# 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** | Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity<br>UNFCCC reference number 0773 |
| **Number and duration of the next crediting period** | 3rd crediting period , 01/03/2019 to 28/02/2026 |
| **Version number of the validation report** | 1.0Aa |
| **Completion date of the validation report** | 27/06/2019 |
| **Version number of PDD to which this report applies** | 2.0 |
| **Project participants** | CERAN -Companhia Energetica Rio das Antas<br>Ecopart Assesoria em Negocios Empresariais Ltda.<br>Ecoinvest Carbon S.A.<br>The Tokyo Electric Power Co., Inc. |
| **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** | 99,459 |
| **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)<br>Head of Sustainability & Food Certification Compliance Unit<br>  |

## SECTION A. Executive summary

### >> Purpose and general description

The primary objective of Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity (hereafter referred to as "Monte Claro Project") is to help meet Brazil's rising demand for energy due to economic growth and to improve the supply of electricity, while contributing to environmental, social and economic sustainability by increasing the share of renewable energy in total electricity consumption for Brazil (and for the region of Latin America and the Caribbean). The project consists of the operation of a hydropower plant with 130.7 MW installed capacity (Installed capacity based on generators' tag: 2 generating units x 72.609 MVA (apparent power) x 0.90 power factor = 130.7MW (active power)) and 1.4 $km^2$ reservoir area, located in Antas' River, among the cities of Bento Gonçalves, Nova Roma do Sul and Veranópolis, State of Rio Grande do Sul, Southern region of Brazil. It operates with two Kaplan turbines and generators, both manufactured by Alstom Power Brasil Ltda., totaling 516,840 MWh/year based on 59 MW assured energy.

Prior to the implementation of the project activity no hydropower plant was operational in the location where Monte Claro is implemented. The project reduces GHG emissions by avoiding electricity generation from fossil fuel sources, which would be generated (and emitted) in the absence of the project. Then, the baseline scenario and the scenario without the project activity are the same.

The project was validated by DET NORSKE VERITAS (validation report N° 2006-0232 issued on 07/011/2007) and it was registered on 08/04/2007 under the CDM registration reference N° 0773; second crediting period was renewed by Bureau Veritas (validation report Nº BR.1058323, version 02 of 16/02/2012).

**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 CERAN -Companhia Energetica Rio das Antas, has performed the validation for renewal of the crediting period for the registered project activity Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity 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 | Thaís | 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** | **LIU** | **Huifeng** | **RINA CHINA** |
| 2. | Approver | **IR** | **SEVERINO** | **Laura** | **RINA HQ** |

## SECTION C. Means of validation

### C.1. Desk/document review

>> The updated PDD version 2.0 of 17/06/2019 and previous version /02/, in particular the applicability of the methodology, the baseline determination, the emission reduction calculations provided in the form of a spreadsheet “20190617_Ceran_Estimated CERs_v.2.xlsx” version 2 of 17/06/2019and previous version /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**: 27-28/05/2019 | | | | |
|---|---|---|---|---|
| **No.** | **Activity performed on-site** | **Site location** | **Date** | **Team member** |
| 1. | -Implementation and operation of the proposed project activity;<br><br>-Confirm data used in the ex-ante estimative of CERs calculation<br><br>-Interviewed key personnel of the plant to confirm the operational and data collection procedures; QA QC procedures | Monte Claro hydropower plant | 27-28/05/2019 | Thaís Carvalho |

