

VALIDATION REPORT FOR THE MANANTIALES BEHR WIND FARM AENOR INTERNACIONAL S.A.U

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Summary:

AENOR Internacional SAU, hereinafter AENOR, has made the validation of the “Manantiales Behr Wind Farm” project of YPF Energía Eléctrica S.A. located in the province of Chubut, Argentina, on the

basis of UNFCCC criteria for the CDM large-scale methodology (ACM0002 version 19.0), Verified Carbon Standard (VCS) version 3.7, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The proposed project activity consists on the installation and operation of a new grid connected wind power plant. The project will have a total installed capacity of 99 MW, given by 30 wind turbines of 3.3 MW, generating power to offset the combustion of thousands of tonnes of fossil fuels and, in doing so, will help preserve non-renewable resources by promoting the exploitation and use of renewable resources and technologies.

The purpose of such a validation is to have an independent, third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant VCS issues and criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria.

AENOR has performed a validation of Manantiales Behr Wind Farm Project. The validation process was performed on the basis of all issues and criteria of VCS Standard version 3.7 /1/ and VCS Program Guide version 3.7 /2/ for VCS projects and also on the criteria given by other guidance as VCS Validation and Verification Manual version 3.2./3/

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) the resolution of outstanding issues and internal technical review followed by the issuance of the final validation report and opinion. In the course of the validation process 07 corrective actions and 04 clarifications were raised, all have been successfully closed (see Appendix 2).

In summary, it is AENOR's opinion that the project correctly applies the large-scale methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"; version 19.0 /4/ and meets the relevant UNFCCC requirements for the CDM Methodology, Verified Carbon Standard (VCS) version 3.7 requirements and the relevant host country criteria.

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 VCS project registration process. 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.

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1 INTRODUCTION

1.1 Objective

This validation concerns a project implemented by YPF Energía Eléctrica S.A., the project proponent (PP), to reduce emissions of CO₂ by generating renewable energy coming from wind resources and thus offsetting the combustion of thousands of tonnes of fossil fuels.

This report summarizes the findings of the validation of the project, performed on the basis of relevant UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting and VCS version 3.7.

The objective of a validation is to provide an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host country criteria and VCS Standard version 3.7 are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable CDM methodology requirements and the identified criteria as well as VCS Standard version 3.7. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (VCUs).

AENOR Internacional SAU as the validation/verification body (VVB) of the Project has been accredited as a DOE by UNFCCC.

1.2 Scope and Criteria

The scope of the validation covers the additionality assessment, the Environmental Impact Assessment and emission reductions, along with the baseline methodology, the ex-ante calculation of the emission reductions and the monitoring methodology to quantify the emissions reductions during the operational life of the project.

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

- Project design document (VCS-PD) initial version /5/ and final version /6/, including baseline study and monitoring plan,
- ACM0002 "Grid-connected electricity generation from renewable sources"; Version 19.0 /4/,
- Tool to calculate the emission factor for an electricity system; version 07.0 /7/
- Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation version 3.0 /8/
- All applicable rules and requirements set out under the VCS Program,
- Associated documentation (technical information, official statistics, etc.).

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against requirements of applicable conditions of the selected CDM methodology, guidance issued by the CDM Board and VCS Program. AENOR has used a risk based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of ERs.

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

1.3 Level of Assurance

The level of assurance was used to determine the depth of detail that the validator placed in the validation sampling plan to determine if there are any errors, omissions, or misrepresentations (ISO 14064-3:2006). AENOR assessed the project (general principles, data, monitoring descriptions, documentation, calculations, etc.) to provide reasonable assurance to meet the Project Level requirements of the VCS Program. The evidence used to achieve a reasonable level of assurance is specified in the following sections.

1.4 Summary Description of the Project

The purpose of the project is the generation of electricity from renewable sources through the construction and operation of a new grid connected wind power plant that will have a total installed capacity of 99 MW, located at the province of Chubut, Argentina. This project will consist of 30 turbines with a capacity of 3.3 MW each. The energy generated by the project will be supplied to the Argentinean national grid.

The project will have an expected operating life of 20 years and an aggregated estimated energy of 502,900 MWh/year, accounting an annual emission reduction of 251,000 tCO₂/year.

2 VALIDATION PROCESS

2.1 Method and Criteria

The project assessment aims at a risk based approach and is based on the methodology developed in the VCS Standard version 3.7, which aims to harmonize the approach and quality of all such assessments. The overall validation, from Contract Review to Validation Report and Opinion, was conducted using AENOR internal procedures.

The validation of the project started on 14 November 2018, with the listing of the project on the project pipeline (PL1820), and concludes with the submission of the final validation report for requesting the registration of the project. The validation was performed in several phases, starting with a desk review of the VCS-PD against the VCS rules, ACM0002 "Grid-connected electricity generation from renewable sources" version 19.0 and other relevant criteria. The desk review was followed by a site visit to the project site in Chubut province, Argentina.

In order to ensure transparency, a validation protocol was customized for the project. 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 organizes, provides details and clarifies the requirements a VCS 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 sequence of the validation is given in the table below:

Topic	Date
Project is listed on pipeline (PL1820)	14 November 2018
On-Site Visit	21-22 January 2019
Validation protocol version 01	25 January 2019
Final Validation Report	01 February 2019

Following the completion of the assessment process by the validation team, all documentation undergoes an internal quality control through a technical review. 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 and sectoral scope of the project activity.

The completed validation findings are enclosed in Appendix 2 to this report.

2.2 Document Review

The Project document submitted by the PP was reviewed against the approved CDM methodology and against VCS Program and other relevant criteria. Additional background documents related to the project description, baseline and additionality analysis were also made available before and during the on-site visit in Chubut province, Argentina.

Furthermore, cross checks were made between information provided in the VCS-PD and information from sources other than those used, (if available) AENOR sectoral or local expertise and, (if necessary) independent background investigations.

To address the corrective actions and clarification requests that arose from the desk review and on-site visit, the consultant revised the initial project design document submitted and developed the final VCS-PD.

All documents assessed during validation are listed in Appendix 1.

2.3 Interviews

The AENOR validation team conducted interviews with project proponent in Chubut province, Argentina, in order to confirm selected information and to resolve issues identified in the document review.

From 21 to 22 January 2019, validation team visited the facilities of the project site. During the visit, representatives from project proponent, in addition to relevant local stakeholders such as local inhabitants, affected by the project were interviewed.

Interviewed organization Person/Position	Interview topics
YPF Luz - Gaston Tuturro/Business Development Coordinator - Mariana Costa/Institutional Relationships Manager - Luis Malbos/Operational Manager - Rodrigo San Sebastian/EHS Manager - Alejandro Eloff/South Region Manager - Noelia/Rivera/ Communication Department	- Project design - System management - Permits and authorizations applicable to the project - Project start date - Ex-ante baseline determination - Opinion about the project - Knowledge of the environmental impacts - Project activity compliance with sectoral policies and legislation - Local Stakeholder Consultation
Prosustentia (Carbon Consultancy) Adriana Torchelo/Director	- Project design - System management - Permits and authorizations applicable to the project - Project start date - Ex-ante baseline determination - Knowledge of the environmental impacts - Project activity compliance with sectoral policies and legislation - Additionality assessment.
Other Stakeholders Victor Bonzano/Neighbourhood association Juan XXIII	- Opinion about the project - Benefits for the community - Local Stakeholder Consultation

Juan Daniel Michaeloud/ Undersecretary of Regulation and Environmental Control of Chubut Province	Environmental approval
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2.4 Site Inspections

From 21 to 22 January 2019, audit team visited the facilities of the project site in order to assess if the project is implemented in accordance with specifications stated in the VCS-PD. It has been observed that the conditions of the main components of the project activity are consistent with the description in the VCS-PD. In addition, site visit included a desk review, including the topics indicated above at project representatives and on-site inspections of communities in the current operation status.

