CLIENT. Vientos Neuquinos I S.A.

Location. Bajada Colorada - Neuquén Province

Date: March 21st , 2014

Report. EIA PEBC 001/-14

Environmental Impact Study Wind Energy Park Vientos Neuquinos I

Scudelati & Asociados

Asesores

ENVIRONMENTAL IMPACT STUDY WIND

ENERGY PARK VIENTOS NEUQUINOS I

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1 EIA PROFESSIONALS INVOLVED

16.1 DATA OF THE PROFESSIONAL INVOLVED

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2 GENERAL INFORMATION OF THE PROJECT

2.1 DATA OF THE REPRESENTATIVES OF THE PROJECT

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2.2 Company Main Activity

Vientos Neuquinos I S.A. (VNI) is a corporation created specifically for the development of the **wind energy farm** to be installed in **Bajada Colorada, national route 237, km 1391**. This company is performing all the investigations and managements according to the requirements of the Mercado Eléctrico Mayorista (MEM), CAMMESA, ENRE, EPEN and the Environmental and Sustainable Development Department.

Once obtained all the permits and approvals , VNI, will start the management stage of the purchase contract of energy, the integration of capital needed for the installation, construction, operation and maintenance of the wind energy park; thus fulfilling its social goal.

2.3 TECHNICAL, ECONOMIC AND SOCIAL JUSTIFICATION OF PROJECT

The recent economic and social development of the region has generated the need of energy originated in the regional productive sector (petrol, services companies and industries related with the activity) and in the consumption of the population as well. In parallel, the growth of warning in the population about the environment indicates the need of developing new clean inexhaustible energy sources, that contribute to improving the current energetic matrix ensuring the sustainable and maintainable provision in time.

The Argentine Republic, in accordance to derived compromises from the Kyoto Protocol, has been supporting an energetic model respectful with the environment, that ensures the supply and quality in the provision of energy. The following laws are part of this policy:

- National Law Nº 25.019. “Régimen de Fomento Nacional para el Uso de Fuentes de Energía Renovables destinada a la Producción de Energía Eléctrica”. Year 1988.
- National Law Nº 26.190. “Régimen de Fomento Nacional para el Uso de Fuentes de Energía Renovables destinada a la Producción de Energía Eléctrica”. Year 2006.

Keeping with the objective of Law N° 26.190 to reach in 2016 the 8% in the consumption of primary energies through renewable sources, all the opportunities of the local-generated capital in Argentina derived from its territory, climate and wind energy are promoted.
From the provincial point of view, it is important to indicate that the wind energy station is framed in the **Governmental Policy of the Neuquen Province**, called **Wind Energy Program**, which by Decree N° 1837/09, set aside permanently and for public use ends, fiscal property lots selected by ADI-NQN for the development of investment plans contemplating the generation, transport and distribution of electric energy of wind source.

As part of the rationale of this type of energy, it is important to indicate that the generation of wind energy is an endless resource. The use of this renewable and sustainable resource has several benefits to society , like: (i) reduction in the use of fossil fuels; (ii) the possibility of being an alternative of energy use coming from hydroelectric source, in particular during dry seasons like the one suffered recently; (iii) the contribution of a new source of energy to the national system allowing the State to earn in the import of energy. There are also external topics related to the project like the CO2 emission reduction, as well as the contribution to the development of local manpower, with regard to the consolidation of an industry associated to renewable energy market growth.

Given that Neuquen Province is in a process of industrial and social development, sustainable energetic sources like wind energy will enable the Provincial Government to extend the current energetic matrix strengthening the model of economic and social industrial growth, varying generation sources and aiming to mitigate risks which implies the use of hydroelectric sources.

Purposefully, in the different stages, the project will enable to increase the local and regional demand of services (hosting for the staff, food consumption, soil movement, staff transportation, renting of vehicles, vehicle repairing, water provision, among others); supplies (materials for the work, electric materials, fuels and oils, among others); manpower: specialized workers (welders, electricians, engineers, mechanics, etc) and technical personnel for permanent facility mounting (CONSTRUCTION STAGE).

It is important to indicate that this type of project reduces the risk of generating Environmental Passives that may be harmful for the heath of future generations.

It must be mentioned that wind energy projects are compatible with the soil use of the project site (intensive breeding of cattle and hydrocarbon activity), in a way that they do not modify or affect the population micro-economy, but reappraise soil use through employing the wind resource which is generally underused with only water extraction (water mills).

It must be mentioned as well that the increase of more projects to the regional scale will enable the development of supply service companies of wind energy parks maintenance with the subsequent creation of new jobs and specialties.

Finally, the Project will keep to the norms and requirements related to social impacts and will consider the participation of the community in regards the promotion of information about the technological characteristics and its affectation to the environment. These topics have been already taken into consideration during the preparation of the present report.

2.3.1 OBJETIVES

The objectives of the present project of wind energy generation are these:

- Obtain a more variety of energetic sources, to ensure less dependence of fossil and hydroelectric resources.
- Ensure satisfaction of the energetic demand reducing costs in the long turn.
- Guarantee a reliable supply through adequate energetic infrastructure.
- Develop an energetic plan respectful of the environment.
- Favor the development of synergy between the competitive objectives, security of supply and environmental safety.
- Creating jobs in the region during the Construction Stage (engineering, infrastructure, civil and electric works and installation) and during the Operation Stage (maintenance, service, management).
- Collaborate in the reduction of environmental impact replacing more contaminating energies of worse effects in the environment.
- Mitigate the generation of Environmental Passives once the service life of the project has finished.
- Collaborate in the strengthening of ecologic and environmentl conscience of the people considering the use of sustainable energy supply systems.

3 DESCRIPTIVE MEMORY OF THE PROJECT

3.1 LOCATION AND LOCALIZATION AREA

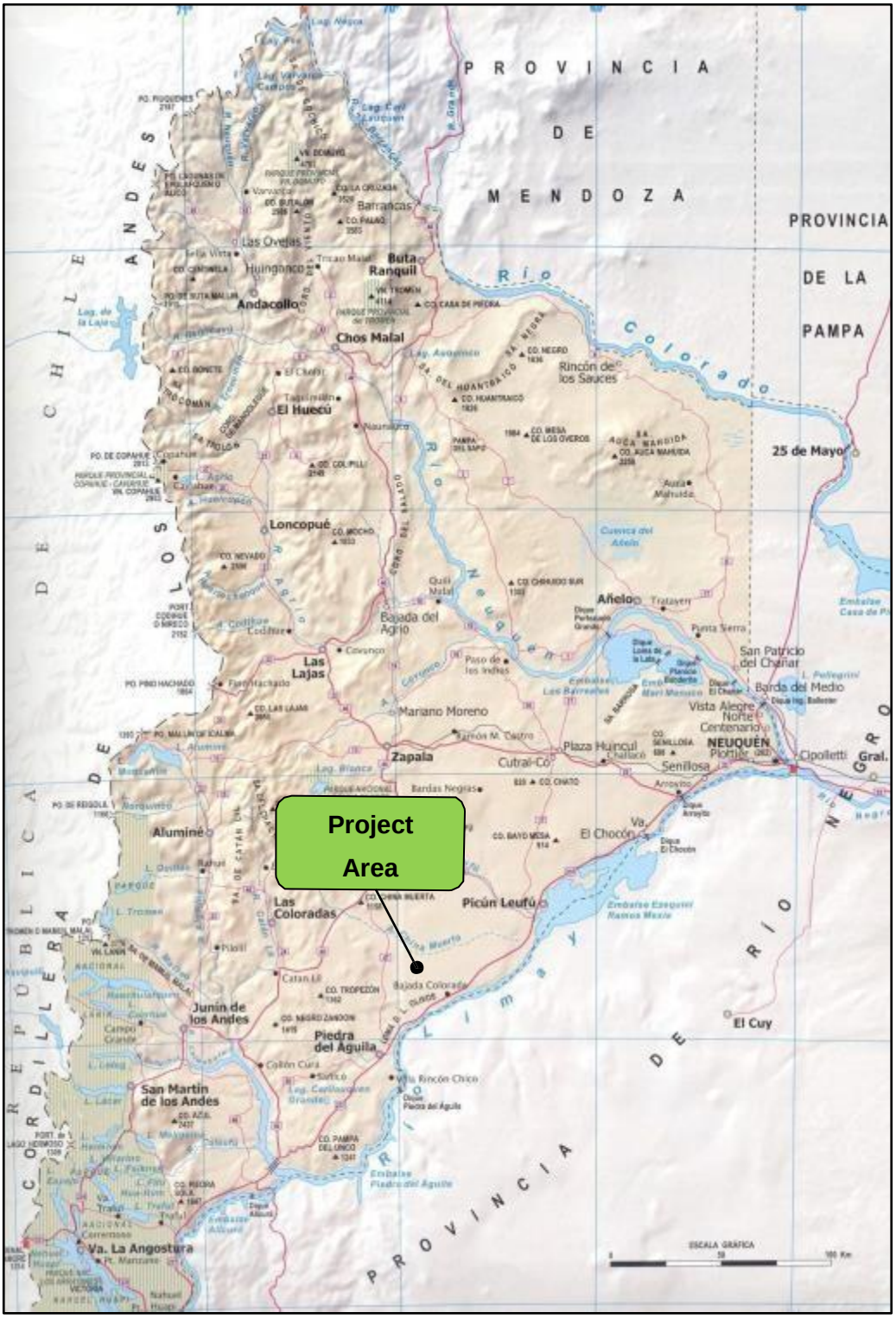
The Project is located over an area of fiscal property in the Neuquén Province. The **Fiscal Lot has been set apart by the Neuquén Province , so that Vientos Neuquinos ISA develops its project.**

Such area is located North of the town Piedra del Águila, within the Department Collón Curá of the Neuquén

Area Wind Energy Station Vientos Neuquinos I				
Corner Posts	Gauss Kruger Campo Inchauspe Zone 3		Gauss Kruger POSGAR 94	
	X	Y	X	Y
A	5.601.561.01	2.427.123.76	5.601.357.46	2.427.034.53
B	5.603.398.04	2.430.408.83	5.603.194.48	2.430.319.59
C	5.602.068.45	2.431.730.17	5.601.864.90	2.431.640.93
D	5.601.412.13	2.434.400.01	5.601.208.58	2.434.310.76
E	5.599.420.47	2.432.361.42	5.599.216.92	2.432.272.18
F	5.600.072.13	2.429.372.91	5.599.868.58	2.429.283.67
G	5.600.485.85	2.433.554.51	5.600.282.30	2.433.465.26
H	5.602.232.07	2.435.342.76	5.602.028.51	2.435.253.50
I	5.600.988.54	2.436.564.07	5.600.784.99	2.436.474.81
J	5.599.386.53	2.434.639.60	5.599.182.98	2.434.550.35
K	5.599.168.35	2.434.855.64	5.598.964.80	2.434.766.39
L	5.600.771.85	2.436.778.18	5.600.568.29	2.436.688.92
M	5.598.751.17	2.438.763.34	5.598.547.63	2.438.674.07
N	5.596.926.35	2.437.069.79	5.596.722.81	2.436.980.53

Table 01. Vertexes of the Project area.

In the following map there is the location of the Project with respect to the Neuquén Province and the nearest towns.



Map 01. Location of the Project Area in the Neuquén Province.

The Project zone is approximately at 7 Km North of the Paraje Bajada Colorada, at 38,5 Km North of the city of Piedra del Águila, at 49 Km South from the city of Picún Leufú and at 75 km South of the Basin Exequiel Ramos Mexía.

The Area of interest is located over a plateau and soft undulation zone and altitude varies between 550 and 650 msnm. These characteristics together with the absence of natural obstacles and the high speed media of the wind in the zone, contribute in a positive was with the objectives and development of the Project.

The main road of access ie the RP N° 47. Leaving from Piedra del Águila (located at 225 Km of the city of Neuquén) and tracing 16 Km by RN N° 237 to the Northwestern part, there is the crossroad with RP N° 47. From here, there are approximately 6 Km Northeast to reach the internal road by which the area of the Project can be reached. From there there is a a gravel road which goes Northeast. After approximately 23 Km the project site can be reached. The access roads are of gravel and have regular conditions of transit due to scarce traffic in the zone.

Picture 01 Aerial View of the Project from RN N° 237

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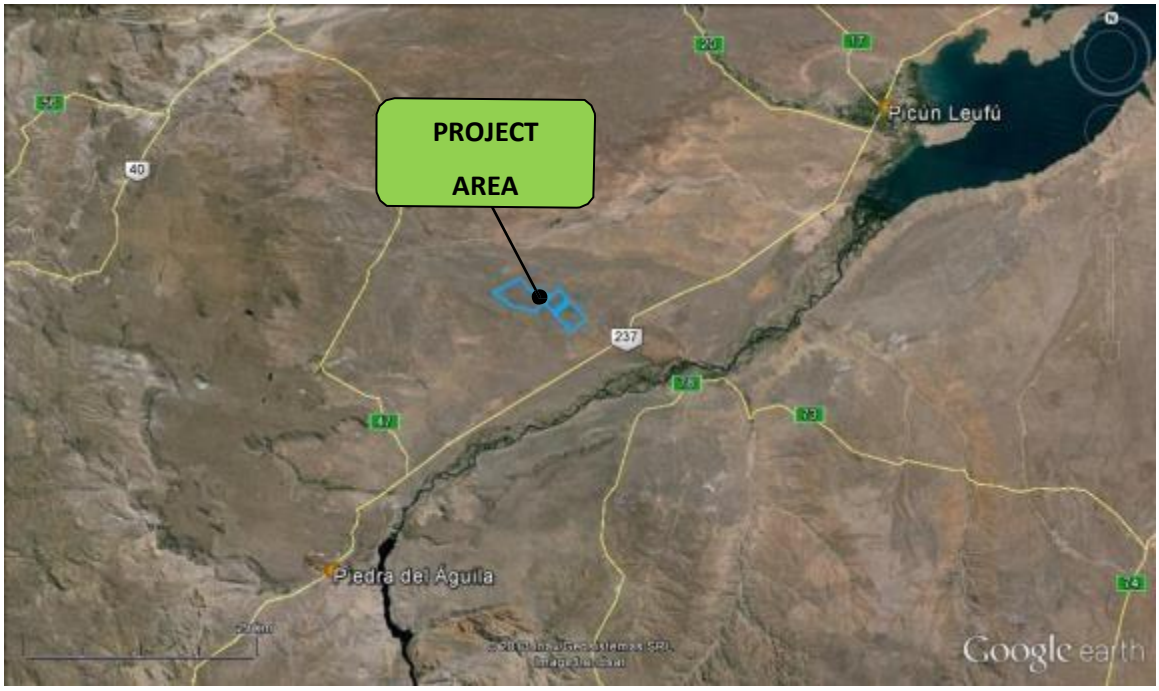
In the following satellite image it can be seen in blue the zone assigned to Vientos Neuquinos I S.A. for the development of the Project, as well as the main routes and nearest towns.

Picture 02 Access from RP Nº 47 near Piedra del Águila



Picture 03 Access Roads to the Project Area and nearest towns.

In the following tables the localization of each wind energy turbine can be seen within the Project Area**,** in coordenates Gauss Krüger Campo Inchauspe Argentina Zone 2 and Gauss Krüger Posgar 94 Faja 2.

