: PP is requested to correct the accuracy class. As the meters found on site was of higher accuracy. PP to update the same. 4. In section 4.2 of MR: PP to provide reference for the calibration frequency selected 5. In section 4.2 of MR: PP is requested to show us evidence that contain the values of gross generation and auxiliary consumption like log book records or some other primary documents. PP to also mention about the distribution share of electricity as per invoices. Also incorporate the same in the ER Sheet while calculating the VCUs 6. In section 4.3 of MR: The procedures used for handling any internal auditing performed and any non-conformities identified. • QA/QC procedures • PP to mention about the monitoring system SCADA present at site that ensures seamless monitoring of the Hydro plant. • Mention about the SLD submitted to the VVB 7. In section 4.3 of MR: PP to correct the owner of the project activity as the statement is contradictory with the deviation mentioned in section 3.2 of MR 8. In section 4.3 of MR: PP to mention details about the meter replacement during current monitoring period. 9. In section 4.3 of MR: PP to please expand the shortform. 10. In section 4.3 of MR: PP is requested to provide the name of the testing agency.		

1 st Response from PP			Date	30-January-2023	
1. Typo error was there in registered PD and same is now corrected in Section 4.1 of MR. 2. Data source section are now been defined in section 4.2 of MR. 3. Accuracy Class is now has been corrected in MR 4. As per the clause 8.2.2.2 of PPA the meters shall be tested and calibrated in accordance with the provisions set out in the connection agreement and IEGC atleast once in 2 years. (page no. 46 of PPA).Also, the monitoring procedure is under control of state electricity board. The meters are calibrated once in every 2 years and faulty meters will be duly replaced immediately. The meter accuracy class and calibration interval are under purview of state electricity board and PP do not have any control on it. 5. Daily Performance Report has been provided to VVB in which gross generation, net energy exported, free electricity supplied to State Electricity board is mentioned. Detailed Calculation has been done in ER sheet which is provided to VVB. 6. • QA/QC procedures has been added to the section 4.3 of revised MR. • Information of SCADA is being added. • Brief SLD is being added. 7. Owner name has been corrected in Section 4.3 of MR. 8. This Meter has been changed on 15/02/2022 (provided in serial no. 4 of Meter Installed by Power Grid), meter is calibrated and valid till 14/02/2024. Hence Meter serial no. is changed from NP8528A to WR2178A with meter make L&T, Model ER300P. 9. Shortform is now expanded. 10. Regional Test Laboratory Jalandhar is responsible for doing the calibration of meters.					
1 st Assessment by Audit		Status	Open	Date	01-March-2023
Team					
1. In section 4.1 of MR: PP to explain if it's a typo error then why the GHG calculation for ER is done in GWh, however the Chosen meth for the project doesn't allow the same [OPEN] 2. In section 4.2 of MR: PP is requested to explain that the source of data in PD version 04 of CDM dated 28/03/2012 says "Measured at Project activity site. (Pothead Yard) " PP to justify the source and also mention about the methods of measurement below [OPEN] 3. In section 4.2 of MR: Assessment Team confirms that PP has corrected the accuracy class. 4. In section 4.2 of MR: Assessment Team confirms that PP has provided reference for the calibration frequency selected 5. In section 4.2 of MR: PP has submitted the evidence that contain the values of gross generation and auxiliary consumption & PP has also mentioned about the distribution share of electricity as per invoices, he same was also incorporated in the ER Sheet while calculating the VCUs 6. In section 4.3 of MR: Assessment Team confirms that PP has mentioned/Updated the MR with • QA/QC procedures • The procedures used for handling any internal auditing performed and any non-conformities identified • SCADA present at site that ensures seamless monitoring of the Hydro plant. • Mention about the SLD submitted to the VVB But PP to include PP has not incorporated Energy measurement procedure followed at site and how Invoices issued to state utility is issued. Pp has also not mentioned about the process about how the DPRs are prepared. [OPEN]					

7. **In section 4.3 of MR:** Assessment Team confirms that PP has corrected the owner of the project activity as the mentioned in section 3.2 of MR

8. **In section 4.3 of MR:** Assessment Team confirms that PP has mentioned details about the meter replacement during current monitoring period.

