HYDROELECTRIC PROJECT IN KINNAUR DISTRICT IN HIMACHAL PRADESH

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Project Title	Hydroelectric Project in Kinnaur District in Himachal Pradesh
Version	02.1
Report ID	Internal project ID:3118

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Client	Himachal Baspa Power Company Ltd.
Pages	26
Date of Issue	08/05/2018
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Summary:

Verification purpose: The project activity is 1000 MW run of the river hydro power plant harnessing the potential of river Sutlej executed by Jaypee Karcham Hydro Corporation Limited (JKHCL). The project activity is located between Karcham and Wangtoo in Kinnaur district of Himachal Pradesh. The project comprises 4 X 250 MW units in an underground power house for the generation of clean electricity. The generated electricity is fed into NEWNE grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

The project was initially implemented by Jaypee Karcham Hydro Corporation Limited (JKHCL) by the promoter group Jaiprakash Industries Limited (formally Jaiprakash Associated Limited). Afterwards Jaypee Karcham Hydro Corporation Limited was merged to newly formed Jaiprakash Power Ventures Ltd (JPVL). Further, 01/09/2015 onwards, the Himachal Baspa Power Company Ltd. (HBPCL) has owned the power plant and thus new owner is acting as project proponent for the proposed project activity.

The project is registered with UNFCCC under Clean Development Mechanism program (CDM) with Registration reference number 4993[1]. The start date of the project activity is the earliest date of commissioning of the 1st 250 MW plant unit (unit-1) involved in the project activity i.e. on 26/05/2011. The fixed crediting period is chosen from 01/01/2013 to 31/12/2022. The monitoring period for this VCS verification is chosen from 01/09/2015 to 31/12/2017 (including both days) and the project activity achieved 7,985,332 tCO_2e emission reductions during this monitoring period.

Validation purpose: The project activity is 1000 MW run of the river hydro power plant harnessing the potential of river Sutlej. The project is registered under CDM mechanism (reference number: 4993). The present validation (gap validation) is under VCS mechanism and assessment of clause 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template. The same is in line with Para 3.11.10 of VCS standard.

A risk based approach has been followed to perform this verification activity. In the course of VCS GAP Validation & Verification, 05 Corrective Action request (CAR), 00 Clarification Requests (CLs) and

[1] http://cdm.unfccc.int/Projects/DB/RWTUV1310469729.49/view

successfully closed. No FAR was raised during this verification The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided *LGAI Technological Center S.A. (Applus+ Certification)* with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (hereafter referred as *Applus+ Certification)* has been appointed by "Himachal Baspa Power Company Ltd." to perform the VCS GAP Validation & 1st periodic VCS verification of the "Hydroelectric Project in Kinnaur District in Himachal Pradesh" under VCS standard and guideline version 3.7. The objective of this verification activity is to have an independent third party for the assessment of the project design, Monitoring report and Final Verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002 - Version 12.1.0"
- the project's monitoring plan is assessed against "ACM0002 - Version 12.1.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM validation and verification standard for project activities Version 01.0
- CDM project standard for project activities Version 01.0
- CDM project cycle procedure for project activities Version 01.0
- VCS standard v3.7
- VCS guideline v3.7

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified emission reductions (VERs).

1.2 Scope and Criteria

The scope of the verification is the independent and objective review of the VCS PD (for Gap Validation) & MR (for VCS Verification). The VCS PD & MR is reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM validation and verification standard for project activities Version 01.0, CDM PDD Version 04 dated 28/03/2012 and Final CDM Validation report version 02 dated 12/04/2012, CDM project standard for project activities Version 01.0, CDM project cycle procedure for project activities Version 01.0 and VCS guideline and standard version 3.7

The assessment team has employed a risk based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the VCS PD & MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of

VERs. The VCS GAP Validation & Verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring report combined.

The only purpose of the VCS GAP Validation & Verification is its usage during the issuance process as part of the VCS project cycle. Therefore, Applus+ Certification can't be held liable by any party for decisions made or not made based on the VCS GAP Validation & Verification opinion, which will go beyond that purpose.

1.3 Level of Assurance

The VCS GAP Validation & Verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for site visit or document verifications. The entire documents have been checked to arrive at positive verification conclusions.

