



Verified Carbon Standard

FIRST MONITORING REPORT

Document Prepared by Swiss Carbon Value Ltd.

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The proposed project consists of the implementation of six wind farms located in different regions in Argentina (Table 1). The implementation of these project instances (hereafter collectively called the 'project' or 'project activity') ensures energy security, diversification of the grid generation mix, and sustainable growth of the electricity sector.

Before the implementation of the project activity, no power plants were installed at the project site. The energy that is generated by the project was dispatched by other power plants that are connected to the respective grid, including fossil fuel power plants. Hence, the baseline scenario and the scenario prior to project implementation are the same and the project helps to reduce thermal power generation in the Argentine Interconnected System (SADI) by increasing the share of renewable energy in the grid.

The project consists of the installation of 71 wind turbines provided by Vestas and Nordex (Table 1), with a total installed capacity of 223.38 MW and generation of around 1,497,243.68 MWh for the corresponding monitoring period (12 November 2018 to 31 December 2020), which was delivered to the SADI – avoiding part of the electricity generated by the grid-connected power plants. Thus, it contributes to sustainability by increasing the share of renewable energy and reducing greenhouse gas (GHG) emissions.

As a result of the implementation of the project activity, GHG emission reductions of 671,364 tCO₂ for the entire monitoring period were achieved. A summary of individual project instances of the project is shown in Table 1

Table 1: Summary of individual wind project instances

Project Instance	Generation (MWh)			Emission reduction (tCO ₂)		
	2018	2019	2020	2018	2019	2020
Chubut Norte I	14,750.56	139,102.81	140,736.42	6,614	62,374	63,106
Chubut Norte II	0	0	0	0	0	0
Pomona I	–	209,861.04	389,559.60	–	94,102	174,679
Pomona II	–	20,210.05	40,891.97	–	9,062	18,336
Villalonga I	23,082.32	236,466.89	252,274.90	10,250	106,032	113,120
Villalonga II	–	15,518.22	14,788.91	–	6,958	6,631
Total	37,832.88	621,159.00	838,251.80	16,964	278,528	375,872

1.2 Sectoral Scope and Project Type

Sectoral Scope: 01 – Energy industries (renewable/non-renewable sources)

Project Type: Renewable Energy Projects

Project Category: Large-scale

The project is not a grouped power activity.

1.3 Project Proponent

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1.4 Other Entities Involved in the Project

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1.5 Project Start Date

The first instance of the project under consideration started operations on 12 November 2018. This project instance is Chubut Norte I wind farm. Hence the project start date is 12 November 2018.

1.6 Project Crediting Period

Project crediting period for the project activity is taken as 10 years from the start date.

Accordingly, with regards to the start date of the project activity, the first crediting period began on 12 November 2018 and will finish on 11 November 2028.

First crediting period: 12 November 2018–11 November 2028.

Type of crediting period: renewable – it was proposed that the crediting period will be renewed twice, adding up 30 years in total.

1.7 Project Location

All the project activity instances in the proposed project activity would be located within geographical boundaries of Argentina. Thus, geographical area of the project is Argentina.

Table 2 presents the geographic coordinates summary of each wind power plant.

Table 2: Project activity instances coordinates

Power plant name	X	Y
Chubut Norte I	324,200	5,284,728
Chubut Norte II	320,172	5,280,304
Pomona I	262,600	5,616,937
Pomona II	261,325	5,613,239
Villalonga I	528,981	5,566,731
Villalonga II	529,190	5,567,732

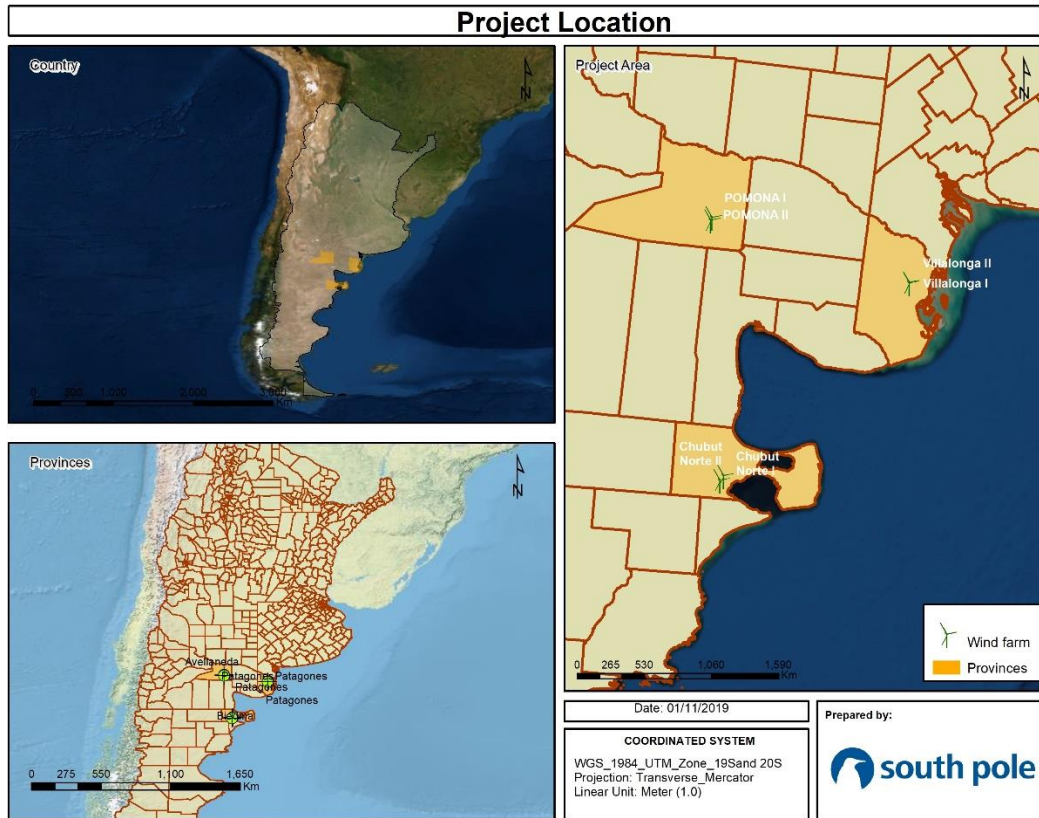


Figure 1: Project location

Chubut Norte I Wind Farm

The generation is carried out through a set of wind turbines distributed on a plot of around 880 hectares (ha) located in the northeast of the city of Puerto Madryn, Province of Chubut, on National Route N°3 KM 1,300, approximately 20 kilometers (km) north of the junction between National Route 3 and provincial Route 4. The site is located in a rural area; the terrain is open and relatively flat. In the area where the property is located, the elevations of the land are between 122 and 102 meters (m) above sea level.

Table 3: Wind turbines coordinates Chubut Norte I wind farm

Aero ID	X	Y
1	324,200	5,284,728
2	324,711	5,284,256
3	325,234	5,283,727
4	325,705	5,283,303
5	326,279	5,285,109

Aero ID	X	Y
6	326,753	5,284,582
7	327,333	5,283,990
8	328,015	5,283,434

Chubut Norte II Wind Farm

Chubut Norte II wind farm (PECN II) is in the same plot of land as Chubut Norte I.

