




**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	Monte Redondo Wind Farm Project UNFCCC ref. no: 4449
Number and duration of the next crediting period	2 nd crediting period: 7 years (12/05/2018 to 11/05/2025)
Version number of the validation report	02
Completion date of the validation report	26/12/2019
Version number of PDD to which this report applies	8.1
Project participants	SUEZ Energy Andino S.A. (Chile) Eólica Monte Redondo S.A. (Chile) Electrabel NV/SA (Netherlands)
Host Party	Chile
Applied methodologies and standardized baselines	Methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 19.0
Mandatory sectoral scopes	1: Energy industries (renewable - / non-renewable sources)
Conditional sectoral scopes, if applicable	Not applicable
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	83,893 tCO ₂ e
Name and UNFCCC reference number of the DOE	AENOR INTERNACIONAL S.A.U UNFCCC ref. no: E-0021
Name, position and signature of the approver of the validation report	 José Luis Fuentes Climate Change Manager

SECTION A. Executive summary

AENOR has been contracted by Eólica Monte Redondo S.A. as a project participant, to undertake the validation for the renewal of the crediting period for the CDM project activity "Monte Redondo Wind Farm Project". The validation has been performed through a process of document review based on the PDD Version 8, initially submitted for validation and the subsequent revisions, follow-up email interviews with the stakeholders, resolution of outstanding issues and issuance of the validation report for RCP.

The Monte Redondo Wind Farm (the Project), developed by Eólica Monte Redondo S.A., implies the installation of 48 MW from 24 wind turbine generators (WTG), each with a capacity of 2 MW located in the Region IV of Coquimbo, Chile. This power plant will displace electricity from the national electricity grid, supplied partly from fossil fuels, resulting in a reduction in greenhouse gas (GHG) emissions.

The project was implemented in 2 stages. The project started commercial operations in December 2009, when the energy from the Stage 1 (consisting of 19 aerogenerators with an installed capacity of 38 MW), started being delivered to the Grid. The second stage (consisting of 5 aerogenerators with an installed capacity of 10 MW) started commercial operation in February 2011. The project will generate an average of 132,534 MWh per year that will be supplied to the grid. The project displaces electricity generated by fossil fuel-fired power plants, avoiding GHG emissions estimated in 83,893 tCO_{2e} per year and 587,250 tCO_{2e} in the second crediting period.

The project is located in the Ovalle commune, Limarí Province, Region IV of Coquimbo, about 325 km north of Santiago.

According to CDM Project Standard for project activities version 02.0 /1/, notification of renewal intention from project participants is no longer required, as long as the DOE submit a renewal request to the secretariat no earlier than 270 days prior to, but no later than one year after, the expiry of the crediting period, the project is valid for renewal and no penalty of "unclaimable period" would be required. And the grace period for the submission of renewal request for the existing registered project activities whose crediting period has expired but has not been renewed is set to be 30/09/2020 /24/. Therefore, the project is eligible for renewal of crediting period.

The project activity was registered with reference number 4449 on 12/05/2011 as a CDM project with a renewable 7 years crediting period. Then, the first crediting period was from 12/05/2011 to 11/05/2018. Therefore; the second crediting period will be from 12/05/2018 to 11/05/2025.

Scope of the Validation

The scope of the validation is to assess all aspects described in the PS version 02.0 related to the purpose of renewal of the crediting period project relating to the baseline, estimated emissions reductions and the monitoring plan using an approved baseline and monitoring methodology.

The following documents were reviewed as part of the scope of the activity:

- The initial version of the updated PDD /2/, including baseline study and Monitoring Plan.
- Approved Methodology: ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources - Version 19.0 /3/
- Decision 3/CMP.1 and relevant decisions and guidelines from the EB
- CDM Validation and Verification Standard for project activities, version 02.0 /4/
- CDM project cycle procedure for project activities version 02.0 /5/
- CDM project standard for project activities version 02.0
- 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 /6/.
- Tool to calculate the emission factor for an electricity system version 07.0. /7/
- Associated documentation (EF calculation, ER calculation, etc.)

The validation scope is defined as an independent and objective review of the PDD, the project's baseline study and monitoring plan, and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. AENOR, based on the Specific Instruction for the Validation, verification and certification of clean development mechanism (CDM) project activities (IE/DTC/0039) /8/, has used a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consultancy services to the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the PDD.