1.4 Summary Description of the Project

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

Verification purpose: The project activity is 1000 MW run of the river hydro power plant harnessing the potential of river Sutlej executed by Jaypee Karcham Hydro Corporation Limited (JKHCL) & after 01/09/2015 onwards, owned by Himachal Baspa Power Company Ltd. (HBPCL). The project activity is located between Karcham and Wangtoo in Kinnaur district of Himachal Pradesh. The project comprises 4 X 250 MW units in an underground power house for the generation of clean electricity. The generated electricity is fed into NEWNE grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

The project is registered with UNFCCC under Clean Development Mechanism program (CDM) with Registration reference number 4993[2]. The start date of the project activity is the earliest date of commissioning of the 1st 250 MW plant unit (unit-1) involved in the project activity i.e. on 26/05/2011. The fixed crediting period is chosen from 01/01/2013 to 31/12/2022. The CDM verification is undergoing till 31/08/2015 as per UNFCCC web site and PP will ensure that there will not be any double accounting of emission reductions in different program for same monitoring period. PP wants to claim emission reductions from 01/09/2015 onwards under VCS program.

Thus the monitoring period for this VCS verification is chosen from 01/09/2015 to 31/12/2017 (including both days) and the project activity achieved 7,985,332 tCO_2e emission reductions during this monitoring period.

Validation purpose: The project activity is 1000 MW run of the river hydro power plant harnessing the potential of river Sutlej. The project is registered under CDM mechanism (reference number: 4993). The

[2] http://cdm.unfccc.int/Projects/DB/RWTUV1310469729.49/view

present validation (gap validation) is under VCS mechanism and assessment of clause 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template. The same is in line with Para 3.11.10 of VCS standard.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Gap Validation & Verification Scope: The scope is defined as an independent and objective review of the VCS PD & Monitoring report (MR) prepared as per the CDM registered PDD and registered approved methodology ACM0002 - Version 12.1.0. The VCS PD & MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology ACM0002 - Version 12.1.0. The verification was based on the requirements in the CDM validation and verification standard for project activities Version 01.0, CDM project standard for project activities Version 01.0, CDM project cycle procedure for project activities Version 01.0 and VCS guideline and standard version 3.7.

The Gap Validation & verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the VCS PD & MR.

Gap Validation & Verification Process: The project assessment is based on the CDM validation and verification standard for project activities Version 01.0 and VCS standard and guideline version 3.7 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

1. A desk review of the VCS PD & Monitoring report against the registered CDM PDD and final CDM validation report;

2. Follow-up interviews with project participant;

3. The resolution of outstanding issues and the issuance of the final verification report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. Applus+ Certification has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria.

Appointment of the assessment team

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in Applus+ Certification. The composition of assessment team has to be approved by the Applus+ Certification ensuring that the required skills are covered by the team. The four qualification levels for team members that are assigned by formal appointment rules as below:

- Leader Auditor (LA)
- Auditor (A)
- Technical Experts (E)
- Technical Review (TR)

It is required that the sectoral scope / technical area related to the methodology has to be covered by the assessment team.

The detail regarding the assessment team is provided below in this report as Appendix 3

Document review

The Monitoring report submitted by the Client was reviewed against the approved methodology, CDM registered PDD and Final CDM Validation report and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1

Follow-up interviews

A site visit is conducted by Applus+ Certification performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report in Section 2.3.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the Gap Validation & Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification's positive conclusion on the VCS PD & Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final VCS PD Version 02 dated 17/04/2018 & MR Version 2 submitted by PP on 17/04//2018 serves as the basis for the final assessment presented. Additional changes to the project during the Gap Validation & Verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a Gap Validation & Verification of the final documentation including the verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the PP the positive verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform

2.2 Document Review

The details of the document observed during the verification process are listed below in Appendix 1 of this report

2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Bera	Rajarshi	Sr. Tech. Manager	12/04/2018	Implementation of the project, monitoring & calibration of monitoring meters, JMR	Dr. Atul Takarkhede
2.	Patil	Ramkrishna	Consultant	12/04/2018	Emission reduction calculations	Dr. Atul Takarkhede

2.4 Site Inspections

Duration of on-site inspection: 12/04/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring. Assessment team also checked that whether the monitoring plan as described in the CDM PDD is actually practised onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity.	Kinnaur, HP	12/04/2018	Dr. Atul Takarkhede

