




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

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

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	SHPPs Jorge Dreher and Henrique Kotzian CDM Project UNFCCC Ref. Number: 8018
Number and duration of the next crediting period	Crediting period: 2 01/01/2020 – 31/12/2026
Version number of the validation report	1.0
Completion date of the validation report	23/10/2020
Version number of PDD to which this report applies	2.3
Project participants	BME Rincão do Ivaí Energia S.A. BME Capão da Convenção Energia S.A. Carbotrader Assessoria e Consultoria em Energia Eireli
Host Party	Brazil
Applied methodologies and standardized baselines	ACM0002: Grid-connected electricity generation from renewable sources – version 20.0
Mandatory sectoral scopes	1 - Energy industries (renewable - / nonrenewable sources)
Conditional sectoral scopes, if applicable	-
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	37,732 tCO ₂ e
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited UNFCCC Ref. Number: E-0066
Name, position and signature of the approver of the validation report	 Dr. Kaviraj Singh Managing Director

SECTION A. Executive summary**Brief summary of the project activity**

The project activity consists in two SHPs, which generate electricity avoiding power generation from fossil fuel sources. The plants are connected to the Brazilian National Interconnected System (SIN).

The plants are all located in the state of Rio Grande do Sul, Brazil, as described below:

Plant	Municipalities	Geographical coordinates(*)	
		Latitude	Longitude
SHP Engenheiro Ernesto Jorge Dreher	Júlio de Castilhos and Salto Jacuí	29° 07' 13" S	53° 22' 04" W
SHP Engenheiro Henrique Kotzian		29° 07' 34" S	53° 19' 06" W

(*) the GPS coordinates refer to the axis of the dams of both plants, in accordance with ANEEL's Dispatches. Refer to item /17/ of Appendix 3 of this report.

Technical description of the plants:

SHP Engenheiro Ernesto Jorge Dreher		
Installed Capacity		17.95 MW
Assured capacity		12.24 MW _{avg}
PLF		68.18%
Reservoir area		0.83 km ²
Power density		21.63 W/m ²
<u>Turbines</u>	Turbine # 1	Serial # 2054
	Turbine # 2	Serial # 2055
	Turbine # 3	Serial # 2056
	Manufacturer	HISA
	Type	Francis
	Quantity	03
	Nominal capacity (per unit)	5,912 kW
	Turbine # 4	Serial # 1240
	Manufacturer	BEE Wirz
	Type – Model	Francis – T.B.S. 2x38/57
	Quantity	01
	Nominal capacity	315.43 kW
<u>Generator</u>	Turbine # 5	Serial # KR01/11
	Manufacturer	Rischbieter
	Type – Model	Kaplan
	Quantity	01
	Nominal capacity	480 kW
	Generator # 1	Serial # 1002920435
<u>Generator</u>	Generator # 2	Serial # 1002284713
	Generator # 3	Serial # 1002492272
	Manufacturer	WEG
	Model / Type	Synchronous – three phase – SPD 900
	Quantity	03

	Nominal capacity (per unit)	6,350 kVA
	Power factor	0.9
	Generator # 4	Serial # 16425
	Manufacturer	Equacional
	Model / Type	Synchronous – three phase – EGT1.1.450M/12
	Quantity	01
	Nominal capacity	375 kVA
	Power factor	0.87
	Generator # 5	Serial # 1010973699
	Manufacturer	WEG
	Model / Type	HGF
	Quantity	01
	Nominal capacity	480 kW
	Power factor	0.81

SHP Engenheiro Henrique Kotzian		
Installed Capacity		13.23 MW
Assured capacity		8.67 MW _{avg}
PLF		65.53%
Reservoir area		0.66 km ²
Power density		20.05 W/m ²
<u>Turbine</u>	Turbine # 1	Serial # 2059
	Turbine # 2	Serial # 2057
	Turbine # 3	Serial # 2058
	Manufacturer	HISA
	Type	Francis
	Quantity	03
	Nominal capacity (per unit)	4,529 kW
<u>Generator</u>	Generator # 1	Serial # 1001523429
	Generator # 2	Serial # 1001901747
	Generator # 3	Serial # 1001901746
	Manufacturer	WEG
	Model	SPD900
	Model / Type	Synchronous – three phase – SPD 900
	Quantity	03
	Nominal capacity (per unit)	4,900 kVA
	Power factor	0.9

The lifetime of the main equipment (turbines and generators) is 30 years, according to technical literature.

