




**Validation report form for renewal of crediting period for
CDM project activities
(Version 03.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	4.5MW grid-connected Sugur Mini Hydel Scheme at SLS Power Industries Ltd in Bellary District, Karnataka (UNFCCC number-0921) https://cdm.unfccc.int/Projects/DB/RWTUV1170947821.58/view
Number and duration of the next crediting period	2 nd renewable crediting period: 24/03/2014 to 23/03/2021
Version number of the validation report	02
Completion date of the validation report	22/11/2019
Version number of PDD to which this report applies	04.1
Project participants	M/s Bhoruka Power Corporation Limited
Host Party	India
Applied methodologies and standardized baselines	AMS-I.D. ver. 18 - Grid connected renewable electricity generation
Mandatory sectoral scopes	01
Conditional sectoral scopes, if applicable	NA
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	9,806 tCO ₂ e per annum
Name and UNFCCC reference number of the DOE	LGAI Technological Center, S.A. (Applus+ Certification) UNFCCC Ref. No.: E-0032
Name, position and signature of the approver of the validation report	Mr. Juan Sendín Caballero Applus+ Certification Business Unit Managing Director Signature: 

SECTION A. Executive summary

The project activity is generation of electricity using hydro potential available in Tungabhadra River and exporting the generated electricity to the state owned power utility company Karnataka Power Transmission Corporation Ltd. (KPTCL).

Tungabhadra is one of the major rivers in South India also one of the major tributaries of River Krishna. River Tungabhadra is formed by the union of Rivers Tunga & Bhadra originate in the Western Ghats in Chickmagalur district in Karnataka State at an elevation of 1,196m. River Tungabhadra flows for about 531 km in a generally northeasterly direction through Karnataka & Andhra Pradesh. It flows thorough Shimoga, Davanagere and Bellary Districts. From Tungabhadra dam two canals take-off one from left bank (Tungabhadra Left Bank Canal or TLBC) and the other from right bank (Tungabhadra Right Bank Canal or TRBC).

The site of the mini hydel scheme across Tungabhadra River is located about 2 km downstream of M. Sugur Village. The site can be reached by road from Bangalore via Bellary (NH13) and from there on with a deviation on State Highway leading to Siruguppa via Emmiganur to project site at M. Sugur Village. The project site is about 350 km from Bangalore.

The project activity exports electricity to INDIAN grid (erstwhile Southern grid) through Karnataka Power Transmission Corporation Ltd. (KPTCL), the local transmission utility. Total annual net generation from this project activity is estimated to be about 11.04 MWh

Thus the proposed project activity leads to an emission reduction of 68,642 tCO₂e over the chosen crediting period of seven years through annual average emission reductions of 9,806tCO₂e.

Validation Scope: The scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.D version 18. The validation was based on the requirements in the CDM validation and verification standard for project activities, version 02.

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

Validation Process: The project assessment is based on the “CDM validation and verification standard for project activities, version 02 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the CDM project activity are appointed.

Once the project is made available for the global stakeholder consultation process, the members of the assessment team carried out:

- I A desk review of the project design documentation;
- II Follow-up interviews with project stakeholders;
- III The resolution of outstanding issues and the issuance of the final validation report and opinion.

The prepared validation report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the CDM-EB.

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

Appointment of the assessment team

According to the sectoral 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 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	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Mr. Sukanta Das	LA/TE	YES	YES	YES	YES
Mr. Denny Xue	TR	YES	YES	YES	NA

The complete list of CVs is included as Appendix 2 of this report.

Document review

The Project Design Document submitted by the Client was reviewed against the approved methodology and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources like 3rd party Government documents has been done. A complete list of all documents and evidence material reviewed is included in Appendix 3 of this report.

Follow-up interviews

A site visit is conducted by Applus+ Certification performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in section C.2 and C.3 of this report.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the validation process, the concerns raised and responses given are summarized in Appendix 4 below.

The final PDD version 04.1 submitted by PP on 21/11/2019 serves as the basis for the final assessment presented. Additional changes to the project during the validation process are not considered to be significant with respect to the main CDM objectives. The two CDM main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

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

After confirmation of the PP the validation opinion and relevant documents are submitted to the EB through the UNFCCC web-platform.

Conclusion

Applus+ Certification has performed a validation of the “4.5MW grid-connected Sugur Mini Hydel Scheme at SLS Power Industries Ltd in Bellary District, Karnataka”. The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria, e.g. AMS-I.D version 18, given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided Applus+ Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by Applus+ Certification for registration with the UNFCCC.