9. **In section 4.3 of MR:** Assessment Team confirms that PP has expanded the shortform.

10. **In section 4.3 of MR:** Assessment Team confirms that PP provided/mentioned about the name of the testing agency.

Hence CAR#03 Open

2 nd Response from PP			Date	17-March-2023	
1. The ER sheet calculations for the current monitoring period, as well as those accepted in the previous verification, are presented in MWh. Also, the conversion of GWh to MWh does not result in any inconsistencies in the calculations. It is simply a unit conversion that has been performed and does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. 2. The source of data has been explained and incorporated along with the source and the methods of measurement in the MR section 4.2 as Meters are installed at the Pothead yard for export/import to Abdullahapur grid and Jhakri grid. There are two lines for each grid through which the electricity is exported / imported. Energy Measurement procedure has now been incorporated in monitoring plan along with the process about how DPRs are prepared as for calculating the daily energy measurement, a manual reading of the energy meter is taken at 24:00 hours and subtracted from the previous day's meter reading. This calculation method is also utilized in the preparation of the DPR.					
2 nd Assessment by Audit Team		Status	Closed	Date	20-March-2023
1. In section 4.1 of MR: PP has explain that the conversion of GWh to MWh does not result in any inconsistencies in the calculations. It is simply a unit conversion that has been performed and does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. This is acceptable 2. In section 4.2 of MR: PP has explained and incorporated source of data along with the methods of measurement in the MR section 4.2 as Meters are installed at the Pothead yard for export/import to Abdullahapur grid and Jhakri grid. There are two lines for each grid through which the electricity is exported / imported. 6 In Section 4.3 of MR: Assessment Team confirms that the PP has incorporated Energy measurement procedure followed at site in detail.					

Hence CAR#03 is closed

Type	Date	15-December-2022
CAR#04	Reference	Section 05/DR/OSV Section: ER Sheet/DR/OSV
Description of the Non Conformance		
1. In section 5.1 of MR: PP to provide weblink for the mentioned reference to maintain transparency. In section 5.3 of MR: Sufficient Elaboration for the justification mentioned here for the Leakage is required, PP to please specify the clause of methodology referred here of ACM0002		

