



Verified Carbon Standard

SALTO PILÃO HYDROPOWER PLANT PROJECT ACTIVITY

DOCUMENT PREPARED BY EARTHOOD SERVICES PRIVATE LIMITED

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Summary:**Summary of the project activity**

The project activity consists in a hydropower plant with installed capacity of 191.88 MW, which generates electricity avoiding power generation from fossil fuel sources. The plant is connected to the Brazilian National Interconnected System (SIN).

The project applies the CDM approved methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 20.0.

Scope of validation and verification

Consórcio Empresarial Salto Pilão has contracted the ESPL to conduct the validation of the renewal of crediting period and the verification for the period from 19/01/2020 to 31/10/2021 (both days included) of the project “Salto Pilão Hydropower Plant Project Activity”, regarding the requirements of VCS version 4.

The scope of the revalidation is to establish that:

- the proposed project activity complies with the corresponding registered VCS-PD and the latest version of the renewed VCS-PD;
- the proposed project activity complies with all relevant VCS rules and requirements. The VCS renewal of crediting period was based on the updated VCS-PD, estimated emission reduction calculation spreadsheet, information from current validated VCS-PD and supporting documents made available to the ESPL by the project participant;
- the proposed monitoring plan complies with all requirements of applied methodology.

And the scope of the verification is to establish/verify that:

- the project activity has been implemented and operated as per the VCS-PD and that all physical features (technology and monitoring equipment) of the project are in place;
- the Joint VCS-PD and MR and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of VCUs, verifiable, and in accordance with applicable requirements of the VCS version 4;
- the actual monitoring system and procedures comply with the monitoring system and procedures described in the monitoring plan and approved methodology;
- the data are recorded and stored as per the monitoring methodology.

Conclusion

ESPL has performed the validation of the renewal of crediting period and the verification for the period from 19/01/2020 to 31/10/2021 (both days included) of the project “Salto Pilão Hydropower Plant Project Activity”, with VCS Project ID 513.

During the present VCS validation and verification, 06 CLs and 07 CARs were raised and successfully closed.

As outcomes of this validation, the VT confirms that:

- the latest available Joint VCS-PD and MR template has been applied;
- the original baseline is still valid as it is given by the applied methodology;
- the project additionality remains valid for the renewal of the crediting period, as per section 3.8.9, paragraph 1 of the VCS Standard version 4.3. The project activity has achieved regulatory surplus and it is in accordance with all applicable regulations and legislations;
- the project description is in accordance with the characteristics identified on site;
- the monitoring plan is adequate to the project activity and is in accordance with the applied methodology;
- at this 2nd crediting period, the project activity is likely to achieve the estimated of 186,810 tCO₂e per year.

In addition, as outcomes of this verification, the VT has confirmed:

- the implementation of the project, as per description of the VCS-PD;
- the monitoring plan of the VCS-PD and the application of the monitoring methodology (ACM0002 – version 20.0);
- that the monitoring system is in place and the emission reductions are calculated without material misstatements;
- the verified emission reductions amount of **229,534 tCO₂e** in the above-mentioned monitoring period.

CONTENTS

1	INTRODUCTION	6
1.1	Objective	6
1.2	Scope and Criteria	6
1.3	Level of Assurance	6
1.4	Summary Description of the Project	7
2	VALIDATION AND VERIFICATION PROCESS	7
2.1	Method and Criteria	7
2.2	Document Review	7
2.3	Interviews	8
2.4	Site Inspections	9
2.5	Resolution of Findings	9
3	VALIDATION FINDINGS	10
3.1	Project Details	10
3.2	Participation under Other GHG Programs	12
3.3	Safeguards	12
3.4	Application of Methodology	13
3.5	Non-Permanence Risk Analysis	20
4	VERIFICATION FINDINGS	20
4.1	Project Implementation Status	20
4.2	Accuracy of GHG Emission Reduction and Removal Calculations	21
4.3	Quality of Evidence to Determine GHG Emission Reductions and Removals	24
5	VALIDATION AND VERIFICATION CONCLUSION	24
	APPENDIX I: REFERENCES	27
	APPENDIX II: ABBREVIATIONS	27
	APPENDIX III: FINDINGS	31
	APPENDIX IV: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS	38

1 INTRODUCTION

1.1 Objective

Consórcio Empresarial Salto Pilão has contracted the ESPL to conduct the validation of the renewal of crediting period for the period from 19/01/2020 to 18/01/2030 (including both days) and the verification for the period from 19/01/2020 to 31/10/2021 (both days included) of the project “Salto Pilão Hydropower Plant Project Activity”, regarding the requirements of VCS version 4.

1.2 Scope and Criteria

The scope of the validation of the renewal of crediting period is to establish/verify that:

- the project is in accordance with requirements of the VCS version 4;
- the update of the applied methodology is in accordance with CDM methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 20.0;
- the validation of the renewal of crediting period is in accordance with requirements of CDM methodological TOOL11 – “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period” – version 3.0.1;

The validation of the renewal of crediting period is based on the registered VCS-PD, revised Joint VCS-PD and MR and estimated GHG emission reduction calculations.

The scope of the verification is to establish/verify that:

- the project activity has been implemented and operated as per the VCS-PD and that all physical features (technology, project equipment and monitoring and metering equipment) of the project are in place;
- the Joint VCS-PD and MR and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of VCUs, verifiable, and in accordance with applicable VCS version 4 requirements;
- the actual monitoring systems and procedures comply with the monitoring system and procedures described in the monitoring plan and the approved methodology;
- the data are recorded and stored as per the monitoring methodology.

The verification of this monitoring period is based on the Joint VCS-PD and MR, GHG emission reduction calculation spreadsheet and supporting documents.

1.3 Level of Assurance

The validation of the renewal of crediting period and the verification of this monitoring period have achieved a reasonable level of assurance.

1.4 Summary Description of the Project

The project activity consists in a hydropower plant with installed capacity of 191.88 MW, which generates electricity avoiding power generation from fossil fuel sources. The plant is connected to the Brazilian National Interconnected System (SIN).

