

“300MW HYDROPOWER PROJECT BY HBPCCL (DEVIATED FROM ORIGINAL TITLE “300MW HYDROPOWER PROJECT BY JHPL”)



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Summary:

The purpose of the project activity is to generate power using renewable hydro energy. The generated electricity is being exported to the regional grid system which is under the purview of the Indian grid which is dominated by mainly fossil fuel fired power plants. The Baspa project is a run-of-the-river hydro-electric power plant with an installed capacity of 300 MW. The diversion barrage of the project is located across river Baspa, at Kuppa in Himachal Pradesh. The power house is located at Karcham village in Kinnaur District.

Revalidation of the Renewal of Crediting Period purpose: The project is registered with VCS with Project ID 92. Start date of the project activity is the 08/06/2003. The First Crediting Period was from 01/04/2006 to 31/03/2016 and Second Crediting Period chosen 01/04/2016 to 31/03/2026.

There is change in ownership of the project activity from Jaiprakash Hydro Power Limited (JHPL) to Himachal Baspa Power Company Ltd (HBPCL). Hence the project proponent has seeking deviation in the project title from “300MW Hydropower Project by JHPL” to “300MW Hydropower project by HBPCL”.

Verification purpose: The purpose of the project activity is to generate power using renewable hydro energy. The generated electricity is being exported to the regional grid system which is under the purview of the Indian grid which is dominated by mainly fossil fuel fired power plants.

The Baspa project is a run-of-the-river hydro-electric power plant with an installed capacity of 300 MW. The diversion barrage of the project is located across river Baspa, at Kuppa in Himachal Pradesh. The power house is located at Karcham village in Kinnaur District. The project activity was an initiative of Jaiprakash Hydro Power Limited (JHPL) a part of the Jaypee Group.

The project is registered with VCS with Project ID 92¹. Start date of the project activity is the 08/06/2003. The First Crediting Period was from 01/04/2006 to 31/03/2016 and Second Crediting Period chosen 01/04/2016 to 31/03/2026.

The monitoring period for this VCS verification is chosen from 01/09/2015 to 31/12/2017 (including both days).

Monitoring period of first crediting period is 01/09/2015 to 31/03/2016 and VCUs generated during this period is 320153 tCO₂.

Monitoring period of second crediting period is 01/04/2016 to 31/12/2017 and VCUs generated during this period is 2377598 tCO₂.

A risk based approach has been followed to perform this verification activity. In the course of verification, 03 Corrective Action request (CAR) & 01 Clarification Requests (CLs) were raised and successfully closed and no FAR were raised. 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.

¹ http://www.vcsprojectdatabase.org/#/project_details/92

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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 Renewal of crediting period and last verification of 1st crediting period and 1st periodic verification from second crediting period of the “300MW Hydropower Project by HBPCL” under VCS standard and guideline version 3.7. The objective of this RCP renewal, change in title & 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 17.0”
- the project's monitoring plan is assessed against “ACM0002 - Version 17.0”
- 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

Revalidation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of certified emission reductions (CERs) for the renewed crediting period..& 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 andCriteria

The scope of the RCP renewal, change in title & verification is the independent and objective review of the Joint VCS PD & MR. The Joint 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, Final version of Joint VCS PD & MR, 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 Joint 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 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 revalidation of the crediting period & 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 revalidation of the crediting period & verification opinion, which will go beyond that purpose.

1.3 Level of Assurance

The revalidation of the crediting period & 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 checked/verification conducted to arrive at positive verification conclusions.

1.4 Summary Description of the Project

The purpose of the project activity is to generate power using renewable hydro energy. The generated electricity is being exported to the regional grid system which is under the purview of the Indian grid which is dominated by mainly fossil fuel fired power plants. The Baspa project is a run-of-the-river hydro-electric power plant with an installed capacity of 300 MW. The diversion barrage of the project is located across river Baspa, at Kuppa in Himachal Pradesh. The power house is located at Karcham village in Kinnaur District.

Revalidation of the crediting period purpose: The project is registered with VCS with Project ID 92. Start date of the project activity is the 08/06/2003. The First Crediting Period was from 01/04/2006 to 31/03/2016 and Second Crediting Period chosen 01/04/2016 to 31/03/2026.

Verification purpose: The purpose of the project activity is to generate power using renewable hydro energy. The generated electricity is being exported to the regional grid system which is under the purview of the Indian grid which is dominated by mainly fossil fuel fired power plants. The generated electricity is being exported to the regional grid system which is under the purview of the INDIAN grid of India which is dominated by mainly fossil fuel fired power plants. The Baspa project is a run-of-the-river hydro-electric power plant with an installed capacity of 300 MW.

