

Project Verification Report

2021

COVER PAGE	
Project Verification Report Form (VR)	
Complete this form in accordance with the instructions.	
BASIC INFORMATION	
Name of approved UCR Project Verifier / Reference No.	VERIFIT LTDA
Type of Accreditation	☐ CDM or other GHG Accreditation ☒ ISO 14065 Accreditation Provide details (if any) below for the boxes ticked above including the name of the entity that provided the accreditation and the date of validity (DD/MM/YYYY to DD/MM/YYYY) of the approval. Entity: INMETRO - CGCRE – validity from 03/09/2019 onwards
Approved UCR Scopes and GHG Sectoral scopes for Project Verification	Energy industries (renewable - / nonrenewable sources)
Validity of UCR approval of Verifier	The UCR approval or Verifier has been granted on 05/04/2022 onwards.
Completion date of this VR	03/11/2022

Title of the project activity	Santana I SHP CDM Project (JUN 1118)
Project reference no. (as provided by UCR Program)	128
Name of Entity requesting verification service (can be Project Owners themselves or any Entity having authorization of Project Owners, example aggregator.)	PCH Santana Ltda
Contact details of the representative of the Entity, requesting verification service (Focal Point assigned for all communications)	Mr. Arthur Moraes moraes.arthur@carbotrader.com Ms. Simone Matico +55 41 98818-1556 simonematico@interalli.com.br
Country where project is located	Brazil
Applied methodologies (approved methodologies by UCR Standard used)	AMS-I.D. - Grid connected renewable electricity generation (version 13)
GHG Sectoral scopes linked to the applied methodologies	Scope 1 - Energy industries (renewable - / nonrenewable sources)
Project Verification Criteria: Mandatory requirements to be assessed	☒ UCR Standard ☒ Applicable Approved Methodology ☒ Applicable Legal requirements /rules of host country ☒ Eligibility of the Project Type ☒ Start date of the Project activity ☒ Meet applicability conditions in the applied methodology ☒ Credible Baseline ☒ Do No Harm Test ☒ Emission Reduction calculations

	☒ Monitoring Report ☒ No GHG Double Counting ☐ Others (please mention below)
Project Verification Criteria: Optional requirements to be assessed	☒ Environmental Safeguards Standard and do-no-harm criteria ☒ Social Safeguards Standard do-no-harm criteria
Project Verifier's Confirmation: The <i>UCR Project Verifier</i> has verified the UCR project activity and therefore confirms the following:	The UCR Project Verifier VERIFIT LTDA., certifies the following with respect to the UCR Project Activity "Santana I SHP CDM Project (JUN 1118)" ☒ The Project Owner has correctly described the Project Activity in the Project Concept Note (CDM PDD version 3a dated on 15/12/2009) including the applicability of the approved methodology AMS-I.D. - Grid connected renewable electricity generation (version 13), and meets the methodology applicability conditions and has achieved the estimated GHG emission reductions, complies with the monitoring methodology and has calculated emission reductions estimates correctly and conservatively. ☒ The Project Activity is likely to generate GHG emission reductions amounting to the estimated 70,345 TCO_{2e}, as indicated in the PCN, which are additional to

	the reductions that are likely to occur in absence of the Project Activity and complies with all applicable UCR rules, including ISO 14064-2 and ISO 14064-3. ☒ The Project Activity is not likely to cause any net-harm to the environment and/or society ☒ The Project Activity complies with all the applicable UCR rules¹ and therefore recommends UCR Program to register the Project activity with above mentioned labels.
Project Verification Report, reference number and date of approval	VR ref # - 22-001 Date of approval: 03/11/2022
Name of the authorised personnel of UCR Project Verifier and his/her signature with date	 Ricardo Lopes Executive Director Date: 03/11/2022

PROJECT VERIFICATION REPORT

Executive summary

Brief summary of the project activity

The project activity consists in generating renewable energy through the construction of a small hydro power plant (SHP) with installed capacity of 14.758 MW called Santana I. The project also comprehends a small reservoir of 1.17 km². The project activity reduces the GHG emissions through dispatching GHG-free electricity to the Brazilian National Grid (SIN).

The SHP is located in the Midwest region of Brazil, in river Santana, state of Mato Grosso and in the city of Nortelândia.

The PA started its operation on 26/04/2012. No ERs will be claimed prior to this date.

Scope of verification

PCH Santana Ltda has contracted VERIFIT Ltda to conduct the verification of emission reductions reported for the UCR project activity "Santana I SHP CDM Project (JUN 1118)" for the period from 01/11/2017 to 31/05/2022 (including both days).

The verification is the periodic independent review and ex post determination of the monitored reductions in GHG emissions that have occurred due to the registered UCR project activity during the defined monitoring period.

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

- the project activity has been implemented and operated as per the registered PDD or any approved revised PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- the monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of CoUs, verifiable, and in accordance with applicable UCR requirements;
- the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, any revised approved monitoring plan, the approved methodology including applicable tool(s) and/or, where applicable, the approved standardized baseline;
- the data recorded and stored as per the monitoring methodology including applicable tool(s) and, where applicable, the standardized baseline.