The project is listed at VCS and can be accessed by the following link: <https://registry.verra.org/app/projectDetail/VCS/513>

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

The validation/verification process is conducted as per internal CDM Quality Manual and in accordance with criteria laid down by VCS. It includes the following steps:

- contract with PP for the scope and appointment of validation/verification team and technical review team;
- completeness check of Joint VCS-PD and MR;
- desk review of Joint VCS-PD and MR, estimated GHG emission reduction calculations and corresponding ER sheet by VT and planning of onsite audit (including sampling approach to be applied);
- remote inspection by VT;
- follow up activities e.g., interviews;
- reporting and closure of findings (CARs/CLs/FARs) and preparation of draft validation/verification report;
- independent technical review of the draft validation/verification report and final/revised documentation (e.g., Joint VCS-PD and MR, estimated GHG emission reduction calculations, corresponding ER sheet and evidences);
- reporting and closure of TR comments/findings (CARs/CLs/FARs) and final approval for the decision made;
- issuance of final validation/verification report to contracted PP (or authorized representatives).

2.2 Document Review

A desk review was conducted by the VT that included:

- a review of the data and information presented to verify its completeness;
- a review of the registered VCS-PD, Joint VCS-PD and MR, estimated GHG emission reduction calculations, monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- an evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;
- supporting documents.

A complete list of documents/evidences reviewed is included as Appendix I.

2.3 Interviews

#	Interviewee		Date	Subject	Means	Team member
	Name	Affiliation				
1	Luís Ribeiro	CESAP / General manager	19/11/2021	Project management	Remote site visit / Direct questions and evidences presentation	Sergio Cruz
2	Pedro Oliveira	CESAP / Environmental Supervisor	19/11/2021	Licenses General aspects of project activity Virtual tour	Remote site visit / Direct questions and evidences presentation	Sergio Cruz
3	Humberto Marçal	CESAP / Operation Supervisor	19/11/2021	Extraction of raw data of electricity generation and consumption Virtual tour Operations and monitoring	Remote site visit / Direct questions	Sergio Cruz
4	Dalton Miguel	CESAP / Maintenance Supervisor	19/11/2021	Extraction of raw data of electricity generation	Remote site visit / Direct questions	Sergio Cruz

				and consumption Virtual tour		
5	David Menuzzi	Ecopart / Consultant	19/11/2021	VCS aspects ER estimates ER calculations	Remote site visit / Direct questions	Sergio Cruz

2.4 Site Inspections

Duration of on-site inspection: -				
#	Activity performed on-site	Site location	Date	Team member
-	-	-	-	-

As per Section 4.1 of the VCS Standard – version 4.3, a physical site visit is not required.

Therefore, a site visit was not performed for the validation of the renewal of the crediting period and verification, because of difficulties still faced by COVID-19.

In addition, there is a deadline for submission of the renewal of crediting period in 18/01/2022. Thus, a remote site visit was performed with interviews with operation and management representatives of the plant. Moreover, live images and photos of main equipment, metering equipment and delivery point were presented to the VT, besides all necessary supporting documents.

Raw data was collected direct from the supervisory system during the remote site visit and cross-check was done with data downloaded from the Chamber of Commerce of Electric Energy's website that is public and official, and which provides a 100% of monthly cross-check information.

So, a reasonable level of assurance was met achieving the materiality requirements for the specific project.

2.5 Resolution of Findings

e findings may be of following types: CAR – Corrective Action Request, CL – Clarification Request and FAR – Forward Action Request.

During the present verification, 06 CLs and 07 CARs were raised and successfully closed.

The list of findings and their resolution are presented at Appendix III of this report.

2.5.1 Forward Action Requests

No FAR was raised.

3 VALIDATION FINDINGS

3.1 Project Details

The project activity consists in hydropower plant Salto Pilão (UHESP), which generates electricity avoiding power generation from fossil fuel sources. The plant is connected to the Brazilian National Interconnected System (SIN). Thus, GHG emission reduction is achieved.

During the 4th verification of first crediting period, the installed capacity of the plant and assured energy were revised to 191.88 MW and 114.1 MW_{avg}, respectively. The changes were duly approved at the time by VCS and are the actual capacities of the plant.

Some of the characteristics of the project activity are described below:

- Project Proponent: Consórcio Empresarial Salto Pilão (CESAP);
- Other Entity involved in the Project: Ecopart Assessoria em Negócios Empresariais Ltda.;
- Project Ownership: Consórcio Empresarial Salto Pilão (CESAP) is the project owner. This can be clearly evidenced by the Concession contract for electricity generation and operation license of the project¹⁰;
- Project Category: Project ($\leq 300,000$ tCO_{2e}/y);
- Sectoral Scope: 1 : Energy industries (renewable - / non-renewable sources);
- Estimated GHG emission reductions: 186,810 tCO_{2e} per year and 1,868,095 tCO_{2e} over the entire crediting period.
- Methodology: ACM0002: Grid-connected electricity generation from renewable sources – version 20.0;
- Start Date: 11/12/2009 – date when first generating unit started operation;
- Crediting Period: First period – from 19/01/2010 to 18/01/2030 and Second period – from 19/01/2020 to 18/01/2030 – 10 years – renewable;
- Project Location: at Itajaí-Açú River, between the cities of Lontras, Ibirama and Apiúna, Santa Catarina State, with geographic coordinates: 27°06 S and 49°28 W (Powerhouse) and 27°08 S and 49°31 W (Dam);
- Conditions prior to project initiation: greenfield project – prior to the project activity implementation, there was not a hydropower plants or any other implemented project activity;
- Compliance with applicable laws, statutes and other regulatory frameworks: the project is in accordance with:
 - o CONAMA Resolution 01 – establishes general criteria and guidelines for the use and implementation of environmental impact assessment – 23/01/1986;

- CONAMA Resolution 06 – establishes the environmental licensing of electric energy generation building sector – 16/09/1987;
- CONAMA Resolution 237 – rules the licensing environmental aspects established on the National Environmental Policy – 22/12/1997;
- Law # 9074 – establishes regulations for concessions and permissions for public services – 07/07/1995;
- Law # 2003 – regulates the electric energy generation – 10/09/1996;
- Law # 9648 – establishes financial compensations for water use – 27/05/1998;
- Law # 14675 – establishes the Environmental Code of the State of Santa Catarina – 13/04/2009.

In addition, the plant has an operation license # 4055/2012 issued by the Environmental Agency of the State of Santa Catarina (FATMA) and a valid protocol for its renewal FCEI # 542535, issued by the Institute of the Environment of the State of Santa Catarina (IMA).