2.5 Resolution of Findings

The objective of this phase of the Gap validation & Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues from validation which need to be clarified for Applus+ Certification's positive conclusion on the VCS PD & Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during

communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final VCS PD Version 02 dated 17/04/2018 & MR Version 2 submitted by PP on 17/04//2018 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	01	00
Description of project activity	00	02	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Project boundary	00	00	00
- Establishment and description of baseline scenario	00	00	00
- Demonstration of additionality	00	00	00
- Emission reductions	00	02	00
-Calibration details	00	00	00
- Monitoring plan	00	00	00
Others (please specify)	00	00	00
Total	**00**	**05**	**00**

The list of findings and there resolution is presented in Appendix 2 of this report.

2.5.1 Forward Action Requests

This is Gap Validation & 1st VCS verification of the project activity and no FAR rose from CDM validation and previous CDM verifications.

2.6 Eligibility for Validation Activities

The project is eligible for Gap validation as per section 3.11.10 of VCS standard version 3.7.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Project has been registration with UNFCCC under Clean Development Mechanism program, Registration reference number is 4993[3]. In-line with the clause **3.11.10** of VCS standard DOE has carried out gap validation as below:

Project Details:

[3] https://cdm.unfccc.int/Projects/DB/RWTUV1310469729.49/view

The project activity is 1000 MW run of the river hydro power plant harnessing the potential of river Sutlej executed by Jaypee Karcham Hydro Corporation Limited (JKHCL). Further, 01/09/2015 onwards, the Himachal Baspa Power Company Ltd. (HBPCL) has owned the power plant and thus new owner is acting as project proponent for the proposed project activity. The project activity is located between Karcham and Wangtoo in Kinnaur district of Himachal Pradesh. The project comprises 4 X 250 MW units in an underground power house for the generation of clean electricity. The project activity includes a concrete gravity diversion dam at Karcham; power intakes and 4 underground desilting chambers to exclude all particles above 0.2 mm size; 10.48 m diameter and 17 km long head race tunnel; an underground power house complex at Wangtoo to generate 4 X 250 MW power and 1.3 km long tail race tunnel to discharge the water back into river Satluj. This is a new hydroelectric project, with a small reservoir of area 588400 m^2 having a power density of 1699.52 W/m^2 (1000*10^6 W / 588400 m^2). Construction work at project site started from 18/11/2005 and the project activity has started generation of power from 26/05/2011. The generated electricity is fed into NEWNE grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

The location and geo-coordinates of the project activity is checked with ownership documents and same are verified during site visit. Further, start date of the project activity is verified from the registered CDM PDD & CDM validation report and found correct. Technical specifications of hydro power plant are verified during onsite visit and crosschecked with registered CDM PDD.

Project Start Date:

The start date of the project activity is the earliest date of commissioning of the 1st 250 MW plant unit (unit-1) involved in the project activity i.e. on 26/05/2011.

Project Crediting Period:

The fixed crediting period is chosen from 01/01/2013 to 31/12/2022.

Project Scale and Estimated GHG Emission Reductions or Removals:

The project falls under Large Project category since the emission reductions are more than 300,000 tCO_2e per annum.

Project Location:

The project activity is located on the stretch of Satluj River between Karcham and Wangtoo in the District of Kinnaur of Himachal Pradesh.

The geo-coordinates of the project area are the following:
Latitude - 31°30’50’’ - 31°32’10’’ N
Longitude - 78°11’15’’ - 78°01’05’’ E

Project Ownership and Project proponent:

Since commissioning, the project has been executed by Jaypee Karcham Hydro Corporation Limited (JKHCL), a special purpose vehicle formed by the promoter group Jaiprakash Associates Limited (JAL). Further, the project activity ownership has been changed from 01/09/2015 onwards to the Himachal

Baspa Power Company Ltd. Which has owned the power plant and thus new owner Himachal Baspa Power Company Ltd is acting as project proponent for the proposed project activity. The ownership transfer documents are checked by assessment team and found to be appropriate.

