VALIDATION REPORT FOR 12 MW RAURA HYDRO PROJECT BY DLI POWER

Document Prepared By: LGAI Technological Center, S.A. (Applus+ Certification)

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Prepared By	LGAI Technological Center, S.A. (Applus+ Certification)
Contact	Campus UAB – Ronda de la Font del Carme, s/n 08193 Bellaterra – Barcelona (Spain) Tel.:+34 93 567 20 08 Fax.:+34 93 567 20 01 www.appluscertification.com agustin.calle@applus.com carla.debat@applus.com
Approved By	Juan Sendin Caballero, LGAI Technological Center S.A. (Applus+ Certification) B.U. Managing Director
Work Carried Out By	Lead Auditor: Ravi Kant Soni Technical Reviewer: Denny Xue

Summary:

LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted by DLI Power (India) Private Limited (Project proponent) to conduct the validation of the project title "12 MW Raura Hydro Project by DLI Power", with regard to the relevant requirements of VCS programme guidelines and standard (VCS standard version 3.7 dated 21/06/2017, VCS Validation and Verification Manual version 3.2 dated 19/10/2016 & VCS Program guide version 3.7 dated 21/06/2017). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for validation.

The purpose of this project activity is to generate clean electricity by utilizing renewable electricity from hydropower and to export the generated net electricity to the regional grid for sale which is connected to the unified Indian Grid system. This results in reduction of greenhouse gas emissions (GHGs) into the atmosphere which would have otherwise been occurred due to production of equivalent amount of electricity at the regional grid from other carbon intensive sources.

The proposed project activity is the installation of a Greenfield power plant. The proposed technology involves installation of three Pelton type hydro turbines each of capacity 4 MW to a total of 12 MW; which are installed but yet to be commissioned. Currently the project is at construction phase. The project activity is developed and owned by DLI Power (India) Private Limited. DLI is part of DLZ Corporation, one of the foremost engineering and water resource companies in the Midwestern United States.

The project proponent has applied the baseline and monitoring methodology AMS-I.D "Grid connected renewable electricity generation", version 18. The project will reduce anthropogenic emissions of greenhouse gases (GHG's) by displacing approximately 60,927.6 MWh/year of electricity at grid which corresponds to an emission reduction of approximately 56,202 tCO_2e per year.

A risk based approach has been followed to perform this validation. In the course of validation, 02 Corrective Action request (CARs) were raised and successfully closed based on the appropriate responses and corrections made by PP and 01 Forward Action Request (FAR) raised. The review of the project description document and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and stakeholders have provided Applus+ Certification with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarized as follows:

- The project is in line with all relevant host country criteria (India) and all relevant VCS and UNFCCC requirements for CDM

- The project additionality is sufficiently justified in the PD.

- The monitoring plan is transparent and adequate.

- The calculation of the emission reductions is carried out in a transparent and conservative manner, so that the calculated annual emission reductions of 56,202 tCO_2e are most likely to be achieved, thereby 562,020 tCO_2e within the 10 years of crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation. This validation is based on the information made available to Applus+ Certification and the engagement conditions are detailed in this report. No

restrictions or uncertainties were identified related to the validation.

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1 INTRODUCTION

1.1 Objective

Applus+ Certification has been contracted by DLI Power (India) Private Limited, the project proponent (PP), to undertake the validation of the renewable energy project titled "12 MW Raura Hydro Project by DLI Power". The purpose of this validation is to have an independent third-party assessment of whether the project activity conforms to the qualification criteria set out in the VCS Version 3.7 standard to attain real, measurable, additional and permanent emission reductions. The validation statement/opinion is a written assurance that the project complies with all the applicable VCS requirements and has the ability to generate the emission reductions stated over the project's crediting period. The validation followed the requirements of the current version of the VCS Standard Version 3.7 and VCS Program guide 3.7 to ensure the quality and consistency of the validation work and the report. .

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (AMS-I.D "Grid connected renewable electricity generation", version 18) which are included in the VCS PD and other relevant supporting documents.

The scope of work covered in the validation is described below:

- To validate whether the project activity meets the requirements of VCS Standard Version 3.7, VCS Validation and Verification Manual version 3.2 and VCS program guide 3.7 including additionality, proof of title and compliance with local laws.
- To evaluate whether the baseline and monitoring plan are in conformance with the applied methodology from the VCS approved GHG program
- To confirm that the information presented are completed, consistent, transparent and free of omission or material error
- Background investigation and follow up interviews
- Issuance of draft validation report with CARs, CRs & FARs, if any
- Final validation opinion

The information in the PD is reviewed against the criteria of VCS Standard 3.7, the VCS Program guide 3.7 and the applied consolidated baseline and monitoring CDM methodology AMS I.D, version 18.

Applus+ Certification has performed validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate Verified Carbon Units (VCUs).

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

1.3 Level of Assurance

The level of assurance of the validation report falls under reasonable assurance engagements as selected by the Client. Materiality for the project is 5%.

1.4 Summary Description of the Project

The proposed project activity is a renewable wind electricity generation project and supplying power to the Indian Grid system. The power generated by the project will be replacing the equivalent amount of electricity from the Grid system, which is dominated by fossil fuel based grid connected power plants. The project activity is located at 31^{0}35'00" N latitude and 76^{0}22'30" E longitude in the district of Kinnaur in the state of Himachal Pradesh, India.

The project activity consists of 3 turbines of 4 MW each, making the total installed capacity to be 12 MW. The turbines are Pelton Type Twin Jet, proposed to be commissioned between by 01/03/2019. The same was discussed during the site visit and as per current status of the plant progress the proposed date seems to practical.

2 VALIDATION PROCESS

2.1 Method and Criteria

Validation was conducted using Applus+ Certification's procedures in line with the requirements specified in the VCS standard Requirements, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

It is to be assessed and determined whether the proposed implementation and operation of the project activity, and the steps taken to report emission reductions comply with the criteria and relevant guidance provided by the VCS Board. The validation process consist of the following three phases;

- A desk review of the VCS PD
- Site visit and follow up interviews with project stakeholders
- The resolution of outstanding issues and issuance of final report and opinion

2.2 Document Review

The validation team has conducted the validation using the VCS Standard and the AMS-I.D version 18 methodology as the reference criteria.

The validation team had done the completeness check of VCS PD submitted by the PP as per the VCS standard Version 3.7 requirements was reviewed. Furthermore, a desk review was also carried out to assess the following:

- Information of project details in compliance with VCS PD template
- Appropriateness of methodology AMS-I.D version 18 applied to the project activity
- Compliance with relevant laws and regulations
- Correctness of application of baseline and monitoring methodology
- Demonstration of additionality

- Monitoring plan described in the VCS PD
- Stakeholder consultation
- Proof of listing of project under pipeline
- Calculation of grid emission factor, etc. where applicable.

The VCS PD version 01 dated 08/08/2018 was initially reviewed and the PP requested to submit the revised documents along with the supporting information and documents. The revised documents and additional supporting documents were further assessed by the validation team. During the validation process, the revised VCS PD and the supporting documents were assessed to confirm the actions taken by the PP to the CARs and CRs issued.

The validation team has reviewed the final version of the final VCS PD version 02 dated 20/12/2018 to confirm that all changes agreed have been incorporated.

Further, prior to the onsite visit, it was verified by the validation team that the project was listed in the VCS pipeline in line with the requirements (Section 3, Registration and Issuance process, version 3.8 dated 21 June 2017) https://www.vcsprojectdatabase.org/#/pipeline_details/PL1800.

The details of the documentation reviewed during the validation are provided under appendix 1 of this report.

2.3 Interviews

The validation team has carried out interviews in order to verify the information included in the project documentation and to gain additional information regarding the compliance of the project with the VCS requirements. Before and during the on-site visit, the validation team has interviewed the representatives of the PP to confirm selected information and to clarify issues identified during the document review. The names and designations of the personnel interviewed are mentioned in section 2.4 below.