- Participation under other GHG programs: the project has no participation under any other GHG program;
- Rejection by other GHG programs: the project was not rejected under any other GHG program;
- Emissions trading programs and other binding limits: not applicable for the project activity;
- Other forms of environmental credit: not applicable for the project activity.
- Technical Data:

Installed capacity		191.88 MW
Assured capacity		114.1 MW _{avg}
Reservoir area		0.15 km ²
Power density		1,279.2 W/m ²
Turbines	Turbine # 1	Serial # 19238
	Turbine # 2	Serial # 19239
	Manufacturer	Voith Hydro
	Type	Francis
	Quantity	02
	Nominal capacity (per unit)	97,650 kW
Generators	Generator # 1	Serial # SP06 002332 01
	Generator # 2	Serial # SP06 002332 02
	Manufacturer	Voith Hydro
	Model / Type	Synchronous / 1DH6647-3WF10-Z
	Quantity	02

	Nominal capacity (per unit)	106,600 kVA
	Power factor	0.9

The lifetime of the main equipment – turbines and generators – is 30 years, according to ANEEL's Resolution 367.

- Commercially sensitive information: there is no commercially sensitive information.
- Sustainable development contributions: contributions regarding renewable energy generation, local development, employment and income generation, and reduction of greenhouse gases.

The overall description in the VCS-PD is accurate, complete, and provides an understanding of the nature of the project.

3.2 Participation under Other GHG Programs

The project is a registered VCS project activity (VCS Project ID 513) seeking for the renewal of its crediting period, in accordance with VCS Standard version 4.3.

The project activity has no participation in any other GHG Program.

3.3 Safeguards

3.3.1 No Net Harm

During the environmental licensing, which is a legal requirement in Brazil for the type of plant of the project activity, an environmental impact assessment was conducted. During construction phase, some impacts were identified, and monitoring programs were designed to mitigate them, which are developed during all lifetime of the project and are essential part of renewal of operation licenses.

3.3.2 Local Stakeholder Consultation

The stakeholder consultation was correctly performed at the original validation of the project activity, in accordance with VCS rules.

In addition, social programs are periodically developed and there are open channels available for stakeholder's interaction with representatives of projects.

3.3.3 Environmental Impact

It is a legal requirement in Brazil for the type of plant of the project activity. During construction phase, some impacts were identified, and monitoring programs were designed to mitigate them.

Those monitoring programs are developed during all lifetime of the project and are essential part of renewal of operation licenses.

3.3.4 Public Comments

According to the Joint VCS-PD and MR, no major concerns were addressed during the local stakeholder consultation done at the original validation of the project activity. Suggestions and comments raised during the licensing process were taken into account while executing the environmental plans and programs with the environmental agency supervision.

3.3.5 AFOLU-Specific Safeguards

Not applicable as the project activity is a non-AFOLU project.

3.4 Application of Methodology

3.4.1 Title and Reference

The applied methodology is the approved CDM methodology ACM0002: Grid-connected electricity generation from renewable sources – version 20.0, which is latest one available at UNFCCC website.

The PA also applies the methodological tools:

- TOOL07: Tool to calculate the emission factor for an electricity system – version 07.0;
- TOOL10: Tool to determine the remaining lifetime of equipment – version 01;
- TOOL11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period – version 03.0.1.

The methodology and tools are from UNFCCC CDM website.

3.4.2 Applicability

All applicability conditions of the applied methodology are met:

Applicability Criteria – ACM0002 – v. 20.0	Assessment
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or	The project complies with the condition (a) as it is constituted by new hydro power plants as verified in the authorization for commercial operation.

(e) Involve a replacement of (an) existing plant(s)/unit(s).	
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	The project complies with the condition (a) as it is constituted by new hydro power plant with reservoirs with no capacity additions, retrofits, rehabilitations or replacements.
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m²; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total	The project complies with the condition (c) as it is constituted by new hydro power plant that result in new single reservoir and power density greater than 4 W/m².

installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	Not applicable to the project as the plant is not an integrated hydro power plant.
The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	Not applicable to the project as it does not involve switching from fossil fuels to renewable energy sources and it is not a biomass fired power plant.
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as	Not applicable to the project as it does not consist in retrofit,

a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	rehabilitation, replacement, or capacity addition.
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In addition, the project activity complies with all requirements of applicable methodological tools.

3.4.3 Project Boundary

The project boundary is the area where the project is located which includes the reservoir, dam, powerhouse included the turbines, generators, substation, metering systems and the National Interconnected Grid.

3.4.4 Baseline Scenario

In accordance with the directives for the renewal of the crediting period of a registered VCS project activity, the validity of the current baseline shall be reassessed using the latest version of the TOOL11.

- Step 1 – Assess the validity of the current baseline for the next crediting period
 - o Step 1.1 – Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies: the current baseline scenario complies with all relevant mandatory national/sectoral legislation, as verified in the operation licenses.
 - o Step 1.2 – Assess the impact of circumstances: the circumstances of current baseline emissions identified at the time of requesting renewal of crediting period are the same of the previous crediting period.
 - o Step 1.3 – Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested: the step is not applicable as the project activity was greenfield.
 - o Step 1.4 – Assessment of the validity of the data and parameters: although the fixed parameters CAP_{BL} and A_{BL} were not included at the original PDD, their values remain valid for the 2nd crediting period. They were included in the new VCS-PD. In addition, parameter $EF_{grid,BM}$ is a fixed parameter for this 2nd crediting period, as per TOOL07.

The application of Steps 1.1, 1.2, 1.3 and 1.4 above confirmed that the current baseline remains valid for the subsequent crediting period and that a fixed parameter has been introduced.

As there are parameters that were updated for the 2nd crediting period, Step 2 is

assessed below:

- Step 2 – Update the current baseline and the data and parameters
 - o Step 2.1 – Update the current baseline: although the current baseline is valid, the baseline emissions were updated in accordance with the stated above in Step 1.4.
 - o Step 2.2 – Update the data and parameters: parameter $EF_{grid,BM}$ (Build margin emission factor of the Brazilian grid) has been included as a fixed parameter. In addition, parameters CAP_{BL} and A_{BL} were also included.

The baseline scenario is given by applied methodology ACM0002 and still valid, as per the assessment against TOOL11.

As per the methodology, “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 “TOOL07: Tool to calculate the emission factor for an electricity system”.