Details of the new project proponent:

Organization name	Himachal Baspa Power Company Ltd.
Contact person	Mr Rajarshi Bera
Title	Sr. Manager (Tech)
Address	Sholtu, Himachal Pradesh, India
Telephone	-
Email	rajarshi.bera@jsw.in

Description of the Project Activity:

The project activity is 1000 MW run of the river hydro power plant harnessing the potential of river Sutlej executed by Jaypee Karcham Hydro Corporation Limited (JKHCL). Further, 01/09/2015 onwards, the Himachal Baspa Power Company Ltd. (HBPCL) has owned the power plant and thus new owner is acting as project proponent for the proposed project activity. The project activity is located between Karcham and Wangtoo in Kinnaur district of Himachal Pradesh. The project comprises 4 X 250 MW units in an underground power house for the generation of clean electricity. The project activity includes a concrete gravity diversion dam at Karcham; power intakes and 4 underground desilting chambers to exclude all particles above 0.2 mm size; 10.48 m diameter and 17 km long head race tunnel; an underground power house complex at Wangtoo to generate 4 X 250 MW power and 1.3 km long tail race tunnel to discharge the water back into river Satluj. This is a new hydroelectric project, with a small reservoir of area 588400 m^2 having a power density of 1699.52 W/m^2 (1000*10^6 W / 588400 m^2). Construction work at project site started from 18/11/2005 and the project activity has started generation of power from 26/05/2011. The generated electricity is fed into NEWNE grid. The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

Technical specifications of hydro power plant are verified during onsite visit and crosschecked with registered CDM PDD. The technology being employed is well proven, safe & sound. No technology transfer to host party is there due to project activity.

Thus project activity description, capacity are checked and found correct by the assessment team. The PDD mentions all the criteria properly and found correct by the assessment team.

Compliance with relevance laws and regulation:

The Project has received necessary approvals for development and commissioning for each plants from the state Nodal agencies and thus confirms compliance to the local laws and regulations.

Ownership and Other Programs:
Project Ownership:

Since commissioning, the project has been executed by Jaypee Karcham Hydro Corporation Limited (JKHCL), a special purpose vehicle formed by the promoter group Jaiprakash Associates Limited (JAL). Further, the project activity ownership has been changed from 01/09/2015 onwards to the Himachal Baspa Power Company Ltd. Which has owned the power plant and thus new owner Himachal Baspa Power Company Ltd is acting as project proponent for the proposed project activity. The ownership transfer documents are checked by assessment team and found to be appropriate.

Emissions Trading Programs and Other Binding Limits:
Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

Other Forms of Environmental Credit:
The project is registered with UNFCCC under Clean Development Mechanism program (CDM) with Registration reference number 4993[4]. The start date of the project activity is the earliest date of commissioning of the 1st 250 MW plant unit (unit-1) involved in the project activity i.e. on 26/05/2011. The fixed crediting period is chosen from 01/01/2013 to 31/12/2022. The monitoring period for this VCS verification is chosen from 01/09/2015 to 31/12/2017 (including both days) and the project activity achieved 7,985,332 tCO_2e emission reductions during this monitoring period.

Participation under Other GHG Programs:
Above projects is registered with UNFCCC (reference number 4993), however an undertaking has been submitted by PP for double counting would never happens with any other GHG program.

Projects Rejected by Other GHG Programs:
The Project is not rejected by other GHG programs.

Application of Methodology:
Assessment team confirms that the application of the baseline methodology is transparent and conservative, and confirms that the chosen baseline and monitoring methodology i.e. ACM0002 - Version 12.1.0 is applicable to the project activity.

Project Boundary:
The spatial extent of project boundary diagram (including the metering system) referred by the methodology is now mentioned in the CDM PDD as per the requirement of applied methodology and thus the same is acceptable to the assessment team.

Baseline Scenario:

ACM0002 already prescribes the baseline scenario being “Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources”, hence no further analysis of alternatives is required in section B.4. or B.5. of the PDD.
The baseline identification in section B.4 of the PDD is found to be described as per the applied methodology ACM0002 - Version 12.1.0.

[4] http://cdm.unfccc.int/Projects/DB/RWTUV1310469729.49/view

3.2 Methodology Deviations

This section is not applicable as there is no methodology deviation observed during this verification period.

3.3 Project Description Deviations

The below deviation is requested for the current monitoring period.

The project activity ownership has been changed from 01/09/2015 onwards. The Himachal Baspa Power Company Ltd has owned the power plant and thus new owner Himachal Baspa Power Company Ltd is acting as project proponent for the proposed project activity. The ownership transfer documents are checked by assessment team and found to be appropriate.

