

MALDONADO II WIND FARM

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1 PROJECT DETAILS

1.1 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 50 MW wind farm, located at the department of Maldonado, in the Southeast region of Uruguay. This wind farm will consist of 25 turbines with a capacity of 2 MW each. The energy generated by the project will be supplied to the national grid of Uruguay through a new generator position situated in the existing substation “Estación Francisco Veira”.

The power plant will have an expected operating life of 20 years and will displace a total amount of 224,300 MW·h/year from the national power grid, generating, on average, annual emission reductions of 84,718 tCO₂ and amounting to 847,179 tCO₂ for first crediting period.

The proposed project activity consists of the installation and operation of a new grid connected wind power project, the baseline scenario for the proposed project activity is the Uruguayan national grid.

1.2 Sectoral Scope and Project Type

Sectoral scope 1. VCS sectoral scope: Energy (renewable/non-renewable).

Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”; Version 17.0

The proposed project activity is not a grouped project.

1.3 Project Proponent

Organization name	R del Este S.A.
Contact person	Pablo Lorente
Title	Project Director
Address	Gabriel Otero 6462 Ofic. 206 11500 Montevideo Uruguay
Telephone	+598 2 6007201
Email	plorente@rdelsur.com.uy

1.4 Other Entities Involved in the Project

n/a

1.5 Project Start Date

The project had its start date on June 16th 2016. This is the date of commencement for the commercial operation of the project.

1.6 Project Crediting Period

The crediting period of the project will be 10 years. It will run from June 16th 2016 to June 15th 2026, extendable twice for another 10 years each time.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2016	46,188
2017	84,718
2018	84,718
2019	84,718
2020	84,718
2021	84,718
2022	84,718
2023	84,718
2024	84,718
2025	84,718
2026	70,095
Total estimated ERs	10 Years
Total number of crediting years	847,179
Average annual ERs	84,718

1.8 Description of the Project Activity

The proposed project activity consists on the installation and operation of a new grid connected wind power project. Emission reductions will be achieved through the substitution of fossil fuel energy generation in order to meet the demands of the Uruguayan national grid

The projected wind farm will have an installed capacity of 50 MW, will consist of twenty-five (25) Gamesa wind turbines G114 2.0 MW rated power, as stated in the project's descriptive report, with the following characteristics.

Gamesa G114 – 2,0 MW
Rotor

Diameter (m)	114
Scanning area (m ²)	10,207
Swing speed (rpm)	13.07
Blades	
Number of blades	3
Length (m)	56
Profile	Gamesa
Material	Fibreglass epoxy resin pre-impregnated carbon fibre reinforced.
Towers	
Type of tower	Modular
Height (m)	80
Gear Box	
Type	1 planetary stage 2 parallel-axis stages
Ratio	1:106,8 (50 Hz) 1:127,1 (60 Hz)
Generator 2.0 MW	
Type	doubly-fed
Nominal power (MW)	2.0
Voltage (V)	690 AC
Frequency (Hz)	50/60
Protection class	IP54
Power factor (cos ϕ)	0.95 cap - 0.95 IND throughout all the power range

At the base of each turbine, the following items are installed:

- Medium-voltage switchgear at 35 KV
- Step-up power transformers of 2,350 kVA.

These 25 turbines spread over two different circuits, as follows:

- The first fourteen (14) wind turbines (from number one to fourteen, inclusive), are called "Circuito Sur".
- The other eleven (11) wind turbines (from number fifteen to twenty-five, inclusive), are called "Circuito Norte".

Moreover, the two power evacuation circuits of wind turbines will meet at a civil works building (substation), where the following items are installed:

- Medium-voltage panels at 35 kV (primary distribution)
- Auxiliary service transformers of 100 kVA.
- Low-voltage switchboards (Both auxiliary services to 400 Vac, as well as 125 Vdc)
- Batteries rectifying-charging equipment
- Communication boards
- Energy measurement boards
- 100 kVA generator

The "PE Maldonado" building is a 30/150 kV transformer substation, which will be shared with the wind farm "Maldonado II". This substation will evacuate the energy generated by the wind farm through an overhead power line connecting with the "Francisco Veira" station where the measurement and control position of UTE are located. From here a high voltage line 150 kV will evacuate electricity to the "San Carlos" substation.

There will be a general earthed electrical network so that all electrical infrastructure forms an equipotential whole. The installation will be completed with the necessary elements of infrastructure (roads, foundations, piping, etc...) and electromechanical (anemometer station (2 units), ground network, security system, fire, etc.).

In order to accommodate the components of the substation and the control system, a control building will be used.

Estimated lifetime for the plant and the equipment used is 20 years

The wind farm is of new construction and there is no previous installed capacity. Forecasted capacity of the wind farm will remain the same through all the project lifetime, remaining at 50 MW.

Load factor for the plant is calculated at 51.2 %, which is considered to be very good by current standards, or operating an amount of 4,486 equivalent hours.

The plant will generate an estimated 224,300 MW·h per year that would have been otherwise generated by the Uruguayan electricity market onto the national grid.

This electricity would have been generated with an emission factor of 0.3777 tCO₂/MW·h in the baseline scenario for this project. Hence the emission reductions are derived from the substitution in the origin of the electricity generated.

The power plant is a greenfield project with no prior existing installations. The Uruguayan power generation sector is dominated by thermal power plants (fuel oil and gas oil) and also a significant share of hydroelectricity.

1.9 Project Location

The 25 wind turbines that will make up the wind farm will be distributed along the Sierra de los Caracoles in the municipality of San Carlos in the department of Maldonado, 28 Km. south of the city of Aiguá in Uruguay.

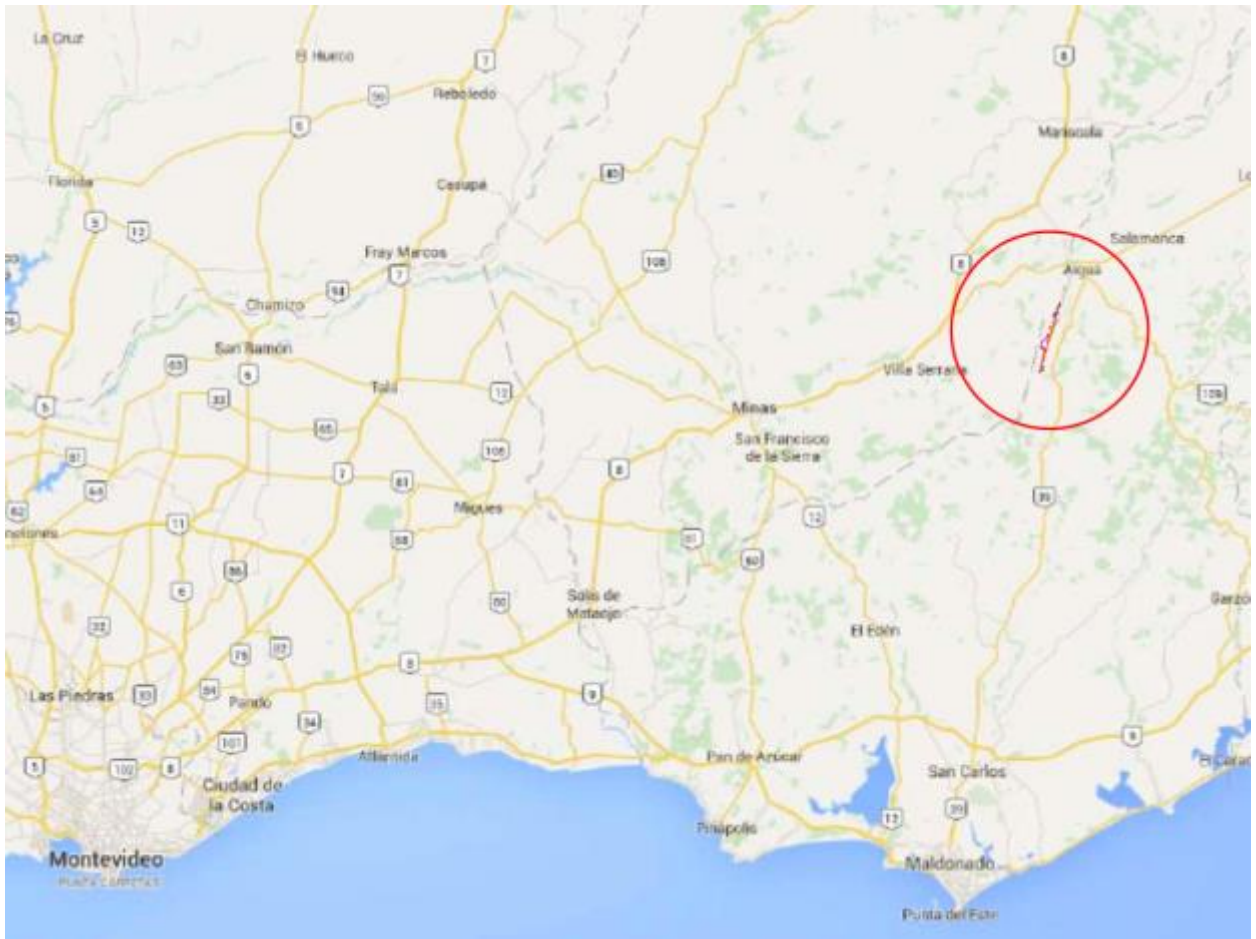


Figure 1: *Project location*

The location of both the wind turbines, as control towers and evacuation transformer substation are shown in the following tables:

Equipment	Latitude	Longitude
Wind Turbines		
Turbine 01	-34.44119	-54.89375
Turbine 02	-34.43858	-54.88919
Turbine 03	-34.43413	-54.88813
Turbine 04	-34.43576	-54.89246
Turbine 05	-34.43052	-54.89043
Turbine 06	-34.42659	-54.88893
Turbine 07	-34.42255	-54.88820
Turbine 08	-34.41867	-54.88692
Turbine 09	-34.41156	-54.88389
Turbine 10	-34.41001	-54.88862
Turbine 11	-34.40222	-54.88153
Turbine 12	-34.39840	-54.87994
Turbine 13	-34.39454	-54.87881
Turbine 14	-34.39179	-54.88207
Turbine 15	-34.39080	-54.87647
Turbine 16	-34.38686	-54.87531
Turbine 17	-34.38331	-54.87778
Turbine 18	-34.38137	-54.87344
Turbine 19	-34.37712	-54.87204
Turbine 20	-34.37279	-54.87048
Turbine 21	-34.36783	-54.87349
Turbine 22	-34.36423	-54.87162
Turbine 23	-34.36214	-54.86769
Turbine 24	-34.35750	-54.86705
Turbine 25	-34.35382	-54.86495

Control Towers		
MAL-TC01	-34.42075	-54.88695
MAL-TC02	-34.35188	-54.86412
Estación Francisco Veira		
SETMAL	-34.524561	-54.910608

1.10 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).

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

Below is a summary of the regulation governing the installation of new electric generation activities in Uruguay, as well as their compliance by the proposed project:

- Law 14.694, National Electricity. Article 2, amended by Law 16.832, revoking the compulsory public service character of electricity generation, while keeping it mandatory for the transmission and distribution activities.
- Decree 77/06, by which the National Plants and Transmissions (UTE) will promote the celebration of special contracts for the sale of electricity with suppliers in order to promote settling in the country, to produce that energy from wind power, biomass, and small hydro.
- Decree 360/002, Regulation of Whole sale Electricity Market. Title I (approval of new generation) of Section IV states that any generator of electricity can make its release to the National Interconnected System, provided it is duly approved by the Executive.
- Decree 403/09 of August 24, 2009 and its amendment 41/10, dated February 1, 2010, entrusted with carrying out a joint venture call for tenders for the purchase of a rated capacity of 150 MW from wind energy private developments and allow for a second stage regulation of the 150 MW goal of completing the 300 MW by 2015.
- The whole project will have 50 MW of capacity generation; therefore, as is established in the Decree 349/005 ("Reglamento de Evaluación de Impacto Ambiental y Autorizaciones Ambientales"), it will need an environmental approval.

1.12 Ownership and Other Programs

1.12.1 Right of Use

The entity's right to all and any GHG emission reductions or removals generated by the project or program during the crediting period or verification period, as the case may be is provided in the attached documents;

- "20150504 Autorización para Generar PEM II (a R del Sur)" where the ministry awards R. del Sur authorisation to generate electricity in the project premises.
- "20150923 Cesión APG de RdS a RdE" issued by the Ministerio de Industria, Energía y Minería of Uruguay on the 4th of May 2015 and the 23rd of September 2015 respectively, where said authorisation is transferred to R del Este.
- And "20161109 Right of use" where it is stated that R. del Este is the only owner of the park and the sole recipient of the emission reductions generated by it.

1.12.2 Emissions Trading Programs and Other Binding Limits

The project does not reduce GHG emissions from activities that are included in an emission-trading program or any other mechanism that includes GHG allowance trading. There is no national program or cap, applicable to this project. The project will not use its GHG emission reductions and removals for compliance, under any such programs or mechanisms.

Uruguay 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.

1.12.3 Other Forms of Environmental Credit

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates.

1.12.4 Participation under Other GHG Programs

The project is not registered under any other GHG programs. In the past, it has been seeking registration under the CDM scheme, but it is no longer the case.

1.12.5 Projects Rejected by Other GHG Programs

Any other GHG programs have not rejected the project.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

This is not a grouped project

Leakage Management

There are no leak emissions in this project; therefore, a leakage management plan is not necessary.

Commercially Sensitive Information

The project proponent has not excluded any commercially sensitive information from the public version of the project description.

Further Information

N/A

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

The UNFCCC approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources --- Version 17.0” 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 05.0”
- “Tool for the demonstration and assessment of additionality --- Version 07.0.0”
- “Combined tool to identify the baseline scenario and demonstrate additionality---Version 06.0.0”

2.2 Applicability of Methodology

The approved methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (version 17.0) is applicable to this project activity as it is explained on the next table:

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	The proposed project activity is a new 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.

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 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;	The proposed project activity is a new grid-connected wind power generation project activity. Hence, project complies with this condition and methodology is applicable.
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.	The proposed project activity does not involve capacity addition, retrofit or replacement. Hence, project does not need to comply with this condition and methodology is applicable.
In case of hydro power plants, one of the following conditions shall apply:1 (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/m ² ; 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/m ² ; 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/m ² , all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as	This project activity is not a hydro power plant. It is a new wind power plant. Hence, project does not need to comply with this condition and methodology is applicable.

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 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.	The proposed project activity does not involve the implementation of any hydropower plant. Hence, project does not need to comply with this condition and methodology is 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.	The proposed project is a new wind power project. Hence, it does not involve any fuel switch, biomass firing or hydropower. Hence, project does not need to comply with this condition and methodology is 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	The proposed project activity does not involve retrofit, replacement of capacity additions. Hence, project does not need to comply with this condition and methodology is applicable.

usual maintenance".	
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This methodology also refers to the latest approved versions of the following tools:

- “Tool to calculate the emission factor for an electricity system”

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, i.e. 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 Uruguayan grid hence this tool is applicable.

- “Tool for the demonstration and assessment of additionality”

Applicability conditions Project case	Applicability conditions Project case
Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory	This tool has been included on the approved methodology ACM 00002 version 17.0, hence this tool is applicable

- “Combined tool to identify the baseline scenario and demonstrate additionality”

Applicability conditions Project case	Applicability conditions Project case
This tool is only applicable to methodologies for which the potential alternative scenarios to the proposed project activity available to project participants cannot be implemented in parallel to the proposed project activity	The potential alternative scenarios to the project activity cannot be implemented in parallel hence the tool is applicable

As per by ACM0002 (version 17.0), the greenhouse gases and emissions sources included in or excluded from the project boundary are summarized in the following table:

Source		Gas	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
Project	CO ₂ emissions from wind farm operation	CO ₂	No	Project activity does not generate GEI emissions
		CH ₄	No	Project activity does not generate GEI emissions
		N ₂ O	No	Project activity does not generate GEI emissions

2.3 Project Boundary

“The spatial extend of the project boundary includes the project power plant and all plants connected physically to the electricity system that the CDM project power plant is connected to”, in accordance with the approved consolidate baseline methodology ACM0002 (version 17.0).



Figure 2: *Structure of the installations*

The following diagram describes the structure of the installations.