WIND ENERGY TURBINE LOCATION				
Wind Turbines N°:	Gauss Kruger Campo Inchauspe Zone 2		Gauss Kruger	
	X	Y	X	Y
1	5,598,316.89	2,436,046.99	5,598,113.34	2,435,957.73
2	5,598,828.27	2,436,599.55	5,598,624.72	2,436,510.29
3	5,599,333.44	2,437,142.95	5,599,129.89	2,437,053.69
4	5,599,805.68	2,437,654.05	5,599,602.13	2,437,564.79
5	5,598,639.51	2,435,738.62	5,598,435.97	2,435,649.36
6	5,599,153.72	2,436,294.68	5,598,950.18	2,436,205.43
7	5,599,637.87	2,436,828.22	5,599,434.32	2,436,738.96
8	5,600,089.58	2,437,360.81	5,599,886.03	2,437,271.55
9	5,598,954.45	2,435,427.52	5,598,750.91	2,435,338.27
10	5,599,452.35	2,435,990.59	5,599,248.80	2,435,901.33
11	5,599,949.75	2,436,536.04	5,599,746.20	2,436,446.78
12	5,600,387.01	2,437,075.68	5,600,183.46	2,436,986.42
13	5,600,225.19	2,436,253.84	5,600,021.64	2,436,164.59
14	5,600,663.19	2,436,790.46	5,600,459.64	2,436,701.20
15	5,599,774.88	2,434,625.94	5,599,571.33	2,434,536.69
16	5,600,720.29	2,435,776.65	5,600,516.73	2,435,687.39
17	5,601,160.22	2,436,312.12	5,600,956.67	2,436,222.86
18	5,600,050.57	2,434,336.37	5,599,847.02	2,434,247.12
19	5,600,544.28	2,434,919.86	5,600,340.73	2,434,830.61
20	5,601,007.79	2,435,496.15	5,600,804.24	2,435,406.89
21	5,601,446.05	2,436,028.86	5,601,242.50	2,435,939.61
22	5,600,391.44	2,434,011.44	5,600,187.89	2,433,922.19
23	5,600,855.44	2,434,623.21	5,600,651.89	2,434,533.96
24	5,601,313.30	2,435,207.68	5,601,109.75	2,435,118.42
25	5,601,756.22	2,435,754.74	5,601,552.67	2,435,665.49
26	5,599,821.17	2,432,335.60	5,599,617.62	2,432,246.35
27	5,600,779.86	2,433,621.61	5,600,576.31	2,433,532.36
28	5,601,297.44	2,434,194.77	5,601,093.89	2,434,105.52
29	5,601,671.06	2,434,860.18	5,601,467.50	2,434,770.93
30	5,602,068.97	2,435,408.66	5,601,865.42	2,435,319.40

WIND ENERGY TURBINE LOCATION				
Wind Turbine N°:	Gauss Kruger Campo Inchauspe Zone 2		Gauss Kruger	
	X	Y	X	Y
31	5,600,193.61	2,431,989.70	5,599,990.06	2,431,900.45
32	5,600,067.68	2,430,989.97	5,599,864.13	2,430,900.72
33	5,600,520.17	2,431,625.36	5,600,316.61	2,431,536.11
34	5,600,420.44	2,430,630.34	5,600,216.89	2,430,541.10
35	5,600,873.79	2,431,273.13	5,600,670.23	2,431,183.88
36	5,600,385.71	2,429,649.92	5,600,182.16	2,429,560.68
37	5,600,802.57	2,430,264.02	5,600,599.02	2,430,174.78
38	5,601,235.46	2,430,923.86	5,601,031.91	2,430,834.62
39	5,600,751.24	2,429,344.67	5,600,547.69	2,429,255.43
40	5,601,146.15	2,429,947.87	5,600,942.60	2,429,858.63
41	5,601,580.52	2,430,602.66	5,601,376.96	2,430,513.42
42	5,601,988.37	2,431,297.86	5,601,784.81	2,431,208.62
43	5,601,089.00	2,428,972.98	5,600,885.45	2,428,883.74
44	5,601,494.45	2,429,581.83	5,601,290.90	2,429,492.60
45	5,601,921.29	2,430,277.21	5,601,717.74	2,430,187.96
46	5,602,347.58	2,430,954.11	5,602,144.02	2,430,864.86
47	5,601,845.61	2,429,245.24	5,601,642.06	2,429,156.01
48	5,602,257.30	2,429,956.59	5,602,053.75	2,429,867.35
49	5,602,190.46	2,428,860.26	5,601,986.90	2,428,771.03
50	5,602,636.00	2,429,556.56	5,602,432.44	2,429,467.32

Table 02. Geographical reference of the turbines of the Wind Energy Station.

In Annex I- Wind Energy Station Plan Vientos Neuquinos I, is observed the extended localization of the wind energy turbines that will be located in the Project.

In the centre of the Project Area, close to the electric transmission line, the Transformation Station will be located together with auxiliary facilities. Such Station will have an approximate dimension of 120 m for 100 m, while the approximate highest height will be of 14 m corresponding to the gantry of incoming lines. Down below there are the location coordinates of the Transformer Station.

Location of the Transformer Station		
Vertex	Gauss Kruger POSGAR 94 Zone 2	
	X	Y
1	5,600,563.07	2,436,690.72
2	5,600,527.83	2,436,720.92
3	5,600,494.97	2,436,682.55
4	5,600,530.20	2,436,652.35

Table 03. Geographical reference of the turbines of the Wind Energy Station.

3.2 SPECIFICATION OF THE SITE SURFACE

The site of fiscal property where the Wind Energy Park will be located occupies an area of approximately 2.603 has, made up of fractions of field identified with the following cadastral naming. 14-RR-020-2849-0000 and 14-RR-020-2560-0000

Here is the surface occupied by each of the permanent facilities, in a summarized way.

Facility	SURFACE (M2)
Foundations.	14,450
INTERNAL ROADS	168,000
CRANE WORK PLATFORM	40,000
Trenches for internal wiring of the park	18,600
Buildings (control room, office, meeting room and deposit)	310
Transformer Station	12,000

Table 04. Surfaces to be occupied by the Wind Farm facilities

3.3 ACTIVITY TO BE DEVELOPED

3.3.1 GENERAL TECHNICAL ASPECTS OF THE PROJECT

At present there are under evaluation the different models of wind energy turbines, of similar technology but of different industry of origin. Being the power of each wind turbine of 2MW, the implementation will require 50 wind energy turbines to cover an installed power of 100 MW

The wind turbine model and technology to be used will dispose of three blades and a steel tower. The main characteristics and dimensions of the type of turbine to be used are from the VESTAS firm which will be used a generic machine for this EIA.

The wind energy turbines to be used consist of three main elements which are formed and mounted during the Construction Stage : the tower, the nacelle and the three-blade rotor. Other minor components include the cube, the frontal cone, the wiring, the control panels and the internal installations of the tower, stairs, among others.

The minimum service life of a wind turbine is 20 years, under conditions of extreme winds. For moderate or low wind intensity of turbulence it is probable that original turbines may reach 25 years of service before requiring replacement of re dimensioning.

VESTAS Turbines have a three-blade rotor and self-regulating inclination and orientation. It has a rotor diameter of 90 m which operates using the OptiSpeed TM This characteristics enables the rotor to operate with a variable speed (RPM) and in this way improve its aerodynamic efficiency.

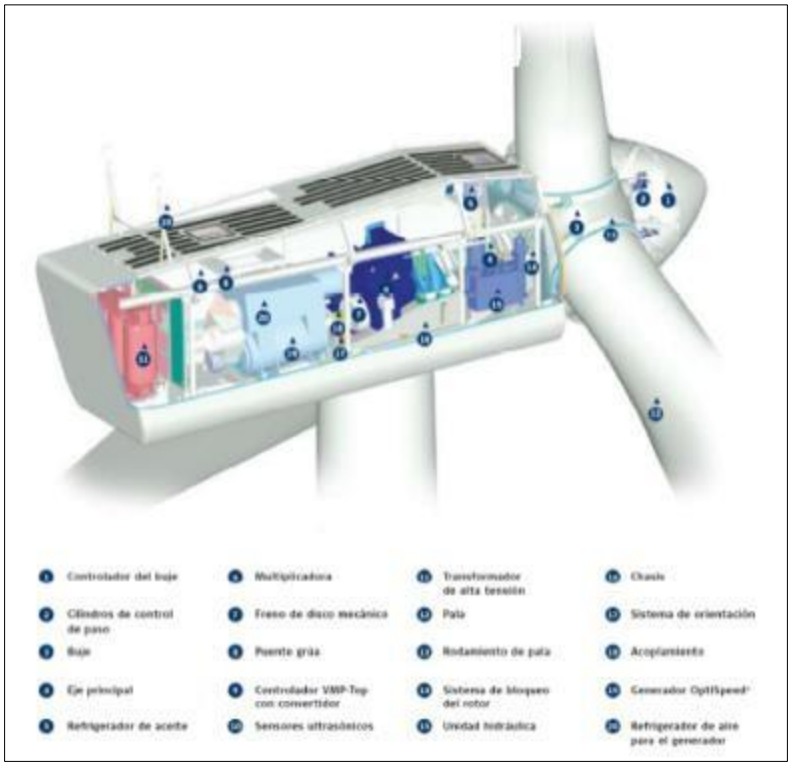


Figure 01. Main components of energy conversion of wind energy turbines Vestas (Source: www.vestas.com)

Turbines will be equiped with the OptiTip® system , pitch regulation special system (inclination of the attack angle) VESTAS. With OptiTip®, blade inclination angles are constantly regulated to the optimal position according to the wind regime **The purpose of this system is to improve energy production as well as the sound emission level.**

The blades will be built with reinforced epoxy with glass and carbon fiber. Each blade will consist of two panels united to a support beam with fastenings of special steel which connect them to the support bearing. This will be a 4-ball bearing connected welded with bolts to the hub of the blade.

The main axis will transmit energy to the transformer through the multiplier box. This will be a combined box with planetary and spiral gears. From the multiplier box, the movement will be transmitted to the generator through a high-speed coupling. This will be a special asynchronous four-pole generator with wound rotor. The transformer riser of tension will be located in a separate compartment in the back part of the nacelle. The transformer design will be of dry resin, specially developed for the operation of wind turbines. It is important to be detailed that such a transformer will be free of PCBs base refrigerant oil according to what is indicated by the current international legislation.

At any wind regime, OptiTip® and OptiSpeed™ systems will improve energy generation, independently of the temperature or air density. At high speed of winds, energy production will be maintained in its nominal value. The turbine will be equipped with an aerodynamic braking system, which will stop the rotation in case it is needed. This braking system will perform a change in the attack angle of the blades taking the rotation speed of the rotor to the desired control value. Besides, there will be a disk brake system will be located in the axis of high speed of the multiplier. This brake will only be activated by hand pulsating the emergency stop inside the turbine.

Pitch regulation (blade rotation) will be done by 3 hydraulic cylinders, one for each blade. The hydraulic unit will be installed in the nacelle and will provide the hydraulic pressure adequate both for the pitch regulation and the braking system. These systems will be equipped with hydraulic batteries to ensure a secure stop that may be controlled during interruptions in the electric network.

In the upper part of the tower, a rotation system composed of 4 gearings will guide the nacelle. This system will be made up of flat gearings of internal friction.

The reinforced glass-fiber cover will protect all the components inside the nacelle from the rain, snow, powder, solar light, etc. A central opening in the base will provide access to the nacelle from the tower. A crane bridge of 800Kg will be installed inside the nacelle. The crane will be able to be replaced by rigs of

7.500 kg.

Given that potentially the blades of a wind turbine may reflect electromagnetic waves, the height of the wind energy turbine and its blade-length are important elements to consider in the design. Potential electromagnetic interference are related to terrestrial telecommunications (radio AM/FM, radio links, among others), aerial radio navigation systems and radar systems. The location of the Wind Energy Park respect to near towns and the height of the equipments make us assume that the affectations by electromagnetic interference will occur in the radius of 1 to 2 Km from the wind energy equipment, being perceived by the Company employees, passers-by and rural settlers in the nearest work station.

Wind energy equipment is coated with anti reflecting coating (matte) reducing the risks of sudden glare by sunlight over the blades of the equipment.

To avoid risks for the airplanes that circulate through the zone, the equipment will have the adequate beaconing system with paint and lights according to the required by aerial authorities.

The foundations of the wind energy turbines will be connected to a steel mesh which will act as earthing and each equipment will have a lightning rod. Auxiliary Electric installations also will count with inbuilt earthing and lightning rods.

OptiSpeed™ System- The OptiSpeed™ system will ensure a constant and stable generation of electric energy through the turbine. The OptiSpeed™ system will consist of an asynchronous generator with bolted rotor of slip rings, a power

conversor with IGBTswitches , contactors and electric protection and it will enable the turbine to operate at variable speed. OptiSpeed and OptiTip systems will ensure the improvement in the production of electric energy, the reduction of sound emission level and the reduction of mechanical charges over the multiplier box and other vital components of the wind turbines. The system will control the electric energy in the rotor circuit of the generator. This will enable a precise control of the reactive power and a sequence of soft connection to the network.

Multiprocessor VESTAS. All the functions and operations of the wind turbine are monitored and controlled by a control unit commanded by a microprocessor called VMP. This control system will be equipped with a number of sensors that will ensure an optimal and secure operation of the wind turbine. The VMP controller will consist of various individual systems of secondary regulation. Each system will have tasks separated from the main operation and will communicate through optical network (ArcNet). The operative system will be VxWorks® created to satisfy the demands on stability, flexibility and safety expected in a wind turbine.

3.3.2 PARTICULAR TECHNICAL ASPECTS OF THE PROJECT

In **Anexo I – Wind Energy Park Plan**, a general vision of the Project is offered Its main technical characteristics are:

- Total quantity of wind energy turbines: 50
- Nominal Power per wind energy turbine 2MW/2000kW.
- Total Power of the Wind Energy Park Project: 100 MW.

The wind energy turbine position has been given having in mind the predominant directions of the wind, distributing the equipment in a perpendicular form to it. It has been kept a minimum distance between the foundations of the wind turbines of 7 to 8 rotor-diameter. This separation is enough to ensure (i) a good development and reduce the turbulence provoked by the wind turbines, (ii) reduce the risk of chain effect in case of a piece detachment of one of the wind energy turbines or a tower fall.

3.4 PROJECT SCHEDULE

Down below are the dates of execution of the general actions contemplated for the development of the Wind Energy Park Project.

Stage	Months
Sign of the PPA and financial closure	6
Work Engineering	4
Service Providers	2
Wind Turbine Construction	8
Civil and Engineering works	8
Submission and transport of foundation rings.	2
Transformer Station Construction	8
Transportation of the Wind Turbines to the site.	2
Installation of the WInd Turbines.	4
Start-up of the Wind Farm	1
Installation Test	1
Close up of the work.	1

Table 05. Due dates for action executions

4 CONSTRUCTION STAGE

For the construction of the Wind Park it will be required the preparation of several areas, which are related with the permanent structure to be developed in the site. As permanent infrastructure is considered:

- Wind Energy Turbines
- Foundations.

Internal Roads

- Platforms for cranes
- Internal wiring and connection to LAT.
- Electric Transformer Station
- Auxiliary building
- Office facilities, toilets and storage spaces.
- Treatment of sewer effluents system.
- Temporary storage sector of dangerous waste.

The Construction Stage comprises the following steps:

- **Preparación**

- Setling of the consultants and engineers for the plannification.
- Preliminary studies (soil structure, statics, transport, etc)
- Detailed design and specifications of the offers (formulation of quoting, etc)
- Specification of contractors (separate contracts or general recruitment)

- **Site preparation for temporary installations**

- Preparation of the zone for the construction of the facilities.
- Location of the temporal facilities (trailers, sewer treatment plant, temporal deposit of dangerous waste, place for the storage of fuels and lubricants, place for the storage of electric supplies, place to store equipments, etc.)
- Incorporation of the mobile equipment.
- Supply of services to the work area (electricity, water, termporary storage of waste, etc)
- Supply of provisions for the work (formwork material, pipes, cables, fuels, lubricants, etc.)

Construction Tasks

- Grubbing, soil movement, soil compacting and engineering works: internal road preparation, new and adequate site for the location of the foundations;

. Preparation of internal roads, internal corridors and easement strip.

- Crane Work Platform Construction
- Excavation, formwork and concreting of the foundations.
- Trenches and wiring of underground electric lines and optical fiber.
- Construction of civil work of the transformer station and permanent facilities : control room, toilets, storage areas, sewer treatment system, contention room for oil spills, etc

Transport and mounting work

- Transportation of the wind turbines from the port to the location site.
- Elevation of the wind turbines in the location site.

Closure

- Installation work of the turbines (mounting and connection)
-Identification of wind energy turbines and safety signs
- Test run of the facilities (connection to the public network)
- Closure and departure of the temporal facilities
- Cleaning the site
- Filling, leveling, scarification and re planting of indigenous species according to the information of the flora of baseline and the landscape design of the areas concerned.

The specific actions previously mentioned do not have a strict order of realization. Many of these tasks may be executed parcially or totally in parallel, since the project is not a construction in series.

4.1 OPERATIONS AND PROCESSES

4.1.1 Temporal Facilities

During the Construction stage several temporal facilities will be located in the surrounding sectors of the work. All the temporary facilities as signs, fencing, work materials, and waste generated will be withdrawn once the Construction Stage has finished. There will be scarification tasks, re planting of indigenous species, hoisting crane platforms, workroom of the site, and all the sectors that have been installed as temporal facility.

Base Camp As a principal element of the base camp there are the pre manufactured modules, type shelter with its corresponding service facilities and air acclimatization. There will not be installed dormitories in the zone due to the fact that the workers employed during the Construction Stage will not sleep in the Project Area. The workers will be transported daily to the city of Piedra del Águila.

The modules will enable the installation of these dependences in the base camp:

- Office and meeting room for the management of the project and construction.
- External Personnel Office.
- Canteen
- Clothing room and restrooms.
- Tool Storeroom and workshop.
- First Aid Room

It is to name that in the base camp there are also services like:

- An area of supply and material storage Such sector will be adequately fenced and with identification signs to establish the elements stored in it.
- A temporal site for waste treatment management. Such sector will have an adequate signaling. The floor and spill-contention walls will be waterproof with polyethylene of high density and will have

sheet-gable roof to avoid the pouring of rain. . It will have prevention signaling of risks and the material stored will be appropriately identified. The site will have a wire fencing to avoid the entrance of other people or animals. It will have an entrance gate where there will be signaling indicating ENTRANCE FORBIDDEN TO ANY UNAUTHORIZED PERSON. In its external part there will be extinguishers according to the study of charge of fire related to the maximum charge stored.