Table 4: Wind turbines coordinates Chubut Norte II wind farm

Aero ID	X	Y
41	320,172	5,280,304
42	319,494	5,280,883
43	318,757	5,281,596
44	319,901	5,278,031
45	319,373	5,278,539
46	318,878	5,279,166

Pomona I Wind Farm

The PEPOM 1 project is located in the Department of Avellaneda, Province of Río Negro, 3 km from Provincial Route 4, approximately 2 km west of the Choele Choele 500kV Transformer Station.

The site is located in a rural area; the terrain is open and relatively flat. In the area where the property is located, the elevations of the land are between 140 m and 144 m above sea level.

Table 5: Wind turbines coordinates Pomona I wind farm

Aero ID	X	Y
1	262,600	5,616,937
2	262,952	5,617,605
3	263,386	5,618,134
4	262,072	5,614,269
5	263,855	5,618,642

Aero ID	X	Y
6	264,357	5,619,120
7	264,849	5,619,640
8	265,271	5,620,139
9	265,742	5,620,623
10	266,492	5,620,919
11	262,345	5,615,518
12	263,281	5,615,827
13	264,041	5,616,549
14	264,943	5,617,594
15	265,834	5,618,625
16	266,558	5,619,281
17	267,293	5,619,887
18	263,003	5,614,522
19	263,890	5,614,487
20	264,705	5,615,231
21	265,472	5,616,074
22	266,084	5,616,709
23	266,746	5,617,423
24	267,289	5,617,953
25	267,754	5,618,431
26	268,178	5,618,914

Pomona II Wind Farm

The generation is carried out by means of a set of three wind turbines distributed over an area of around 500 ha, located within a total of 4,500 ha in the vicinity of the city of Choele Choel, Province of Río Negro.

Table 6: Wind turbines coordinates Pomoma II wind farm

Aero ID	X	Y
1	261,325	5,613,239
2	261,294	5,612,612
3	261,403	5,611,677

Villalonga I & II Wind Farms

Villalonga I & II wind farms are located in an area of about 727 ha on National Route 3, approximately 90 km north of the city of Carmen de Patagones, province of Buenos Aires.

The site is located in a rural area. The terrain is open and relatively flat. In the area where the property is located, the elevations of the land are between 12 m and 25 m above sea level.

Table 7: Wind turbines coordinates Villalonga I wind farm

Aero ID	X	Y
V1	528,981	5,566,731
V2	529,250	5,567,185
V3	529,674	5,567,621
V4	530,055	5,567,955
V5	529,785	5,568,743
V6	530,726	5,568,917
V7	528,970	5,569,992
V8	529,071	5,570,578
V9	528,982	5,568,308
V10	528,970	5,569,236
V11	529,906	5,569,742
V12	529,565	5,566,060
V13	529,956	5,566,502
V14	530,396	5,566,915
V15	530,717	5,567,345

Table 8: Wind turbine coordinates Villalonga II wind farm

Aero N°	X	Y
V16	529,190	5,567,732

1.8 Title and Reference of Methodology

For this project, the approved large-scale (CDM) methodology ACM0002 'Grid-connected electricity generation from renewable sources'. Version 19.0. Sectoral Scope 01. Available at: <https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>, has been used.

The identification of the baseline scenario and the demonstration of additionality are assessed by applying the latest versions of the CDM 'Tool for the demonstration and assessment of additionality' (Version 7.0.0). Available at:

https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf/history_view

The emission factor of the relevant power-grid is determined based on the procedures of the CDM 'Tool to calculate the emission factor for an electricity system' (Version 7.0). Available at: https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf/history_view.

The investment analysis is based on the tool methodological tool, 'Investment analysis' (Version 9.0). Available at:

https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-27-v9.0.pdf/history_view

The analysis of common practice is based on the tool, 'Common practice' (Version 3.1). Available at: https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-24-v1.pdf/history_view

1.9 Participation under other GHG Programs

The Project Proponent hereby confirms that they have not applied for or will apply to any other GHG program to generate, certify or verify emission reductions achieved from this project activity while it is active under the VCS program.

1.10 Other Forms of Credit

The project activity neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under any type of standards.

1.11 Sustainable Development

In line with the Sustainable Development Goals and the 2030 Agenda for Sustainable Development that Argentina adopted in 2015, the project contributes to sustainable development by contributing to

several of its environmental, social, economic and technological objectives, both directly and indirectly, such as:

- increasing the percentage of renewable energy from the energy mix.
- expanding infrastructure and improving technology to provide modern and sustainable energy service.
- achieving levels of economic productivity through diversification and technological modernization.
- decreasing emissions of sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide, particulate matter and other pollutants, as well as carbon dioxide associated with the combustion of fossil fuels.
- reducing the dependence on fossil fuels, which are non-renewable and limited in supply.
- providing employment opportunities during the construction phase of the project – these job opportunities will be filled by local residents, where practicable. In addition, employment will also be generated in association with operational and maintenance activities.
- ensuring sustainable production and the efficient use of natural resources.
- addressing the problem of solid waste disposal encountered by most other sources of power, as renewable energy projects do not produce any solid waste end products (ash etc.). Being a renewable resource, the generation of electricity contributes to resource conservation and therefore, responsible consumption.

2 SAFEGUARDS

2.1 No Net Harm

The project does not involve any potential negative environmental and socio-economic impacts and hence this criterion is not applicable to this project activity.

2.2 Local Stakeholder Consultation

Chubut Norte I and II Wind Farms

Since these two parks are within the same geographical area, the local stakeholder consultation was held for both wind farms. Table 9 details a list of the different stakeholders that were consulted with regards to the wind farms' construction:

Table 9: Attendance list

Organization	Date	Description	Location of meeting
Inst. Ballester	24/09/2013	3° Class A y B	Buenos Aires
Colegio San Andrés	03/10/2013	4° Class Ciencias	Olivos, Bs. As.
Colegio E.A.O.	09/10/2013	6° grado A, B y C	San Justo, Buenos Aires
Esc. 138	14/10/2013	6° grado C y D	Trelew, Chubut
Escuela del Sol	24/10/2013	6° grado	Trelew, Chubut
Esc. 138	25/10/2013	6° grado A y B	Trelew, Chubut
Esc. 775	28/10/2013	9° Class EGB	Puerto Madryn, Chubut
Esc. 710	30/10/2013	4° Class	Puerto Madryn, Chubut
Dirección Turismo Rawson	31/10/2013	Equipo técnico	Rawson, Chubut
Esc. 733	01/11/2013	9° Class EGB A y B	Bryn Gwyn, Gaiman Chubut
Esc. 733	01/11/2013	9° Class EGB C y D	Bryn Gwyn, Gaiman Chubut
Esc. 730	04/11/2013	5° Class	Trelew, Chubut
Esc. Técnica N° 21	20/11/2013	4° Class	San Martín de los Andes, Neuquén
Estudio de Arq. Villalobos	05/02/2014		Rawson, Chubut
Biólogos de la UPSJB	07/04/2014		Trelew, Chubut
CREE	07/04/2014		Rawson, Chubut