2. In section 5.4 of MR: PP to provide sufficient justification of the potential causes for the difference in actual versus estimated GHG ERRs. PP is requested to provide information that could possibly lead to the substantial difference between the ex-ante and ex-post GHG ERR. 3. In Appendix (Meter Calibration Details): The date of calibration for FEEDER NUMBER: 02/04/05/06 is found to be inconsistent with the calibration certificate submitted by the PP. 4. In Appendix (Meter Calibration Details): As found on site visit PP is requested to also add the new meter details along with its date of calibration and due date of calibration and submit the evidence/Meter replacement certificate to VVB for verification. 5. In ER SHEET: PP is requested to enter the formula correctly throughout the ER Summary Sheet. 6. In ER SHEET: PP is requested to specify the source of data entered in Monthly Generation sheet i.e. DPRs & Invoice to justify the conservative approach of the PP while calculating VCUs 7. IN ER SHEET: For (EG facility,y Total Electricity Exported (MWh)) As per RMP this value is obtained by subtracting Auxiliary consumption from gross generation. PP is requested to enter the values of gross generation and auxiliary consumption and then show the final calculation 8. IN ER SHEET: PP is requested to mention the net electricity value recorded in both invoice and DPRs to justify the conservative approach taken by the PP while calculating VCUs; Also 9. In ER SHEET: 10. PP is requested to explain how the VVB can do the assessment of net metered generated electricity with (Invoices prepared for quantity of electricity exported and sold) PP to upadte the ER sheet as per the Registered PD version 02 dated 28/03/2012, page number 51 11. IN ER SHEET: PP to mention date and Version of ER SHEET	
1st Response from PP	30-January-2023
1. PP has now provided weblink for transparency. 2. Clause of meth is now mentioned in MR. The actual VER is 14.37% lower than estimated VCUs which is mainly due to the variations in water flow which is mainly dependent rainfall and other parameters including grid availability – these factors are not in the control of project proponent. Detailed elaboration is provided in Section 5.4 of MR. 3. Date of Meter Calibration is corrected in MR as per the provided calibration certificate. 4. New meter details with its date of calibration and due date of calibration has now been added in the MR. 5. All the formulas mentioned in ER sheet is now corrected. 6. All the values mentioned in ER Sheet is taken from daily performance report and Invoice provided and as a conservative approach net generation is taken from the Invoice or DPR which is lower. 7. Calculation has been corrected in ER sheet and Auxiliary consumption is obtained by subtracting gross generation with total energy exported. 8. PP has now mentioned net electricity from DPRs and Invoice in ER sheet and as a conservative approach lower value obtained among the two is taken for calculating VCUs. 9. All the calculation is now properly explained in ER Sheet and supporting document for cross verification has been provided to VVB. 10. Date and Version of ER is now mentioned in ER Sheet. 11. Now Incorporated in the ER sheet.	

1 st Assessment by Audit Team	Status	Closed	Date	01-March-2023
For section 5.1 of MR: Assessment team confirms that PP has provided weblink for the mentioned in this section. For section 5.3 of MR: Assessment team confirms that PP has provided Sufficient Elaboration for the justification for the Leakage is required, PP has specified the clause of methodology referred here of ACM0002 For section 5.4 of MR: Assessment team confirms that PP has provided sufficient justification of the potential causes for the difference in actual versus estimated GHG ERRs. In Appendix (Meter Calibration Details): Assessment team confirms that the date of calibration for FEEDER NUMBER: 02/04/05/06 is now corrected by the PP. For Appendix (Meter Calibration Details): Assessment team confirms that as found on site visit PP has updated the new meter details along with its date of calibration and due date of calibration and submit the evidence/Meter replacement certificate to VVB for verification. For ER SHEET: Assessment team confirms that PP has made corrections while entering the formula correctly throughout the ER Summary Sheet. For ER SHEET: Assessment team confirms that PP has specified the source of data entered in Monthly Generation sheet i.e. DPRs & Invoice to justify the conservative approach of the PP while calculating VCUs For ER SHEET: For (EG facility,y Total Electricity Exported (MWh)) As per RMP this value is obtained by subtracting Auxiliary consumption from gross generation. PP has entered the values of gross generation and auxiliary consumption and then show the final calculation. PP has updated this section. For ER SHEET: PP has mentioned the net electricity value recorded in both invoice and DPRs to justify the conservative approach taken by the PP while calculating VCUs; Also For ER SHEET: PP has made relevant changes in ER SHEET For ER Sheet: PP updated the date and Version of ER SHEET for V02 of MR & ER Hence CAR#04 closed				

Type	Date	01-March-2023
CAR#05	Reference	Section 01/DR/OSV Section 02/DR/OSV Section 03/DR/OSV Section 04/DR/OSV Section 05/DR/OSV Section: ER Sheet/DR/OSV
Description of the Non Conformance		
In Section 1.1 of MR: PP is requested to specify about the capacity of the plant when plant got commissioned and then about the upgradation of the capacity of the plant. Please clarify the capacities when commissioned. In Section 1.3 of MR: As the PP change took place from HBPCL to JSW Hydro Limited and during previous verifications Registration representation was submitted to the Verra, PP is thus requested to mention about the same in footnote in this MR, so as to maintain transparency regarding the PP change. In Section 1.6 of MR: Inclusive of both dates		