3.4 Grouped Project

This section is not applicable as the project has undergone verification only.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the verification site visit it was concluded that the project is implemented as per the instruction of the registered CDM PDD and Final CDM Validation report. During the current monitoring period it was observed that no unforeseen situation evolved which can impact the operation of the project activity. Scheduled maintenance was carried out as per the instruction of the manufacturer and the same is acceptable to the assessment team.

The Project activity is a run-of-river hydropower project having aggregated installed capacity of 1000 MW that utilizes the natural flow of Satluj to generate electricity. The project location is Karcham and Wangtoo villages in Kinnaur district of Himachal Pradesh. There are four identical power units each having an installed capacity of 250 MW. The project activity includes 4 Francis turbines (with a rated capacity of 250 MW). The technical specifications of Turbine/Generator were found to be consistent as checked during the physical site visit. The nameplate specifications were checked during the physical inspection of each power unit and were found to be consistent with the description given in the registered CDM PDD & VCS PD.
CAR 03 was raised regarding inclusion of first & last days of the monitoring period. Revised MR version 02 was submitted by PP. Thus CAR closed.

By comparing the actual ER claimed in this monitoring period with the estimate in the VCS PD (8,277,412 tCO_2e for the monitoring period), the actual emission reductions (7,985,332 tCO_2e for the monitoring period) are lower than by 4% what is stated in the VCS PD which surely will not lead to the overestimation of VERs.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period.

All required equipments and procedures are available and implemented in an appropriate manner.

It was observed that the monitoring plan was implemented as per the requirement of the CDM PDD & VCS PD and approved methodology ACM0002 - Version 12.1.0. The organisational role and responsibility as mentioned in the CDM PDD & VCS PD is followed onsite. All the monitoring equipment was calibrated as per the specified interval in the registered PD. All the emergency preparedness as mentioned in the CDM PDD & VCS PD is followed onsite and no discrepancies were found regarding the same.

Start date of the project activity is 26/05/2011. Project has been registration with UNFCCC under Clean Development Mechanism program, Registration reference number is 4993. The project activity CDM verification is undergoing till 31/08/2015 as per UNFCCC web site and PP will ensure that there will not be any double accounting of emission reductions in different program for same monitoring period. PP wishes to claim emission reductions from 01/09/2015 onwards under VCS program.

The assessment team observed that the project is in line with the CDM PDD & VCS PD, CDM Final Validation Report & previous verifications and approved methodology and thus no clarification/deviation is sought.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The emission reduction sheet, CEA database and registered CDM PDD, VCS PD & MR version 01 is checked by the assessment team.
Findings	Baseline emissions are calculated as per the applied methodology ACM0002 - Version 12.1.0. CAR 04 was raised during the verification.
Conclusion	The baseline emissions as discussed in MR will include emissions that would have occurred in the absence of the project activity. The emission reduction calculation has been done as per the methodology ACM0002 - Version 12.1.0. $BE_y = EG_{PJ,y} * EF_{grid,CM,y}$ Where, BE_y = Baseline emissions in year y (t CO_2/yr) $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr) $EF_{grid,CM,y}$ = Combined margin CO_2 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" (t CO_2/MWh) The value of net electricity exported has been conservatively calculated deducting the energy imported and auxiliary consumption. All the export and import values were verified from the daily energy logs. $EF_{grid,CM,y}$: The emission factor for NEWNE grid to which the project activity exports electricity. All the data was made available and have been monitored as per required monitoring frequency. The baseline emissions are calculated as per provisions indicated in the registered CDM PDD and applied methodology. **Combined Margin emission factor for NEWNE regional grid, $EF_{grid,CM,y}$** The registered CDM PDD gives the value of 803.1 tCO_2/GWh. The value was calculated in accordance with the tool to calculate the emission factor for an electricity system prescribed by the applied methodology. The source value has been obtained from "CO2 Baseline Database for the Indian Power Sector prepared by Central Electricity Authority Version 4.0. The value in the monitoring report and corresponding emission reduction calculation spreadsheet is consistent with registered CDM PDD. The applied value is correct and justified. **Project Emissions** As per ACM0002 - Version 12.1.0 $PE_y = 0$. As per the methodology if the power density of the power plant is greater than 10 W/m^2, then the project emission $PE_{HP,y}$ are zero. **Leakage** As per applied methodology, no other leakage emissions are considered. The project activity reduces carbon dioxide emissions through displacement of grid electricity generation with predominantly fossil fuel based power plants[5] by renewable