Organization	Date	Description	Location of meeting
IMA Secundario	05/05/2014	2° Class A	Rawson, Chubut
Capacitación CREE y UPSJB	12/05/2014		Salta, Río Negro, Santa Cruz,
Capacitación CREE y UPSJB	13/05/2014		Chubut, Santa Fe, Mendoza, Bs. As.
Capacitación CREE y UPSJB	14/05/2014		Capacitador de España
IMA Secundario	16/05/2014	2° Class B	Rawson, Chubut
Esc. 47	30/05/2014	6° grado A y B	Rawson, Chubut
DGER	12/06/2014		Rawson, Chubut
IMA Primario	27/06/2014	6° grado A y B	Rawson, Chubut
Canal CCTV para CNN	05/07/2014		Buenos Aires
Dirección Turismo Rawson	15/07/2014	Conting. Turístico	Rawson, Chubut
Dirección Turismo Rawson	17/07/2014	Conting. Turístico	Rawson, Chubut
Esc. N° 50	08/09/2014	6° A, B y C	Trelew, Chubut
ISFD N° 808.	25/09/2014	1°, 2° y 3° Class	Anexo Rawson, Chubut
St. Brendan´s	26/09/2014	1° Class A y B	Buenos Aires
St. Brendan´s	26/09/2014	6° A, B y C	Buenos Aires
Instituto Ballester	29/09/2014	3° Class	Villa Ballester, Bs. As.
San Andrés	01/10/2014	4° Class Ciencias	Olivos, Bs. As.
E.A.O	09/10/2014	6° grado A, B y C	San Justo, Buenos Aires
Esc. N° 24	17/10/2014	5° Class	Rincón de los Sauces, Neuquén
Esc- N° 773	21/10/2014	5° y 6° Class	28 de Julio, Chubut
Esc. N° 94	12/11/2014	5° y 6° grado	Lago Blanco, Chubut
Productora Gomotion	24/11/2014		Trelew, Chubut
TELECOM Argentina	03/12/2014		Bs. As.
Familia empleados	19/12/2014		Rawson y Trelew
Argentina Visión	29/04/2015	Turismo educativo	Puerto Madryn, Chubut
UPSJB y JOREIC	05/05/2015	Estud. Ingen.	Patagonia

Organization	Date	Description	Location of meeting
Canal 7	20/05/2015	Locutora, camar.	Rawson, Chubut
IMA Primario	26/06/2015	6° A y B	Rawson, Chubut

During the stakeholder consultations, a number of communication channels were provided in relation to the project – to date, no negative comments have been received.

Pomona I and II

On 8 March 2018, a stakeholder consultation was held in a meeting room in Pomona, Viedma, Río Negro. Over 75 people attended, comprising local authorities, interested locals and the press.

Among the guests that attended, the following were present:

- Jorge Brito, President of Genneia
- Marcos Leonard and José Cortes, representing Nordex Windpower SA
- Alberto Weretilneck, Governor of de Río Negro
- Miguel Jara, intendent of Pomona
- Lucas Pica, Labor Secretary of de Río Negro
- Ricardo Diclérico, General Secretariat of UOCRA in Río Negro
- Representatives of Parliament María Maldonado, Elsa Inchassendague y Leandro Tozzi
- Luis Di Giacomo, minister of local government of Río Negro
- Carlos Valeri, Minister of Public Projects of Río Negro
- Fabián Zgaib, Health Minister of Río Negro
- Intendents of Valle Medio.
- Community of Pomona y surroundings'.

During this meeting, a presentation was made about the project, the investment and the installation location of the wind turbines. The structure of local labor to be employed was also presented, in line with the objective to have at least 70% of locals employed.

A number of communication channels relating to the project were provided to local stakeholders – to date, no negative comments have been received.

Villalonga I & II Wind Farms

A number of meetings with local authorities and representatives of the community were held during the month of September 2017, in relation to the two projects. In total, 23 contacts were made with 13 in-depth meetings. Topics such as the construction phase, functioning of a wind farm, and how this project will not adversely affect the environment and neighbors was addressed.

The following chart shows photos of such meetings and the list in Spanish from the open-sourced brochure of GENNEIA:



The evaluation of the stakeholders and the analysis of their perception about the project is fundamental for Genneia to understand the opinions and expectations that the project generates and if necessary, take measures to avoid or minimize possible conflicts that could complicate its development – thus a mechanism was defined for ongoing communication with local stakeholders including:

- brochures containing information on all the stages containing access to non-technical summary and contact channels;
- telephone numbers;
- email address;
- mailbox at the entrance of the site;
- complaints, queries and claims book; and
- news bulletin sent periodically to interested parties.



Figure 2: Mailbox implemented at the project site for communications with stakeholders

The comments, complaints and claims obtained for the relevant monitoring period are listed below in Table 10:

Table 10: Complaints, claims or queries raised by stakeholders

Reception date	Wind farm	Channel	Claim/request
31/05/2019	Chubut Norte	Approach to the neighbor	The neighbor contacted the contractor to agree to leave the gate padlocked, then communicated this agreement to the neighbor.
30/09/2019	Chubut Norte	Approach to the neighbor	Excavation in one of the access roads to neighboring properties.
17/12/2019	Chubut Norte	Approach to the neighbor	Subcontractor (Milicic) entered without authorization to harvest firewood on neighboring land. Nordex was immediately informed so that this does not happen again, reinforcing this with its subcontractors.
24/01/2020	Chubut Norte	E-mail	A neighbor complained about the condition of the new road offered by Genneia to avoid having to go through the company's property. As a temporary solution, the neighbor was offered access to continue using the road he was using before, until the new access road is in good condition, which he accepted. Work is being done to improve the current road, in communication with the neighbor.
10/02/2020	Villalonga	E-mail	Consultation for viewpoint to observe the park.

Reception date	Wind farm	Channel	Claim/request
12/03/2020	Chubut Norte	E-mail	Request for collaboration made by Escuela Inicial 495. The request was rejected because it was not aligned with the social investment criteria defined in the company's strategy.
26/03/2020	Pomona	E-mail	Request for collaboration made by Pomona´s hospital. Donation of disposable kits (masks, coifs, and gowns) is being processed.
20/04/2020	Pomona	Complaints, Inquiries and Claims Book	The company, Agropecuaria, was compensated for the loss of a bull. The condition of the fences was checked and Agropecuaria was in agreement.
12/07/2020	Chubut Norte	Telephone	Sand mound that hindered the circulation of vehicles was removed at the request of an anonymous person.
13/07/2020	Villalonga	Telephone	Sand mound that hindered the circulation of vehicles was removed at the request of an anonymous person.

2.3 AFOLU-Specific Safeguards

For non-AFOLU projects, this section is not required.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The renewable energy generation technologies employed under the project activity instances correspond to wind projects.