The estimated ERs of the project activity is 37,732 tCO_{2e}/y and 264,124 tCO_{2e} for the entire crediting period.

Scope of validation

BME Rincão do Ivaí Energia S.A. has contracted ESPL to conduct the validation of the renewal of the crediting period of the project activity “SHPPs Jorge Dreher and Henrique Kotzian CDM Project”.

The scope of the validation is to establish that:

- the PA is in accordance with all relevant CDM rules and requirements;
- the PA is in accordance with conditions of the latest version of applied 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 tool “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.

Validation process

The validation process involved the following:

- contract with BME Rincão do Ivaí Energia S.A. for the scope of validation of the renewal of the crediting period of the project activity;
- desk review;
- issuance of validation findings;
- reporting, calculation checks, QA/QC and resolution of findings;
- issuance of draft validation report;
- independent technical review of the project documentation;
- issuance of the final validation report;
- submission of the request for renewal, as appropriate.

Conclusion

ESPL has performed the validation of the renewal of the crediting period of the CDM PA “SHPPs Jorge Dreher and Henrique Kotzian CDM Project” (UNFCCC Ref. Number: 8018).

The validation team has confirmed that it is in accordance with all relevant CDM rules and requirements and conditions of the latest version of applied methodology ACM0002 – version 20.0. In addition, it was confirmed that the monitoring system is feasible and the estimated emission reductions are conservatively calculated.

The PA is expected to generate an annual average of 37,732 tCO₂e in the second crediting period.

The request for renewal of the crediting period of the PA is being submitted in accordance with the CDM procedures.

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader	OR	Cruz	Sergio	Verifit	Y	N	Y	Y
2.	Local Expert	OR	Cruz	Sergio	Verifit	Y	N	Y	Y
3.	Methodological Expert	OR	Cruz	Sergio	Verifit	Y	N	Y	Y

4.	Technical Expert	OR	Cruz	Sergio	Verifit	Y	N	Y	Y
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B.2. Technical reviewer and approver of the validation report for RCP

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Garg	Shreya	Central Office
2.	Technical Expert	IR	Garg	Shreya	Central Office
3.	Approver	IR	Singh	Kaviraj	Central Office

SECTION C. Means of validation

C.1. Desk/document review

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

- a review of the data and information presented to assess its completeness;
- a review of the registered project activity, the applied methodology including applicable tool(s) and, where applicable, the applied standardized baseline;
- a review of supporting documents.

A complete list of documents/evidences reviewed is included as Appendix 3.

C.2. On-site inspection

Duration of on-site inspection:				
No.	Activity performed on-site	Site location	Date	Team member
-	-	-	-	-

A site visit has not been performed for the validation of the renewal of the crediting period, in accordance with CDM validation and verification standard for project activities – version 02.0 – paragraph 31, as the estimated annual average of ERs is below 100,000 tCO₂e. Therefore, the on-site visit is not obligatory.

In addition, the PPs have provided evidences to show the facilities and equipment (e.g. pictures, equipment manuals and virtual tour) and PPs' representatives have been interviewed and operation personnel have provided all necessary information for a clear and precise understanding of the project activity, which has been considered sufficient by the validation team for the purpose of the present validation.

Moreover, FAR 01 has been raised to have all technical data thoroughly checked to confirm their consistency with presented information during the next verification of the project activity.

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Vieira de Lima	Eliseu	BME Rincão do Ivaí Energia S.A. and BME Capão da Convenção Energia S.A.	18/08/2020 09/09/2020	- Project management	Sergio Cruz
2.	Moraes	Arthur	Carbotrader	18/08/2020 09/09/2020	- CDM aspects - ER calculations	Sergio Cruz
3.	Diniz Alves	Jeferson	BME Rincão do Ivaí Energia S.A. and	09/09/2020	- Virtual tour - Project operations and monitoring	Sergio Cruz

			BME Capão da Convenção Energia S.A.			
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C.4. Sampling approach

Not applicable as no sampling has been used during the validation.