The baseline emissions have been updated due to the update of the $EF_{grid,CM,y}$, which will be annually calculated, because of monitoring of $EF_{grid,OM-DD,y}$.

3.4.5 Additionality

According to section 3.8.9, paragraph 1 of the VCS Standard version 4.3, “a full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with the requirements set out in the VCS Program rules and the project description shall be updated accordingly”.

And according to Section 3.13.2, “the project shall not be mandated by any law, statute or other regulatory framework, applying in the host country that was implemented on or before 11 November 2001, or the compliance rate of any such law, statute or other regulatory framework during (part of) the project crediting period shall be below 50 percent”.

It can be confirmed that the project is not mandated by any law, statute or other regulatory framework from the host country. Therefore, the project activity has achieved regulatory surplus and it is totally in compliance with all applicable regulations and legislations of the host country. This information was clearly stated in Section 3.5 of the Joint VCS-PD and MR.

3.4.6 Quantification of GHG Emission Reductions and Removals

All equations, formulas and assumptions were correctly applied as per the applied methodology (ACM0002 – v. 20.0) and tools.

The baseline emissions are calculated by the following formula:

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

Where:

- BE_y : baseline emissions in year y ;
- $EG_{PJ,y}$: quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y ;
- $EF_{grid,CM,y}$: combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

The project emissions are calculated by the following formula if the power density of the single or multiple reservoirs (PD) is greater than 4 W/m² and less than or equal to 10 W/m². The power density of the plant is 1,279.2 W/m². Thus, no project emissions are identified for the project activity.

As per the applied methodology (ACM0002 – v. 20.0), no leakage is to be accounted.

Thus, as both project emissions and leakage are zero, **$ER_y = BE_y$** .

The parameters used to calculate the emission reductions are conservative, traceable and from official, public and reliable sources. Raw data was collected direct from the supervisory system during the remote site visit and the cross-check was done with data downloaded directly from the Chamber of Commerce of Electric Energy's website that is public and official, and which provides a 100% of monthly cross-check information.

All fixed ex-ante parameters necessary for the project activity are listed at the Section 5.1 of VCS-PD, in accordance with the applied methodology and tools. They are:

- $EF_{grid,BM,y}$: Build margin CO₂ emission factor in year y (used data from 2020, which is the most recent official data set);
- CAP_{BL} : Installed capacity of the hydro power plant before the implementation of the project activity;
- ABL : Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full.

Thus, it can be concluded that:

- all relevant assumptions and data are listed in the project description, including their references and sources;

- all data and parameter values used in the project description are considered reasonable in the context of the project;
- all estimates of the baseline emissions can be replicated using the data and parameter values provided in the project description;
- the quantification of GHG emission reductions were determined in accordance with applied methodology and tools, with reliable and conservative parameters.

3.4.7 Methodology Deviations

The project activity complies with the applied methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 20.0.

Not applicable, as no methodology deviation is applied and/or being requested.

3.4.8 Monitoring Plan

The PDD sets a monitoring plan, which is feasible and in accordance with the applied methodology and tools.

The management structure and roles and responsibilities are established for data collection, calibration frequency of meters, data report and data archiving.

Data is recorded directly in the supervisory system and the cross-check can be done with data directly recorded by the Chamber of Commerce of Electric Energy's website that is public and official, and which provides a 100% of monthly cross-check information. The monitoring system is robust, transparent and accurate.

In addition, $EF_{grid,CM,y}$ is calculated with fixed ex-ante $EF_{grid,BM,y}$ and monitored $EF_{grid,OM-DD,y}$, which is calculated by the Brazilian DNA and official data is publicly provided in its website^{16/}.

Moreover, there are procedures set for crosschecking the monitored data.

No sampling plan is set to monitor the parameter.

The parameters to be monitored necessary for the project activity are listed at the VCS-PD, in accordance with the applied methodology and tools.

The parameters required for monitoring are contained in the monitoring plan:

- $EG_{facility,y}$ – SDG 7.2.1: Quantity of net electricity generation supplied by project/plant unit to the grid in year y;
- CAP_P : Installed capacity of the hydropower plant after the implementation of the project activity;
- AP_P : Area of the single or multiple reservoirs measured in the water surface, after the implementation of the project activity, when the reservoir is full;

- $EF_{grid,CM,y}$: Combined factor of margin CO₂ emission for grid-connected power generation in year y ;
- $EF_{grid,OM-DD,y}$: CO₂ Operating Margin emission factor of the grid, in a year y ;
- *Unemployment rate, by sex, age and persons with disabilities – SDG 8.5.2;*
- *Total greenhouse gas emissions per year – SDG 13.2.2.*

The calibration frequency of the electricity meters is 5 years, and the meters are bi-directional and with accuracy class of 0.2%. There are four meters (two main and two backup meters) located at the substation for generator units 1 and 2. In addition, there are two other internal meters used for double check the generated electricity. Everything is in accordance with Brazilian regulations.

3.5 Non-Permanence Risk Analysis

Not applicable to the project activity.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

A remote site visit was performed with interviews with operation and management representatives of the plant. Moreover, live images and photos of main equipment, metering equipment and delivery point were presented to the VT, besides all necessary supporting documents.

Therefore, it was possible to verify that the project activity is totally implemented and in accordance with description of VCS-PD and with all its described features in operation. No material discrepancies were identified.

The monitoring plan could be checked and its completeness were verified. In addition, the implemented monitoring system could be assessed during the verification process, raw data was collected direct from the supervisory system during and cross-check was done with data downloaded from the Chamber of Commerce of Electric Energy's website that is public and official, and which provides a 100% of monthly cross-check information. Therefore, the transparency, robustness and accuracy of the monitoring system could be attested. No material discrepancies were identified.

The project has never participated or has been rejected under any other GHG programs since validation or previous verification and the project has never received or sought any other form of environmental credit or has become eligible to do so since validation or previous verification.

The project in hydropower plant Salto Pilão (UHESP), which generates electricity avoiding power generation from fossil fuel sources. The plant is connected to the Brazilian National Interconnected System (SIN). Thus, the activity results in contributions do SDG 7, SDG 8 and SDG 13, as follows:

- **7.2.1 – Renewable energy share in the total final energy consumption:** during the present monitoring period, 1,071,926 MW of renewable energy was generated and delivered to the Brazilian SIN;
- **8.5.2 – Unemployment rate, by sex, age and persons with disabilities:** during the present monitoring period, 45 direct and 67 indirect jobs were generated by the project activity, independently of sex, color, age and disabilities;
- **13.2.2 – Total greenhouse gas emissions per year:** during the present monitoring period, there was a reduction of 229,534 tCO₂e.