The activity of the proposed project consists of the installation of six wind grid-connected power plants located in different regions of the country of Argentina. The total installed capacity of the six wind power plants is 223.38 MW. The projects will be implemented at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant).

The electricity generated by the project will be exported to the SADI. Therefore, the project will displace an equivalent amount of electricity that would otherwise have been generated based on fossil fuels. In the baseline scenario, all the electricity supplied to the grid by the project activity would otherwise have been generated by the operation of grid-connected power plants.

The project activity applies the approved CDM methodology ACM0002 (Version 19), as the methodology is also applicable for small-scale projects.

In the following paragraphs, further details of the individual instances included in the project activity are provided.

Chubut Norte I Wind Farm

Chubut Norte I wind farm (PECN I) is a project generating electricity through wind energy. The contracted power is 28.35 MW and the plant will have a total installed nominal capacity of 28.8 MW. The generation is carried out through a set of eight wind turbines distributed on a plot of around 880 ha located northwest of the city of Puerto Madryn, Province of Chubut. The connection to the SADI will be made by means of a 16.5 km long and 132 kV high voltage line to the TRANSPA's 132/330 kV Transformer Station Puerto Madryn.

Table 11: Chubut Norte I wind farm

Wind Turbine Manufacturer	Vestas
Wind Turbine Types	V126
Wind Turbine Capacity	3.60 MW
No. of Turbines	8
Total Capacity	28.8 MW
Generation Monitoring Period	286,015.98 MWh

Chubut Norte II Wind Farm

With an installed capacity of 26.28 MW, Chubut Norte II wind farm (PECN II) is in the same plot of land as Chubut Norte I. It comprises six Nordex wind turbines. The connection to the SADI will be made through a double terna LAT 132 kV, of which one terna will be connected at TRANSENER's ET 132/330 kV Puerto Madryn and the other terna will be connected at TRANSENER's ET 132/500 kV Puerto Madryn.

Table 12: Chubut Norte II wind farm

Wind Turbine Manufacturer	Nordex
Wind Turbine Types	N149-4.5
Wind Turbine Capacity	4.38 MW
No. of Turbines	6
Total Capacity	26.28 MW
Generation Monitoring Period	0 MWh

Pomona I Wind Farm

Pomona I wind farm (PEPOM I) constitutes an electricity generation project using wind energy. The development of the project comprises 26 wind turbines of 3.9 MW, totaling 101.4 MW of wind power. The generation will be carried out through a set of wind turbines distributed on a property of about 2,440 ha, located in the vicinity of the town of Pomona, Province of Río Negro.

The connection to the SADI will be made through a new 33/132 kV Transformer Station and a sectioning of the 132 kV LAT linking the Choele Choel and Luis Transformer Stations Beltran.

Table 13: Pomona I wind farm

Wind Turbine Manufacturer	Nordex
Wind Turbine Types	N131
Wind Turbine Capacity	3.90 MW
No. of Turbines	26
Total Capacity	101.4 MW
Generation Monitoring Period	576,256.62 MWh

Pomona II Wind Farm

Pomona II wind farm (PEPOM II) is a project that generates electricity through wind energy. In the development of PEPOM II, 11.7 MW of wind power was installed. The generation is carried out by means of a set of three wind turbines distributed over an area of around 500 ha, located within a total of 4,500 ha in the vicinity of the city of Choele Choel, Province of Río Negro. The PEPOM II will be adjacent to the Pomona I wind farm, awarded in the RenovAr program – Round 1.5.

The connection to the SADI will be made through the 33/132 kV Transformer Station of the Pomona I wind farm, awarded in the RenovAr program – Round 1.5.

Table 14: Pomona II wind farm

Wind Turbine Manufacturer	Nordex
Wind Turbine Types	N131
Wind Turbine Capacity	3.90 MW
No. of Turbines	3
Total Capacity	11.7 MW
Generation Monitoring Period	61,102.53 MWh

Villalonga I Wind Farm

The Villalonga I wind farm consists of the construction and operation of a wind farm with 15 wind turbines and an installed capacity of 51.75 MW. The wind turbines are interconnected with each other by a medium voltage (33 kV) underground electrical grid, from which the energy is conducted to the internal transformer stations (ET PEVI)¹. At the substation, the voltage is increased to 132 kV and from there, connecting the project to the SADI between ET Pedro Luro and ET Carmen de Patagones

Table 15: Villalonga I wind farm

Wind Turbine Manufacturer	Vestas
Wind Turbine Types	V126
Wind Turbine Capacity	3.45 MW
No. of Turbines	15
Total Capacity	51.75 MW
Generation Monitoring Period	503,405.06 MWh

¹ 33/132 kV transformer station inside the Villalonga wind farm (PEVI)

Villalonga II Wind Farm

The Villalonga II wind farm's generation will be carried out by means of a wind turbine distributed over an area of around 60 ha located within a 727 ha site in the vicinity of the city of Villalonga, Province of Buenos Aires. The project is located next to the Villalonga I wind farm. The connection to the SADI is made through the Transformer Station 33/132 kV of the Villalonga I wind farm.

Table 16: Villalonga II wind farm

Wind Turbine Manufacturer	Vestas
Wind Turbine Types	V126
Wind Turbine Capacity	3.45 MW
No. of Turbines	1
Total Capacity	3.45 MW
Generation Monitoring Period	30,307.13 MWh

Below are the technical specifications of each type of technology according to manufacturer:

Table 17: Technical specifications 'Vestas-V126-3.60 MW' turbine

Vestas-V126-3.60 MW	
Rotor	
Diameter	126 m
Swept area	12,469 m ²
Air brake	Full rotation of the blades
Blades	
Type	Infused structural airfoil shell
Length	61.65 m
Material	Carbon fibre pultrusions, glass fibre fabrics, balsa and PET foam core
Hub	
Type	Cast ball shell hub
Material	Cast iron
Hub high	117 m
Main Shaft	
Type	Cast hollow shaft

Material	EN GJS-500-14 cast iron
Generator	
Type	Asynchronous with cage rotor
Rated Power [PN]	3,650 kW
Voltage	3x750 V
Rated speed	1450 rpm
Protection system	IP 54
Transformer	
Type	Dry-type transformer (ECO)
Nominal Voltage (HV)	33 kV
Frequency	50 Hz

Table 18: Technical specifications 'Nordex-N149-4.35 MW' turbine

Nordex-N149-4.0-4.5 MW	
Rotor	
Diameter	141.1 m
Swept Area	17,460 m ²
Blades	
Length	72.40 m
Material	Glass-fiber and carbon-fiber reinforced plastic
Hub	
Type	Stiff cast structure
Material	Cast iron
Hub high	120 m
Main Shaft	
Type	Forged hollow shaft
Material	42CrMo4 or 34CrNiMo6
Generator	
Type	doubly-fed induction
Rated Power [PN]	4,380 kW
Voltage	660 V
Protection system	IP 54

Transformer	
Type	Ester transformer
Primary / Secondary voltage	33 kV
Frequency	50/60 Hz