After background information on the history of the current system and the proposed project was assessed; project details such as the responsible contractors and implementation steps were discussed. For this purpose, visits and meetings were held at project proponent office. Evidences related to the discussions were provided to the audit team during the meeting.

Community inspections consisted of observations on the infrastructure, monitoring aspects, personnel and general operation.

2.5 Resolution of Findings

As an outcome of the validation process, the team can raise different types of findings (corrective actions, clarifications or other findings) according to the rules and requirements governing the VCS Program.

A Clarification Request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met; or

Where a non-conformance arises the validation team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The VCS requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.

Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

A Forward Action Request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the VCS requirements for registration.

The project participants were requested to address all validation findings and ultimately provided the validation team with sufficient evidence to determine that the applicable VCS requirements have been met. The project participant modified the initial VCS-PD to resolve the validation team concerns and resubmitted a final version of the VCS-PD. AENOR has prepared this report based on the final VCS-PD.

To guarantee the transparency of the validation process, the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting changes in the VCS-PD or supporting annexes are documented in the Validation Findings in Appendix 2.

2.5.1 Forward Action Requests

Project validation resulted without any forward action requests.

3 VALIDATION FINDINGS

3.1 Project Details

Project type, technologies and measures implemented, and eligibility of the project

According to the VCS version 3.7 Guidelines and the list of Sectoral Scopes of the UNFCCC, the project is applicable under the sectoral scope 1:

- Energy Industries (renewable/ non-renewable sources).

The proposed project activity involves the installation and operation of a wind farm with 30 turbines of a capacity of 3.3 MW each resulting in a total installed capacity of 99 MW; in Escalante department, Province of Chubut, Argentina, by YPF Energía Eléctrica S.A.

The project is a greenfield project which results in an estimated annual average GHG emission reduction of 251,000 tonnes of CO₂e.

The technology employed, converts wind to electrical energy. The technology is an environment friendly technology since there are no GHG emissions associated with the electricity generation.

The purpose of the project activity is the generation of electricity from renewable sources to be supplied to the national grid of Argentina. The project will generate greenhouse gas (GHG) emission reductions by avoiding CO₂e emissions which otherwise would have been generated by the operation of grid connected power plants and by the addition of new sources. Hence the project fulfils VCS conditions.

Project proponent

The project proponent has been identified as YPF Energía Eléctrica S.A (YPF LUZ). The contact address of the project proponent is as follows:

Organization Name	YPF Energía Eléctrica S.A (YPF LUZ)
Contact Person	Santiago Sajaroff
Title	Chief Operation Officer
Address	Macacha Güemes 511, Buenos Aires Argentina
Telephone	+54 11 54413985
Email	santiago.sajaroff@ypf.com

Project start date

The project had its start date on August 1st 2018. This is the date of commencement for the commercial operation of the project /9/.

Project crediting period

The crediting period of the project will be 10 years. It will run from August 1st 2018 to July 31st 2028, extendable twice for another 10 years each time.

Project scale and estimated GHG emission reductions or removals

The scale of the project is indicated in the table below:

Project Scale	
Project	X
Large Project	

The estimated GHG reductions of the project in the first crediting period are summarised in the table below

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 2018 (from 01/08/2018)	57,545
Year 2019	255,976
Year 2020	255,976

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 2021	255,976
Year 2022	255,976
Year 2023	255,976
Year 2024	255,976
Year 2025	255,976
Year 2026	255,976
Year 2027	255,976
Year 2028 (Until 31/07/2028)	148,677
Total estimated ERs	2,510,006
Total number of crediting years	10 Years
Average annual ERs	251,000

Project location

The Project is located in the San Jorge Gulf basin within the Manantiales Behr reservoir operated by YPF S.A., in Escalante Department, province of Chubut, approximately 40 km north-west from Comodoro Rivadavia city, Argentina. Its geo-coordinates are: 45° 40' 12"S 67° 46' 48"W

Conditions prior to project initiation

Baseline scenario is the same as the conditions existing prior to the project initiation and is stated in full in section 2.4 (Baseline Scenario).

Project compliance with applicable laws, statutes and other regulatory frameworks

The project activity had to follow relevant laws and statutes or other regulatory frameworks before the beginning of the implementation.

- National Constitution /10/
- Law N° 24065 "Electric Energy Regime" /11/
- Decree N°1398/92 /12/
- Law N°25675 "General Environment Law" /13/
- Law N°25,019 "National Regime of Solar and Wind Energy" /14/

- Decrees N°1220/98 and N°1597/99 /15/
- Law N°26190 "Renewable Sources of Energy Promotion Regime" /16/
- Chubut Province Constitution /17/
- Law XI N°35 "Chubut Province Environmental Code" /18/
- Law N°4389 "Wind Activity Regulation" /19/
- Decree N°235/99 /20/
- Decree N°185/09 /21/

The implementation of the project activity was approved by the Government of Argentina in accordance with relevant sectoral regulations.

Ownership and other programs:

- **Right of use**

On 15 December 2016 the Secretariat of Electric Energy of the Argentinean Government, authorized YPF LUZ to act as Wholesale Electricity Market (MEM) Agent for its project Manantiales Behr wind farm /22/. In addition the legal title for the project's land has been provided to the VVB /23/.

YPF Energía Eléctrica S.A (YPF LUZ) is the only owner of the park and the sole recipient of the emission reductions generated by it.

- **Emissions trading programs and other binding limits**

The project activity is a voluntary action implemented by the project proponent YPF Energía Eléctrica S.A (YPF LUZ). Argentina is not an Annex I country of the Kyoto protocol so it is not participating in the Assigned Amount Unit (AAU) markets. Also the country has not implemented a national emission rights market. The project proponent YPF Energía Eléctrica S.A (YPF LUZ) has declared that the generated GHG emission reductions will not be used in the compliance market and are not traded in any emission trading scheme /24/.

- **Other forms of environmental credit sought or received and eligible to be sought or received**

The project proponent has declared that the project activity has not been registered nor is it seeking registration in other form of GHG related environmental credit for GHG emission reductions or removals claimed under the VCS Program /24/.

- **Participation under other GHG programs**

The project proponent has declared that the project activity has not been registered nor is it seeking registration in other GHG programs besides VCS /24/.

Rejection by other GHG programs

- The project activity has never been rejected by other GHG programs.

Additional information relevant to the project

- **Eligibility criteria for grouped projects**

The project does not belong to a grouped project.

- **Leakage management for AFOLU projects**

Not applicable. The project activity is a non-AFOLU project.

- **Commercially sensitive information**

No commercially sensitive information has been excluded from the public version of the project description.