The main topics covered during the interview are as follows:

- General Aspects of the project
- Project Implementation
- Equipment and operation
- Proposed Staff Training procedures
- Proposed Monitoring & Measuring System
- Proposed Calibration procedures
- Data collection, recording and archiving procedure
- QA/QC procedures
- VCS documentation
- Projected emission reduction calculations

2.4 Site Inspections

As part of the verification, an on-site inspection has been performed by the validation team and. The site visit was carried out on 04/12/2018. During the site visit representatives of the PP at site were interviewed; i.e. personnel responsible for monitoring of the project activity, data collection and management, and QA/QC procedure. The details of the people interviewed and the topics discussed are mentioned in the table below:

Location: Hydro Project Site at kinnaur district of Himachal Pradesh, India	**Date:** 04/12/2018
Coverage	**Source of Information / Persons Interviewed**
Project implementation, start date as per the VCS requirements. Electricity Generation Records (monthly energy statements, Invoices) Reliability & accuracy of readings considered for emission reduction calculations, Calibration procedure	Mr. Manoj Kumar Sah (DGM- DLI)
Monitoring and measuring system • Collection of measurements • Observations of established practices • Data Verification of monitoring parameters	Mr. Vineet Thakur (Senior Engineer - DLI)
QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices Consideration of monitoring period, monitoring methodology, project documentation and emission reduction calculations	Mr. Hitendra Kumar (Senior Engineer - DLI)

2.5 Resolution of Findings

As an outcome of the validation process, the team can raise different types of findings

A Clarification Request (CR) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met

Where a non-conformance arises the team leader shall raise a **Corrective Action Request (CAR).** A CAR is issued, where:

- The Project Proponent has made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The VCS requirements have not been met;

- There is a risk that emission reductions cannot be monitored or calculated.

The validation process may be halted until this information has been made available to the team leader's satisfaction. Failure to address a CR may result in a CAR. Information or clarifications provided as a result of a CR may also lead to a CAR. No CR has been raised during the validation of the project activity.

During the validation process, total 02 CARs were raised and resolved satisfactorily. The list of CARs/CRs/FARs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix 2 of this report.

2.5.1 Forward Action Requests

A Forward Action Request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the VCS requirements for registration.

01 FAR has been raised during the validation of the project activity for confirmation of implementation of project activity as per PD description during verification of project.

3 VALIDATION FINDINGS

3.1 Project Details

Project type, technologies and measures implemented, and eligibility of the project:

As per the project type defined by the UNFCCC and VCS version 3.7 Guidelines, the project activity falls under type-I (Renewable energy projects) and the list of Sectoral the sectoral scope 1 - Energy Industries (renewable/ non-renewable sources).

The project activity consists of 3 hydro turbines (4 MW capacity each), making the total installed capacity to be 12 MW. The turbines are of Pelton Type Twin Jet. The proposed project activity is a Green field project which results in an estimated GHG emission reduction of 56,202 tCO_2e annually and a total of 562,020 tCO_2e over 10 years of the 1st crediting period.

The technology employed by project activity involves, generation of electrical using hydropower pant. The technology used in the project does not generate any GHG emissions, hence considered as an environment friendly. The project activity is a Greenfield project and there was no electricity generation at the project site prior to the implementation of project activity. The turbine under the project activity is generally having an average lifetime of 35 years. The equipment's are based on manufacturer's specifications and as per industry standards. The key technical specifications of the project activity are as follows:

Details	**Values**
Intake Well:	
Shape:	Rectangular
Size:	W 7.3 m , H 6.8 m, L 5 m
Intake Conveyance Tunnel:	Size 2 m, L 27 m
Forebay (Underground):	
Specifications:	Bed Width 7.5 m, Height 6.5 m, Length 39 m
Full Supply Level	2144.5 m

Shaft Diameter	5 m
Shaft Height	35 m
Penstock:	
Number of Main Penstock	One
Number of branch Penstock	Three
Diameter	Main 1500 mm, Branch 900 mm
Design Discharge	4.6 m3/sec
Length of main branch penstock	1645 m
Power House:	
Type:	Underground
Length:	45 m
Width:	13.5 m
Height:	20 m
Max. Tail Water Level:	1824.5 m
Min. Tail Water Level:	1822.5 m
Max. Gross Head Up to Forebay:	318 m
Net Head (Design)	307 m
Turbine:	
Installed Capacity:	12 MW
Type of Generating Unit:	3 nos. of Horizontal Axis Pelton Turbines coupled with synchronous generators
Rated capacity of each Turbine:	4 MW
Minimum Discharge:	1.11 cumecs
Generators:	
Type of Generators:	Synchronous
Number of Generators:	3 Nos.
Power Factor:	0.9
Rated Voltage:	6.6 kV
Frequency:	50 Hz
Power and Energy Generations:	
Energy Generated in 75% dependable year	66.3 MU

The purpose of the project activity is to generate the electricity and supplying to grid by the utilization of hydro power. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding GHG emissions which otherwise would have been generated by the operation of grid connected power plants and by the addition of new sources. Hence the project accomplishes VCS conditions.

Project proponent and other entities involved in the project-

M/s DLI Power (India) Private Limited is the project proponent and no other entities involved in the project activity at present.

Project start date-

The project start date is proposed to be 01/03/2019. This is because the project is currently at construction phase and expected date of commissioning is by 01/03/2019. Nevertheless, the current prescribed date is futuristic and hence the start date of the VCS project activity is to be considered as the date of actual commissioning of the plant.

Project crediting period-

The crediting period of the project activity is fixed for 10 years. The crediting period is proposed from 01/03/2019 to 28/02/2029. Since the project is yet to be commissioned, therefore actual start date of the crediting will be considered as the date of commissioning of the plant. However, as per provision of the VCS the crediting period can be renewed for another 10 years on expiry of the first crediting period as project has sufficient lifetime of operation.

Project scale and estimated GHG emission reductions or removals-

The estimated annual emission reductions for the project activity are 56,202 tCO_2e which is less than 300,000 tCO_2e. Hence the category is applicable under "Project".

Project location-

The project activity is located as follows:

Host Part(ies) : India
Region : North India.
State : Himachal Pradesh
District : Kinnaur

Geo-coordinates of the project location is verified as:

Latitude : 31^0 35' 00" N
Longitude : 76^0 22' 30" E

Conditions prior to project initiation-

The project is a Greenfield run-of river small hydro power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. Prior to the initiation of the project activity, the equivalent amount of electricity would have been drawn from grid connected or new power plants, in Indian Grid. The grid is predominantly fossil fuel based and therefore is a major source of carbon dioxide emissions in India. The main emission in the pre-project scenario is the power plants connected to the Indian Grid, and main GHG involved is CO_2e.

Project compliance with applicable laws, statutes and other regulatory frameworks:

The project is a voluntary initiative by the project proponent and has not been implemented to meet any local / national laws or regulatory compliances. The project activity is in compliance with current laws and regulations and there are no legal and/or regulatory requirements that prevent the project implementation. Also, the validation team has confirmed that there is no such compliance requirement with an emission trading program or any binding limits on GHG emissions for the project activity in India (host country) as it is a non-annex 1 country. The project has obtained valid consents for the installation and operation from the concerned agencies and authorities; and is in compliance with local laws and regulations.

Ownership and other programs-

Right of use

The project activity comprises of 3 hydro turbines with a capacity of 4 MW each owned by DLI Power (India) Private Limited. The ownership of the project activity is verified through the following documents:

- Purchase order issued by the PP to technology supplier
- Consents and Approvals received for the project from different nodal agencies
- Detailed Project Report (DPR)
- Also, when the plant will be commissioned then ownership can also be referred from Commissioning Certificate

Emissions trading programs and other binding limits

Project activity does not reduce GHG emissions from activities that are included in emissions trading program or any other mechanism that includes GHG allowance trading. This is verified through the declaration submitted by the PP which states that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions for the same monitoring periods.

Other forms of environmental credit sought or received and eligible to be sought or received:

The project activity has not sought or received another form of GHG related environmental credits. The project seeking registration under the VCS and not listed under REC mechanism as verified from https://www.recregistryindia.nic.in/index.php/general/publics/registered_regens.

Participation under other GHG programs:

The project has not been participated under other GHG programs. Also the PP has submitted the declaration which states that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions for the same monitoring period.

Rejection by other GHG programs:

The project has not been rejected by other GHG programs. It was verified and confirmed from website of other GHG programs like GS and CDM at publically available information, and found to be correct.