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

Area of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	1	-	-
Application and selection of methodologies and standardized baselines	-	-	-
Validity of original baseline or its update	1	-	-
Estimated emission reductions or net anthropogenic removals	-	1	-
Validity of monitoring plan	-	1	-
Crediting period	-	-	-
Project participants	-	-	-
Post-registration changes	-	-	-
Others (please specify): PA technical features	-	-	1
Total	02	02	01

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

Means of validation	The PDD was crosschecked with the CDM-PDD-FORM template available at the UNFCCC website and with the instructions for filling it out.
Findings	CL 01
Conclusion	The latest version of the PDD template (CDM-PDD-FORM – version 11.0) available at the UNFCCC website has been used. It has been filled out in accordance with the instructions.

D.2. Application and selection of methodologies and standardized baselines

Means of validation	<p>The PA applies approved methodology ACM0002: Grid-connected electricity generation from renewable sources – version 20.0, which is latest one available at UNFCCC website.</p> <p>The PA also applies the methodological tools:</p> <ul style="list-style-type: none">a. TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation – version 03.0;b. TOOL07: Tool to calculate the emission factor for an electricity system – version 07.0;c. 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. <p>The methodology and tools are from UNFCCC CDM website.</p>	
Findings	-	
Conclusion	All applicability conditions of the applied methodology are met:	
	Applicability Criteria – ACM0002 – v. 20.0	Assessment
	<p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <ul style="list-style-type: none">(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	<p>The project complies with the condition (a) as it is constituted by new hydro power plants, as verified in the authorizations for commercial operations.</p>

	<p>plant(s)/unit(s); or</p> <p>(e) Involve a replacement of (an) existing plant(s)/unit(s).</p>	
	<p>The methodology is applicable under the following conditions:</p> <p>(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;</p> <p>(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.</p>	<p>The project complies with the condition (a) as it is constituted by new hydro power plants with reservoirs with no capacity additions, retrofits, rehabilitations or replacements</p>
	<p>In case of hydro power plants, one of the following conditions shall apply:</p> <p>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(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</p> <p>(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</p> <p>(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:</p> <p>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²;</p> <p>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</p> <p>(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be:</p> <p>a. Lower than or equal to 15 MW; and</p> <p>b. Less than 10 per cent of the total installed capacity of integrated hydro power project.</p>	<p>The project complies with the condition (c) as it is constituted by new hydro power plants that result in new single reservoirs and power densities greater than 4 W/m²</p>
	<p>In the case of integrated hydro power projects, project proponent shall:</p> <p>(a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the</p>	<p>Not applicable to the project as none of the plants are integrated hydro power plants.</p>

	<p>generation capacity of the integrated hydro power project; or</p> <p>(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.</p>	
	<p>The methodology is not applicable to:</p> <p>(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;</p> <p>(b) Biomass fired power plants/units.</p>	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.
	<p>In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as 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".</p>	Not applicable to the project as it does not consist in retrofit, rehabilitation, replacement, or capacity addition.
	<p>In addition, the project activity complies with all requirements of applicable methodological tools.</p>	

D.3. Validity of original baseline or its update

Means of validation	<p>In accordance with the directives for the renewal of the crediting period of a registered CDM project activity, the validity of the current baseline shall be reassessed using the latest version of the TOOL11.</p> <p><u>Step 1:</u> Assess the validity of the current baseline for the next crediting period</p> <p><u>Step 1.1:</u> 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^{/13/}.</p> <p><u>Step 1.2:</u> 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.</p> <p><u>Step 1.3:</u> 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 a greenfield.</p> <p><u>Step 1.4:</u> Assessment of the validity of the data and parameters: the values of fixed parameters CAP_{BL} and A_{BL} remain valid for the 2nd crediting period. Parameter $EF_{grid,BM}$ is a fixed parameter for this 2nd crediting period, as per TOOL07.</p> <p>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.</p> <p>As there are parameters that were updated for the 2nd crediting period, Step 2 is assessed below:</p>
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	<p><u>Step 2:</u> Update the current baseline and the data and parameters</p> <p><u>Step 2.1:</u> 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.</p> <p><u>Step 2.2:</u> Update the data and parameters: parameter $EF_{grid,BM}$ (Build margin emission factor of the Brazilian grid) has been included as a fixed parameter.</p>
Findings	CL 02
Conclusion	<p>The baseline scenario is given by applied methodology ACM0002 and still valid, as per the assessment against TOOL11.</p> <p>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”.</p> <p>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 $EF_{grid,OM-DD,y}$.</p>