- ***Sustainable development contributions***

The project will contribute to the sustainable development of Argentina by promoting wind power technology development in the host country, reducing GHGs and local air pollutants (SO₂, NO_x and PM) emissions from the Argentinean energy matrix, stimulating the regional economy and improving energy security and grid stability. The renewable energy generated by the project will satisfy part of the growing electricity demand in the host country and the region.

By reviewing project description stated in the VCS-PD, site visit and supporting evidence provided by project participant; AENOR is able to confirm that the project description is accurate, complete, and provides an understanding of the nature of the project.

3.2 Application of Methodology

3.2.1 Title and Reference

The UNFCCC approved consolidated baseline and monitoring methodology ACM0002 “Grid-connected electricity generation from renewable sources --- Version 19.0” will be used in this project.

This methodology also refers to the approved versions of the following UNFCCC tools that will also be used:

- “Tool to calculate the emission factor for an electricity system; version 07.0”
- “Tool for the demonstration and assessment of additionality; version 07.0.0” /25/
- Methodological Tool: Investment Analysis version 09.0 /26/

- Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation version 03.0

3.2.2 Applicability

The project applies the Approved consolidated baseline and monitoring methodology ACM0002, version 19.0. Applicability criteria for the baseline methodology are assessed by the validation team by means of document review and interview. In AENOR's opinion the project activity fully meets the criteria as described below:

Applicability conditions Project case	Applicability conditions Project case
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	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. Hence, project complies with this condition and methodology is applicable.
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the	(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. (b) Not applicable

Applicability conditions Project case	Applicability conditions Project case
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.	
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (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 (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 (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: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed	Not Applicable.

Applicability conditions Project case	Applicability conditions Project case
capacity of integrated hydro power project.	
In the case of integrated hydro power projects, project proponent shall: (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 (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.
The methodology is not applicable to: (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; (b) Biomass fired power plants/units.	Not Applicable.
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	Not Applicable.

Applicability conditions Project case	Applicability conditions Project case
usual maintenance”.	
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 as discussed below. Hence, project complies with this condition and methodology is applicable.

Applicability condition of applied tools; also, have been discussed in the VCS-PD:

Tool for the demonstration and assessment of additionality version 07.0.0

Applicability conditions Project case	Applicability conditions Project case
The use of the “Tool for the demonstration and assessment of additionality” is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	Not Applicable.
Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The project activity demonstrates and assesses additionality using this tool and the provisions contained in the methodology.

Tool to calculate the emission factor for an electricity system, version 07.0

Applicability conditions Project case	Applicability conditions Project case
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	This project activity will supply electricity to the Argentinean grid (SADI) hence this tool is applicable.
Under this tool, the emission factor for the project electricity system can be calculated	The emission factor for the project activity electricity system is calculated for grid power

either for grid power plants only or, as an option, can include off-grid power plants.	plants only.
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The project activity electricity system (SADI) is located in Argentina.
Under this tool, the value applied to the CO2 emission factor of biofuels is zero.	A value of zero will be applied to the CO2 emission factor of biofuels

Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation version 03.0

Applicability conditions Project case	Applicability conditions Project case
If emissions are calculated for electricity consumption, the tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption: (a) Scenario A: Electricity consumption from the grid. The electricity is purchased from the grid only, and either no captive power plant(s) is/are installed at the site of electricity consumption or, if any captive power plant exists on site, it is either not operating or it is not physically able to provide electricity to the electricity consumer; (b) Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants are installed at the site of the electricity consumer and supply the consumer with electricity. The captive power plant(s) is/are not connected to the electricity grid; or (c) Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants operate at the site of the electricity consumer. The captive power plant(s) can provide electricity to the electricity consumer. The captive power plant(s) is/are also connected to the electricity grid. Hence, the electricity	Scenario A applies to the source of electricity consumption by the project activity since it will consume electricity from the grid and is purchased only from the SADI. No captive power plant(s) are installed at the site of electricity consumption.

consumer can be provided with electricity from the captive power plant(s) and the grid.	
This tool can be referred to in methodologies to provide procedures to monitor amount of electricity generated in the project scenario, only if one out of the following three project scenarios applies to the recipient of the electricity generated: (a) Scenario I: Electricity is supplied to the grid; (b) Scenario II: Electricity is supplied to consumers/electricity consuming facilities; or (c) Scenario III: Electricity is supplied to the grid and consumers/electricity consuming facilities.	Scenario I apply to the recipient of the electricity generated by the project activity since it dispatches electricity to the Argentinean Electricity System (SADI).
This tool is not applicable in cases where captive renewable power generation technologies are installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage. The tool only accounts for CO2 emissions.	Not Applicable.

The VCS-PD describes the baseline methodology, which is in conformance with the latest version of the approved Baseline and Monitoring Methodology: ACM0002 “Grid-connected electricity generation from renewable sources - Version 19.0.

In addition, section 2.2 of the final VCS-PD identifies the applicability conditions of the approved methodology and states how the project activity fulfils each of these conditions. AENOR has verified by desk review, on-site visit and interviews that the conditions required by the methodology are met. Thus, the VCS-PD clearly identifies that the project activity fulfils the conditions of the applicable methodology and tools.

3.2.3 Project Boundary

The boundary of the project activity is as per methodology definition ACM0002 “includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

Project boundary is the wind turbines site, the power house, the concession area and the auxiliary facilities. In addition, all emission sources and gases related to the baseline scenario, project scenario, and leakage are clearly identified and described in a complete manner. CO₂ is the main emission source and is included in the baseline; but CH₄ and N₂O are excluded, in

compliance with the methodology. CO₂, N₂O and CH₄ are not included in the project activity as an emission source.

In order to calculate the emission factor for the project activity, the interconnected system is also included in the boundary of the project activity.

AENOR has validated the project boundary of the project during the on-site visit and Project description report /27/. The validation team states that the identified boundary and selected sources and gases are justified for the project activity.

3.2.4 Baseline Scenario

The final version of the VCS-PD describes the baseline methodology, which is in conformance with the approved methodology ACM0002; version 19.0 According to description of the VCS-PD, as the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

“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 emissions factor for an electricity system”.

The assumptions and data used in the identification of the baseline scenario are appropriately justified, supported by evidence and can be deemed reasonable. In addition, relevant national and/or sectoral policies and circumstances are indicated in the final version of the VCS-PD.

The VCS-PD identifies the baseline for the proposed project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed project activity.

3.2.5 Additionality

The additionality of Manantiales Behr Wind Farm project activity as required by ACM0002 version 19.0 is demonstrated by applying the “Tool for the demonstration and assessment of additionality” version 07.0.0.

The project activity is not first-pf-its-kind, thus step 1 is applied.

Applying the step 1 of the tool, plausible alternative baseline scenarios to the project have been identified and discussed in the final PD. These are:

Alternative 1: Execution of the project activity without its registration as VCS.

Alternative 2: Continuation of the current situation i.e. the supply of electricity from the National Interconnected System of Argentina (baseline scenario).

The alternatives presented in the Step 1 are realistic and credible and comply with the regulation in place./10/--/21/

Application of Benchmark Analysis

Concerning the step 2, the PP has chosen the investment analysis. As the project generates financial and economic benefits other than VCS related income through the sales of electricity and the proposed baseline scenario does not involve an investment, YPF Energía Eléctrica S.A (YPF LUZ), has used an IRR benchmark analysis in order to demonstrate the additionality of the Project activity.