Additional information relevant to the project, including:

- ***Eligibility criteria for grouped projects***

The project activity is not a grouped project, hence not applicable to the project activity.

- ***Leakage management for AFOLU projects***

Not applicable to the project activity.

- ***Commercially sensitive information***

No commercially sensitive information has been excluded from the public version of the project description. This verified from review of PD and found to be correct.

Conclusion:

In view of the assessment of final VCS PD and supporting documents as listed in Appendix 1 of this report, the validation team is able to confirm that the description contained in the final VCS PD of the project activity provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. Consequently, Applus+ Certification confirms that the project description of the project contained in the VCS PD to be complete and accurate. The VCS PD complies with the relevant forms and guidance for completing the VCS PD.

3.2 Application of Methodology

3.2.1 Title and Reference

The project activity has applied CDM approved methodology AMS-I.D version 18.
Title: Grid connected renewable electricity generation
Reference: The approved baseline methodology has been referred from the "Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories." https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

Tools referenced in the applied methodology:

- Tool to calculate the emission factor for an electricity system" (version 07.0)
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (version 03.0)
- Tool to determine the remaining lifetime of equipment (version 01.0)
- Project and leakage emissions from biomass (version 04.0)
- 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)

Apart from above, Additionality Tools also applied as "'Demonstration of additionality of Small Scale project Activities' (version 12.0.0)." and "Investment Analysis tool version 09.0"

3.2.2 Applicability

The project activity has a proposed capacity of 12 MW which will qualify for a small-scale project activity under Type-I of the Small Scale methodology. The project status is corresponding to the methodology AMS-I.D version 18 and applicability of methodology is discussed below:

As per the AMS-I.D, version 18

Applicability criteria 1:

1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:

(a) Supplying electricity to a national or a regional grid; or

(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.

Justification for project activity:

The project activity is a Renewable Energy Project i.e. Small Hydro Power (SHP) generation Project which falls under applicability criteria option 1 (a) i.e., "Supplying electricity to the Indian grid". Hence the project activity meets the given applicability criterion as well as satisfies the applicability illustration mentioned in Appendix of AMS-I.D Table 1 – Scope of AMS-I.D version 18.

VVB Conclusion:

The current project activity is a grid-connected renewable power generation. The connection of the project activity with the grid is substantiated and confirmed by means of the Power Purchase agreements. The project activity is a new wind power plant at the project site where no renewable power plant was operated prior to the implementation of the project activity; same has been confirmed during the site visit. The Purchase order for the civil work and turbines indicates that the project is new and do not involve retrofit and/or modifications. Thus the criterion is fulfilled by the proposed project activity.

Applicability criteria 2:

2. This methodology is applicable to project activities that:

(a) *Install a Greenfield plant;*
(b) *Involve a capacity addition in (an) existing plant(s);*
(c) *Involve a retrofit of (an) existing plant(s);*
(d) *Involve a rehabilitation of (an) existing plant(s)/unit(s); or*

(e) Involve a replacement of (an) existing plant(s).

Justification for project activity:

The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion.

VVB Conclusion:

As verified above the project activity involves installation of hydro power plant hence point (a) is applicable and the project activity does not involve any capacity additions, retrofits or replacements of an existing facility because it is a greenfield hydro power generation project activity, same has been confirmed from physical inspection during the validation site visit., hence point (b) is not applicable for the project activity.

Applicability criteria 3:

3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:

(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or

(b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m^2.

(c) (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.

Justification for project activity:

The project is installation of new runoff river SHP electricity generation plants (not a reservoir based hydro power plant). Hence this criterion is not applicable to the proposed project activity.

VVB Conclusion:

The project activity is new runoff river SHP electricity generation plants (not a reservoir based hydro power plant). Hence this criterion is not applicable to the proposed project activity.

Applicability criteria 4:

4. If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.

Justification for project activity:

The proposed project is 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

VVB Conclusion:

The project activity capacity is 12 MW which below 15 MW as the capacity is confirm from Technical Details and Purchase Order of hydro turbine during site visit, hence; the criterion is not applicable to this project activity.

Applicability criteria 5:

5. Combined heat and power (co-generation) systems are not eligible under this category.

Justification for project activity:

The project is SHP power project and thus the criterion is not applicable to this project activity.

VVB Conclusion:

The project activity is SHP power project and thus the criterion is not applicable to this project activity.

Applicability criteria 6:

6. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct1 from the existing units.

Justification for project activity:

The proposed project is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

VVB Conclusion:

The project activity is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW as confirmed during site visit; hence, the criterion is not applicable to this project activity.

Applicability criteria 7:

7. In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.

Justification for project activity:

The proposed project is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

VVB Conclusion:

During site visit it was confirmed that the project activity is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

Applicability criteria 8:

8. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.

Justification for project activity:

The proposed project is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

VVB Conclusion:
The project activity is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

Applicability criteria 9:

9. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.

Justification for project activity:

The proposed project is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

VVB Conclusion:
The project activity is a greenfield 12 MW SHP i.e. only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.

3.2.3 Project Boundary

As per applicable methodology AMS-I.D. Version 18, "The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to."

The project boundary also includes a proposed stand-by diesel generator (DG) set which will be operated only as a failsafe option or standby power requirements in case the power plant is not operating. The Indian grid is included in the project boundary.

The consideration, by the PP, of only CO_2 gas for the baseline emissions is conservative and also in line with the methodology. The exclusion of CH_4 & N_2O in the baseline scenario is appropriate.

The project activity involves the generation of electricity using hydro energy. Hence, there are no project emissions associated with this project activity. Hence, the exclusion of CO_2, CH_4 & N_2O in the project scenario are appropriate. The electricity imported by the project activity will be accounted in the net electricity exported to the grid by the project activity. There are no other sources of project emissions. Hence, the project participant has considered the project emissions as zero for project activity; this is in line with the methodology.

The project boundary gives a clear understanding of emission sources related to the baseline scenario. The project proposes a DG set as standby arrangement. However there are no sources attributable to project emissions or leakage emissions, which can contribute more than 1% of overall expected annual emission reductions, and which are not addressed by the applied methodology, involved, as the project activity is electricity generation through hydro power. No leakage emissions involved as equipment's were not transferred from another activity or to another activity. The project boundary in section 2.3 of the VCS PD properly explains the physical description of the project activity. Also it is found that all the components and facilities to mitigate GHG gases are included in the project boundary. The validation team is of the opinion that the project boundary has been correctly identified in the VCS PD in line with paragraphs 69 to 74 of VVS for PAs, version 02.0.

3.2.4 Baseline Scenario

As the project activity involves the installation of a newly built and grid-connected renewable power plant that exports the generated electricity to the Indian grid system, hence, according to the methodology AMS-I.D version 18, the baseline scenario is determined properly as:

"*The baseline scenario is that the 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 into the grid".*

The latest available version for "Tool to calculate the emission factor for an electricity system" is version 07 and the PP has correctly referred to the same in the section 3.1 of the final PD for determining baseline grid emission factor and it is found to be correct.

The calculation for the operating margin and combined margin for the Indian Grid is readily available and published by the Central Electricity Authority, Government of India. The CEA power sector data is referred by all CDM project in India in the ER calculation and it is yearly updated with recent data. The project activity has referred the CEA Baseline Carbon Dioxide Emission Database is version 13 Published in June 2018, which was the latest version available during submission of the PD.

The PP has used the simple operating margin calculation. The simple operating margin is calculated as an average of the latest available three years (at the time of PD submission for validation) i.e. 2014-15, 2015-16 and 2016-17. The value for simple operating margin has been validated and used as 0.9726 tCO_2/MWh. The Build margin for the Indian grid is considered as 0.8723 tCO_2/MWh. The weighted average combined margin has been calculated by the PP, considering the 50% weighted for operating margin and 50% for build margin; this is in accordance with the tool. The weighted average combined margin emission factor for the project

activity comes to 0.92245 tCO_2/MWh. The PP has provided the calculation for the same in the ER calculation sheet and it was validated by the validation team. The baseline emission factor for the electricity system has been calculated on ex-ante basis and will remain fixed for the entire project crediting period.