Table 19: Technical specifications 'Nordex - N131-3.90' turbine

Nordex - N131-3.90	
Rotor	
Diameter	131 m
Swept Area	13,478 m ²
Blades	
Type	Prepreg or Infused structural airfoil shell
Length	64.4 m
Material	Glass-fiber and carbon-fiber reinforced plastics
Hub	
Hub high	120 m
Main Shaft	
Type	Forged part
Material	42CrMo4 or 34CrNiMo6
Generator	
Type	Doubly fed induction asynchronous
Rated Power [PN]	3,900 kW
Voltage, Stator [U _{NS}]	660 V
Rated speed	730–1325 rpm
Protection system	IP 54
Transformer	
Type	Dry-type
Frequency	50 Hz

Table 20: Technical specifications 'Vestas-V126-3.45 MW' turbine

Vestas - V126-3.45 MW	
Operating data	

Rated power	3.450 kW
Cut-in wind speed	3 m/s
Cut-out wind speed	22.5 m/s
Re cut-in wind speed	20 m/s
Wind class	IEC IIB/IEC IIIA
Rotor	
Diameter	126 m
Swept Area	12,469 m ²
Air brake	Full blade feathering with three pitch cylinders
Electrical	
Frequency	50/60 Hz
Converter	Full scale
Blades	
Type	Prepreg or Infused structural airfoil shell
Length	61.7 m
Material	Fibreglass reinforced epoxy, carbon fibres and Solid Metal Tip (SMT)
Hub	
Type	Cast ball shell hub
Material	Cast iron
Hub high	87 m
Main Shaft	
Type	Hollow shaft
Material	Cast iron or forged steel
Generator	
Type	Asynchronous with cage rotor
Rated Power [PN]	3,300 kW
Power factor	0.98 Cap – 0.96 Ind (default: 1.00)
Voltage, Stator [U _{NS}]	Stator: 690 V, Rotor: 480 V
Rated rpm	1,680–2,016
Protection system	IP 54
Transformer	
Type	Dry-type cast resin transformer

Primary / Secondary voltage	0.69/33 kV
Frequency	50 Hz

3.2 Deviations

2.3.1 Methodology Deviations

No methodology deviations are made.

2.3.2 Project Description Deviations

Project start date: As can be seen in the public records of the Argentinean electricity system operator (CAMMESA), Chubut Norte I wind farm began operating and dispatching energy to the grid on 12 November 2018 (registered PD: 12 December 2018), from that date the project began to generate GHG emissions reductions as defined by the VCS Standard, therefore, a deviation in the project start date reported in the PD validated is included.

The credit period was adjusted accordingly to 12/11/2018 - 11/11/2028. Changes to project start date of the registered PD have no material impact on the applicability of the applied methodologies or the other applied methodological regulatory documents, or the applied standardized baselines which remains valid, the project activity is the installation of a Greenfield power plant, 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...". Furthermore, the project remains additional, the days difference in the start date does not represent a material change.

3.3 Grouped Projects

This is not a grouped project activity. Thus, this section is not applicable for this project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data/Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor for grid-connected power generation in year y calculated using the latest version of the 'Tool to calculate the emission factor for an electricity system'.
Source of data	Calculated based on information provided by the electricity wholesale market management company (Compañía Administradora del Mercado Mayorista Eléctrico (CAMMESA)).
Value applied	0.4484
Justification of choice of data or description of measurement methods and procedures applied	As per the most recent 'Tool to calculate the emission factor for an electricity system'.
Purpose of Data	Calculation of baseline emissions.
Comments	Since the operating margin (OM) and build margin (BM) emission factor was set ex-ante, as a result the combined margin (CM) emission factor is also set ex-ante for the first crediting period.

4.2 Data and Parameters Monitored

Data/Parameter	EG _{facility,y}
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
Source of data	Measurement in the power plant.
Description of measurement methods and procedures to be applied	The meters installed are bi-directional, taking into account both the quantity of electricity supplied by the project plant to the grid and the quantity of electricity delivered to the project plant from the grid. In this case, the individual values are not required.
Frequency of monitoring/recording	Continuous measurement and at least monthly recording. Typically, the measured data is read once every 24 hours using tele-metering technology (remotely).

Value monitored		2018	2019	2020
	Chubut Norte I	14,750.56	139,102.81	140,736.42
	Chubut Norte II	0	0	0
	Pomona I	-	209,861.04	389,559.60
	Pomona II	-	20,210.05	40,891.97
	Villalonga I	23,082.32	236,466.89	252,274.90
	Villalonga II	-	15,518.22	14,788.91
Monitoring equipment	See details in section ¡Error! Marcador no definido.¡Error! No se encuentra el origen de la referencia.			
QA/QC procedures to be applied	The verification of the meters will be done as established by the national authorities, or alternatively, at least once every three years. In addition, the generation values will be crosschecked with the information available on the website of the electricity wholesale market management company.			
Purpose of the data	Calculation of baseline emissions.			
Calculation method	N/A			
Comments	All data collected as part of the monitoring process is archived electronically and kept for at least two years after the end of the last crediting period.			

4.3 Monitoring Plan

The monitoring plan, which is implemented by the Project Proponent, describes the monitoring organization, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving, etc., according to the approved methodology, ACM0002. The continuous monitoring of electricity generation ensures that the net electricity delivered to the grid is completely monitored along the whole crediting period, given the fact that the total generation measured will affect the amount of emission reductions obtained.

Electricity Generation of the Project Activity

Due to the project participant's choice of an ex-ante emission factor, the most important variable to monitor is the project's electricity generation. It is measured according to the national standards and regulations for the wholesale market participants (rules from the CAMMESA²) Two 0.2s precision meters are installed for each wind farm, one of them acting as a back-up unit. All units are connected at the interconnection point where they inject energy to the transmission system.

² Additional relevant information available at <https://smec.cammesa.com/normativa/>

The main and back-up meters for each wind farm are illustrated below:

Wind Farm Chubut Norte I

Main meter



Back-up meter

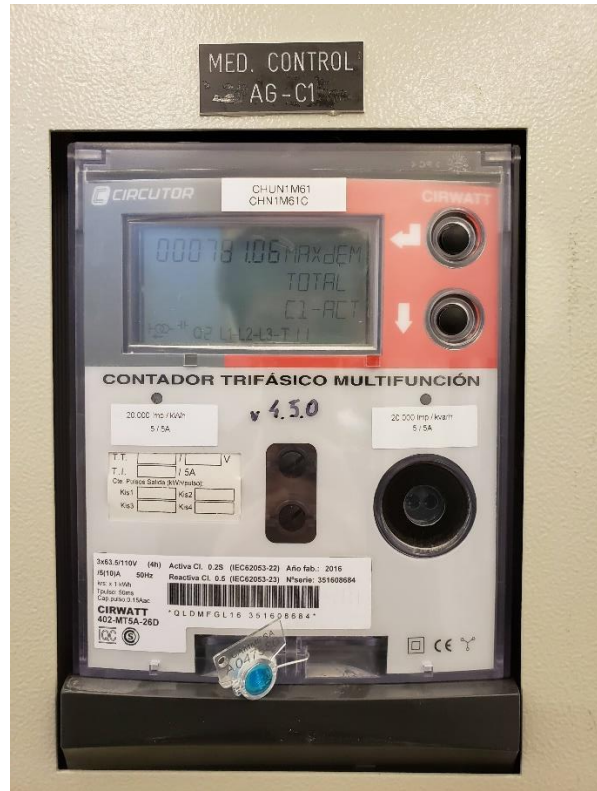


Table 21: Main and back-up meters' details Ullum I

	Serial	Model	Brand	Accuracy
Main	351608687	402-MT5A-26D	Circutor	0.2%
Back-up	351608663	402-MT5A-26D	Circutor	0.2%