## C.3. Interviews

| No. | Interviewee | | | Date | Subject | Team member |
|---|---|---|---|---|---|---|
| | Last name | First name | Affiliation | | | |
| 1. | Akashi | André | CERAN | 27-28/05/2019 | O&M Supervisor: Project implementation; equipments installed, assured energy, energy measurements, calibration requirements | Thaís Carvalho |
| 2. | Vaccaro | Sandro | CERAN | 27/05/2019 | Environmental coordinator: Enviromental aspects, reservoir area | Thaís Carvalho |
| 3. | Cesar | Marco Aurélio | CERAN | 27-28/05/2019 | Manager: Project implementation; equipments installed, assured energy, energy measurements, calibration requirements | Thaís Carvalho |
| 4. | Claro | André Luis | CERAN | 27/05/2019 | Administrative manager: project implementation | Thaís Carvalho |
| 5. | Perin | Marcio | CERAN | 27/05/2019 | energy measurements, meters installed, calibration requirements | 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 | | | |
| Application and selection of methodologies and standardized baselines | | | |
| Validity of original baseline or its update | | 2 | |
| Estimated emission reductions or net anthropogenic removals | | 1 | |
| Validity of monitoring plan | 2 | 1 | |
| Crediting period | | | |
| Project participants | | | |
| Post-registration changes | | | |
| Others (please specify)- | | | |
| **Total** | 2 | 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. |
| **Findings** | N/A |
| **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:

| **Applicability criteria** | **Project activity** | **Criteria is met?** |
|---|---|---|
| 3. This methodology is applicable to grid-connected renewable energy power generation project activities that:<br>(a) Install a Greenfield power plant;<br>(b) Involve a capacity addition to (an) existing plant(s);<br>(c) Involve a retrofit of (an) existing operating plants/units;<br>(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or<br>(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:<br>(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;<br>(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 | RINA verified that the project activity is a hydropower plant.<br><br>Option b) is not applicable, since only new project/unit(s) is considered in the proposed project activity. | Yes |

| | | | |
|---|---|---|---|
| | 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. | | |
| | 5. In case of hydro power plants, one of the following conditions shall apply:<br>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or<br>(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<br>(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<br>(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:<br>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m2;<br>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;<br>(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 shall be:<br>a. Lower than or equal to 15 MW; and<br>b. Less than 10 per cent of the total installed capacity of | RINA verified during the onsite visit that in the case of the project activity, option (c) is applied since the hydropower plant result in new single reservoir with power density greater than 4 W/m2. | Yes |

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|---|---|---|---|
| | integrated hydro power project. | | |
| | 6. In the case of integrated hydro power projects, project proponent shall:<br>(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<br>(b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity. | Not applicable, since the project activity is not an integrated project type. | Yes |
| | 7. The methodology is not applicable to:<br>(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;<br>(b) Biomass fired power plants/units. | a) Not applicable, since the hydropower plant is a grid-connected power project.<br>b) Not applicable, since the project activity is a hydropower project type. | Yes |
| | 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 | Not applicable, the project is a green field hydropower plant. | Yes |

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| | maintenance”. \| \| \|<br><br>13. This methodology also refers to the latest approved versions of the following tools:<br>(a) “TOOL01: Tool for the demonstration and assessment of additionality”, version 7.0 (not used in the project activity);<br>(b) “TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality”, version 7.0 not used in the project activity;<br>(c) “TOOL03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion”, version 3.0 (not used in the project activity);<br>(d) “TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”, version 3.0; /14/<br>(e) “TOOL07: Tool to calculate the emission factor for an electricity system”, version 7.0 /13/;<br>(f) “TOOL10: Tool to determine the remaining lifetime of equipment”, version 1.0 /15/;<br>(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/. |
| **Findings** | N/A |
| **Conclusion** | 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. |

## D.3. Validity of original baseline or its update

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| **Means of validation** | 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:<br>***Step 1: Assess the validity of the current baseline for the next crediting period***<br>***Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies****.*<br>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”.<br>In the first crediting period, the project electricity system was the South-Southeast-Midwest and the CO2 emission factor of the grid was calculated by the project participants, while applying the ex-ante 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).<br>In this third crediting period, the project participants are applying the grid delineation and values published by the Brazilian DNA, while applying the OM simple adjusted method (option (b) 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 in this third crediting period. RINA verified that the values used for the grid emission factor are in accordance with the values publicity available by the Brazilian DNA /16/

Rina verified during the on-site visit that the following equipment's are installed and operational:
2 Turbines Kaplan, from Alstom Power Brasil Ltda. with nominal power of 67.1 each.
2 generators from Alstom Power Brasil Ltda. with nominal power (kVA) 72,609 and power factor 0.90
2 transformers with rated power (kVA) 75,000, one from ARESTA and one from WEG
1 diesel generator from Maquigeral - Empresa do Conglomerado Battistella, with power (kVA) 525 and power factor 0.8 (used just for internal consumption)

RINA verified that the installed capacity of the project activity was definied 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. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units: Installed capacity based on generators' tag: 2 generating units x 72.609 MVA (apparent power) x 0.90 power factor = 130.7MW (active power). In the previous PDD the installed capacity considered the value presented on the official documents such asEnvironmental License issued by the Environmental Agency and documents from the Brazilian Power Regulatory Agency (ANEEL).