The discussion on baseline is comprehensive in the VCS PD section 3.1 and it is in line with the approved consolidated baseline and monitoring methodology AMS-I.D version 18. Also the identified baseline for the project activity is the most likely scenario of what would have occurred in the absence of the project activity and is confirmed by TA expert on the team; thus it is accepted. The project proponent has included all sources and references used for baseline determination for the project activity in the PD and the identified baseline is justified appropriately by the project participant. The Baseline scenario and baseline emission calculations are found as per AMS-I.D. version 18. The combined margin approach is the ex-ante approach as per tool to calculate the emission factor for an electricity system. Based on the requirements of paragraph 83 of the VVS for PAs, version 02.0, the validation team confirm that:

(a) All the assumptions and data used by the PP are listed in the VCS PD, including their references and sources;

(b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PD;

(c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;

(d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PD;

(e)The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed project activity.

3.2.5 *Additionality*

The additionality of the proposed project activity is demonstrated using an investment barrier analysis as according to the steps described in the 'Demonstration of additionality of Small Scale project Activities' (version 12.0.0).

As per the applied methodology AMS-I.D. version 18; Para 19, 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 plant and by the addition of new generation sources. As the baseline scenario is prescribed by applied methodology, hence no further analysis is carried out to identify alternatives. This is in line with the methodological requirement.

PP has adopted "Investment Analysis tool" version 09.0 to demonstrate the additionality of the project.

PP has considered Post-Tax Equity IRR for investment analysis at the time of investment decision. As per Para 15 of investment analysis tool version 09.0 states that "....Required/expected returns on equity are appropriate benchmarks for equity IRR. Therefore, the expected return on equity is considered appropriate benchmark."

In line with this guideline, the post-tax Equity IRR has been considered as the relevant financial indicator for Investment Analysis. As a conservative approach, default value of benchmark (cost of equity) as per investment analysis tool version 09.0 has been considered for this project activity, which is 16.61%.

Assessment team has found that the input parameters in the financial analysis have been taken as per the values and assumptions applicable and available at the time of decision to invest in the project activity in line with Paragraph 10, Investment Analysis tool version 09.0.

The approach used in the PD has been assessed based on a document review, whilst the following relevant documents have been reviewed:

- Board Resolutions by the Project Proponent to confirm investment into the proposed project activity with consideration of carbon credit revenue
- Detailed Project Report, year 2015
- Proposal & Purchase order submitted by technology supplier to PP
- Equity IRR and Benchmark Analysis calculation sheet
- HPERC tariff order, available in 2012 and in 2018.

On site, the additionality of the project activity has been discussed with representatives of the PP and finally the data, rationales, assumptions; justifications and documentation provided have been checked using local knowledge and sectoral and financial expertise of the Assessment Team.

The financial calculations for the project activity have been discussed as below in detail;

Financial Indicator (Equity IRR):
The PP has selected equity IRR (post-tax) as the financial indicator for the Benchmark Analysis. The appropriateness of the financial indicator has been verified by the assessment team, it was confirmed that the equity IRR is a widely accepted financial metric used by many corporations and financial institutions for investment decision-making and is a long-established benchmark for investment decisions in the Indian power sector. The PP has selected Return on equity as the benchmark which is in line with Investment Analysis tool version 09.0.

The post-tax equity IRR for the project activity at the time of investment decision comes out to be 8.33%. The data, rationales, assumptions and justifications mentioned in the PD and investment analysis excel sheets were checked against the local knowledge of the validation team, sectoral scope expertise, regulatory and applicable legal requirements in the Host country India. The documents were also verified by the financial expert. The appropriateness of the input values, used for financial calculation have been checked in line with paragraph 10 of the Investment Analysis tool version 09.0.

1. Project Cost:

The Project cost for the project activity has been considered from the budget stipulated into the DPR which was available to PP at the time of investment decision. The project cost includes cost of materials and equipment, labour and services, identification, selection and allocation of land, cost for obtaining all government permissions, infrastructure development charges, cost of Financing, and few other essential miscellaneous charges. This is found to be appropriate and it is accepted. The project cost for the project activity has been considered as INR 9,641.25 lacs. The appropriateness of the same is further cross-checked against the actual purchase order placed for the project activity.

Also, at the time of site audit and assessment, PP has submitted a CA certified account statement of the actual cost incurred in the project as on 30/11/2018. It has been verified that the actual project cost incurred so far is more than the cost considered as input in the IRR sheet. Assessment Team has also verified that as per sensitivity analysis the IRR reaches the benchmark only when project cost is reduced by 27%, which corresponds to a project cost of 5.86 Crore per MW. However, this is not a realistic condition as actual project cost incurred so far is already more than INR 8 Crore per MW as confirmed from the certified account statement.

2. Operation and Maintenance Cost and its escalation:

The O & M cost for the project activity & annual escalation has been considered as per the HPERC Order. Also the O&M cost & escalation considered for the project activity is further checked with the DPR and the assumption is found to be conservative. The appropriateness of same has been crosschecked with few other hydro power projects of India and found to be appropriate and it is accepted.

Moreover, as per sensitivity analysis the IRR reaches the benchmark only when O&M expenses is reduced by 180%, which is practically not possible as under such circumstances the O&M cost will be negative which is not practical. Thus, assessment team concluded that any variation in O&M expenses does not have impact on the project additionality.

3. Plant Load Factor:

The Plant Load Factor as 63% is considered from the third party approved DPR available to the PP at the time of decision. In line with paragraph 3 (b) of Annex 11 of EB 48 the proposed PLF is prescribed by third party based on detailed hydrology study as can be referred from the DPR. Hence it can be concluded the PLF considered by the PP is appropriate.

To further crosscheck the appropriateness of the PLF considered for the project activity, HPERC tariff order has been checked and found that assumed PLF is conservative and hence acceptable. Further, as per sensitivity analysis the IRR reaches the benchmark only at a PLF of 87% which is achievable only when projected generation of the project increases by 38%. This is a very remote possibility as IRR has already been evaluated at an avg. PLF of 63% which is already more than average PLF prescribed for the state.

4. Electricity Tariff:

The Project Proponent had considered INR 2.89/kWh as the power tariff in line with the HPERC tariff order. Since, it was the latest available and applicable tariff rate for the project at the time of decision making of the project activity, paragraph 10 of Investment Analysis tool version 09.0 is

followed and it is accepted. Thus it is concluded that electricity tariff considered for the project activity is found to be appropriate and it is accepted.

Also the validation team has assessed the impact on the IRR value and project additionality using the sensitivity analysis. It has been observed that the IRR reaches the benchmark only when tariff is increased by 38%, which corresponds to a power tariff of 3.98 Rs./kWh. This is not practical or not possible to achieve as project is about to get commissioned and the maximum levellised tariff calculated as per HPERC tariff order for projects of such capacity range (i.e. 5 MW to 25 MW) is 3.44 Rs./kWh wherein as per rounding practice fraction of less than 0.5 shall be ignored, thus net effective power tariff can be maximum of 3 Rs./kWh which is well below this breakeven value. Thus, the validation team concluded that any probable variation in tariff does not have impact on the project additionality.

The Electricity Act, 2003, the policies framed under the Act, as also the National Action Plan on Climate Change (NAPCC) provide for a roadmap for increasing the share of renewable energy in the total generation capacity in the country. Central Electricity Regulatory Commission (CERC) has notified Regulation on Renewable Energy Certificate (REC) in fulfilment of its mandate to promote renewable sources of energy and development of market in electricity. Thus the project applicability for these benefits under REC mechanism has been checked. Detailed procedure on REC mechanism dated 01/06/2010 published by Central Electricity Regulatory Commission (http://www.nerldc.org/Docs/Order_for_Detailed_Procedure_01-06-2010.pdf) is checked for REC eligibility of the project activity and it is confirmed that the procedure was applicable at the time of projects investment decision. It is confirmed that PP has not applied for REC benefits and also REC is not applicable for the projects as consideration of power tariff for the project is based on preferential tariff. Also in the actual scenario, PP will not be claiming REC benefits for the project activity and it is confirmed during the site visit while interviewing the PPs representative and further checked from the official web site of REC registry hence it is accepted.

Furthermore, Validation team has checked through the probable benefits of subsidy available for hydro projects in India. However, it has been found that the projected subsidy has already been accounted in IRR computation which is not yet certained/confirmed for the project activity. Thus, any future subsidy received from MNRE as per applicable amount will not impact the additionality of the project.