Applus+ Certification has received a confirmation from the host Party that the project activity assists it in achieving sustainable development.

By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO_{2e} emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the positive list of renewable project demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 9,806tCO_{2e}.

The validation has been performed following the requirements of the latest version of the CDM validation and verification standard for project activities, version 02 and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the CDM/UNFCCC project cycle.

SECTION B. Validation team, technical reviewer and approver**B.1. Validation team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Lead Auditor/ Technical Expert	OR	DAS	SUKANTA	True Quality Certifications Private Limited- Outsourced entity	YES	YES	YES	YES

B.2. Technical reviewer and approver of the validation report for RCP

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical Reviewer	EI	Xue	Denny	Applus+ Certification
2.	Approver	IR	Sendín Caballero	Juan	Applus+ Certification

SECTION C. Means of validation**C.1. Desk/document review**

The details of the document observed during desk review /validation process are listed below in Appendix 3 of this report.

C.2. On-site inspection

Duration of on-site inspection: 20/11/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring.	The Project site location is as below: Village - M. Sugur Taluka – Siruguppa District – Bellary	20/11/2019	Mr. Sukanta Das

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	-	Sangamesh	PP representative	20/11/2019	As explained in section C.2	Mr. Sukanta Das

C.4. Sampling approach

The assessment team did not apply any sampling approach for the project activity. The site visit was conducted for complete power plant implemented in the locations as mentioned in the PDD.

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Area of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	00	01	00
Application and selection of methodologies and standardized baselines	00	00	00
Validity of original baseline or its update	00	01	00
Estimated emission reductions or net anthropogenic removals	00	01	00
Validity of monitoring plan	00	01	00
Crediting period	00	01	00
Project participants	00	00	00
Post-registration changes	00	00	00
Others (please specify)	00	00	00
Total	00	05	00

SECTION D. Validation findings**D.1. Compliance with PDD form**

Means of validation	Assessment team checked the PDD version 11.0 forms supplied by the project participant and found that the latest form applicable in the UNFCCC web site is used for the presentation of the PDD.
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Findings	CAR 01 was raised during the validation process and closed successfully.																																				
Conclusion	<p>The PDD mentions all the criteria as detailed out in PDD form version 11.0 properly and found correct by the assessment team.</p> <p>Assessment team also checked the commissioning details and found the same to be correct. The actual commissioning of the power plant is December 2004 (Commissioning of the hydro power plant) checked from the 3rd party Government documents and found to be accurate.</p> <p>The technical details for the revision of Crediting period were checked by the assessment team from the details available from the manufacturers and also during the onsite visit. The details are as below:</p> <p>Hydrology</p> <table border="1"> <tr> <td>Design Flow</td><td>29 m³/sec</td></tr> <tr> <td>Gross head</td><td>6.1metre</td></tr> <tr> <td>Net rated head</td><td>5.7 metre</td></tr> <tr> <td>Runner Diameter</td><td>3000 mm</td></tr> <tr> <td>Rate Speed</td><td>750 rpm</td></tr> </table> <p>Energy</p> <table border="1"> <tr> <td>Expected annual gross generation</td><td>24.40 GWh</td></tr> <tr> <td>Expected net annual export</td><td>11.04 GWh</td></tr> <tr> <td>Generation voltage level</td><td>3.3kV</td></tr> <tr> <td>Grid interfacing voltage</td><td>33 kV</td></tr> </table> <p>Plant Equipment</p> <table border="1"> <tr> <td>Hydro Turbine</td><td>Vertical Shaft Full Kaplan.</td></tr> <tr> <td>Rated Flow</td><td>32.2 m³/sec</td></tr> <tr> <td>Rated Net Head</td><td>5.7 m</td></tr> <tr> <td>Rated Speed</td><td>132 RPM</td></tr> <tr> <td>Type of generator</td><td>Vertical Shaft Synchronous.</td></tr> <tr> <td>No. of generating units</td><td>3 Nos.</td></tr> <tr> <td>Rated capacity of generating unit</td><td>1765 kVA</td></tr> <tr> <td>Power Factor</td><td>0.85 (lag)</td></tr> <tr> <td>Installed Capacity</td><td>4500 kW</td></tr> </table> <p>Assesment team also checked the feeder details of the connected Hydro power plant during the onsite visit and found the detail as mentioned in the PDD is correct.</p> <p>The project activity is a Greenfield hydro power project of 1.5 MW*3=4.5MW installed capacity. Since the project utilizes hydro energy, which is a renewable resource, to generate power, the project does not lead to GHG emissions into the atmosphere which makes it a clean technology. In the absence of the project activity, the equivalent amount of electricity would have been generated in the fossil fuel dominated Indian grid.</p> <p>Assessment team checked the geographical coordinate of the project activity with GPS meter and cross checked the same with the google Map. The latitude and longitude as mentioned in the registered PDD for 1st crediting period is found correct. The details are as below:</p> <p>The project site is located in M. Sugur village in Bellary district of Karnataka State. The project is commissioned on right side of Tunga Bhadra River 4 km after the Ullanaur Central Water Commission (CWC) gauging station. Total area of land acquired for the project is 11.85 acres of which 3.65 Acres is owned by SLSPIL BPCL and the remaining is leased from Government. The site is located about 2 km downstream of M. Sugur Village. The plant approximate co-ordinates are as follows 15°38'57"N & 76°52'58"E.</p>	Design Flow	29 m ³ /sec	Gross head	6.1metre	Net rated head	5.7 metre	Runner Diameter	3000 mm	Rate Speed	750 rpm	Expected annual gross generation	24.40 GWh	Expected net annual export	11.04 GWh	Generation voltage level	3.3kV	Grid interfacing voltage	33 kV	Hydro Turbine	Vertical Shaft Full Kaplan.	Rated Flow	32.2 m ³ /sec	Rated Net Head	5.7 m	Rated Speed	132 RPM	Type of generator	Vertical Shaft Synchronous.	No. of generating units	3 Nos.	Rated capacity of generating unit	1765 kVA	Power Factor	0.85 (lag)	Installed Capacity	4500 kW
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	No post registration changes is envisaged for the 2 nd CP as the project is implemented as per the registered PDD of 1 st CP and in continuous operation apart from scheduled maintenance (as per manufacturer specification) and thus there is no scenario observed which can alter the requirement of the methodology. The project activity complies with the applicability criteria of the small scale CDM Project activity category. The capacity of the proposed project is 4.5 MW, which is less than the maximum qualifying Type I capacity of 15 MW. Thus the project qualifies as small scale project. There is no change in installed capacity of the project as mentioned in registered PDD for 1 st CP. The same is checked by the assessment team during onsite visit and found correct.
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D.2. Application and selection of methodologies and standardized baselines