Verification process

The verification process involved following:

- contract with PHC Santana Ltda for the scope of verification;
- publication of monitoring report;
- desk review;
- virtual on-site inspection;
- issuance of verification findings;
- reporting, calculation checks, QA/QC and resolution of findings;
- issuance of draft verification report;
- independent technical review of the project documentation;
- issuance of the final verification report;
- submission of the request for issuance, as appropriate.

Conclusion

VERIFIT Ltda has performed the verification of the Project activity “Santana I SHP CDM Project (JUN 1118)”, having UCR Ref. Number 128 for the monitoring period from 01/11/2017 to 31/05/2022. The verification team has confirmed the implementation of the project as per description in the PDD, the monitoring plan of the PDD and the application of the monitoring methodology (AMS-I.D. version 13). In addition, it was confirmed that the monitoring system is in place and the emission reductions are calculated without material misstatements.

The verified emission reductions amount to 81,338 tCO₂e in the above mentioned monitoring period.

The verification team concluded that the registered PA complies with all relevant UCR procedures/standards/guidance and therefore request for issuance is being submitted in accordance with the UCR procedures.

Project Verification team, technical reviewer and approver

Project Verification team

No.	Role	Last name	First name	Affiliation (e.g. name of central or other office of UCR Project Verifier or outsourced entity)	Involvement in		
					Doc review	Off-Site inspection	Interviews
1.	Team Leader	Sebben	Marcelo	Central Office	x	x	x
2.	Technical Expert	Sebben	Marcelo	Central Office	x	x	x
3.	Methodological Expert	Sebben	Marcelo	Central Office	x	x	x
4.	Local Expert	Sebben	Marcelo	Central Office	x	x	x

Technical reviewer and approver of the Project Verification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of UCR Project Verifier or outsourced entity)
1.	Technical reviewer	IR	Cruz	Sergio	Central Office
2.	Technical Expert	IR	Cruz	Sergio	Central Office
3.	Approver	IR	Lopes	Ricardo	Central Office

Means of Project Verification

Desk/document review

A desk review was conducted by the verification team that included:

- a review of the data and information presented to verify its completeness;

- b. a review of the registered 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;
- c. 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.

A complete list of documents/evidences reviewed is included in the section Document reviewed or referenced below.

Off-site inspection

Date of off site inspection: 04/08/2022			
No.	Activity performed Off-Site	Site location	Date
1.	Opening Meeting: Introduction, scope and objective of work, roles and responsibilities of audit team, resources required, and timetable of the onsite audit including venue for closing meeting and any concerns from PP.	Santana I HydroPower Plant	04/08/2022
2.	Implementation and operation of project activity (project boundary, project location, technology, project equipment, monitoring and metering equipment) as per registered PDD/previous verification.	Santana I HydroPower Plant	04/08/2022
3.	Responsibility – PCH Santana Ltda Carbotrader	Santana I HydroPower Plant	04/08/2022
4.	Grievance mechanism No net Harm - Social benefits - Environmental benefits - Economic benefits Sustainable Development Goals Environmental License (annual monitoring as per No net harm assessment) Confirmation of no double counting	Santana I HydroPower Plant	04/08/2022
5.	Video call - Physical inspection of the project activity Site visit to the hydro power plant machinery for confirmation of its installed capacity and interview of monitoring personnel	Santana I HydroPower Plant	04/08/2022
6.	Video Call - Download of monitored data during the call, from original source, related to all monitoring period.	Santana I HydroPower Plant	04/08/2022
7.	Video call - substation to which electricity is delivered to the SIN): Check of electricity meters which dispatch electricity to the grid and access to its Serial Number . Site visit and interview of monitoring personnel	Santana I HydroPower Plant	04/08/2022
8.	Management and operational system: Documentation, allocation of responsibilities, qualification and training,	Santana I HydroPower Plant	04/08/2022

	data recording & archiving, internal audit and management review and emergency procedures		
9.	Verification checklist: compliance of monitoring procedures followed at project site with registered PDD and monitoring methodology.	Santana I HydroPower Plant	04/08/2022
10.	Review of monitored data and relevant document in accordance with registered monitoring plan and applied monitoring methodology	Santana I HydroPower Plant	04/08/2022
11.	Review of ER calculations in accordance with applied methodology and relevant tools.	Santana I HydroPower Plant	04/08/2022
12.	Compilation of the audit findings.	Santana I HydroPower Plant	04/08/2022
13.	Closing Meeting: Submission of the audit findings to the client and agreement on the issues raised and agreement on timelines.	Santana I HydroPower Plant	04/08/2022

Interviews

No.	Interview			Date	Subject
	Last name	First name	Affiliation		
1.	Mafre	Magnus	PCH Santana Ltda	04/08/2022	Description of project activity. Physical Inspection of site. Installed Capacity
2.	Fabro	Felipe	Auto Gestão Energia	04/08/2022	Download of electricity meter data Download of CliqCEE data (Cross-check data)
3.	Matico	Simone	PCH Santana Ltda	04/08/2022	Calibration Certificates, Human Resources, Environmental, social impacts
4.	Moraes	Arthur	Carbotrader	04/08/2022	MR and ER calculations

