




**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	Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project UNFCCC reference number 0693
Number and duration of the next crediting period	3rd crediting period , 09/04/2019 to 08/04/2026
Version number of the validation report	1.1Aa
Completion date of the validation report	30/08/2019
Version number of PDD to which this report applies	3.0
Project participants	Votorantim Cimentos Ltda. Ecopart Assessoria em Negocios Empresariais Ltda. J. Aron & Company CM Capital Market Holding S.A.
Host Party	Brazil
Applied methodologies and standardized baselines	ACM0002: Grid-connected electricity generation from renewable sources" version 19 of 31/08/2018
Mandatory sectoral scopes	Sectoral scope 1: Energy industries (renewable-/ non renewable sources
Conditional sectoral scopes, if applicable	N/A
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	101,417 tCO ₂ e
Name and UNFCCC reference number of the DOE	RINA Services S.p.A. (RINA), UNFCCC reference number of the DOE E-0037
Name, position and signature of the approver of the validation report	Laura Severino (Authorized officer signing for the DOE)  Sustainability & Food Certification Compliance Head

SECTION A. Executive summary

>> Purpose and general description

The project activity is a hydropower plant with existing reservoir built since 1985, which neither volume nor flooded area of the reservoir was increased. The project included construction of electric sub-stations, fabrication and installation of turbines and generators. The plant has an installed capacity of 162 MW, located in the city of Governador Mangabeira, São Félix and Cachoeira, state of Bahia, Northeastern of Brazil. UHE Pedra do Cavalo (hereinafter referred to as UHEPC) is owned by VOTORANTIM CIMENTOS LTDA. and administered by VOTORANTIM ENERGIA LTDA., both are subsidiaries of GRUPO VOTORANTIM.

The project was validated by DET NORSKE VERITAS (validation report N° 2006-0543 version 01a dated 04/10/2006) and it was registered on 31/12/2006 under the CDM registration reference N° 0693; second crediting period was renewed by DET NORSKE VERITAS (validation report N° 2012-9049, version 01 of 17/05/2012).

Scope of validation

The objective of the Validation is to have an independent evaluation of the update PDD's compliance with relevant UNFCCC requirements and host Party criteria to confirm that the original project baseline is still valid or has been updated taking into account of new data where applicable. In particular, the project's baseline, monitoring plan and the project's compliance with relevant UNFCCC requirements and host Party criteria are validated in order to confirm the correctness of the application of the approved baseline methodologies for the determination of the continued validity of the baseline/or its update, and estimation of the emission reductions for the applicable crediting period. The validation scope is to review the updated PDD against the UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, and the subsequent decisions by the CDM Executive Board.

Validation process

This report summarizes the findings from the validation of the updated PDD of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given by the CDM Validation and Verification Standard, CDM Project Cycle Procedure and CDM Project Standard and included an assessment of: (a) The impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period; (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions from the applicable crediting period. This validation opinion is also to be seen in conjunction with the validation report at the time of requesting registration for the first crediting period. The Validation Opinion is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

Conclusion

RINA Services S.p.A. (RINA), commissioned by Votorantim Cimentos Ltda., has performed the validation for renewal of the crediting period for the registered project activity Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project in Brazil. In conclusion, it is RINA's opinion that the project meets all the relevant requirements for the renewal of the crediting period.

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/ validator Technical Expert	IR	Carvalho	Thais	RINA Brazil	x	x	x	x

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	Buragohain	Champak	RINA India
2.	Approver	IR	Severino	Laura	RINA HQ

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

>> The updated PDD version 3.0 of 05/08/2019 and previous versions /02/, in particular the applicability of the methodology, the baseline determination, the emission reduction calculations provided in the form of a spreadsheet "20190805_PCavalo_CERs_v.3.xls" version 3 of 05/08/2019 /10/, and the documents listed in the table 3 below, were reviewed during the validation.

C.2. On-site inspection

Duration of on-site inspection: 10/06/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	-Implementation and operation of the proposed project activity; -Confirm data used in the ex-ante estimative of CERs calculation -Interviewed key personnel of the plant to confirm the operational and data collection procedures; QA QC procedures	UHE Pedra do Cavalo	10/06/2019	Thais Carvalho

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Melo	Adilson Antonio	Votorantim	10/07/2019	Manager of the UHE: Project implementation; equipments installed, assured energy, energy measurements, calibration requirements	Thaís Carvalho
2.	Miranda	Livia	Votorantim Cimentos	10/07/2019	Sustainability consultant-project implementation, PDD, monitoring	Thaís Carvalho
3.	Casadri	Eloisa	Votorantim Cimentos	10/07/2019	Environmental consultant-project implementation, PDD, monitoring, environmental aspects	Thaís Carvalho
4.	Nagai	Karen	EQAO	10/07/2019 (conference call)	CERs estimative, emission factor	Thaís Carvalho

C.4. Sampling approach

>>N/A

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			
Estimated emission reductions or net anthropogenic removals		1	
Validity of monitoring plan	2	3	
Crediting period			
Project participants			
Post-registration changes			
Others (please specify)-			
Total	3	4	