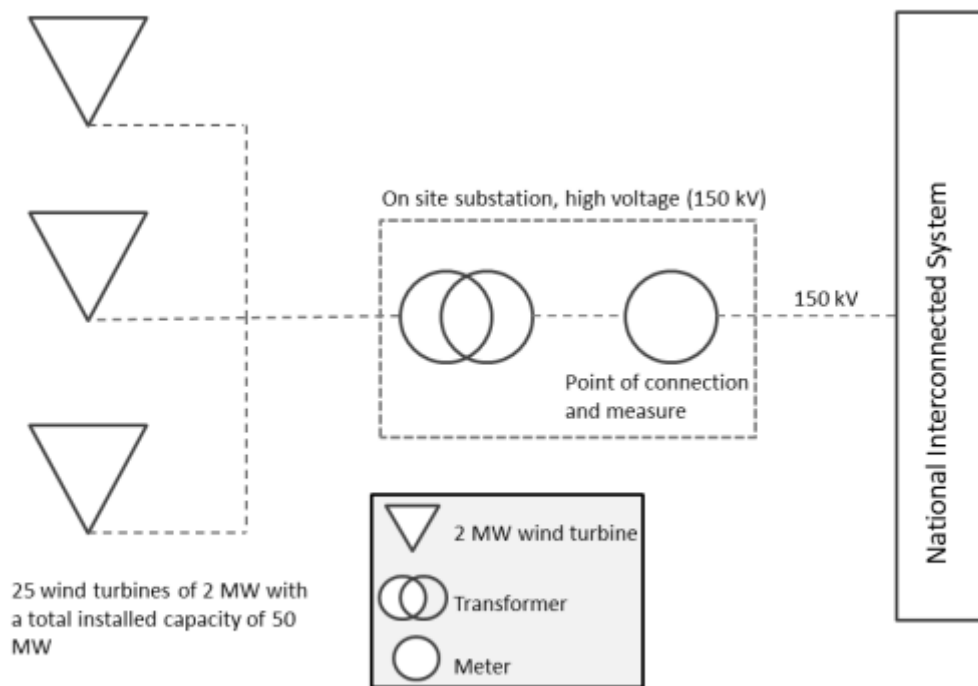


Figure 3: Structure of the installations

2.4 Baseline Scenario

According to description of the approved methodology ACM0002 (version 17.0), if 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 proposed project activity consists on the installation and operation of a new grid connected wind power project. Thus, according to this, the baseline scenario for the proposed project activity is the Uruguayan national grid.

In the step 4 of section 3.1 is described the Uruguayan System is described.

2.5 Additionality

Per the UNFCCC methodology ACM0002 (version 17.0), the latest approved version of the “Tool for the demonstration and assessment of additionality” (version 07.0.0), shall be utilized to demonstrate and assess the additionality.

Step 1: Identification of alternatives to the project activity consistent with mandatory laws and regulations

Sub-step 1a: Define alternatives to the project activity

The proposed project activity consists of the installation of a new grid-connected wind power plant, with no capacity additions, retrofit or replacement of existing grid-connected renewable power plant/unit.

Therefore, the baseline scenario according to the methodology 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”

According to the Tool for the demonstration and assessment of additionality, version 07.0.0, project activities that apply this tool in context of approved consolidated methodology ACM0002, only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity.

The alternatives identified for the proposed project activity are:

- The proposed project activity undertaken without being registered as a VCS project activity;
- The continuation of the current situation (no project activity or other alternatives undertaken), i.e., 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 Section 3.1 of this project description.

Outcome of Step 1a: Identified realistic and credible alternative scenario(s) to the project activity.

As previously mentioned the only viable alternative is to develop the project without CDM or the baseline scenario.

Sub-step 1b: Consistency with mandatory laws and regulations

This has been reviewed in section 1.11 of this project description document.

Outcome of Step 1b: Identified realistic and credible alternative scenario(s) to the project activity, that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country.

Since Step 1 is complied with, we proceed to step 2.

Step 2: Investment analysis

Sub-step 2a: Determine appropriate analysis method

The project activity will generate economic benefits to the project developer, apart from the VCS incomes. Hence according to the “Tool for the demonstration and assessment of additionality” the simple cost analysis (option I) is not applicable. There are two possible investment analysis methods to choose: investment comparison analysis (option II) and benchmark analysis (option III).

According to the tool, if the alternative to the VCS project activity does not include investment of comparable scale, the Option III must be applied.

Sub-step 2b: Option III. Apply benchmark analysis and Sub-step

According to paragraph 38 of the tool for the demonstration and assessment of additionality, discount rates and benchmarks shall be derived from:

- Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data;
- Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers' views and private equity investors/funds. required return on comparable projects;
- A company internal benchmark (weighted average capital cost of the company), only in particular cases;
- Government/official approved benchmark where such benchmarks are used for investment decisions;
- Any other indicators, if the project participants can demonstrate that the above Options are not applicable and their indicator is appropriately justified.

Based on the information and data available for the proposed project activity, the PP has applied the Project IRR as the most suitable financial indicator for the proposed project.

According to this tool, “The applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR.”.

Local commercial lending rates have been used in this instance. According to the world bank, the lending interest rate in the country at the time of investment decision was 15.53%.¹

Sub-step 2c: Calculation and comparison of financial indicators.

Based on the calculation of the proposed project’s cash flow project Internal Rate of Return of (Project IRR) of the proposed project is 9.41%.

The following assumptions have been considered for the investment analysis:

Financial parameters	
Installed capacity (MW)	50
Estimated output (MW·h/year)	224,300
Contracted output as per the PPAs (MW)	50
Electricity tariff (USD/MW·h)	61.46
Total Investment (thousand USD)	101,561.01
Plant load factor (%)	51.2
Project Lifetime (years)	20

The following table summarizes the benchmark and the IRR values:

Economic Results	
IRR without VCU sales (%)	10.19
Financial Benchmark (%)	15.53

Without the sales of VCU the Project IRR is 10.19 %, post taxes, this is lower than the financial benchmark. Thus, the project is not financially attractive without the credits selling in the voluntary markets.

Sub-step 2d: Sensitivity Analysis

The sensitivity analysis should show whether the conclusion regarding the financial attractiveness is robust to withstand reasonable variations in the critical assumptions and is a frequently used method for assessing the perceived uncertainties by identifying the potential changing ranges of some key elements and potential impacts of such changes on the economic model of the Project.

According to the UNFCCC “Guidance on the Assessment of Investment Analysis” only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the

¹ <http://data.worldbank.org/indicator/FR.INR.LEND>

results of this variation should be presented in the PD and be reproducible in the associated spreadsheets.

For the proposed project activity and in line with the requirements of the relevant guidance, four parameters were identified as sensitive factors:

1. Investment.
2. Electricity price.
3. O&M
4. Annual Power generation

The following table shows the result of the sensitivity analysis.

Fluctuate indexes	-10%	-5%	0%	5%	10%
Investment	11.59%	10.86%	10.19%	9.57%	8.99%
Electricity price	8.75%	9.49%	10.19%	10.89%	11.56%
O&M	10.42%	10.30%	10.19%	10.08%	9.97%
Annual Power generation	8.6%	9.48%	10.19%	10.88%	11.56%

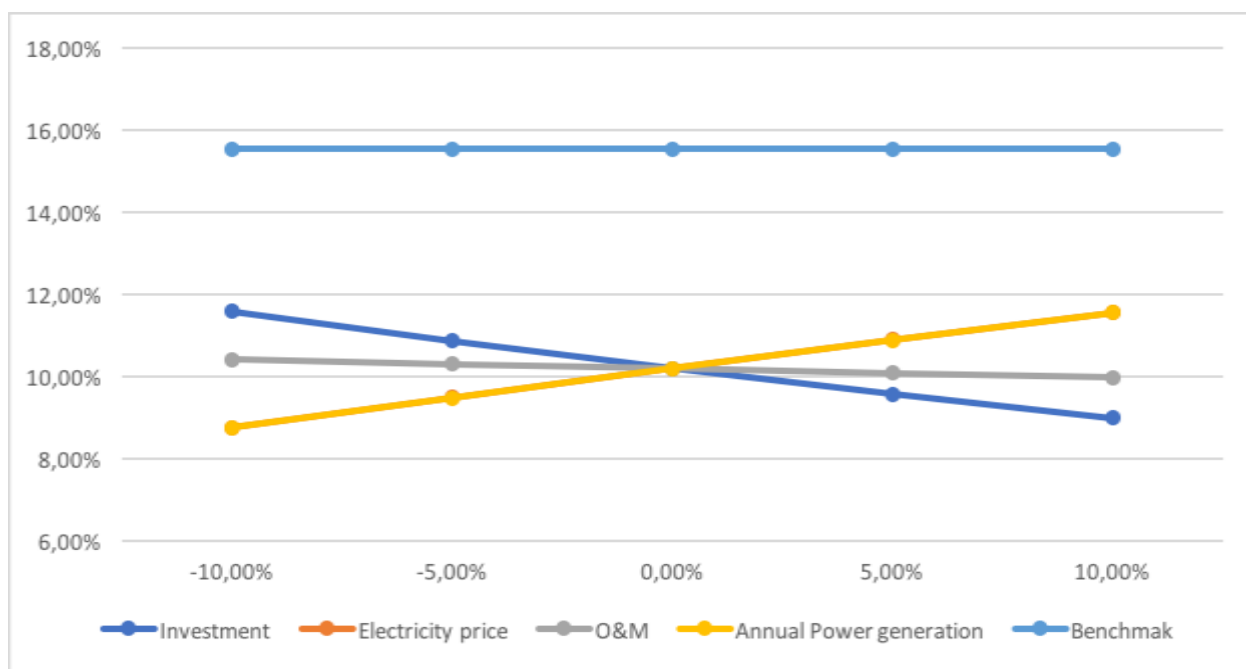


Figure 3: Sensitivity analysis

Outcome of Step 2: According to the sensitivity analysis, the proposed project activity is unlikely to be financially attractive.