Start date of the project activity is the 08/06/2003. The First Crediting Period was from 01/04/2006 to 31/03/2016 and Second Crediting Period chosen 01/04/2016 to 31/03/2026.

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Monitoring period of second crediting period is 01/04/2016 to 31/12/2017 and VCUs generated during this period is 2377598 tCO₂.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

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 Joint VCS PD & MR against the registered PD and final 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 Joint Validation & 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. The revalidation & verification checklist consists of three tables. The different columns in these tables are described in the tables below:

Revalidation & Verification Checklist Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements which the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the draft Revalidation & Verification report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated/verified. This is to ensure a transparent Revalidation & Verification process.

Revalidation & Verification Checklist Table 2: Requirement checklist				
Checklist Question	Reference	Comment	Draft Conclusion	Final Conclusion
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organized in several different sections. Each section is then further sub-divided. The lowest level	Gives reference to documents where the answer to the checklist	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions	Conclusions are presented based on the assessment of the first joint PD & MR version. This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification is used when the assessment	Conclusions are presented in the same manner based on the assessment of the final joint PD & MR version and further documents including assumptions presented in the

constitutes a checklist question.	question or item is found.	reached.	team has identified a need for further clarification. Forward action request to highlight issues related to project implementation that requires review during the further verifications.	documentation.
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Revalidation & Verification Checklist Table 3: Resolution of Corrective Action and Clarification Requests				
Draft report clarifications and corrective action requests	Ref. to checklist question in table 1&2	Summary of project owner response	Revalidation/Verification conclusion	
If the conclusions from the draft Revalidation & Verification report are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 1&2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the assessment team should be summarized in this section.	This section should summarize the assessment team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".	

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)
- Internal Technical Review (ITR)

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 Joint VCS PD & MR submitted by the Client was reviewed against the approved methodology, VCS PD & Final Validation report of first crediting period.

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 Revalidation & 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 Joint VCS PD & MR. 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 Joint VCS PD & MR submitted serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a Revalidation & Verification of the final documentation including the Revalidation & 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 Revalidation & Verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform

2.2 Document Review

The Joint VCS PD & MR submitted by the Client was reviewed against the approved methodology, VCS PD & Final Validation report of first crediting period 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.

The details of the document observed during the revalidation & 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	HBPCL, Manager	13-15/03/2018	Implementation of the project activity	Dr. Atul Takarkhede
2.	Thakur	Anil	HBPCL, Site Incharge	13-15/03/2018	Monitoring instruments, JMR practice, calibrations and plant operation	
3.	Patil	Ramkrishna	EKI, Consultant	13-15/03/2018	Monitoring Report, Renewal of crediting period, emission reduction calculations	

2.4 Site Inspections

Duration of on-site inspection: 13/03/2018 - 15/03/2018				
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 Joint PD & MR is actually practiced onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity.	Karcham village, Kinnaur District, Himachal Pradesh	13/03/2018 - 15/03/2018	Dr. Atul Takarkhede

2.5 Resolution of Findings

The objective of this phase of the Revalidation & 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 crediting period renewal & 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 revalidation & verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final joint PD & MR Version 2 submitted by PP on 21/03/2018 serves as the basis for the final assessment presented. Additional changes to the project during the revalidation & 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	01	00	00
Description of project activity	00	00	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	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	01	00
- Calibration details	00	00	00
- Monitoring plan	00	02	00
Others (please specify)	00	00	00
Total	01	03	00

The list of findings and their resolution are presented in Appendix 2 of this report.

2.5.1 Forward Action Requests

This is 1st renewal of crediting period and last monitoring from first crediting period & 1st periodic verification from 2nd crediting period of the project activity and no FAR rose from validation and previous verifications.

3 VALIDATION FINDINGS

3.1 Project Details

The Baspa project is a run-of-the-river hydro-electric power plant with an installed capacity of 300 MW. The diversion barrage of the project is located across river Baspa, at Kuppa in Himachal Pradesh. The power house is located at Karcham village in Kinnaur District. The project site is located about 210 Kms from Shimla. Shimla is connected to the project site by National Highway-22 (Hindustan Tibet Road). Nearest broad gauge railway station from the project site is Kalka which is about at a distance of 300 Kms from the project site.

The purpose of the project activity is to generate electricity using renewable hydro energy and sell it to Himachal Pradesh State Electricity Board (HPSEB).

From 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.

There is change in ownership of the project activity from Jaiprakash Hydro Power Limited (JHPL) to Himachal Baspa Power Company Ltd (HBPCL). The assessment team checked the documents for change in ownership and verified change in ownership. Thus the project proponent has seeking deviation in the project title from “300MW Hydropower Project by JHPL” to “300MW Hydropower project by HBPCL”.