D.4. Estimated emission reductions or net anthropogenic removals

Means of validation	<p>All equations, formulas and assumptions were correctly applied as per the applied methodology (ACM0002 – v. 20.0) and tools.</p> <p>The baseline emissions are calculated by the following formula:</p> $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ <p>Where:</p> <ul style="list-style-type: none"> • 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”. <p>The project emissions are calculated by the following formula, if the power density of the single or multiple reservoirs (PD) is greater than 4W/m² and less than or equal to 10W/m².</p> <p>The power densities are as follow:</p> <ul style="list-style-type: none"> - SHP Engenheiro Ernesto Jorge Dreher: 21.63 W/m²; - SHP Engenheiro Henrique Kotzian: 20.05 W/m². <p>Thus, no PE is identified for the Project activity.</p> <p>As per the applied methodology (ACM0002 – v. 20.0), no leakage is to be accounted. So, $LE_y = 0$.</p> <p>Thus, $ER_y = BE_y$.</p> <p>The parameters used to calculate the emission reductions are conservative, traceable and from official, public and reliable sources.</p> <p>All fixed ex-ante parameters necessary for the project activity are listed at the Section B.6.2 of PDD, in accordance with the applied methodology and tools. They are:</p> <ul style="list-style-type: none"> - $EF_{grid,BM,y}$: Build margin CO₂ emission factor in year y; - CAP_{BL}: Installed capacity of the hydro power plant before the implementation of the project activity; - 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; - EF_{Res}: Default emission factor for emission from reservoirs.
Findings	CAR 01
Conclusion	The methodology and tools were correctly applied to calculate the estimates of emission reductions, with reliable and conservative parameters.

D.5. Validity of monitoring plan

Means of validation	<p>The PDD sets a monitoring plan, which is feasible and in accordance with the applied methodology and tools.</p> <p>The management structure and roles and responsibilities are established for data collection, calibration frequency of meters, data report and data archiving.</p> <p>Moreover, there are procedures set for crosschecking the monitored data.</p> <p>No sampling plan is set to monitor the parameter.</p> <p>The parameters to be monitored necessary for the project activity are listed at the PDD, in accordance with the applied methodology and tools.</p> <p>The parameters required for monitoring are contained in the monitoring plan:</p> <ul style="list-style-type: none"> - $EG_{Engenheiro\ Ernesto\ Jorge\ Dreher,y}$: Quantity of net electricity generation supplied by the SHPP Engenheiro Ernesto Jorge Dreher to the grid in year y; - $EG_{Engenheiro\ Henrique\ Kotzian,y}$: Quantity of net electricity generation supplied by the SHPP Engenheiro Henrique Kotzian to the grid in year y; - $EG_{Total\ (Engenheiro\ Ernesto\ Jorge\ Dreher/Henrique\ Kotzian),y}$: Quantity of net electricity generation supplied by both SHPPs (Engenheiro Ernesto Jorge Dreher and Henrique Kotzian) to the grid in year y; - $EF_{grid,CM,y}$: 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; - $CAP_{PJ - Ernesto\ Jorge\ Dreher\ SHP}$: Installed capacity of SHP Ernesto Jorge Dreher after the implementation of the project activity; - $CAP_{PJ - Henrique\ Kotzian\ SHP}$: Installed capacity of SHP Henrique Kotzian after the implementation of the project activity; - $APJ - Ernesto\ Jorge\ Dreher\ SHP$: Area of the single or multiple reservoirs measured in the water surface, after the implementation of the project activity, when the reservoir is full; - $APJ - Henrique\ Kotzian\ SHP$: Area of the single or multiple reservoirs measured in the water surface, after the implementation of the project activity, when the reservoir is full.
Findings	CAR 02
Conclusion	<p>The monitoring plan of the PA is in accordance with the approved monitoring methodology and the means of monitoring of the parameters contained in the monitoring plan are feasible.</p> <p>The management structure and roles and responsibilities are set for data collection, calibration frequency of monitoring equipment, data report and data archiving. In addition, procedures for quality assurance and quality control are be set, as well as specific training for involved personnel.</p> <p>There is no sampling plan set to monitor the parameters.</p>