Step 3: Barrier analysis

Project proponents chose to undertake Step 2 Investment Analysis.

Step 4: Common practise analysis

The analysis on the common practice has been developed in accordance with the provisions in the UNFCCC methodological tool. "Common practice v 03.1" (EB84, Annex 07) as follows:

Applicable geographical area

According to the Guidelines on Common Practice, the applicable geographical area covers the entire host country as a default; if the technology applied in the project is not country specific, then the applicable geographical area should be extended to other countries. Project participants may provide justification that the applicable geographical area is smaller than the host country for technologies that vary considerably from location to location depending on local conditions.

Therefore, according to this, the applicable geographical area is Uruguay.

Measure

Measure (for emission reduction activities) - a broad class of greenhouse gas emission reduction activities possessing common features. Four types of measures are currently covered in the framework:

- a) Fuel and feedstock switch;
- b) Switch of technology with or without change of energy source (including energy efficiency improvement);
- c) Methane destruction;
- d) Methane formation avoidance.

The proposed project activity consists on the implementation and operation of a greenfield wind power project which will generate electricity that will be supplied to the Uruguayan grid, thus replacing the same amount of energy which, in the absence of the project activity, would have been generated by other carbon intensive sources. Hence, it corresponds to measure (a) above.

Output

According to the Guidelines, output is defined as “goods or services with comparable quality, properties, and application areas (e.g. clinker, lighting, residential cooking)”.

The proposed project activity will be compared to other proposed project activities which would provide a comparable amount of electricity to the grid.

Different technologies

Different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project and applicable geographical area):

- a) Energy source/fuel;
- b) Feed stock;
- c) Size of installation (power capacity):
 - a. Micro (as defined in paragraph 24 of Decision 2/CMP.5 and paragraph 39 of Decision 3/CMP.6);
 - b. Small (as defined in paragraph 28 of Decision 1/CMP.2);
 - c. Large
- d) Investment climate in the date of the investment decision, inter alia:
 - a. Access to technology;

- b. Subsidies or other financial flows;
 - c. Promotional policies;
 - d. Legal regulations
- e) Other features, inter alia.
 - a. Unit cost of output (unit costs are considered different if they differ by at least 20 %);

The proposed project activity will be compared to other large scale wind power projects.

Approach for common practice:

As per the methodological tool, the PP shall follow the following steps to demonstrate that the proposed project is not common practice.

- Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.
- Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions
 - (a) The projects are located in the applicable geographical area;
 - (b) The projects apply the same measure as the proposed project activity;
 - (c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
 - (d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
 - (e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
 - (f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.
- Step 3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all} .
- Step 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff} .
- Step 5: calculate factor $F = 1 - N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

- The proposed project activity is a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3.

Step 1: Applicable output range:

The installed capacity of the proposed project activity is 50 MW.

The applicable output range is from 25 MW to 75 MW;

Step 2: Identification of plants in the applicable geographical area that deliver the same output, within the applicable output range.

As per documentation supplied by ADME², in 2014, the installed capacity of the electric power system in Uruguay is divided among the following generation plants:

Plant	Type	Technology	Fuel	Commission date	Installed Power (MW)
Agroland	Wind	----	----	28/03/2007	0.45
Sierra de los Caracoles I y II	Wind	----	----	2009-2010	20
Kentilux	Wind	----	----	08/04/2011	10
Nuevo Manantiales	Wind	----	----	26/11/2009	13
Engraw S.A.	Wind	----	----	01/10/2012	1.8
Lavadero de lanas Blengio S.A	Wind	----	----	01/07/2013	1.8
R del Sur	Wind	----	----	01/04/2014	50
Polesine S.A.	Wind	----	----		50
Palmatir S.A.	Wind	----	----	01/05/2014	50
Luz de Rio S.A.	Wind	----	----	10/07/2014	50
Luz de Mar S.A.	Wind	----	----	01/10/2014	18
Luz de Loma S.A.	Wind	----	----	01/10/2014	20
Juan Pablo Terra	Wind	----	----	01/12/2014	67.2
Generación Eólica Minas S.A.	Wind	----	----	01/09/2014	42
Togely (P.E. Libertad)	Wind	----	----	07/01/2014	7.7
Sub-total Wind					539.45
Salto Grande (Uruguay)	Hydraulic	----	----	1979	945
Baygorria	Hydraulic	----	----	1960	108
Gabriel Terra	Hydraulic	----	----	1945	152
Constitución (Palmar)	Hydraulic	----	----	1982	333
Sub-total Hydraulic					1538
Alur	Biomass	Steam turbine	Sugarcane bagasse	03/11/2010	13
Bioener	Biomass	Steam turbine	Sawmill residues	13/08/2009	12
Fenirol	Biomass	Steam turbine	Chip and rice husk	01/07/2009	10
Lidertat	Biomass	Steam turbine	Chip	29/06/2010	5
UPM	Biomass	Steam turbine	Black liquor	25/07/2007	161
Weyerhaeuser	Biomass	Steam turbine	Sawmill residues	03/03/2010	12

² <http://www.adme.com.uy/mdl/inicioMDL.php>

Plant	Type	Technology	Fuel	Commission date	Installed Power (MW)
Galofer	Biomass	Steam turbine	Sugarcane bagasse	11/07/2010	14
Ponlar S.A.	Biomass	Steam turbine	Chip	23/02/2012	7,5
Las Rosas Maldonado	Biogas	Four-stroke engine	Municipals landfill	2005	1
Celulosa y Energía Punta Pereira S.A	Biomass	Steam turbine	Chip	30/06/2013	170
Asahi	PV	----	----	24/07/2013	0.48
Lanas Trinidad S.A.	Biomass	----	----	1/08/2014	0.6
Paysandu	PV	----	----	20/01/2014	8
Sub-total Renewable					414.58
J. Batlle y Ordoñez-Sala B	Thermal	Steam turbine	Fuel oil	1957	50
J. Batlle y Ordoñez- 5th unit	Thermal	Steam turbine	Fuel oil	1970	80
J. Batlle y Ordoñez- 6th unit	Thermal	Steam turbine	Fuel oil	1975	125
Central Batlle Motores	Thermal	Four-stroke engine	Fuel oil	2009	80
Central Térmica Maldonado	Thermal	Cycle Gas turbine	Gas oil	1982	20
CTR (La Tablada)	Thermal	Cycle Gas turbine	Gas oil	1991	212
Punta del Tigre G01-G06	Thermal	Cycle Gas turbine	Natural gas/Gas oil	2006	300
Rivera	Thermal	Four-stroke engine	Gas oil	1995	2
San Borja	Thermal	Four-stroke engine	Gas oil	(1999) 2005	1,54
Zendaleather	Thermal	Four-stroke engine	Natural gas	02/05/2008	3.2
Vichadero	Thermal	Four-stroke engine	Gas oil	(1998) 2005	0,98
APRAPR (Motores arrendados)	Thermal	Cycle Gas turbine	Natural gas/Gas oil	2012	100
APR B y C	Thermal	Cycle Gas turbine	Natural gas/Gas oil	01/05/2013	200
Villa Sara	Thermal	Steam turbine		01/12/2014	9.8
Rio Branco	Thermal	Steam turbine		01/12/2014	9.8
Sub-total Thermal					1194.32

According to this data, the power plants with an installed capacity between 25 and 75 MW are:

- R del Sur: 50 MW
- Palmatir S.A.: 50 MW
- Luz de Rio S.A: 50 MW
- Juan Pablo Terra: 67.2 MW
- Generación Eólica Minas S.A: 42 MW

Hence, 5 wind power projects exist in Uruguay with installed capacity between 25 and 75MW.

Step 3: Identify those neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}

Between the projects identify in step 3, R del Sur, Palmatir, Luz de Rio and Generación Eólica Minas S.A. are registered CDM projects

The project Juan Pablo Terra are neither registered CDM projects activities, submitted for validation, nor a project activity undergoing validation.

Hence $N_{all}=1$.

Step 4: Identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff} .

The proposed project activity is a wind power plant, as the Juan Pablo Terra project is.

In this way, and considering the definition of different technologies in the context of common practice, the number of plants that deliver the same output or capacity to the proposed project activity, among the applicable output range, that have started commercial operation before the starting date of the project activity, but uses a different technology to that that will be implemented in the proposed project activity is $N_{diff} = 0$.