Sampling approach

Not applicable

Clarification request (CLs), corrective action request (CARs) and forward action request (FARs) raised

Areas of Project Verification findings	No. of CL	No. of CAR	No. of FAR
Green House Gas (GHG)			
Identification and Eligibility of project type	-	-	-
General description of project activity	-	-	-
Application and selection of methodologies and standardized baselines	-	-	-
- Application of methodologies and standardized baselines	-	-	-
- Deviation from methodology and/or methodological tool	-	-	-

- Clarification on applicability of methodology, tool and/or standardized baseline	-	-	-
- Project boundary, sources and GHGs	-	-	-
- Baseline scenario	-	-	-
- Estimation of emission reductions or net anthropogenic removals	-	-	-
- Monitoring Report	CL 01 CL 04	CAR 01 CAR 02 CAR 03	-
Start date, crediting period and duration	CL 02	-	-
Environmental impacts	CL 03	-	-
Project Owner- Identification and communication	CL 04	-	-
Others (please specify)	-	-	-
Total	6	03	-

Project Verification findings

Identification and eligibility of project type

Means of Project Verification	The project consists in grid-connected generation of renewable energy through installation of small hydro power plant. In absence of project activity, electricity would be generated by power plants connected to the Brazilian Interconnected System (SIN). The project comply with eligibility criteria as follows: 1. Comply with sectoral scope Energy industries (renewable - / non-renewable sources) 2. Have started operations and be currently operational, and begun generating emission reductions, after 01 January 2002. Its commercial start date was on 26/04/2012; 3. Claim CoUs for the period beginning 01 January 2013 onwards: this project is claiming CoUs from 01/11/2017 onwards. 4. Do-no-net-harm to the Environment and Society. The project generates No-net-harm to environment and society. For details refers to section "Positive Environmental Impacts" below. 5. The project promotes Sustainable Development and Economic Goals. For details refer to "Sustainable development aspects". Moreover, the project is a type I project activity - Renewable energy project activities with a maximum output capacity of 15 MW. The installed capacity of this project activity is 14.758 MW.
Findings	N/A
Conclusion	The project is eligible to be registered under UCR.

General description of project activity

Means of Project Verification	During the virtual inspection, the verification team checked the implementation status of the project activity as well as the monitoring equipment. In addition, interviews with personnel and PP's representatives were also performed. The project is located in river Santana in the Central West of Brazil, State of Mato Grosso in the municipality of Nortelândia. The geographical coordinates of the location of the dam are: 56° 49' 44" West and 14° 23' 28" South^{/19/} The project activity consists in generating renewable energy through the construction of a small hydro power plant (SHP) with installed capacity of 14.758 MW reducing the GHG emissions through dispatching GHG-free electricity to the Brazilian National Grid (SIN). The commercial start date of the PA was in 26/04/2012^{/13/}. No project emissions from reservoir are expected. This project was registered under CDM with reference # 2793. CERs were claimed for the period between 01/11/2010 and 31/10/2017 (1st CP of CDM). Therefore, CoUs are being claimed during this monitoring period under UCR between 01/11/2017 to 31/05/2022. No double counting is occurring. The main equipment used at the project activity is given below: - 02 horizontal axis turbines (Francis) with 7.656² MW each, Serial #s 1206/11-013 and 1206/11-013; - 02 horizontal axis Generators (Synchronous) with 7.380 MW each, Serial #s EDH227001663 and EDH227001664; - Assured energy 8.89³ MW average^{/12/}; - Reservoir area 1.17 km²
Findings	Not applied
Conclusion	According to information verified during the virtual site visit, the verification team confirms that all physical features (technology, project equipment, and monitoring and metering equipment) of the registered project activity were in place. The project activity is being operated as per as the registered PDD from 26/04/2012 which is the operational start date of the Project activity. The project activity remains within the limit of small scale project activity with an installed capacity of 14.758 MW (<15MW).

Application and selection of methodologies and standardized baselines

(.a.i) Application of methodology and standardized baselines

Means of Project Verification	The application of the methodology AMS-I.D – version 13 was reviewed in the registered PDD and it could be concluded that the project activity is in compliance with all requirements of applied methodology and tools. The applied version of methodology was valid at the time of project registration in CDM and therefore, remains valid along this monitoring period. The assessment of validity of methodology application was carried out during the validation phase of the project activity under CDM and no change has occurred.
Findings	-
Conclusion	The monitoring plan of the project activity is totally in accordance with the applied methodology (AMS-I.D – version 13 – Grid connected renewable

² Although value is slightly different in the registered PDD (equal to 7,653 MW) this value is in accordance with actual turbine installed in the project activity and it does not influence the installed capacity as it is given by generator's capacity. Moreover, this value does not influence the GHG reduction calculations.