The estimates done of the contributions over project lifetime considered the actual values of first crediting period and estimates for second and third periods,

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The project activity applies the approved CDM methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 20.0 is applied to the project activity. Thus:

- the baseline and project emissions are considered for the project activity, in accordance with the applied methodology;
- no leakage is considered for this kind of project, in accordance with the applied methodology;
- all methods and formulas used in the calculations of emission reductions have been followed in accordance with the applied methodology and monitoring plan of the VCS-PD;
- all monitored data is traceable.

Fixed parameters – as per the registered VCS-PD, the parameters fixed ex-ante are:

- $EF_{grid,BM,y}$ (Build margin CO₂ emission factor in year y): 0.0979 tCO₂/MWh (as per Section 5.1 of VCS-PD);
- CAP_{BL} (Installed capacity of the hydro power plant before the implementation of the project activity): 0 W (as per Section 5.1 of VCS-PD);
- A_{BL} (Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full): 0 m² (as per Section 5.1 of VCS-PD).

Monitored parameters:

- $EG_{facility,y}$ (Quantity of net electricity generation supplied by project/plant unit to the grid in year y) – SDG 7.2.1: 374,565 MWh/y (2020) and 697,361 MWh/y (2021);
- CAP_{PJ} (Installed capacity of the hydropower plant after the implementation of the project activity): 191,880,000 W;
- AP_J (Area of the single or multiple reservoirs measured in the water surface, after the implementation of the project activity, when the reservoir is full): 150,000 m²;
- $EF_{grid,CM,y}$ (Combined factor of margin CO₂ emission for grid-connected power generation in year y): 0.1966 tCO₂/MWh (2020) and 0.2236 tCO₂/MWh (2021);
- $EF_{grid,OM-DD,y}$ (CO₂ Operating Margin emission factor of the grid, in a year y): 0.4926 tCO₂/MWh (2020) and 0.6005 tCO₂/MWh (2021);
- *Unemployment rate, by sex, age and persons with disabilities* – SDG 8.5.2: 56 jobs (2020) and 56 jobs (2021);
- *Total greenhouse gas emissions per year* – SDG 13.2.2: 73,633 tCO₂ (2020) and 155,901 tCO₂ (2021).

The calibration frequency of the electricity meters is 5 years, in accordance with Brazilian regulations.

It is important to note that by the presented calibration certificates^{/15/}, there are a delayed calibrations as follows:

- from 14/04/2020 until 08/08/2020 – meters # PT-0902A536-01 and PT-0903A301-01; and
- from 14/04/2020 until 07/08/2020 – meters # PT-0903A335-01 and PT-0903A346-01).

For the period that a delayed calibration was verified and as the error identified was below the maximum permissible error, in accordance with CDM VVS paragraph 366 (a), the maximum permissible error of the electricity meter was applied in the amount of generated electricity. Conservatively, the delayed calibration was considered for the period from 01/04/2020 until 31/08/2020 (including both days).

The monthly aggregated values of monitored electricity generation and consumption of the entire period were crosschecked with public data from CCEE. The lower values among electricity meters and CCEE were used in the calculations.

It was verified and was confirmed that the difference among the monthly values of same months of 2020 and 2021 are due to a great draught of 2020, that resulted in very small electricity generation in several months.

The emission reduction spreadsheet is transparent, traceable and correct, with no manual transposition errors.

Baseline emissions (BE_y)

The baseline emissions are calculated as follows:

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

Where:

- BE_y Baseline emissions in year y ;
- $EG_{PJ,y}$ Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y ;
- $EF_{grid,CM,y}$ Combined margin CO_2 emission factor for grid connected power generation in year y , calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

So, **$BE_{2020} = 73,633 \text{ tCO}_2\text{e}$** ;

$BE_{2021} = 155,901 \text{ tCO}_2\text{e}$.

Project emissions (PE_y)

As per ACM0002, project emissions are calculated the power density of the single or multiple reservoirs (PD) is higher than 4W/m^2 and lower than or equal to 10W/m^2

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

- PD Power density of the project activity;
- Cap_{PJ} Installed capacity of the hydro power plant after the implementation of the project activity;
- Cap_{BL} Installed capacity of the hydro power plant before the implementation of the project activity;
- A_{PJ} Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full;
- A_{BL} Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full.

For UHESP, the power density is $1,279.2 \text{ W/m}^2$. Thus, as the power density is higher than 10 W/m^2 , project emissions of the project activity are zero. So, **$PE_y = 0 \text{ tCO}_2\text{e}$.**

Leakage emissions (LE_y)

No leakage is considered for this kind of project. Thus, **$LE_y = 0 \text{ tCO}_2\text{e}$.**

Emission Reductions (ER_y)

Therefore, according to the applied methodology, as PE_y and $LE_y = 0 \text{ tCO}_2\text{e}$, $ER_y = BE_y$.

Thus, $ER_y = BE_y$. So, **$ER_{2020} = 73,633 \text{ tCO}_2\text{e}$** ;

$ER_{2021} = 155,901 \text{ tCO}_2\text{e}$.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

- records were submitted by the project proponent as evidences to determine emission reduction;
- the records, data and information provided were found valid for the current verification period. The documents were verified during site visit and when possible, were checked directly from its source;
- interviews were performed during site visit with involved personnel and PP's representatives;
- the GHG emission reduction calculations were check step by step with PP's representatives;
- the quality of evidences was found of adequate level by the VT to ensure an accurate quantification of the emission reductions.

5 VALIDATION AND VERIFICATION CONCLUSION

ESPL, contracted by Consórcio Empresarial Salto Pilão, has performed the validation of the renewal of crediting period and the verification for the period from 19/01/2020 to 31/10/2021 (both days included) of the project "Salto Pilão Hydropower Plant Project Activity", with VCS Project ID 513.

ESPL commenced the validation and verification based on the baseline and monitoring methodology ACM0002 – version 20.0, the registered PDD (from previous crediting period) and draft Joint VCS-PD and MR (for the 2nd crediting period).