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

The proposed project activity is a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3.

$$N_{all}-N_{diff}=1$$

$$F = 1 - 0 = 1$$

Hence, as per the Guidelines on Common Practice, since $N_{all} - N_{diff} < 3$, it is demonstrated that the proposed project activity is not common practice in Uruguay.

As it complies with all the requirements set by the methodology the project can be deemed as additional.

2.6 Methodology Deviations

There are no methodology deviations in this project.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

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 05.0 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 (MW·h/yr.)

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

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” (version 05.0). 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 following are the procedure steps of this methodological tool:

Step 1: Identify the relevant electricity systems

For determining the electricity emission factors, identify the relevant project electricity system. Which 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.

Energy imports from the interconnected networks must be taken into consideration for the calculations.

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

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.

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.

Any above method can be utilized. However, the simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation, in Uruguay the percentage of low cost / must run units of the total generation (hydro, wind, low-cost biomass, and solar), over the five most recent years, is greater than 50%. Therefore, the simple OM method cannot be used.

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

The simple adjusted OM emission factor ($EF_{(grid,OM-adj,y)}$) is a variation of the simple OM, where the power plants / units (including imports) are separated in low-cost/ must-run power sources (k) and other power sources (m). As under Option A of the simple OM, it is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OM-adj,y} = (1 - \lambda_y) \times \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} + \lambda_y \times \frac{\sum_k EG_{k,y} \times EF_{EL,k,y}}{\sum_k EG_{k,y}}$$

Where:

$EF_{grid,OM-adj,y}$ = Simple adjusted operating margin CO₂ emission factor in year y (tCO₂/MW·h)

λ_y = Factor expressing the percentage of time when low-cost/must-run power units are on the margin in year y.

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

$EG_{k,y}$ = Net quantity of electricity generated and delivered to the grid by power unit k in year y (MW·h)

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

$EF_{EL,k,y}$ = CO₂ emission factor of power unit k in year y (tCO₂/MW·h)

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

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

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

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

In terms of vintage of data, project participants can choose between one of the following two options:

- Option 1: For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of VCS-PD submission to the VVB for validation. For the second crediting period, the build margin emission factor should 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 VVB. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.
- Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The build margin emissions factor is the generation-weighted average emission factor (tCO₂/MW·h) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MW·h)

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

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

m = Power units included in the build margin

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

Step 6. Calculate the combined margin 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/MW·h)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MW·h)

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MW·h)

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

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

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);

3.2 Project Emissions

Project has no emissions.

3.3 Leakage

Project has no leakage

3.4 Net GHG Emission Reductions and Removals

Step 1: Identify the relevant electricity systems

The spatial extent of the project boundary includes the project site, connected to the National Interconnected System. In accordance to the methodological tool used to calculate the emission factor, Step 1, energy imports from the interconnected networks of Argentina and Brazil, are taken into consideration for the calculations with an emission of factor 0 tons CO₂ per MW·h. For the calculations we used the information provided by the Office Uruguay national charges which is the operator of the network, with daily information time economic dispatch of generation system.

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

Option I (Only grid power plants are included in the calculation) is chosen to calculate OM and BM.

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

The Simple adjusted OM was selected by the proponent to calculate the operating margin, using the ex-ante option for the data vintages. As per the ex-ante option, the emissions factor is determined once at the validation stage, thus no monitoring and recalculation of the emission factor during the crediting period is required.

For the calculation purposes, hourly dispatch data for the electric system has been provided by ADME³ and they have been made available to the project proponent.

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

The simple OM, is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OM-adj,y} = (1 - \lambda_y) \times \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} + \lambda_y \times \frac{\sum_k EG_{k,y} \times EF_{EL,k,y}}{\sum_k EG_{k,y}}$$

Where:

$EF_{grid,OM-adj,y}$ = Simple adjusted operating margin CO₂ emission factor in year y (tCO₂/MW·h)

³ <http://www.adme.com.uy/mdl/inicioMDL.php>

λ_y = Factor expressing the percentage of time when low-cost/must-run power units are on the margin in year y.

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

$EG_{k,y}$ = Net quantity of electricity generated and delivered to the grid by power unit k in year y (MW·h)

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

$EF_{EL,k,y}$ = CO₂ emission factor of power unit k in year y (tCO₂/MW·h)

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

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

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

For the calculation of emission factor of each power Option A1 was because data on fuel consumption and electricity generation is available,

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}}$$

Where:

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

$FC_{i,m,y}$ = Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)

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

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

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

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

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

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

The data supply by ADME for the calculation of $EF_{EL,m,y}$ is $FC_{i,m,y} / EG_{m,y}$

The following table lists the plants that are part of the Uruguayan Interconnected System.

Name	Commissioning	Energy source	Installed Power [MW]	(K) or (m)
Agroland S.A.	3/28/07	Wind	0.45	low cost / must run units (k)
Agua Leguas S.A. Peralta I	7/10/15	Wind	0	low cost / must run units (k)
Agua Leguas S.A. Peralta I	7/10/15	Wind	0	low cost / must run units (k)
Alcoholes del Uruguay S.A.	11/3/10	Biomass	13	low cost / must run units (k)
APR A	7/16/12	Gasoil	100	other power sources (m)
APR B and C	5/1/13	Gasoil	200	other power sources (m)
Asahi	7/24/13	Solar	0.48	low cost / must run units (k)
Astidey S.A.	6/1/15	Wind	0	low cost / must run units (k)
Bioener S.A.	8/13/09	Biomass	12	low cost / must run units (k)
Cadonal S.A.	1/5/15	Wind	0	low cost / must run units (k)
Celulosa y Energía Punta Pereira S.A.	6/30/13	Biomass	170	low cost / must run units (k)
Central Batlle y Ordoñez	1/1/57	Fueloil	335	other power sources (m)
Central Baygorria	1/1/60	Hidro	108	low cost / must run units (k)
Central Palmar	1/1/82	Hidro	333	low cost / must run units (k)
Central Termica de Respaldo	1/1/91	Gasoil	212	other power sources (m)
Central Terra	1/1/45	Hidro	152	low cost / must run units (k)
Engraw S.A.	10/1/12	Wind	1.8	low cost / must run units (k)
Estrellada S.A.	9/1/15	Wind	0	low cost / must run units (k)
Fenirol S.A.	7/1/09	Biomass	10	low cost / must run units (k)
Fideicomiso 25418 2014 Ventus I	10/14/15	Wind	0	low cost / must run units (k)
Fingano S.A.	9/1/15	Wind	0	low cost / must run units (k)
Galofer S.A.	7/11/10	Biomass	14	low cost / must run units (k)
Generación Eólica Minas S.A.	9/1/14	Wind	42	low cost / must run units (k)
Jacinta Solar Farm S.R.L.	7/1/15	solar	0	low cost / must run units (k)
Juan Pablo Terra	12/1/14	wind	67.2	low cost / must run units (k)
Kentilux S.A.	4/8/11	wind	10	low cost / must run units (k)
Lanas Trinidad S.A.	8/1/14	biomass	0.6	low cost / must run units (k)
Las Rosas Maldonado	1/1/05	landfill gas	1	low cost / must run units (k)
Lavadero de Lanas Blengio S.A.	7/1/13	wind	1.8	low cost / must run units (k)
Liderdat S.A.	6/29/10	biomass	5	low cost / must run units (k)
Los Caracoles	1/1/09	wind	20	low cost / must run units (k)
Luz de Loma S.A.	10/1/14	wind	20	low cost / must run units (k)
Luz de Mar S.A.	10/1/14	wind	18	low cost / must run units (k)
Luz de Rio S.A.	7/10/14	wind	50	low cost / must run units (k)
Montevideo A Motores	10/15/12	gasoil	25	other power sources (m)

Montevideo B Motores	10/1/12	gasoil	25	other power sources (m)
Nuevo Manantial S.A.	6/25/08	wind	13	low cost / must run units (k)
Palmatir S.A.	5/1/14	wind	50	low cost / must run units (k)
Paysandu	1/2/14	solar	8	low cost / must run units (k)
Polesine S.A.	9/23/14	wind	187.5	low cost / must run units (k)
Ponlar S.A.	2/23/12	biomass	7.5	low cost / must run units (k)
Punta del Tigre	1/1/06	gasoil	300	other power sources (m)
R del Sur S.A.	4/1/14	wind	50	low cost / must run units (k)
Raditon S.A.	10/14/15	solar	0	low cost / must run units (k)
Rio Branco	12/1/14	gasoil	9.8	other power sources (m)
Rouar S.A.	2/22/15	wind	0	low cost / must run units (k)
Salto Grande Uruguayo (500 kV)	1/1/79	hidro	945	low cost / must run units (k)
San Borja	1/1/05	gasoil	1.54	other power sources (m)
TGAA	1/1/82	gasoil	20	other power sources (m)
Togely (P.E. Libertad)	7/1/14	wind	7.7	low cost / must run units (k)
Togely Company S.A. (P.E. Rosario)	11/24/15	wind	0	low cost / must run units (k)
Turbina de Rivera	1/1/95	gasoil	3	other power sources (m)
UPM S.A.	7/25/07	biomass	161	low cost / must run units (k)
Vengano S.A.	9/11/15	wind	0	low cost / must run units (k)
Villa Sara	12/1/14	gasoil	9.8	other power sources (m)
Weyerhaeuser Productos S.A.	3/3/10	biomass	12	low cost / must run units (k)
Zendaleather S.A.	5/2/08	natural gas	3.2	other power sources (m)

In determining λ_y only grid power units (and no off-grid power plants) were considered.