Means of validation	<p>The assessment team has validated the documentation referred to in the revised PDD for renewable of crediting period and verified the documentation content for verifying the justification of the applicability of the methodology AMS-I.D version 18 and confirmed that the documentation referred to in the PDD is correctly quoted and interpreted. The assessment team has also cross-checked the information provided in the registered PDD of 1st CP with the documentation other than from the PDD based on the local and sectoral knowledge of the assessment team.</p> <p>Following documentation has been reviewed by the assessment team:</p> <ul style="list-style-type: none"> - Site visit - Interview with the concerned person mentioned in this report - Technical detail analysis of the power plant from the documents submitted by the manufacturer. - Commissioning certificates of the turbines <p>The assessment of the project's compliance with the applicability criteria of AMS-I.D version 18 are documented in detail in section B.2 of the PDD.</p>
Findings	Applicability criteria were explained properly as per the requirement of the applied approved methodology for the present crediting period. No CAR raised.
Conclusion	<p>The applied baseline methodology is justified as it has been demonstrated that the proposed project activity is:</p> <p>Applicability 1: The Project activity involves electricity generation using renewable energy which is based on hydro power and supply of electricity to Indian Grid. Hence AMS-I.D Version 18 option 1 (A) is applicable.</p> <p>Applicability 2: The project activity falls under point No. 1 of the Project Category as mentioned in the Table 1 of AMS-I.D Version 18. Hence AMS-I.D Version 18 is applicable.</p> <p>Applicability 3: The project involves installation of hydro power plant where there was no renewable energy power plant operating prior to the implementation of the project activity. Hence Option 3 (a) is applicable to the project activity.</p> <p>Applicability 4: The project activity is implemented on an existing reservoir and there is no change in the volume of reservoir.</p> <p>Applicability 5: The project is Hydro power project and thus the criterion is not applicable to this project activity.</p> <p>Applicability 6: The project is Hydro power project and thus the criterion is not applicable to this project activity.</p> <p>Applicability 7: The project is Hydro power project and thus the criterion is not applicable to this project activity.</p> <p>Applicability 8: The project is Hydro power project and thus the criterion is not applicable to this project activity.</p> <p>Applicability 9: As the given project activity is a Hydro Power project and is not</p>