ESPL's validation and verification approach is based on the understanding of the risks associated with reporting the project activity, estimates of GHG emission data and the controls to be implemented to mitigate these. ESPL planned and performed the validation by obtaining evidence, other information and explanations that ESPL

considered necessary to give reasonable assurance that the estimated GHG emission reductions are fairly to be achieved.

The VT confirms, based on final version of Joint VCS-PD and MR for the 2nd crediting period, that:

- the project complies with the validation and verification criteria for projects and their GHG ERs set out in VCS Version 4;
- the original baseline is still valid, and it is given by the applied methodology;
- the additionality of the project is valid for the renewal of the crediting period. The project activity has achieved regulatory surplus, as it is not mandated by any enforced law, statute or other regulatory framework. Therefore, the project is totally in compliance with all applicable regulations and legislations of the host country;
- the project description is in accordance with the characteristics identified on site;
- the monitoring plan is adequate to the project activity, and it is in accordance with the applied methodology;
- at this 2nd crediting period, the project activity is likely to achieve the estimated of 186,810 tCO₂e per year.

And that:

- the project activity was found completely implemented as per the description given in the Joint VCS-PD and MR; and
- the actual operation conforms to the description in the Joint VCS-PD and MR.

In our opinion, the GHG emissions reductions reported for the project activity for the period from 19/01/2020 to 31/10/2021 (including both days) are correct in the final version of the Joint VCS-PD and MR. The GHG emission reductions were calculated correctly based on the approved baseline and monitoring methodology ACM0002 – version 20.0 and the monitoring plan contained in the Joint VCS-PD and MR.

Therefore, ESPL can certify that the emission reductions from the VCS project “Salto Pilão Hydropower Plant Project Activity”, as follows:

Verification period: From 19-January-2020 to 31-October-2021

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

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2020*	73,633	0	0	73,633

2021**	155,901	0	0	155,901
Total	229,534	0	0	229,534

* from 19/01/2020 to 31/12/2020

** from 01/01/2021 to 31/10/2021



Approved by

Dr. Kaviraj Singh

Managing Director

Earthood Services Private Limited

Date: 02/12/2022

Place: Gurgaon, Haryana

APPENDIX I: REFERENCES

No.	Title	References
1	VCS Standard	version 4.3
2	Project design document (registered)	version 7.1 – 22/05/2019
3	Joint Project design document and Monitoring Report (draft)	version 1 – 11/11/2021
4	Joint Project design document and Monitoring Report (revised)	version 2 – 09/12/2021 version 2.2 – 10/12/2021 version 2.6 – 10/01/2022 version 2.7 – 10/08/2022
5	Joint Project design document and Monitoring Report (final)	version 2.8 – 02/12/2022
6	ER Spreadsheet (draft)	version 1 version 2.2
7	ER Spreadsheet (final)	version 2.4
8	<u>Methodology</u> ACM0002: Grid-connected electricity generation from renewable sources	version 20.0
9	<u>Methodological tools</u> - TOOL07: Tool to calculate the emission factor for an electricity system	version 07.0
	- TOOL10: Tool to determine the remaining lifetime of equipment	version 01
	- TOOL11: 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
10	<u>Licenses</u> - Operation license # 4055/2012 – Environmental Agency of the State of Santa Catarina (FATMA) - Protocol of renewal FCEI # 542535 – Institute of the Environment of the State of Santa Catarina (IMA) - Concession contract for electricity generation # 015/2002 and its 7 addenda – ANEEL	31/05/2012 30/01/2020 23/04/2002; 23/07/2004; 20/08/2007; 03/10/2008; 24/08/2009; 07/07/2011; 04/11/2011; 13/03/2012
11	Pictures (nameplates) and Remote tour	22/11/2021
12	<u>Technical lifetime of turbines and generators</u> Normative Resolution # 367 – ANEEL	02/06/2009
13	Raw data – SIGRO	2020 and 2021

14	Electricity generation and consumption (Infomercado – CCEE)	2020 and 2021
15	<u>Calibration Certificates</u> - Serial # PT-0902A536-01 o Certificate # CC-0085-15 – Metrum – valid until 13/4/2020 o Certificate # CCR-665-20 – Lactec – valid until 07/08/2025 - Serial # PT-0903A301-01 o Certificate # CC-0087-15 – Metrum – valid until 13/4/2020 o Certificate # CCR-666-20 – Lactec – valid until 07/08/2025 - Serial # PT-0903A335-01 o Certificate # CC-0084-15 – Metrum – valid until 13/4/2020 o Certificate # CCR-661-20 – Lactec – valid until 06/08/2025 - Serial # PT-0903A346-01 o Certificate # CC-0086-15 – Metrum – valid until 13/4/2020 o Certificate # CCR-660-20 – Lactec – valid until 06/08/2025	14/04/2015 08/08/2020 14/04/2015 08/08/2020 14/04/2015 07/08/2020 14/04/2015 07/08/2020
16	Emission Factor – DNA of Brazil	https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao
17	Infomercado – CCEE	https://www.ccee.org.br/relatoriodeadministracao/30-mercado-50.html
18	Annual Report of Social, Environmental, Economic and Financial Responsibility – Consórcio Empresarial Salto Pilão Information about direct and indirect jobs per year – Section 9 – Table 4	2021
19	DNA of Brazil	mctic.gov.br
20	IPCC publications	www.ipcc-nggip.iges.or.jp
21	UNFCCC	http://cdm.unfccc.int
22	VCS	https://verra.org/

APPENDIX II: ABBREVIATIONS

Abbreviations	Full texts
ACM	Approved Consolidated Methodology
ANEEL	National Agency of Electric Energy
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CESAP	Consórcio Empresarial Salto Pilão
CL	Clarification Request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Crediting Period
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact Assessment
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse Gas
GSC/GSP	Global Stakeholder Consultation Process
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
kW	kilo Watt
kWh	kilo Watt hour
MP	Monitoring Plan
MW	Mega Watt
MWh	Mega Watt hour
OM	Operating Margin
PA	Project Activity
PDD	Project Design Document
PE	Project Emission
PLF	Plant Load Factor
PP	Project Participant

PS	Project Standard
SIN	Brazilian Interconnected Electricity System
tCO ₂ e	Tons of Carbon dioxide equivalent
UHESP	Hydropower Plant Salto Pilão
UNFCCC	United Nations Framework Convention on Climate Change
VT	Validation and Verification Team
VVS	Validation and Verification Standard