³ Value updated through Mines and Energy Ministry Ordinance #21 of 27/06/2011 unlike in Registered PDD stating 8.72 MWavg. No influence in the actual ERs occurred due to this slightly change.

	electricity generation) and applicable tools. Moreover, the applicability conditions of methodology are fulfilled by the project activity.
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(.a.ii) Clarification on applicability of methodology, tool and/or standardized baseline

Means of Project Verification	No clarification on applicability of methodological documents are applicable
Findings	N/A
Conclusion	N/A

(.a.iii) Project boundary, sources and GHGs

Means of Project Verification	The project boundary is the physical and geographical locality of the renewable energy generation. Moreover, the boundary comprehends all Brazilian Interconnected System (Grid) to which the project activity is connected. The source of baseline emissions is the renewable electricity generated by the project activity and that, in the absence of the project activity, would be generated by carbon intensive plants connected to the grid. CO₂ is the only GHG applied to this project activity. No project emissions due to methane generation from reservoir are applicable to this project activity.
Findings	N/A
Conclusion	The project boundary, sources and GHGs are clearly described in the PDD and are considered correct by the verification team.

(.a.iv) Baseline scenario

Means of Project Verification	The baseline scenario is the electricity being generated by plants already connected to the Brazilian Interconnected Grid. The baseline emissions, as per applied methodology, is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as per combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system.
Findings	N/A
Conclusion	The baseline scenario is correctly determined and it is in accordance with applied version of the methodology.

(.a.v) Estimation of emission reductions or net anthropogenic removal

Means of Project Verification	The estimation of emission reductions has been given in the registered PDD as follows: Estimated yearly electricity generated was equal to 76,391 MWh per month. The estimated ex-ante grid emission factor was equal to 0.18418 tCO₂e/MWh. The equation used is the follow: $BE_y = EF_{grid,CM,y} \times EG_{Santana\ I,y}$ Where: BE_y = Baseline emissions in the year y EF_{grid,CM,y} = Combined Margin Emission factor of the grid in the year y EG_{Santana I,y} = Net electricity of the Santana I SHP delivered to grid in the year y (hourly value aggregated for each year)
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	The estimated Baseline emissions is 14,069 tCO ₂ e/year
Findings	N/A
Conclusion	The estimated values are determined in accordance with applied methodology.

(.a.vi) Monitoring Report

Means of Project Verification	The calculations of baseline emission have been done in accordance with registered monitoring plan and applied methodology. The equation used is the follow: $BE_y = EF_{grid,CM,y} \times EG_{Santana I,y}$ Where: BE_y = Baseline emissions in the year y $EF_{grid,CM,y}$ = Combined Margin Emission factor of the grid in the year y $EG_{Santana I,y}$ = Net electricity of the Santana I SHP delivered to grid in the year y (hourly value aggregated for each year) The parameter $EG_{Santana I}$ is continuously read, measured and recorded every one hour automatically by two meters (main and backup) in the Nortelândia Substation. Two electricity meters (main and backup) are responsible for these measurements: 1- Main - S/N: MW-1612A263-02, calibrated on 09/03/2017 and 08/05/2018. Valid for 5 years. 2- Backup - S/N: MW-1706B363-02, calibrated on 08/05/2018. Valid for 5 years (calibration delay between 06/03/2017 and 08/05/2018). The accuracy of the equipment is 0.2 as required by Brazilian Regulations^{/15/}. The data is directly measured by electricity meters^{/16/} and has been cross-checked with official data from CCEE^{/17/}. It was observed a delay in the backup electricity meter S/N MW-1706B363-02 between 06/03/2017 and 08/05/2018. As a conservative measure, the Project participants have applied correction factor to the delayed period. This factor was the maximum permissible error allowed by the electricity meter, being applied conservatively for electricity generation and electricity consumption. The Combined margin emission factor of the grid ($EF_{grid,CM,y}$) was calculated as follows: $EF_{grid,CM,y} = EF_{OM} \times w_{OM} + EF_{BM} \times w_{BM}$ Where w_{OM} and w_{BM} are the Operating margin weight and the build margin weight and both are fixed as 0.5 as per applied tool for calculating emission factor for an electricity system. For the determination of $EF_{OM,y}$ and $EF_{BM,y}$ the PP applied the parameters provided by the Brazilian DNA^{/18/}. EF_{OM} is hourly provided and aggregated monthly, whereas the EF_{BM} was directly provided by the Brazilian DNA yearly. The latest data available was used for each month (EF_{OM}) and each year (EF_{BM}) (the value applied for EF_{BM} for year 2022 was the one from 2022 as it was the latest one available. Nevertheless, some issues were found.
Findings	CL 01