The assessment team accepts the same as this title change has no impact on project design, scale of the project activity, baseline methodology and monitoring etc.

Other details of the project activity are same as registered PD.

Means of verification	The guideline for completing VCS combined validation and verification template form version 03.1 for this project activity is checked by the assessment team. 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 PD & validation report for 1 st crediting period and found correct. Technical specifications of hydro power plant are verified during onsite visit and crosschecked with registered PD.
Findings	The Joint Project Description & Monitoring Report version 01 submitted to the DOE were not in compliance with the directive of the VCS Joint Project Description & Monitoring Report Template version 3.1.
Conclusion	CL 01 was closed based on response by PP and in compliance with VCS form version 03.1 for this project activity. The PD and MR version 02 is thus acceptable to the assessment team.

3.2 Participation under Other GHG Programs

This section is not applicable as the project is registered under VCS only.

3.3 Application of Methodology

3.3.1 Title and Reference

The original applied methodology ACM0002 - Version 8.0 in the registered VCS PD is still applicable. However, in accordance with section 3.8.5 of the VCS Standard 3.7 and latest version of CDM Tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period, Version 03.0.1”. The project meets the applicability criteria of the applied version of methodology ACM0002 - Version 17.0 as the project activity is a Renewable Energy Project i.e. Hydro Power Project which falls under applicability criteria option 1(a) i.e., Installation of a Greenfield power plant. Further, the project activity meets all other applicability stipulated in the methodology.

Applied methodology: ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0. Sectoral Scope: 01

<https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

The project activity also takes reference from following Tools from the tools prescribed by applied methodology:

- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 6.0, EB 97, Annex 7.

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf/history_view

3.3.2 Applicability

Applus+ Certification has assessed the relevant information contained in the joint VCS PD & MR and evidence obtained during on-site visit against the application criteria listed in the methodology. The applicability of this methodology is justified as below:

- The proposed project activity is a greenfield, grid connected renewable electricity generation project,
- The project activity is the installation of hydro power plant,
- The project does not involve capacity addition, a retrofit of (an) existing plant(s) or a replacement of (an) existing plant(s)
- Project activity does not involve switching from fossil fuels to renewable energy sources at the site of project activity
- The project does not involve combined heat and power generation activity
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

Means of verification	The assessment team has validated the documentation referred to in the Joint VCS PD & MR and verified the documentation content for verifying the justification of the applicability of the methodology and confirmed that the documentation referred to in the Joint VCS PD & MR is correctly quoted and interpreted. The assessment team has also crosschecked the information provided in the Joint VCS PD & MR with the documentation other than from the Joint VCS PD & MR based on the local and sectoral knowledge of the assessment team. Following documentation has been reviewed by the assessment team: ▪ Site visit ▪ Interview with the concerned person mentioned in this report ▪ Technical detail analysis of the power plant from the documents submitted by the
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	manufacturer. Commissioning certificates The assessment of the project's compliance with the applicability criteria of ACM0002 - Version 17.0 are documented in detail in Joint VCS PD & MR.
Findings	Applicability criteria were explained properly as per the requirement of the applied approved methodology. No NC was raised.
Conclusion	The applied baseline methodology is justified as it has been demonstrated that the proposed project activity is: - The proposed project activity is a greenfield, grid connected renewable electricity generation project, - The project activity is the installation of Hydro power plant, - The project does not involve capacity addition, a retrofit of (an) existing plant(s) or a replacement of (an) existing plant(s) - Project activity does not involve switching from fossil fuels to renewable energy sources at the site of project activity - The project does not involve combined heat and power generation activity - The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available. Applus+ Certification 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 17.0 is applicable to the project activity.

3.3.3 Project Boundary

Means of verification	The project boundary as depicted in the joint VCS PD & MR version 02 is checked during the validation site visit and also during the interview with the plant official.				
Findings	No NC was raised during the validation process.				
Conclusion	The spatial extent of project boundary diagram (including the metering system) referred by the methodology is now mentioned in the joint VCS PD & MR as per the requirement of applied methodology and thus the same is acceptable to the assessment team. The below table mentions the emission source				
		Source	GHGs	Included?	Justification/Explanation
	Baseline	INDIAN Grid	CO ₂	Yes	Main emission source
			CH ₄	No	Minor emission source
			N ₂ O	No	Minor emission source
	Project	NA	NA	NA	NA

3.3.4 Baseline Scenario

Means of verification	The baseline scenario as depicted in the PD version 01 is checked during the validation site visit and also during the interview with the plant official.
Findings	No findings were raised.