D.6. Crediting period

Means of validation	The crediting period is 7 years renewable. This is the 2 nd crediting period and its start date is 01/01/2020, which is the first date after the end of the 1 st crediting period.
Findings	-
Conclusion	<p>The 2nd crediting period is from 01/01/2020 – 31/12/2026.</p> <p>The renewal is being requested in accordance with CDM requirements and EB directives.</p>

D.7. Project participants

Means of validation	<p>The project participants are:</p> <ul style="list-style-type: none"> - BME Rincão do Ivaí Energia S.A.; - BME Capão da Convenção Energia S. A.; and - Carbotrader Assessoria e Consultoria em Energia Eireli
Findings	-
Conclusion	<p>The names of the project participants included in the updated PDD were assessed in accordance with the applicable validation requirements related to the renewal of crediting period.</p> <p>All information is in accordance with UNFCCC website.</p>

D.8. Post-registration changes

Type of post-registration changes (PRCs)	Validation report for PRCs
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	Confirmation (Y/N)	Version	Completion date
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ¹	N	-	-
Corrections	N	-	-
Change to the start date of the crediting period	N	-	-
Inclusion of a monitoring plan	N	-	-
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	N	-	-
Changes to the project design	N	-	-
Changes specific to afforestation and reforestation project activities	N	-	-

SECTION E. Internal quality control

The draft validation report that is prepared by validation team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by ESPL were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM 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 validation 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 the renewal of the crediting period is submitted to UNFCCC. 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 validation team. The decision taken by the technical reviewer is final and is authorized on behalf of ESPL.

SECTION F. Validation opinion

ESPL, contracted by BME Rincão do Ivaí Energia S. A., has performed the independent validation of the renewal of crediting period of the project “SHPPs Jorge Dreher and Henrique Kotzian CDM Project”, with UNFCCC Ref. Number: 8018.

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

ESPL's validation 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 validation team confirms, based on final version of revised PDD for the 2nd crediting period, that:

- the original baseline is still valid as it is given by the applied methodology;
- the additionality of the project is valid for the renewal of the crediting period. No regulatory surplus has been identified. The project 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 it is in accordance with the applied methodology;
- at this 2nd crediting period, the project activity is likely to achieve the estimated of 37,732 tCO₂e per year.

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

Appendix 1. Abbreviations

Abbreviations	Full texts
ACM	Approved Consolidated Methodology
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
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
FEPAM	Environmental Agency of the State of Rio Grande do Sul
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
LoA	Letter of Approval/Authorization
MoC	Modalities of Communication
MP	Monitoring Plan
MW	Mega Watt
MWh	Mega Watt hour
OM	Operating Margin
PA	Project Activity
PCP	Project Cycle Procedure
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	Tonnes of Carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VT	Validation Team
VVS	Validation and Verification Standard

Appendix 2. 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	Yes (ACM0001, ACM0002, AM0026, ACM0006, AMS-I.D)		
Local expert	Brazil, Chile, Colombia		
Financial Expert	Yes		
Technical Reviewer	No		
TA Expert	Yes (1.2, 13.1)		
Reviewed by	Shreya Garg	Date	29/08/2019
Approved by	Anshika Gupta	Date	29/08/2019

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	+6 Years		
Field	Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	Yes (AMS.I.A, AMS.I.C, AMS.I.D, AMS.I.F, AMS.II.D, AMS.II.G, AMS.II.J, AMS.III.AV, ACM0002, ACM0012)		
Local expert	India		
Financial Expert	No		
Technical Reviewer	Yes		
TA Expert	Yes (1.2, 3.1)		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Gautam	Date	01/03/2018