Moreover, PP has provided the operational license number 07907, valid from 29/12/2017 until 23/05/2020 /17/.

**Step 1.2: Assess the impact of circumstances**

**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).

**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.

**Step 2: Update the current baseline and the data and parameters**
**Step 2.1: Update the current baseline**
The current scenario 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.<br><br>**Step 2.2: Update the data and parameters**<br>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. |
| **Findings** | **CAR 1**: verified during the onsite visit that one of the transformers' ARESTA was replaced by one Transformer WEG, with the same specification.<br><br>**CAR 2**: PP is requested to clarify the installed capacity project activity ($A_{PJ}$) 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. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units<br><br>To close CAR 1 and CAR 2, MR was correctly revised |
| **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 |
|---|---|---|
| $EF_{Res}$ (kgCO2e/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 | 0 | In accordance with the methodology, for new reservoirs, this value is zero. |

| | | |
|---|---|---|
| activity, when the reservoir is full. | | |
| $EF_{grid,OM\text{-}adj,2016\text{-}2018}$ (tCO2e/MWh): Simple adjusted operating margin CO2 emission factor in year y | 0.4199 | 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) |
| $EF_{BM,2010}$ (tCO2e/MWh): Build Margin CO2emission factor of the grid. | 0.1166 | 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 2nd 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 $CO_2$e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year *y* (t $CO_2$/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year *y* (t $CO_2$e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year *y* (t $CO_2$e/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:
$PD = Cap_{PJ} - Cap_{BL} / A_{PJ} – A_{BL}$

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);
$Cap_{BL}$ = 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). For new reservoirs, this value is zero;
$Cap_{PJ}$ (W)= 130,696,200 (RINA confirmed in the generator' plate, during the onsite visit)
$A_{PJ}$ ($km^2$)= 1,400,000 (The reservoir area is confirmed in the environmental license)
PD ($W/m^2$)= 93.35

Therefore, project emissions is equal 0.

**Baseline emissions**:

In accordance with ACM0002, baseline emissions include only $CO_2$ 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 $CO_2$/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 $CO_2$ 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 $CO_2$/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 for the ex-ante estimative, the assured energy described in the registered PDD is used /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, consistent with previous crediting periods: 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 $CO_2$ 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 | 0.4372 | 485,310,967 |
| 2017 | 0.4287 | 475,332,364 |
| 2018 | 0.3932 | 468,555,516 |

Therefore, $EF_{grid,OM\text{-}adj,2016\text{-}2018}$ = 0.4199 tCO2e/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 $CO_2$ BM EF considered in the 2nd crediting period PDD /01/ will be used in the 3rd crediting period of the project. Thus, $EF_{grid,BM,2010}$ = 0.1166 tCO2/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 * 0.4199 + 0.75 * 0.1166 $tCO_2e$/MWh
$EF_{grid,CM,y}$ = 0.1924 $tCO_2e$/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, Ly = 0 tCO2e.

**Emission Reduction**

Emission reductions are calculated as follows:
$ER_y = BE_y – PE_y$,

Where:
$ER_y$ = Emission reductions in year y ($tCO_2e/yr$);
$BE_y$ = Baseline emissions in year y ($tCO_2e/yr$);
$PE_y$ = Project emissions in year y ($tCO_2e/yr$);