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

Means of validation	PDD applies the applicable CDM- PDD-FORM: Project design document form version 11.0. /07/ RINA verified that for the renewal crediting period, information transferred to the later valid version of the PDD form is materially the same as that in the registered PDD.
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Findings	<p>CL 1: In accordance with Instructions for completing the CDM-PDD-FORM , appendix 7: Provide a summary of the post-registration changes being proposed in this version of the PDD, and where applicable, the history of all post-registration changes to the project activity that have been approved by the Board after its registration. For all post-registration changes, include reasons for the changes and any additional information relating to the changes. RINA verified in the UNFCCC web that there was a PRC approved in the first crediting period, not listed in the appendix 7.</p> <p>To close CL 1 PDD was correctly revised in accordance with the instructions.</p>
Conclusion	RINA confirms that the PDD is based on the currently valid CDM-PDD-FORM template version 11.0 and is completed in accordance with the Attachment: Instructions for completing this form /07/

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

Means of validation	The project was originally registered based on version 6 of the methodology ACM0002 and the second crediting period based on version 12 of the /09/; the revised PDD /02/ applies ACM0002: Grid-connected electricity generation from renewable sources version 19 of 31/08/2018 /06/.										
	RINA verified that the ACM0002 is still applicable to the project activity as described below:										
	<table><tr><th>Applicability criteria</th><th>Project activity</th><th>Criteria is met?</th></tr><tr><td>3. 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 (e) Involve a replacement of (an) existing plant(s)/unit(s).</td><td>RINA verified that the option a) Install a Greenfield power plant is applicable to the project activity</td><td>Yes</td></tr><tr><td>4. 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.</td><td>RINA verified that the project activity is a hydropower plant. Option b) is not applicable, since only new project/unit(s) is considered in the proposed project activity.</td><td>Yes</td></tr></table>			Applicability criteria	Project activity	Criteria is met?	3. 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 (e) Involve a replacement of (an) existing plant(s)/unit(s).	RINA verified that the option a) Install a Greenfield power plant is applicable to the project activity	Yes	4. 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.	RINA verified that the project activity is a hydropower plant. Option b) is not applicable, since only new project/unit(s) is considered in the proposed project activity.
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	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>5. 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>	RINA verified during the onsite visit that in the case of the project activity, option (a) is applied the project activity is implemented in existing single reservoir, with no change in the volume of any of the reservoirs, confirmed in the feasibility study /18/ and interview during the onsite visit.	Yes
	6. In the case of integrated	Not applicable, since the project	Yes

	<p>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 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>	activity is not an integrated project type.	
	<p>7. 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>	<p>a) Not applicable, since the hydropower plant is a grid-connected power project.</p> <p>b) Not applicable, since the project activity is a hydropower project type.</p>	Yes
	<p>8. 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, the project is a green field hydropower plant.	Yes

	<p>13. This methodology also refers to the latest approved versions of the following tools:</p> <p>(a) "TOOL01: Tool for the demonstration and assessment of additionality", version 7.0 (not used in the project activity);</p> <p>(b) "TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality", version 7.0 not used in the project activity;</p> <p>(c) "TOOL03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion", version 3.0 (not used in the project activity);</p> <p>(d) "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation", version 3.0; /14/</p> <p>(e) "TOOL07: Tool to calculate the emission factor for an electricity system", version 7.0 /13/;</p> <p>(f) "TOOL10: Tool to determine the remaining lifetime of equipment", version 1.0 /15/;</p> <p>(g) "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 /08/.</p>
Findings	N/A
Conclusion	<p>RINA confirms that the selected baseline and monitoring methodologies have been previously approved by the CDM Executive Board and are applicable to the project, which complies with all the applicability conditions therein the selected versions are valid at the time of submission of the renewal of crediting period. It is also confirmed that the methodologies are correctly applied by comparing them with the actual text of the applicable versions.</p>