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UNFCCC	Standard: CDM PS for PA	version 02.0	Other
2.	UNFCCC	Standard: CDM PCP for PA	version 02.0	Other
3.	UNFCCC	Standard: CDM VVS for PA	version 02.0	Other
4.	UNFCCC	Form: CDM-PDD-FORM	version 11.0	Other
5.	UNFCCC	Project design document (registered)	version 4 – 26/06/2012	PP
6.	PP	Project design document (draft)	version 1 – 15/06/2020	PP
7.	PP	Project design document (revised)	version 2 – 09/09/2020 version 2.1 – 30/09/2020 version 2.2 – 19/10/2020	PP
8.	PP	Project design document (final)	version 2.3 – 22/10/2020	PP
9.	PP	ER Spreadsheet (draft)	version 1	PP
10.	PP	ER Spreadsheet (final)	version 2	PP
11.	UNFCCC	<u>Methodology</u> ACM0002: Grid-connected electricity generation from renewable sources	version 20.0	Other
12.	UNFCCC	<u>Methodological tools</u> - TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation	version 03.0	Other
		- TOOL07: Tool to calculate the emission factor for an electricity system	version 07.0	
		- 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	
13.	FEPAM FEPAM FEPAM	<u>Environmental licenses</u> - SHP Engenheiro Ernesto Jorge Dreher o LO # 01058 / 2019 – valid until 05/02/2024 - SHP Engenheiro Henrique Kotzian o AUTGER # 00206 / 2019 – valid until 03/09/2020 o Renewal Protocol # 1343 / 2019-DL	19/02/2019 02/09/2019 30/06/2020	PP
14.	ANEEL ANEEL	<u>Starting date of Commercial operation</u> - SHP Engenheiro Ernesto Jorge Dreher: Dispatch # 3756 - SHP Engenheiro Henrique Kotzian: Dispatch # 1063	02/10/2009 04/03/2011	PP
15.	PP	<u>Pictures (nameplates) and Virtual tour</u> - SHP Engenheiro Ernesto Jorge Dreher	August and September/2020	PP

		- SHP Engenheiro Henrique Kotzian	August and September/2020	
16.	ANEEL	Technical lifetime of turbines and generators Study of Economic Lifetime and Depreciation Rate	November/2000	PP
17.	ANEEL	<u>Location – GPS Coordinates (refer to pictures below this table)</u> - SHP Engenheiro Ernesto Jorge Dreher o Dispatch # 1181 – GPS coordinates of the axis of the dam	17/04/2007	PP
	ANEEL	- SHP Engenheiro Henrique Kotzian o Dispatch # 1180 – GPS coordinates of the axis of the dam	18/04/2007	
	-	<u>Terra Incognita – GPS mapping and management software</u>	https://sourceforge.net/projects/terraincognita2/	Other
	-	SIGAM converter – GPS coordinates converter	https://sigam.ambiente.sp.gov.br/sigam3/Controles/latlongutm.htm?latTxt=ctl00_conteudo_TabNavegacao_TBCadastro_carCadastro_numLatitude&lonTxt=ctl00_conteudo_TabNavegacao_TBCadastro_carCadastro_numLongitude	Other
18.	-	Emission Factor – accessed on 23/09/2020	http://antigo.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despach.html	Other
19.	-	DNA of Brazil	mctic.gov.br	Other
20.	-	IPCC publications	www.ipcc-nggip.iges.or.jp	Other
21.	-	UNFCCC	cdm.unfccc.int	Other

/17/ – Pictures of plants by their GPS coordinates

- SHP Engenheiro Ernesto Jorge Dreher

Terra Incognita 2.45 - http://maps.google.com/ - Satellite: 200 m (2m/px)

File Map source Zoom levels Selection Go to Waypoints, Tracks Device Help

GPS Position

Latitude / Longitude

degrees ☐ N degrees ☐ E

degrees minutes ☐ S degrees minutes ☐ W

degrees minutes seconds

Locate

100 m

29.1202805 53.367784W no grid

Conversor

☐ UTM para Geográfica ☒ GMS para Geográfica

GMS (Graus, Min e Seg) Para/De Geográfica (graus decimais)

Longitude: >> Longitude:

Latitude: << Latitude:

Coordenadas geográficas são digitadas e apresentadas em graus decimais. Números negativos indicam longitudes oeste e latitudes sul. Coordenadas UTM são digitadas e apresentadas em metros. O modelo de elipsoide usado para os cálculos é o WGS84.