Validation Process

The project validation assessment for renewal of crediting period aims to be a risk-based approach and is based on the methodology developed in the CDM Validation and Verification Standard, an initiative of Designated and Applicant Entities, which aims to harmonise the approach and quality of all such assessments.

The validation for the renewal of the crediting period began in 15/11/2019 when the PP provided the initial version of the PDD, and was concluded in December 2019, with the submission of the final validation report for RCP. The validation was performed in the manner of an audit, where, a desk review of the PDD was undertaken against the latest version of the approved methodology and CDM and other relevant criteria applying to the project.

As a final step of the validation, the validation report for RCP and the protocol have to undergo internal quality control by means of a technical review following the procedures of AENOR. The technical reviewer is a competent person from AENOR, independent of the team that carried out the validation of the project activity.

In order to ensure transparency, a validation protocol was customised for the project, according to Specific Instruction IE-DCT-039. The protocol shows, in a transparent manner, criteria (requirements), means of validation and the results derived from validating the identified criteria.

The validation protocol serves the following purposes:

- It organises, provides details and clarifies the requirements a CDM project is expected to meet.
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The Project Design Document submitted by the PP was reviewed against the approved methodology and against CDM and other relevant criteria. Additional background documents related to the project design, rules and regulations issued by the government and baseline were also validated.

The project participant was requested to address all validation findings and finally provided the validation team with sufficient evidence to determine that the applicable CDM requirements have been met. The project participant modified the initial updated PDD to resolve the validation team concerns and resubmitted a final version of the updated PDD /9/. AENOR has prepared this report based on the final updated PDD.

All Corrective Action Requests (CAR) and Clarification Actions (CL) have been checked by the validation team and have been adequately resolved.

All the validation findings are summarized in section C.5 below and documented in more detail in Appendix 4.

The ex-ante emission factor of the national grid of Chile and the ex-ante estimates of emissions reductions have been calculated correctly on the basis of the approved methodology ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources - Version 19.0 and the "Tool to calculate the emission factor for an electricity system" version 07.0.

In AENOR's opinion, the GHG emissions reductions of the annual average over the crediting period and the total emissions reductions for the crediting period from 12/05/2018 to 11/05/2025, were calculated correctly and amount 83,893 tonnes of CO₂ equivalent.

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	IR	Pellitero Martinez	Marcelino	AENOR	Yes	No	Yes	Yes

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	Arribas Alonso	Luis Javier	AENOR
2.	Approver	IR	Fuentes Perez	Jose Luis	AENOR

SECTION C. Means of validation

C.1. Desk/document review

The Project Design Document submitted by the PP was reviewed against the approved methodology and against CDM and other relevant criteria. Additional background documents related to the project design, rules and regulations issued by the government and baseline were also validated.

To address the corrective actions and clarification requests that arose from the desk review, the consultants revised the initial project design document submitted and developed the final PDD.

C.2. On-site inspection

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

No on-site inspection was conducted as part of the validation assessment. The expected average annual emissions reductions of the project activity are less than 100,000 tCO_{2e} of emission reductions per year in the average along its 2nd crediting period. As per applicable guideline of the VVS for project activities version 02.0, no on-site inspection is required as part of validation assessment for renewal of crediting period for registered project activities promoting less than 100,000 tCO_{2e} of emission reductions per year. Moreover, in the particular case of the project activity, there is no relevant information required for the assessment of its validation of renewal of crediting period that would only be assessable and/or confirmable upon the performance of an on-site inspection.

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
	Cortés	Magdalena	Engie Energia Chile	03/12/2019	- Basic information, technology of the project, etc.; - Monitor Data: meter readings, control and maintenance, QA&QC systems - Status of the project activity and any modifications with respect to the registered PDD. - Applicability to the latest methodology. - National and local policies and changes - Baseline of the project and its updates - The lifetime of the project activity - Emission Factors and their updates - Monitoring plan and changes	Marcelino Pellitero Martinez
2.	Torchelo	Adriana	Carbon consultant at Prosustentia			
3.	Fernandez	Pablo	Carbon consultant at Climate-link			

C.4. Sampling approach

Not applicable.