- A parking space for heavy equipment and other light vehicles. Such sector will be adequately signaled and the vehicles in it will be a starting position. All the vehicles parked there must have with flame arrester. It is not predicted that there will be in the workroom an area for cleaning and/or maintenance since both tasks will be done by contractors out of the project area in areas designated by environmental authorities. .

- Lubricant storeroom. This room will have a sheet-gable roof , contention enclosure built with embankment of soil as consolidated filling and waterproof walls, and the floor with polyethylene of medium density to avoid potential spills into the natural soil. The contention enclosure will be designed to contain 10% additional to the maximum capacity of lubricant storage in the sector. Inside it will have a metal platform in which there will be oil containers in order to control potential spills. Such platform will have a metallic ramp to ease the elevation of the containers. In the external part of the sector there will be safety signaling and labor risk indicators, as well as extinguishers according to the type of study of fire charge done and elements for the contention of spills (diatomite, sand, plastic scovel and containers with 200 liters with a lid for the disposal of contaminated waste).

- Restrooms for the personnel equipped with treatment of grey and black waters The same will be used for the treatment of effluents originated in the restrooms (black waters) and in the washing-up (grey waters) It will be comprised by a tank of PRFV, equipped with buffers and incorporation of additives that may permit an adequate treatment of

effluents . It is important to indicate that the treatment system will meet all the requirements in the current legal frame, the provider of service will have the obligatory permission of the environmental authority /EPAS and it will be needed the presentation of the permission for the disposal of effluents given by environmental authority /EPAS prior to the beginning of the Construction Stage.

- Fuel Tanks (gasoil) of 30 m^3 capacity, located in the inside of a contention room built with embankment of consolidated natural soil and the walls and floor must be waterproof with polyesthylene of medium density, to avoid potential spills. The contention enclosure will be designed to contain 10% additional to the maximum capacity of storage of the fuel, this is 30 m3. It is important to indicate that the charge and discharge sector will be waterproof with polyethylene of high density to avoid spills and/or splashes during the execution of the tasks. Inside the room there must be order and cleanness, and it will not be permitted any element or material from the outside. The tank will be coated with epoxi paint, without any breakage or corrosion signs, it will have the adequate identification visible that permits to establish , at least, manufacturer data, number of manufacture, date of construction, nominal capacity in liters, test pressure and maximum temperature of service, remarking the inscription "EXCLUSIVE USE FOR GAS OIL" visible at the front. The vent line of the tank will have at least 1.5-meter height over its upper part, being the discharging point upwards and protected with a protection to avoid pouring rain. The transfer of fuels from the tank to the vehicle will be through an equipment whose motor and electric installation have at least a protection of IP 55 duly certified in origin and ratified by audit safety company. The tank will be located at a distance over 3 meters with respect to the circulation roads of the temporary facilities. It will have a metallic enclosure that may permit to collect the liquid that purges after charge and discharge tasks. The fuel storage sector will have extinguishers duly charged in quantity enough according the charge of fire stored, signaling and contention elements in case of spills (diatomite

sand, plastic scovel and a 200-liter container with a lid for the disposal of contaminated waste). The tank will have PAT authorized by work safety and it will show current hermetic proof as required by the Secretaría de Energía de la Nación.

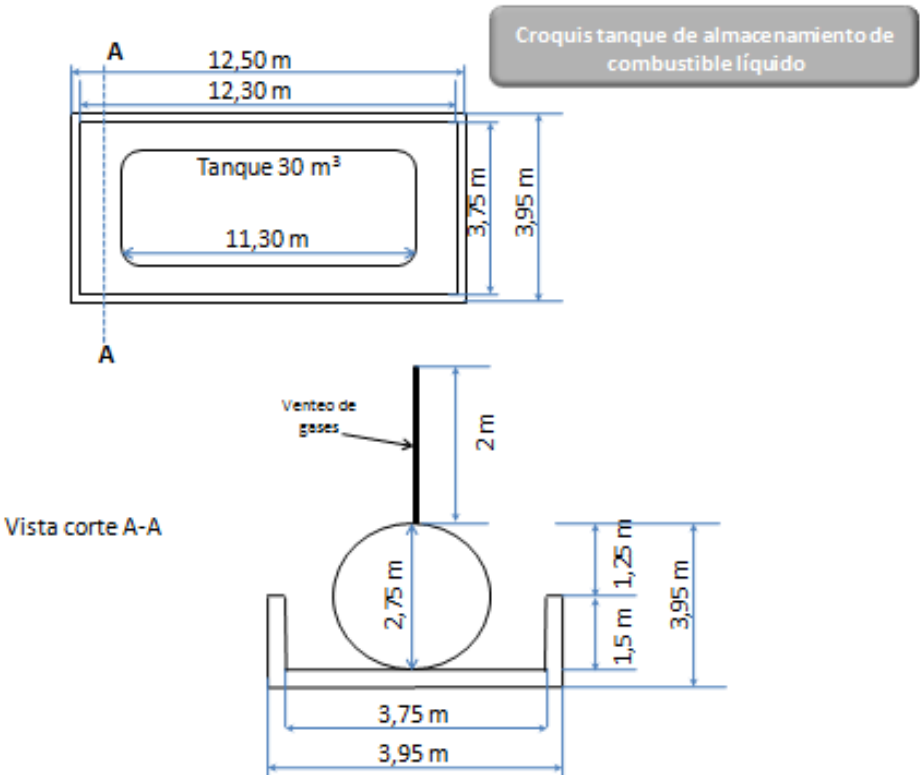


Figure 02. Liquid Fuel Tank

- Water Storage Tank for restrooms and canteen (10 m^3). Such tank will have a provision of water for services of extraction and provision of drinking water and that will be used for the restrooms and cleaning of kitchen elements. It will be a PRFV tank. About the liquid stored in it , there will be daily controls as indicated by current work regulation.

- Control gatehouse.

Any site where temporal facilities are installed will have a perimeter fencing (wiring of 3 to 5 threats) that avoids the entering of fauna or strangers to the work site, and gates/palisade and safety signs.

The base camp with have external lights. The wiring to such lights and the general lighting of the place will be underhand with rods indicating its presence and risk. Until the Transformer station is built and connected, the provision of energy will be done by portable generator sets not over 10 KW.

It is predicted that the temporary facilities will occupy a surface of 5.000 m2.

The area needed will depend largely on the type and size of unfolded equipment, the selected site, the logistics and supply quantities required , for the total projected surface for the construction of temporary facilities may be modified. The modifications that may be produced will be informed previously to the appropriate competent authority.

It will have elements of shower against fires(extinguishers) in the needed quantity within the workroom area as indicated in the study of charge of fire to be made considering the facilities and substances stored. There will also be extinguishers and flame arresters in the vehicles of the site.

Roads All the roads in existence and the temporal ones will be signaled with road posters and signs. Access roads will be identified and there will be sings of approximation indicating the entrance and exit of vehicles for the presence of the work, signs preventing the crash with animals, road safety signs (maximum speed limit), signs for banned hunting, signs for no fires permitted, signs for non smoking, etc.

Equipments in the sites of location of the wind energy turbines. Each site for the construction will have independent electric systems formed by generators (operated by gas oil)

In case of needed, the distribution of fuel to the field will be done through a vehicle duly authorized and equipped with a fuel tank. All operation of fuel charge in the field will be done previously putting

in the charging site a waterproofing membrane with small embankments waterproof that avoid the liquid spill and soil affectation.

4.1.2 MATERIAL AND MACHINERY TRANSPORT

The components of the wind turbines, may potentially be delivered by the manufacturer in the port of Bahia Blanca. In this basis and after assessing the logistics, the route of transport chosen to the area of the wind energy park will be donde since the Port of Bahía Blanca (Buenos Aires Province), by National Route N°3 along 22Km up to reach Nation Route N° 22. By this route, up to the town of Senillosa (Neuquén Province) up to reach National Route N° 237, in direction towards the city of Piedra del Águila, 16 Km before the access to this town there is a crossroads with National Route N°47 (gravel). By this route 5 Km North up to reach the downhill that drives you to direction NE and is traced along 24.5Km up to the access of the Project Area.

Prior to the transportation of the turbine components the circulation permission for national and provincial routes given by Dirección Nacional de Vialidad will be required to the DIrección de Vialidad of the Buenos Aires Province , the Dirección de Vialidad of the Rio Negro Province and the Dirección de Vialidad of the Neuquén Province.

According to the construction requirements, it will be requested the circulation and operation of vehicles, machinery and additional equipment for the development of works during the Construction Stage, such as:

- Mixer trucks.
- Crawler and fixed cranes (principal and auxiliary).
- Telehandlers.
- Special excavators
- Bulldozers
- Wheel loaders and crawlers.
- Concrete pumping system

- Scrapers.
- Transport vehicles (dump trucks, buses, etc.).
- Trenchers
- Compacting equipment
- Special equipment (For example,upright drills).

The details for type and quantity of vehicles, machinery and equipments used will be specified by the contractors, thus they have not been stipulated in the present Study. This information will be sent in due course by note to the authorities of the Project.

The materials for the work that will be transported to the site of the Project will be the following:

- Aggregates or similar materials for the road construction storage areas.

Concrete and/or plastic tubes(for drainage and/or piping).

- Especial materials (for example, geogrid).
- Concrete or cement and aggregates
- Steel for frames

Electric cables

- Telecommunication cables (optical fiber).
- Wood for formwork and other building

materials.
- Electric equipment
- Operative supplies and lubricants for building equipment (gas oil and lubricant oils).

All the materials will be transported in suitable vehicles. The number of trips to hand the equipments have not been estimated in the stage of the Project.

The Company predicts to contract the provision of aggregates from regional providers duly authorized for their extraction by the Subsecretaría de Minería e Hidrocarburos of the Province. Such authorization will be required to

the contractor and a copy of it will be sent to the beginning of the Construction Stage.

4.1.3 MATERIAL AND SUPPLIES STORAGE

As mentioned before, it is predicted to have a temporary area of storage for materials and supplies

There will be an open-air storage of:

- Concrete and/or plastic tubes.
- Concrete or cement and aggregates
- Steel for frames
- Formwors and other building materials
- Aggregates

In metallic containers with lids:
- Especial materials (polyethylene of high density).
- Electric equipment
- Electric cables
- Telecommunication cables (optical fiber).

As mentioned before, lubricants will be stored in the sector designed for that end. In case of gas oil , it will be stored in the sector described above.

Normally, turbine components will not be stored in this sector and will be mounted once they have entered the area of the Project. The required surface for the storage will be approximately 350 m2. It will be occupied during a short period of time.

After finishing the mountain work of the wind energy turbines, restoration measures will be applied over the storage area in order to recompose the native flora.

the planting of exemplars according their distribution and the type of species determined in the Base line Study.

4.1.4 EXCAVATION OF THE FOUNDATIONS.

Prior to the beginning of the work, the Company will conduct a structural soil study which will be presented to the environmental authority. According to its results, the engineers will suggest the type of structure base to apply. To select the type of structure base , stability and the needs for the construction or functionality of the structure will be considered. Initially it will be used a superficial foundation (flat) Nevertheless, depending on the results of the soil study mentioned previously, the engineers might suggest the construction of other type of base. The objective of this Study will be to ensure the stability of the foundation during the service life period of the project, considering the solicitations that will be applied over all the structure of the wind turbine equipment.

The Project will require several types of foundations, including: foundations for the transformer station and the installations for operation and maintenance. The foundation constructions of the turbines in one row will star when the corresponding roads are completed. For these excavations bulldozers, loaders and backhoes will be used. The charge and the transport will be done in dump trucks with a capacity of 12 m3. The tasks will start with the withdrawal of the first 0.20 m of vegetable soil which will be reused subsequently. Afterwards, they will start excavating the natural soil until they reach the level of the foundation, respecting the design of the grounding strap It is predicted a removal or 578 m3 of soil for the excavation (excavations of 17x17x2) Because there will be a short period between the excavation for a foundation and its covering the material excavated will remain the surroundings of each wind turbine (at one meter of each) For the storage of the material care will be taken to put the horizons of the soil retired so that they can be used as filling material, continuing a logical sequence, trying to protect the topographic layers. It will covered and protected against blasting (by wind effect) using polyethylene film of a medium density. The same will be used in the filling tasks of the site of

the foundations. In case there is excess material, it will be used for filling and stabilization of the internal roads or deposited where the environmental authority indicates. The sites affected will later be filled , scarified and re planted with indigenous species.

4.1.5 CONSTRUCTION OF THE FOUNDATIONS.

After the excavation, a finishing layer will be put in the bottom part of it (normally concrete with little cement of approximately 10 cm of thickness) Once the finishing layer has been forged, over the concrete cleaning the frame previously folded in the workshop will be disposed, the foundation insertion of the wind turbine will be implanted, then the formwork, the meshes with bars arranged in a radial and annular form , the cylinder of the foundation properly leveled as well as the ducts for the wiring and drainage of the base. After that, the concreting and vibrating. The formwork will be by means of steel sheets that will be joined by bolts in a way in which the formwork can contain the pressure that the elaborated concrete makes. 361 m3 of concrete will be used for each foundation.

Once the foundation work is finished, there must be a period of at least 56 days to enable the forging before it can be charged, only then the mounting of the wind turbine will be possible. To ensure the stability of the base studies on the material used must be conducted. A mixture of concrete for test must be done at least 60 days prior the starting of the concreting and the respective test tubes must be submitted to busrt test at 7, 14 and 28 days. These results must be submitted to the approval by the manufacturer of the wind turbine.

After the concrete forging the base in the ground will be filled with the soil previously extracted and compacted in layer of a thickness no superior to 25 cm respecting the edaphic horizons. At a superficial level it will be used the vegetable soil removed and previously conditioned.

The concrete for the foundation will be generated in situ by a temporal plant installed in the surroundings of the workroom. The characteristics of such plant will be informed prior to the beginning

of the Construction Stage considering the technology reported by the selected provider. Such plant must fulfill the measures tending to avoid the affectation of the environment. Such measures will be informed previously the beginning of the works. The transport of the concrete to the points of tipping will be done with mixer trucks, with a capacity of 7 m3. It is important to indicate that the washing of the mixer truck will be done outside the area of the project, in the base of operations of the contractor company selected. Given that the installation of the concrete plant mentioned above exceeds the present study, prior to the beginning of the work it will be presented another study for these tasks by the contractor company selected to the environmental authorities.

The excavations and constructions will be conducted in a way that it will be reduced the time and size of the excavated area. The filling will start immediately after the foundation approval.

Characteristics of the foundations. The foundations include a foundation slab of 17 m for 17 m (289m2) formed by concrete with steel core, of approximately 2 m height in the border and 2.6 m up to the base of the tower. It will be visible at the ground level the concrete plinth with tubular form (of 4.15 m diameter) that fixes the steel cylindrical-conical tower to the foundation. The wind energy turbines will be built upon concrete slabs (ATTACHED IN THE ANNEXES) and central pedestal (concrete plinth) of reinforced concrete. The pedestal is cylindrical and in it the anchor bars of the tower will be located. The tubes for wiring will be incorporated as well as support pieces for the installation of the control unit of the wind turbine. The excavation volume of the wind turbine will be approximately 578 m3 (2 m depth). Considering the 50 wind turbines, the total movement of soil related to the excavations of foundations will be of 28.900 m3.

Around the foundation slab of each wind turbine there will be trenches opened of 1.20 m depth and 0.6 m width to install the mesh of grounding strap made up of copper wire welded by machine in their crosses. The cable will be in the bottom of the trench and will be buried with a land layer of 0.2 m. The soil extracted will be stored at one meter from the trench. It will be preserved of the wind action with polyethylene of medium density and it will be used to fill the trenche once

the installation of the wiring has concluded. For the filling it will be used the original edaphic sequence of the soil profile extracted.

The Transformer Station of the Park will require the connection to the High Voltage Line of 132 kV **El Chocón – Piedra del Águila operated by EPEN**, to enable the vinculation with the Sistema Argentino de Interconexión (SADI). Given that such High Voltage Line goes through the interior of the project it implies that the Park **will not require** the construction of a new **High Voltage Line** as an additional electric infrastructure.

It is to indicate that the material surplus of the foundation excavations of the wind turbines will be used to fill the lower parts fo the foundation for the crane and the roads in a consistent way with the surrounding areas. If there is material surplus that cannot be used, it will be disposed in the site/s that the environmental authority indicates. To the ends of adequate the landscape of the site the foundations will be covered completely, leaving only the tower visible.