D.3. Validity of original baseline or its update

Means of validation	<p>The baseline was assessed according to the tool "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" /08/. The following steps were assessed:</p> <p>Step 1: Assess the validity of the current baseline for the next crediting period</p> <p>Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.</p> <p>In accordance with the ACM0002, if the project activity consists of the installation of a greenfield power plant, the baseline scenario is: "Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".</p> <p>In the first crediting period, the project electricity system was the North-Northeast and the CO2 emission factor of the grid was calculated by the project participants, while applying the ex-post option. For the second crediting period of the project, the CO2 emission factor of the grid has changed considering the electricity system delineation of grid-connected projects following the Brazilian DNA definition. According to Resolution # 8 issued by the Brazilian DNA on May 26th, 2008, the project electricity system for projects connected to the National Interconnected System ("SIN" from the Portuguese "Sistema Interligado Nacional") shall cover cover all five macro-geographical regions of the country (North, Northeast, South, Southeast and Midwest) /11/. The CO2 emission factor of the grid continued to be calculated by the project participants as the Brazilian DNA presented values using OM dispatch data analysis method only (option (c) of TOOL07).</p> <p>In this third crediting period, the project participants are applying the grid delineation and values published by the Brazilian DNA, while applying the OM dispatch data analysis method only (option (c) of TOOL07). Therefore, the current baseline complies with national and sectoral policies which have come into effect after the submission of the project for registration and first renewal. Since circumstances related to the calculation of the emission factor of the grid have changed, information related to baseline emission factor calculation was reviewed</p>
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	<p>in this third crediting period. RINA verified that the values used for the grid emission factor are in accordance with the values publicly available by the Brazilian DNA /16/</p> <p>Rina verified during the on-site visit that the following equipment's are installed and operational: 2 Turbines Francis, from Voith Simens with nominal power of (KW) 82,650 each. 2 generators from Voith Simens with nominal power (kVA) 90,000 and power factor 0.90</p> <p>RINA verified that the installed capacity of the project activity was defined in the updated PDD in accordance with the definition of ACM0002: installed capacity of Installed power generation capacity (or installed capacity or nameplate capacity) - the installed power generation capacity of a power unit is the capacity, expressed in Watts or one of its multiples, for which the power unit has been designed to operate at nominal conditions.</p> <p>Moreover, PP has provided the protocol to renew the operational license CRA nº 5206 /17/.</p> <p>Step 1.2: Assess the impact of circumstances</p> <p>Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which the renewal is requested In the absence of the project, the electricity would be generated by grid connected power plants. The National Interconnected System (SIN, from the Portuguese "Sistema Interligado Nacional") is composed by more than 7,000 plants and each one has specific characteristics and equipment /18/. Thus this step does not apply, since the whole system would continue to supply energy independently of the lifetime of individual equipment. Regarding the project lifetime, the project has more than 35 years lifetime without any new investment required as validated in the registered PDD. Since the project startup occurred in 2004-2005 year, the project is expected to be operational up to 2039-2040 year. Then, the remaining technical lifetime exceeds the end of the last crediting period of the project (2026 year).</p> <p>Step 1.4: Assessment of the validity of the data and parameters The baseline emissions of the project activity were updated considering the last version of the methodologies and related applicable tools.</p> <p>Step 2: Update the current baseline and the data and parameters Step 2.1: Update the current baseline The current scenario is still valid, thus there is no need to be updated. The baseline emissions for the third crediting period have been updated, without reassessing the baseline scenario, based on the latest approved version of the methodology ACM0002 and applicable tools.</p> <p>Step 2.2: Update the data and parameters The data and/or parameter(s) for the third crediting period were updated. The assessment is described in the sections below, considering changes in the Brazilian grid delineation, the CO₂ emission factor of the grid was updated to reflect the current delineation and matrix, following the latest version of TOOL07.</p>
Findings	N/A
Conclusion	RINA verified that the baseline was assessed according to the tool "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" /08/. The current project baseline is still valid at the renewal crediting period.

D.4. Estimated emission reductions or net anthropogenic removals

Means of validation	The approved baseline and monitoring ACM0002: Grid-connected electricity generation from renewable sources version 19 of 31/08/2018 /06/ has been applied.		
	Data/parameter / unit	Value applied	Assessment
	EF _{Res} (kgCO _{2e} /MWh) Default emission factor for emissions from reservoirs	90	Default value, established in the applied methodology ACM0002.
	Cap _{BL} (W) Installed capacity of the hydro power plant before the implementation of the project activity	0	In accordance with the methodology, for new hydro power plants, this value is zero
	A _{BL} (m ²) 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.	186 x 10 ⁶	In accordance with registered PDD, project activity was installed in a existing reservoir /01/.
	EF _{grid,OM-adj,2016-2018} (tCO _{2e} /MWh): Simple adjusted operating margin CO ₂ emission factor in year y	0.4195	Data is provided by the Brazilian DNA, public available /16/, calculated in accordance with the requirements of the "Tool to calculate the emission factor for an electricity system" /13/. According to TOOL07, the 3-year generation-weighted average should be used. PP has used data from 2016, 2017 and 2018 (latest data available by the Brazilian DNA)
	EF _{BM,2010} (tCO _{2e} /MWh): Build Margin CO ₂ emission factor of the grid.	0.1404	Official publications (data from ONS), IPCC default values and default values provided by the "Tool to calculate the emission factor for an electricity system". Data from the 2 nd crediting period is used in accordance with ex-ante data vintage /01/. According to TOOL07, for the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Project emissions:

In accordance with ACM0002, for most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y = Project emissions in year y (t CO₂e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO₂/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO₂e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

For all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected.

According to ACM0002, project emissions from reservoir depend on the power density of hydropower projects calculated as follows:

$$PD = \text{Cap}_{PJ} - \text{Cap}_{BL} / A_{PJ} - A_{BL}$$

Where:

PD = Power density of the project activity, as W/m²;

Cap_{PJ} = Installed capacity of the hydroelectric plant after implementation of the project activity (W) = 162×10^6 (RINA confirmed in the generator' plate, during the onsite visit)

Cap_{BL} = Installed capacity of the hydroelectric plant before implementation of the project activity (W). For new hydroelectric power plants, this value is zero;

A_{PJ} = Reservoir area measured at the surface of the water, after implementation of the project activity when the reservoir is full (m²);

A_{BL} = Reservoir area measured at the surface of the water, before implementation of the project activity when the reservoir is full (m²).