	<p>landfill gas, waste gas, waste water treatment or agro industries projects, therefore this eligibility criterion is not applicable to the Project activity.</p> <p>Applicability 10: As the given project activity is a Hydro Power project and is not a biomass project, therefore this eligibility criterion is not applicable to the Project activity</p> <p>(Applus+ Certification) confirms that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. AMS-I.D version 18 is applicable to the project activity.</p> <p>The capacity of the proposed project is 4.5 MW, which is less than the maximum qualifying Type I capacity of 15 MW. Thus the project qualifies as small scale project. There is no change in installed capacity of the project as mentioned in registered PDD for 1st CP. Also no additional WTGs will be added to the project activity during its crediting period; Hence the project activity will remain under small scale project activity during every year of 2nd crediting period.</p>
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D.3. Validity of original baseline or its update

Means of validation	The baseline scenario as depicted in the PDD version 04.1 is checked during the validation site visit and also during the interview with the plant official.
Findings	The baseline is selected as per the requirement of the approved methodology AMS-I.D version 18 for the present Crediting period. However, CAR 02 was raised during the validation process and closed successfully.
Conclusion	<p>Assessment team referred "Methodological tool (EB 66, Annex 47) "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)" and CDM validation and verification standard for project activities, version 02" to check the originality of the baseline. Following are the observation of the assessment team regarding selected baseline for the project activity in this present 2nd renewable crediting period:</p> <p><u>Step 1.1 (EB 66, Annex 47): Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies</u></p> <p>The baseline for the project activity is the electricity delivered to the grid by the project activity which 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 project activity is claiming the emission reductions from the net exported electricity to the grid only. In absence of project activity this quantity of electricity would have been generated from the electricity grid mix (mainly fossil fuel). The Government of India enacted the Electricity Act in the year 2003 to harmonize and rationalize the provisions in the then existing laws. The Act consolidated the laws relating to generation, transmission, distribution, trading and use of electricity. With the Enactment of the act, the then existing laws viz, The Indian Electricity Act 1910, The Electricity Supply Act, 1948 and The Electricity Regulatory Commissions Act, 1998 were repealed. The Electricity Act 2003 was in force at the time of the completion of the baseline study during first crediting period.</p> <p>The baseline remains unchanged for the present (2nd)crediting period since there is no policy been revised and/or is currently in force as well, therefore the baseline scenario is still in compliance with all the relevant mandatory national and/or sectoral policies.</p> <p><u>Step 1.2 (EB 66, Annex 47) : Assess the impact of circumstances</u></p> <p>There are no new circumstances that can impact the original baseline. The baseline emission factor value is however updated based on the current data available for the grid.</p> <p><u>Step 1.3 (EB 66, Annex 47): Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested</u></p>

As per the “Tool to determine the remaining lifetime of equipment”, the remaining lifetime of the equipment is the time for which the existing equipment can continue to operate before it has to be replaced/discarded. As per this Tool, Project participant can use one of the following options to determine the remaining lifetime of the equipment:

- (a) Use manufacturer’s information on the technical lifetime of equipment and compare to the date of first commissioning;
- (b) Obtain an expert evaluation;
- (c) Use default value

The project activity started commercial operation in the year December 2004(100% Commissioning)and since commissioning, the project activity is running satisfactorily. As per Manufacturer specification and Registered PDD, the technical lifetime of Hydro turbine is 30 years (As per 1st CP). Thus the remaining lifetime of equipment’s exceeds the crediting period for which renewal is requested. Thus as per manufacturers information, the remaining lifetime of equipment is exceeds crediting period as per option 1 of Tool to determine the remaining lifetime of the Equipment.

The below conditions are fulfilled. (i)The equipment has been operated and maintained according to the recommendations of the equipment supplier; (ii) There are no periodic replacement schedules or scheduled replacement practices specific to the industrial facility, that require early replacement of equipment before the expiry of the technical lifetime; and (iii) The equipment has no design fault or defect and did not have any industrial accident due to which the equipment cannot operate at rated performance levels.

An per option (a), evaluating the remaining lifetime for the type of equipment has been approached and requested to determine the remaining lifetime of the equipment. The assessment of remaining life time of the equipment’s had been done and confirmed that the remaining technical lifetime of the equipment of the project activity exceeds the crediting period for which renewal is requested. As the remaining technical lifetime of the equipment is not less than the end of the crediting period or which renewal is requested, the current baseline holds good for this crediting period too.

Step 1.4(EB 66, Annex 47): Assessment of the validity of the data and parameters

This step stipulates that “Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.”