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	0	2	0
Application and selection of methodologies and standardized baselines	0	0	0
Validity of original baseline or its update	0	0	0
Estimated emission reductions or net anthropogenic removals	0	0	0
Validity of monitoring plan	0	0	0
Crediting period	0	0	0
Project participants	0	0	0

Post-registration changes	0	0	0
Others (please specify)	0	0	0
Total	0	2	0

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	The assessment team has checked all sections of the updated PDD and confirms by means of comparison with the valid version of the applicable PDD form listed in UNFCCC website. The assessment team also checked the information transferred to the updated PDD against the original registered PDD to confirm whether the information transferred is materially the same.
Findings	The corrective action requests CAR 1 and CAR 2 were closed. For details refer to the respective tables in Appendix 4.
Conclusion	<p>Due to the corrective actions requested during the validation process, the project participants made a final version of the PDD which includes corrections to all issues raised, so according to paragraph 403 of VVS for project activities version 02.0, AENOR validation team confirms that:</p> <ul style="list-style-type: none"> The updated PDD complies with the applicable PDD form with version 11.0 and instructions therein for filling out the PDD /10/. Information transferred to the updated PDD form is materially the same as that in the registered PDD /11/.

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

Means of validation	The assessment team has checked whether the selected baseline and monitoring methodology applied is applicable to the project activity. This assessment was based on a review of the updated PDD for the 2 nd crediting period, associated documentation, previous validation and telephone calls.				
Findings	<p>At the time of registration, the PP has used the approved consolidated baseline and monitoring methodology ACM0002 version 12 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".</p> <p>The revised PDD for the 2nd crediting period applies a valid version of the same methodology, that is ACM0002 version 19.0 "Grid-connected electricity generation from renewable sources". The main changes for the updated version include expanding the applicability of the methodology, more definitions, clarifications, references, etc.</p> <p>The assessment of the relevant information contained in the revised PDD against each applicability condition is described below:</p> <table border="1"> <thead> <tr> <th>Applicability conditions Project case</th><th>DOE Assessment</th></tr> </thead> <tbody> <tr> <td> <p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <p>(a) Install a Greenfield power plant;</p> <p>(b) Involve a capacity addition to (an) existing plant(s);</p> <p>(c) Involve a retrofit of (an) existing</p> </td><td> <p>The proposed project activity involves the installation of a greenfield wind power farm which is to be installed where no renewable power plant was operating prior to the implementation of the project.</p> <p>Hence, project complies with this condition and methodology is applicable.</p> </td></tr> </tbody> </table>	Applicability conditions Project case	DOE Assessment	<p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <p>(a) Install a Greenfield power plant;</p> <p>(b) Involve a capacity addition to (an) existing plant(s);</p> <p>(c) Involve a retrofit of (an) existing</p>	<p>The proposed project activity involves the installation of a greenfield wind power farm which is to be installed where no renewable power plant was operating prior to the implementation of the project.</p> <p>Hence, project complies with this condition and methodology is applicable.</p>
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	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).	
	<p>The methodology is applicable under the following conditions:</p> <p>(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;</p> <p>(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.</p>	<p>(a) The proposed project activity is a new grid-connected wind power generation project activity. Hence, project complies with this condition and methodology is applicable.</p> <p>(b) Not applicable</p>
	<p>In case of hydro power plants, one of the following conditions shall apply:</p> <p>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m²; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or</p> <p>(d) The project activity is an integrated hydro power project</p>	Not Applicable.

	<p>involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m^2, 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/m^2;</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/m^2 shall be:</p> <p>a. Lower than or equal to 15 MW; and</p> <p>b. Less than 10 per cent of the total installed capacity of integrated hydro power project.</p>	
	<p>In the case of integrated hydro power projects, project proponent shall:</p> <p>(a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the 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>	Not Applicable.
	<p>The methodology is not applicable to:</p> <p>(a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the</p>	Not Applicable.

	continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	
	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”.	Not Applicable.
	In addition, the applicability conditions included in the tools referred in the methodology.	The project activity meets the applicability conditions included in the tools referred in the methodology. Hence, project complies with this condition and methodology is applicable.
No CARs/CLs/FARs raised in this section.		
Conclusion	According to paragraph 404(b) of the VVS for project activities version 02.0, AENOR validation team confirms that the application of the baseline methodology is transparent and conservative, and that the chosen baseline and monitoring methodology i.e. ACM0002 version 19.0 is applicable to the project activity.	