In order to reproduce and validate the financial calculations, the spreadsheets together with the evidence regarding the input values were requested to the PP. In regard to this matter, the financial model /28/ has been provided.

It has been demonstrated that the project IRR post-tax of 9.37% is lower than the project IRR benchmark post-tax of 11.85% adopted by the Project Participant derived from the WACC based on parameters that are standard in the market.

The cost of equity of 13.94% is derived from the value provided by the “Methodological tool: Investment analysis” version 09.0 /26/ for project activities under Group 1 in Argentina of 13.94%

The cost of debt of 9.75% was derived according to paragraph 24 of the investment analysis tool, version 09.0, from the World Bank nominal commercial lending interest rate in Argentina at the time of the investment decision (24.92%) raised by the average CPI long term forecast provided by International Monetary Fund (IMF) in order to convert it to real terms. The references from the World Bank /29/ and IMF /30/ have been verified and crosschecked by AENOR and are found to be correct; hence, it has been accepted by the validation team.

Regarding the debt/equity finance structure 50% debt and 50% equity financing has been chosen by the project participant. The benchmark is based on parameters that are standard in the market, and the typical debt/equity finance structure observed in the sector of the country is not readily available, thus 50% debt and 50% equity financing may be assumed as a default in compliance with paragraph 26 of the Methodological tool: Investment analysis” version 09.0 and accepted by AENOR. The assumption is deemed appropriate thus accepted by the validation team.

The post-tax benchmark IRR of 11.85% is validated to be suitable for the project activity by AENOR’s validation team in compliance with paragraph 100 of the CDM VVS version 02.0 /58/.

The validation team verified that taxes and depreciation used in the investment analysis comply with the Argentinean legal requirements i.e. 35% value of the income tax and a linear depreciation 20 years for civil works and machinery /31/.

Following the Methodological tool: Investment analysis” version 09.0 /26/, it has been validated that the project IRR calculation reflects the expected operation of the underlying project activity (a technical lifetime of 20 years), that the capital cost of the assets and their depreciation as an expense to the project were not both treated to constitute a double counting of this cost, and that the cost of financing expenditures (i.e., loan repayments and interest) was not included in the calculation of the project IRR in the final version of the VCS-PD and the IRR calculation spreadsheet /28/.

AENOR has verified and confirmed that the values used in the financial analysis are consistent with the value of the source and this information was available before the starting date of the project and was thus likely to be considered in the decision. References are included in the VCS-PD and IRR calculation spreadsheet.

The financial spreadsheets have been evidenced and verified to be correct. The assumptions used, the base documents and the financial calculations have also been verified.

Total Project Investment costs

The total project investment costs of 205,600,000 US\$ have been derived from YPL LUZ Board Meeting Acts /32/ where the Board approved the capital expenditure for the project activity. The PP has provided evidence of these investment costs and AENOR's validation team has checked that the total figure matches the amount stated in the financial model.

In addition a comparison of investment cost per MW is done among the proposed project activity and similar wind power projects in Argentina.

The comparison results show that the investment per MW used in the VCS-PD for Manantiales Behr wind farm project is within the range observed in similar projects registered as CDM and VCS in the same area (see below table), hence accepted by the validation team.

Comparison of investment per MW among similar registered CDM and VCS projects in Argentina

Project	Capacity (MW)	Total static Investment 1,000 US\$	Investment per MW 1,000 US\$
Project 8127 : PEM 1 - Wind Power Plant Project /33/	97.20	205,060	2,110
Project 8228 : PEM SUR - Wind Power plant project /34/	117.00	246,831	2,110
Project 8583 : PER 1 and PER 2 Wind Power Plants (Umbrella Project) /35/	77.40	162,291	2,097
Project 8999 : Loma Blanca III Wind Farm CDM Project Activity./36/	50.00	100,781	2,016
Project 9002: Loma Blanca IV Wind Farm CDM Project Activity./37/	50.00	100,781	2,016

Project	Capacity (MW)	Total static Investment 1,000 US\$	Investment per MW 1,000 US\$
Project 8998: Loma Blanca II Wind Farm CDM Project Activity./38/	50.00	100,781	2,016
Project 8997: Loma Blanca I Wind Farm CDM Project Activity./39/	50.00	100,781	2,016
Manantiales Behr Wind Farm	99.00	205,600	2,077

Source: PP, VCS and UNFCCC.

O&M Costs

The applied annual O&M costs are estimated by the PP based on its sectoral and local expertise in operating wind farm projects and the maintenance contract signed with Vestas /40/. In order to validate the suitability of the input values applied, the validation team of AENOR crosschecked the annual average O&M costs with data from IRENA “Renewable Power Generation. Costs in 2017” /41/ and with similar projects signed as CDM and VCS in the same area (see table below).

Comparison of O&M costs among similar registered CDM and VCS projects in Argentina

Project	Capacity (MW)	Annual Generation (MW)	Annual Average O&M costs 1,000 US\$	O&M costs US\$/KWh
Project 8127 : PEM 1 - Wind Power Plant Project	97.20	392,529	11,776	0.030
Project 8228 : PEM SUR - Wind Power plant project	117.00	472,488	14,175	0.030
Project 8583 : PER 1 and PER 2 Wind Power Plants (Umbrella Project)	77.40	277,990	3,550	0.013
Project 8999: Loma Blanca III Wind Farm CDM Project Activity.	50.00	183,141	3,157	0.017

Project	Capacity (MW)	Annual Generation (MW)	Annual Average O&M costs 1,000 US\$	O&M costs US\$/KWh
Project 9002: Loma Blanca IV Wind Farm CDM Project Activity.	50.00	183,141	3,194	0.017
Project 8998: Loma Blanca II Wind Farm CDM Project Activity.	50.00	172,368	3,173	0.018
Project 8997: Loma Blanca I Wind Farm CDM Project Activity.	50.00	183,141	3,152	0.017
Manantiales Behr Wind Farm	99.00	502,900	4,023	0.008

Source: PP, VCS and UNFCCC.

The applied average annual O&M costs were found to in line with similar projects signed as CDM and VCS in the same area an also within below the full-service renewal contract cost of 44 US\$/KW/year provided by the IRENA, hence it deems appropriate and therefore accepted by the validation team of AENOR.

Based on above information, in AENOR's opinion the Annual O&M cost used in the VCS-PD was reasonable, valid and applicable at the time of the investment decision.

Annual Power Generation/ Plant Capacity Factor

The wind farm plant capacity factor of 58% was found to be higher than those of similar projects signed as CDM and VCS in the same area, and is, therefore, accepted by AENOR's validation team.

In addition, electricity generation was determined by a third party, EAPC Sur with data from the wind resource measurement, taking into account the on-site topography, geomorphology, air density, wind turbine efficiency and other basic data /42/.

Therefore, AENOR confirms that the above procedure for the annual power supply estimation is common practice for wind farm projects in Argentina.