4. **In section 1.7 of MR:** PP is requested to correct the geocoordinates as the already mentioned geocoordinates doesn't pinpoint the project implemented site
5. **In section 1.8 of MR** PP to add weblink for the specific methodology referred in the project PD
6. **In Section 1.10 of MR:** PP is requested to mention the registration reference number of CDM for this project
 - a. PP to mention till which date CERs in CDM were issued
 - b. PP to also declare that no double counting of GHG emission reductions will be done for the current monitoring period.
7. **In Section 1.11 of MR: PP to clarify**
 - a. Increase or generate/supply?
 - b. Increase or avoid?
 - c. Specify the MP
8. **In section 2.1 of MR:** PP to justify if the no net harm/ EIA assessment defined in this section is implemented to yet to be implemented since the sentence signify future tense. PP to modify statements as per project implementation
9. **In section 3.1 of MR:** PP to
 - a. Mention breakdown hours
 - b. Inclusive of both dates?
10. **In section 3.2 of MR:** PP is requested to properly define the deviation requested in previous verification and the ones requested in this verification
11. **In section 4.2 of MR:** Since this Hydro plant is not new anymore it's been more than ten years since the date of commissioning of the UNIT I Turbine. PP to justify the same
 - a. PP to re-modify the statements as per registered PD and specify the measurement methods
 - b. PP to mention about the deviation requested with regard to the increased capacity also cross reference the section 3.2 of MR
 - c. PP to submit evidences
 - d. PP to mention if this data is applicable for this Monitoring period
12. **In section 4.3 of MR:** PP to specify if the owner is HBPCL or JSW Hydro?
 - a. PP to justify if the monitoring has taken place or yet to take place
13. **In section Appendix 01 of MR:** PP to mention that the details provided are of the replaced meter
14. **In section Appendix 02 of MR:** PP to mention that the details provided are of the replaced meter
15. **In ER Sheet:** Since in CDM PDD version 04 dated 28/03/2012 the baseline calculation is done in GWh, how come here in ER sheet the calculation is shown in MWh. Since the project is following ACM0002 methodology that clearly states on Page 08 in baseline emissions that "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)" also Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh) PP is thus requested to explain the above inconsistency in calculation of baseline for the project.
16. **In ER Sheet:** PP to justify this estimated value for ER since this monitoring period falls under 01-08-2021 to 31-07-2022 and the estimated value for ER in CDM PDD version 04 dated 28/03/2012 from date 2020-21 is calculated as 3,541,917 tCO₂e & for period (2021-22 (April 2022 to July 2022) is calculated as 2,475,793tCO₂e, So how can estimated calculation is done without keeping this in reference also explain the further calculation of ER achieved vs estimated