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

| Year | Baseline emissions (t $CO_2e$) | Project emissions (t $CO_2e$) | Leakage (t $CO_2e$) | Emission reductions (t $CO_2e$) |
|---|---|---|---|---|
| Year 1 - 2019 (form March 1st) | 83,382 | 0.0 | 0.0 | 83,382 |
| Year 2 - 2020 | 99,459 | 0.0 | 0.0 | 99,459 |
| Year 3 - 2021 | 99,459 | 0.0 | 0.0 | 99,459 |
| Year 4 - 2022 | 99,459 | 0.0 | 0.0 | 99,459 |
| Year 5 - 2023 | 99,459 | 0.0 | 0.0 | 99,459 |
| Year 6 - 2024 | 99,459 | 0.0 | 0.0 | 99,459 |
| Year 7 - 2025 | 99,459 | 0.0 | 0.0 | 99,459 |
| Year 8 – 2026 (until February 28th ) | 16,077 | 0.0 | 0.0 | 16,077 |
| **Total** | **696,214** | **0.0** | **0.0** | **696,214** |
| **Total number of crediting years** | 7 | | | |
| **Annual average over the crediting period** | **99,459** | **0.0** | **0.0** | **99,459** |

| | |
|---|---|
| **Findings** | **CAR 3**: For the parameter $\boldsymbol{EF_{grid,OM-adj,}}$ PP did not use the most recent data available by the Brazilian DNA. Moreover, PP is requested to clarify the source of data of the parameter $\boldsymbol{EF_{grid,OM-adj,}}$<br><br>To close CAR 3 emission factor was revised in accordacen with the requirements of the tool and data available by the Brazilian DNA, |
| **Conclusion** | It is RINA's opinion:<br>(a) All assumptions and data used by the PP are listed in the PDD;<br>(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/;<br>(c) All values used in the PDD and CERs spreadsheet. including GWPs are considered reasonable in the context of the proposed project activity /10/;<br>(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/;<br>(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. |

## 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.<br><br>The assessment of the ex-post parameters are described in the table below: |

| Parameter | Description/Assessment |
|---|---|
| $EG_{facility,y}$ (MWh/yr): | Value applied: 516,840, RINA verified that |

| | | |
|---|---|---|
| Quantity of net electricity generation supplied by the project plant/unit to the grid in year y. | for ex-ante estimative the assured energy provided by ANEEL described in the registered PDD /01/ is used. 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:<br>(a) The quantity of electricity supplied by the project plant/unit to the grid;<br>and<br>(b) The quantity of electricity delivered to the project plant/unit from the grid.<br><br>The monitoring frequency is Continuous measurement and at least monthly recording and the accuraccy class of the energy meters are 0.2%.<br><br>Calibration will follow the ONS requirements. |
| $Cap_{PJ}$ (W): Installed capacity of the hydro power plant after the implementation of the project activity | Value applied: 130,696,200 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: 1,400,000. RINA verified that the value described in the PDD is in accordance with the environmental license /17/. Parameter is determined once at the beginning of each crediting period |

**Management system and quality assurance**

An onsite inspection has been performed on 27-28/05/2019 and it is confirmed that the monitoring arrangements in the monitoring plan are feasible within the project design. The monitoring is based only on data measured. PDD describes the accuracy and calibration periodicity of the monitoring equipments. The updated PDD /02/ describes that All monitored data and required for verification and issuance be kept and archived electronically for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later. Electricity data is collected in real time by the four meters and, later, stored in the meters database. Electricity is integrated every 5 minutes and consolidated in monthly electricity generation sheets and report. Meters located at Monte Claro's generators measure gross energy and meters located at the substation measures energy dispatched to the grid (EGfacility,y). As mentioned in the registered PDD, meters are projected to verify bi-directionally the energy generated by the facility. Therefore, it registers energy exported and imported from the grid. For emission reductions purposes, only the net energy is considered (energy exported minus imported).