5. Debt to Equity Ratio:

The Debt – Equity ration considered for the project is 70:30. This is in line with the paragraph 26 of Guidelines on the assessment of Investment Analysis tool version 09.0 which talks about typical debt/equity finance structure in the sector in the country. Typical debt-equity ratio is 70:30 in wind energy sector and this is also checked from HPERC tariff order.

In addition, the actual debt equity ratio was confirmed to be 70:30 from the actual loan sanction letter. There is no variation and IRR remains well below the benchmark and hence it is found appropriate and thus it is accepted.

6. Life Time of project activity: 35 years

The lifetime of the project activity considered as 35 years which has been considered from the proposal issued to the PP by the supplier. This found to be appropriate as confirmed by the technical expert and also prescribed in the DPR. The crediting period of the proposed project activity is 10 years as mentioned in the VCS PD. However the period of assessment considered for the investment analysis is 35 years. This has been confirmed from the IRR-benchmark spreadsheet submitted by the PP. Hence the considered assessment period meets the requirement of Investment Analysis tool version 09.0.

7. Interest rate on term loan: 12.87%

The interest on term loan considered for the investment analysis from the HPERC tariff order/X/. This was available to the PP at the time of the investment decision. Hence the considered rate is appropriate and in line with applicable guidance in Investment Analysis tool version 09.0.

8. Loan Tenure, Repayment period and Moratorium period:

The PP has considered loan tenure as 10 years, a repayment period of 7 years months with a moratorium period of 3 years as per the DPR. The considered repayment schedule was available to the PP at the time of investment decision and also found to be consistent with the actual loan sanction letter; hence found to be acceptable.

9. Book Depreciation Rate and Income Tax Depreciation Rate:

The Depreciation rate is considered at 3.40% on Straight Line Method (SLM) as per the Companies Act, Schedule XIV, Item II (i) (b) published by the Government of India/23/. Furthermore, the PP has considered 10% as salvage value and 90% as depreciable component on plant and machinery as per publically available source (Schedule XIV, The Companies Act 1956/23/), which is found justified.

The income tax depreciation rate (WDV) were considered as 10% for building and 15% for plant & machinery which are in line with Income Tax Act 1961 (Source: Appendix IA of Income Tax Rules) published by the Government of India. As the Income tax India website is official data, it eliminates any ambiguity that there could have been in this regard.

Corporate Tax Rate and Minimum Alternate Tax (MAT) rate:

The PP has considered the corporate tax rate as 34.61% and MAT rate as 21.34% from the Income tax act published by the Government of India. The values and sources were available to the PP at the time of decision making. This is found to be appropriate and hence accepted.

10. Salvage value:

Salvage value of 10% of plant and machinery and 100% of land cost has been assumed based on the publically available source (Schedule XIV, The Companies Act 1956) published by the Government of India. As the data has been published by the government, the same is acceptable to the assessment team. Furthermore, the HPERC tariff order also mentions that "The salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset". The salvage value has been correctly used in the calculation of Equity IRR.

11. Income tax holiday (Section 80I/A benefit)

The PP has considered the income tax holidays for 10 consecutive years in the first 15 years of the of the project lifetime as per section 80IA of income tax act 1961. The tax holiday is considered as per Income Tax Act, Government of India (http://law.incometaxindia.gov.in/dittaxmann/incometaxacts/2008itact/sec_080-ia.htm). The appropriateness of the same has been checked and confirmed by financial expert involved in the project activity. This is found to be appropriate and it is accepted.

Conclusion:

The values considered for all the above discussed parameters were available at the time of investment decision and hence are valid and applicable to the project activity. All input values have been be consistently mentioned and applied in all calculations. This meets the requirement of paragraph 10 of Investment Analysis tool version 09.0. The assessment team confirms that in the calculation of equity IRR only the portion of investment costs which is financed by equity has been considered as the net cash outflow and the portion of the investment costs which is financed by debt has not been considered a cash outflow. This meets the requirement of Investment Analysis tool version 09.0.

Based on the above parameters, the Equity IRR for the project activity is calculated to be 8.83%. This is lower than the calculated benchmark of 16.61%. This signifies that the proposed project activity is not financially attractive and is therefore additional.

The PP has provided the IRR calculation and the benchmark in the form of an investment analysis in excel spreadsheet and results have been provided in the VCS PD. The benchmark has been calculated in line with table 1 of Investment Analysis tool, version 09 for country India applicable to group 1 projects. Based on the option, the PP has selected the default value for the expected return on equity (in real terms) from table 1 of Investment Analysis tool, version 09. The default value has been obtained as 11.06% for India corresponding to Group 1 (Energy Industries).

The IRR calculation has been carried out on in nominal terms. Hence as per the requirement of Investment Analysis tool, version 09, the PP has converted the default value (i.e. 11.06%) which is in real terms to nominal terms by adding an inflation rate. The inflation rate has been sourced from the Reserve Bank of India's (RBI) Survey of Professional Forecasters: Results of 34th Round dated 03/06/2015. It was verified that the inflation rate is expected to be 5% over the next 10 years. The RBI is the Central Bank of India and hence the source for the inflation rate is appropriate. The assessment team has confirmed that the default value was available at the time of decision making and has been appropriately applied by the PP.

Therefore the benchmark is calculated to be 16.61% (i.e. based on the equation: Nominal Rate = {(1+Real Rate)*(1+Inflation Rate)}-1.)

The validation team is of the opinion that the above benchmark, which is based on the parameters that are standard in the market, is suitable in the context of the project activity. Since the benchmark is based on parameters that are standard in market, the ROE is calculated by using best financial practices and data sources have been clearly validated by validation team.

The suitability of the benchmark considered for the project activity is confirmed in line with paragraph 20 of the Investment Analysis tool, version 09.0 as follows:

a. The financial indicator used for the project investment analysis is post-tax Equity IRR, and the benchmark has been calculated as ROE which is suitable to the type of financial indicator chosen by the PP.

b. Since this is a hydro energy generation project, and RBI's WPI minimum inflation rate for host country i.e. India is applied as per the Investment Analysis tool, version 09.0 and hence no risk premiums are applied.

c. The financial analysis of the project at the time of investment decision as well as with actual parameters, along with the respective sensitivity analysis, shows that the Equity IRR of the project, under no scenario crosses the benchmark returns. Therefore it can be concluded that the project is not financially viable and hence it can be assumed that no investment would be made at a rate lower than the benchmark return.

Sensitivity analysis:

As discussed above under the Financial Indicator section, the sensitivity analysis has been carried out by PP for a reasonable range of variations i.e. +/-10% of major parameters and demonstrated in the IRR spreadsheet and the VCS PD; and this was found to be as per Investment Analysis tool, version 09.0. Moreover, PP has demonstrated the sensitivity analysis to find out all breakeven points under which IRR crosses the benchmark. It has been observed that the project activity is additional under all plausible circumstances.

The summary of the sensitivity analysis of the key sensitive variables is tabulated as below;

Parameters	**Change**	**Factor Value**	**At what percentage the IRR crosses the Benchmark Value**
Equity IRR	**8.83%**		
Generation (PLF %)	0.0%	63%	**38.00%**
Project cost (INR in Lacs)	0.0%	9641.25	**-27.00%**
Operation & Maintenance Expense	0.0%	2.3%	**-180.0%**
Tariff (INR/kWh)	0.0%	2.89	**38.00%**

Change in Generation	-10%	0%	10%
Equity IRR	6.58%	8.83%	10.96%

Change in Project cost	-10%	0%	10%
Equity IRR	11.20%	8.83%	6.82%

Change in Operation & Maintenance Expense	-10%	0%	10%
Equity IRR	9.40%	8.83%	8.22%

Tariff	-10%	0%	10%
Equity IRR	6.58%	8.83%	10.96%

3.2.6 *Quantification of GHG Emission Reductions and Removals*

The proposed project activity has applied baseline methodology as mentioned in the small scale methodology AMS-I.D. version 18, "Grid connected renewable electricity generation".

Baseline indicated by the applied methodology for grid connected wind power projects 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".

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of Net electricity supplied by the WTGs in the project activity to the grid multiplied by the grid emission factor. The $EG_{BL,y}$ is the calculated value from the Export and Import as per the equation $EG_{BL,y} = EG_{Export} – EG_{Import}$.