17. In ER Sheet: Why the section is blackened, if not applicable please clarify

1 st Response from PP	Date	17/_March-2023
1. The capacity of the plant when the plant got commissioned is now incorporated and the upgradation of the capacity of the plant is include in section 1.1 along with incorporation in footnote no. 2 of the monitoring report. 2. As the PP change took place from HBPCCL to JSW Hydro Limited and during previous verifications Registration representation was submitted to the Verra, same has been incorporated in the footnote no. 3. And certificate of incorporation pursuant to change of name has been submitted to the assessment team. 3. Now incorporated in section 1.6 of MR. 4. Geocoordinates are now revised and location of the Karcham & Wangtoo HEP has been updated in the monitoring report to ensure more accurate detection also added in the deviation 3 in section 3.2.2 of MR. 5. Web link has now been added in section 1.8 of MR. 6. a) Now incorporated in the MR section 1.10 as CERs have been issued till 31/03/2013. b) no double counting of GHG emission reductions has been done for the current monitoring period and no double accounting declaration has been submitted to the assessment team. 7. a) It has now been corrected in section 1.11 of Monitoring report. b) It has now been corrected in section 1.11 of Monitoring report. c) It has now been corrected and MP has been specified in section 1.11 of Monitoring report. 8. Statements are now modified in present tense in section 2.1 of MR. 9. a) Total Breakdown hours are now incorporated in the MR in section 3.1 of MR. b) Inclusive of both dates has been added in section 3.1 MR. 10. It has now been properly defined in section 3.2.2 of the deviation requested in previous verification and the ones requested in this verification. 11. a. Statement has been modified as per the registered PD and measurement methods are specified in section 4.2 of MR. b. Deviation has been incorporated regarding increased capacity of the HEP in section 3.2.2 of MR. c. Evidence has been submitted to the assessment team. d. The data is applicable for the current monitoring period and same has been incorporated in the MR section 4.2. 12. The current owner of the project is JSW hydro. a. An internal audit carried out every year to ensure that the monitoring parameters are being monitored on sampling basis in accordance with Section 4.2 of monitoring report. 13. The details of the replaced meter are now provided in appendix 1 of the MR. 14. The details of the replaced meter are now provided in the MR in appendix 1. 15. The ER sheet calculations for the current monitoring period, as well as those accepted in the previous verification, are presented in MWh. Therefore, the conversion of GWh to MWh does not result in any inconsistencies in the calculations. It is simply a unit conversion that has been performed and does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. 16. The estimated value for ER in CDM PDD version 04 dated 28/03/2012 from date 2020-21 is calculated as 3,541,917 tCO₂e & for period 2021-22 (April 2022 to July 2022) is		

calculated as 2,475,793tCO₂e, therefore ER estimation has now been updated in the ER sheet as well as in the monitoring report.

17. The ER sheet has been revised, and the previously marked blackened section has been considered as zero as there is no electricity exported for respective months.

1stAssessment	by	Audit	Status	Closed	Date	20-March-2023
Team						
1. In Section 1.1 of MR: PP has specified about the capacity of the plant when plant got commissioned and then about the upgradation of the capacity of the plant. 2. In Section 1.3 of MR: PP mentioned about the change of ownership from HBPL to JSW Hydro Limited during previous verifications Registration representation submitted to the Verra. 3. In Section 1.6 of MR: PP has mentioned that the crediting period dates are Inclusive 4. In section 1.7 of MR: PP has corrected the geocoordinates of the project implemented site. 5. In section 1.8 of MR PP has add weblink for the specific methodology referred in the project PD. 6. In Section 1.10 of MR: • PP has now mentioned till which date CERs in CDM were issued • PP has declared that no double counting of GHG emission reductions is done for the current monitoring period. 7. In Section 1.11 of MR: PP clarified • Increase or generate renewable electricity share • Increase or avoid greenhouse gases • Has also specified the MP 8. In section 2.1 of MR: PP has justified the no net harm/ EIA assessment defined in this section along with modifications in the statements. 9. In section 3.1 of MR: PP to • Mention breakdown hours • Inclusive of both dates? 10. In section 3.2 of MR: PP has now properly defined the deviation requested in previous verification and the ones requested in this verification. 11. In section 4.2 of MR: • PP has re-modified the statements as per registered PD and specify the measurement methods • PP has mentioned about the deviation requested with regard to the increased capacity & has also cross referenced the section 3.2 of MR • PP has submitted relevant evidences • PP to mentioned that the data is applicable for the current monitoring period and same has been incorporated in the MR section 4.2. 12. In section 4.3 of MR: • PP has specified that the owner is JSW Hydro in the organizational chart. • PP has justified that the An internal audit carried out every year to ensure that the monitoring parameters are being monitored on sampling basis in accordance with Section 4.2 of monitoring report 13. In section Appendix 01 of MR: PP has mentioned that the details provided in Appendix 01 are of the replaced meter 14. In section Appendix 02 of MR: PP has mentioned that the details provided are of the replaced meter, assessment team thus confirms the same. 15. In ER Sheet: Assessment team confirms that in the ER sheet calculations for the current monitoring period, as well as those accepted in the previous verification, are presented in MWh. Therefore, the conversion of GWh to MWh does not result in any						

inconsistencies in the calculations. It is simply a unit conversion that has been performed and does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