Conclusion	The baseline scenario is still valid for this next crediting period and it is given by the applied methodology: “If the project activity is the installation of a Greenfield power plant, the baseline scenario is 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, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.”. Thus, as per VCS Standard 3.7, para 3.8.5; 2. b). “Where it is determined that the original baseline scenario is still valid, the GHG emissions associated with the original baseline scenario shall be reassessed using the latest version of the CDM Tool to assess the validity of the original/ current baseline and to update the baseline at the renewal of a crediting period.” Step 1: Assess the validity of the current baseline for the next crediting period <i>Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies</i> The current baseline scenario complies with all relevant mandatory National/sectoral legislation. <i>Step 1.2: Assess the impact of circumstances</i> Indian Power Sector has the installed capacity consisting of 188897.78 MW Thermal, 31692.14 MW Renew and 5,780 MW Nuclear as on 31.03.2015 (CEA Database version 12). However, the installed capacity is predominantly coal based and therefore, is a major source of carbon dioxide emissions in India. Hence, there exists scope for reducing the CO₂ emissions in the country by increased use of renewable energy sources. Furthermore, project participant has considered the latest available CO₂ Baseline Database (CEA database, version 12) at the time of requesting renewal of the crediting period for establishing the baseline emission factor, which itself considered all the new circumstances. Hence, the new circumstances do not have an impact on the baseline emission. <i>Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested</i> As explained in step 1.2, the baseline scenario was the electricity generation from the power plants connected to the electricity grid. Therefore this condition is not applicable to the project activity. <i>Step 1.4: Assessment of the validity of the data and parameters</i> The emission factor has been updated using latest tool to calculate emission factor & CEA Database version 12. <i>Step 2: Update the current baseline and the data and parameters</i> The approved consolidated baseline methodology, ACM0002 version 17.00 has been used to determine the baseline and the estimation of emission reductions for the current crediting period. The data and parameters are calculated using “Tool to calculate the emission factor for an electricity system” (version 06.0). Being a grid connected hydro energy generation project, PP developed the project based on the Methodology ACM0002 - Version 17.0. As per Para 23 the methodology “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, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.
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	As per CDM validation and verification standard for project activities Version 01.0, “The DOE shall determine whether the description of the identified baseline scenario in the PDD is in accordance with the selected standardized baseline”. As the selected approved methodology clearly mention the baseline scenario and the same has been opted in this project, therefore, no further analysis on baseline is required. Assessment Team, therefore, concludes that the joint VCS PD & MR conforms to the guidance given by EB via CDM validation and verification standard for project activities Version 01.0.
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3.3.5 Additionality

Means of verification	According to the VCS Standard 3.7, section 3.8.5, “a full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with Section 4.6.3 and the project description shall be updated accordingly”. The same is discussed in below conclusion section.
Findings	No findings were raised.
Conclusion	According to the VCS Standard 3.7, section 3.8.5, “a full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with Section 4.6.3 and the project description shall be updated accordingly”. And according to the section 4.6.3, “The project shall not be mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. For UNFCCC non-Annex I countries, laws, statutes, regulatory frameworks or policies implemented since 11 November 2001 that give comparative advantage to less emissions-intensive technologies or activities relative to more emissions-intensive technologies or activities need not be taken into account. For all countries, laws, statutes, regulatory frameworks or policies implemented since 11 December 1997 that give comparative advantage to more emissions-intensive technologies or activities relative to less emissions-intensive technologies or activities shall not be taken into account” This project is a greenfield hydro power plant and it is not mandated by any law, statute or other regulatory framework from the host country or foreign countries or UNFCCC.

3.3.6 Quantification of GHG Emission Reductions and Removals

Means of verification	The emission reduction sheet, CEA database and Joint VCS PD & MR version 02 is checked by the assessment team.
Findings	Baseline emissions are calculated as per the applied methodology ACM0002 - Version 17.0 para 44. No findings raised on the section.
Conclusion	The baseline emissions as discussed in Joint VCS PD & 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 17.0. $BE_y = EG_{PJ,y} * EF_{grid,CM,y}$ 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) PP has estimated the baseline energy generation considering the capacity of the project

activity, yearly generation hour and plant load factor. Validation team assessed the technical specification of the promoters of the project activity, Further, PP considered the PLF of the project activity from DPR. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors according to the procedure prescribed in the "Tool to calculate the emission factor for an electricity system" version 6.0 and OM & BM values are sourced from Baseline CO₂ Emission Database, Version 12.0 published by Central Electricity Authority (CEA), Government of India and forms the part of emission reduction calculation. The baseline emission factor calculation is checked by the validation team and found that the calculation is transparent and conservative.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
EF _{grid,CM,y}	0.9273 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.25) & build margin (0.75) values, sourced from Baseline CO ₂ Emission Database, Version 12.0, May 2017 published by Central Electricity Authority (CEA), Government of India
EF _{grid,OM,y}	0.9843 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2013-14, 2014-15, 2015-16) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 12.0, May 2017 published by Central Electricity Authority (CEA), Government of India
EF _{grid,BM,y}	0.9083 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 12.0, May 2017 published by Central Electricity Authority (CEA), Government of India