Since the proposed project activity is an installation of a new grid connected renewable power plant, the baseline for the project activity is the 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. Therefore, as per the requirement of AMS-I.D version 18, the baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor ($EF_{grid,CM,y}$).

The Project proponent has adopted the combined margin approach for determination of the grid emission factor as per Tool to calculate the emission factor of an electricity system' Version 7.0. The PP opted for combined margin emission factor ($EF_{grid,CM,y}$) for the project activity and it has been estimated ex-ante as 0.92245 tCO_2/MWh (for unified Indian grid system). It will remain fixed throughout the crediting period for the project activity as opted by PP. The combined margin emission factor is obtained from the three years generation weighed average of the operating margin emission factor and the latest year build margin emission factors by applying suitable weights (i.e. 50 % to operating margin emission factor ($EF_{grid,OM,y}$) and 50 % to build margin emission factor ($EF_{grid,BM,y}$)) as referred to the EF tool version 7.0.

The simple operating margin value of 0.9726 tCO_2/MWh and build margin value of 0.8723 tCO_2/MWh for electricity grid in India have been referred from CO_2 baseline database published by Central Electricity Authority, Govt. Of India, version 13 published in Jun 2018. This is the latest available CO_2 baseline database at the time of the VCS PD submission for validation of the project activity. This is found to be appropriate and it is accepted.

The following algorithm to calculate the emission reductions from the project activity has been appropriately adopted as per AMS-I.D version 18:

$ER_y = BE_y – PE_y - LE_y$

Where,

ER_y = Emission Reduction in tCO_2/year

BE_y = Baseline emission in tCO_2/year

PE_y = Project emissions in tCO_2/year

LE_y = Leakage emissions in tCO_2/year

As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of DG Set, would be accounted for the project emission on actuals.

The project also involves consumption of minor quantity of Diesel in standby DG Set. So, Project emission has been accounted for diesel consumption, by using the equation:

$PE_y = PE_{Diesel} = \sum DCy \times P \times NCV_{Diesel} \times EF\ CO_{2Diesel}$

Here, DCy is the diesel consumption as per plant records, NCV, Density (P) and Emission Factors of diesel are considered as per default values of IPCC.

Whereas, as per methodology reference the project activity does not lead to any leakage emission, LE_y is nil.

The validation team assessed the calculations of ex-ante estimated ERs as provided by the project participant in the emission reduction calculation spreadsheet. Emission reduction due to project activity in the year y (tones/year) is arrived at by multiplying the net energy generation from the project activity multiplied by the emission factor of the grid system of India adopted from the CEA Baseline Carbon Dioxide Emission Database, version 13 (published in Jun 2018) and found consistent.

Determination of $EG_{BL,y}$ (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y):

The PP has considered the value of $EG_{BL,y}$ as 60,928 MWh per year for the project activity which is based on an estimated Export of 66,226 MWh per year subtracted by Import value of 5,298 MWh which are calculated based on third party approved DPR and the estimated annual average of emission reductions is arrived as 56,202 tCO_2e over the 10 years crediting period. The validation team confirms that the estimates of baseline emissions can be replicated using the information provided in the final VCS PD. It can also be verified using the emission reduction calculation spreadsheet. Hence, it is concluded that the approach to calculate emission reductions is clearly demonstrated in the VCS PD is appropriate. The selection of baseline scenario and assumptions used for the emission reduction calculations have been checked as per paragraphs VVS for project activity version 02.0.

Based on the above discussion and the requirements of VVS for project activity version 02.0, the validation team confirm that:

- All assumptions and data used by the PP are listed in the PD, including their references and sources.
- All documentation used by the PP as the basis for assumptions and source of data is correctly quoted and interpreted in the PD.
- All values used in the PD are reasonable in the context of the proposed project activity.
- The relevant national and/or sectoral policies and circumstances are considered and listed in the PD.
- The baseline methodology AMS-I.D version 18 has been applied correctly to calculate project emissions, baseline emissions, and leakage and emission reductions.

3.2.7 Methodology Deviations

There are no methodology deviations applicable for project activity. Project is currently validated as per approved baseline methodology AMS-I.D. version 18.

3.2.8 Monitoring Plan

The proposed project activity uses monitoring methodology AMS-I.D version 18, "Grid connected renewable electricity generation." The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The PP has defined the monitoring parameters as per the requirements of the methodology AMS-I.D version 18 and taking into consideration the actual procedure followed on the site. In line with this, the PP has defined the monitoring plan under the section 4.3 and includes the below parameters in sections 4.1. & 4.2 of the VCS PD.

Data and Parameters to be monitored ex-post:

1. **$EG_{BL,y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh) -**

The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from joint meter reading certificates/credit notes issued as per below equation:

$EG_{PJ,y} = EG_{Export} - EG_{Import}$

The calculation will be done by HPSEB and the PP has no control over the authority for the calculation. Based on the joint meter reading certificates/credit notes, the project shall raise the invoice.

This parameter will be calculated and based on the measured values of export and import on the basis of Export readings of Main, Check meters taken on monthly basis by authorized officer of HPSEB in the presence of PP or representative of PP.

Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the authority.

2. **EG_{export}: Quantity of Total electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh):**

The electricity exported to the grid by the project activity connected to the sub-station will be measured by energy meters of accuracy class 0.2s. The electricity exported will be measured continuously using Main & Check meters.

Export readings of Main, Check meters shall be taken on monthly basis by authorized officer of HPSEB in the presence of PP or representative of PP.

Quantity of Total electricity Export to the grid will be cross checked from the invoices raised by the PP to the authority.

3. **EG_{import}: Quantity of Total electricity Import from the grid as a result of the implementation of the project activity in year y (MWh).**

The electricity exported to the grid by the project activity connected to the sub-station is measured by energy meters of accuracy class 0.2s. The electricity exported will be measured continuously using Main & Check meters.

Export readings of Main, Check meters shall be taken on monthly basis by authorized officer of HPSEB in the presence of PP or representative of PP.

Quantity of Total electricity Imported from the grid will be cross checked from the invoices raised by the project participant to the grid

4. **DC_y: Diesel consumption by the standby DG set in year y -**

It has been proposed that the diesel quantity available in the diesel storage tank is recorded daily by PP in the plant log book. The diesel consumption would be recorded in the logbook in litres. However, based on the density of diesel (i.e. default IPCC value of about 0.86 kg/litre), the diesel consumption in tons would be calculated.

Data and Parameters ex-ante fixed:

1. **$EF_{grid, CM, y}$: Combined margin emission factor for Indian grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system"**

The combined margin emission factor has been followed wherein Simple operating margin and Build Margins were calculated in line with the applied tool. The values were considered from

latest available CEA database, version 13 which was published in June 2018 at the time of submission of the project. This parameter is ex-ante fixed for entire crediting period.

2. **P : Density of diesel**

Density of Diesel has been considered for measuring the diesel consumption at project level as a part of backup DG set arrangement. The value has been considered from publically available source which is found to be reliable and accepted. This parameter is ex-ante fixed for entire crediting period.

3. **$NCV_{diesel,y}$: Net calorific value of the Diesel in year y**

The project proponent chooses the option of "IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories" and is fixed Ex-ante. This is in accordance to the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" version 02. The value is to be used for calculation of project emission from Diesel usages, if any, at project level. This parameter is ex-ante fixed for entire crediting period.

4. **$EF_{CO2,diesel,y}$: CO2 emission factor of diesel in year y**

The project proponent chooses the option of "IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories" and is fixed Ex-ante. This is in accordance to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" version 02. The value is to be used for calculation of project emission from Diesel usages, if any, at project level. This parameter is ex-ante fixed for entire crediting period.

Procedure for data apportioning:

In the event when the verification period dates and billing cycle dates (JMR dates) do not coincide, PP has proposed that the daily export and import reading from main and check meter would form the source of emission reduction calculation for that period. The daily export and import readings are taken manually from the main and check meter on the daily basis in the presence of representative of PP and HPSEB. In case of any uncertainty in daily readings, PP may choose to forego the days of non-coinciding month and values will be accounted from the immediate billing cycle.

As this approach is reliable and also conservative for ER estimation, hence it's acceptable.