All meters involved in the project are in accordance with the necessary technical specifications as required by CCEE and the National Operator System (from the Portuguese Operador do Sistema Nacional – ONS). Calibration of meters is carried out by an accredited person or institution and is made every 5 years as required by

| | |
|---|---|
| | ONS. |
| **Findings** | **CL 1**: 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/$m^2$ and less than or equal to 10 W/$m^2$. To close CL 1, TEGy was excluded from the onitoring plan.<br><br>**CAR 5:** 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. To close CAR 5, MR was updated in accordance with requirements of project standard.<br><br>**CL 2:** Monitoring plan describes that bi-direcional meters are applicable to the project activity. PP is requested to clarify the meters applicable to the monitoring of parameter $EG_{facility,y}$. To close CL 2, MR was revised to clearly describe the meters that measures the $EG_{facility,y}$. |
| **Conclusion** | 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.<br>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 |

## D.6. Crediting period

| | |
|---|---|
| **Means of validation** | The last day of the 2nd crediting period is 28/02/2019.The third crediting period starts on the day immediately after the expiration of the current crediting period, on 01/03/2019. |
| **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: CERAN -Companhia Energetica Rio das Antas; Ecopart Assesoria em Negocios Empresariais Ltda.; Ecoinvest Carbon S.A. and The Tokyo Electric Power Co., Inc. |
| **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. |

## 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 Service Spa (RINA) has performed a validation of the updated PDD for the project activity "Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity" in Brazil, CDM Registration Reference N° 0773. The validation of the updated PDD has performed for the third renewal crediting period (from 01/03/2019 to 28/02/2026) 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 2.0 of 17/06/2019 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 sourcesversion 19 of 31/08/2018. The total emission reductions from the Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity are estimated to be on an average 99,459 $tCO_2e$ 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 "Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity" 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 |
| $CO_2e$ | Carbon dioxide equivalent |
| CRT | Coordination and Technical Control Staff |
| DCI | Certification Division of RINA Services Spa |
| 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 Spa |
| 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:<br>*We declare that Mr/Mrs/Ms:* | **Thais DE LIMA CARVALHO** |
| è qualificato come[1]:<br>*is qualified as:* | **CDM -TEC, -VAL, -VER, -TL ITRP, REG-EXP[2]** |
| per le seguenti aree tecniche:<br>for the following technical areas: | **1.1, 1.2, 2.1, 13.1** |

| AREE TECNICHE<br>*TECHNICAL AREAS* | DESCRIZIONE DELL'AREA TECNICA<br>*TECHNICAL AREA DESCRIPTION* | SCOPO SETTORIALE<br>*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<br>*REVISION* | DATA<br>*DATE* | MOTIVAZIONI PER LA REVISIONE<br>*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 | CDM: Clean Development Mechanism | |
| VER: | Verifier | VCS : Verified Carbon Standard: | |
| TEC: | Technical Expert | GS: Gold Standard | |
| TL: | Team Leader | SCS: SocialCarbon Standard | |
| FIN-EXP: | Financial Expert | JI: Joint Implementation | |
| DET: | Determiner | | |

[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: **Hui Feng LIU**

*We declare that Mr/Mrs/Ms:*

è qualificato come[1]: **CDM –TEC, -VAL,- VER, -TL ITRP, REG-EXP[2]**
*is qualified as:*

per le seguenti aree tecniche: **1.1, 1.2, 8.1, 9.2, 13.1**
for the following technical areas:

| AREE TECNICHE<br>TECHNICAL AREAS | DESCRIZIONE DELL'AREA TECNICA<br>*TECHNICAL AREA DESCRIPTION* | SCOPO SETTORIALE<br>*SECTORAL SCOPE* |
|---|---|---|
| 1.1 | Thermal energy generation | 1 |
| 1.2 | Renewables | 1 |
| 8.1 | Mining and mineral processes | 8 |
| 9.2 | Iron, steel and ferro-alloy production | 9 |
| 13.1 | Solid waste and wastewater | 13 |

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

| REVISIONE<br>*REVISION* | DATA<br>*DATE* | MOTIVAZIONI PER LA REVISIONE<br>*REASON FOR THE REVISION* |
|---|---|---|
| 0 | 10/09/2010 | - |
| 11 | 31/03/2017 | Updating qualification as ITRP |
| 12 | 30/07/2018 | Updating qualification as REG-EXP |

Il Resp. CCPLS
*Head of CCPLS*

[1] Legend:

| | | |
|---|---|---|
| VAL: | Validator | CDM: Clean Development Mechanism |
| VER: | Verifier | VCS : Verified Carbon Standard: |
| TEC: | Technical Expert | GS: Gold Standard |
| TL: | Team Leader | SCS: SocialCarbon Standard |
| FIN-EXP: | Financial Expert | JI: Joint Implementation |
| DET: | Determiner | |