Wind Farm Pomona I

Main meter



Back-up meter



Table 22: Main and back-up meters details Ullum I

	Serial	Model	Brand	Accuracy
Main	351803679	402-MT5A-26D	Circutor	0.2%
Back up	151803680	402-MT5A-26D	Circutor	0.2%

Wind Farm Pomona II

Main meter



Back-up meter



Table 23: Main and back-up meters' details Ullum I

	Serial	Model	Brand	Accuracy
Main	351803681	402-MT5A-26D	Circutor	0.2%
Back-up	151803682	402-MT5A-26D	Circutor	0.2%

Wind Farm Villalonga I

Main meter



Back-up meter



Table 24: Main and back-up meters' details Ullum I

	Serial	Model	Brand	Accuracy
Main	MW-1707A035-02	ION8650	SCHNEIDER ELECTRIC	0.2%
Back-up	MW-1706B597-02	ION8650	SCHNEIDER ELECTRIC	0.2%

Wind Farm Villalonga II

Main meter



Back-up meter

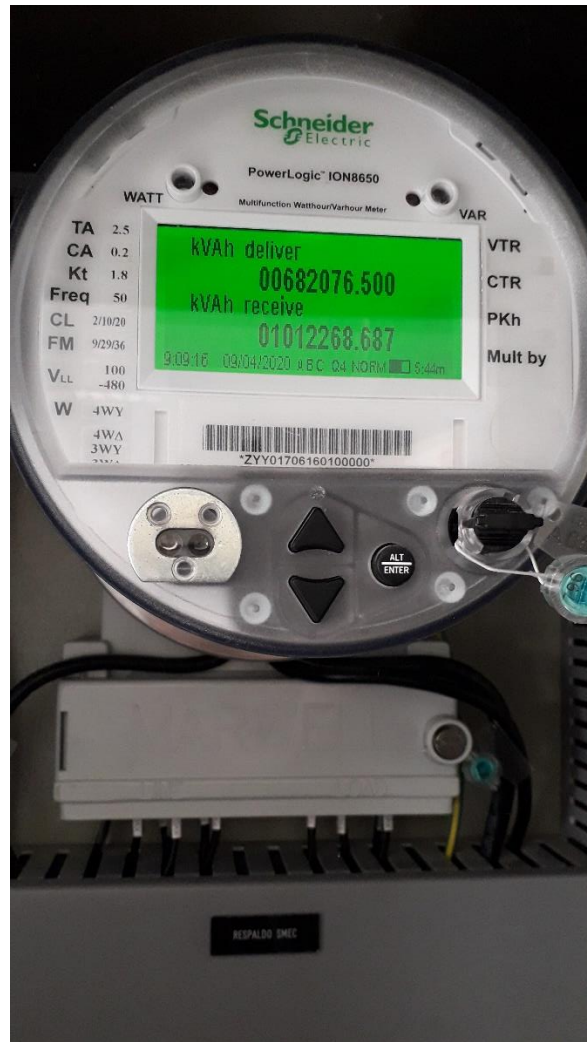


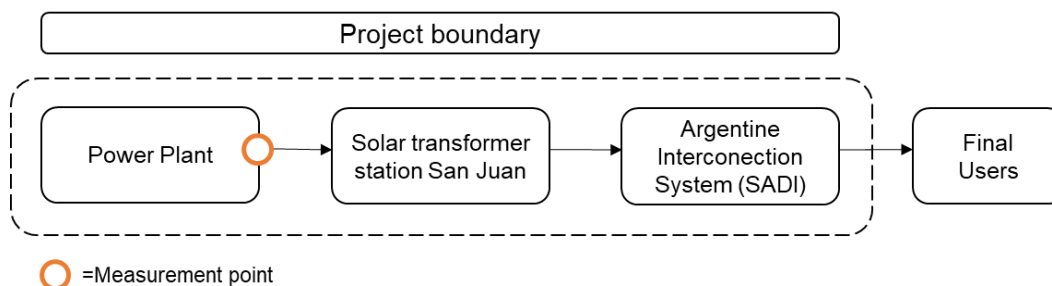
Table 25: Main and back-up meters' details Ullum I

	Serial	Model	Brand	Accuracy
Main	MW-1706B236-02	ION8650	SCHNEIDER ELECTRIC	0.2%
Back-up	MW-1706B242-02	ION8650	SCHNEIDER ELECTRIC	0.2%

All the meters are provided with built-in registers, and generation data is ready to download both remotely and/or locally by CAMMESA and the project developer. The information is acquired on programmable intervals, ranging from a minimum of one minute to a maximum of an hour.

The operational team frequently backs up the information. The data is included in an Excel spreadsheet for emission reductions calculations on a monthly basis. All data collected as part of the monitoring process are archived electronically and kept for at least for two years after the end of the last crediting period.

The following scheme shows the power plants, the substation and the metering points:



QA/QC Measures

As indicated, there is a main and a back-up electricity meter for each wind farm, which assures correct measurement in case of failures of the main electricity meters. Moreover, in case of failure of any of the meters, the project developer will proceed according to the 'Sistema de Medición Comercial' (SMEC) and CAMMESA regulations³.

If any other emergency does not allow the power generation of the plants to be measured correctly, or if data would be missing as a result of a failure in the monitoring process, no emission reductions shall be claimed during that period until correct function of the meters is again guaranteed, in addition to reliable data.

Personnel Responsible for Monitoring

Figure 3 shows the organizational chart of the monitoring.