	Section C.5: sample calculation of EF_{cm} and BE refer to year not belonging to current monitoring period CAR 01 Data from 31/03/2022 (all 24 hours) used in the ER calculations are not in accordance with evidences directly discharged from Electricity meter. CAR 02 As per TOOL07, the EF_{om} to be applied is the one determined for the period which electricity has been displaced by project activity. Considering that EF for 2022 are already available, the calculation is not accurate.																																
Conclusion	After the findings resolution, the verification team confirms that: a. the monitored data was available in accordance with the registered monitoring plan for the operational period of the SHP; b. the reported data were crosschecked, as prescribed in the revised approved PDD, with the relevant supporting and were found consistent; c. appropriate methods and formulae for calculating baseline GHG emissions have been followed; d. the assumptions, emission factors and default values that were applied in the calculations are correct and evidenced; e. the calculations are transparent, consistent, correct and complete. The electricity generated for the period as well as the calculated EF_{CM} and the baseline emissions are as follows: <table><tr><th>year</th><th>EG_{Santana I} (MWh)</th><th>EF_{Grid}, (tCO₂e/MWh)</th><th>BE (tCO₂e/year)</th></tr><tr><td>2017⁴</td><td>7,239.78</td><td>0.2955</td><td>2,135</td></tr><tr><td>2018</td><td>65,285.22</td><td>0.3380</td><td>22,044</td></tr><tr><td>2019</td><td>70,992.04</td><td>0.3100</td><td>22,010</td></tr><tr><td>2020</td><td>43,583.50</td><td>0.2759</td><td>12,024</td></tr><tr><td>2021</td><td>46,488.28</td><td>0.3263</td><td>15,167</td></tr><tr><td>2022⁵</td><td>37,882.33</td><td>0.2101</td><td>7,958</td></tr><tr><td>TOTAL</td><td>271,471.15</td><td>-</td><td>81,338</td></tr></table> The achieved values are 15% higher than the estimated in the registered PDD. Nevertheless, this increase is due to the increase in 58% of the grid emission factor when compared to the estimated values in the PDD. Moreover, the actual electricity generated decreased in 29%. Therefore, the obtained increase in the GHG reduction calculations when comparing to the registered PDD was not under PP's control.	year	EG _{Santana I} (MWh)	EF _{Grid} , (tCO ₂ e/MWh)	BE (tCO ₂ e/year)	2017 ⁴	7,239.78	0.2955	2,135	2018	65,285.22	0.3380	22,044	2019	70,992.04	0.3100	22,010	2020	43,583.50	0.2759	12,024	2021	46,488.28	0.3263	15,167	2022 ⁵	37,882.33	0.2101	7,958	TOTAL	271,471.15	-	81,338
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2022 ⁵	37,882.33	0.2101	7,958																														
TOTAL	271,471.15	-	81,338																														

Start date, crediting period and duration

Means of Project Verification	The operational start date of the project activity was on 26/04/2012. The project was registered under CDM for the period between 01/11/2010 to 31/10/2017. However the crediting period of the UCR programme has not been determined.
Findings	CL 02 Section A.5: crediting period has not been determined in the MR.

⁴ From 01/11/2017 to 31/12/2017

⁵ From 01/01/2022 to 31/05/2022

Conclusion	It has been now duly clarified that the crediting period under UCR starts on 01/11/2017 and ends on 31/10/2031
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Positive Environmental impacts

Means of Project Verification	As positive environmental impacts, the project carries out verification and analysis campaigns in various fields of the plant (ichthyofauna, wild fauna, degraded areas, limnology and water quality, hydrosedimentometric and water levels, etc.) constant contact with the surrounding population regarding information on good environmental practices and preservation of the surroundings and the plant. Nevertheless, no evidences were provided. Therefore, a NC has been raised.
Findings	CL 03 No evidences of environmental, social and economic benefits for the current monitoring period have been provided to the verification team.
Conclusion	Evidences have been provided ^{/22/} to the verification team and therefore it is considered that the project activity contributes positively to the environment.

Project Owner- Identification and communication

Means of Project Verification	The contract with verifier has been signed with company PCH Santana Ltda, who owns the project activity. However, during the verification assessment it has been observed that Firenze Energética S.A was a project participant but no longer exists. Therefore, a clarification has been requested.
Findings	CL 04 Section A.3: companies are listed as project participants: Firenze Energética S.A and Carbotrader Assessoria e Consultoria em Energia Ltda. Nevertheless, during the audit process, it has been observed that the company Firenze no longer exists and therefore, clarification is required.
Conclusion	It could be concluded that the project is owned by PCH Santana Ltda whose representative is Mrs. Simone Matico. Arthur Moraes (Carbotrader) is the consultant and focal point of project activity. Both are clearly identified in the Verification Contract between VERIFIT LTDA and PCH Santana Ltda.

Positive Social Impact

Means of Project Verification	It could be observed that during this monitoring period that the project contributed with installation of net tanks in the Santana reservoir, program carried out in partnership with the municipality that allowed the installation of 150 net tanks for the cultivation and processing of fish inside the plant's reservoir. This activity is conducted by an association created by the population generating income and employment for the city. Nevertheless, no evidences were provided to the verification team and a NC has been raised.
Findings	Refer to NC 05
Conclusion	Evidences have been provided ^{/22/} to the verification team and therefore it is considered that the project activity generated positive social impacts in the region.