EF_{grid,CM,y} = 0.9273 tCO₂e/MWh and it is fixed ex ante for the second crediting period. Considering this process, combined margin emission factor has been considered and same value is confirmed correct.

Project Emissions

As per para 36 of ACM0002 - Version 17.0 PE_y = 0.

As per para 43(c) of the methodology if the power density of the power plant is greater than 10 W/m², 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 plants⁵ 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, $ER_y = BE_y$.
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3.3.7 Methodology Deviations

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

3.3.8 Monitoring Plan

Means of verification	Assessment team checked the monitoring practice onsite and also checked the guideline of HP State Electricity Regulatory Commission.
Findings	Assessment team raised concern regarding the mechanism for crosscheck of JMR values with Invoices. The detail of the same is mentioned as CAR 01 in this report and the same is closed successfully.
Conclusion	Parameters determined ex-ante: Baseline emission factor of INDIAN Grid is establish ex-ante based on Tool to calculate the grid emission factor, using a combined approach consisting 25 % operating margin and 75 % build margin for second crediting period. The emission coefficient from official data published in Central Electricity Authority (CEA) CO₂ Baseline database available to the project participant at the time of submission of Joint VCS PD & MR for validation and global stakeholder's consultation process. CEA is an official source of Ministry of Power, Government of India have worked out baseline as CO₂ baseline database. The assumption were verified by the validation team and found to be correct. Parameters determined ex-post: The parameters monitored ex-post involves net electricity supplied to the grid (calculated from electricity exported and imported) to the INDIAN grid by the project activity. As per the joint VCS PD & MR, the JMR provided by State Utility are the source of the monthly values of net electricity supplied by the project activity. The DOE will use the same source for verification of emission reductions. State Utility is a Government Organization responsible for distribution of electricity, with no interests in the Project Activity. As per the applied methodology ACM0002 - Version 17.0 "Monitoring shall consist of metering the net electricity supplied by the project activity to the grid. Measurement results shall be cross-checked with records for sold electricity/electricity bills". In accordance with the methodology requirement, net electricity supplied by the project activity is obtained from the JMR statement provided by State Utility and form the forms the basis for emission reduction calculation. Electricity export to the grid and import from the grid is metered by main and check tri-vector energy meters. The meter readings is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of state utility and O&M personnel. In the event of failure of main meter, the check meter will be used in monitoring the electricity data. Calibration of all the meters is done by state electricity board officials as per the industry standards. However, the calibration will be done once in a 5 year. The energy meter recording the export and import from the grid at substation is under the control and supervision of state electricity board officials. Similarly O&M contractor is responsible for monitoring of the generation data at CMS. It is reported that the data

	will be kept for 2 years following the end of the crediting period. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit.
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3.4 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

4 SAFEGUARDS

4.1 No Net Harm

No potential environment or socio economic matter was found during the site visit. The project is renewable energy project and thus no negative impact observed in Air or water quality onsite. However, as per the requirement of loan lending agencies practices Environmental Impact Assessment (EIA) studies were conducted though not a statutory requirement. Assessment team checked the implementation of mitigation measures implemented by the project proponent against the impacts identified as per EIA report. The Environmental Management Plan implemented by project proponent as per the EIA report prepared by National Environmental Engineering Research Institute (NEERI), Nagpur for Air, Water, Noise, Soil, Biological & Socio-economic environment. For the compensatory forestry the project proponent has already contributed Rs. 20 crores (200 million) via Govt. of Himachal Pradesh as per the rules and regulations of the host country. 50% afforestation work is completed already completed. To minimize water pollution impact, PP has installed Sewage Treatment Plant (STP) to treat domestic waste from Sholtu site colony. To reduce downstream impacts on river stream a flow of 5 cusecs is maintained by project proponent. The EMP implemented by project proponent is sufficient to care of potential environmental damages. Same were verified during site visit. .