4.1.6 INTERNAL ROADS

The wind turbines positions will determine the internal roads trace needed, trying to use those already in existence to minimize soil movement, vegetation crushing and the work time

Given that the roads must be adapted to enable circulation of heavy trucks (max weight 12 tones by axis) and cranes in the moment of the installation, it will requires the improvement of the existing ones in maximum downhills as well as radios of curves in the rails.

Road adaptation tasks include the intervention of equipments (excavators, metallic shovels and rollers) which will withdraw 0.20 meters of vegetable layer. To the modified sites there will be added a 0.20 meter-layer of a gravel and lime mixture compacted. In the middle line it will have 0.30 meter-thickness dropping on either sides of the road and ending in a superficial trench which permits rain drainage.

Specifications about road adaptation and/or construction are the following ones:

- Road width will be 5 m useful in straight sections and up to 11,5 m in curves (medium-width 7 m).
- Bend radius will be 35 m. at least.
- The road maximum slope must not be over 10% and in no case of 12%.
- In very concrete cases, the maximum curve cant will be of 3%. On the curve margins there not must be obstacles that may limit vehicle turns.

Roads will be conditioned in the way that the conditions required for their traffic ability will not be modified by weather events. Road mapping will enable the adequate natural drainage of the zone. For that the piping will be installed in the cross point with natural runoffs that enable the natural liquid flow and avoid water accumulation. The localization of the runoffs will be identified in the hydro geologic map of local scale that is attached in the Annexes. Internal roads will be under maintenance during the Operation Stage to facilitate maintenance tasks. It is anticipated the construction of approximately 24 Km of new roads, which means a surface of 168.000 m2.

4.1.7 CRANE WORK PLATFORM

During the mounting and subsequent maintenance tasks cranes will be used for the hoisting of the constitutive parts of the wind turbines. For the movement of these equipments there will be required the construction of 50 mounting platforms, called "Staging Areas" (one for each generator) of 1.400 m2 each (35 m by 40 m)). Considering the totality of equipment, the affected area will be of 70.000 m2.

4.1.8 Transport and Mounting Platforms for the wind turbines.

All the wind turbine components will be transported from the port of Bahía Blanca to the location site using low-deck trucks.

For the terrestrial transport of the components, the corresponding permits will be solicited to the appropriate authorities(Vialidad Nacional and Direcciones Provinciales de Vialidad of the Provinces de Neuquén, Rio Negro and Buenos Aires). Mass media will be used to communicate the vehicle traffic to the population. There will be supporting vehicles that ensure to alert on the convoy transit.

Wind turbine mounting will be performed in multiple stages that include:

- Mounting of bar cabinets and control panels at the ground level, with the foundation
- Mounting of the tower in 3 sections.
- Mounting of the nacelle.
- Rotor assembling and mounting
- Internal cable connection and termination.
- Electric system inspection and test prior to the first power-up.

Each wind turbine mounting will be completed in one or two days, depending on the weather conditions. For the mounting, it will be obligatory to operate with two cranes of different sizes (600 tn and 100 tn), whose details will be specified in the subsequent stage of the Project. Firstly, the tower segments will be assembled. Then, the nacelle will be installed in the upper part of the tower. The rotor blades will be connected to the hub on the ground and the complete rotor will be mounted in the nacelle with crane help. The wind turbine assembling and mounting imply the use of heavy trucks and cranes mounted in trucks, smaller cranes, self-forklift for loading and discharging of materials and equipments, flat trailers and low-deck trucks for the transport of materials in each site. All the workers performing mounting tasks will be properly prepared about the risks of their tasks and will have the corresponding personal protection equipment required for them, as well as the necessary ART insurance coverage and /or personal accident insurance. Hoisting equipments will have duly certifications that indicate their good condition for the safety development of the task. Tasks will be suspended in case of extreme weather events like winds over 40 Km/h or thunderstorms. Once the tower is hoisted it will be connected to the grounding strap.

4.1.9 UNDERGROUND WIRING

The wind turbines will be totally interconnected by underground cables of medium tension (MT) of 33 kV. Together with this underground wiring the optical fiber will be disposed to communicate the wind energy station. All the medium tension cables and optical fibers will be undergrounded in trenches of 1.2 m depth, 0.6 m width, with a total distance of 31 km. This implies a soil removal of approximately 22.320 m2. The removed soil will be stored at one meter-distance from the trench. It will be preserved of the wind action with polyethylene of medium density and it will be used to fill the trench once the wiring installation is concluded. For the filling it will be used the original edaphic sequence of the soil profile extracted.

The trench bed will be covered with a sand layer of 0.10 m. Over it the feeding cables (phases) and a grounding cable will be installed. Once the cables are installed in their final positions, they will be covered with another sand layer of 0.30 m of thickness. In the sand, optical fiber cables will be installed as well as a telephone line for internal communications in the Wind Park. Before the trench is completely closed with compressed material (extracted from the site of the trench and stored in the surroundings avoiding its blast), a prevention tape will be put with the inscription " DANGER HIGH TENSION", and a contact telephone number, approximately at 0.75 m over the final position of the electric cables. The rest of the trench will be filled with the excavated material. Other procedure that might be used consists of installing the cables by means of special equipments for the task. The special equipment (trenchers) will make a small slot in the ground and at the same time, all the necessary cables and warning tapes will be undergrounded. After the wiring process in the trench has completed, it will be closed independently with the soil previously extracted and adequately stored.

All the cables and trenches will be inspected before their filling to verify the non existence of strange elements that might damage the cable and/or the presence of waste that may affect the soil. After completing the coverage of the open trenches, the scarification process and re planting of indigenous species will be take place.

Each generator will connect to underground cables through a medium tension cell located at the bottom of the tower. As well, by means of PVC pipes inserted , the cables will trace the respective trenches. All the system will be inspected and tested before the energizing. Underground wiring of a group of turbines will be connected to the 33 kV bar of the Transformer Station through a primary anti-arc cell, from where the power transformers will be connected to the transmission headline 132

4.1.10 ELECTRIC COLLECTOR SYSTENM

The objective of the collector system is the interconnection of the wind turbines for the power transfer (medium-tension lines 10-33kV), the grounding strap of the system (grounding cable connected to a buried javelin), and the communication and control (optical fiber wiring). The system will be underground, as previously said. For its tracing adjacent areas to the internal roads will be used. The medium-tension wiring will have three conductors (one for each electric phase) that will connect circuits in series of each wind turbine.

Medium tension cables that are interconnected between the wind turbines, will be separated through cells with the isolators planted in the base of each tower of the equipments, whose function will be that of interrupting the distribution in case of contingency. The optical fiber cable will be connected to a cabinet located in the base of the tower, which will bond it with the console located in the transformer station. The installation of collector systems may be structured in base of different configurations, depending on the level of reliability.

All the energy generated will be sent to the transformer station of 132/33/13.2 kV through the independent circuits of 33 kV connected through shielded anti-arc cells of MT connected to the MT bar of the transformer station. The board will be formed by primary distribution anti-arc cells of high electric breaking current.

4.1.11 NETWORK OF GROUNDING CABLES

Each wind energy turbine will have a grounding strap which will meet the requirements of applicable laws. The grounding strap resistance, measured in each wind turbine without interconnection with the rest, will not be over 5Ω. To that effect, in each one, there will be installed electrodes of PAT needed (javelin, nude cooper cables), bonded to the frames of the concrete foundations and all the ground cables of the equipments. The PAT of all the wind turbines must be connected between them and with the PAT mesh of the ET 33/132 kV through a nude cooper cable of 50 mm2, thus forming the PAT Network of the wind station. The bonding cable will share the same trench of the 33kV cables and the dual tubes for cables.

4.1.12 Transformer Station 132/33/13,2 KV

To interconnect the Wind Energy Station to the Regional System Comahue, there will be a Transformer Station (TS) 132/33/13.2 kV - 2x63 MVA according to procedure of CAMMESA Annex 16 REGULATION OF CONNECTION AND USE OF THE ELECTRIC ENERGY TRANSPORT SYSTEM The Transformer Station will have a typical architecture according to the regulations required by the transport company for this type of work. It will be formed by:

- Two complete fields of line in 132kV.
- A coupling field.
- Two transformer fields of 63/63/10 MVA and 132/33/13.2 kV.
- Two future fields.

The installations of the transformer station will be located over a surface of approximately 120 x 100 meters (approximate surface of 12.000 m2) Each generator will contain a grounding strap that will meet current legislation. The PAT of each machine will bond between each other and with the mesh of grounding strap of the transformer station 132/33/13.2 kV. The configuration of the TS will be with transference bar. It will composed of 5 (five) fields of 132 kV according the following detail and components:

- Two fields in line 132 kV isolated in air, each one constituted by an isolator in SF6, three isolators, three transformers of current and tension measure, over tension dischargers, and a system of carrier wavea (coil - capacitor), all for a nominal value of tension of 132 kV.
- Two transformation fields conformaded by an isolator in SF6, three isolators, two power transformers of 33/132 kV-63 MVA isolated in oil, ONAN-OFAF, tension measure and current transformers, all for a nominal value tension of 132 kV.
- A coupling field of bars composed by: a switch in SF6 and isolators in bar line.
- Board of MT: composed by 14 anti carch shielded cells
- AC /CC auxiliary systems, standard measuring and control-protection device.

Connecting Point: As mentioned before, given that the High Tension Line crosses the polygon of the Wind Energy Station, to connect the project to the Argentine System of Interconnection, there will be an **opening of the High Tension Line of 132 kV "Chocón-Piedra del Águila i**n the retention structure, geographic coordinates **(39°44´33.55´´S; 69°44´17.7´´O)**

Installations of 132kV. The installations of 132 kV will be implemented in an outdoor station conformed by equipments of 132 kV, their supporting structures, gantry, bare conductors, insulators and ironworks strings, constituting a simple bar scheme.

General Characteristics It´s been anticipated a sole conductor by aluminum/steel phase of section 240/40 mm2, plus an optical guard wire (OPGW). Suspension structures will be one-pole of H°A° and the terminals, straight holdings, angular and especial holdings in general will be double or triple. The disposal of the conductors will be in a triangle. Transpositions are not anticipated along the line. All the elements that form the structures (columns, brackets, bonds, among others) will be of reinforced concrete. The selection of final trace will emerge from the capacity of the park. that will be built.

Structures All the elements that form the structures (columns, crossheads, brackets, bonds) will be of reinforced concrete. It is anticipated the use of suspension structures, angular retention and terminals. The suspension structures will be one-pole and the angular retention and terminals will be double or triple. In the bonding to the HTL it is anticipated the intercalation of two terminal and derivation structures at 90°.

Foundations. The foundations of the structures will correspond with the characteristics of the ground where they will installed, for which the building project, as well as the WP, will include geotechnical investigations including the estimation of the degree of aggressiveness of the soil and water contact with the foundations concrete. For the total foundations of the line, there will be used pozzolanic cements whose characteristics must be determined during the execution of the project detail (example, pozzolanic cement four norms, type CP 30 by Loma Negra). In any case and whatever the design and/or methodology of construction, the foundations will always be the link in the chain, or sequence of flaws selected.

Clampers, isolator chains and accessories. In general, all the clampers, group of elements for the isolators chain and accessories will be of hot-dip galvanized steel. The components design will include the verification of the services through the method of finite elements. The groups will be able for the maintenance under tension and will not influence negatively over the service life of the conductor.

Isolator chains . The isolators will be of porcelain or glass Class according to IEC 305: U 120 BL. The isolators chain of simple suspension will be formed by 9 isolators and those of double retention by two chains of 10 isolators each. Isolator U 120 BL, leakage distance: 32,0 cm, shift: 14.6 cm; disc diameter: 25,5 cm; weight(glass isolator): 4.2 kg.

Grounding Straps For the grounding strap it will be considered an average value of 25 Ω among three structures (that to be measured and the other adjacent ones) along the line. Any individual value will not be over 50 Ω. It is predicted that a unique type of javelin will be used for all the work. Considering the structure to be protected and the soil properties there will be several javelins and/or counterweights in each picket. Basic configurations indicated will vary considering soil resistivity, for which the basic investigations will be conducted.

Auxiliary services. Auxiliary services of alternate current (SACA) will be supplied in a normal way from a source external to the station, through a Medium Tension or Low Tension Line coming from a near and safe installation. For the emergency functioning of the SACA it will be convenient to count with a portable generator to supply the normal provision. The feeding system SACA will be completed with the general and section board required, installed in the inside of the board room. Auxiliary services of Continuous Current will count with chargers, batteries and boards, installed in the board room, to feed the auxiliary equipment of the Transformer Station in the tension levels that are projected (110 Vcc and, if necessary, 48 Vcc).

Protection and Control Systems. It will be comformed by:

- Local Control Boards.
- Telecontrol equipment.
- Operation in real time System
- Automatic disconnection of Generation, if it is required by the authority of the application.

Grounding strap meshes. As a requirement in the design of any Transformer Station it will be essential the installation of a grounding strap mesh. It will be used to ensure that the potential of the TS will not exceed the maximum shift and contact tensions permitted for the operators´safety.

that work in it.. The desing of the grounding strap mesh and its layout will be finished in a subsequent stage of the Project. Its design, in general, will be determined by the expected level for flaws or grounds, either athmospheric ones like the system, and the general distribution of the site. The grounding strap mesh will be installed underground and will require the burial of a series of cooper sticks in the ground to increase the connection of the grounding straps with the soil.

Safety Perimeter Fencing. Having in mind the danger that exists for high tension inside the Transformer Station there will be a safety perimeter fencing surrounding it. The fencing will be designed to reduce the risk of animals and strangers entrance. The perimeter fencings will be built with materials that reduce the maintenance and visual impact to the minimum, but they must be resistant enough to dissuade intruders. Over these fencings there will be a poster with ENTRANCE FORBIDDEN TO ANY PERSON FOREIGN TO THE COMPANY and the safety poster that indicates the RISK OF ELECTRIC SHOCK. Also there will be signs that indicate the personal protection equipment needed for the entrance.

Protection system against atmospheric discharge. As part of the protection systems, the Transformer Station will require a lightning bolt and additional equipment like guard wires. The system will be built inside the perimeter fencing of it and will be higher that the highest structure inside it. The system function will be of directing the electric charge/voltage produced by a ray directly to the earth, preventing the damage that they might generate in the electric systems. The system will be used also as element for protection for the wind turbines.

4.1.13 POWER TRANSFORMER

This component will provide the means to transform medium tension of the associated circuits of the WInd Energy Part (33 kV) to a higher voltage (132kV) required..

for the transfer of energy through the transmission line and to the electric energy network as well.

Energy Increase Transformers will be installed from 132/33/13.2 kV - 63 MVA. In the project detail will be defined, to acquire the transformers, the norms of application and the technical specifications, including the requirements of maximum power loss. The transformers will be mounted over the bases of reinforced concrete. The safe separation between the equipment will be provided with firebreaks of concrete.

Oil will be used as a method of refrigeration for the transformers It is to be indicated that according the provincial, national and international regulations, oil free from PCB will be used as refrigerant. Oil will require a means for its contention in case of contingency by leakage or breakage in the transformer. For that it is anticipated to have a pan for spill containment that has 10% additional of the total volume of oil in the transformers and a 10% additional for other liquids that the emergency personnel may incorporate in case of fire extinction. The pan for spill containment will be built from pre-manufactured concrete panels. If there is a spill, the liquid will drain directly from the pan to the sump. The sump will be next to the transformer equipment (at the side), at a distance of one meter from them. It will have the pan for spill containment built with pre-manufactured concrete and a two-sheet gable roof to avoid the accumulation of rain. The liquid that gets into the sump tank will be disposed by a bombing system and liquid extraction. The disposal of the liquid will be done by a company in charge of transporting dangerous waste, authorized by competent environmental authority and will be transported for its final treatment by the company authorized by competent authority.

4.1.14 Installations of 33 KV.

The main equipment will be a group of collector cells of 33 kV, for the inside, to be installed inside the cell building and control of the Transformer Station. The group of cells of 33 kV will be designed for a system with two bar sections.

coupled lengthwise(parted bar). These bar sections will be equipped including the following cells:

- Two supply cells to a transformer 33/132kV – 63 MVA.
- Five supply cells of collector from wind turbines
- One feeder cell to auxiliary service transformers
- One supply cell lengthwise of bars.

The bonding of collector cells of 33 kV with the far away installations will be done with unipolar wires of 33 kV underground. This includes the interconnection of cells with: transformers 33/132kV, auxiliary service transformers and collectors from the wind energy turbines.