D.3. Validity of original baseline or its update

Means of validation	AENOR checked the updated PDD to assess the validity of the original/current baseline for the proposed CDM project activity against the applicable requirements of methodological 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
Findings	<p>The validity of the baseline has been assessed as per the methodological tool “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 /6/. The assessment was performed as follows:</p> <p>Step 1.-Assess the validity of the current baseline for the next crediting period</p> <p>As demonstrated in the validation report /12/ for the registered PDD, the baseline scenario for the project activity 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>As per the methodology ACM0002 Version 19.0, the baseline for the project activity remains the same as that in the validation report for the registered PDD, which is “electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plant 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” Version 07.0”.</p> <p>Step 1.1: Assess compliance of the current baseline with relevant mandatory</p>

	<p>national and/or sectoral policies</p> <p>There are no new national and/or sectoral policies that could affect the baseline scenario since the date of PDD registered till now. Hence, it was concluded that the current baseline was complied with all relevant national and sectorial policies.</p> <p>Step 1.2: Assess the impact of circumstances</p> <p>The audit team could assess that there are no important changes in the market characteristics and the conditions used to determine the baseline emissions in the previous crediting period are still valid.</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 renewal is requested.</p> <p>The current baseline scenario is the continuation of the current practice. In the absence of the project, the electricity would have been supplied by the grid, and it will not request an investment by the project proponent or third party. So, this step is not applicable.</p> <p>Step 1.4: Assessment of the validity of the data and parameters</p> <p>The emission factors have been updated by the project participants for the second crediting period of the project activity accordingly.</p> <p>Step 2.-Update the current baseline and the data and parameters</p> <p>Step 2.1: Update the current baseline</p> <p>As per the requirement of the sub-step, the update for the power grid emission factor of the second crediting period is based on ACM0002 Version 19.0, which is the methodology applied to the project activity at the time of request for renewal of the crediting period.</p> <p>Step 2.2: Update the data and parameters</p> <p>The emission factors for the project activity have been updated as per the "Tool to calculate the emission factor for an electricity system", Version 07.0.</p> <p>With reference to the "Tool to calculate the emission factor for an electricity system", the Simple OM emission factor ($EF_{grid,OM,y}$) of the SEN (Chilean grid) is calculated as 0.708 tCO_{2e}/MWh. Similarly, the build margin emission factor ($EF_{grid,BM,y}$) of the SEN is calculated ex-ante as 0.408 tCO_{2e}/MWh.</p> <p>Therefore, the combined baseline emission factor is determined ex-ante and will remain fixed during the second crediting period.</p> $EF_{grid,CM,y} = 0.708 \times 0.75 + 0.408 \times 0.25 = 0.633 \text{ tCO}_{2e}/\text{MWh}$ <p>Validity of original baseline and its update was therefore confirmed</p> <p>No CARs/CLs/FARs raised in this section.</p>
Conclusion	<p>According to paragraph 404 of the VVS for project activities version 02.0, AENOR validation team confirms that:</p> <ul style="list-style-type: none"> • There has been no change in the relevant national and/or sectoral regulations on building a wind farm project for supplying electricity to the grid since the previous crediting period. • The baseline scenario for building a wind farm project for supplying electricity to the grid is still valid according to methodology ACM0002 Version 19.0