The parameter λ_y is defined as follows:

$$\lambda_y (\%) = \frac{\text{Number of hours low - cost / must - run sources are on the margin in year } y}{8760 \text{ hours per year}}$$

Lambda (λ_y) was calculated according the following steps:

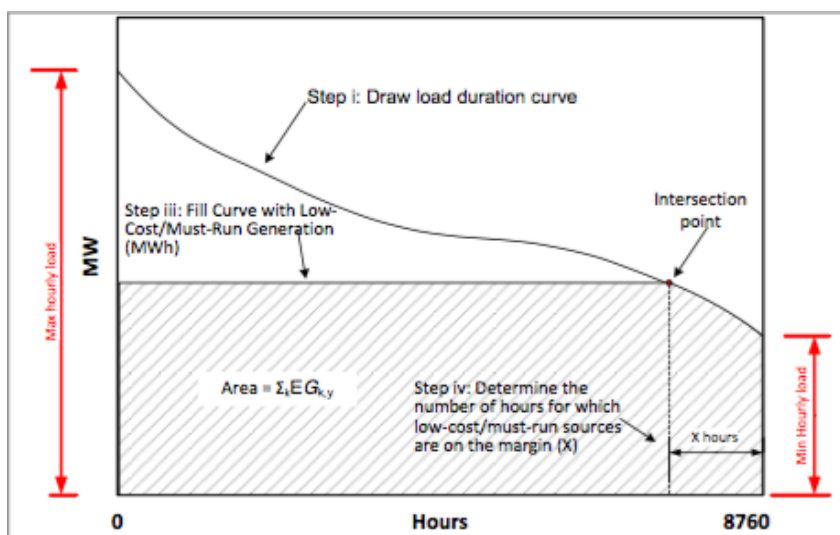
Step (i) Plot a load duration curve. Collect chronological load data (typically in MW) for each hour of the year y , and sort the load data from the highest to the lowest MW level.

Step (ii) Collect power generation data from each power plant / unit. Calculate the total annual generation (in MW·h) from low-cost/must-run power plants / units (i.e. $\sum_k EG_{k,y}$).

Step (iii) Find out the intersection on the load duration curve in order to determine a period LCMR sources are on the margin. To find the intersection, fill the area under the load duration curve by the total generation (in MWh) from LCMR power plants/units. To fill the area, plot a horizontal line across the load duration curve such that the area under horizontal line and the curve right from

the intersection point (MW times hours) equals the total generation (in MWh) from low-cost/must-run power plants/units (i.e. $\sum_k EG_{k,y}$).

Step (iv) Determine the “Number of hours for which low-cost/must-run sources are on the margin in year y. At the step where cumulative electricity generation reaches the level of the total generation (in MWh) from low-cost/must-run power plants/units, i.e. $EG_{cumul} \geq k \sum EG_{k,y}$ determine the value of Z-L. This is the number of hours for which low-cost/must-run sources are on the margin in year y.



The results for the three most recent years and weighted average are presented in the tables below:

λ_{2013}	λ_{2014}	λ_{2015}
24.36%	49.11%	37.50%

EF _{GRID,OM-adj,y} = Simple adjusted operating margin CO ₂ emission factor in year y (tCO ₂ /MW·h)		
EF _{grid,OM-adj,2013}	EF _{grid,OM-adj,2014}	EF _{grid,OM-adj,2015}
0.5888	0.4075	0.4691
Weighted average		
0.4828		

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

In terms of vintage of data, project participants can choose between one of the following two options:

- Option 1: For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of VCS-PD submission to the VVB for validation. For the second crediting period, the build margin emission factor should 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 VVB. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.
- Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

In terms of vintage of data, Option 1 was selected:

For the first crediting period, calculate the build margin emission factor ex ante is based on the most recent information available on units already built for sample group m at the time of VCS-PD submission to the VVB for validation.

This option does not require monitoring the emission factor during the crediting period.

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

- Identify the set of five power units, excluding power units registered as VCS project activities, that started to supply electricity to the grid most recently ($SET_{5-units}$) and determine their annual electricity generation ($AEG_{SET-5units}$, in MW·h);

Name	Commissioning	Generation 2015 [MWh]
Togely Company S_A. (P.E. Rosario)	24/11/15	1,069.42
Raditon S.A.	14/10/15	3,635.01
Fideicomiso 25418 2014 Ventus I	14/10/15	1,579.50
Vengano S.A.	11/9/15	34,121.90
Estrellada S.A.	1/9/15	46,762.29

- Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total} , in MW·h). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity

generation ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET_{\geq 20\%}}$, in MW·h);

Name	Commissioning	Generation 2015 [MWh]
Togely Company S.A. (P.E. Rosario)	24/11/15	1,069.42
Raditon S.A.	14/10/15	3,635.01
Fideicomiso 25418 2014 Ventus I	14/10/15	1,579.50
Vengano S.A.	11/9/15	34,121.90
Estrellada S.A.	1/9/15	46,762.29
Fingano S.A.	1/9/15	50,857.15
Agua Leguas S.A. Peralta I	10/7/15	70,932.49
Agua Leguas S.A. Peralta I	10/7/15	70,932.49
Jacinta Solar Farm S.R.L.	1/7/15	40,555.39
Astidey S.A.	1/6/15	70,455.43
Rouar S.A.	22/2/15	132,813.06
Rio Branco	1/12/14	8,288.25
Villa Sara	1/12/14	106.87
Juan Pablo Terra	1/12/14	209,300.36
Luz de Loma S.A.	1/10/14	67,497.14
Togely (P.E. Libertad)	1/7/14	25,639.32
Asahi	24/7/13	17,479.95
Lavadero de Lanas Blengio S.A.	1/7/13	264.72
APR B and C	1/5/13	0.00
Montevideo A Motores	15/10/12	118.73
Montevideo B Motores	1/10/12	0.00
Engraw S.A.	1/10/12	3,677.11
APR A	16/7/12	0.00
Alcoholes del Uruguay S.A.	3/11/10	11,212.33
Zendaleather S.A.	2/5/08	12,313.64
Agroland S.A.	28/3/07	312,287.61
Punta del Tigre	1/1/06	635,348.81

- c) From $SET_{5\text{-units}}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10

years ago, then use SET_{sample} to calculate the build margin. In this case ignore Steps (d), (e) and (f).

The build margin emissions are calculated as follows:

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

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MW·h)

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

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

m = Power units included in the build margin

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

$EF_{GRID,BM,2014}$ = Build margin CO ₂ emission factor in year y (tCO ₂ /MW·h)
0.0624

In this project the $EF_{EL,m,y}$ was obtained from the Uruguay's dispatch centre ADME (Annual data from 2015).

Step 6. Calculate the combined margin 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/MW·h)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MW·h)

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MW·h)

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

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

For wind power generation activities, for the first and subsequent period should use the following default values:

$w_{OM}=0,75$

$W_{BM}=0.25$

$EF_{GRID,CM,2015}$ = Combined margin CO ₂ emission factor in year y (tCO ₂ /MW·h)
0.3777

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);

Since $PE_y = 0$ for the first crediting period, the emission reductions are estimated for a year y, as follows:

$$ER_y = EG_{facility,y} \times EF_{grid,CM,y}$$

$$ER_y = 224,300 \times 0.3777 = 84,718 \text{ t CO}_2$$

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2015	46,188	0	0	46,188
2016	84,718	0	0	84,718
2017	84,718	0	0	84,718
2018	84,718	0	0	84,718
2019	84,718	0	0	84,718
2020	84,718	0	0	84,718
2021	84,718	0	0	84,718
2022	84,718	0	0	84,718
2023	84,718	0	0	84,718
2024	84,718	0	0	84,718
2025	70,095	0	0	70,095
Total	847,179	0	0	847,179