4.1.15 Auxiliary building

Adjacent to the Transformer Station the auxiliary building will be built. The installation will be of the wet type (reinforced concrete independent bearing with partitioning of masonry, and the roof coated with metal with good insulation.) This building will have several functions among which , they may be mentioned:

- Repairing workshoop, and basic maintenance of the equipment of the wind turbines. In this sector tools and components required for these tasks will be stored.
- Canteen for the personnel.
- Meeting room
- Training room.
- Reception sector for visitors
- Dormitories for the personnel
- Restroom sector connected to the treatment of sewer effluents system.
- Sentry with toilet
- Spare Parts storage room
- Conditioned service room
- Maintenance supply deposit.

It is a one plant building with a surface of approximately of 120 m^2. The effluents generated in the restroom sector (black waters) and those generated in the canteen (grey waters) will be treated through a compact plant of identical characteristics to the one employed durign the Construction Stage and according current legislation approved by EPAS.

In the supply deposit there will be stored: oil for gears (approximate quantity: 400 liters), hydrolic oil (approximate quantity: 100 liter), lubricant grease (approximate quantity: 25 liter), anti-freeze agent (approximate quantity: 100 liters). Such deposit will have masonry wall with plaster, metal or crockery roof, metal door, lights/wiring with explosion protection and smooth-cement floor. It will have adequate ventilation, several extinguishers with the specification of type of charge, safety signs, MSDS of the stored products and element for spill contention.

Next to the auxiliary building there will be an area of 25m for 25 m destined to:

- Materials stockpile zone: 350m^2.
- Place for the portable generator.
- Tank for water supply for the personnel
- Temporary storage sector of waste.

The temporary storage sector of waste will have a cement floor and a pan for spill containment 10% superior to the maximum volume stored. The walls will be of rhomboid knit and metal roof. It will have lights and wiring against explosion. The metallic door will have safe and secure closing and a poster with FORBIDDEN THE ENTRANCE TO NO AUTHORIZED PERSONNEL On the outside it will have several extinguishers with the specification of type of charge, safety signs, MSDS of the stored products and elements for spill contention.

4.2 TECHNOLOGY USED

The current plan indicates that the Wind Energy Park will have 50 wind energy turbines manufactured by VESTAS The tecnical specifications of the wind turbine may be found itn the Annexes.

A synthesis of these technical specifications is presented below: Rotor

Diameter 90 m.

- Swept area of the rotor: 6.362 m².
- Power: 2,000 kW.
- Hub height of the rotor/ Total height: 80 m / 105 m.
- Wind speed for maximum power (Vr): 25 m/s
- Speed range of wind for operation: 2,5 – 25 m/s.

Estimated service life : 20 years.

4.2.1 RAW MATERIALS, SUPPLIES AND PRODUCTS

These are the materials and supplies that will be used in the construction of the Wind Park:

Material/Supply	Quantity
Conrete, cement and specific aggregates (foundations, main substation and Operation and Maintenance Building)	20.000 m^3.
Reinforced steel (foundations, main substation and Operation and Maintenance Building)	2,700 Ton.
Wooden frames	2.350 m^2.
Material (gravel or similar) for the roads and crane work platforms	37.000 m^3.
Material (gravel or similar) for the roads and crane work platforms	10.000 m^3.
Sand to use in the filling of wiring trenches	7.440 m^3.
Grounding cables (cooper)	5,900 m

Table 06. Material/Supply

The quality of concrete will be determined by the test tubes with samples of the material in authorized laboratories All the materials will be transported in vehicles porpertly authorized according current regulation. The number of trips to be made by the vehicles to deliver the materiasl/supplies, has not been stated yet since there is no final date.

4.2.2 FUELS AND LUBRICANTS

Besides the materials described previously, it will be requires fuels and lubricants for the functioning of the building equipment, special materials and engineering equipment. These supplies will be provided by local companies. The provisioning of fuels and maintenance of mobile equipment and heavy machinery, including washing and oil change, must be done in places appropriate to that effect (workshops or service stations), never in the area of the project, to avoid risks of soil contamination. Fuel storage will be done in the 30m3 tank and the lubricant storage in a sector of the base camp with the characteristics described previously. Down below it is indicated in an approximate way the consumption of fuel for the project informed by the Company:

Works	m^3
Foundations.	15
Roads and crane work platforms	3
Transport and mounting of wind turbines.	45
Main substation and Operation and Maintenance Building	1.3
Service constructions (includes generation of energy and transport of the workers)	3

Table 07. Fuel consumption

4.2.3 Water

For personal use , it is estimated that each worker use 75 liters of water per day This includes hand washing and the use of restrooms There will be a water storage in a PRFV tank of 10 m3 in the sector of

Workroom The tanks will be frequently provided by tankers coming from the city of Piedra del Águila and/or Picún Leufú by companies authorized by competent authority for the extraction and provision of water.

For personal use and preparation of food packaged water (bottles/ dispenser) will be provided from the nearest town. In both cases, water consumption and for personal use will have the controls required according to current labor legislation.

The Company informs that it is not predicted the use of water for washing equipment in the field or the preparation of concrete (if needed, it will be analyzed by a specific study related to the elaboration of concrete in situ and will be presented by the contractor selected , which is not to be found in the present Study)

The Company informs that the installations of services will not be at the contractors´companies disposition (water, sanitary services, etc) They will be at the contractor´s expense the costs originated by the acquisition of water, including all the projects and permits needed for their installations.

4.2.4 ELECTRIC ENERGY

The electric supply will be done with generator equipments that use fuels like gas oil.
The Company informs that the installation of electricity will not be at the contractors´companies disposition. They will be at the contractor´s expense the costs originated by the acquisition of it, including all the projects and permits needed for their installations.

4.3 SOLID WASTE, EFFLUENTS AND EMISSIONS 51

The most quantity of waste, effluents and emissions of the Project will be generated during th Construction Stage. The Company will establish strict contractual requirements and procedures with each contractor company, tending to ensure an adequate treatment and final disposal of the waste and effluents generated.

All the waste from this stage will be stored in the temporal site of disposal located in the base camp and they will frequently be transported by companies authorized for their final elimination/disposal in companies authorized by environmental authority.

4.3.1 SOLID AND SEMI-SOLID WASTE

The main solid and semi-solid waste will be:

- Excavation and construction waste. Remnants of road construction and civil works in general that cannot be use for filling tasks. Even though it is anticipated a low or null generation of these types of waste, they will be disposed in the site/s duly indicated and authorized by environmental authority. Prior the beginning of the Construction Stage such permits will be solicited to the local authorities of the town of Piedra Buena , to whom it will be asked to indicate the site/s where the dumping will be done.

- Ferrous waste. Waste of reinforced steel, cables and metal or general scrap. This waste will be piled within the are of the Project in a delimited identified sector, withdrawn regularly for its commercialization to specialized companies for their reutilization in the metallurgical industry as raw material.

- Domestic waste. Waste from packaging, papers, cartons, canteen food, pallets, wooden boxes, plastic films, among others. Due to the variability in the number of personnel employed in the Construction Stage , it is difficult to estimate the volume of this type of waste (particularly in the canteen). This waste will be piled in the Temporal area for waste and they will be discarded in metallic containers with lids. Such wast will be withdrawn every 2 days and will be sent to the sanitary filling authorized by competent environmental authorities. The authorization of dumping will be issued at the beginning of the Construction Stage.

- Dangerous Waste Given that heavy equipment maintenance will be done outside the area of the Project it is only considered (in case of contingency of a heavy equipment) lubricant grease used, as well as materials contaminated with such products (cloths with oil) , originated during maintenance tasks in situ. This waste will be dumped in metal containers of

  200 liters with lids. They will be duly tagged in the Temporal Area of Dangerous Waste. As described before , such area will have the conditions that ensure the adequate environmental and labor safety. Afterwards, the withdrawal will take place and their final dumping in the Neuquén Province, by the companies inscribed in the Registro Provincial de Generadores, Tratadores, Transportistas y Operadores de Residuos Peligrosos (REGTyORE). The transport company will issue the Manifiesto of Transporte de Residuos Peligrosos and the Treating company , the correspondent Certificate of Final Disposition. Both documents will remain in the Company for the presentation to the competent environmental authority. It is predicted to count with the services of the company INDARSA located in the city of Neuquén.

- Patogenic Waste They will be originated in the first aids room located in the workroom. Within them there are needles, bends, materials contaminated with blood, among others. They will be disposed temporarily in containers of 200 liters, with lids, adequately identified and equipped with red bags of resistant polyethylene The bags closed will be withdrawn by the transport authorized by competent environmental authority and transported to a company authorized by competent environmental authority for it adequate treatment. The authorized privider for this service will be informed in a more advanced stage of the project.

There will be a Responsible person for the Safety , Health and Environment to manage the sites in the work. This person will inspect daily and will control to ensure that all the waste is treated correctly. The recollection, withdrawal and final dumping of all the waste will be registered by

the person responsible , and the reports will be presented daily to the Dirección del Proyecto for its presentation to competent environmental authority.

4.3.2 LIQUID WASTE.

- Dangerous Waste It is only predicted the generation of oils before a contingency that implies the development of maintenance tasks in sity of the vehicles in the work, given that the daily maintenance will be done outside the area of the project according to what was informed by the Company. Other generation of this type of waste is related to the emulsion of fuel with water before a contingency related to the inlet of rain to the site of gas oil storage. This waste will be disposed in containers of 200 liters, closed and tagged adequately in the Temporal Area for Waste. Afterwards, the withdrawal will take place and its final dumping in the Neuquén Province, by companies authorized for competent environmental authority. The Transport company will issue the Manifiesto de Transporte de Residuos Peligrosos and the Treating company, the corresponding Certificate of Final Disposition Both documents will remain in the Company for the presentation to the competent environmental authority. It is predicted to count with the services of the company INDARSA located in the city of Neuquén.

4.3.3 Liquid Effluents

Grey and Black waters These will be originated in the installations of the canteen/kitchen (washing-up) and in the restrooms. According to what is indicated by current environmental legislation, sewage effluent treatment(black waters) and effluents originated by the washing up in the canteen and kitchen sectors (grey waters) will be treated in situ through the use of compact plants duly certified by envrionmental authority and by EPAS. The base of this aerobic technology is called activated sludge. The process will be a system of cultivation in suspension where the organic material is degraded by the action of aerobic bacteria, which use it as a source of energy. In this treatment there will be obtained a prolonged cellular retention time through a mechanism

recirculation of sludges. This type of treatment plants have a capacity of 5000 liters and are composed of three chambers. The first one, located immediately after the entrance, enables the primary decanting of big size solids and the separation of greases; the second one is the biologic reactor. Both cameras are communicated between them through a communion cup. The biologic reactor has a diffusers that together with the blower will enable the oxygen supply and the agitation necessary to conduct an efficient treatment. Here, the finest particles are joined to the bacteria forming floc. Once the necessary cellular retention is over the mixture licuor passes to the third stage of treatment. The secondary decanter is given time for the hydraulic retention, enough to enable the sedimentation of this floc that will form the activated sludge. Part of this sludge will be recirculated to the reactor, as it has bacteria that perform the degradation, while the waste must be extracted from the system daily. The provider of the technology still has not been selected in the present stage of the project. Once the provider is selected, he will be given EPAS information for its revision and treatment authorization according to the methodology explained above. Prior to the beginning of the Construction stage it will be asked to EPAS the authorization of dumping of the liquid obtained (prior to the analysis) for the use in watering internal roads that enable to collaborate in the mitigation of vague emissions of particularized material originated by the traffic of the vehicles in the area of the workroom-

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4.3.4 GASEOUS EMISSIONS

The main emissions to the atmosphere correspond to the vague emissions of particularized material product of:

- Soil movement in the areas destined for the material and supply stockpiling; waste management area, crane work plataform, founfations of wind turbines, roads, trenches for wiring and drainages, temporary and permanent installations for the personnel
- The circulation and operation of vehicle machinery and equipment in the internal roads and access roads to the area of the project.
- The filling , levelling and scarification of the foundation excavation, trenches, temporary roads and temporal facilities.

Vague emissions of combustion gases are originated by the circulation and operation of vehicles and motor generators**.** Given the punctual, esporadic and vague character of the atmospheric emissions, these are considered of little warning.

4.3.5 Disturbing noises for the neighborhood.

In this Stage the main sources of noise generation correspond to the sectors where vehicles and heavy machinery circulate (soil movement, excavation, mounting of wind turbines, etc) The activities that produce noise are punctual and discontinuous in the surrounding of the Project Area. From the investigation it has been observed that there will be potentially those persons that live in the rural post.

4.4 STAFF AFFECTED TO THE PROJECT

For the construction works of the Project a great number of people will participate, with different professional knowledge and levels of ability required for this stage. The manpower to be employed will be from the cities of Piedra del Águila and Picún Leufú. Even though to this day there is no specific quantity of personnel to be employed, given the type of project and that there is population with knowledge for the execution of a work of such an importance, the labor demand will be of great importance for the region.

4.5 SERVICE LIFE OF THE PROJECT

The project described contemplates a service life of the wind energy park of at least 20 years. There are no anticipated future extensions or activities to be developed. After 20 years of operation of the wind energy turbines, the park will continue functioning, after the assessment of its conditions and only if it is in the will of all the parts involved to continue.

4.6 OTHER ASPECTS

4.6.1 TRAFFIC FLOW GIVEN BY THE PROJECT

The component parts of each wind turbine that will be transported in trucks will

Component to transport	Number of trucks
Tower.	3
Nacelle	1
Blades	3
Rotor points	1
Coupling of the Foundation	1
Secondary equipment (in containers)	2

Table 08. Use of trucks according to the component to transport.

Thus, each wind energy turbine requires 11 trucks to its transportation. As described above, the components will be delivered by ship in the Port of Bahía Blanca. Depending on the type of ship use for the transport, there will be delivered from 4 to 6 wind turbines each time. Once the ship has moored, the cranes in the pier will discharge the parts of the wind turbines and they will place them in especial semitrailer trucks according the characteristics of the component transported. The trucks with the components will follow the map described in the section MATERIAL AND MACHINE TRANSPORT. This provides a temporal flow of heavy vehicles circulating at low speed by the roads which have an important daily traffic.

The critical points that are anticipated are RN N°22 between the cities of Villa Regina-Senillosa and RN N° 237 between the cities of Senillosa - Piedra del Águila.

In this routes circulate an important quantity of:

- light vehicles during summer holidays (January- March) and winter holidays (June – July),
- Long and short distance trucks and rural machinery (tractors) in the route corridors Villa Regina – Cipolletti during the harvest season (December- March)

- Long distance tankers with fuel liquids and methanol during the whole year due to the presence of plants in Plaza Huincul.

Given this fact, the timetables of the convoy must be analyzed and ask for the corresponding permits to the national authorities for roads and routes (Vialida Nacional) and provincial authorities (Direcciones Provincial de Vialidad de Neuquén, Río Negro y Buenos Aires) prior to the beginning of the Construction Stage. The Company will present a Communication and Traffic Plan tending to spread through mass media about the convoy traffic so that to mitigate the risk of accidents. As mentioned before, the convoy will be accompanied by support vehicles that warn its transit in the zone.

The area of installation of the wind turbines is located far from RN N°237. The access to the site will be using RP N° 47 (gravel) and the downhill of the LAT minimizing the creation of new access roads for the transit of vehicles during the stage of construction and operation of the wind station, getting advantage of the existing ones.

Prior the beginning ot the Construction Stage a study will be done about the access routes, having mind the limit load of the bridges and roads, curve level, width and height of tunnels and bridges, electric lines and any other obstacle that may restrict the passage of the vehicles.

4.6.2 MAINTENANCE OF BUILDING MACHINERY AND EQUIPMENT

It is not anticipated the performance of maintenance of vehicles in the work sector. Their maintenance will be done in especialized workhops out of the area of the project in workshops located in the city of Neuquén. If any equipment maintenance is required in situ (for any contingency) the waste generated will be disposed in containers duly tagged and classified (according to what is said in SOLID, SEMI SOLID AND LIQUID WASTE.

4.6.3 DISASSEMBLING AND WITHDRAWAL OF TEMPORARY FACILITIES

When finishing the construction of the wind station, the contractors involved will be in charge of dismantling the cranes and the transport of the equipment used during the

construction of the project. In the case of temporary facilities (offices, canteen, supply stockpile sector, crane work platforms, service sectors, etc), it is anticipated a development closure program and the withdrawal of each of the structures and works, which includes the withdrawal of all elements stranger to the initial natural and anthropic means. Such program will be informed to the competent environmental authority prior to the beginning of the Construction Stage.

4.6.4 RESTAURATION OF THE SITE

Once all the temporary facilities are withdrawn, the restoration of the site will be conducted in the most similar way possible to its initial state. Cleaning tasks will be done to withdraw from the place every solid, semi solid and liquid waste. There will be tasks of scarification and re planting of indigenous species, planting exemplars considering their distribution and diversity identified during the development of the Study of Base line.