Sustainable development aspects (if any)

Means of Project Verification	Regarding the sustainable development aspects highlighted by the project participants, the following were listed • It contributes to environmental sustainability as reduce the use of fossil energy (nonrenewable sources). Thus the project contributes to the best use of natural resources and makes use of clean and efficient technologies; • It contributes to better working conditions and increases the opportunity for employment in the area where the project is located; • It contributes to local economy better conditions, since the use of renewable energy reduces the fossil fuel dependence; reduce the amount of pollution and the associated social costs related to it. • Moreover, the project contributed with fencing of the APP area/track (permanent preservation area) in addition to supplying seedlings of native species for the recovery of this track.
Findings	N/A
Conclusion	The project activity contributes positively to sustainable development of region and country.

Internal quality control

The draft verification report that is prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by VERIFIT were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable UCR rules/requirements.

The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope to which the project activity is related. All members of technical review team are independent of the verification team.

During the technical review process, additional findings may be identified or the closed out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UCR. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the technical reviewer is final and is authorized on behalf of VERIFIT.

Project Verification opinion

VERIFIT declares that the " Santana I SHP CDM Project (JUN 1118)" project has been verified taking into account the following parameters:

- the verification of the project activity has reached a reasonable level of assurance;
- Assurance level: 95%;
- materiality: 5%;
- objective: international carbon sales;
- scope and criteria: Verification of the "Santana I SHP CDM Project (JUN 1118)" project in Colombia, in accordance with the requirements of the AMS-I.D. - Grid connected renewable electricity generation (version 13), of the UCR CoU Standard, UCR Program, Verification Standard, ISO 14064-2:2006 – Part 2, ISO 14064-3:2006 – Part 3 and applicable national Legislation;
- data and information: the data and information used as a basis and/or support for the verification process are of a measured nature, that is, they are obtained in accordance with national regulations and cross-checked with official information.
- The project activity complies with all the conditions of the applied version of the methodology;

- the environmental assessment is adequate and sufficient;
- the monitoring plan is transparent and adequate;
- all information has been applied consistently in the MR.
- monitoring is in accordance with the monitoring plan established in the PDD;
- the calibrations of the equipment are being carried out correctly and in accordance with legal and supplier determinations;
- the calculations of reductions were carried out correctly, transparently and conservatively and in accordance with the methodology and methodological tools applied;
- based on the processes and procedures conducted, the GHG statement is materially correct and a fair representation of the GHG data and information and is prepared in accordance with applicable standards.

In this way, the VERIFIT confirms that the GHG emission reductions or removals were generated in accordance with the methodology defined in ISO 14064-2:2006 and the results obtained in the verification carried out under ISO 14064-3. In addition, the validation of the project activity and the verification of the project activity are in accordance with all applicable rules and requirements and that the process is complete, reliable, conservative, consistent, evident and transparent.

The table below shows the amount of GHG reduction obtained by the project in the verification period below:

Verification period: 01.11.2017 to 31.05.2022

Year	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions (tCO ₂ e)
2017 ⁶	2,139	0	0	2,135
2018	22,067	0	0	22,044
2019	22,010	0	0	22,010
2020	12,024	0	0	12,024
2021	15,167	0	0	15,167
2022 ⁷	7,958	0	0	7,958
TOTAL	81,365	0	0	81,338

⁶ From 01/11/2017 to 31/12/2017

⁷ From 01/01/2022 to 31/05/2022

Abbreviations

Abbreviations	Full texts
ABNT	Brazilian Association of Technical Regulation
BE	Baseline Emission
BM	Build Margin
CCEE	Electric Energy Commercialization Chamber (Government Agency)
CDM	Clean Development Mechanism
CM	Combined Margin
CME	Coordinating/Managing Entity
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
EPE	Energy Research Company of the Ministry of Mines and Energy – Brazil
GHG	Green House Gas
GW	Giga Watt
GWh	Giga Watt hour
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
kW	kilo Watt
kWh	kilo Watt hour
MoV	Means of Validation
MP	Monitoring Plan
MW	Mega Watt
MWh	Mega Watt hour
N ₂ O	Nitrous Oxide
OM	Operating Margin
ONS	National System Operator (from Portuguese – Operador Nacional do Sistema)
PA	Project Activity
PCP	Project Cycle Procedure
PDD	Project Design Document
PE	Project Emission
PP	Project Participant
PS	Project Standard
tCO ₂ e	Tonnes of Carbon di oxide equivalent
VT	Verification Team

Competence of team members and technical reviewers

Competence Statement	
Name	Marcelo Sebben
Country	Brazil
Education	M.Sc. (Sustainable Energy System) B. Eng. (Chemical Engineering)
Experience	11 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 ID)		
Local expert	Brazil		
Financial Expert	No		
Technical Reviewer	Yes		
TA Expert	Yes (TA 1.1, 1.2, 5.1, 13.1)		
Reviewed by	Sergio Cruz	Date	16/08/2017
Approved by	Ricardo Lopes	Date	16/08/2017

Competence Statement			
Name	Sergio Bonanno Cruz		
Country	Brazil		
Education	Post Graduate Diploma in Environment		
Experience	21 Years		
Field	Environmental Law, CDM, Energy, Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	Yes (ACM0001, ACM0002, AM0026, ACM0006, AMS ID)		
Local expert	Brazil		
Financial Expert	No		
Technical Reviewer	Yes		
TA Expert	Yes (TA 1.2, 13.1)		
Reviewed by	Marcelo Sebben	Date	16/08/2017
Approved by	Ricardo Lopes	Date	16/08/2017