The project activity was installed in a existing reservoir, with no change in the capacity during the project implementation/operation = $186 \times 10^6 / 17$

Therefore, project emissions is equal 0.

Baseline emissions:

In accordance with ACM0002, baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

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

Where:

BE_y = Baseline emissions in year y (t CO₂/yr)

$EG_{PJ,y}$ = 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 (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of "TOOL07: Tool to calculate the emission factor for an electricity system" (t CO₂/MWh)

If the project activity is the installation of a Greenfield power plant, then:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$ = 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 (MWh/yr)

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

RINA verified that the assured energy was revised considering concession contract # 19/2002, also used in the first and second crediting period /01/

For the combined emission factor, data is provided by the Brazilian DNA /16/, in accordance with the requirements of the tool /13/, as described below.

STEP 1: Identify the relevant electricity system

The Brazilian DNA published a Resolution #08, issued on 26th May, 2008, defines the Brazilian Interconnected Grid as a single system that covers all the five macro-geographical regions of the country (North, Northeast, South, Southeast and Midwest) /11/

STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional)

The Brazilian DNA is responsible for calculating the emission factors and it did not include off-grid power plants in the calculation, therefore Option I is used: Only grid power plants are included in the calculation;

STEP 3: Select a method to determine the operating margin (OM)

The $EF_{grid,OM,y}$ is given by the Brazilian DNA and calculated under the method: *Simple adjusted OM*. The Brazilian DNA made available the operating margin emission factor calculated following the "Tool to calculate the emission factor for an electricity system", approved by the CDM Executive Board. The project activity applies the simple adjusted OM. The project activity applies the ex-ante option: if the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the five most recent calendar years prior to the time of submission of the CDM-PDD for validation

Step 4: Calculate the operating margin emission factor according to the selected method

Data for OM CO₂ emission factor published by the Brazilian DNA using the simple adjusted method is used. As the project applies the ex-ante option, the three-year generation-weighted average based on the most recent data is considered /16/

Year	Simple adjusted OM (tCO ₂ /MWh)	Total energy dispatched to SIN (MWh)
2016	0.4360	485,310,967
2017	0.4287	475,332,364
2018	0.3932	468,555,516

Therefore, $EF_{grid,OM-adj,2016-2018} = 0.4195 \text{ tCO}_2\text{e/MWh}$

Step 5. Calculate the build margin (BM) emission factor

For data vintage, Option 1 (ex-ante) was chosen for the proposed project in the second crediting period. Therefore, the CO₂ BM EF considered in the 2nd crediting period PDD /01/ will be used in the 3rd crediting period of the project. Thus, $EF_{grid,BM,2010} = 0.1404 \text{ tCO}_2\text{e/MWh} /01//16/$

Step 6: Calculate the Combined Margin emission factor

$$EF_{grid,CM,y} = EF_{grid,OM,y} \cdot w_{OM} + EF_{grid,BM,y} \cdot w_{BM}$$

According with the Tool, values adopted for w_{OM} and w_{BM} in the third crediting period is equal $w_{OM} = 0.25$ and $w_{BM} = 0.75$.

$$EF_{grid,CM,y} = 0.25 \cdot 0.4195 + 0.75 \cdot 0.1404 \text{ tCO}_2\text{e/MWh}$$

$$EF_{grid,CM,y} = 0.2102 \text{ tCO}_2\text{e/MWh}$$

Leakage:

In accordance with ACM0002, "no leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing and transport) are neglected". Therefore, $L_y = 0 \text{ tCO}_2\text{e}$.

Emission Reduction

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y,$$

Where:

ER_y = Emission reductions in year y (tCO₂e/yr);

BE_y = Baseline emissions in year y (tCO₂e/yr);

PE_y = Project emissions in year y (tCO₂e/yr);

The summary of ex-ante estimative will be presented in the final report

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1 - 2019 (form 09/04/2019)	74,129	0.0	0.0	74,129
Year 2 - 2020	101,616	0.0	0.0	101,616
Year 3 - 2021	101,338	0.0	0.0	101,338
Year 4 - 2022	101,338	0.0	0.0	101,338
Year 5 - 2023	101,338	0.0	0.0	101,338
Year 6 - 2024	101,616	0.0	0.0	101,616
Year 7 - 2025	101,338	0.0	0.0	101,338