Finished the Construction Stage there will be activities of scarification and re planting of (i) the zones of the wind energy turbine foundations; (ii) lines of trenches for wiring and the location of workrooms. There must be left surface roughness to ensure the natural re vegetation of the place. Indigenous species must be planted according to the ones determined in the base line, following the coverage pattern of each of them. No zone will be left with loose soil that may enable the blasting and subsequent erosion.

4.6.5 PREVIOUS STUDIES CONDUCTED

- ELECTRIC STUDY STAGE I (ACCESS TO THE CAPACITY OF TRANSPORT AND EXTENSIONS).

In December 2012 the Study Stage I of the Wind Energy Project was conducted. The objective of the study was to verify the behavior of the system of regional transmission before the incorporation of the wind energy station Vientos Neuquinos I. The works developed involved the studies and analysis needed to prepare the documents that enable the Company to fulfill the Stage I of the required formality so that the ENRE authorizes the access to the capacity of the existing transport. These studies were conducted according the requirements of current regulations, Resolution 137/92-

Annex 16: “Regulation of Access to the Existing Capacity and Extension of the Transport System of Electric Energy " (Part 2, Título I), Annex 17: “ Admission of New Agents to the Mercado Eléctrico Mayorista” (inciso 3.5.1.3), Annex 40 ”Generación Eólica”, and the Procedimiento Técnico Nº 1 de CAMMESA, in what refers to Stage I of the formality of access to the capacity of transport. For that simulations were done, of the static and dynamic functioning of the system, and the evaluation of the requirements of the transport system. As part of the evaluation, studies of power flow and power cuts were conducted. In all the analysis there is a conclusion over the conditions of feasibility of th Wind Energy Park.

- STUDIES OF PREFEASIBILITY OF THE PROJECT (EVALUATION OF THE WIND RESOURCE MESO ESCALE METHOD).

The Company conducted statistical studies tending to determine the pre feasibility of the project Wind Energy Park. For its development the meso scalar method was applied with satellite data of re-analysis in the long term. For the development of this study it was considered the data of 30 years, speed information, direction, temperature and time pressure at the levels of 10, 50, 80 and 150 meters above the level of the ground. Along these years investigation centers and meteorological agencies (NCIP-NCAR Reanalysis Project, ECMWF 1979-1983 Reanalysis Project) have generated the development of techniques and methodologies around them with direct application in the wind industry, in concrete in the estimation of the wind resource or the development of studies in the long term through MCP This regional re-analysis with a mesh of 20 Km and a time period from 1980 to the present time, has permitted the generation of homogeneous, spatial and temporal series that ensure the construction of climatic patterns of the different meteorological variables, among them of the wind resource. This type of information has been ideal for the studies on the long term (MCP) and to verify and study the variation of the wind resource in temporal daily, monthly or annual slots. The study started with the development of the database " Air Data Computer Statistics", continued with the elaboration of the report about the estimation of the production of the Wind Energy Park Vientos Neuquinos I and concluded with the elaboration of the roughness map in format WAsP in an environment of 25 x 25 kilometers centered in the wind project. Once the topography and the roughness of the ground was obtained,

first to the confection of the wind map of the zone of study, and then the realization of the Wind Atlas of Vientos Neuquinos I and by estimating the production of the wind energy park according the configuration of the layout which is considered optimal for the site for this stage of the analysis. With the information previously mentioned it was started the development of the three-dimension simulation model of terrain and wind to determine the average annual values of wind speed, distribution of Weibull II and estimation of the energetic media density, in an area larger than that of the project to evaluate the climatic characteristics of the zone of the study. Afterwards, with the simultaneous application of dynamic fluid, the values obtained in the previous models were corrected and it was determined the wind map of the zone of the study.

4.6.6 PREVIOUS STUDIES TO BE CONDUCTED.

THEORICAL STUDIES OF DISTURBING NOISE IN THE NEIGBORHOOD

With the aim to evaluate the potential affectation of the project in the environment by the acoustic action a simulation will be conducted using software (example: WinPRO version 2.6.1.252). The values of noise will be estimated in isolines of noise calculated according to norm ISO 9613-2 considering sound emissions of the design of the wind energy turbine equipment and a standard wind speed As a result of this simulation it will be elaborated a Noise Map for the proposal of the wind energy park The conclusions are part of the analysis of affectation that will be developed for the Operation Stage comparing with the Estimated Level according to Norm IRAM 4062 (Disturbing Noises to the Neighborhood) It is important to say that during field investigation it only was observed the presence of a poor housing presumably inhabited occasionally by rural puesteros out of the polygon area of the project (see Map of Anthropic Affectation in Annexes). This implies that whoever lives in the house will be the only one/s potentially affected by the Disturbing Noises to the Neighborhood and only in a temporary form (while they stay in the house).

BASE LINE STUDY OF DISTURBING NOISES IN THE NEIGBORHOOD

As a complement of the Noise Map developed with the simulation software, it will be generated a Base Line Study of Environmental Noise In it, measurements will be determined in the field at different times established by Norm IRAM 4062 (Disturbing Noises to the Neighborhood) As in the previous case, the present study only

will apply to the house occasionally used by rural puestero/s out of the polygon area of the project.

STRUCTURAL STUDY OF SOIL AND THE BASE LINE

Prior to the Construction Stage the company will conduct a structural study of soil and the Base Line In such study it will be determined the characteristics of the study to the effects of an adequate design of the foundations of the wind energy turbines and is determined through the laboratory analysis contaminants present in the soil.

ARCHAEOLOGICAL AND PALEONTOLOGICAL STUDY

Prior to the Construction Stage an Archaeological and Paleontological Study will be conducted in the location area of the permanent facilities with the aim to determine the risk of affectation of the sites with potentiality of findings that may be violated during the tasks to be developed during the Construction Stage.

BIRD MONITORING PLAN

Prior to the Construction Stage it will be started a Bird Monitoring Plan that will have the aims of observing the behavior of species that live and/or transit around the area of the project in the different seasonal periods, identify nests and establish mitigation actions for risks to avoid the affectation of exemplars. The guidelines of such Program are established in the section where the Envrironmental Monitoring Plan is developed. It must be mentioned that in the investigation of the base line there were no avifauna exemplars under a dangeorous situation and/or the presence of migration birds observed.

5 OPERATIVE STAGE AND MAINTENANCE

5.1 PERSONNEL AND OPERATION SCHEME

For the operation and maintenance the Wind Energy Park is estimated will be necessary approximately 15 people.

5.1.1 SAFETY, HEALTH AND ENVIRONMENT PLAN

Prior to the first energization and the start-up of the Wind Farm, the Safety, Health and Environment Plan will be started. It will contemplate the procedures and actions that the personnel will have to develop for the health and environment care where they develop their activities. This Plan will include actions of training personnel and the development of daily monitoring of variables established in the present study.

5.1.2 WIND ENERGY PARK OPERATION AND MAINTENANCE PLAN

This Plan will be developed and executed by the equipment in charge of the Stage. The Plan will enable the safe and reliable functioning of the Wind Energy Park. This Plan will be specific and in accordance with the regulatory agency, the equipment providers and the requirements of the industry at the moment of Project development.

5.1.3 OPERATION TASKS

With the aims of guaranteeing the safety and protection of the funcioning of the Wind Park there will be performed certain operative tasks like:

Induction and training Given the nature of the installation and its environment, the personnel that works there will require the specialized training, in order to be entitled to work in the Wind Energy Park. The induction/training will be in charge of the personnel of the Company that operates the Park These will comprise trainings in the following procedures of work:

- Permits for the performance of the activities in situ

- Emergency procedure and localization in situ of first aids and emergency equipment
- Of circulation of vehicles in the facilities of the Project .
- Accident notification
- Of protection for the wild fauna and flora.

MONITORING OF THE DEVELOPMENT OF THE WIND ENERGY PARK. Monitoring tasks will be done by the people who operates th Wind Energy Park The monitoring activities predicted will be:

- To ease the maintenance and the programming based on the Operation and Maintenance Plan
- Program the training applicable to the personnel of Operation and Maintenance of the site
- Supervise the execution of the Wind Park
- Watch the environment of the Wind Park on the basis of the guidelines developed in the Health, Safety and Environment Plan
- Conduct all the business activities associated.

It is anticipated the permanence of on-call staff or surveillance in the operation stage. Having in mind the wind nature, the environment, the location and the wind turbine functioning, it will be anticipated that during the whole service live of the wind park it will be necessary a permanent level of analysis to evaluate the rendering of each of the wind turbines. From the statistical analysis, an optimization will be done in terms of the parameter tendencies, adjustments and maintenance of each turbine.

5.1.4 OPERATION TASKS

This section is related to the tasks needed to perform the preventive maintenance and the repairs of the components of the Wind Energy Park

Programmed Maintenance of the wind turbines. It refers to the inspection and revision of equipments and their components according to predetermined frequencies It includes lubrication tasks, readjustment, change of consumables and component and system control. It is performed through 3 technical services:

- Technical Service every three months
- Technical Service every six months
- Annual Technical Service (once a year, every wind turbine will have a detailed inspection of its components, as is required by the manufacturer).
- Especial Technical Services: They will be done additionally to the annual service every 3,4,5 and 7 years of operation.

Programmed Maintenance of the civil infrastructure It is related to the inspection on buildings, roads and auxiliary facilities, to know:

- Control of vegetation in internal roads: Annual Frequency
- Outline of gravel roads and surfaces extremely damaged: Annual frequency
- General condition of the auxiliary building and fencing: Annual Frequency
- Large breakages in the equipment of the wind turbines (breakage and/or corrosion of blades, towers, and foundations) Annual Frequency
- Unusual functioning of the equipment Annual Frequency
- Unusual and/or excessive noise (validated by a study of disturbing noises in the neighborhood Norm IRAM 4062 and Base Line of Disturbing Noise to the Neighborhood). Annual Frequency
- Wast management (analysis of documents, personnel training and elements for the internal management). Annual Frequency

Programmed Maintenance of the electric infrastructure It considers maintenance preventive actions related to the electric equipment. It comprises the following actions:

- Maintenance of medium tension cells It includes tests of dielectric rigidity, controls of contact torque, check of functionals and cleaning of panels. Annual Frequency

- Maintenance of medium tension wiring: It includes the verification of the components and dielectri rigidity test Annual Frequency
- Maintenance of the ground system and lightning bolt. It imp|lies PAT measurements by professional authorized and certified equipment. Annual Frequency
- Verification of all the electrical connextions to ensure that there are no loose connections that may provoke an increase in temperature, with the potential risk of generating a fire and the failure of the equipment.. This maintenance guarantees the protection, back up of all the equipments in service effectively and the adequate operation under conditions of electrical failure. Annual Frequency
- Infrared control It will be done in all the equipments in full charge. This will determine the conditions of electrical connections that may be more likely to show electrical failure due to temperature increase. Frequency : every 4 months
- Inspection of the oil containment enclosure in the transformer. This will include the existence of stains, splashes, leaks in the transformer equipment in the pan for containment of spill, as well as the capacity of containment of the same. Annual Frequency
- Component Maintenance of the Transformer Station that may require de-energize condition The de-energize condition is necessary for the personnel to work safe and efficietnly in the components, without setting their lives to risk due to an electrical charge. The especific equipments that require the de-energized condition are: main switches, main collector bars and principal transformers. Probably, the maintenance of the equipments mentioned above will be during the months of the years with lower-speed winds, and in conformity with the requirements established by the oprator of the network Annual Frequency
- Maintenance of the Transformer Station 13.2/33/132 kV: The operation and maintenance tasks of the transformer station will be under the supervision of EPEN No determined frequency

Not Programmed Maintenance It is included in this maintenance, the repairs or adjustments after finding an anomaly, a breakage, in order to

ro establish the opeative capacity of the equipments and the safety capacity of its components.

- -Basic repairs and small spare part replacement. In general, the majority of the maintenance tasks will be related to the repair or substitution of a small part which will require the use of basic manual tools, machinery and maintenance vehicles. If the component that will be susbtituted is in the upper part of the tower, will imply the use of an integral system of ascension of the turbines. All the basic activities related to the repairing and replacement of small parts will be done according to the manufacturers´specifications and the regulations required.
- -Basic repairs and big spare part replacement. Even though the damage in the main components are not usual, it is anticipated that during the service life of the Wind Park it is necessary the replacement of some big spare parts. Considering the Project location, all the big repairs will require the use of cranes and vehicles to transport them to the site.

A more detailed description of the procedures related to each of the substitution and repair tasks can be found in the Instruction Manual of Work Inspection of the wind turbines handed by the manufacturer prior to the installation, which will be sent to the corresponding environmental authority prior to the start-up of the plant. All the inconveniences detected and verified will be documented and will take place corrective measures to eliminate any danger for the personnel, the infrastructure and the surroundings. If the damage in the component or infrastructure is such that it cannot be repaired in a short time, it will be reported to the Application Authorities.

5.2 WIND ENERGY GENERATION PROCESS

See Section 3.3 ACTIVITY TO BE DEVELOPED

5.3 SUPPLIES FOR MAINTENANCE TASKS

Down below there is an estimation of the supplies that will be used during the maintenance tasks in the Wind Park. The quantities are for a year. They will be piled in a sector enabled for that end which was described in the Construction Stage.

Supply	Trademark:	Quantity
Oil for gearings	Mobilgear SHC XMP 320	400 liters.
Hydraulic oil	Texaco Rando WM 32	100 liters.
Lubricant grease	Shell Stamina HDS	25 liters.
Anti freeze	Extended Life Coolant Pre-mixed 50/50	100 liters.

Table 09. Necessary supplies in the Operation and Maintenance Stage.

5.4 TRAFFIC FLOW GIVEN FOR THE PROJECT

In this stage, it is anticipated the almost total circulation through internal roads of the park with a few vehicles. In case the replacement of big parts is needed, the traffic will be incremented in the Project zone due to the movement of the crane at slow speed and the support vehicles to fulfill the tasks.

5.5 SOLID WASTE, EFFLUENTS AND EMISSIONS

The solid waste, effluents and emissions generated in the Operation and Maintenance stage will be minimum, matching the reduced occupation of the personnel and the equipments in the area of the project. All the waste coming from the maintenance/repairs will be disposed in the temporal site of waste disposal and afterwards will be transported by authorized companies for their final elimination/disposal in companies authorized by environmental authority.

5.5.1 SOLID AND SEMI-SOLID WASTE

- Ferrous waste. Its generation will be occasional in the case of producing the replacement of mechanic parts. The will be sent for commercialization.

as metallic scrap or to metallurgical companies , or will be stored for reuse as spare part.

- **Assimilable to domestic** waste. Packaging, cartons, canteen food, office papers, etc. This waste will be stocked in the Temporary Waste Area located in the surroundings of the Maintenance Personnel Building in metallic containers of 200 liters, with lid, duly identified that will be installed and afterwards transported , prior to the authorization of competent organisms, to the sanitary fill indicated by competent environmental authorities.
- Dangerous Waste It is only considered the generation of lubricant grease used, filters, contaminated cloths, produced during the maintenance of the turbines. This waste will be dumped in metal containers of
  200 liters with lids and identified. It will be stocked in the Temporal Waste Area and will be taken to final treatment/disposal in a similar form to the Construction Stage (section SOLID AND SEMI SOLID WASTE)

5.5.2 LIQUID WASTE.

Dangerous Waste It is only predicted the generation of oils due to:

- Any contingency that implies the development of maintenance tasks in situ of the vehicles in the work. Such maintenance will be done putting a polyethylene film of medium density on the floor to avoid its affectation.

- Transformer maintenance that implies the replacement of oil in the equipment. To determine this, samples of oil from the box will be taken and will be analyzed in the laboratory to evaluate the oil condition.

- A contingency that may generate oil dumping in the pan for spill containment. Due to this reason the TS will count with an underground deposit (sump) connected to the pan for spill containment. The tank design will fit the recommended by the Environmental Authority for sumps in the petrol industry. Its storage capacity will be of 20 m3. It will be located in the inside of the pan for spill containment of 22 m3 of capacity built with masonry covered with cement and epoxi paint. Such tank will be located under a metallic roof.

It will have PAT, safety posters, extinguishers elements of contention for spills and pan for spill containment of liquid for the expurge hose. Its withdrawal will be done with a truck provided with vacuum system In its surrounding it will have a monitoring network formed by three (3) phreatic pits. From those pits samples will be taken every year (see Monitoring Plan). The final location site of the sump tank it has not been indicated yet. The company will present prior to the beginning of the work the final lay out which will comprise the spill collector system and the phreatic network formed by three monitoring pits.