Comparison of Annual Power Generation among similar registered CDM and VCS projects in Argentina

Project	Capacity (MW)	Annual Generation (MW)	Load Factor (%)
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Project	Capacity (MW)	Annual Generation (MW)	Load Factor (%)
Project 8127 : PEM 1 - Wind Power Plant Project	97.20	392,529	46.1%
Project 8228 : PEM SUR - Wind Power plant project	117.00	472,488	46.1%
Project 8583 : PER 1 and PER 2 Wind Power Plants (Umbrella Project)	77.40	277,990	41.0%
Project 8999: Loma Blanca III Wind Farm CDM Project Activity.	50.00	183,141	41.8%
Project 9002: Loma Blanca IV Wind Farm CDM Project Activity.	50.00	183,141	41.8%
Project 8998: Loma Blanca II Wind Farm CDM Project Activity.	50.00	172,368	39.4%
Project 8997: Loma Blanca I Wind Farm CDM Project Activity.	50.00	183,141	41.8%
Manantiales Behr Wind Farm	99.00	502,900	58.0%

Source: PP, VCS and UNFCCC.

Therefore, according to the “Guidelines for the reporting and validation of plant load factors” /49/ and above cross-checking, AENOR considers that the annual grid-connected electricity generation is reasonable and appropriate.

Electricity price

The electricity tariff has been settled based on the average monomic spot price of 70.70 US\$/MWh for year 2015 provided by CAMMESA /44/. AENOR has checked the report and found the tariff values used in the financial model to be the same. Calculations were also found to be correct.

In addition, AENOR checked the PDDs of wind farm projects in Argentina and found the tariff used in the investment analysis and the final VCS-PD, within the range of tariffs for registered CDM projects.

Comparison of tariffs among similar registered CDM and VCS projects in Argentina

Project	Capacity (MW)	Tariff (US\$/MWh)
Project 8127 : PEM 1 - Wind Power Plant Project	97.20	125.70
Project 8228 : PEM SUR - Wind Power plant project	117.00	122.47
Project 8583 : PER 1 and PER 2 Wind Power Plants (Umbrella Project)	77.40	49.28
Project 8999: Loma Blanca III Wind Farm CDM Project Activity.	50.00	59.98
Project 9002: Loma Blanca IV Wind Farm CDM Project Activity.	50.00	59.98
Project 8998: Loma Blanca II Wind Farm CDM Project Activity.	50.00	59.98
Project 8997: Loma Blanca I Wind Farm CDM Project Activity.	50.00	59.98
Manantiales Behr Wind Farm	99.00	70.70

Source: PP, VCS and UNFCCC.

Therefore, AENOR considers that the value for the tariff used for the IRR calculation as has been done in the VCS-PD is appropriate and was valid and applicable at the time of the investment decision.

Sensitivity Analysis

The VCS-PD includes a sensitivity analysis to demonstrate that the conclusion regarding the financial/economic attractiveness withstands reasonable variations in the critical assumptions.

For this purpose, variations in the range of +/- 10% for the parameters of revenues (electricity generation), total project investment costs, O&M costs and interest payments have been considered, since that range is reasonable for the project context and these variables constitute more than 20% of either total project costs or total project revenues.

The sensitivity analysis shows that without the income from VCUs sales the IRR of the proposed project is also lower than the benchmark, even when the possible variations of the main parameters are considered. It was confirmed that the conclusion obtained in the analysis mentioned above was robust to conclude that the project activity is unlikely to be financially attractive.

In addition, AENOR has validated that higher variations of these parameters, that would make the project IRR reach the benchmark, are not likely to occur due to the following facts:

- 18.60% increase in the electricity price. As told before, the chosen price was settled based on the average monomic spot price of 70.70 US\$/MWh for year 2015 provided by CAMMESA. The validation team has checked that the average monomic price provided by CAMMESA for years 2016 /45/ and 2017 /46/ were 70.37 and 70.11 US\$/MWh respectively, therefore it is unlikely that the chosen electricity tariff could increase an additional 18.60% to make the project IRR reach the benchmark.
- 17.42% decrease in the total project investment costs. Prices including those for the main equipment and raw materials have been increasing in recent years /47/. In addition, the investment cost per MW of the project was found to be below similar registered projects in the area; therefore, it is unlikely that the total investment will decrease by 17.42%, such that the project IRR reaches the benchmark.
- >100% decrease in the total O&M costs. It means that even without operational and maintenance costs the project IRR does not reach the benchmark.
- 18.60% increase in plant capacity factor (electricity generation) .The annual electricity output is determined by a third party, EAPC Sur and engineering firm specialised in the wind power sector resulting in a plant capacity factor of 58%. In addition, the load factor of the project activity is the highest in the area; thus, it is unlikely that the load factor of the project will increase an additional 18.60%, such that the project IRR reaches the benchmark.

AENOR reviewed and confirmed all related documents. The assessments show clearly that investment is unlikely to be 17.42% lower, electricity tariff 18.60% higher and electricity generation 18.60% higher, while the required operational costs variation scenario is unreal.

In summary, it is AENOR's opinion that the additionality of the project is sufficiently demonstrated based on the investment analysis and thus it is sufficiently demonstrated that the project is not a likely baseline scenario and those emission reductions are therefore additional.

Barrier analysis

The barrier analysis has not been selected to demonstrate the additionality.

Common Practice

According to the tool on common practice, version 03.1 /48/, a common practice analysis is carried out.

Step 1: The proposed project is of 99 MW installed capacity, thus the projects with $\pm 50\%$ design capacity of the proposed project activity (49.5~148.5MW) are considered as of similar size.

Step 2: 41 similar projects located in Argentina with an installed capacity within the range of 49.5~148.5MW MW and that started commercial operation before the start date of the project,

have been correctly identified in this step. Information used has been carefully verified and the determination of similar projects is assessed as reasonable and it has been crosschecked with the "Electricity Sector Statistics Report 2016" of the Ministry of Energy and Mines of Argentina /49/, and found to be accurate by the validation team of AENOR.

Step 3: 37 plants have been correctly identified. Ministry of Energy and Mines of Argentina, there are 37 similar projects which fulfil all the conditions. Hence, the value of the parameter N_{all} is determined as 37.

Information used has been carefully verified and the determination of N_{all} is assessed as reasonable.

Step 4: There are similar projects applying different technologies that the proposed project activity. Hence, the value of the parameter N_{diff} is determined as 37.

Information used is carefully verified and the determination of N_{diff} is assessed as reasonable.

Step 5: calculate factor $F=1-N_{diff}/N_{all}$

$$F=1- N_{diff}/N_{all} = 1- 37/37 = 0.00$$

$$N_{all} - N_{diff} = 37-37= 0.$$

Therefore as F is smaller than 0.2 and $N_{all} - N_{diff}$ is smaller than 3, therefore, the proposed project clearly cannot be taken as common practice in Argentina.

In summary, based on our local and sectoral expertise it is AENOR's opinion that the additionality of the project is sufficiently demonstrated based on the investment analysis, that the project is not a likely baseline scenario, and that those emission reductions are, therefore, additional.

3.2.6 *Quantification of GHG Emission Reductions and Removals*

The emission reduction is determined in accordance with the CDM methodology AMC0002. This section contains the description of the alternatives chosen from the methodology in order to calculate GHG emission reductions for the project activity which have been correctly used in the calculation spreadsheet for emission reductions /50/. The spreadsheet was checked against the source of all used parameters such as, generation data, IPCC default values and electricity market statistics.