	Year 8 – 2026 (08/04/2026)	27,208	0.0	0.0	27,208
	Total	709,920	0.0	0.0	709,920
	Total number of crediting years	7			
	Annual average over the crediting period	101,417 (rounded down)	0.0	0.0	101,417 (rounded down)
Findings	<p>CAR 1: PP is requested to confirm the method used to calculate the $EF_{grid,OM}$ (including data vintage). Moreover, most recent data is not used.</p> <p>To close CAR 1, emission factor data was revised in accordance with the requirements of the tool and data available by the Brazilian DNA</p>				
Conclusion	<p>It is RINA's opinion:</p> <p>(a) All assumptions and data used by the PP are listed in the PDD;</p> <p>(b) All documentation used by the PP as the basis for assumption and source of data is correctly quoted and interpreted in the PDD /01/ /06/ /08/ /09/ /14/ /16/ /17/ /18/;</p> <p>(c) All values used in the PDD and CERs spreadsheet. including GWPs are considered reasonable in the context of the proposed project activity /10/;</p> <p>(d) The baseline methodology and methodological tools have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions; /01/ /06/ /08/ /09/ /14/ /16/ /17/ /18/;</p> <p>(e) All estimates of the baseline and project emissions can be replicated using the data and parameters values provided in the PDD and CERs spreadsheet.</p>				

D.5. Validity of monitoring plan

Means of validation	The approved baseline and monitoring ACM0002: Grid-connected electricity generation from renewable sources version 19 of 31/08/2018 /06/ has been applied.				
	The assessment of the ex-post parameters are described in the table below:				
	<table><tr><th>Parameter</th><th>Description/Assessment</th></tr><tr><td>$EG_{facility,y}$ (MWh/yr): Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.</td><td><p>Value applied: 482,136, in accordance with concession contract # 19/2002, also used in the first and second crediting period /19/. This parameter should be either monitored using bi-directional energy meter or calculated as difference between (a) the quantity of electricity supplied by the project plant/unit to the grid; and (b) the quantity of electricity the project plant/unit from the grid. In case it is calculated then the following parameters shall be measured:</p><p>(a) The quantity of electricity supplied by the project plant/unit to the grid; and (b) The quantity of electricity delivered to the project plant/unit from the grid.</p><p>In order to determine $EG_{facility,y}$, parameter (a) will be checked by CCEE data and discounting parameter (b), which will be checked by the local utility invoices. Both references are official source of data.</p></td></tr></table>		Parameter	Description/Assessment	$EG_{facility,y}$ (MWh/yr): Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
Parameter	Description/Assessment				
$EG_{facility,y}$ (MWh/yr): Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.	<p>Value applied: 482,136, in accordance with concession contract # 19/2002, also used in the first and second crediting period /19/. This parameter should be either monitored using bi-directional energy meter or calculated as difference between (a) the quantity of electricity supplied by the project plant/unit to the grid; and (b) the quantity of electricity the project plant/unit from the grid. In case it is calculated then the following parameters shall be measured:</p> <p>(a) The quantity of electricity supplied by the project plant/unit to the grid; and (b) The quantity of electricity delivered to the project plant/unit from the grid.</p> <p>In order to determine $EG_{facility,y}$, parameter (a) will be checked by CCEE data and discounting parameter (b), which will be checked by the local utility invoices. Both references are official source of data.</p>				

		<p>The monitoring frequency is Continuous measurement and at least monthly recording and the accuracy class of the energy meters are 0.2%.</p> <p>Calibration will follow the ONS requirements.</p>
	Cap _{PJ} (W): Installed capacity of the hydro power plant after the implementation of the project activity	Value applied: 162 x 10 ⁶ in accordance with the generator's manufacturer specification, confirmed during the onsite visit. Parameter is determined once at the beginning of each crediting period.
	A _{PJ} (m ²): 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.	Value applied: 186 x 10 ⁶ . RINA verified that the value described in the PDD is in accordance with the feasibility study /17/ and confirmed during the onsite visit through interview. Parameter is determined once at the beginning of each crediting period
<p>Management system and quality assurance</p> <p>An onsite inspection has been performed on 10/07/2019 and it is confirmed that the monitoring arrangements in the monitoring plan are feasible within the project design.</p> <p>There are two energy meters (principal and backup) for which the model and type are specified by ONS. In addition, before the operations start, ONS demands that these meters are calibrated by an entity with <i>Rede Brasileira de Calibração</i> (RBC) credential. According to current ONS procedures, they recommend a 5-year calibration frequency. Calibration of electricity meters will be carried out by an accredited person or institution and it will follow the ONS procedures. The project sponsor is responsible for ensuring that the calibrations occur within the periodicity determined by ONS. In order to confirm and to give more credibility about the energy generated, it is controlled in real time by the plant and CCEE.</p> <p>Data monitored and required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.</p>		
Findings	<p>CL 2: PP is requested to clarify the value of the assured energy used in the PDD (different values are presented in the PDD). To close CL 2, assured energy was revised in accordance with concession contract # 19/2002, also used in the first and second crediting period.</p> <p>CL 3: PP is requested to clarify the inclusion of the parameter TEGy in the monitoring plan, as it is applicable to hydro power project activities with a power density greater than 4 W/m² and less than or equal to 10 W/m². To close CL 3, PDD was revised and excluded the parameter TEGy.</p> <p>CAR 2: RINA verified during the onsite visit that the PDD does not describe the measures to monitor: (b) The quantity of electricity delivered to the project plant/unit from the grid, in accordance with the applied methodology. To close CAR 2 monitoring plan was revised in accordance with methodology requirements.</p> <p>CAR 3: Monitoring plan does not describe that the calibration of measuring equipment shall be carried out by an accredited person or institution; in accordance</p>	