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$FC_{i,m,y}$; $FC_{i,k,y}$
Data unit	Mass or volume unit
Description	Amount of fossil fuel type i consumed by power plant/unit m or k in a year y
Source of data	Data provided by ADME
Value applied:	See section 3.4 and attached calculations
Justification of choice of data or description of measurement methods and procedures applied	As per Option A.1 of the “Tool to calculate the emissions factor for an electricity system”, version 05.0, CO₂ emission factor of power unit m or k in year y (tCO₂/MW·h) is calculated as: $EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_{m,y}}$ ADME publishes the specific fuel consumption (amount of fuel per unit delivered to the grid) for each power unit as the ratio of fuel consumption ($FC_{i,m,y}$) and the net electricity generated ($EG_{m,y}$). The ratio is consistent with the equation under Option A.1.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$NCV_{i,y}$										
Data unit	GJ/Gg										
Description	Net calorific value (energy content) of fossil fuel type i in year y.										
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.										
Value applied:	<table border="1"> <thead> <tr> <th></th><th>Net Calorific Value [GJ/Gg]</th></tr> </thead> <tbody> <tr> <td>Fuel Oil</td><td>39,800</td></tr> <tr> <td>Gas Oil</td><td>41,400</td></tr> <tr> <td>Natural Gas</td><td>46,500</td></tr> <tr> <td>Landfill Gas</td><td>25,400</td></tr> </tbody> </table>		Net Calorific Value [GJ/Gg]	Fuel Oil	39,800	Gas Oil	41,400	Natural Gas	46,500	Landfill Gas	25,400
	Net Calorific Value [GJ/Gg]										
Fuel Oil	39,800										
Gas Oil	41,400										
Natural Gas	46,500										
Landfill Gas	25,400										
Justification of choice of data or description of measurement methods and procedures applied	As per Option A.1 of the “Tool to calculate the emissions factor for an electricity system”, version 05.0, CO₂ emission factor of power unit m or k in year y (tCO₂/MW·h) is calculated as: $EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_{m,y}}$ IPCC publishes the standard default values of Net Calorific Values for each fuel. This is consistent with the equation under Option A.1.										
Purpose of Data	Calculation of baseline emissions										
Comments	Since local net calorific values per fuel type are not available, IPCC world-wide default values have been used.										

Data / Parameter	EF _{CO₂,i,y}										
Data unit	tCO ₂ /GJ										
Description	CO ₂ emission factor of fossil fuel type i used year y										
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG.										
Value applied:	<table border="1"> <thead> <tr> <th></th><th>Net Calorific Value [GJ/Gg]</th></tr> </thead> <tbody> <tr> <td>Fuel Oil</td><td>39,800</td></tr> <tr> <td>Gas Oil</td><td>41,400</td></tr> <tr> <td>Natural Gas</td><td>46,500</td></tr> <tr> <td>Landfill Gas</td><td>25,400</td></tr> </tbody> </table>		Net Calorific Value [GJ/Gg]	Fuel Oil	39,800	Gas Oil	41,400	Natural Gas	46,500	Landfill Gas	25,400
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Fuel Oil	39,800										
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Natural Gas	46,500										
Landfill Gas	25,400										
Justification of choice of data or description of measurement methods and procedures applied	As per Option A.1 of the “Tool to calculate the emissions factor for an electricity system”, version 05.0, CO₂ emission factor of power unit m or k in year y (tCO₂/MW·h) is calculated as: $EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_{m,y}}$ IPCC publishes the standard default values of CO₂ emission factor of each fossil fuel type. This is consistent with the equation under Option A.1.										
Purpose of Data	Calculation of baseline emissions										
Comments	According to the “Tool to calculate the emission factor for an electricity system”, if values are reliable and documented in regional or national energy statistics/energy balances, regional or national average default values can be used.										

Data / Parameter	EG _{m,y} and EG _{k,y} Plant yearly generation (last 3 years)
Data unit	MW·h
Description	Net electricity generated by power plant/unit m or k in year y
Source of data	Data provided by ADME
Value applied:	See section 3.4 and attached calculations
Justification of choice of data or description of measurement methods and procedures applied	Data used are from Uruguayan authorities (ADME).
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ /MW·h
Description	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the “Tool to calculate the

	emission factor for an electricity system" Version 05.0
Source of data	Administración del Mercado Eléctrico (ADME)
Value applied:	0.3777
Justification of choice of data or description of measurement methods and procedures applied	"Tool to calculate the emission factor for an electricity system" Version 05.0
Purpose of Data	Calculation of baseline emissions
Comments	The Combined Margin emission factor is calculated ex ante, as described in section 3.1

4.2 Data and Parameters Monitored

Data / Parameter	EG _{facility, y}
Data unit	MW·h/y
Description	Quantity of net electricity generation supplied by the project plant to the grid in year y
Source of data	Electricity meter at project site (SMEC)
Description of measurement methods and procedures to be applied	The electricity supply by the project will be measured by SMEC meter, located in the connection and measure point, along with the substation "Estación Francisco Veira" in project land. The measured of back up meter will be utilized only if there are any problem with the main meter.
Frequency of monitoring/recording	The hourly measured reading by SMEC meters will be recorded monthly by plant personnel
Value applied:	224,300
Monitoring equipment	The system SMEC has two meters, the main meter, class 0.2, and back up meter, class 0.5, installed in parallel with the main meter.
QA/QC procedures to be applied	The measurement results recorded monthly will be used for cross check with records of sold electricity and/or with DTE ⁴ . The SMEC meters should be periodically calibrated at least one every two years during the verification of the system, according with Resolution 14/002 ⁵ .
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	This data will be used to calculate directly the emission reductions and will be archived electronically as per internal procedures, for two years after the end of the last crediting period.

4.3 Monitoring Plan

The monitoring plan will specify the monitoring tasks to be implemented in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the proposed project is monitored and reported.

⁴ DTE: it is the Economic Transactions Document published monthly by ADME

⁵ Resolution 14/002 UREE: http://www.adme.com.uy/normativa/pdf/resoluciones/res_smec_2014_002.pdf

The applicable methodology, ACM0002 is suitable for monitoring the emission reductions due to the project activity, according to the applicability criteria.

- Project owner will implement a monitoring plan to guarantee the accurate and transparent determination of avoided emissions. In accordance with the methodology, monitoring consists of metering the electricity generated by the renewable technology.
- 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.
- All measurements will be conducted with calibrated measurement equipment according to relevant industry standards Commercial Measurements System by UREE (UREE Decision no. 14/002 of 27 November 2002).

The project owner will hire specific consultants to train, during the period needed, the correspondent staff that will deal with the monitoring and data recording system. This training will take place prior the operation starting date of the project to train all staff fully in the correct operation of the plant.

Monitoring Management Structure

In order to ensure organization in the project in terms of reliable data collection and gathering during the full crediting period, project owner will establish the organization of the monitoring team with clear roles and responsibilities assigned to all staff involved in the VCS project.

The project owner will train the relevant personnel before the project operation.

In summary, the project owner will execute the monitoring plan of the project, under the supervision of the VCS project consultant in accordance with the requirements of the applicable methodology and the EB on monitoring and verification to ensure that the emission reductions are monitored recorded and reported accurately.

Monitoring equipment and installation

Given that, the emission factor is calculated ex-ante, and referring to the Monitoring Methodology ACM0002, the only monitored data is the quantity of net electricity supplied to the grid by the wind project in every year.

Project owner will install an electricity meter at the connection and measurement point along with the substation “Estación Francisco Veira”, in the project land. The grid connection diagram indicates the principles for positioning of metering instruments used in the monitoring of emission reductions, in the figure below:

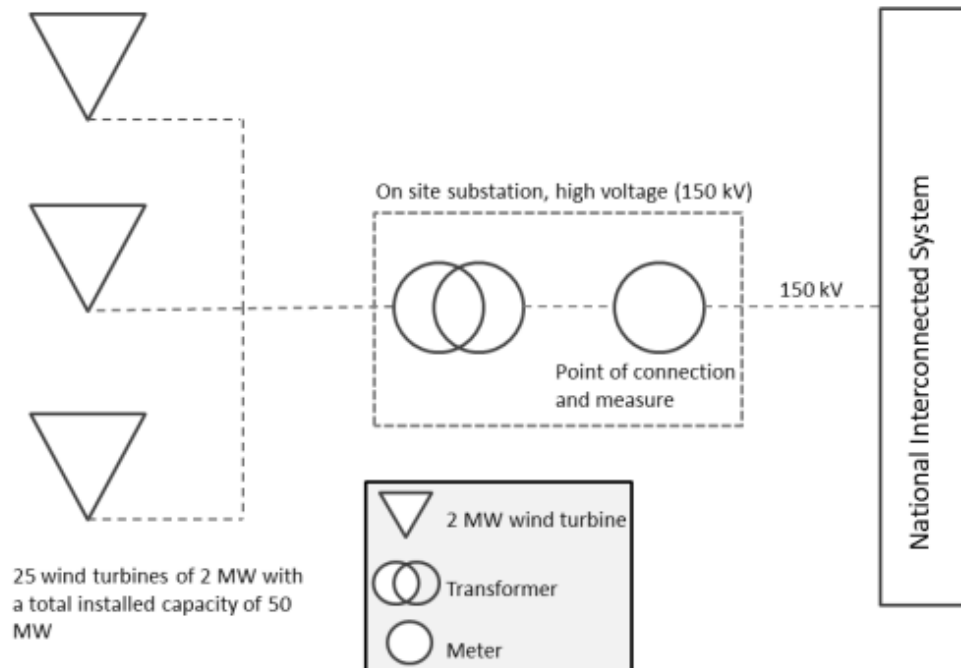


Figure 3: Positioning of metering instruments

Certified entities will provide the equipment used to monitor the electricity production and conduct calibration according to the Resolution 14/002 and the standards IEC 62052-11⁶ and IEC 62053-22⁷ for static active meters of classes 0.2 and 0.5.