	electricity. The emission reduction (ER_y) due to project activity during a given year y is calculated as the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage, as per the formulae given below: $ER_y = BE_y - PE_y$ Where, ER_y = Emission Reduction in tCO_2/year BE_y = Baseline emission in tCO_2/year PE_y = 0 for the project activity as per the methodology. Therefore, $ER_y = BE_y$. $EG_{PJ,y}$ is The parameter is monitored through energy meters installed at the Pothead yard. It indicates the net electricity generated by the project activity in MWh. The parameter is continuously monitored and monthly recorded as per the PDD. The measuring and reporting frequency are in line to registered CDM PDD and applied methodology. There is one main Energy meter and one check meter at every Power Unit. All the meters were of accuracy class 0.2s. The technical details of the meters are specified in the MR are found consistent with the actual records and on ground. The accuracy of the monitoring equipment is 0.2s (all main and check meters), which is as per the registered CDM PDD. Calibration frequency is specified as Once in two years. The calibration frequency is in line with the registered PDD and details are given in Appendix 5 of this report. Moreover, the verification team has checked the entire monthly JMR report and invoices applicable for the monitoring period and found all the parameters are monitored and recorded as per the monitoring plan in the registered PDD. The verification team has crosschecked the revised emission reduction sheet and monitoring report data with the JMR sheet and the JMR values have been cross checked with the invoices on sample basis and found that values are matching. The monitoring values were also cross checked with TEGy, which is also a monitored parameter to determine gross electricity generation. The annual value for TEGy (10,008,849.2 MWh) is higher than the EGfacility,y (9,943,136. 45 MWh). The data management system is effective and reliable. The necessary QA/QC processes were found to be in place. The parameter has been monitored appropriately, in accordance with the registered monitoring plan and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the break down log for the monitoring period. During the verification site visit the unit wise generation log was also checked. The Calibration details are also checked.
Findings	CAR 05 was raised during verification for crosscheck mechanism of JMR values with invoices.
Conclusion	The metering arrangement is tri-vector bi-directional energy meters (main and check) at the State Electricity Board (SEB) substation. These meters record several parameters including electricity exported & imported. These electricity meters are being used by state electricity board for JMR (Joint Meter Reading) electricity generation statements. No delayed calibrations were observed in the project activity for this monitoring period. All the meters are of same accuracy class i.e. 0.2s as per the requirement of the registered CDM PDD. On-site visit and interview with plant personnel also conforms

	the same.

4.4 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Not applicable	Not applicable	Not applicable	Not applicable

5 SAFEGUARDS

5.1 No Net Harm

Environmental Impact Assessment (EIA) studies were carried out as per the Ministry of Environment & Forest guideline i.e. EIA Notification 1994 applicable at that time by NEERI, a premier Government Environmental Research Lab & Consultancy [5] . Environmental Impacts were identified following components:

a. Air and Noise Environment
b. Water Environment
c. Land Environment
d. Biological Environment
e. Socio-economic Environment

As per the prevailing rules and regulations at that time Environmental Management Plan (EMP) was prepared & implemented by PP to mitigate adverse impacts and maximize beneficial impacts. The Project Proponents have made sufficient provision in the Project Cost to implement EMP provisions. Same are already mentioned in the registered CDM PDD[6] and verified during site visit.

5.2 Local Stakeholder Consultation

All the stakeholders are happy with the implementation and operation of the project activity and no negative comments envisaged for the project activity. There was no change in project description form the registered CDM PDD. Assessment team confirmed the same during the verification site visit.

[5] http://www.neeri.res.in

[6] http://cdm.unfccc.int/Projects/DB/RWTUV1310469729.49/view

6 VERIFICATION CONCLUSION

Applus+ Certification has been engaged by Himachal Baspa Power Company Ltd. to perform the GAP Validation & 1st VCS verification of the "Hydroelectric Project in Kinnaur District in Himachal Pradesh"

The Himachal Baspa Power Company Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project's Monitoring Plan in the registered CDM PDD and the applied methodology ACM0002 - Version 12.1.0.