The project chosen **ex-ante default value i.e. Emission Factor**. As per the Guidance given in Tool the emission factor is updated as follows:

1. The operating margin is calculated as per the latest version of CEA (Version 14) available to the project participant. The operating margin calculation is checked by the assessment team and found correct.
2. The build margin is considered from CEA database version 14 as per “Tool to calculate the emission factor for electricity system” version 07. The value considered is checked by the assessment team and found correct
3. The Combined margin calculation is carried out as per “Tool to calculate the emission factor for electricity system” version 07. The value considered is checked by the assessment team and found correct

	<p>The emission factor is fixed ex-ante and thus will be used for the complete 2nd renewable crediting period and for entire verification conducted under 2nd renewable crediting period.</p> <p>Application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline is valid for the Second crediting period but data and parameters needs to be updated. Therefore step 2 is used</p> <p>Step 2.1: Update the current baseline This step is applicable since the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated. As evident from the explanation provided above the baseline scenario remains unchanged.</p> <p>Updated the baseline emissions based on the latest approved version of the methodology applicable to the project activity for the subsequent crediting period, without reassessing the baseline scenario.</p> <p>Step 2.2: Update the data and parameters The updated Data and/or parameter are followed for estimating the baseline emissions</p> <p>Hence as per AMS-I.D version 18 (latest Methodology), the baseline of the project is as follows:</p> <p><i>Project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".</i></p> <p>The above selected baseline is correct and thus applicable to the project activity and in line with approved methodology for the applied renewable of crediting period.</p>
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D.4. Estimated emission reductions or net anthropogenic removals

Means of validation	The emission reduction sheet, CEA database version 14.0 (Latest applicable) and PDD version 04.1 is checked by the assessment team.
Findings	CAR 03 is raised and closed successfully.
Conclusion	<p>The baseline emissions as discussed in section B.6.1 will include emissions that would have occurred in the absence of the project activity. The emission reduction calculation has been done as per the AMS-I.D version 18</p> <p><u>Baseline Emission (BE_y):</u></p> $BE_y = EG_{PJ,y} * EF_{grid,y} \text{-----}(1)$ <p>Where BE_y = Baseline Emissions in year y; (tCO₂) EG_{PJ,y} = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh). In case of Greenfield project activity, $EG_{PJ,y} = EG_{PJ, facility,y}$</p> <p>Where, $EG_{PJ, facility,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)</p> <p>The proposed project activity being a Greenfield project, $EG_{PJ,y} = EG_{PJ, facility,y}$</p> <p>EF_{grid,y} = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"t CO₂e/MWh</p>

	<p>PP has estimated the baseline energy generation considering the capacity of the project activity, yearly generation hour and plant load factor. The project activity involves installation of 4.5 MW grid connected power plant in the state of Karnataka. Validation team assessed the technical specification of the promoters of the project activity, Commissioning certificate and found that installed capacity of this project activity is correct.</p> <p>Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors according to the procedure prescribed in the "Tool to calculate the emission factor for an electricity system" version 07.0 which is sourced from CEA version 14.0, Govt. of India and forms the part of emission reduction calculation. The baseline emission factor calculation is checked by the validation team and found that the calculation is transparent and conservative.</p> <p>Annual estimated generation = 11,037.6 MWh Combined Emission Factor of CO₂ for INDIAN Grid = 0.885 tCO₂/MWh Baseline Emissions(BE_y) = BE_y = 11,0437.6 MWh x 0.885 tCO₂/MWh = 9,806 tCO₂</p> <p><u>Project Emissions:</u></p> <p>According to the chosen baseline methodology AMS-I.D. Version 18.0, for hydro power projects without reservoir project emissions are not considered. Moreover, there is a diesel generator, which is used at the time of construction and the present use of the same is negligible (since the project is run of river and not canal based) compared to the amount of CO_{2e} displacement of the project activity. Hence, no project emissions are applicable to this project activity. PE_y = 0</p> <p><u>Leakage Emissions:</u></p> <p>As per the Methodology requirement and 1st crediting period registered PDD Leakage emission LE_y=0</p> <p><u>Emission Reductions:</u></p> <p>The project activity reduces carbon dioxide emissions through displacement of grid electricity generation with predominantly fossil fuel based power plants¹ by renewable electricity. The emission reduction (ER_y) due to project activity during a given year y is calculated as the difference between baseline emissions (BE_y), project emissions (PE_y) and leakage emission (LE_y) as per the formulae given below:</p> $ER_y = BE_y - PE_y - LE_y$ $ER_y = 9,806 - 0 - 0 \text{ tCO}_{2e}$ $ER_y = 9,806 \text{ tCO}_{2e} \text{ (Rounded Down)}$
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D.5. Validity of monitoring plan