	<p>with requirements of paragraph 79 of the project standard. Moreover, the calibration frequency described in the PDD is not in accordance with current ONS requirements. To close CAR 3, PDD was revised in accordance with project standard requirements.</p> <p>CAR 4: Monitoring plan does not describe Provisions to ensure that data monitored and required for verification and issuance are kept and archived for at least two years after the end of the final crediting period or the last issuance of CERs, whichever occurs later, in accordance with paragraph 82 of the project standard. To close CAR 4, PDD was revised in accordance with project standard requirements.</p>
Conclusion	<p>It is RINA's opinion that the monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions. RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology and methodological tools; no deviations relevant to the project activity have been found in the plan.</p> <p>RINA confirms that the monitoring arrangements described in the monitoring plan, including the data management and quality assurance and quality control procedures, are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified</p>

D.6. Crediting period

Means of validation	The last day of the 2nd crediting period is 08/04/2019. The third crediting period starts on the day immediately after the expiration of the current crediting period, on 09/04/2019.
Findings	N/A
Conclusion	RINA confirmed that the third crediting period of the registered CDM project activity commences on the day immediately after the expiration of the current crediting period.

D.7. Project participants

Means of validation	RINA verified that the project participants listed in the PDD are in accordance with project information in the UNFCCC web page: Votorantim Cimentos Ltda.; Ecopart Assesoria em Negocios Empresariais Ltda.; J. Aron & Company and CM Capital Market Holding S.A.
Findings	N/A
Conclusion	RINA verified that the project participant included in the updated PDD is consistent with the name of the project participant in the project view page and MoCs updates in the UNFCCC page.

D.8. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents 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 final revision of the validation opinion report before being submitted to UNFCCC for request of renewal of crediting period were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent RINA instructions.

The technical review is performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

SECTION F. Validation opinion

>> RINA Services S.p.A. (RINA) has performed a validation of the updated PDD for the project activity "Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project" in Brazil, CDM Registration Reference N° 0693. The validation of the updated PDD has performed for the third renewal crediting period (from 09/04/2019 to 08/04/2026) and is based on the information made available to us.

RINA has performed this validation in accordance with CDM validation and verification standard for project activities version 02.0 of 29/11/2018 and included an assessment of:

- An impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period:
- The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.

During the validation, there are not proposed post-registration changes for the next crediting period that is submitted together with the request for renewal of crediting period of the registered CDM project activity.

The review of the PDD version 3.0 of 05/08/2019 and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the validity of the original baseline scenario. The project correctly applies the baseline and monitoring methodology ACM0002: Grid-connected electricity generation from renewable sources version 19 of 31/08/2018. The total emission reductions from the Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project are estimated to be on an average 101,417 tCO₂e per year over the selected 7 years renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

It is RINA's opinion that the project "Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project" in Brazil meets all the relevant requirements for the renewal of the crediting period. Hence RINA requests the renewal of the crediting period of the project activity.

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
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services S.p.A.
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Thais DE LIMA CARVALHO

è qualificato come¹:
is qualified as:

CDM -TEC, -VAL, -VER, -TL
ITRP, REG-EXP²

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.2, 2.1, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19-08-2009	-
13	31-03-2017	Added qualification as ITRP
14	20-07-2018	Added qualification as REG-EXP

Il Resp. CCPLS
Head of CCPLS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: Social Carbon Standard
JI: Joint Implementation

² Argentina, Mexico, Panama, Colombia, Dominican Republic, Honduras, Ecuador, Chile, Cape Verde

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

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**CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE**

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Champak BURAGOHAIN

è qualificato come¹:
is qualified as:

**CDM -TEC, -VAL, -VER, -TL
ITRP, REG-EXP²**

per le seguenti aree tecniche:
for the following technical areas:

1.2, 2.1, 13.1, 13.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13
13.2	Manure	13

in accordo alle istruzioni dell'unità Sostenibilità & Cambiamenti Climatici.
in accordance with the instructions of the Sustainability & Climate Change Unit.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19-01-2011	-
11	31-03-2017	Update qualification as ITRP
12	20-07-2018	Update qualification as REG-EXP

Il Resp. CCPLS
Head of CCPLS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: Social Carbon Standard
JI: Joint Implementation

² India, Nepal, Sri Lanka, Thailand, Indonesia, Vietnam.

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS.

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports.