D.4. Estimated emission reductions or net anthropogenic removals

Means of validation	<p>AENOR checked the estimated GHG emission reductions in the updated PDD, EF grid calculation spreadsheet /14/ and ER calculation spreadsheet /13/ against the applicable requirements in the Project Standard, methodology ACM0002 Version 19.0 and applicable methodological tools.</p>
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Findings	<p>The validation team of AENOR checked that the estimated GHG emission reductions in the updated PDD and ER calculation spreadsheet comply with the applicable requirements in the Project standard, and the valid version of the methodologies and tools that are applicable to the registered CDM project activity as follows:</p> <p><u>Emission Reduction (ER_y)</u></p> <p>The emission reduction (ER_y) of the project activity are calculated as the difference between the baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (LE_y).</p> $ER_y = BE_y - PE_y - LE_y$ <p>ER_y = 83,893 tCO_{2e}/year</p> <p><u>Determination of the project activity emissions (PE_y)</u></p> <p>According to the methodology ACM0002 Version 19.0, and considering that the project activity does not involve fossil fuel consumption and is not a geothermal or hydro power plant, the project emissions are zero (PE_y=0).</p> <p><u>Determine the emission factor for the grid</u></p> <p>The baseline emission factor for the grid (EF_{grid,y}) has been calculated as a combined margin emission factor, using the "Tool to calculate the emission factor for an electricity system" version 07.0.</p> <p>The determination of the relevant electricity system was made following the Option 2, considering the dispatch area covered by the responsible dispatch centre for each year of the ex-ante emission factor calculation requirements. In this case, since in November 2017, the SIC grid was connected to the SING grid, creating a new electricity system called SEN, which considers a single dispatch area coordinated by the National Electricity Coordinator (CEN); thus, the relevant electricity system is the SEN /15/.</p> <p>As the "Tool to calculate the emission factor for an electricity system" requires an annual based emission factor calculation, and the interconnection occurred during 2017, therefore the relevant electricity system is SEN for 2017 and 2018 and SIC for 2016. The Project participant has chosen to calculate the operating margin and build margin emission factor the option I and only grid power plants are included in the calculation.</p> <p>In terms of vintage of data, the period considered for the calculation is 2016-2018.</p> <p>As data for Option A is actually available, this option will be used for the calculation; under this option, the simple OM emission factor is calculated based on the net electricity generation and an emission factor for each power unit, as follows:</p> <p>The operating margin emission factor is calculated as follows:</p> $EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$ <p>EF_{grid,OMsimple,y} =Simple operating margin CO₂ emission factor in year y (tCO₂/MWh).</p> <p>EG_{m,y} =Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)</p> <p>EF_{EL,m,y}=CO₂ emission factor of power unit m in year y (tCO₂/MWh).</p> <p>m=All power units serving the grid in year y except low-cost/must-run power units.</p> <p>y=The relevant year as per the data vintage chosen in Step 3 (2016 to 2018).</p> <p><u>Determination of EF_{EL,m,y}</u></p> <p>The emission factor of each power unit m is determined, options A1 and A2 of the tool are applied as follow:</p>
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- **Option A1** - If for a power unit m data on fuel consumption and electricity generation is available, the emission factor ($EF_{EL,m,y}$) is determined as follows:

Equation 1. Emission factor per power unit calculation

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_{m,y}}$$

Where:

$EF_{EL,m,y}$ = CO₂ emission factor of power unit m in year y (tCO₂/MWh).

$FC_{i,m,y}$ = Amount of fuel type i consumed by power unit m in year y (mass or volume unit). /16/17/18/

$NCV_{i,y}$ = Net calorific value (energy content) of fuel type i in year y (GJ/mass or volume unit)./19/

$EF_{CO_2,i,y}$ = CO₂ emission factor of fuel type i in year y (tCO₂/GJ)./20/

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh) /21/22/23/

m = All power units serving the grid in year y except low-cost/must-run power units.

i = All fuel types combusted in power unit m in year y .

y = The relevant year as per the data vintage chosen in Step 3 (2016 to 2018).

- Option A2** - In for a power unit m only data on electricity generation and the fuel types used is available, the emission factor is determined based on the CO₂ emission factor of the fuel type used and the efficiency of the power unit, as follows:

Equation 2. CO₂ emission factor based on efficiency

$$EF_{EL,m,y} = \frac{EF_{CO_2,m,i,y} \times 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$ = CO₂ emission factor of power unit m in year y (tCO₂/MWh).

$EF_{CO_2,m,i,y}$ = Average CO₂ emission factor of fuel type i used in power unit m in year y (tCO₂/GJ).

$\eta_{m,y}$ = Average net energy conversion efficiency of power unit m in year y (ratio).

m = All power units serving the grid in year y except low-cost/must-run power units.

y = The relevant year as per the data vintage chosen in Step 3.

Where several fuel types are used in the power unit, the fuel type with the lowest CO₂ emission factor for $EF_{CO_2,m,i,y}$ is used.

Calculate the build margin (BM) emission factor

The BM emission factor is determined in accordance to Option 1 of the “Tool to calculate the emission factor of an electricity system” version 07.0, where for the second crediting period the build margin emission factor is calculated ex-ante based on the most recent information available (2018) on units already built for sample group *m* at the time of PDD submission to the DOE for validation.

Equation 3. BM emission factor calculation

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year *y* (tCO₂/MWh).

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh).

$EF_{EL,m,y}$ = CO₂ emission factor of power unit *m* in year *y* (tCO₂/MWh).

m = Power units included in the build margin.

y = Most recent historical year for which electricity generation data is available.