Means of validation	Assessment team checked the monitoring practice onsite and also checked the requirement of AMS-I.D version 18 and procedure mentioned in the registered PDD of 1 st CP.
Findings	CAR 04 was raised and closed successfully.
Conclusion	<p><u>Parameters determined ex-ante:</u></p> <ol style="list-style-type: none"> 1. EF_{grid,OM,y} : = (0.9610tCO₂/MWh) = Operating Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system"

version 07.” $EF_{grid, OM, y}$ is computed using the Simple Operating margin CO_2 emission factor. Simple Operating margin CO_2 emission factor is calculated from 3-year generation weighted average using data for the years 2015-2016, 2016-2017 & 2017-2018 CO_2 emissions per unit net electricity generation of all power plants serving the system, not including low-cost / must-run. This is in agreement with the guidance provided in the Tool to calculate the emission factor for an electricity system. **The value is considered from CEA version 14.** The value is fixed ex-ante for the entire duration of 2nd crediting period. As the value is sourced from CEA (publicly available document) no further analysis is required

2. $EF_{grid, BM, y} = (0.8644 \text{ tCO}_2/\text{MWh})$ Build Margin emissions factor for grid connected power generation in year y calculated using the latest version of “Tool to calculate the emission factor version 07 for an electricity system. Build margin emission factor is the generation-weighted average emission factor of all power plants m during the most recent year y for which generation data is available. **The value is considered from CEA version 14.** The value is fixed ex-ante for the entire duration of 2nd crediting period. As the value is sourced from CEA (publicly available document) no further analysis is required
3. $EF_{grid, y} = EF_{grid, CM, y} = (0.8885 \text{ tCO}_2/\text{MWh})$ Combined Margin emissions factor for grid connected power generation in year y calculated using the latest version of “Tool to calculate the emission factor for an electricity system version 07.” Combined Margin is computed using the official data sources and is in-line with the guidance provided in the tool. **The value is considered from CEA version 14.** The combined margin emissions factor is calculated as follows:

$$EF_{grid, y} = EF_{grid, CM, y} = EF_{grid, CM, y} = EF_{grid, OM, y} * W_{OM} + EF_{grid, BM, y} * W_{BM}$$

Where:

$EF_{grid, BM, y}$ = Build margin CO_{2e} emission factor in year y (tCO_2/MWh)

$EF_{grid, OM, y}$ = Operating margin CO_{2e} emission factor in year y (tCO_2/MWh)

W_{OM} = Weighting of operating margin emissions factor (%) = 25%

W_{BM} = Weighting of build margin emissions factor (%) = 75%

The above weighing is as per “Tool to calculate the emission factor for an electricity system”, version 07.0.0 for other projects (Hydro in this case) and for second crediting period. The value is fixed ex-ante for the entire duration of 2nd crediting period. As the value is sourced from CEA (publicly available document) no further analysis is required.

Parameters determined ex-post:

$EG_{export, y}$ = Electricity exported to the grid by the project. The source of data for the parameter is JMR sheet. The data will be recorded both at the project site as well as at the grid substation, which is under the control of KPTCL. The energy will be measured and recorded using calibrated meters at the KPTCL substation. Records of measurements will be used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid. The energy meters are being periodically calibrated and the calibration certificates are being maintained. The project proponents also have the provision of check meters which are also regularly calibrated whenever the main meter becomes faulty the check meter is used as reference for arriving at the energy generated data

$EG_{import, y}$ = Grid electricity import to the project activity during the year y . The source of data for the parameter is JMR sheet. The data will be recorded both at the project site as well as at the grid substation, which is under the control of KPTCL. The energy will be measured and recorded using calibrated meters at the KPTCL substation. Records of measurements will be used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid. The energy meters are being periodically calibrated and

the calibration certificates are being maintained. The project proponents also have the provision of check meters which are also regularly calibrated whenever the main meter becomes faulty the check meter is used as reference for arriving at the energy generated data

$EG_{PJ,y} = EG_{PJ, facility,y}$: Net electricity supplied to the grid by the project. The source of data for the parameter is JMR sheets. The net electricity supplied to the grid is calculated as difference between the electricity exported to the grid and electricity imported from the grid to the project and adjusting transmission losses.

$$EG_{PJ,y} = EG_{export,y} - EG_{imports,y}$$

The measurement of the electricity generated using main and backup meters installed at connected substation (Delivery point) is considered to be a reliable method for measurement of electricity generated. The main and backup meters shall be sealed in the presence of representatives of the project participant and Discom. Any meter seal shall be broken only by the Discom representative in the presence of the project participant's representative whenever the main and backup meters are to be inspected, tested, adjusted, repaired or replaced. The energy meters are 0.2 accuracy class and will be calibrated annually. The data on net electricity exported to the grid can be cross-checked with the invoices raised by the PP to Discom.