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Votorantim Cimentos Ltda.	CDM-PDD for project activity "Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project" in Brazil	Version 3 of 14/05/2012 (second crediting period)	PP
2	Votorantim Cimentos Ltda.	CDM-PDD updated for the third crediting period "Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project".	version 01 of 11/06/2019 version 2 of 24/07/2019 version 3.0 of 05/08/2019	PP
3	CDM Executive Board	CDM project cycle procedure for project activities	version 02.0 of 29/11/2018	Other
4	CDM Executive Board	CDM project standard for project activities	version 02.0 of 29/11/2018	Other
5	CDM Executive Board	CDM validation and verification standard for project activities	version 02.0 of 29/11/2018	Other
6	CDM Executive Board	Baseline and monitoring methodology ACM0002: Grid-connected electricity generation from renewable sources	version 19 of 31/08/2018	Other
7	CDM Executive Board	CDM-PDD-FORM: Project design document form, including its Attachment: Instructions for completing this form	Version 11 of 31/05/2019	Other
8	CDM Executive Board	CDM Executive Board: TOOL 11: "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 of 02/03/2012	Other
9	CDM Executive Board	Baseline and monitoring methodology ACM0002: Grid-connected electricity generation from renewable sources	Version 6 (1 st crediting period) Version 12.2.0 (2 nd crediting period)	Other
10	Votorantim Cimentos Ltda.	CERs spreadsheet "20190611_PCavalo_CERs_v.1.xls" "20190724_PCavalo_CERs_v.2.xls" 20190805_PCavalo_CERs_v.3.xls	Version 1 of 11/06/2019 Version 2 of 24/07/2019 Version 3 of 05/08/2019	PP
11	MCTI-Brazilian DNA	Resolution number 8, that defines the grid for CDM project	26/05/2017	Other
12	DET NORSKE VERITAS	Validation report number NO. 2006-0543 for the project Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project, Validation opinion 2 nd crediting period, report N° 2012-9049	version 01a dated 04/10/2006 version 01 of 17/05/2012	Other
13	CDM Executive	TOOL 7: "Tool to calculate the	Version 7 of 31/08/2018	Other

	Board	emission factor for an electricity system		
14	CDM Executive Board	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption"	Version 03.0 of 22/09/2017	Other
15	CDM Executive Board	TOOL10: Tool to determine the remaining lifetime of equipment",	Version 1	Other
16	MCTI (Brazilian DNA)	Emission factor data for the monitoring period: http://www.mctic.gov.br/mctic/open/cms/ciencia/SEPED/clima/textogeral/emissao_ajustado.html	Accessed on 12/07/2019	Others
17	CRA Centro de Recursos Ambientais	Operational license CRA nº 5206 Protocol to renewal the license (Requerimento_2009-001615 TEC LO-0017.pdf)	12-13/05/2005 06/02/2009	PP
18	Intertechne	Feasibility study for the implementation of UHE Pedra do Cavao –Existing reservoir (Estudo Viabilidade - Área alagada pág_1-15-71.pdf)	May 2001	PP
19	ANEEL	concession contract # 19/2002	23/04/2012	PP

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

Table 1. CL from this validation

CL ID	1	Section no.	D.1	Date: 17/07/2019
Description of CL				
In accordance with Instructions for completing the CDM-PDD-FORM , appendix 7: Provide a summary of the post-registration changes being proposed in this version of the PDD, and where applicable, the history of all post-registration changes to the project activity that have been approved by the Board after its registration. For all post-registration changes, include reasons for the changes and any additional information relating to the changes. RINA verified in the UNFCCC web that there was a PRC approved in the first crediting period, not listed in the appendix 7.				
Project participant response				Date: 24/07/2019
<p><i>During the second verification – corresponding to the period of 01/01/2007 to 31/12/2010 – of the first crediting period of the project, a Notification of Changes was carried out in order to:</i></p> <ul style="list-style-type: none"> - <i>Revise technical characteristics of equipment including:</i> <ul style="list-style-type: none"> o <i>Revision of turbine capacity from 80MW to 82.65MW each;</i> o <i>Inclusion of generators capacity of 81MW each;</i> - <i>Revise of installed capacity from 160MW to 162MW according to the nameplate of generators</i> <p><i>It is important mentioning that no equipment was changed, modified or retrofitted since the startup of the plant. The Notification of Changes was accepted by DOE and submitted to UNFCCC, and CERs were issued on 11/06/2012. Information above was included in apêndix 7 of the PDD. Please refer to the 2nd version of the document.</i></p> <p>Project participant response on 05/08/2019:</p> <p><i>Information was excluded from appendix 6 and included in appendix 7. Please refer to the third version of the document.</i></p>				
Documentation provided by project participant				

- 20190724_PCavalo_PDD_v.2-track.docx;
- 20190805_PCavalo_PDD_v.3-track.docx.

DOE assessment	Date: 02/08/2019
Information was included in Appendix 6: Summary report of comments received from local stakeholders.	
This CL remains open.	
2 nd response 07/08/2019: PDD version 3 was correctly revised.	
This CL is closed	

CL ID	2	Section no.	D.5	Date: 17/07/2019
Description of CL				
PP is requested to clarify the value of the assured energy used in the PDD (different values are presented in the PDD)				
Project participant response				Date: 24/07/2019
Assured Energy of the Project was revised according to the concession contract # 19/2002. Please refer to the revised version of the PDD and ER spreadsheet.				
Documentation provided by project participant				
<ul style="list-style-type: none"> - CG0219PedraCavalo-CCANEEL.pdf; - 20190724_PCavalo_PDD_v.2-track.docx; - 20190724_PCavalo_CERs_v.2.xlsx. 				
DOE assessment				Date: 02/08/2019
RINA verified that the assured energy was revised considering concession contract # 19/2002, also used in the first and second crediting period.				
This CL is closed				