Note:

Regarding Power Evacuation arrangement and metering locations:

As per proposed scheme, Raura SHP (12 MW) has its generation at 6.6 KV Voltage level. The power is stepped up via means of two Power Transformers up to 66 KV Voltage level. This power is then scheduled to be transmitted to HPPTCL's (State Transmission Company) 66 KV Urni Switching Station, situated 300 Meters away from Raura Switchyard.

Urni Substation along with its Main Incomer Transmission Line is scheduled to be commissioned by June 2019, which is expected to be anyhow after the proposed date of commissioning of the project. Therefore, PP has the need for temporary power evacuation for the Raura SHP as Raura SHP is expected to get commissioned by 01 March 2019 which is well before Urni Substation.

The validation team has discussed this matter with the site technical team at the time of site audit and it has been note that DLIPL (i.e. the PP) has entered into an interim interconnection arrangement with the HPPTCL where DLIPL will be allowed to evacuate its power via solid tap on 66 KV circuit of a nearby Kashang-Bhaba Line untill Urni Substation along with its Main Incomer Line is commissioned. However, post-commissioning of Urni SS and its Main Incomer Line, the power of Raura SHP will be evacuated in Urni SS itself.

It has been observed that the above two situations seek requirement of metering location at two different points accordingly.

Location # 1 - Default Location when Power will be evacuated to Urni Substation, the metering location will be at Urni Substation (receiving end SS).

Location # 2 - Initial Temporary Location (till the time of commissioning of Urini SS) when Power will be evacuated under interim arrangement into the Kashang Bhaba Line, the metering location will be at Raura Switchyard.

This information has been reported in the VCS PD under the monitoring section. Also, a Single Line Diagrams indicating metering location in both the situations are enclosed in the Appendix 3 of the VCS PD.

The validation team is of the opinion that the metering arrangement and monitoring plan included in the revised VCS PD is transparent and comprehensive and hence it's acceptable.

Conclusion:

The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The PP has the ability to implement the monitoring plan. This is checked through discussion with consultant, the representatives of project proponent at site during the physical site inspection and is found to be acceptable.

The final VCS PD has been reviewed to check that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mention in the PD. The monitoring plan completely describes all measures to be implemented for

monitoring all parameters required. Based on the above discussion and the requirements of paragraphs 148 and 150 of the VVS for project activity version 02.0, the validation team confirm that:

- The monitoring plan included in the PD is based on the approved methodology AMS-I.D. version 18 which has been applied to the proposed VCS project activity.
- The monitoring arrangements described in the monitoring plan are feasible within the project design
- The PP has the ability to implement the monitoring plan as per the PD.

3.3 Non-Permanence Risk Analysis

The project activity does not require a non-permanence risk analysis. Hence this is not applicable.

4 SAFEGUARDS

4.1 No Net Harm

No potential negative environmental and socio-economic impacts have been identified by the project proponent. The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation.

This is as per the requirements laid out in Appendix-1 of the VCS Standard (version 3.7) and deemed acceptable to the validation team.

4.2 Environmental Impact

The project proponent has mentioned in the PD that the present project activity does not require EIA to be carried out because As per the Ministry of Environment and Forests (Government of India) notification dated 14/09/2006 regarding the requirement of environmental Impact Assessment (EIA) studies as per the Environmental Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) Ministry of Environment and Forests), any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. The renewable energy power Projects are not included in this list and thus an EIA is not required. Hence, environmental impact analysis is not required for the project activity.

The project proponent has nevertheless submitted all No Objection Certificates (NOCs) and approvals received from nodal agencies and authorities which are required to develop, commission and operate the project. Thus the adequacy of the analysis carried out by the project proponent for the impact of the implementation of the project activity on the environment has been validated as per VVS for project activity version 02.0.

The validation team is of the opinion that the project complies with environmental regulations in India.

4.3 Local Stakeholder Consultation

The local stakeholder consultation process has been described in detail, by the PP, in section 5.3 of the PD version 02. The project proponent identified the relevant stakeholder like the local villagers, panchayat members, suppliers and vendors, and also the representatives of PP associated with the project. Thus, the validation team is of the opinion that the relevant stakeholders have been consulted appropriately and adequately.

The PP has conducted the stakeholder consultation meeting on 10/08/2018 at the project site. Stakeholders were invited through public notices (dated 24/07/2018) given by the PP. The documentary evidence provided as proof of date of the invitation and mode of invitation has been checked by the assessment team and found to be appropriate.

After sharing information with the local stakeholders about the company and the purpose of proposed activity, the stakeholders were briefed about non-conventional energy sources and their importance. The PP also informed the stakeholders about their intention of securing carbon credits benefits for the proposed project activity. The attendance sheets, feedback forms, other records of meeting including photographs of the event have been submitted by the PP. The details were included under the Appendix 2 of the VCS PD.

During the site visit the assessment team interviewed some of the local villagers. Based on the replies of the villagers, the validation team was convinced that the process of stakeholder consultation was carried out as described in the PD. The villagers also confirmed that they were invited for the meeting through public notice. This was found to be consistent with the invitation process mentioned in the PD.

Overall, there was agreement among the stakeholders that the proposed project activity would lead to the overall development of the area, mainly by generating employment opportunities and improving the infrastructure leading to an improved life for the villagers. The local stakeholders interviewed during the site visit endorsed this view.

4.4 Public Comments

The project has undergone Public Comment period from 07/09/2018 – 07/10/2018. There is no comment received for project. This is as per the requirements laid out in Appendix-1 of the VCS Standard (version 3.7) and deemed acceptable to the validation team.

5 VALIDATION CONCLUSION

LGAI Technological Center, S.A. (also referred to as Applus+ Certification), contracted by M/s DLI Power (India) Private Limited, to perform a validation of the VCS project activity "12 MW Raura Hydro Project by DLI Power" in India.

The validation process was performed on the basis of all guidance and criteria as provided in VCS Standard (version 3.7), VCS Program Guide (version 3.7), VCS Validation and Verification Manual (version 3.2) and Registration & Issuance Process (version 3.8).

Applus+ Certification has reviewed the project description documents and subsequently carried out site visit interviews to confirm the fulfilment of stated criteria.

The purpose of this project activity is to generate electricity using renewable sources (Hydro) and export it to regional grid which is connected to the unified Indian Grid system, thereby displacing an equivalent amount of grid generated electricity.

A risk-based approach has been followed to perform this validation. In the course of the validation 02 Corrective Action Requests (CARs) were raised and successfully closed.

The project activity has applied the baseline and monitoring methodology, AMS-I.D: Grid connected renewable electricity generation, Version 18, which is an approved methodology under the CDM programme and is acceptable under VCS Standard (version 3.7), VCS Program Guide (version 3.7), VCS Validation and Verification Manual (version 3.2) and Registration & Issuance Process (version 3.8). The baseline has been determined in accordance with the stated approved baseline methodology.

As summary the validation team able to conclude that:

- The project is in line with all relevant host country criteria (India) and all relevant VCS requirements.
- The project additionality is sufficiently justified in the VCS PD.
- The monitoring plan is transparent and adequate and in line with applied baseline and monitoring methodology of AMS-I.D, version 18.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 56,202tCO_2e/year is most likely to be achieved within the 10 years (fixed) of 1st crediting period.

- The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation as outlined under VCS Standard (version 3.7), VCS Program Guide (version 3.7), VCS Validation and Verification Manual (version 3.2) and Registration & Issuance Process (version 3.8).

- No limitations or doubts were identified related to the validation.