The CO₂ emission factor of each power unit *m* ($EF_{EL,m,y}$) is determined as per guidance in Step 4, using options A1 or A2 (represented by Equations 4 and 5 in Step 4), using for *y* the most recent historical year (2018) for which power generation data is available, and using as *m* the power units included in the build margin.

The combined margin emissions factor is calculated as follows:

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

Where:

$EF_{BM,y}$ = Build margin CO₂ emission factor in year *y* (tCO₂/MWh)

$EF_{OM,y}$ = Operating margin CO₂ emission factor in year *y* (tCO₂/MWh)

W_{OM} = Weighting of operating margin emissions factor (%)

W_{BM} = Weighting of build margin emissions factor (%)

EF_{OM} : 0.708 tCO_{2e}/MWh

EF_{BM} = 0.408 tCO_{2e}/MWh

EF_{CM} = (0.708 × 0.75) + (0.408 × 0.25) = 0.633 tCO_{2e}/MWh

BE_y = 83,893 tCO_{2e}/year

Leakage

According to ACM0002 version 19.0, no leakage needs to be considered for the proposed project.

Conclusion

In accordance with paragraph 113 of the VVS for project activities version 02.0, AENOR validation team confirms that:

- All assumptions and data used by the project participants are listed in the

	<p>PDD and/or supporting documents, including their references and sources;</p> <ul style="list-style-type: none"> • All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD; • All values used in the PDD are considered reasonable in the context of the proposed CDM project activity; • The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, and leakage emissions; • All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.
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D.5. Validity of monitoring plan

Means of validation	The validation team has checked that the monitoring plan in the updated PDD complies with the applicable requirements in the Project standard, and the valid version of the methodologies and tools that are applicable to the registered CDM project activity.	
Findings	The project applies methodology ACM0002 - Version 19.0. The original monitoring plan was updated based on ACM0002 - Version 19.0 requirements. There are no basic changes from the current crediting period.	
	Based on the document review and follow-up actions, the validation team confirms that the parameter required to be monitored for the project will be:	
	Data/Parameter	EG _{facility,y}
	Data unit	MWh/year
	Description	Quantity of net electricity generation supplied by the project plant to the grid in year y
	Value applied	132,534
	Measurement methods and procedures	Measured by bi-directional energy meters installed at the grid interface for electricity export to the grid (measures the electricity from the power plant and from the grid). This data will be archived electronically as per internal procedures, for 2 years after the end of the last crediting period.
	Monitoring frequency	Continuous (hourly) measurements and monthly recording.
	QA/QC procedures	The meter should have a maximum error of 0.2% and will be calibrated annually by an external testing facility accredited under Chilean standards. Monitored data is cross checked against records for sold electricity which are publicly available at the “Coordinador Eléctrico Nacional” web page (www.coordinador.cl)
	Purpose of data	Calculation of baseline emissions
	Additional comment	N/A
	No CARs/CLs/FARs raised in this section.	
Conclusion	The Monitoring plan contained in the updated PDD is in accordance with the requirements of the monitoring methodology and tools applied.	
	All necessary changes have been appropriately reflected in the updated PDD, the	

	monitoring plan in the updated PDD is in compliance with the applied monitoring methodology, and the monitoring arrangements described in the updated PDD can be implemented and are feasible within the project design
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D.6. Crediting period

Means of validation	The assessment team checked whether the starting date and length of the 2 nd crediting period, as stated in the updated PDD meets all applicable requirements for renewal of crediting period.
Findings	The first 7-year renewable crediting period was from 12/05/2011 to 11/05/2018, the PPs are applying for a second period started from 12/05/2018 to 11/05/2025. No CARs/CLs/FARs raised in this section.
Conclusion	According to paragraph 412 of VVS for project activities version 02.0, AENOR validation team confirms that the correct crediting period has been applied in the updated PDD.

D.7. Project participants

Means of validation	AENOR checked the names of the project participants included in the updated PDD against the names included in the latest version of the completed Modalities of Communication (MoC) form for the project activity as available in the UNFCCC website.
Findings	No CARs/CLs/FARs raised in this section.
Conclusion	According to paragraph 412 of VVS for project activities version 02.0, AENOR validation team confirms that the information of the PPs has been correctly indicated in the updated PDD.