Document reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UCR	UCR CoU Standard	Aug 2022 (Updated Ver.6)	Others
2.	UCR	UCR Program Manual	Ver 5 August 2022	Others
3.	UCR	Verification Standard	Ver 2.0 Aug 2022	Others
4.	UCR	Monitoring Report Sample Template	-	Others
5.	PP	Monitoring Report (draft)	version 1 – 18/07/2022	PP
6.	PP	Monitoring Report (revised/final)	version 2 – 24/08/2022 Version 2.1 – 24/10/2022	PP
7.	PP	ER Spreadsheet (draft)	version 1	PP
8.	PP	ER Spreadsheet (revised/final)	version 2	PP
9.	PP	Registered PDD	version 3a – 15/12/2009	Others
10.	UNFCCC	Methodology: AMS-I.D.: Grid connected renewable electricity generation -	Version 13	Others
11.	UNFCCC	Tool to calculate the emission factor for an electricity system	version 1.1	Other
12.	ANEEL	Aneel Generation Database – regarding assured energy of 8.89 MW average	-	Other
13.	PP	<u>Evidence of Santana I Operation start date</u> Dispatch 1361 issued by Superintendence of Generation Services, referring to start date of commercial operation on 26/04/2012.	25/04/2012	Other
14.	TUV NORD	Validation Report “Santana Project (JUN1118)” issued by TUV-NORD, report # 5891/08 – 08/344	Revision 2.b - 07/01/2010	Other
15.	ONS (National Electric System Operator)	- Procedure 12.2 from ONS (National Electric System Operator) regulating the accuracy class of the electricity meters - Procedure Submodule 12.3 from ONS (National Electric System Operator) regulating the frequency of calibration (2 years calibration frequency) - New regulation (ONS Grid Procedure, submodule 12.3) issued on 01/01/2017 revision 2016/12 stating that from this date on 5 years calibration frequency is to be applied to electricity meters	-	Other
16.	PP	Reports of electricity generated by the project activity (E-Meter) for all period	2017 to 2022	Other

17.	CCEE	Commercialization Chamber of Electric Energy – Market information – InfoMercado_Dados_Individuais.xls regarding electricity generated by each power plant.	https://www.ccee.org.br/web/guest/dados-e-analises/dados-mercado-mensal	Other
18.	EF	Data provided by the Brazilian DNA website regarding the EF _{OM} and EF _{BM,y}	https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao	Other
19.	Google	Geographical coordinates of the project activity plotted on Google Maps	https://www.google.com.br/maps/place/14%C2%B023'28.0%22S+56%C2%B049'44.0%22W/@-14.3920533,-56.8414134,2630m/data=!3m1!1e3!4m5!3m4!1s0x0:0x5b183a6637beb12a!8m2!3d-14.391111!4d-56.8288889	Other
20.	Schneider	<u>Calibration Certificates:</u> <u>Electricity Meter:</u> - Main: Serial # MW-1216A263-02 model ION8650C operated from 09/03/2017 o Cert # RCM 1075-17 calibrated on 09/03/2017 - Backup: Serial # MW-1706B363-02 model ION8600C o Certificate # RCM 158-18 calibrated on 08/05/2018	-	Other
21.	LIC	- Operational Permit of the SHP Santana I # 316226/2017 issued by SEMA (State Environment Secretariat)	Validity: 14/12/2022	Other
22.	SAMA	<u>Environmental and social reports</u> Report 26/2021/SAMA issued by Environment Secretariat of Municipality of Nortelândia regarding the recovery and preservation of degraded areas in project activity's surroundings.	15/02/2021	PP
23.	SEMI	<u>Manuals:</u> - Operation and Maintenance Manual of Turbine issued by SEMI # 1206-81-00-000 on 18/04/2012	-	PP
24.	PP	<u>Monthly Maintenance LogBook</u>	Aug/2022	PP
25.	PP	<u>Trainings and Duties of Personnel:</u>	20/07/2004	PP

		- SHP Automation Course – Magno Mafre		
26.	ANEEL	ANEEL – National Agency of Electric Energy	www.aneel.gov.br	Other
27.	CCEE	Commercialization Chamber of Electric Energy – Market information – InfoMercado_Dados_Individuais.xls regarding the current name of Project participant	https://www.ccee.org.br/web/guest/dados-e-analises/dados-mercado-mensal	Other
28.	IPCC	IPCC publications	www.ipcc-nggip.iges.or.jp	Other
29.	UNFCCC	UCR	https://www.ucarbonregistry.io/	Other

Clarification request, corrective action request and forward action request

Table 1. CLs from this Project Verification

CL ID	01	Section no.	-	Date: 22/08/2022
Description of CL				
Section C.5: sample calculation of EF _{cm} and BE refer to year not belonging to current monitoring period				
Project Owner's response				Date: 05/09/2022
EF _{CM} and BE were adjusted accordingly.				
Documentation provided by Project Owner				
MR version 2				
UCR Project Verifier assessment				Date: 18/10/2022
Information related to EF _{cm} and baseline emissions have been duly updated.				
CL is closed				