³ Technical regulations available at <https://smec.cammesa.com/normativa/>

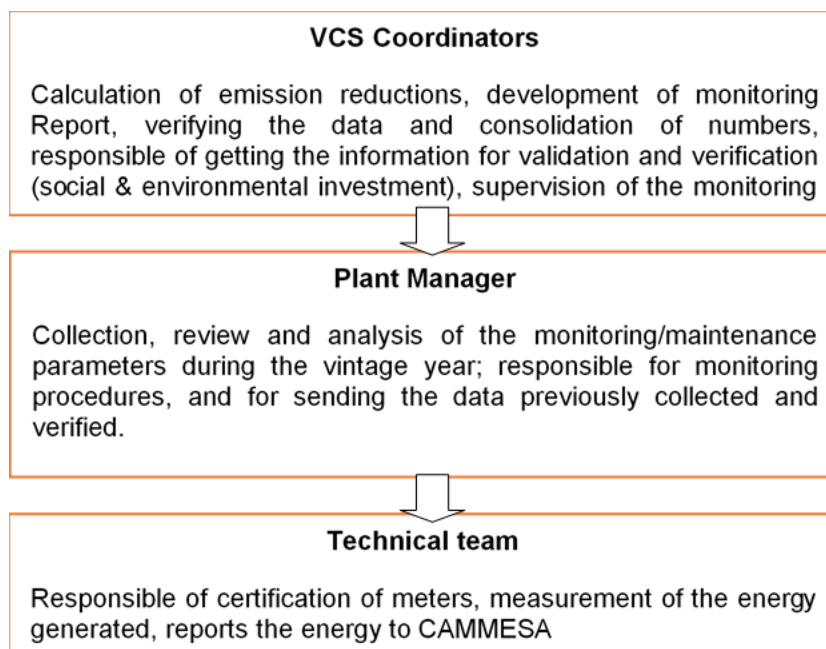


Figure 3: Operational structure of the monitoring plan

Responsible Personnel:

- The **VCS Coordinators** supervise the monitoring process and are in charge of compiling the monitoring data in an Excel spreadsheet and calculating the emission reductions of the monitoring period. They also develop the monitoring report in accordance with the VCS rules.
- The **Plant Manager** is responsible for verification of energy measurement. The Plant Manager is responsible for checking and verifying the meter readings.
- The **Instrumentation and Control Engineers** are responsible for electricity generation reading and for processing the energy produced by the project from the meters installed at the substation. Records of the meter are downloaded in a spreadsheet for measurement control and the data discharged from the meter is stored electronically and sent to CAMMESA.

Personnel who carry out monitoring tasks are familiar with the basic monitoring requirements and structures. New personnel have to participate in basic training in order to get familiarized with the monitoring procedures. Since the main monitoring tasks, i.e. the measurement of the energy production, the calibration of energy meters, and the reporting of the energy generation, are carried out independently from the VCS as part of the daily operation, no specific training is required. The VCS Coordinators are supported by an external consultant if necessary, in order to assure correct application of the monitoring procedures. They also carry out corrective actions if any inconsistency is identified and train the Plant Manager and the Technical Team, if necessary.

All data collected as part of monitoring is archived electronically and kept at least for two years after the end of the last crediting period.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline scenario and the emission rate calculation are based on the electricity that would otherwise have been generated by the plants connected to the grid and by addition of future plants. According to the methodology, no leakage emissions are considered.

Baseline emissions are calculated by multiplying the combined margin emission factor ($EF_{grid,y}$, in tCO_2e/MWh) by the electricity generated by the proposed project activity during the year y (EG_y , in MWh).

Baseline emissions include only CO_2 emissions from electricity generation in fossil-fuel-fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation by the project activity would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The detailed calculations and data of the baseline emissions are presented in the emission factor Excel spreadsheet. The relevant methodological approaches and equations are presented below:

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

Equation 1
(Equation 11 of the
ACM0002 v. 19.0)

Where:

- BE_y = Baseline emissions in year y (tCO_2/yr)
- $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
- $EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid-connected power generation in year y , calculated using the latest version of the 'Tool to calculate the emission factor for an electricity system' (tCO_2/MWh)⁴

Since it is a green-field project, according to Equation (12) of ACM0002 (version 19.0):

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

The expression $EG_{PJ,y}$ is used in this Project Document Design (PDD).

⁴ Calculated by Equation 6 of this document

The combined margin emission factor ($EF_{grid,CM,y}$) is calculated following the guidance in the 'Tool to calculate the emission factor for an electricity system' (Version 7.0) by applying the following steps:

- STEP 1. Identify the relevant electricity systems;
- STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional);
- STEP 3. Select a method to determine the OM;
- STEP 4. Calculate the OM emission factor according to the selected method;
- STEP 5. Calculate the BM emission factor;
- STEP 6. Calculate the CM emissions factor.

The following explains how each step is applied:

STEP 1. Identify the relevant electricity systems.

For determining the electricity emission factors, the project electricity system is defined by the spatial extent of the power plants that are physically connected (including imports) through transmission and distribution lines to the multiple project instances and that can be dispatched without significant transmission constraints. In this case, the project electricity system is given as the Argentine Interconnection System (SADI⁵).

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

In accordance with the tool, this step is optional. For the proposed project activity, off-grid power plants are not included in the project electricity system (Option 1).

STEP 3. Select a method to determine the OM.

In accordance with the tool, the calculation of the OM 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.

For the project activity, the simple OM is applied, using the ex-ante data vintage:

Ex-ante option: if the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a three-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation. For off-grid power

⁵ In spanish: Sistema Argentino de Interconexión

plants, use a single calendar year within the five most recent calendar years prior to the time of submission of the PDD for validation.

The OM was calculated using the simple OM method (option (a)), because as stated in the methodology, the 'Tool to calculate the emission factor for an electricity system' (Version 07.0), the following requirement is satisfied:

Low-Cost/Must-Run (LCMR) resources constitute less than 50% of total grid generation (excluding electricity generated by off-grid power plants) in average of the five most recent years.

As seen in the following table, the average of the five most recent years is below 50%:

Table 26: Percentage of LCMR Participation⁶

	2014	2015	2016	2017	2018	
LCMR (GWh)	47.940	50.245	47.720	48.362	50.099	Average
Total (GWh)	131.205	136.870	138.070	137.200	137.825	
%	37%	37%	35%	35%	36%	

All power plants connected to the SADI are included for the simple OM calculation. Power plants registered as Clean Develop Mechanism (CDM), VERRA or Gold Standard (GS) project activities are also included, as suggested by the tool. Historical data of the three most recent years is available at the Wholesale Electricity Market Management Company web page⁷.

STEP 4. Calculate the OM emission factor according to the selected method.

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including the LCMR power plants/units.

According to the 'Tool to calculate the emission factor for an electricity system (Version 07.0), the simple OM may be calculated by one of the following options:

- **Option A:** Based on the net electricity generation and a CO₂ emission factor of each power unit.
- **Option B:** Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

⁶ See Excel "191023_EG_SADI_Argentina_2018" spreadsheet for more details

⁷ Information available at: <http://portalweb.cammesa.com/memnet1/Pages/descargas.aspx>

As data for Option A is actually available, this option will be used for the calculation. Under this option, the simple OM emission factor is calculated based on the net electricity generation and an emission factor for each power unit, as follows:

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

Equation 2
(Equation 3 of the
TOOL07 v.7.0)

Where:

- $EF_{grid,OMsimple,y}$ = Simple OM CO₂ emission factor in a year y (tCO₂/MWh)
- $EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh).
- $EF_{EL,m,y}$ = CO₂ emission factor of power unit m in year y (tCO₂/MWh).
- m = All grid power units serving the grid in year y except LC/MR power units.
- y = The relevant year as per the data vintage chosen in step 3.