16. **In ER Sheet:** PP has justified that the estimated value for ER in CDM PDD version 04 dated 28/03/2012 from date 2020-21 is calculated as 3,541,917 tCO₂e & for period 2021-22 (April 2022 to July 2022) is calculated as 2,475,793tCO₂e, therefore ER estimation has now been updated as 3,185,569 in the ER sheet as well as in the monitoring report
17. **In ER Sheet:** Assessment team confirms that the previously marked blackened section has been considered as zero as there is no electricity exported for respective months.
18. **In Section 1.1 of MR:** The processes involved in the measurement and monitoring of energy generation is not mentioned in this section as per MR guidance.
19. **In Section 2.2 of MR:** PP is requested to follow the instructions to fill this section as per MR guidance document., eg dates of announcements, periods during which comments were sought, Describe the process for, and the outcomes from, ongoing communication with local stakeholders conducted prior to verification **[OPEN]**
20. **In Section 3.1 of MR:** In table about features of hydro plant PP to use notation of numbers as per internationally recognised convention viz., comma after '000s digit **[OPEN]**
21. **In section 4.3 of MR:** Please use proper terms to mention the difference in energy readings between two successive days **[OPEN]**
22. **In section 4.3 of MR:** How is ER calculations performed if the dates of monitoring period and dates as per invoices are not in alignment? What is the basis of measurement in this scenario? **[OPEN]**
23. **In section 5.3 of MR:** As per methodology emissions due to upstream emissions from fossil fuel use and power plant construction are neglected. It is not stated that it is negligible. Please justify & correct. **[OPEN]**

Hence CAR#05 is open

2 nd Response from PP		Date	30-March-2023
18. The processes involved in the measurement and monitoring of energy generation is now mentioned in section 1.1 of MR. 19. During the current monitoring period, there were comments/suggestions logged by the local stakeholders mentioned in below table and there were no comments logged by the local stakeholder's prior verification. The grievance register copy is shared with VVB for the current monitoring period. Same has been incorporated in section 2.2 of MR. 20. table about features of hydro plant has been revised as per the internationally recognized convention. 21. Proper terms have now been mentioned in section 4.3 of MR. 22. As per the current measurement scenario is concerned, monitoring period is aligned with the invoice date therefore no apportioning procedure is required, if in future cases the dates of monitoring period and dates as per invoices are not in alignment we will proceed with the deviation in further verifications. 23. According to applicable methodology ACM0002 page 11²⁵, leakage emissions are neglected and same has now been revised in the section 5.3 of MR.			
2 nd Assessment by Audit Team	Status	Closed	Date
			30-March-2023

²⁵ <https://cdm.unfccc.int/UserManagement/FileStorage/4W1SCKX3EMPO6AYGRJUTD7BQ8IVN0H>

18. In Section 1.1 of MR: The processes involved in the measurement and monitoring of energy generation has been mentioned in this section by PP as per MR guidance.
19. In Section 2.2 of MR: PP has described the process for, and the outcomes from, ongoing communication with local stakeholders conducted prior to verification
20. In Section 3.1 of MR: PP has revised the table about features of hydro plant as per the internationally recognized convention.
21. In section 4.3 of MR: PP has revised proper terms in section 4.3 of MR
22. In section 4.3 of MR: PP mentions that if monitoring period is aligned with the invoice date therefore no apportioning procedure is required, if in future cases the dates of monitoring period and dates as per invoices are not in alignment otherwise the deviation in further verifications will be requested, thus acceptable to assessment team.
23. In section 5.3 of MR: PP has revised the section 5.3 about justification required for leakage emissions w.r.t methodology ACM0002 page 11²⁶ The PP has provided reference for the same, which was verified by the assessment team and hence acceptable.