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in VCS Monitoring Report is as per the VCS PD;
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

Verification period: 01/09/2015 to 31/12/2017 (including both days)

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01/09/2015 to 31/12/2015	832,649	0	0	832,649
01/01/2016 to 31/12/2016	3,504,652			3,504,652
01/01/2017 to 31/12/2017	3,648,031	0	0	3,648,031
Total	**7,985,332**	**0**	**0**	**7,985,332**

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates of the hydropower plant.	NA	Project participant
2.	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3.	NA	Technical specifications of turbine from manufacturers	Manufacturer technical specifications	Project participant
4.	NA	Power Purchase agreement for the project activity	NA	Project participant
5.	NA	Registered CDM PDD	Version 04 28/03/2012	UNFCCC
6.	NA	Final CDM Validation report	Version 02 12/04/2012	UNFCCC
7.	NA	First CDM MR	Version 03 14/09/2016	UNFCCC
8.	NA	First CDM Verification Report	Version 01 04/11/2016	UNFCCC
9.	NA	VCS PD	Version 01 11/03/2018	Project participant
10.	NA	Final VCS PD	Version 02 17/04/2018	Project participant
11.	NA	Monitoring report	Version 01 11/03/2018	Project participant
12.	NA	Final Monitoring report	Version 02 17/04/2018	Project participant
13.	NA	Emission Calculation sheet version 01 Revised Emission Calculation sheet version 02	11/03/2018 11/03/2018	Project participant
14.	NA	The operational lifetime of the project activity from the manufacturer=(Technical specefications)	Manufacturer technical specifications	Project participant
15.	NA	Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in VCS: Verified Carbon Standard www.v-c-s.org	Reference link is provided.	Independent Search
16.	NA	Tools/ guidelines used in the project activity • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool to calculate the emission factor for an electricity system • Glossary of CDM terms version 07 • VCS verification report template version 03.4	UNFCCC CDM web site	UNFCCC

No.	Author	Title	References to the document	Provider
17.	NA	JMR records for the complete monitoring period	JMR records	Project participant
18.	NA	Invoices for the complete monitoring period	Invoice	Project participant
19.	NA	Break down details of the complete monitoring period	Log sheet	Project participant

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS & FARWARD ACTION REQUEST (CAR/CL/FAR)

Validation Findings

Participation under Other GHG Programs

CAR ID	01	**Section no.**	1.12.4 of VCS PD	**Date:** 13/04/2018
Description of CAR				
VCS PD provided reference of UNFCCC Registration in Section 1.12.4. However, details of till date verifications along with issuance status is missing in the section. Further, PP to provide copy of undertaking in effect of no double counting of CDM & VCS emission reductions achieved.				
Project participant response				**Date: 17/04/2018**
In section 1.12.4 of VCS PD, the earlier status of CDM verification till 31/08/2015 is mentioned. PP intends to avail emission reductions in VCS program from 01/09/2015 onwards and given undertaking that there will not be any double accounting of emission reductions for same monitoring period. The VCS declaration has been provided to DOE. There is no any double accounting of emission reductions for current monitoring period.				
Documentation provided by project participant				
Revised VCS PD				
DOE assessment				**Date:18/04/2018**
Section 1.12.4 has been revised accordingly for details of earlier verification. VCS undertaking has been submitted for double counting of VCUs. CAR closed.				

Project Description Deviations

CAR ID	02	**Section no.**	1.12.1 of VCS PD	**Date:** 13/04/2018
Description of CAR				
PP to submit copy of change of ownership documents.				
Project participant response				**Date: 17/04/2018**
The ownership documents has been submitted now. The project activity ownership is transferred to HBPCL from 01/09/2015 onwards and monitoring period considered the monitoring period accordingly.				
Documentation provided by project participant				
Ownership Document of HBPCL				
DOE assessment				**Date:18/04/2018**
Change of ownership documents submitted by PP and found ok. CAR closed.				

Verification Findings

Project Implementation Status

CAR ID	03	**Section no.**	VCS MR	**Date:** 13/04/2018
Description of CAR				
MR not consistent about inclusion of first & last days of monitoring period.				
Project participant response				**Date: 17/04/2018**
The MR is revised with mention of inclusive of first and last days for monitoring period mentioned. The current monitoring period is from 01-September-2015 to 31-December-2017 (Inclusive of first and last days)				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date: 18/04/2018**
MR revised appropriately. CAR closed.				