[2] China

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 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 | CERAN - Companhia Energetica Rio das Antas | CDM-PDD for project activity "Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity" in Brazil | Version 04 of 14/02/2012 (second crediting period) | PP |
| 2 | CERAN - Companhia Energetica Rio das Antas | CDM-PDD updated for the third crediting period "Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity". | version 01 of 31/01/2019<br><br>version 2.0 of 17/06/2019 | 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 (1st crediting period)<br><br>Version 12 (2nd crediting period) | Other |
| 10 | CERAN - Companhia Energetica Rio das Antas | CERs spreadsheet "20190131_Ceran_Estimated CERs_v.1.xlsx"<br>20190617_Ceran_Estimated CERs_v.2.xlsx | Version 1 of 31/01/2019<br><br>Version 2 of 17/06/2019 | PP |
| 11 | MCTI-Brazilian DNA | Resolution number 8, that defines the grid for CDM project | 26/05/2017 | Other |
| 12 | DET NORSKE VERITAS<br><br>Bureau Veritas | Validation report number NO. 2006-0232 for the project Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity,<br><br>Validation opinion 2nd crediting period, report Nº BR.1058323 | version 03a dated 07/11/2006<br><br>version 02 of 16/12/2012 | Other |
| 13 | CDM Executive Board | TOOL 7: "Tool to calculate the emission factor for an electricity | Version 7 of 31/08/2018 | Other |

| | | | | |
|---|---|---|---|---|
| | | 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/opencms/ciencia/SEPED/clima/textogeral/emissao_ajustado.html | Accessed on 28/05/2019 | Others |
| 17 | FEPAM | Operational license number 07907 (4. 2017_FEPAM_LO_site.pdf) | valid from 29/12/2017 until 23/05/2020 | PP |
| 18 | ANEEL | Installed capacity and power plants: http://www2.aneel.gov.br/aplicacoes/capacidadebrasil/capacidadebrasil.cfm | Accessed on 28/05/2019 | Other |

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

**Table 1. CL from this validation**

| **CL ID** | 1 | **Section no.** | D.5 | **Date:** 13/06/2019 |
|---|---|---|---|---|
| **Description of CL** | | | | |
| 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/m$^2$ and less than or equal to 10 W/m$^2$. | | | | |
| **Project participant response** | | | | **Date:** 17/06/2019 |
| *Figure 3 was also revised and TEGy parameter was excluded from section B.7.1 as the project power density is 93.35 W/m$^2$ (response in CAR2). In addition, the PDD form was updated to consider the latest version available at the UNFCCC's website (v.11.0). Contacts of Project Participants (Appendix 1) was also revised considering updated MoC available at the UNFCCC's website. Sections D and E were revised based on the environmental and stakeholder processes conducted to the project. Please refer to the second version of the document.* | | | | |
| **Documentation provided by project participant** | | | | |
| — *20190617_Monte Claro_PDD_v.2.docx;* | | | | |
| **DOE assessment** | | | | **Date:** 25/06/2019 |
| RINA verified that the documents were correctly revised.<br>This CL is closed | | | | |

| **CL ID** | 2 | **Section no.** | D.5 | **Date:** 13/06/2019 |
|---|---|---|---|---|
| **Description of CL** | | | | |
| Monitoring plan describes that bi-direcional meters are applicable to the project activity. PP is requested to clarify the meters applicable to the monitoring of parameter $EG_{facility,y}$. | | | | |
| **Project participant response** | | | | **Date:** 17/06/2019 |

| |
|---|
| *As described in the monitoring plan "Meters located at Monte Claro's generators measure gross energy and meters located at the substation measures energy dispatched to the grid". Therefore, electricity meters used to monitor $EG_{facility,y}$ parameter is the ones located at Monte Claro substation. Please refer to the revised version of the PDD.* |
| **Documentation provided by project participant** |
| — *20190617_Monte Claro_PDD_v.2.docx;* |
| **DOE assessment** **Date:** 25/06/2019 |
| MR was revised and describes that the meters that mesure the net energy delivered to the grid are located on the Monte Claro substation.<br><br>This CL is closed. |