Quantification of baseline emissions

According to the applied methodology, baseline emissions are calculated as follows:

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel power plants displaced due to the project activity. The methodology assumes that existing grid-connected power plants and the addition of the new grid-connected power plants would have generated all project electricity generation above baseline levels. Thus, the calculation of baseline emissions is as follows:

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

Where:

BE_y : Baseline emissions in year y (tCO₂/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 VCS project activity in year y (MW·h/yr.)

$EF_{grid,CM,y}$: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using version 07.0 of the “Tool to calculate the emissions factor for an electricity system” (tCO₂/MW·h)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants, (b) retrofits and replacements, and (c) capacity additions. Since this project activity is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the project activity, the option (a) was selected:

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

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 VCS project activity in year y (MWh/y)

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

At the start of validation stage net energy supplied to the grid is done based on wind resources study /45/, which states that, the estimated energy is: 502,900 MWh

$$EG_{facility,y} = EG_{PJ,y} = 502,900 \text{ MWh}$$

Then:

The baseline emission factor ($EF_{grid,CM,y}$) is determined following the six steps stated in the “tool to calculate the emission factor for an electricity system” version 07.0.

Calculation of $EF_{grid,CM,y}$

The calculation of the combined margin CO2 emissions factor is in accordance with the “Tool to calculate the emission factor for an electricity system”. This methodological tool determines the CO2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the combined margin emission factor (CM) of the electricity system. The CM is the result of a weighted average of two emission factors pertaining to the electricity system: the operating margin (OM) and the build margin (BM). The operating margin is the emission factor that refers to the group of existing power plants whose current electricity generation would be affected by the proposed VCS project activity. The build margin is the emission factor that refers to the group of prospective power plants whose construction and future operation would be affected by the proposed VCS project activity.

The Ministry of Energy and Mining of Argentina that calculates the Combined Margin (CM) emission factor of the Argentinean Interconnection System (SADI) according to the different methods provided in the “Tool to calculate the emission factor for an electricity system” and makes it available to the public.

Therefore, the $EF_{grid,CM,y}$ for the present project activity is obtained from the Ministry of Energy and Mining (MEM) of Argentina for year 2015, which is the latest version available at the time of submission of the project for validation /59/

The following are the procedure steps of this methodological tool:

Step 1. Identify the relevant electricity systems

For determining the electricity emission factors, a project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints.

In Argentina the relevant electric power system for the project is the Argentinean Interconnected System (“SADI”), the only grid in the country.

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

In accordance with the tool, project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

MEM has chosen option I.

Step 3. Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

- a) Simple OM; or
- b) Simple adjusted OM; or
- c) Dispatch data analysis OM; or
- d) Average OM.

According to the MEM 2015 EFgrid calculator, which is the latest version available at the time of submission of the project to validation, low-cost/must-run contributes to less than 50% of total grid generation and, therefore, simple OM method (option a) of the tool based on ex-ante data vintage (2013, 2014 and 2015) is used for the present project activity.

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

MEM has selected to calculate the simple OM is calculated by using Option B.

Under this option, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including lowcost/must-run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system.

It has been validated that Simple OM is calculated using option B, based on data from the total net electricity generation of all power plants serving the system, fuel types and total fuel consumption of the project electricity system. $EF_{grid,OM,y}$ is calculated as 0.532 tCO₂e/MWh in the final VCS-PD. This has been verified to be in compliance with the methodology, the “Tool to calculate the emission factor for an electricity system” and relevant EB guidance.

Due to the fact that ex ante option was chosen; the emission factor is determined using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the VCS-PD to the DOE for validation.

$EF_{grid,OMsimple,2013}$	$EF_{grid,OMsimple,2014}$	$EF_{grid,OMsimple,2015}$
0.534	0.528	0.535

Therefore, the operation margin is 0.532 tCO₂/59/

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

For calculating the Build Margin (BM) emission factor, the option 1 (ex-ante) of the tool has been chosen. Thus, the Build Margin emission factor for 2015, as published by the Ministry of Energy and Mining of Argentina, is utilized and fixed ex-ante for the crediting period. For the second crediting period, the BM emission factor will be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the BM emission factor calculated for the second crediting period will be used.

The build margin emissions factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units *m* during the most recent year *y* for which power generation data is available.

The resulting sample group of power units *m* for determining the build margin is the: $SET_{sample} = SET_{\geq 20\%}$. Then the resulting value for $EF_{grid,BM,y}$ is calculated as 0.440 tCO₂e/MWh /59/. The calculations have been reproduced and AENOR deems that they are in compliance with the methodology and follow the procedures of the tool.

Step 6. Calculate the combined margin (CM) emissions factor

The baseline emission factor shall be calculated as the weighted average of the OM emission factor and the BM emission factor, as follows:

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

Where:

$EF_{grid,CM,y}$: Combined margin CO₂ emission factor in year *y* (tCO₂/MWh)

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

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

w_{OM} : Weighting of operating margin emission factor (%)

w_{BM} : Weighting of build margin emission factor (%)

$EF_{grid,OM,y}$	w_{OM}	$EF_{grid,BM,y}$	w_{BM}	$EF_{grid,CM,y}$
0.532	0.75	0.440	0.25	0.509

Then, the baseline emissions are (for a full year of operation):

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

$$BE_y = 502,900 \times 0.509$$

$$BE_y = 255,976 \text{ tCO}_2\text{e}$$

Quantification of Project emissions

According to the applied methodology the project emissions are equal to the sum of the Project emissions from fossil fuel consumption; project emissions from the operation of geothermal power plants due to the release of non-condensable gases; and project emissions from water reservoirs of hydro power plants. For wind power projects the aforementioned values are zero. Therefore, project emissions (PE_y) are zero.

Quantification of Leakage

According to the applied methodology no leakage emissions are considered.

Quantification of Emission Reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y : Emission reductions in year y (tCO₂e/y);

BE_y : Baseline emissions in year y (tCO₂e/y);

PE_y : Project emissions in year y (tCO₂e/y);

Therefore,

$$ER_y = 255,976 - 0$$

$$ER_y = 255,976 \text{ tCO}_2\text{e}$$

In AENOR's opinion, the calculation of emission reduction carried for validation process is deemed appropriate and consistent with applied methodology, tools and IPCC guidelines. Assumptions, emission factors and default values that were applied in the calculations have been justified. Therefore, the emission reduction calculation is deemed to be correct.

3.2.7 Methodology Deviations

No methodology deviation has been applied to the Project.

3.2.8 Monitoring Plan

The project participant has developed a monitoring plan, which is detailed in section 4.3 of the VCS-PD, in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the proposed project is monitored and reported. The project monitoring management, monitoring equipment and installation and procedures for calibration and

maintenance of monitoring equipment, reporting, review, etc., are addressed in the monitoring plan.

There are only one parameter to be monitored, which is $EG_{\text{facility},y}$ ($EG_{PJ,y}$): Quantity of net electricity generation supplied by the project plant to the grid in year y . It will be monitored by Electricity meter at Escalante substation and will be measured by SMEC (Commercial Energy Measuring System of Argentina). There will be two meters: a main meter and a backup meter; the measured of back up meter will be utilized only if there is any problem with the main meter. The hourly measured reading by meters will be recorded monthly by plant personnel. According to the local regulation /51/; the class of the meters is 0.2, installed in parallel with the main meter and should be periodically calibrated at least once a year, according to CAMMESA procedures /52/53/ the verification of the system. Furthermore, project owner will archive electronically all data collected as part of monitoring electronically and kept it at least for 2 years after the end of the last crediting period.