Accuracy of GHG Emission Reduction and Removal Calculations

CAR ID	04	**Section no.**	3.2 of MR	**Date:** 13/04/2018
Description of CAR				
Net Export values for the month of Feb. 2016, Mar. 2016 & Dec. 2016 not matching with JMR. Corrections requested.				
Project participant response				**Date: 17/04/2018**
The same has been corrected. The supporting documents are submitted.				
Documentation provided by project participant				
Revised ER sheet, MR and JMR for the month of Feb. 2016, Mar. 2016 & Dec. 2016.				
DOE assessment				**Date: 18/04/2018**
Correct JMRs for these months has been submitted and found correct. Also values are crosschecked with invoices. CAR closed				

Quality of Evidence to Determine GHG Emission Reductions and Removals

CAR ID	05	**Section no.**	3.2 of MR	**Date:** 13/04/2018
Description of CAR				
Mechanism for crosscheck of JMR values with Invoices is missing in PD.				
Project participant response				**Date: 17/04/2018**
The note has been mentioned in ER sheet about cross checking of net export values. The supporting of cross checking has been submitted to DOE.				
Documentation provided by project participant				
Revised ER sheet, MR				
DOE assessment				**Date: 18/04/2018**
MR has been revised appropriately by including crosscheck mechanism. CAR closed.				

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader/Lead Assessor	OR	Takarkhede	Dr. Atul	TQC-Outsourced entity	Yes	Yes	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Shen	Simon	Applus+ Certification
2.	Approver	IR	Sendin	Juan	Applus+ Certification B.U. Managing Director

Short CVs of the Team:

1. Dr. Atul Takarkhede counts with 9 years of experience in field of Environmental Auditing, consulting and accreditation. He is an Expert in ISO 9001-14001, CO_2/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management Reporting for organizations environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; Conducting Environmental/water Audits; NABET requirements appliance. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. He has Ph.D. (Environmental Science) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical reports related to environmental science.

2. Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ LGAI for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
JMR	Joint Metering reading
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS OF THE METERS

Calibration frequency: At least once in two (2) Tariff years

Sr No	Location	Type	Serial Number	Make	Accuracy Class	Calibration date	Validity of calibration	Calibration compliance
1	Feeder-1	Main	NP8526A	M/s L & T	0.2s	08/01/2015 16/12/2016	07/01/2017 15/12/2018	Yes
2	Feeder-2	Main	NP8530A	M/s L & T	0.2s	08/01/2015 16/12/2016	07/01/2017 15/12/2018	Yes
3	Feeder-3	Main	NP8528A	M/s L & T	0.2s	08/01/2015 16/12/2016	07/01/2017 15/12/2018	Yes
4	Feeder-4	Main	NP8529A	M/s L & T	0.2s	08/01/2015 15/12/2016	07/01/2017 14/12/2018	Yes
5	Feeder-5	Main	NP8527A	M/s L & T	0.2s	08/01/2015 16/12/2016	07/01/2017 15/12/2018	Yes
6	Feeder-6	Main	NP8546A	M/s L & T	0.2s	08/01/2015 16/12/2016	07/01/2017 15/12/2018	Yes
7	Feeder-1	Check	NP8400A	M/s L & T	0.2s	07/01/2015 17/12/2016	06/01/2017 16/12/2018	Yes
8	Feeder-2	Check	NP8401A	M/s L & T	0.2s	07/01/2015 17/12/2016	06/01/2017 16/12/2018	Yes
9	Feeder-3	Check	NP8402A	M/s L & T	0.2s	07/01/2015 17/12/2016	06/01/2017 16/12/2018	Yes
10	Feeder-4	Check	NP8403A	M/s L & T	0.2s	07/01/2015 15/12/2016	06/01/2017 14/12/2018	Yes
11	Feeder-5	Check	NP8548A	M/s L & T	0.2s	07/01/2015 16/12/2016	06/01/2017 15/12/2018	Yes
12	Feeder-6	Check	NP8547A	M/s L & T	0.2s	07/01/2015 17/12/2016	06/01/2017 16/12/2018	Yes