Hence CAR#05 is now closed

Type	Date	DD/MM/YYY
FAR	Reference	Section Of VER Protoco
Description of the Non-Conformance		
7		
1 st Response from PP	Date	DD/MM/YYYY
1 st Assessment by Audit Team	Status	Open/Closed
	Date	DD/MM/YYYY
2 nd Response from PP	Date	DD/MM/YYYY
2 nd Assessment by Audit Team	Status	Open/Closed
	Date	DD/MM/YYYY

²⁶ <https://cdm.unfccc.int/UserManagement/FileStorage/4W1SCKX3EMPO6AYGRJUTD7BQ8IVNOH>

APPENDIX C: COMPETENCE STATEMENTS

Team Leader



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Vivek Kumar Ahirwar
Nationality	Indian
Countries of Experience	India, Madagascar, Thailand, Indonesia, Bangladesh, Nepal, Ghana, Uganda, Kenya etc
Education Qualification	B.E. (Mechanical Engineering) M. Tech (Energy Management)
Year of Experience	12 Years +
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	TA 1.1 - Thermal energy generation TA 1.2 - Renewables TA 2.1 - Energy Distribution TA 3.1 - Energy Demand

Roles

Project Trainee	NO
Validator/Verifier Trainee	NO
Validator	YES
Verifier	YES
Team Leader	YES
Technical Reviewer	YES
Local Expert (Country Wise)	YES
TA Expert (1.1, 1.2, 2.1, 3.1)	YES
Financial Expert	YES

Reviewed by	Vandana Gupta (Quality Manager)	Date	28/02/2023
Approved by	Dr. Vikas Kumar Aharwal (Director)	Date	04/03/2023

Validator/Verifier-Trainee



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Niharika Kaushik
Nationality	Indian
Countries of Experience	India
Education Qualification	B.Sc. (Zoology Honours) M.Sc. (Environmental Sciences)
Year of Experience	2.5+ Years
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	NA

Roles

Project Trainee	NO
Validator/Verifier Trainee	YES
Validator	NO
Verifier	NO
Team Leader	NO
Technical Reviewer	NO
Local Expert	NO
TA Expert (X.X)	NO
Financial Expert	NO

Reviewed by	Vandana Gupta (Quality Manager)	Date	02.02.2023
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	02.02.2023

Project Trainee



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Anil Dhankar
Nationality	Indian
Countries of Experience	India
Education Qualification	B.Sc. (BCZ) M.Sc. (Environmental Science)
Year of Experience	NA, Fresher
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	NA

Roles

Project Trainee	YES
Validator/Verifier Trainee	NO
Validator	NO
Verifier	NO
Team Leader	NO
Technical Reviewer	NO
Local Expert (Country Wise)	NO
TA Expert (X.X)	NO
Financial Expert	NO

Reviewed by	Vandana Gupta (Quality Manager)	Date	06/12/2022
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	06/12/2022

Technical Reviewer



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Sanjay Kumar K
Nationality	Indian
Countries of Experience	India
Education Qualification	B.E. (Civil Engineering) M. Tech (Environmental Engineering)
Year of Experience	20 Years +
Area of Expertise	Climate Change & Environment Sustainable Development GHG Footprints
Eligible Sectoral Scope	TA 1.2 - Renewables TA 3.1 - Energy Demand TA 6.1 - Construction

Roles

Project Trainee	NO
Validator/Verifier Trainee	NO
Validator	YES
Verifier	YES
Team Leader	YES
Technical Reviewer	YES
Local Expert (Country Wise)	YES
TA Expert (1.2, 3.1, 6.1)	YES
Financial Expert	YES

Reviewed by	Vandana Gupta (Quality Manager)	Date	03.03.2023
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	03.03.2023