CL ID	02	Section no.	-	Date: 22/08/2022
Description of CL				
Section A.5: crediting period has not been determined in the MR.				
Project Owner's response				Date: 05/09/2022
Included in the MR version 2;				
Documentation provided by Project Owner				
MR version 2				
UCR Project Verifier assessment				Date: 18/10/2022
It has been clarified in the MR that the crediting period correspond is from 01/11/2017 to 31/10/2031.				
CL is closed				

CL ID	03	Section no.	-	Date: 22/08/2022
Description of CL				
No evidences of environmental, social and economic benefits for the current monitoring period have been provided to the verification team.				
Project Owner's response				Date: 05/09/2022
Section B.2 was updated accordingly and evidences were provided				
Documentation provided by Project Owner				
<i>Official Letter No. 26/2021/SAMA of the Municipality of Nortelândia</i>				
UCR Project Verifier assessment				Date: 18/10/2022
Evidences of environmental social and economic benefits during the monitoring period have been duly provided to the verification team and detailed in the MR.				
CL is closed.				

CL ID	04	Section no.	-	Date: 22/08/2022
Description of CL				
Section A.3: companies are listed as project participants: Firenze Energética S.A and Carbotrader Assessoria e Consultoria em Energia Ltda. Nevertheless, during the audit process, it has been observed that the company Firenze no longer exists and therefore, clarification is required				
Project Owner's response				Date: 05/09/2022
Indeed "Firenze Energética S.A." was exchanged to "PCH Santana Ltda" in ANEEL (see "Infomercado report" venture code "PCH.PH.MT.028971-0.01";				
Documentation provided by Project Owner				
InfoMercado_Dados_Individuais ^{27/}				
MR version 2				

UCR Project Verifier assessment	Date: 18/10/2022
It has been clarified and duly evidenced that the company has change its name to PCH Santana Ltda. Information has been corrected in the MR.	
CL is closed	

CL ID	05	Section no.	-	Date: 22/08/2022
Description of CL				
Estimated ERs ex-ante in the ER calculations are not in accordance with registered PDD.				
Project Owner's response				Date: 05/09/2022
<i>The estimated ERs ex-ante were adjusted accordingly (in accordance with registered PDD).</i>				
Documentation provided by Project Owner				
MR_JUN1118_rev2_1 CERs 2nd MR_rev2_1				
UCR Project Verifier assessment				Date: 18/10/2022
The estimated ERs are now in accordance with registered PDD and have been duly pro-rated for the current monitoring period.				
CL is closed				

Table 2. CARs from this Project Verification

CAR ID	01	Section no.	-	Date: 22/08/2022
Description of CAR				
Data from 31/03/2022 (all 24 hours) used in the ER calculations are not in accordance with evidences directly discharged from Electricity meter.				
Project Owner's response				Date: 05/09/2022
The data from 31/03/2022 (all 24 hours) was adjusted accordingly in the spreadsheet version 2.				
Documentation provided by Project Owner				
CERs 2nd MR_rev2				
UCR Project Verifier assessment				Date: 18/10/2022
The calculations are now accurate and the electricity generated is in accordance with evidenced directly downloaded from electricity meters.				
CAR is closed				

CAR ID	02	Section no.	-	Date: 22/08/2022
Description of CAR				
As per TOOL07, the EF _{om} to be applied is the one determined for the period which electricity has been displaced by project activity. Considering that EF for 2022 are already available, the calculation is not accurate..				
Project Owner's response				Date: 05/09/2022
EF _{OM} from 2022 year was included in the spreadsheet for CoUs calculation (version 2).				
Documentation provided by Project Owner				
CERs 2nd MR_rev2				
UCR Project Verifier assessment				Date: 18/10/2022
Latest available information provided by Brazilian government had been used in the determination of Grid emission factor in accordance with requirements of TOOL07.				
CAR is closed				

CAR ID	03	Section no.	-	Date: 22/08/2022
Description of CAR				

No calibration certificate has been provided for the backup meter S/N MW-1706B363-02 between 06/03/2017 and 08/05/2018	
Project Owner's response	Date: 05/09/2022
<i>Due to calibration delay, adjustments (+- 0.2%) were provided in the ER spreadsheet and also MR.</i>	
Documentation provided by Project Owner	
MR_JUN1118_rev2_1 CERs 2nd MR_rev2_1	
UCR Project Verifier assessment	Date: 18/10/2022
The delays in calibration has been duly considered in the ER calculations. The correction factor applied to the delayed period was the maximum permissible error allowed by the electricity meter, which has been applied conservatively for electricity generation and electricity consumption.	
CAR is closed	

Table 3. FARs from this Project Verification

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
Project Owner's response				Date: DD/MM/YYYY
Documentation provided by Project Owner				
UCR Project Verifier assessment				Date: DD/MM/YYYY