4.2 Environmental Impact

Means of verification	The guideline provided by MOEF is checked by the assessment team http://envfor.nic.in/legis/eia/so1533.pdf
Findings	NA
Conclusion	Environmental Impact Assessment (EIA) studies were conducted though not a statutory requirement. Assessment team checked the implementation of mitigation measures implemented by the project proponent against the impacts identified as per EIA report. The Environmental Management Plan implemented by project proponent as per the EIA report prepared by National Environmental Engineering Research Institute (NEERI), Nagpur for Air, Water, Noise, Soil, Biological & Socio-economic environment. For the compensatory forestry the project proponent has already contributed Rs. 20 crores (200 million) via Govt. of Himachal Pradesh as per the rules and regulations of the host country. 50% afforestation work is completed already completed. To minimize water pollution impact, PP has installed Sewage Treatment Plant (STP) to treat domestic waste from Sholtu site colony. To reduce downstream impacts on river stream a flow of 5 cusecs is maintained by project proponent. The EMP implemented by project proponent is sufficient to care of potential environmental damages. Same were verified during site visit.

4.3 Local Stakeholder Consultation

Means of verification	The local stakeholder consultation MOM, attendance sheet is checked by the assessment team. During the validation site visit assessment team also interviewed some of the stakeholder present during the meeting with PP.
Findings	No finding was raised.
Conclusion	All the stakeholders are happy with the implementation and operation of the project activity and no negative comments envisaged for the project activity. Being mountainous area with dense forest of Himalyan range, almost 50% of the compensatory afforestation work is completed with a survival rate of 75- 80% of the plants. Further, the project proponent has constructed cement walls along the side of the river banks and roads to stabilize the area and prevent erosion. During site visit no

	apparent trends identified to indicate that the project has resulted in adverse impact on the livelihood, health, availability of water and other necessities of life in the region. There was no change in project description from the registered VCS PD & joint VCS PD & MR. Assessment team confirmed the same during the verification site visit.
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4.4 Public Comments

Means of verification	The local stakeholder consultation MOM, attendance sheet is checked by the assessment team. During the validation site visit assessment team also interviewed some of the stakeholder present during the meeting with PP.
Findings	No finding was raised.
Conclusion	The project received positive comments from stakeholders and related employment opportunities and infrastructure development in the project region. Since there were no negative comments received from the stakeholders, therefore, it was not necessary to take due account of any comments.

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the joint VCS PD & MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the joint VCS PD & MR.
Findings	CAR 3 was raised during the verification. The description of the CAR and its closure is described below in Appendix 2 of this report.
Conclusion	Ex-ante Parameter: First Crediting Period: $EF_{grid,CM,y}$ = Parameter is fixed ex-ante for the entire first crediting period and as per the validated VCS PD same is fixed 0.805 tCO₂/MWh. Verification team found same was used in the ER calculations. Second Crediting Period: Further, for second crediting period Parameter $EF_{grid,CM,y}$ is fixed ex-ante for the entire first crediting period and as per the joint VCS PD & MR and same is fixed 0.9273 tCO₂/MWh. Verification team found same was used in the ER calculations. Baseline Emissions: The baseline Emissions for a given year is calculated by multiplying the energy baseline with the grid emission factor. The grid in this case would be the 'Indian Grid' Formula Used:- $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where: BE_y = Baseline emissions in year y (t CO₂/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 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" (t CO₂/MWh) $EG_{PJ,y}$ = The verification team has checked the entire monthly JMR reports for net electricity generated & supplied to the grid and crosschecked same with the invoices raised by PP towards State Utilities for the monitoring period. All values are found correct. All the parameters are monitored and recorded as per the monitoring plan in the registered VCS PD & joint VCS PD & MR. The verification team has crosschecked the revised emission reduction sheet and monitoring report data with the JMR sheet and invoice and found all the values are matching. PE_y = As per para 37 of ACM0002 - Version 17.0, all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected. Leakage: As per para 60 of ACM0002 - Version 17.0, Leakage emissions are not considered for the project activity. However, for first crediting period, Project Emissions from Diesel Consumption (PEy1),

	22 KV Transmission line (PEy2) and SF6 (PEy3) are calculated as per the registered VCS PD.
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5.2 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. The Calibration details of the monitoring meters are also checked with calibration certificates.
Findings	No finding was raised on this section.
Conclusion	The metering arrangement is tri-vector bi-directional energy meters of Secure Make; accuracy class 0.2s (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. Monitoring meters are of accuracy class i.e. 0.2s. The meters are monitored continuously & cumulative readings are taken at the end of the month by joint meter reading procedure. These are sealed by State Utilities to avoid malfunctioning with meter readings. Meter is calibrated yearly by the meter testing division of the state utility in the presence of O&M Contractor / investor's representatives and State Utilities officials to ensure the working of meter within permissible limits, however, calibration frequency and schedule is under the complete discretion of State Utility and PP do not have control on it. The calculation of net electricity supplied to grid is under purview of state electricity board and PP does not have control on it. Calibration details of the monitoring meters checked with calibration certificates submitted by PP and found that calibration frequency of 5 years is complied. Calibration details are provided in the Appendix 1 of joint PD & MR. The break down log is checked and there is no major breakdown during the monitoring period. No unforced error observed.