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	N/A	N/A
Corrections	N	N/A	N/A
Change to the start date of the crediting period	N	N/A	N/A
Inclusion of a monitoring plan	N	N/A	N/A
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	N	N/A	N/A
Changes to the project design	N	N/A	N/A
Changes specific to afforestation and reforestation project activities	N	N/A	N/A

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).

SECTION E. Internal quality control

Following the completion of the assessment process by the validation team, all documentation undergoes an internal quality control through a technical review before submission to the CDM-EB. The Technical reviewer is a qualified member of AENOR, independent from the team that carried out the validation of the project activity. The technical reviewer or the team appointed for the technical review are qualified in the technical area(s) and sectoral scope(s) of the project activity.

SECTION F. Validation opinion

AENOR has performed the validation of the renewal of the crediting period of the project "Monte Redondo Wind Farm Project". The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following phases: i) a desk review of the project design and the baseline and monitoring plan; ii) the resolution of outstanding issues and the issuance of the final validation report and opinion. In the course of the validation process 2 corrective actions were raised, all have been successfully closed.

The review of the project design documentation has provided to AENOR enough evidence to determine the validity of the original baseline scenario and the update of the baseline. The project correctly applies the baseline and monitoring methodology ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources - Version 19.0.

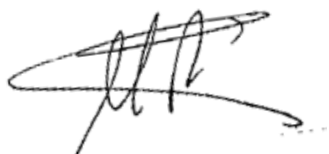
The calculation of the project emission reductions is carried out in a transparent and conservative manner, so the project activity is likely to achieve the average estimated amount of emission reductions of 83,893 tCO_{2e} per year over the 2nd renewable crediting period.

In AENOR's opinion, the project meets all relevant UNFCCC requirements and the relevant host country criteria for the renewal of the crediting period. Hence, AENOR requests the renewal of the crediting period of the project.

The validation has been performed using a risk based approach, as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle.

Hence, AENOR cannot be held liable by any party for decisions made or not made based on the validation opinion, which goes beyond the purpose.

Madrid, 26/12/2019



Marcelino Pellitero Martinez
Team leader



José Luis Fuentes
Authorized person

Appendix 1. Abbreviations

Abbreviations	Full texts
ACM0002	Consolidated baseline methodology for grid-connected electricity generation from renewable sources - Version 19.0
BM	Build margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM-EB	CDM Executive Board
CEN	National Electricity Coordinator
CER	Certified Emission Reductions
CL	Clarification Action
CM	Combined margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DOE	Designated operational entity
DR	Desk review
ER	Emission reduction
EF	Emission factor
FAR	Forward action request
GHG	Greenhouse Gasses
GSC	Global stakeholder consultation
GWh	Electrical Giga Watt hour
IPPC	Intergovernmental Panel on Climate Change
kW	Kilowatt
LC/MR	Low cost/Must run
LoA	Letter of Approval
MoCs	Modalities of Communication
MP	Monitoring plan
MW	Megawatt

Abbreviations	Full texts
OM	Operating margin
PDD	Project Design Document
PP	Project participant
PS	CDM project standard for programmes of activities version 02.0
RCP	Renewal of crediting period
SEN	National Electricity System (Chilean grid after interconnection of SIC and SING by the end of year 2017)
tCO _{2e}	Carbon dioxide equivalent tonnes
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM validation and verification standard for programmes of activities version 02.0

Appendix 2. Competence of team members and technical reviewers



CERTIFICATE OF QUALIFICATION

Subject: Validation and Technical Review Team for "Monte Redondo Wind Farm Project"

Madrid, 16 December 2019

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: Marcelino Pellitero Martínez

CDM Team Leader: Yes

CDM Validator: N/A

CDM Verifier: N/A

CDM Technical Reviewer: N/A

External Technical Expert: N/A

Technical areas related with the project activity:

TA 1.2: Renewables

Jose Luis Fuentes
Climate Change Manager

**CERTIFICATE OF QUALIFICATION**

Subject: Validation and Technical Review Team for "Monte Redondo Wind Farm Project"

Madrid, 16 December 2019

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: Luis Javier Arribas

CDM Team Leader: N/A

CDM Validator: N/A

CDM Verifier: N/A

CDM Technical Reviewer: Yes

External Technical Expert: N/A

Technical areas related with the project activity:

TA 1.2: Renewables

A handwritten signature in blue ink, appearing to read "JL Fuentes", written over a faint circular stamp.