The Calibration details is checked by the assessment team during the onsite visit. The Calibration detail are as below:

	LINE -1		LINE - 2	
	Main meter	Check meter	Main meter	Check meter
Serial No.	10059245	10059270	10059282	10059258
Type	ABT featured Tri vector meter	ABT featured Tri vector meter	AB featured Trivector meter	ABT featured Tri vector meter
Make	L & T	L & T	L & T	L & T
Accuracy class	0.2 S	0.2 S	0.2 S	0.2 S
PF	1 to -1	1 to -1	1 to -1	1 to -1
Current	-/1A	-/1A	-/1A	-/1A
Voltage	3x63.5 V	3x63.5 V	3x63.5 V	3x63.5 V
Year of manf.	2010	2010	2010	2010
Calibration frequency	Every calendar quarter	Every calendar quarter	Every calendar quarter	Every calendar quarter

The data will be archived electronically for a minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

D.6. Crediting period

Means of validation	The crediting period is checked as per UN home page (reference number : 0921) and discussion with Client.
Findings	CAR 05 raised during the validation period and closed successfully
Conclusion	This is 2 nd renewable crediting period and the duration is 7-year renewable (2 nd CP duration: 24/03/2014 to 23/03/2021).

D.7. Project participants

Means of validation	The project participant names were checked from UN homepage
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	https://cdm.unfccc.int/Projects/DB/RWTUV1170947821.58/view		
Findings	No findings raised		
Conclusion	Following are the details of PP (host country) and Annex 1 country. The same is correct and in line with PDD registered under 1 st Crediting period as well as MOC obtained from UN home page. The details are true for the 2 nd Crediting period as well.		
	Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
	India (host Party)	M/s Bhoruka Power Corporation Limited (Private entity)	No

D.8. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ²	N	NA	NA
Corrections	N	NA	NA
Change to the start date of the crediting period	N	NA	NA
Inclusion of a monitoring plan	N	NA	NA
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	N	NA	NA
Changes to the project design	N	NA	NA
Changes specific to afforestation and reforestation project activities	N	NA	NA

² Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

SECTION E. Internal quality control

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

SECTION F. Validation opinion

Applus+ Certification has performed a validation of the “4.5 MW grid-connected Sugur Mini Hydel Scheme at SLS Power Industries Ltd in Bellary District, Karnataka”. The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria, e.g. AMS-I.D version 18, given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided Applus+ Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by Applus+ Certification for registration with the UNFCCC.

Applus+ Certification has received a confirmation from the host Party that the project activity assists it in achieving sustainable development.

By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the positive list of renewable project demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 9,806tCO₂e.

The validation has been performed following the requirements of the latest version of the CDM validation and verification standard for project activities, version 02 and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the CDM/UNFCCC project cycle.

Appendix 1. Abbreviations

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CMS	Central Monitoring system
CP	Crediting period
CM	Combined Margin
CMS	Central Monitoring system
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
ER	External Resource
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IR	Internal Resource
OR	Outside resource
OEM	Original Equipment manufacturer
OM	Operating Margin
PP	Project Participant

Appendix 2. Competence of team members and technical reviewers

1. **Mr. Sukanta DAS**, has done M. SC in (Electronics and Photonics) and M. Tech in (Energy technology) from Tezpur Central University/ Indian Institute of technology Bombay in India. He is a certified lead auditor for ISO 14001 EMS LA and ISO 9001 QMS LA from International registry for Certified Auditors (IRCA) and Certified Lean Management practitioner from Quality Council of India (QCI). He has more than eight years of working experience at TUV NoRD/ Re-consult/CRA/APPLUS certifications under various categories of projects stating from Renewable to waste to supercritical projects. He was JI/ CDM Lead Assessor in TUV NoRD and was involved in more than 100 CDM validation and verifications activities in Gold Standard, VCS, CDM projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1, 13 technical areas 1.2/1.1/13.1. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APPLUS certification to carry out GHG audit.
2. **Mr. 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 more than 5 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