Data recording and archiving

- A. Project owner will monitor the electricity supplied by the project to the grid using a calibrated electricity meter, and taking monthly records.
- B. Measurements will be crosschecked with sale receipts for electricity and/or with the information published in DTE, using conservative values for calculation of emission reductions.
- C. The project participants will archive all data collected as part of monitoring during the monitoring period plus two years.
- D. Quality assurance and Quality control will be applied:
 - Development of an overarching monitoring system will maintain the quality of data generated by this project. This system may include procedures used to double check data, for staff training, meter calibration, accreditation of the facility completing calibration and the adherence to the relevant standards.

⁶ Norma IEC 62052-11 (2003): metering equipment

⁷ Norma IEC 62053-22 (2003): Static meters for active energy (classes 0.2S and 0.5 S)

- Measuring equipment will be calibrated according to the Resolution 14/002, at least once every two years during the verification of the system.

E. Procedures on how to deal with erroneous measurements:

In the event of problem to the measurements system, the information will be obtained through one of the following sources of measurement in this order:

- Data from the main meter of SMEC,
- Data from the back-up meter of SMEC,
- Data from SCADA system,
- Data provided by user to the control centre of DNC via telephone.

Verification and Monitoring Results

Monitoring personnel will prepare the monitoring report. It shall contain the data report, and the results of the emissions reductions of the project for the defined verification period.

Management structure in order to monitor emission reductions

The General Manager will hold the overall responsibility for the monitoring process, but as indicated below parts of the process are delegated. The first step is the measurement of the electrical energy supplied to the grid and reporting of daily operations by the plant operation staff.

The project owner will appoint a monitoring officer who will be responsible for verification of the measurement, collection of sales receipts, collection of billing receipts of the power supplied by the grid to the wind farm and the calculation of the emissions reductions. The monitoring officer will prepare operational reports of the project activity, review the daily operation of the wind farm station including operating periods, power delivered to the grid, equipment defects, etc. Finally, the General Manager will review the monitoring reports.

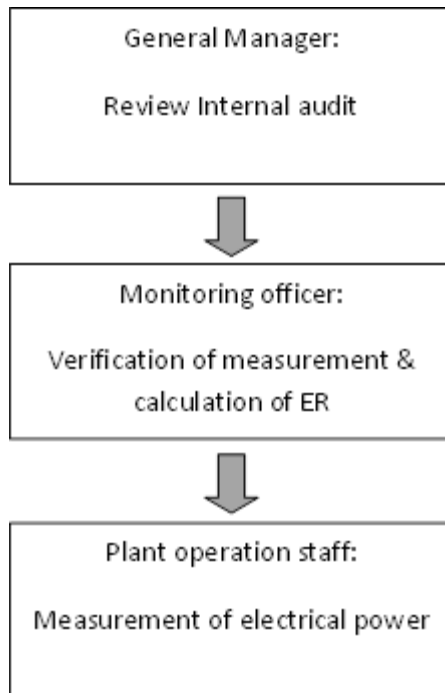


Figure 4: General management structure

5 ENVIRONMENTAL IMPACT

Documentation on the analysis of the environmental impacts, including transboundary impacts:

R.del Este S.A. carried out a study on the environmental impact assessment (EIA). This document shows the physical, social, biological and cultural impacts in the zone where the project will be carried out.

Background

In compliance with the Decreto 349/05 art.5, on July 2, 2010 the project was classified as Category "B",

[...] "projects and activities, construction or works whose implementation may have significant environmental impacts moderate whose adverse effects can be eliminated or minimized through the adoption of measures well known and easily applicable "[..].

R del Sur requested an extension of the Environmental Authorization or Autorización Ambiental Previa (AAP) granted to R del Sur on November the 7th 2012. On March 11th 2015 it was approved the extended AAP to include Maldonado II wind farm.

A change on the ownership of the wind farm, and an independent AAP was requested on March 20th, 2015.

This is the summary of the most relevant impacts of the project that were identified on EIA⁸.

Impact	Mitigation Measure
Effects on water quality from effluents	- Implementation of a decantation sink system and stabilization of the waste water from the concrete washing process. - Control and neutralization of the pH before discharge the wastewater.
Effects on water quality from run-off of solids	- Cover ditches with artificial grass, avoiding erosive processes. - Additional measures to avoid erosive processes in roads with steep grade: dikes, rock mattresses, and sinks. - The material will be extracted from authorized quarries.
Effects on soils from erosive processes	- Recover the surface with plants - Graduated removal of the vegetative cover and layers of soil. - Selection of the most appropriate site to place the workroom. - Management of the runoff water with a piping network.
Birds death by collision	- Establishment of a program to monitor the impact of wind turbines on birds that includes periodic sampling of animals killed by wind turbines,
Barrier effect creation for birds movement	- Measures will be implemented, according to the result of the monitoring program established,
Bats death by collision	- Measures will be implemented, according to the result of the monitoring program established,
Habitat loss and modification	- Minimize the surface affected by the land

⁸ Environmental impact study (Estudio de Impacto ambiental- Ampliación APP R del Sur- Parque eólico Maldonado II)

	and vehicles movements - Recover the surface with plants - Prohibit activities causing birds migration. - Minimize dust emissions - Avoid the thinning of the mount.
Effects on ecosystems due to the increase of the accessibility	- No mitigation measures needed
Impact on neighbors and passers by the noise level increase	- No mitigation measures needed
Public nuisances generated by shadows	- Measure will be implemented after the establishment of a program to monitor the impact of wind turbines on the intermittent nuisance
Public nuisances by flashes ("Disc-Effect")	- Use antiglare paint for the blades of wind turbines, with a brightness level lower to 30%
Exposure to electromagnetic fields	- No mitigation measures needed
Land use change	- No mitigation measures needed
Damage in road infrastructure	- Replacement of the removed posters - Repairing of the damage infrastructures
Increase of traffic in public roads	- Performing an Environmental Management Plan Construction (PGA-C) to ensure the environmentally sound management of its environmental aspects - Placement of road signage
Effects on road safety	- Implementation of measures based on the recommendations of the "Environmental Handbook for Activities in the Road Sector" (MTOP, 1998)
Effects on local activity	- The DINACIA authorization is requested, complying with signalling and beaconing conditions
Damage on properties due to vibration	- Follow the security measures of the SMA

Damage on properties and effects on land use due to fires	- Performing an Environmental Management Plan (PGA) to establish procedures in case of fire.
Effect on the landscape	- Use of grayish paint to disguise the wind turbines on the horizon - Three wind turbines were replaced in order to avoid interference with native forests.

The web for the park has a detailed account of the actions taken by the project proponent to engage the community, those include works to improve infrastructures like the #8 & #39 access routes, the Arroyo Solís Grande bridge and improvement of the school 34's infrastructure among others. Also several schools and organizations have had the chance to make educational visits to the park.

6 STAKEHOLDER COMMENTS

The project proponent carried out a Social Perception Study in 2015, in order to analyse the social impact of the project.

During the definition phase of the project, several interviews were held with Maldonado and Lavalleja local governments to introduce the project. Both local governments gave green light to the project.

Given the lack of rural electrification in the area of influence of the project, the project proponent, in agreement with the local community, after two meeting with representatives of the inhabitants of the area, held several meeting with the rural electrification department of UTE to identify solutions.

Additionally, from 2008, the project proponent has been in touch with landowners. In July 27th 2013, the project proponent held a meeting with the local community to obtain comments and opinions about the project.

An additional meeting with Buddhist community was organized to show how the project would contribute with them.

A second meeting with stakeholder, to inform about the project progress was held on March 24th 2014. All the opinions and comments from stakeholders were taken into account in the project development.

Also there is an active web page (<http://www.rdeleste.com.uy/>) for anyone to leave any comments or complaints about the project. All comments to date have been addressed by the project proponent.