**Table 2. CAR from this validation**

| | | | | |
|---|---|---|---|---|
| **CAR ID** | 1 | **Section no.** | D.3 | **Date:** 13/06/2019 |
| **Description of CAR** | | | | |
| *Verified during the onsite visit that one of the transformers' ARESTA was replaced by one Transformer WEG, with the same specification.* | | | | |
| **Project participant response** | | | | **Date:** 17/06/2019 |
| *Manufacturer of transformers was revised in section A.3. Please refer to the second version fo the PDD.* | | | | |
| **Documentation provided by project participant** | | | | |
| — *20190617_Monte Claro_PDD_v.2.docx;* | | | | |
| **DOE assessment** | | | | **Date:** 25/06/2019 |
| MR was revised to present the transforms installed at the project activity.<br>This CAR is closed | | | | |

| | | | | |
|---|---|---|---|---|
| **CAR ID** | 2 | **Section no.** | D.3 | **Date:** 13/06/2019 |
| **Description of CAR** | | | | |
| PP is requested to clarify the installed capacity project activity ($A_{PJ}$) 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. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units | | | | |
| **Project participant response** | | | | **Date:** 17/06/2019 |
| *All official documents of Monte Claro refers to 130MW installed capacity as can be checked in the Environmental License issued by the Environmental Agency and documents from the Brazilian Power Regulatory Agency (ANEEL).*<br><br>*However, while analysing equipment's tag, installed capacity is 130.696MW: 2 generating units x 72.609 MVA (apparent power) x 0.90 power factor = 130.7MW (active power). Therefore, the installed capacity of the project was revised to consider generators' tag. Please refer to the revised documents from the project.* | | | | |
| **Documentation provided by project participant** | | | | |
| — *20190617_Monte Claro_PDD_v.2.docx;*<br>— *20190617_Ceran_Estimated CERs_v.2.xlsx.* | | | | |
| **DOE assessment** | | | | **Date:** 25/06/2019 |
| MR was revised and describes the installed capacity in accordance with the requirements of the methodology.<br><br>This CAR is closed. | | | | |

| | | | | |
|---|---|---|---|---|
| **CAR ID** | 3 | **Section no.** | D.4 | **Date:** 13/06/2019 |
| **Description of CAR** | | | | |

| |
|---|
| For the parameter $EF_{grid,OM-adj,}$ PP did not use the most recent data available by the Brazilian DNA. Moreover, PP is requested to clarify the source of data of the parameter $EF_{grid,OM-adj,}$ |
| **Project participant response** **Date:** 17/06/2019 |
| *The $CO_2$ emission factor of the grid was revised to consider the updated values from the Brazilian DNA (2018 year). In addition, the $EF_{grid,OM-adj}$ calculation was revised to consider §42, while applying option a):*<br>*"(a) 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;"*<br>*Please refer to the revised version of the PDD and CER spreadsheet.* |
| **Documentation provided by project participant** |
| — *20190617_Monte Claro_PDD_v.2.docx;*<br>— *20190617_Ceran_Estimated CERs_v.2.xlsx.* |
| **DOE assessment** **Date:** 25/06/2019 |
| RINA verified that the revised documents are in accordance with the tool and Brazilian DNA data.<br><br>This CAR is closed. |

| | | | | |
|---|---|---|---|---|
| **CAR ID** | 4 | **Section no.** | D.5 | **Date:** 13/06/2019 |
| **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 | | | | |
| **Project participant response** | | | | **Date:** 17/06/2019 |
| *Section B.7.3 was revised to include information regarding calibration. Please refer to the revised version of the PDD.* | | | | |
| **Documentation provided by project participant** | | | | |
| — *20190617_Monte Claro_PDD_v.2.docx;* | | | | |
| **DOE assessment** | | | | **Date:** 25/06/2019 |
| RINA verified that the revised PDD is in accordance with project standard requirements.<br>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:<br>• 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);<br>• 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