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
2	NA	Technical specifications of Hydro turbine and other equipments	Manufacturer technical specifications	Project participant
3	NA	1st PDD version 04 PDD based on which opinion is provided- Version 04.1	14/11/2019 21/11/2019	Project participant
4	NA	Estimated Emission reduction calculation sheet- version 01	21/11/2019	Project participant
5	NA	AMS-I.D version 18	UNFCCC CDM web site	UNFCCC
6	NA	Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in	Reference link is provided.	Independent Search
7	NA	Tools/ guidelines used in the project activity: <ul style="list-style-type: none"> • Clarification on national and/or sectoral policies Para 27 EB 55. • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50. • Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, Version 3. • Tool to calculate the emission factor for an electricity system version 07. • 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). 	UNFCCC CDM web site	UNFCCC
8	NA	Commission Certificate for hydro Power plant	Commissioning certificate as provided by 3 rd party	Project participant

9	NA	Registered PDD and Validation report for 1 st CP	https://cdm.unfccc.int/Projects/DB/RWTUV1170947821.58/view	UNFCCC web site
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Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. ~~CL from this validation~~

CL ID	xx	Section no.		Date: DD/MM/YYYY
Description of CL				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CAR from this validation

CAR ID	01	Section no.	D.1	Date: 20/11/2019
Description of CAR				
The technical details are mentioned in the PDD, however the supporting are not submitted to the assessment team. CAR is thus raised.				
The feeder details of the power plant are missing in the revised PDD.				
Project participant response				Date: 21/11/2019
<i>Supporting documents for technical specification have been provided. Feeder details of the power plant has been included in section B.3 of the PDD</i>				
Documentation provided by project participant				
<i>Scanned copy of DPR (technical specification) and PDD Version 04.1</i>				
DOE assessment				Date: 21/11/2019
The technical details are now mentioned in the renewed PDD version 04.1. The supporting documents is also checked and found correct.				
The feeder details are now mentioned in the revised PDD. CAR is closed.				

CAR ID	02	Section no.	D.3	Date: 20/11/2019
Description of CAR				
Section B.4 of the PDD is not in Compliance with Tool to determine remaining lifetime of Equipment. The Section is thus reserved till the submission of the revised PDD along with supporting's.				
Project participant response				Date: 21/11/2019
<i>Tool to determine remaining lifetime of equipment has been included in section B.4 of the PDD</i>				
Documentation provided by project participant				
<i>PDD Version 04.1</i>				
DOE assessment				Date: 21/11/2019
The letter from the Manufacturer states that Power plant has the operational lifetime which is more than life of the 2 nd crediting period. CAR is thus closed.				

CAR ID	03	Section no.	D.4	Date: 20/11/2019
Description of CAR				
The generation as mentioned in the PDD is different from the generation as mentioned in the 1 st CP registered PDD. Corrective action is sought.				
Project participant response				Date: 21/11/2019

<i>PDD has been revised with correction in annual generation by as per the 1st CP registered PDD</i>	
Documentation provided by project participant	
<i>PDD Version 04.1</i>	
DOE assessment	Date: 21/11/2019
The generation is made consistent with 1 st registered PDD. CAR is closed	

CAR ID	04	Section no.	D.5	Date: 20/11/2019
Description of CAR				
As per sectoral knowledge of the DOE, the Net electricity exported to the Grid is not as per the onsite practice. Kindly correct or clarify the same.				
Project participant response				Date: 21/11/2019
<i>As per the JMRs and Invoices, the net electricity is being exported to the grid</i>				
Documentation provided by project participant				
<i>JMRs and Invoices</i>				
DOE assessment				Date: 21/11/2019
The onsite monitoring practice is now detailed out in the revised PDD. The same is checked by the assessment team and found correct. CAR is thus closed.				

CAR ID	05	Section no.	D.6	Date: 20/11/2019
Description of CAR				
The start date of the 2 nd crediting period is incorrect. Corrective action is sought in section C.3.2 of the PDD.				
Project participant response				Date: 21/11/2019
<i>Start date of crediting period has been revised</i>				
Documentation provided by project participant				
<i>PDD Version 04.1</i>				
DOE assessment				Date: 21/11/2019
The start date of 2 nd CP is now detailed out in the revised PDD. CAR is thus closed.				

Table 3. FAR from this validation

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN) and version 02.0 of the “CDM project cycle procedure for project activities” (CDM-EB93-A06-PROC);• Make editorial improvements.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Renewal of crediting period Keywords: crediting period, project activities, validation report		