6 VALIDATION AND VERIFICATION CONCLUSION

Applus+ Certification has been engaged by Himachal Baspa Power Company Ltd. to perform the Renewal of crediting period, title change and last verification of 1st crediting period and 1st periodic verification from second crediting period of the “300MW Hydropower Project by HBPL”

Renewal of crediting period Conclusion:

Applus+ Certification commenced the revalidation of the crediting period based on the following documents:

- baseline and monitoring methodology ACM0002 – version 17,
- VCS Standard version 03.7,
- Methodological tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” version 03.0.1,
- monitoring plan contained in the joint VCS PD & MR.

Applus+ Certification’s renewal of crediting period approach is based on the understanding of the risks associated with reporting of estimated GHG emission data and the controls in place to mitigate these. Applus+ Certification planned and performed the renewal or crediting period by obtaining evidence and other information and explanations that Applus+ Certification considered necessary to give reasonable assurance that reported information and estimated GHG are fairly stated.

The verification team confirms that:

- the project activity was found completely implemented as per the description given in the joint VCS PD & MR.
- The actual operation conforms to the description in the joint VCS PD & MR.
- The project complied with the renewal of crediting period criteria for project set out in VCS Version 3.
- The project is likely to achieve the following estimated GHG emissions reductions during the 10 years’s 2nd crediting period

Estimated GHG emissions **1212379 tCO₂e/year** and a total **12123790 tCO₂e** for the whole 10 years’ 2nd crediting period are likely to occur without material misstatement.

There is change in ownership of the project activity from Jaiprakash Hydro Power Limited (JHPL) to Himachal Baspa Power Company Ltd (HBPL). Hence the project proponent has seeking deviation in the project title from “300MW Hydropower Project by JHPL” to “300MW Hydropower project by HBPL”. This title change has no impact on project design, scale of the project activity, baseline methodology and monitoring etc.

Verification Conclusion:

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 VCS PD and the applied methodology ACM0002 - Version 17.0.

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 Monitoring Report is as per the joint VCS PD & MR;
- 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: Monitoring period from First crediting period; 01/09/2015 to 31/03/2016 and monitoring period from second crediting period; 01/04/2016 to 31/12/2017.

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)
01/09/2015 to 31/12/2015	257877.03	74.97	0.00	257802
01/01/2016 to 31/03/2016	62521.82	170.25	0.00	62351
01/04/2016 to 31/12/2016	1156291.06	0.00	0.00	1156291
01/01/2017 to 31/12/2017	1221307.23	0.00	0.00	1221307
Total	2697997.15	245.22	0.00	2697751

**APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (CREDITING PERIOD
RENEWAL, TITLE CHANGE & VERIFICATION)**

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates of the of the 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	Change in ownership documents	Deed of Novation	Project participant
4.	NA	Technical specifications of hydro turbine from manufacturers	Manufacturer technical specifications	Project participant
5.	NA	Power Purchase agreement for the project activity	NA	Project participant
6.	NA	Registered VCS PD	Version NA, dated 25/12/2008	Project participant
7.	NA	Final VCS Validation report	Version 01 dated 26/12/2008	Project participant
8.	NA	Monitoring report for earlier verification for monitoring period 01/01/2013 to 30/06/2013	Version 1.1 Dated 24/09/2013	Project participant
9.	NA	Verification report for earlier verification for monitoring period 01/01/2013 to 30/06/2013	Version 01 Dated 24/09/2013	Project participant
10.	NA	The operational lifetime of the project activity from the manufacturer=(Technical specifications)	Manufacturer technical specifications	Project participant
11.	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
12.	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
13.	NA	JMR records for the complete monitoring period	JMR records	Project participant
14.	NA	Joint VCS PD & MR version 1 Joint VCS PD & MR version 2	11/03/2018 21/03/2018	Project participant
15.	NA	Estimated Emission Calculation sheet version 01 Estimated Emission Calculation sheet version 02	11/03/2018 21/03/2018	Project participant
16.	NA	Actual Emission Calculation sheet version 01 Actual Emission Calculation sheet version 02	11/03/2018 21/03/2018	Project participant
17.	NA	Invoices for the complete monitoring period	Invoice	Project

No.	Author	Title	References to the document	Provider
				participant
18.	NA	Break down details of the complete monitoring period	Log sheet	Project participant