AENOR has checked that the provisions included in the monitoring plan satisfy the purpose of guaranteeing that the project activity has been correctly managed since the beginning. Also, the CAMMESA webpage was reviewed in order to check the availability of information, and all of it is in conformance with the provisions detailed in the monitoring plan of the VCS-PD.

Therefore, AENOR confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and that the data management, quality assurance, and quality control procedures are sufficient to ensure that the emission reductions achieved by resulting from the proposed project activity can be reported ex post and verified.

3.3 Non-Permanence Risk Analysis

Since this project activity is not an AFOLU project and its emission reductions do not have risk of reversibility, it is not necessary to perform a non-permanence risk analysis.

4 SAFEGUARDS

4.1 No Net Harm

No any significant negative environmental and socio-economic impacts have been identified by the project proponent that is deemed acceptable for the project activity. Most of the impacts correspond to the categories moderate and low.

The only negative aspects would occur during the operation of the wind farm which are the impacts on birds and the generation of noise and visual impact, It also highlighted as positive the fact that in the abandonment stage the negative impacts are considered reversible in the short term achieving the restoration of environmental conditions prior to the project./54/

In addition to mitigate the negative impacts of the project, an Environmental Management Plan has been put in place /55/.

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation and provides a boost to the local economy.

4.2 Environmental Impact

The environmental matters in Argentina are jurisdiction of the Provincial Governments. According to Law XI N° 35 “Chubut Province Environmental Code” and Decree N° 185/09 “Environmental Impact Evaluation” of the Government of Chubut, the project has to prepare and present an Environmental Impact Assessment (EIA).

Therefore, project proponent hired an environmental consultant to develop the environmental impact assessment /54/ for the project Wind Farm.

All of the impact would be within an acceptable limit by carrying out corresponding mitigation measures as per the statement of the EIA. Moreover, AENOR confirms that environmental information in VCS-PD is consistent with the resolutions of the Ministry of Environment and Sustainable Development Control of Chubut and that the PP has followed a correct analysis of environmental impacts in accordance with procedures as required by the host party.

On 22 July 2016, the project proponent obtained from the Ministry of Environment and Sustainable Development Control of Chubut the approval resolution of the EIA (Disposición N°137/16-SGAYDS) /56/. Regarding, the transmission line between Manantiales Behr and Escalante substation, the Environmental Report of the Project was also approved by the Ministry of Environment and Sustainable Development Control of Chubut on 12 August 2016 (Disposición N°155/16-SGAYDS) /57/.

Additionally, in the context of the Argentinean electricity market, all new agents (generators, self-generators, cogenerators or transmission agent) that aim to participate in the MEM have to present together with the request to be a MEM agent, the EIA to the Argentinean Ministry of Energy. The Project is in compliance with this requirement given that it obtained the authorization to be a MEM agent by Resolution E 468/2016 /22/ of the Secretariat of Electric Energy of the Argentinean Government.

The final VCS-PD summarize in section 5 the main environmental impacts gathered in the EIA. Environmental impacts that are considered significant by the project participants or the host Party are properly described in the VCS-PD and they were checked against the EIA.

AENOR concludes that the Project Participant has followed a correct analysis of environmental impacts in accordance with procedures as required by the host Party

4.3 Local Stakeholder Consultation

In order to assess the adequacy of the local stakeholder consultation PP holds interviews with the local stakeholders relevant for the project activity. Project proponent has conducted many meetings to communicate project details to the communities involved.

The stakeholder consultation for the project activity, took place on 29 June 2016. 94 persons attended the event

In order to take into account the local stakeholder comments, PP holds interviews with the stakeholders relevant for the project activity. The PP provided the summary of the stakeholder comments process to the validation team. According to the records the comments were related to the following aspects:

- Environmental: impacts on the birds, soil movements, environmental management in the construction and operation phases and residues management.
- Technical: aerogenerators characteristics, providers and the transmission line.
- Human resources: generation of work
- Corporate social responsibility: socialization of the Project and training.

AENOR has checked all the related documents and confirms that the consultation was appropriate, provided information were confirmed during the onsite visit

4.4 Public Comments

The PP provided sufficient evidence that all concerns or issues were raised during the stakeholder consultation process have been addressed. No comments were received during VCS public comment period.

5 VALIDATION CONCLUSION

AENOR has performed the validation of the project Manantiales Behr Wind Farm. The validation process was performed on the basis of all issues and criteria of VCS Standard version 3.7 and VCS Program Guide version 3.7 for VCS projects and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. In the course of the validation process 07 corrective actions and 04 clarifications were raised, all have been successfully closed.

The project proponent applied the methodology ACM0002 “Grid-connected electricity generation from renewable sources” --- version 19.0. In addition, the “Tool for the demonstration and assessment of additionality --- version 07.0.0” is used to demonstrate the additionality of the project.

The project proponent demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

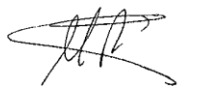
The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties and stakeholders have provided AENOR with sufficient evidence to validate the fulfilment of the stated criteria.

The conclusions can be summarised in detail as follows:

- The project additionality is sufficiently justified in the VCS-PD.
- The monitoring plan is transparent and adequate.
- 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 251,000 tCO₂e per year.

In AENOR opinion, the project correctly applies and meets all applicable rules and requirements set out under the VCS Program. The validation is based on the information made available to us and the engagement conditions detailed in this report.

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 VCS Project Registration Process. 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.



Marcelino Pellitero Martinez
Team Leader
Date: 01 February 2019



Jose Luis Fuentes
Authorized Person
Date: 01 February 2019

APPENDIX 1: REFERENCES

Ref	Document Name	Date	Author/Competent Authority
1	VCS Standard: version 3.7	21 June 2017	Verified Carbon Standard
2	VCS Program Guide version 3.7	21 June 2017	Verified Carbon Standard
3	VCS Validation and Verification Manual version 3.2.	19 October 2016	Verified Carbon Standard
4	Approved methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"; version 19.0	31 August 2018	CDM- Executive Board
5	Initial Version of VCS-PD version 01	05 November 2018	Project Proponent
6	Final Version of VCS-PD version 03	28 January 2019	Project Proponent
7	Tool to calculate the emission factor for an electricity system; Version 07.0	31 August 2018	CDM- Executive Board
8	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation version 3.0	22 September 2017	CDM- Executive Board
9	CAMMESA's authorization: Date of commencement of the commercial operation of the project	31 July 2018.	CAMMESA
10	National Constitution		Government of Argentina
11	Law N° 24065 "Electric Energy Regime"		Government of Argentina
12	Decree N°1398/92		Government of Argentina
13	Law N°25675 "General Environment Law"		Government of Argentina
14	Law N°25,019 "National Regime of Solar and Wind Energy"		Government of Argentina
15	Decrees N°1220/98 and N°1597/99		Government of Argentina
16	Law N°26190 "Renewable Sources of Energy Promotion Regime"		Government of Argentina