Ex ante $EF_{grid,OMsimple,y}$ is calculated as an annual generation weighted average of: $EF_{grid,OMsimple,2016}$, $EF_{grid,OMsimple,2017}$, $EF_{grid,OMsimple,2018}$.

Determination of $EF_{EL,m,y}$

The emission factor of each power unit m should be determined as follows:

Option A1: If for a power unit m , data on fuel consumption and electricity generation is available, the emission factor ($EF_{EL,m,y}$) should be determined as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{O2,i,y}}{EG_{m,y}}$$

Equation 3
(Equation 4 of
the TOOL07
v.7.0)

Where:

- $EF_{EL,m,y}$ = CO₂ emission factor for power unit m in year y (tCO₂/MWh).
- $FC_{i,m,y}$ = Amount of fuel type i consumed by power unit m in year y (mass or volume unit)
- $NCV_{i,y}$ = Net calorific value (energy content) of fuel type i in year y (GJ/mass or volume)

unit).

$EF_{CO_2,i,y}$ = CO₂ emission factor of 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 (MWh).

m = All power units serving the grid in year y except LCMR power units.

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

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

However, for the calculation of the emission factor of each power unit m , the following options should be considered as well, according to the availability of information:

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

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

Equation 4

(Equation 5 of
the TOOL07
v.7.0)

Where:

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

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

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

m = All power units serving the grid in year y except LCMR power units.

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

3.6 = Conversion factor (GJ/MWh)

Option A3: If for a power unit m , only data on electricity generation is available, an emission factor of 0 tCO₂/MWh can be assumed as a simple and conservative approach.

Determination of $EG_{m,y}$

For grid power plants, $EG_{m,y}$ has been determined according to the data collected by the monitoring systems of each power generation plant, these data are referenced in the emission factor Excel

spreadsheet. Using the data from the emission factor Excel spreadsheet it is possible to calculate the OM for the required three years (2016, 2017, and 2018).

- $EF_{grid,OM\ 2016}$: 0.5038 tCO₂/MWh

- $EF_{grid,OM\ 2017}$: 0.4887 tCO₂/MWh

- $EF_{grid,OM,2018}$: 0.4726 tCO₂/MWh

Therefore the weighted average $EF_{grid,OM,2016,2017,2018}$ remains as:

$EF_{grid,OM\ 2016,2017,2018}$	0.4885 t CO ₂ /MWh
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STEP 5. Calculate the BM emission factor

In terms of vintage of data, Option 1 of the tool is chosen, i.e. the *ex-ante* approach:

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 PDD submission 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. 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.*

Capacity additions from retrofits of power plants are not included in the calculation of the BM emission factor.

The sample group of power units m used to calculate the BM is determined as per the following procedure:

- Identify the set of five power units, excluding power units registered as CDM, VCS or GS project activities, that started⁸ to supply electricity to the grid most recently ($SET_{5-units}$) and determine their annual electricity generation ($AEG_{SET-5-units}$, in MWh);
- Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM, VCS or GS project activities (AEG_{total} , in MWh). Identify the set of power units, excluding power units registered as CDM, VCS or GS 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 ($AEG_{SET \geq 20\%}$, in MWh);

⁸ The date on which the plants started to supply electricity to the grid is available on:
<https://portalweb.cammesa.com/memnet1/Pages/descargas.aspx>

- (c) From $SET_{5-units}$ 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. Ignore steps (d), (e) and (f).

Otherwise:

- (d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM, VCS or GS project activity, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent that is possible. Determine for the resulting set ($SET_{sample-CDM}$) the annual electricity generation ($AEG_{SET-sample-CDM}$, in MWh); If the annual electricity generation of that set comprises at least 20% of the annual electricity generation of the project electricity system (i.e. $AEG_{SET-sample-CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample-CDM}$ to calculate the BM. Ignore steps (e) and (f).

Otherwise:

- (e) Include in the sample group $SET_{sample-CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);
- (f) The sample group of power units m used to calculate the BM is the resulting set ($SET_{sample-CDM- >10yrs}$).

As can be seen in the emission factor Excel spreadsheet, in this case all steps (a) to (f) need to be applied and the resulting sample group of power units m is the $SET_{sample-CDM- >10yrs}$.

The BM 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, i.e. in this case the year 2018. The calculation is made as follows:

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

Equation 5
(Equation 15 of the
TOOL07 v.7.0)

Where:

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

- $EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
 $EF_{el,m,y}$ = CO₂ emission factor of power unit m in year y (tCO₂/MWh)
 m = Power units included in the BM
 y = Most recent historical year for which power generation data is available

The emission factor of each power unit m in the build margin is determined analogous as for the OM by Equation 3 or other listed methods depending on the available information.

The detailed calculations are provided in the worksheet “Build Margin (BM)” of the emission factor Excel spreadsheet.

The resulting BM emission factor is (rounded):

$EF_{BM,2018}$	0.3282 t CO₂/MWh
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Step 6: Calculate the CM emissions factor

The CM emission factor is calculated as follows:

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

Equation 6
(Equation 16 of the
TOOL07 v.7.0)

Where:

- $EF_{grid,OM,y}$ = OM CO₂ emission factor in year y (tCO₂/MWh)
 $EF_{grid,BM,y}$ = BM CO₂ emission factor in year y (tCO₂/MWh)
 w_{OM} = Weighting of OM emissions factor (%)
 w_{BM} = Weighting of OM emissions factor (%)

For wind projects the weighting of OM and BM is done as indicated in the tool for the first crediting period, i.e. $w_{OM} = 0.75$ and $w_{BM} = 0.25$.

The CM emission factor is (rounded):

$EF_{grid,CM,y}$	0.4484 t CO₂/MWh
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Considering that the total electricity generation of the project for the respective monitoring period was 1,497,243.68, the total baseline emissions calculated with Equation 1 are as follows:

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

$$BE_y = 1,497,243.68 \text{ MWh} \times 0.4484 \text{ tCO}_2/\text{MWh}$$

$$BE_y = 671,364 \text{ tCO}_2$$

Project Instance	Generation (MWh)			Emission reduction (tCO ₂)		
	2018	2019	2020	2018	2019	2020
Chubut Norte I	14,750.56	139,102.81	140,736.42	6,614	62,374	63,106
Chubut Norte II	0	0	0	0	0	0
Pomona I	–	209,861.04	389,559.60	–	94,102	174,679
Pomona II	–	20,210.05	40,891.97	–	9,062	18,336
Villalonga I	23,082.32	236,466.89	252,274.90	10,250	106,032	113,120
Villalonga II	–	15,518.22	14,788.91	–	6,958	6,631
Total	37,832.88	621,159.00	838,251.80	16,964	278,528	375,872

5.2 Project Emissions

Since the project activity are the installation of six wind farms, the project emissions are zero.

$$PE_y=0$$

5.3 Leakage

No leakage emissions are considered as provided in the methodology:

$$LE_y = 0$$

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2018 (12/11/2018 to 31/12/2018)	16,964	0	0	16,964
2019	278,528	0	0	278,528
2020	375,872	0	0	375,872
Total	671,364	0	0	671,364