APPENDIX 1: DOCUMENT REFERENCE

Ref. No	Document
1	VCS PD, version 02, dated 20/12/2018 & VCS PD, version 01, dated 08/08/2018
2	Emission Reductions Calculation Spreadsheet, Version 01, dated 08/08/2018
3	Investment Analysis Spreadsheet, Version 01, dated 08/08/2018
4	Approved consolidated methodology AMS-I.D, Version 18
5	Tool to calculate the emission factor for an electricity system, version 7
6	VCS pipeline https://www.vcsprojectdatabase.org/#/pipeline_details/PL1800
7	Power purchase agreement signed by PP with state electricity authority
8	Local stakeholder documents – Attendance sheet, Public Invitation, Feedback sheet, Photos
9	Detailed Project Report (Third Party Report)
10	CDM Validation and Verification Standard for PA, Version 02.0
11	Proposal and Purchase Orders
12	Copies of Board resolutions, dated 30/05/2015, 31/07/2014 and 30/04/2011
13	NOCs and Approvals from all Nodal Agencies and Authorities
14	CO_2 baseline database published (in June 2018) by Central Electricity Authority, Govt. Of India, version 13 available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
15	HPERC tariff order, 2012 and 2018
16	Loan Sanction Documents for the project activity
17	Income Tax Act 1961 (Source: Appendix IA of Income Tax Rules) https://taxguru.in/income-tax/income-tax-slab-financial-year-201516.html
18	Companies Act 1956 (Schedule XIV) www.fast**facts**.co.in/resources/DepCo**Act**.rtf and Electricity (Supply) Act, 1948 http://www.icai.org/resource_file/11398p012-14.pdf
19	Income tax rate and Minimum Alternate Tax (MAT) rate https://taxguru.in/income-tax/income-tax-slab-financial-year-201516.html
20	Reserve Bank of India's (RBI) Survey of Professional Forecasters: Results of 34th Round dated 03/06/2015 https://rbi.org.in/Scripts/PublicationsView.aspx?id=16402
21	i. SCHEDULE (Page no 10) of the notification S.O. 1533 (E) dated 14/09/2006 published by the Ministry of Environment and Forests (MoEF), Government of India ii. Schedule of the notification S.O. 3067 dated 01/12/2009 published by the Ministry of Environment and Forests (MoEF), Government of India http://www.moef.nic.in/legis/env_clr.htm
22	Detailed procedure on REC mechanism dated 01/06/2010 by Central Electricity Regulatory Commission (http://www.nerldc.org/Docs/Order_for_Detailed_Procedure_01-06-2010.pdf) REC registry(https://www.recregistryindia.nic.in/index.php/general/publics/accredited_regens)
23	Methodological Tool: Investment analysis, Version 07.0
24	VCS Requirements: - Verified Carbon Standard Program Guide, v3.7; - Verified Carbon Standard, v3.7; - VCS Program Definitions, Ver. 3.7 - VCS Registration and Issuance Process, v3.8 - VCS Validation and Verification Manual, v3.2 - VCS Project Description Template, v3.1 - VCS Validation Report Template, v3.1
25	Declaration issued by the PP, dated 12/12/2018
26	CA Certified Account Statement of actual project cost incurred, dated 13/12/2018.
27	Electricity Act 2003 http://www.cercind.gov.in/08022007/Act-with-amendment.pdf dated 26/05/2003
28	MNRE Subsidy - MNRE Scheme dated 2nd July, 2014, pg 7

APPENDIX 2: ABBREVIATIONS

Abbreviations	Full texts
ABT	Availability Based Tariff
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
EB	Executive Board
EF	Emission Factor
EPC	Engineering ,Procurement and Construction
ER	Emission Reductions
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CR	Clarification Request
DOE	Designated Operational Entity
DNA	Designated National Authority
FAR	Forward Action Request
GCEES	Green Carbon Energy and Environment Services
GHG	Greenhouse Gas(es)
GOI	Government of India
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt hour
MCR	Monthly Credit Reports
MP	Monitoring Plan
MR	Monitoring Report
MWh	Megawatt hour
PD	Project Description
PP	Project Proponent
PS	Project Standard
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

APPENDIX 3: RESOLUTION OF FINDINGS

Findings Overview Summary

Type	CAR	CL	FAR
Total Number raised	02	00	01

Table 1. CR from this validation

CR ID	N/A	**Section no.**	N/A	**Date : N/A**
Description of CL				
N/A				
Project participant response				**Date :** N/A
N/A				
Documentation provided by project participant				
N/A				
DOE assessment				**Date:** N/A
N/A				

Table 2. CAR from this validation

CAR ID	01	**Section no.**	VCS PD	**Date : 07/12/2018**
Description of CAR				
1. Please provide the declaration from PP on other GHG and double accounting. 2. Please provide the supporting document for the project start date considered as the expected date of commissioning of the project.				
Project participant response				**Date : 24/12/2018**
1. The declaration related to non-participation in other GHG mechanism and no double-accounting is being submitted to DOE. 2. PP would like to inform that project is currently under final stage of development (i.e. pre-commissioning stage) and hence commissioning is yet to be achieved. Therefore, start date of the project is considered as futuristic date (01/01/2019) which is the expected date of commissioning of the plant. This information is already included in the VCS PD; also one footnote reference (#3) is now included to confirm the same.				
Documentation provided by project participant				
1. Declaration letter from PP, dated 12 Dec 2018. *2.* Revised VCS PD, version 02, dated 20 Dec 2018.				
DOE assessment				**Date:** 21/01/2019

The PP has provided requested documents and same has been verified and found to be correct, hence accepted, thus, CAR#1 is closed.

CAR ID	02	**Section no.**	VCS PD	**Date : 07/12/2018**
Description of CAR				
1. Please provide the reference document related to investment decision of PP. 2. Please provide footnote reference to CEA database. 3. Please provide the technical specification sheet of the equipment used. 4. Please provide evidence /reference of the actual project cost incurred in order to justify the sensitivity. 5. Please provide further details on Power Evacuation arrangement and metering locations in section 4.3 of PD. 6. Please provide supporting documents for local stakeholder's consultation for the project activity. 7. Please update information in section 5.4 as per latest updated PD.				
Project participant response				**Date : 24/12/2018**
1. PP is submitting the extract of the minutes of the board resolutions which were the reference documents related to the investment decision of the project. 2. Footnote reference to CEA database version 13 is provided under footnote #6 3. The technical specification sheet of the project equipment has been submitted to DOE. 4. PP is submitting the CA Certified account statement of the actual project cost incurred so far. 5. PP has updated the section 4.3 of the VCS PD to detail the power evacuation arrangement and metering details and also included Appendix 3 to provide a single line diagram. Please refer to the VCS PD version 02. 6. The documents related to Local Stakeholders' Consultation have been attached under the Appendix 2 of the PD. Also, the actual documents were made available to DOE during the site visit and scanned copies were submitted to DOE for further records. 7. The Section 5.4 of the PD has been updated with reference to the status of public comments.				
Documentation provided by project participant				
1. Extracts of the minutes of the board meetings. 2. Technical specification sheet of the project equipments 3. CA Certified account statement for actual project costs; dated 13 Dec 2018. *4.* Records of Local Stakeholders Consultation.				
DOE assessment				**Date:** 21/01/2019
The PP has provided requested documents and same has been verified and found to be correct, hence accepted, thus, CAR#2 is closed.				

Table 3. FAR from this validation

FAR ID	01	**Section No.**	N/A	**Date:** 24/01/2019
Description of FAR				

The project is not commission yet, so implementation of project activity and description of the PD shall be confirm during first verification of the project. Therefore FAR#1 is raised	
Project participant response	**Date:**N/A
N/A	
Documentation provided by project participant	
N/A	
DOE assessment	**Date:** N/A
N/A	

APPENDIX 4: COMPETENCY STATEMENTS

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

The composition of audit team shall be approved by the Applus+ Certification ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Qualification	Coverage of scope	Coverage of technical Area	Financial aspect	Host country Experience	Attendance to the On-Site Assessment
Ravi Kant Soni	Lead Auditor (LA)	Yes (1)	Yes (1.2)	N/A	Yes	Yes
Denny Xue	Technical Reviewer (TR)	Yes (1)	Yes (1.2)	N/A	N/A	N/A

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

Ravi Kant Soni is a certified lead auditor for Lead Auditor ISO 14001:2004&Lead Auditor ISO 14064:2006 GHG Inventory and verification. He has more than 10 years of work experience across Climate Change, Environmental Management & Monitoring, Health & Safety Management, and Statutory Compliance. He was involved in more than 100 CDM validation and verifications activities and Gold Standard, VER projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1 technical area 1.2. He has done Mater in Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Bachelor of Engineering (Mechanical Engineering) from M.I.T.S Gwalior Jiwaji University Gwalior, India

Denny Xue: Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project assessment. He is based on Shanghai. He has many years of work experiences in CDM project development. Before he joined Applus+ LGAI, he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

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