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

FAR ID	00	Section no.		Date:
Description				
Project participant response				
Documentation provided by project participant				
DOE assessment				Date:

Validation Findings

Renewal of Crediting period

Project Details

CL ID	01	Section no.	MR	Date: 17/03/2018
Description of CAR				
Clarification requested on the last verification period of previous crediting period and omission of monitoring period. Further, PP requested to submit MR, FVR and other supporting documents for last crediting period.				
Project participant response				Date: 21/03/2018
The current monitoring period is from 01/09/2015 to 31/12/2017 and ownership for this current monitoring period is with Himachal Baspa Power Company Ltd (HBPCL). For Current monitoring period, Himachal Baspa Power Company Ltd (HBPCL) is acting as PP for the project activity. The ownership documents are submitted to DOE. The previous verification have ownership of project with Jaiprakash Hydro Power Limited (JHPL), and previous verification documents are not accessible to new owner, hence the previous verification documents could not submit by new PP. As per VCS guideline, the project activity can choose any distinct monitoring period for VCS verification, hence the current monitoring period has been selected based on new PP ownership period.				
Documentation provided by project participant				
Ownership Documents Revised VCS PD and MR				
DOE assessment				Date: 25/03/2018
The change in ownership documents have been submitted by PP. Assessment team accepts the PP's response. CL closed.				

Monitoring Plan

CAR ID	01	Section no.	Section 4.2 of MR	Date: 17/03/2018
Description of CAR				
Mechanism for crosscheck of JMR values with Invoices is missing in PD.				
Project participant response				Date: 21/03/2018
The net electricity generated by project activity is sold Himachal Pradesh State Electricity Board (HPSEB) and JMR value is cross checked with invoices and found to be consistent. The note is mentioned in ER sheet.				
Documentation provided by project participant				

Revised VCS PD and MR ER spreadsheet JMR and invoices of the project activity	
DOE assessment	Date: 25/03/2018
Revised joint VCS PD & MR and ER sheets submitted by PP. CAR closed.	

CAR ID	02	Section no.	Section 4.3 of MR	Date: 17/03/2018
Description of CAR				
Joint PD & MR States that “At the Jhakri substation, the JMR of commercial metering at inter-connection point is jointly recorded by the representatives of PP and HPSEB every month.” However, both main & check meters are now located at project site. Correction in statement requested.				
Project participant response				Date: 21/03/2018
The meter details provided in VCS PD and MR are from project site and 0.65% transmission loss is deducted as per state electricity board. The main and check meter details are provided now in revised VCS PD and MR				
Documentation provided by project participant				
Revised VCS PD and MR				
DOE assessment				Date: 25/03/2018
Revised joint VCS PD & MR submitted. CAR closed.				

Verification Findings

Accuracy of GHG Emission Reduction and Removal Calculations

CAR ID	03	Section no.	Section 6 of MR	Date: 17/03/2018
Description of CAR				
Emission reduction values reserved for submission of ER sheet.				
Project participant response				Date: 21/03/2018
The ER sheet for calculation of emission reductions are submitted to DOE. The supporting documents are submitted to DOE.				
Documentation provided by project participant				
Revised VCS PD and MR ER spreadsheet				
DOE assessment				Date: 25/03/2018
ER sheets are submitted and checked. Found correct. 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
2.	Auditor	OR	Das	Mr. Sukanta	TQC-Outsourced entity	Yes	NA	NA	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)	IR	Shen	Simon	Applus+ Certification
2.	Approver	IR	Sendin	Juan	Applus+ Certification B.U. Managing Director

Short CVs of the Team:

- 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, CO₂/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.
- Mr. Sukanta Das, has done M. SC in (Electronics and Photonics) and M. Tech in (Energy technology) from Tezpur Central University/ Indian Institute of technology Bombay in India. He is a certified lead auditor for ISO 14001 EMS LA and ISO 9001 QMS LA from International registry for Certified Auditors (IRCA) and Certified Lean Management practitioner from Quality Council of India (QCI). He has more than 10 years of working experience at TUV NoRD/ Re-consult/CRA/APROJECT OWNERSLUS certifications under various categories of projects stating from Renewable to waste to supercritical projects. He was JI/ CDM Lead Assessor in TUV NoRD and was involved in more than 100 CDM validation and verifications activities in Gold Standard, VCS, CDM projects as a team leader/technical reviewer /validator / verifier covering the sectoral

scope 1, 13 technical areas 1.2/1.1/13.1. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APROJECT OWNERSLUS certification to carry out GHG audit.

3. 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
CO ₂	Carbon dioxide
CO _{2e}	Carbon dioxide equivalent
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