Ref	Document Name	Date	Author/Competent Authority
17	Chubut Province Constitution		Government of Argentina
18	Law XI N°35 "Chubut Province Environmental Code"		Government of Argentina
19	Law N°4389 "Wind Activity Regulation"		Government of Argentina
20	Decree N°235/99		Government of Argentina
21	Decree N°185/09		Government of Argentina
22	Right of Use: Authorization to YPF LUZ to act as Wholesale Electricity Market (MEM) Agent for its project Manantiales Behr wind farm		Secretariat of Electric Energy of the Government of Argentina
23	Right of Use: Legal title of the project's land	23/09/2005	Project Proponent
24	Declaration that the project has not applied any other GHG scheme	03 January 2019	Project Proponent
25	Tool for the demonstration and assessment of additionality; Version 07.0.0	23 November 2012	CDM- Executive Board
26	Methodological Tool: Investment Analysis version 09.0	29 November 2018	CDM- Executive Board
27	Project Description Report		Project Proponent
28	Project IRR calculation spreadsheet	2019	Project Proponent
29	Commercial lending rate: World Bank Indicators for Argentina		World Bank
30	Inflation Forecast: World Economic Outlook 2016		IMF
31	Tax law: Law N° 20.628 and Decree N° 649/97		Government of Argentina
32	Project Investment Costs: Board meetings	23/10/2015 10/05/2016	Project Proponent
33	Project 8127 : PEM 1 - Wind Power Plant Project		CDM- Executive Board
34	Project 8228 : PEM SUR - Wind Power plant project		CDM- Executive Board
35	Project 8583 : PER 1 and PER 2 Wind Power Plants (Umbrella Project)		CDM- Executive Board

Ref	Document Name	Date	Author/Competent Authority
36	Project 8999: Loma Blanca III Wind Farm CDM Project Activity.		CDM- Executive Board
37	Project 9002: Loma Blanca IV Wind Farm CDM Project Activity.		CDM- Executive Board
38	Project 8998: Loma Blanca II Wind Farm CDM Project Activity.		CDM- Executive Board
39	Project 8997: Loma Blanca I Wind Farm CDM Project Activity.		CDM- Executive Board
40	O&M Contract		Vestas and Project Proponent
41	Renewable Power Generation Costs in 2017		IRENA
42	Wind Resource Assessment for Manantiales Behr wind farm	30/08/2016	EAPCSUR Wind Energy
43	Guidelines for the reporting and validation of plant load factors version 01	17 July 2009	CDM- Executive Board
44	Electricity Price: CAMMESA Annual report 2015		CAMMESA
45	Electricity Price year 2016: CAMMESA Annual report 2016		CAMMESA
46	Electricity Price year 2017: CAMMESA Annual report 2017		CAMMESA
47	Argentinean Price Indexes	Various years	National Institute of Statistics and Censuses (INDEC)
48	Methodological tool: Common practice version 03.1	3 June 2015	CDM- Executive Board
49	Electricity Sector Statistics Report 2016		Ministry of Energy and Mines of Argentina
50	Spreadsheet for Emission Reductions Calculation	2019	Project Proponent
51	CAMMESA Procedures version XXVI, Annex24		CAMMESA
52	CAMMESA Technical Procedure N°3		CAMMESA
53	CAMMESA, Technical Procedure PT-14		CAMMESA
54	Manantiales Behr wind farm EIA		Confluencia, Ambiente y Seguridad

Ref	Document Name	Date	Author/Competent Authority
55	Environmental Management Plan		Project Proponent
56	EIA approval for Manantiales Behr wind farm (Disposición N°137/16-SGAYDS)	22 July 2016	Ministry of Environment and Sustainable Development Control of Chubut
57	EIA approval for transmission line between Manantiales Behr and Escalante substations (Disposición N°155/16-SGAYDS)	12 August 2016	Ministry of Environment and Sustainable Development Control of Chubut
58	CDM validation and verification standard for project activities version 2.0	29 November 2018	CDM- Executive Board
59	Argentinean Grid CO2 EF calculation for year 2015 http://www.energia.gob.ar/contenidos/verpagina.php?idpagina=2311		Ministry of Energy and Mines of Argentina

APPENDIX 2: RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
CAR 1: The table of contents does not match with the Project description template v 3.3	The table of contents format has been corrected to match with the PD template v 3.3	OK
CAR 2.- The applied methodology is ACM0002 “Grid-connected electricity generation from renewable sources”-version 18.0 when the methodology in force is “Grid-connected electricity generation from renewable sources” version 19.0	The applied methodology ACM0002 version has been updated to the latest approved version in force “version 19.0”	OK
CAR 3.- The versions of the tools for investment analysis and for calculation of the emission factor for an electricity system are no in force. In addition, the methodology requires also the use of the Methodological Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation version 3.0 which is not considered in the current VCS-PD.	The version of the CDM “Methodological Tool: Investment Analysis” has been updated to version 9.0 in force. The version of the CDM “Tool to calculate the emission factor for an electricity system” has been updated to version 07.0 in force. The “Methodological Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 3.0 has been included in the updated VCS-PD.	OK
CAR 4: No the sources of gases are different that those stated in the methodology ACM0002 version 19.0	The table sources has been updated in the VCS-PD to be in line with ACM0002 version 19.0	OK
CAR 5: Project IRR post-tax has been identified as financial indicator. However, the cost of equity used for the calculation of the benchmark is not	The cost of equity has been updated to be in line with the default value for Argentina provided in the	OK

Clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
in line with the default value for Argentina provided in the methodological tool. Investment analysis version9.0	methodological tool Investment analysis version9.0.	
CAR 6.- The start and final dates used for calculating the ERs are not consistent with the dates addressed in the VCS-PD.	The start and final dates of the crediting period - 01/08/2018 and 31/07/2028, respectively - have been corrected in the excel calculator.	OK
CAR 7.- The QA/QC procedures are not in line with the requirements stated in the tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 3.0	The QA/QC procedures have been updated in the PD to be in line with the tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 3.0.	OK
CL 1: The work execution schedule provided to the VVB does match with the dates stated in the VCS-PD.	An updated work execution schedule will be provided. Nevertheless, the dates stated in the PD are in line with CAMMESA commercial operation authorization of phase 1 and 2 (attached).	OK
CL 2.- Authorization from CAMMESA shall be provided to the VVB.	Please, find attached CAMMESA authorizations dated on 31/07/2018 and 21/12/2018, that authorize the commercial operation of the wind farm first and second phase from 01/08/2018 and 22/12/2018 onwards, respectively.	OK
CL 3: The PP has not provided following evidence (please refer to the section 1.12 of VCS-PD): The Project does not have any binding limits on GHG emissions, and does not look for any compliance with an emissions trading program	A letter from Mr. Santiago Sajaroff (Chief Operation Officer of YPFEE S.A.) stating the mentioned requirements will be provided to the VVB.	OK

Clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
• The project does not intend to generate any other kind of environmental credit • The project has not been registered under any other GHG programs and is not seeking registration under any other GHG programs • This project has not been rejected from any other GHG programs		
CL 4: Clarification is required about the value of load factor on a P90 basis when the standard in the market is the use of load factor on a P50 basis, which is more conservative in the CDM additionality context.	The project load factor has been updated based on P50 to be more conservative.	OK