Jose Luis Fuentes
Climate Change Manager

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UNFCCC	CDM project standard for project activities version 2.0	https://cdm.unfccc.int/Reference/Standards/index.html	UNFCCC
2	PPs	PDD version 8.0		PPs
3	UNFCCC	ACM0002: Grid-connected electricity generation from renewable source version 19.0	https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG	UNFCCC
4	UNFCCC	CDM Validation and Verification Standard for project activities version 2.0	https://cdm.unfccc.int/Reference/Standards/index.html	UNFCCC
5	UNFCCC	CDM Project Cycle Procedure for project activities version 2.0	https://cdm.unfccc.int/Reference/Procedures/index.html	UNFCCC
6	UNFCCC	Methodological 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	https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf	UNFCCC
7	UNFCCC	Methodological Tool: Tool to calculate the emission factor for an electricity system version 07.0	https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf	UNFCCC
8	AENOR	Specific Instruction for the Validation, verification and certification of clean development mechanism (CDM) project activities(IE/DTC/0039)		AENOR
9	PPs	Final PDD version 8.1		PPs
10	UNFCCC	CDM-PDD form version 11.0	https://cdm.unfccc.int/Reference/PDDs_Forms/index.html	UNFCCC
11	PPs	Registered PDD version 7.1	https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1296695607.41/view	UNFCCC
12	UNFCCC	Validation Report version 6	https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1296695607.41/view	UNFCCC
13	PPs	ER calculation spreadsheet		PPs

14	PPs	Chile Electricity System Emission Factor 2018 Calculation Spreadsheet		PPs
15	CEN	Resolution 668	https://www.leychile.cl/Navegar?idNorma=1111361	CEN
16	CDEC-SIC	Annual Report 2016	https://sic.coordinador.cl/informes-y-documentos/fichas/operacion-real/	CDEC-SIC
17	CEN	Annual Report 2017	http://www.cne.cl/estadisticas/electricidad/	CEN
18	CEN	Annual Report 2018	http://www.cne.cl/estadisticas/electricidad/	CEN
19	CEN	Chile National Energy Balance 2017	http://energiaabierta.cl/visualizaciones/balance-de-energia/	CEN
20	IPPC	Guidelines on National GHG Inventories, Vol. 2 (Energy), Chapter 1, Table 1.4, Pages 1.23 and 1.24	http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf	IPPC
21	CEN	Fuel consumption per power unit 2016		CEN
22	CEN	Fuel consumption per power unit 2017		CEN
23	CEN	Fuel consumption per power unit 2018		CEN
24	UNFCCC	EB Meeting:105 (paragraph 28)	https://cdm.unfccc.int/EB/index.html	UNFCCC

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

Table 1. CL from this validation

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

N/A

Table 2. CAR from this validation

CAR ID	01	Section no.	B.1	Date:	04/12/2019
Description of CAR					
Section B.1. of the PDD does not comply with the Instructions for completing the form. According to the instructions, the PDD shall refer to the UNFCCC CDM website for the exact reference of the applied methodologies, methodological tools and standardized baselines					
Project participant response					Date: 09/12/2019
PDD section B.1 has been updated by including the exact references of the approved methodology and methodological tools in the UNFCCC CDM website.					
Documentation provided by project participant					
PDD Version 8.1 from 09/12/2019					
DOE assessment					Date: 16/12/2019
PPs updated the MR correctly. CAR 1 is closed out.					

CAR ID	02	Section no.	B.2	Date:	04/12/2019
Description of CAR					
Section B.2. of the PDD does not comply with the Instructions for completing the form. According to the instructions, the PDD shall Justify the choice of the selected methodologies and, where applicable, the selected standardized baselines and the other methodological regulatory documents, by showing that the project activity meets all applicability conditions of these regulatory documents.					
Project participant response					Date: 09/12/2019
Section B.2. of the PDD has been updated by included tables for the applicable methodology and tools that demonstrate how the applicability conditions of each of them are met by the project activity and the documentation that has been used for the justification and references to them.					
Documentation provided by project participant					
PDD Version 8.1 from 09/12/2019					
DOE assessment					Date: 16/12/2019
PPs updated the MR correctly. CAR 2 is closed out.					

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
N/A					
Documentation provided by project participant					
N/A					
DOE assessment					Date: DD/MM/YYYY
N/A					