This waste will be sent to final treatment/disposal in a similar way to what is mentioned for dangerous waste in th Construction Stage (section LIQUID WASTE)

5.5.3 Liquid Effluents

It is only predicted the generation of sewage effluents (black waters) of the personnel office restrooms in occasional cases and during maintenance tasks. These black waters will be treated in situ in the compact plant according the technology approved by EPAS and the requirements of competent environmental authority. The base of this aerobic technology is called activated sludge. The process will be a system of cultivation in suspension where the organic material is degraded by the action of aerobic bacteria, which use it as a source of energy. In this treatment there will be obtained a prolonged cellular retention time through a mechanism of sludge re circulation. These types of treatment plants have a capacity of 5.000 liters and are formed by three chambers. The first one, located immediately after the entrance, enables the primary decanting of big size solids and the separation of greases; the second one is the biologic reactor. Both chambers are communicated between them through a communion cup. The biologic reactor has a diffusers that together with the blower will enable the oxygen supply and the agitation necessary to conduct an efficient treatment. Here, the finest particles are joined to the bacteria forming floc. Once the necessary cellular retention is over the mixture liquor passes to the third stage of treatment. The secondary decanter is given time for the hydraulic retention, enough to enable the sedimentation of

this floc that will form the activated sludge Part of this sludge will be recirculated to the reactor, as it has bacteria that perform the degradation, while the waste must be extracted from the system daily. The provider of this technology has not been designed in the present stage of the project. Once the provider has been selected information will be sent to EPAS for its revision and authorization of black water treatment according to the methodology described before. Authorization will be solicited to the EPAS for the dumping of the liquid obtained (prior analysis) for watering vegetable species that are used in the landscape of the facilities for the personnel. The daily control of the plant will be done as part of the Environmental Monitoring Plan.

5.5.4 GASEOUS EMISSIONS

The diffuse emissions of particulate material will be related to the reduced circulation and operation of vehicles (light transport for the personnel and maintenance cranes). They are very little. The diffuse combustion emissions deserve identical description to the ones generated in the Construction Stage. It is indicated that the operation in the wind park will imply the reduction in the generation of greenhouse effect gases for the use of renewable energy sources in replacement for conventional centers that use fossil fuels.

5.5.5 Disturbing noises for the neighborhood.

Mechanic and aerodynamic noises will be produced due to the proper operation of the wind turbines. Mechanic noise will be of the multiplier, the transmission acis and the generator of the wind turbine. Aerodynamic noise will be from the wind flow over the blades. "White noise" is the name of the clash of the wind on the smooth surface of the rotor blades. The wind turbines have been designed to cover the international regulations of sound emission. From now on, it is expected that the main noise of the generation unit will not be produced by the engine, but by the clash of the blades with the air.

6 DEPARTURE STAGE

6.1 DISMANTLING OF THE EXISTING FACILITIES

As mentioned before, the service life of the Project will be of 20 years After this period, the Departure Stage will be communicated to the Authorities To this respect there will be a Closure of Facilities Plan The main activities to be covered are detailed below.

Work and/or installation	Closure activities
Wind turbines and external electric lines	Installation of the appropriate signals related to the closure Dismantling of the wind turbines. Withdrawal of electric wiring and towers.
Underground Channeling	Withdrawal of electric wiring and optical fiber.
Perimeter fencing and posters	Withdrawal
Affected areas	Filling, leveling and scarification process. Re planting with indigenous species.

Table 10. Closure activities

6.2 MANPOWER RECRUITMENT

The required manpower for the dismantling of the work and equipment as well as for the facilities needed, will be estimated with more detail the moment that the Departure Stage is programmed.

6.3 DISMANTLING OF WIND ENERGY TURBINES

All the constructions and facilities that are feasible to be dismantled will be so. All the equipment, fittings and devices that were used during the operation of the Project will be withdrawn.

6.4 BASES AND FOUNDATIONS REMOVAL

Concrete works will be unbuilt and the mackerel in the Project Area will be withdrawn, in order not to produce a visual impact for accumulating them inside the area of the Project.

6.5 RESTITUTION OF THE GEOFORMS IN THE SITE ZONE OF THE PROJECT

Once the service life of the project is concluded, and except with especial requirement of the specialists, the geoforms will be restored to their initial condition, using what was extracted from the zones near the site to fill the sectors that have been modified. The material used will be provided by the company authorized by the Subsecretaría de Minería for the extraction of aggregates.

6.6 SHUT DOWN AND CLOSURE OF THE FACILITIES

The materials that do not have economic value for their commercialization will be taken to special sites indicated by competent environmental authorities.

6.7 SOLID AND SEMI SOLID WASTE, EFFLUENTS AND EMISSIONS

6.7.1 SOLID AND SEMI-SOLID WASTE

- Excavation and demolition waste. Mackerel product from the dismantling of the foundations and civil works in the Project Area. They will be used a filling material in the sectors that competent environmental authoritis indicate.
- Ferrous waste. It will involve wind turbines and wiring of the wind park. This waste will be stored inside the Project Area in a far identified sector, and will be finally withdrawn for their commercialization and reuse in the metallurgical industry or as spare parts of other wind turbine equipment of other wind parks.

- Assimilable and domestic waste They will come from people while the activities of closure and departure. They will be kept in metallic containers of 200 liters with lid, identified, in the Temporal Waste Area to be sent afterwards to the waste treatment plant or sanitary fill which must have obtained the authorization for dumping and/or final disposition by competent environmental authority.
- Dangerous Waste They come from the activities of the dismantling activities of the turbines (oils, lubricant grease, lights, among others). This waste will be kept temporarily in containers with lid, of 200 liter capacity and identified, in the Temporal Waste Area, to be withdrawn afterwards and sent to a final disposition in the similar way as explained itn the Construction Stage.
- Pathogenic Waste They will be originated in the first aids room located in the workroom. Within them there are needles, bends, materials contaminated with blood, among others. They will be disposed temporarily in containers of 200 liters, with lids, adequately identified and equipped with red bags of resistant polyethylene The bags will be closed and sent to a final disposition in a way similar to that mentioned in the Construction Stage.

6.7.2 LIQUID WASTE.

- Dangerous Waste The oils generated from draining the transformers will be piled in closed and identified containers and they will be located in the Temporal Waste Area for their final treatment/ disposition in a similar way explained in the Construction Stage.

6.7.3 Liquid Effluents

According to what is indicated by current environmental legislation, sewage effluent treatment(black waters) and effluents originated by the washing up in the canteen and kitchen sectors (gray waters) will be treated in situ through the use of compact plants of similar characteristics to that indicated in the section of Construction Stage or those determined by environmental authority.

6.7.4 GASEOUS EMISSIONS

Diffuse emissions of particle materials will be generated:

- The demolition and withdrawal of foundations of: areas destined to material and supply stockpiling, waste management area, wind turbine foundations, temporal and permanent facilities;
- The withdrawal of wiring , perimeter fencing and safety :osters;
- The circulation and operation of vehicles;
- Filling, leveling and scarification activities of foundation excavations, trenches for wiring, drainages, internal roads and location sites of permanent facilities.

Also, vague emissions of combustion gases are originated by the circulation and operation of vehicles and motor generators**.** As in the Construction Stage they have been considered despicable.

6.7.5 Disturbing noises for the neighborhood.

The noise produced will be originated by similar sources to the ones described in the Construction Stage.

6.8 SCARIFICATION AND RECOMPOSITION OF THE LANDSCAPE

Scarification tasks will be conducted tending to promote the natural re planting of the indigenous flora in all the areas affected with the aim of returning the environment and landscape to the its original setting, reducing the affectation that might have caused the anthropic activities conducted. Attention will be paid in the planting of indigenous species disposing them on the ground according to the density, diversity and coverage identified in the base line.

BASE INFORMATION

7.1 PHYSICAL OR INERT MEDIUM

7.1.1 CLIMATIC CHARACTERIZATION

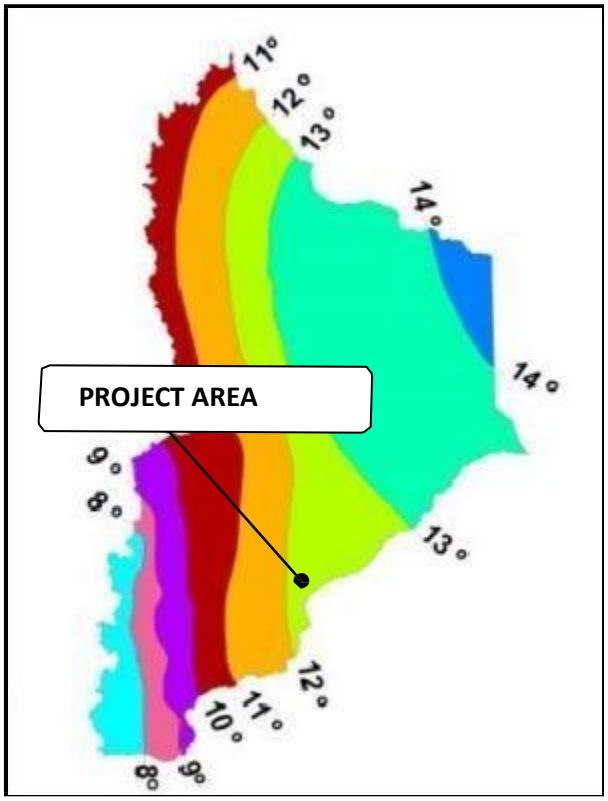
For this characterization the Meteorological Station automatic data from the Airport of Cutral-Co will be used, located at 142 Km from the city of Piedra del Águila, given that hte Automatic Meteorological Station INTA Picún Leufú has very recent data, taken from yeat 2012.

Type of weather

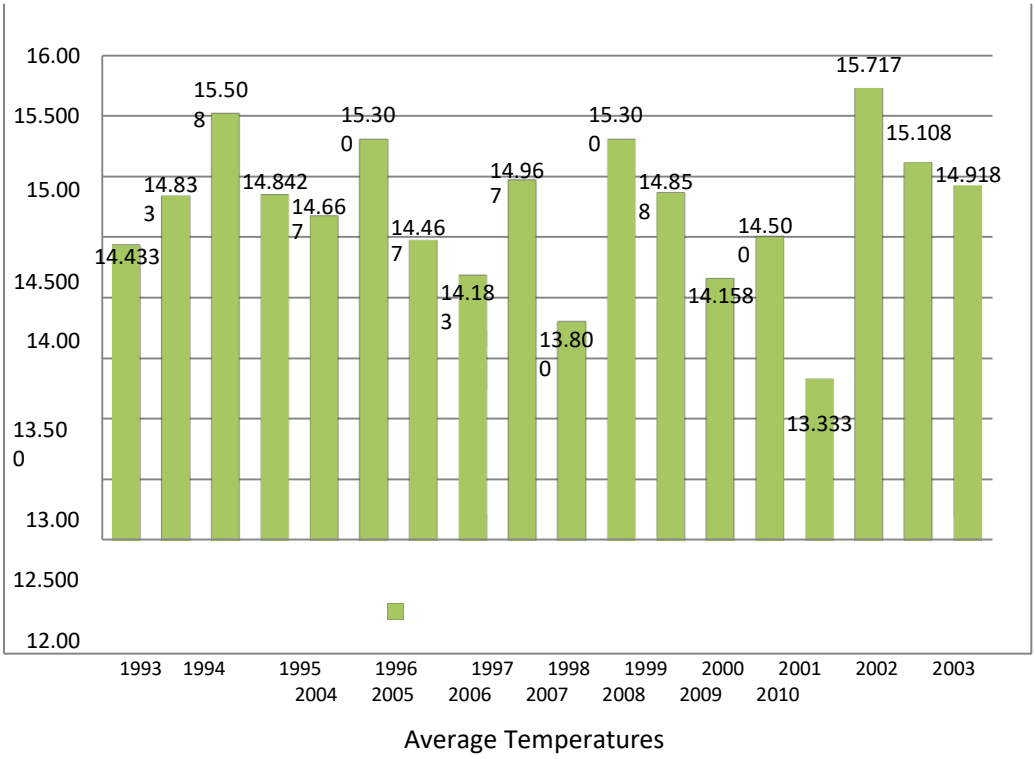
According to the climatic classification of Thornthwaite, the region of the project is characterized for having dry arid to semi arid climate, meso thermal and with scarce rains throughout the year and in the Koppen classification, the zone is within the climatic region of Bwk: dry climate, cool desert.

Temperature

From the registers obtained in the period 1993-2010, there is an annual average temperature of 14.7° C. The warmest months (December, January and February) register an annual average temperature of 22.6°C, while colder months /(May, June, July and August) register an annual average of 7.9°C. The lowest average temperature registered during 18 years was of 1.8°C during the month of July , 2002. The highest average value of maximum temperature was 28.8°C during the month of January 2008.



Map 02. Annual Average Temperature (°C) Source: INTA

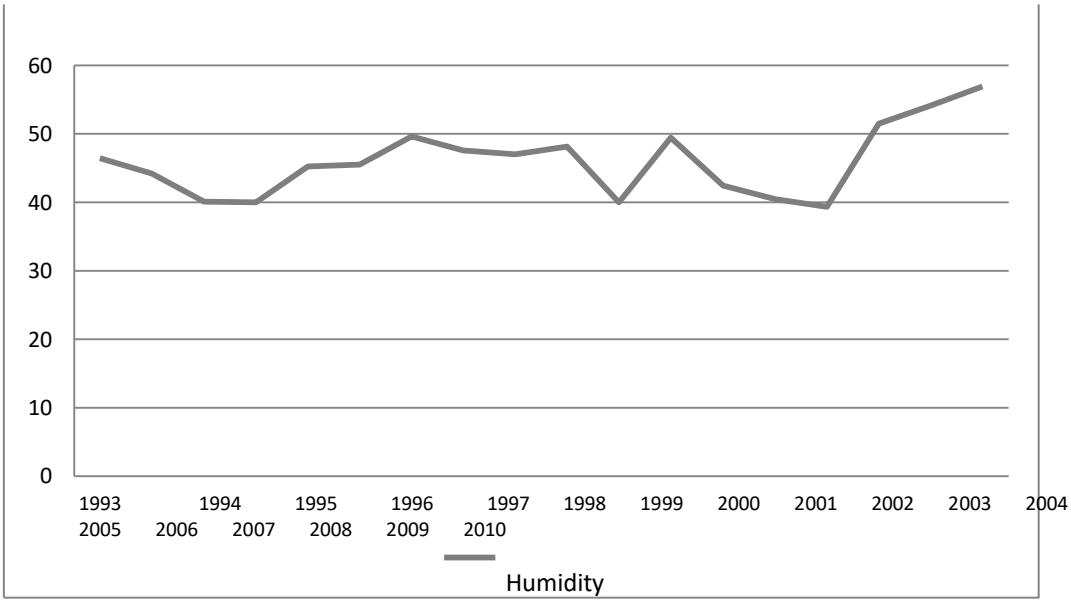


Graph 1 Annual Average Temperatures periof 1993-2010 (Source: Estación

Aeropuerto Cutral-Co).

Relative Humidity

The annual average relative humidity is of 46% and the average values over the 60% are observed from May to July. The minimum relative humidity is registered generally in the first hours of the afternoon matching the highest thermal values. The range of minimum average values per month is between 31 to 35 % during the warmest months . The minimum average of relative humidity for the period 1993-2010 is of 39.4 % The highest values are registered during the winter (between 60 to 64 %) and the lowest values are obtained in the period spring-summer (from November to February).