CL ID	3	Section no.	D.5	Date: 17/07/2019
Description of CL				
PP is requested to clarify the inclusion of the parameter TEG _y in the monitoring plan, as it is applicable to hydro power project activities with a power density greater than 4 W/m ² and less than or equal to 10 W/m ² .				
Project participant response				Date: 24/07/2019
TEG _y parameter was withdrawal from the PDD (sections B.3 and B.7.1) as it is applicable only to hydropower plants with power density greater than 4 W/m ² and less than or equal to 10 W/m ² . Please refer to the second version of the document.				
Documentation provided by project participant				
<ul style="list-style-type: none"> - 20190724_PCavalo_PDD_v.2-track.docx. 				
DOE assessment				Date: 02/08/2019
PDD was revised in accordance with the updated methodology requirements.				
This CL is closed				

Table 2. CAR from this validation

CAR ID	1	Section no.	D.4	Date: 17/07/2019
Description of CAR				
PP is requested to confirm the method used to calculate the EF _{grid,OM} (including data vintage). Moreover, most recent data is not used.				
Project participant response				Date: 24/07/2019

PDD was revised (sections B.6.1 and B.6.3) in order to detail method for the determination of the CO₂ emission factor of the grid. 2018 data recently published by the Brazilian DNA was considered in this revision. Please refer to the revised version of PDD and ER spreadsheet.

Project participant response on 05/08/2019:

In fact, project activities applied ex-post data vintage in the first and second crediting periods. Information was revised in the PDD and ER spreadsheet. Please refer to the third version of the documents.

Documentation provided by project participant	
<ul style="list-style-type: none"> - 20190724_PCavalo_PDD_v.2-track.docx; - 20190724_PCavalo_CERs_v.2.xlsx; - 20190805_PCavalo_PDD_v.3-track.docx; - 20190805_PCavalo_CERs_v.3.xlsx. 	
DOE assessment	Date: 02/08/2019
<p>Revised PDD describes that project activity applies the simple adjusted OM (option b) and applies the ex-ante option, consistent with previous crediting periods.</p> <p>However, RINA verified the PDD for the second crediting period and the dispatch data is applied with ex post data vintage.</p> <p>This CAR remains open</p> <p>2nd response 07/08/2019 PDD was correctly revised</p> <p>This CAR is closed</p>	

CAR ID	2	Section no.	D.5	Date: 17/07/2019
Description of CAR				
RINA verified during the onsite visit that the PDD does not describe the measures to monitor: (b) The quantity of electricity delivered to the project plant/unit from the grid, in accordance with the applied methodology				
Project participant response				Date: 24/07/2019
Information regarding monitoring of electricity consumed by the plant was included in the PDD. Please refer to the revised version of the PDD and ER spreadsheet.				
Documentation provided by project participant				
<ul style="list-style-type: none"> - 20190724_PCavalo_PDD_v.2-track.docx; - 20190724_PCavalo_CERs_v.2.xlsx; - 2018_Faturas_COELBA.zip 				
DOE assessment				Date: 02/08/2019
<p>Rina verified that the PDD was revised in accordance with the requirements of the applied methodology, to consider the net energy delivered to the grid,</p> <p>This CAR is closed</p>				

CAR ID	3	Section no.	D.5	Date: 17/07/2019
Description of CAR				
Monitoring plan does not describe that the calibration of measuring equipment shall be carried out by an accredited person or institution; in accordance with requirements of paragraph 79 of the project standard. Moreover, the calibration frequency described in the PDD is not in accordance with current ONS				
Project participant response				Date: 24/07/2019
Section B.7.1 of the PDD was revised to include information regarding calibration of electricity meters. Please refer to the second version of the PDD.				
Documentation provided by project participant				

- 20190724_PCavalo_PDD_v.2-track.docx.	
DOE assessment	Date:
Revised PDD describes that the Calibration of electricity meters will be carried out by an accredited person or institution and it will follow the ONS procedures, in accordance with requirements of Project Standard.	
This CAR is closed	

CAR ID	4	Section no.	D.5	Date: 17/07/2019
Description of CAR				
Monitoring plan does not describe Provisions to ensure that data monitored and required for verification and issuance are kept and archived for at least two years after the end of the final crediting period or the last issuance of CERs, whichever occurs later, in accordance with paragraph 82 of the project standard.				
Project participant response				Date: 24/07/2019
<i>PDD was revised (section B.7.3) to include the above mentioned CDM Project Standard requirement. Please refer to the second version of the PDD. Information regarding environmental and stakeholder assessment was also included in the PDD.</i>				
Documentation provided by project participant				
- 20190724_PCavalo_PDD_v.2-track.docx.				
DOE assessment				Date: 02/08/2019
PDD was correctly revised. This CAR is closed				

Table 3. FAR from this validation

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

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Document information

Version	Date	Description
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory		
Document Type: Form		
Business Function: Renewal of crediting period		
Keywords: crediting period, project activities, validation report		