- SHP Engenheiro Henrique Kotzian

Terra Incognita 2.45 - http://maps.google.com/ - Satellite: 200 m (2m/px)

File Map source Zoom levels Selection Go to Waypoints, Tracks Device Help

GPS Position

Latitude / Longitude

degrees ☐ N degrees ☐ E

degrees minutes ☐ S degrees minutes ☐ W

degrees minutes seconds

Locate

100 m

29.1261105 53.318324W no grid

Conversor

☐ UTM para Geográfica ☒ GMS para Geográfica

GMS (Graus, Min e Seg) Para/De Geográfica (graus decimais)

Longitude: >> Longitude:

Latitude: << Latitude:

Coordenadas geográficas são digitadas e apresentadas em graus decimais. Números negativos indicam longitudes oeste e latitudes sul. Coordenadas UTM são digitadas e apresentadas em metros. O modelo de elipsoide usado para os cálculos é o WGS84.

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	01	Section no.	D.1	Date:	09/09/2020
Description of CL					
<i>According to the instructions for filling out the PDD, it is missing:</i>					
a. Section A.1: the estimates of annual average and total GHG emission reductions for the chosen crediting period.					
b. Section A.3: the age and average lifetime of the equipment based on the manufacturer's specifications and industry standards;					
c. Section C.3.3: the duration of the crediting period is not given in years and months.					
Project participant response					Date: 09/09/2020
The sections A.1, A.3 and C.3.3 were adjusted accordingly in PDD version 2. Was included the missing information.					
Documentation provided by project participant					
PDD – version 2					
DOE assessment					Date: 22/09/2020
All sections of the PDD were filled up in accordance with the instructions.					

CL ID	02	Section no.	D.3	Date:	09/09/2020
Description of CL					
<i>At Section B.4 – Step 1.4 and Step 2.2, the assessment of the fixed parameters was not done in accordance with the requirements of TOOL11.</i>					
Project participant response					Date: 09/09/2020
The assessment related to build margin emission factor (fixed for 2 nd CP) was included in section B.4 steps 1.4 and 2.2.					
Documentation provided by project participant					
PDD – version 2					
DOE assessment					Date: 22/09/2020
Section B.4 was revised and it is clear that the parameter $EF_{grid,BM,y}$ is now a fixed parameter in accordance with TOOL07.					

Table 2. CAR from this validation

CAR ID	01	Section no.	D.4	Date:	09/09/2020
Description of CAR					
<i>The value used for $EF_{grid,BM,y}$ is not the latest one available at the DNA website, as required by TOOL07.</i>					
Project participant response					Date: 09/09/2020
Since the latest value was made public by the Brazilian DNA the value was updated accordingly (2019 year).					
Documentation provided by project participant					
PDD – version 2; CER's calculations – version 2; DNA's website					
DOE assessment					Date: 22/09/2020
The value used for $EF_{grid,BM,y}$ is the latest one available at the DNA website (accessed on 23/09/2020).					

CAR ID	02	Section no.	D.5	Date:	09/09/2020
Description of CAR					
<i>The values used for the calculation of $EF_{grid,OM-DD,y}$ and further for the calculation of $EF_{grid,CM,y}$ are not the latest ones available at the DNA website, as required by TOOL07.</i>					
Project participant response					Date: 09/09/2020
Since the latest values were made public by the Brazilian DNA the values for $EF_{grid,OM-DD,y}$ and further for the calculation of $EF_{grid,CM,y}$ were updated accordingly (2019 year).					
Documentation provided by project participant					
PDD – version 2; CER's calculations – version 2; DNA's website (accessed on 23/09/2020)					
DOE assessment					Date: 22/09/2020
The values used for the calculation of $EF_{grid,OM-DD,y}$ and further for the calculation of $EF_{grid,CM,y}$ are not the latest ones available at the DNA website (accessed on 23/09/2020).					

Table 3. FAR from this validation

FAR ID	01	Section No.	C.2	Date: 09/09/2020
Description of FAR				
<i>As no physical site visit was performed during the validation of renewal of the crediting period of the project activity and all checking of technical data of equipment has been done based on documents, pictures and interviews, the verifier shall reconfirm the technical data in the next verification of the project activity.</i>				
Project participant response				Date: 09/09/2020
Agreed				
Documentation provided by project participant				
-				
DOE assessment				Date: 22/09/2020
The verification team shall reconfirm the technical data in the next verification of the project activity.				

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Document information

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