APPENDIX III: FINDINGS

CL from this joint validation and verification

CL ID	01	Section no.	2.2	Date: 23/11/2021
Description of CL				
Editorial and template issues: a. the header and footer of official VCS Joint PD and MR template are missing; b. Section 1.1: - the sentence about the achieved emission reductions from 19/01/2020 to 31/10/2021 is misplaced; - it is missing the total estimates of ERs for the entire crediting period; c. Section 1.8: - the reference to VCS 2007.1 is outdated; - the reference to the crediting period is misplaced and not in accordance with the new crediting period; d. Section 1.9: - the reference to footnote 9 is not correct; - the statement "maximum of 10 years"..."can be renewed two times" is not in accordance with the new crediting period; e. Section 1.11: the expected lifetime of main equipment with references; f. Section 1.12: - the map (Figure 4) presented is outdated; - the given coordinates have no indication about what they refer to; g. Section 3.5: - the reproduction of the additionality assessment of original VCS-PD is not complete as it ends in Step 2; h. Section 3.6: - the stated deviation was not a methodology deviation. Thus, it is misplaced; - there are two "re-assessment of additionality" that are not clear; i. Section 4.1 – Table 11: the number of days presented at column "Days of operation" is not correct.				
Project participant response				Date: 29/11/2021
All issues raised in checking for editing errors and in the document template have been revised in accordance with the latest version available. Please refer to the revised version of the document.				
DOE assessment				Date: 09/12/2021
a. the VCS Joint PD and MR template is correctly formatted; b. Section 1.1: - the sentence about the achieved emission reductions was excluded; - the total of estimated ERs for the entire crediting period was included; c. Section 1.8:				

- the reference to VCS 2007.1 was excluded;
 - the reference to the crediting period was excluded;
 - d. Section 1.9:
 - the reference to footnote 9 was excluded;
 - the statement was excluded;
 - e. Section 1.11: the expected lifetime of 30 years of main equipment as per directives of ANEEL was included;
 - f. Section 1.12:
 - the map (Figure 4) presented was updated;
 - there is an indication that the given coordinates refer to the powerhouse and to the dam;
 - g. Section 3.5:
 - the reproduction of the additionality assessment of original VCS-PD is complete;
 - h. Section 3.6:
 - the section was correctly revised;
 - i. Section 4.1 – Table 11: as the values are presented per year, the number of days was excluded.
- CL is closed

CL ID	02	Section no.	3.1	Date:	23/11/2021
Description of CL					
In Section 1.14, the latest mentioned regulation is from 2009, which does not enable the verification if the plant follows laws and regulations nowadays.					
Project participant response					Date: 29/11/2021
The laws and regulations applied to the project were updated. Please refer to the revised version of the document.					
DOE assessment					Date: 09/12/2021
The section was revised with inclusion of more recent laws and regulations enabling the assessment the project activity is in compliance with laws, statutes and other regulatory frameworks.					
CL is closed					

CL ID	03	Section no.	3.1	Date:	23/11/2021
Description of CL					
In Section 1.17 – Sustainable Development, it is missing the information about the sustainability contribution of the project activity.					
Project participant response					Date: 29/11/2021
Information on sustainable development associated with the project activity has been revised. Please refer to the revised version of the document.					
DOE assessment					Date: 09/12/2021

The section was revised with inclusion of the information of the sustainability contribution of the project activity.
CL is closed

CL ID	04	Section no.	3.3.1; 3.3.2	Date: 23/11/2021
Description of CL				
At Sections 2.1, 2.2 and 2.3, it is missing an assessment about eventual net harm, environmental impacts and stakeholder's access for this 2 nd crediting period.				
Project participant response				Date: 29/11/2021
Added information on environmental impact actions and programs, no net harm and local stakeholder's consultation regarding the 2 nd crediting period. Please refer to the revised version of the document.				
DOE assessment				Date: 09/12/2021
Sections 2.1, 2.2 and 2.3 were revised to include information related to the 2 nd crediting period. Environmental concerns are permanent, and programs are continuously developed, and their performance is assessed as part of licensing renewal process. In addition, the plant has open channels with community and stakeholders to allow direct interaction, which are used for comments, suggestions and complaints. CL is closed				

CL ID	05	Section no.	3.4.2	Date: 23/11/2021
Description of CL				
At Sections 3.2, not all applicability conditions of ACM0002 are being discussed. In addition, when the condition is discussed, it is not indicated which alternative is being accomplished by the project activity.				
Project participant response				Date: 29/11/2021
All discussions about the version of the methodology applied to the project were reviewed. Please refer to the revised version of the document.				
DOE assessment				Date: 09/12/2021
All applicability conditions of ACM0002 are being properly discussed. CL is closed				

CL ID	06	Section no.	3.4.8	Date: 23/11/2021
Description of CL				
At Section 5.2 a. parameter $EG_{facility}$: i. both sources of data are being considered at main source and no crosschecking source is indicated, as required by applied methodology;				

ii. it is indicated sales receipts for double checking the information. Nevertheless, as revealed during the interviews, there are no receipts available for the operation; iii. the frequency of monitoring is not in accordance with applied methodology; iv. it is missing the description of the characteristics of the meters used (i.e., type, model, accuracy); v. calibration frequency; b. parameter Cap_{PJ}: the frequency of monitoring is not in accordance with applied methodology; c. parameter A_{PJ}: i. the frequency of monitoring is not in accordance with applied methodology; ii. the source of the value applied is outdated.	
Project participant response	Date: 29/11/2021
All parameters applied to the project were revised according to the methodology. Please refer to the revised version of the document.	
DOE assessment	Date: 09/12/2021
a. parameter $EG_{facility}$: i. the main source of data is the meters of the delivery point at local substation and the crosschecking source is indicated as CCEE reports; ii. as there are no sales receipts for double checking, the information was excluded; iii. the frequency of monitoring was revised to continuously measured and at least monthly recorded, in accordance with applied methodology; iv. the characteristics of the meters used are described and they are in accordance with national regulations; v. calibration frequency is in accordance with national regulations; b. parameter Cap_{PJ}: the frequency was revised to once at the beginning of the crediting period, in accordance with applied methodology; c. parameter A_{PJ}: i. the frequency was revised to once at the beginning of the crediting period, in accordance with applied methodology; ii. the source of the value applied was revised and it is in accordance with applied methodology. CL is closed	

CAR from this joint validation and verification

CAR ID	01	Section no.	3.1	Date: 23/11/2021
Description of CAR				
In Section 1.10, the classification of project scale as "Large project" is not in accordance with the ERs estimated for the crediting period.				
Project participant response				Date: 29/11/2021

Project scale information has been revised. Please refer to the revised version of the document.	
DOE assessment	Date: 09/12/2021
The classification of project scale as "Project" is in accordance with the ERs estimated for the crediting period. CAR is closed	

CAR ID	02	Section no.	3.4.4	Date: 23/11/2021
Description of CAR				
In Section 3.4, the validity of the current baseline scenario is not being assessed with TOOL11.				
Project participant response				Date: 29/11/2021
Discussion on the applicability of TOOL11 to the project baseline was revised. Please refer to the revised version of the document.				
DOE assessment				Date: 09/12/2021
The assessment of the validity of the current baseline scenario is being performed by the step approach of TOOL11. CAR is closed				

CAR ID	03	Section no.	3.4.6	Date: 23/11/2021
Description of CAR				
In Section 4.1, EF_{BM} is being calculated ex-post (as also indicated in Section 5.2), which is not in accordance with TOOL07. In addition, it is missing the chosen option of calculation of BM, as per directives of TOOL07.				
Project participant response				Date: 29/11/2021
Build margin (BM) information has been revised in accordance with TOOL07. Please refer to the revised version of the document.				
DOE assessment				Date: 09/12/2021
Section 4.1 was revised and EFBM is calculated ex-ante in accordance with TOOL07 and the option of the calculation is clearly stated. CAR is closed				

CAR ID	04	Section no.	3.4.6	Date: 23/11/2021
Description of CAR				
Although Section 5.1 does not present any parameter, as per applied methodology and tools, there are parameters fixed ex-ante, available at the validation				
Project participant response				Date: 29/11/2021

The ex-ante fixed parameters available at the validation (A_{BL} , CAP_{PJ} and $EF_{grid,BM,y}$) were revised according to the methodology applied to the second crediting period. Please refer to the revised version of the document.

DOE assessment	Date: 09/12/2021
Parameters A_{BL} , CAP_{PJ} and $EF_{grid,BM,y}$ were included in Section 5.1 as fixed parameters ex-ante, in accordance with applied methodology and tools. CAR is closed	

CAR ID	05	Section no.	4.1	Date: 23/11/2021
Description of CAR				
By the calibration certificates presented to the VT, there is a delayed calibration from 14/04/2020 until 08/08/2020 (meters # PT-0902A536-01 and PT-0903A301-01) and from 14/04/2020 until 07/08/2020 (meters # PT-0903A335-01 and PT-0903A346-01).				
Project participant response				Date: 29/11/2021
A discount of 0.2% (referring to the accuracy of the measuring equipment) was applied to power generation in the period outside the calibration (14/04/2020 - 08/08/2020). Please refer to the revised version of both documents.				
DOE assessment				Date: 09/12/2021
The delayed calibration is considered and the maximum admissible error of the instrument was considered in the calculations, in accordance with CDM VVS. CAR is closed				

CAR ID	06	Section no.	4.1	Date: 23/11/2021
Description of CAR				
The values used for the ER calculations are not related to <u>net</u> electricity delivered to the grid. In addition, the values of SIGRO (supervisory system of the plant) were not presented in the Excel calculations, which does not enable the verification if the most conservative values are being used for the calculations.				
Project participant response				Date: 29/11/2021
The values of net electric energy were revised, and the most conservative value among the SIGRO and CCEE was used. Please refer to the revised version of both documents.				
DOE assessment				Date: 09/12/2021
The net electricity generation was considered for the calculations and all values from main monitoring and crosscheck values are presented, enabling the comparison and the use of more conservative ones. CAR is closed				

CAR ID	07	Section no.	4.1	Date: 21/12/2021
Description of CAR				

Excel	
Tab EF2020 and EF2021:	
- the values applied for w_{OM} and w_{BM} are not in accordance with revised PDD; - it is not clear why there are values of generation for September 31st, considering that this day does not exist (for both years); - the values of EF_{OM} for September and October 2021 are not in accordance with data provided by Brazilian DNA.	
Project participant response	Date: 10/01/2022
- The values of w_{OM} and w_{BM} have been revised according to the PDD ($w_{OM} = 0.25$ and $w_{BM} = 0.75$). - The months of September and October were revised according to the values provided by DNA.	
DOE assessment	Date: 10/01/2022
The Excel calculations were properly revised. CAR is closed	

FAR from this joint validation and verification

Not applicable

APPENDIX IV: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Competence Statement			
Name	Sergio Bonanno Cruz		
Country	Brazil		
Education	Post Graduate Diploma in Environment		
Experience	+25 Years		
Field	Environmental Law, CDM, Energy, Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	ACM0001, ACM0002, AM0026, ACM0006, AMS ID		
Local expert	Brazil, Chile, Colombia		
Financial Expert	Yes		
Technical Reviewer	Yes		
TA Expert	1.2, 13.1		
Reviewed by	Shreya Garg	Date	29/08/2019
Approved by	Anshika Gupta	Date	29/08/2019

Competence Statement	
Name	Marcelo Sebben
Country	Brazil
Education	M.Sc. (Sustainable Energy System) B. Eng. (Chemical Engineering)
Experience	+12.5 Years
Field	Chemical process industry, CDM, Energy, Climate Change
Approved Roles	
Team Leader	Yes
Validator	Yes
Verifier	Yes
Methodology Expert	Yes (ACM0001, ACM0002, ACM0006, AM0065, AMS.I.D, AMS.I.C, AMS.I.E, AM0026, AMS.I.A, AMS.I.F, AMS. IIIE. AMS.IIIH, AMS.III.I, AMS.III.J.)
Local expert	Brazil, Chile, Honduras, Colombia
Financial Expert	Yes
Technical Reviewer	No
TA Expert	Yes (TA 1.1, 1.2, 5.1, 9.1,13.1)

Reviewed by	Shreya Garg	Date	29/07/2020
Approved by	Anshika Gupta	Date	29/07/2020