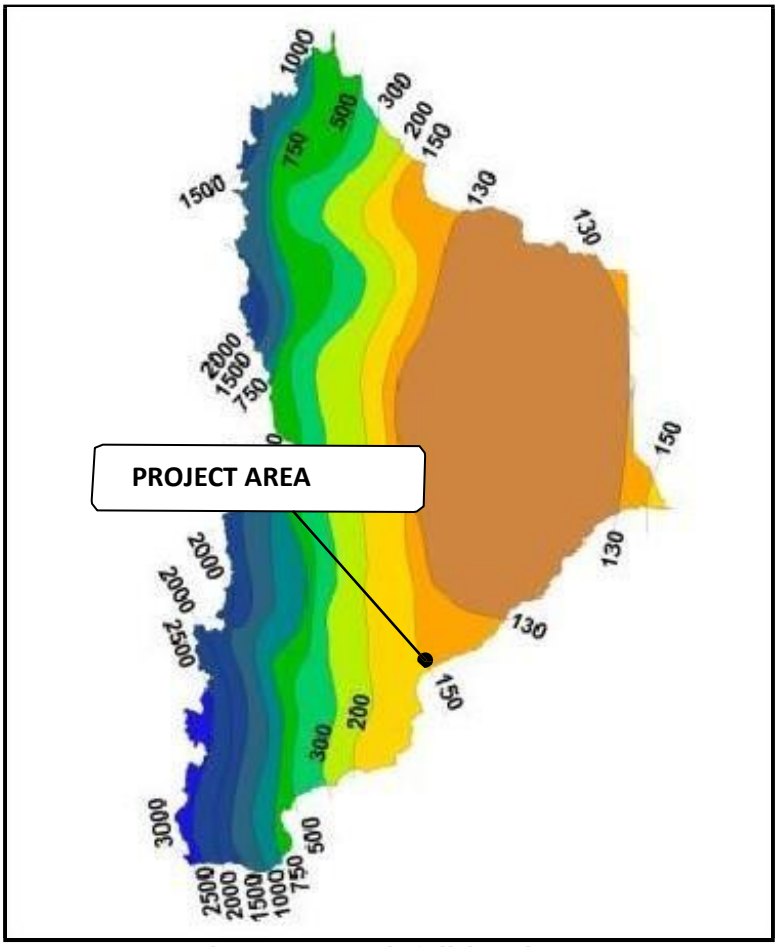


Graph 02 Annual Average Temperatures period 1993-2010

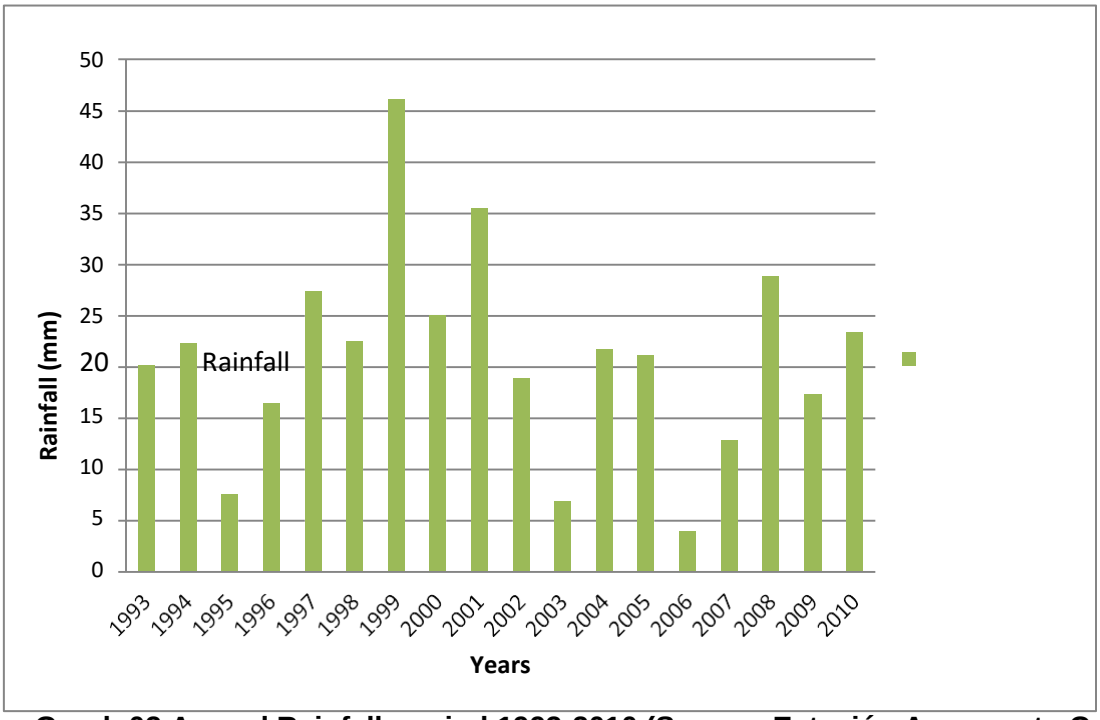
Rainfall

Rainfall in the region is the result of the incoming of damp air masses coming from the Pacific Ocean which, for the Andes orographic barrier is obliged to ascend, in the ascent they adiabatically cool by reduction of the atmospheric pressure, they condense and fall as rain of snow. In the Eastern part of the basin the annual average of rain is only 200 mm. This sudden variation is caused by the loss of great quantity of humidity of the air masses in the mountain range wall and other orographic barriers that are placed between one and the other extremes of the basin. Precipitations for the region present a strong gradient of decrease towards the Eastern sector. Considering the quantity of rain accumulated during the

period 1993-2010, 44% of the years have rainfall under the average value. The year that shows the least rain accumulated is 2006 with only 40,4 mm. Within the values that exceed the average, the maximum corresponds to the year 1999 with 506.9 mm. During the period studied the averages of the series show the monthly distribution presents two moment with peaks of maximum rainfall. The first one is between the months of May and June and the second one , in the months of September and October. In general terms we can conclude that during the autumn and spring seasons it is registered the most quantity of millimeters accumulated.



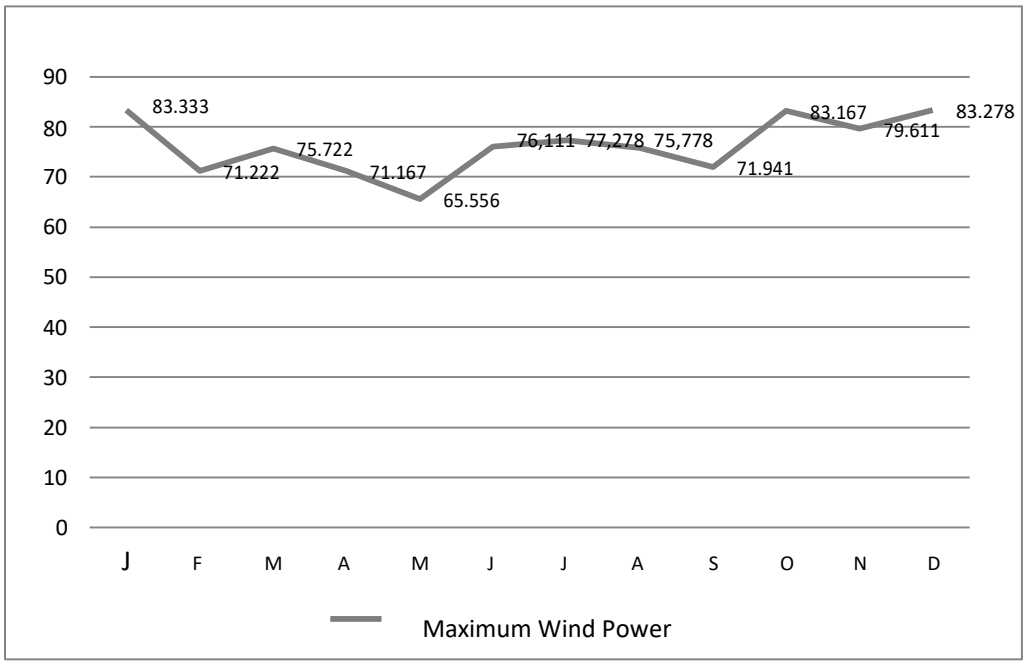
Map 03. Annual Average Rainfall (mm) Source: INTA



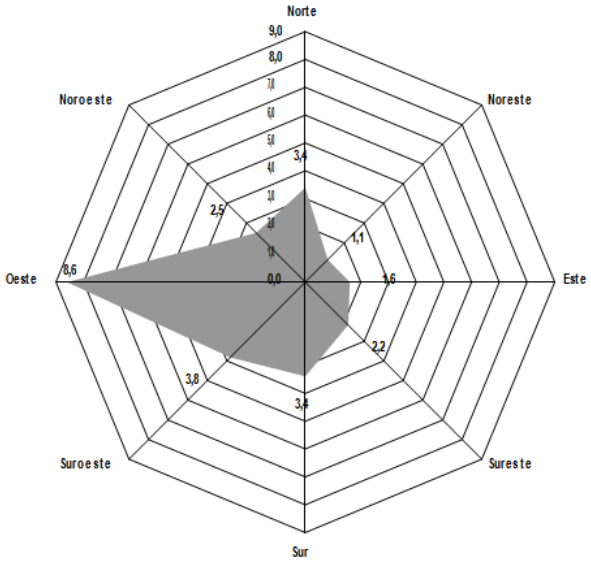
Graph 03 Annual Rainfall, period 1993-2010 (Source: Estación Aeropuerto Cutral-Co).

Winds

The average maximum speed for the period studied for the region of the Project, is of 83.3 Km/h. The lowest values of maximum speed correspond to the months of April with 71.2 Km/h and May with 65.6 Km/h. The highest values are registered in the months of January and December with 85.6 Km/h for both months. Analyzing these values we can say that in spring and summer winds are more persistent and relatively stronger than during autumn and winter. In the region the predominant winds are from the Western sector (15.4 Km), in second place wind from the Southeastern sector (20.6 Km/h) prevail, and in third place those coming from the South and North. Less frequent winds are from the Northeast and East. It is important to indicate that there have been registered hurricane-like winds that may be over 100 Km/h.



Graph 04 Annual Average Wind Speed for the period 1993-2010



Graph 05 Average Frequence of wind directions. Period 1990-2004 Source: INTA Station Valle Medio

7.1.2 GEOLOGY

The area of the Project is located over the Neuquén Group, which comprises a succession of continental deposits of fluvial, wind and lake origin (Cazau & Uliana, 1973), developed in the Neuquén Basin in the Late Cretaceous Period. This formation

reaches a maximum thickness of 1.200 m (Cazau & Uliana, 1.973), and is limited in base and roof by discrepancies from the Patagonia (Keidel, 1.917; Leanza, 2.009) and Huantráiquica (Méndez et al., 1.987) respectively. Lithologically the Neuquén Group is formed by sandstones, fangolitas and greywackes of a reddish color towards the base; with a small participation of conglomerate horizons.

Stratigraphic units of an inferior range that integrate the Neuquén Group are: the Sub group Río Limay formed by deposits of channels of low sinuosity developed under tectonic and climatic and subordinate control (Garrido, 2.010); the Sub group Río Neuquén formed by a succession of alternating units (psamíticas and pelíticas) of fluvial origin, developed mainly under climatic control, and finally by the Sub group Río Colorado which comprises fluvial deposits formed under the new dominant tectonic control.

The Sub group Limay described previously is the most important for its influence in the area of study. The outcrops of this Sub group are characterized for showing extensive surfaces of low relief and great development in the area, geo morphological feature that González Díaz & Ferrer (1986) characterize as " structural plateau by razing". This characteristics is given by the presence of these units of extensive banks of tabular sandstones well lithified, which due to their higher resistance against erosive agents, they generate large surfaces of flat or scaled expositions, often masked by a thin modern sedimentary coating. Example of this are the extensive outcrops located in the area between the cities of Plaza Huincul, Ramón Castro, Picún Leufú and Villa El Chocón; as well as those developed in the area of the Dorse de Los Chihuidos - Las Cárceles. These sectors exposed to an extreme erosive action by fluvial courses, either permanent or temporal, generate marked topographic projection crossed by large canyons of vertical walls. Other geomorphological feature, minor but frequent in these deposits, is the generation of arcs and small hills (buttes), such as the ones observed in the zone of El Gigante (Villa El Chocón) and Bajada Colorada.

7.1.3 GEOMORPHOLOGY

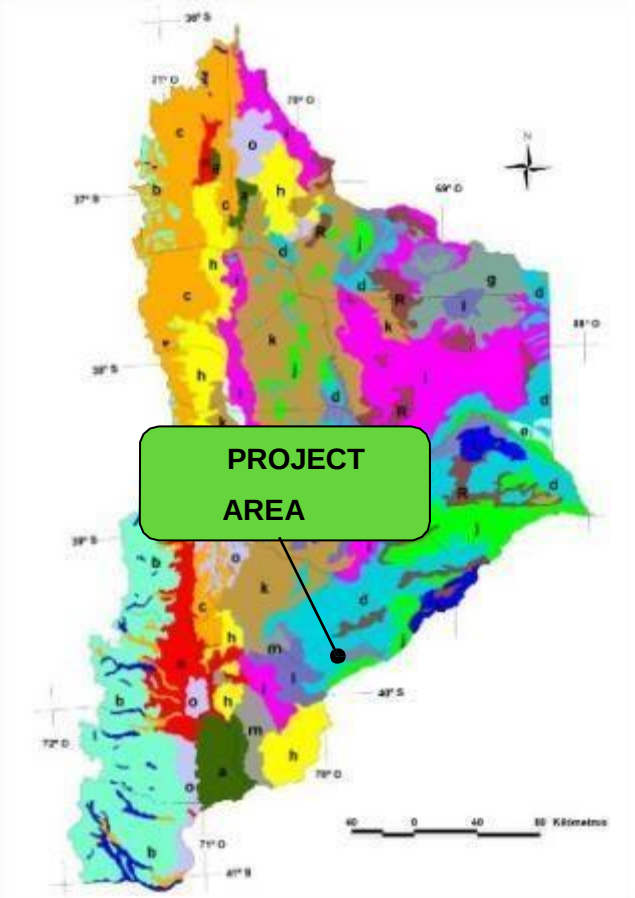
From the geomorphological point of view, the area of study is located in the region of "Plateaus Patagónicas-Neuquinas" (Holmberg, 1978; González Díaz y Ferrer, 1986), or the so called " Plains of the Patagonia Central" (Méndez et at.,1995). This region is characterized for the development of a relief formed by extensive areas with mountain ranges, mesetiform movements and basaltic plateaus, generally over 900 m.s.n.m. The plateaus are discontinuously distributed, matching some mountain-plateau, rocky-hilly bodies, depressions (occasionally with lakes or salt flats), floodplains and river terraces. The dominant reliefs, controlled by the geologic structure, have been carved between 0 and 800 to 1000 meters s.n.m.

Due to the geomorphological characteristics of the area it is practical to state that the ground is free of rocky formations with steep slopes. This characteristics enables the free circulation of winds and favors the total advantage of the wind resource of the project zone.

Picture 04 Landscape view from RN N° 237.

7.1.4 SOIL SCIENCE

In the Project Area there are moderately deep to deep soils, of sandy loam and clay texture, scarce of organic material, with a pH moderately alcaline (usually with calcium carbonate) and of a moderate annual hydric deficit, (Aridic argixelores, Aridic Xerortentes , Entic Haploxeroles and typical Torriortentes) During the field investigation there have been observed zones out of the area of the project with moderate to severe wind and water erosion.(deflation and accumulation, laminate action and in furrows)



ORDEN DEL SUELO DOMINANTE *	PRINCIPALES SUBGRUPOS DE SUELOS	GEOFORMAS	SIMBOLO UNIDAD CARTOG.
ALFISOLES	Haploxeralfes típicos y cálcicos.	Pedimentos labrados sobre sedimentos.	a
ANDOSOLES	Hapludandes típicos y vítricos. Udivitrandes fríglicos.	Relieve montañoso afectado por glaciación (incluye circos, valles colgantes, cerros "cuernos" y planicies glaciofluviales.	b
	Vitrixerandes típicos y mólicos. Haploxerandes típicos.		c
ARIDISOLES	Petrocalcides típicos. Haplocalcides típicos.	Planicies estructurales (incluye cerros "mesa" y mesillas). Antiguas planicies pedemontanas. Altas terrazas fluviales.	d
	Haplargides típicos. Natrargides típicos.		e
	Haplocalcides típicos. Petrocalcides típicos.		f
	Haplogypsides típicos y líticos. Petrogypsides típicos.	Planicies basálticas y campos volcánicos.	g
ENTISOLES	Xerortentes típicos. Xeropsamentes típicos.	Planicie lávica pedemontana y bajadas aluviales modernas.	h
	Fases inclinadas y serranía de Torriortentes típicos. Torripsamentes típicos. Torriortentes vítricos.	Paisaje de "crestas", "espinazos" y "cuestas". Pedimentos de flanco.	i
	Torriortentes típicos gravillosos. Torripsamentes típicos. Torrifluventes típicos.	Bajadas aluviales modernas y depresiones intersemanas. Terrazas bajas.	j
	Torriortentes típicos y líticos. Torripsamentes típicos, someros. Asomos rocosos.	Paisaje complejo en sedimentitas plegadas. Valles anticlinales.	k
	Torriortentes líticos y típicos. Asomos rocosos.	Planicie lávica.	l
MOLISOLES	Argixeroles cálcicos antípicos. Xerortentes típicos.	Relieve "multiple" en rocas cristalinas y Pedimentos sobre sedimentos.	m
	Argixeroles vítricos. Argixeroles típicos.	Relieve "multiple" en rocas volcánicas (serranías y colinas). Superficies de erosión.	n
	Haploxeroles énticos. Argixeroles típicos.	Relieve "multiple" en rocas volcánicas.	o
NO SUELO	Afloramientos de sedimentitas en forma escalonada y asomos rocosos.	Paisaje en "gradería" y depresiones por disolución ("karst").	R
	Glaciar (Volcán Lanín, Tronen y en Cordillera del Viento)		G
	Lago/Laguna		

* Muy minoritarios los Histosoles, Inceptisoles y Vertisoles se hallan en las unidades b, c; n respectivamente. Molisoles también se hallan en la unidad c.

Map 04. Soil Orders Source INTA

Picture 05 Soil Profile view of the area of study.

Picture 06 Soil Profile view of the area of study.

7.1.5 SEISMICITY

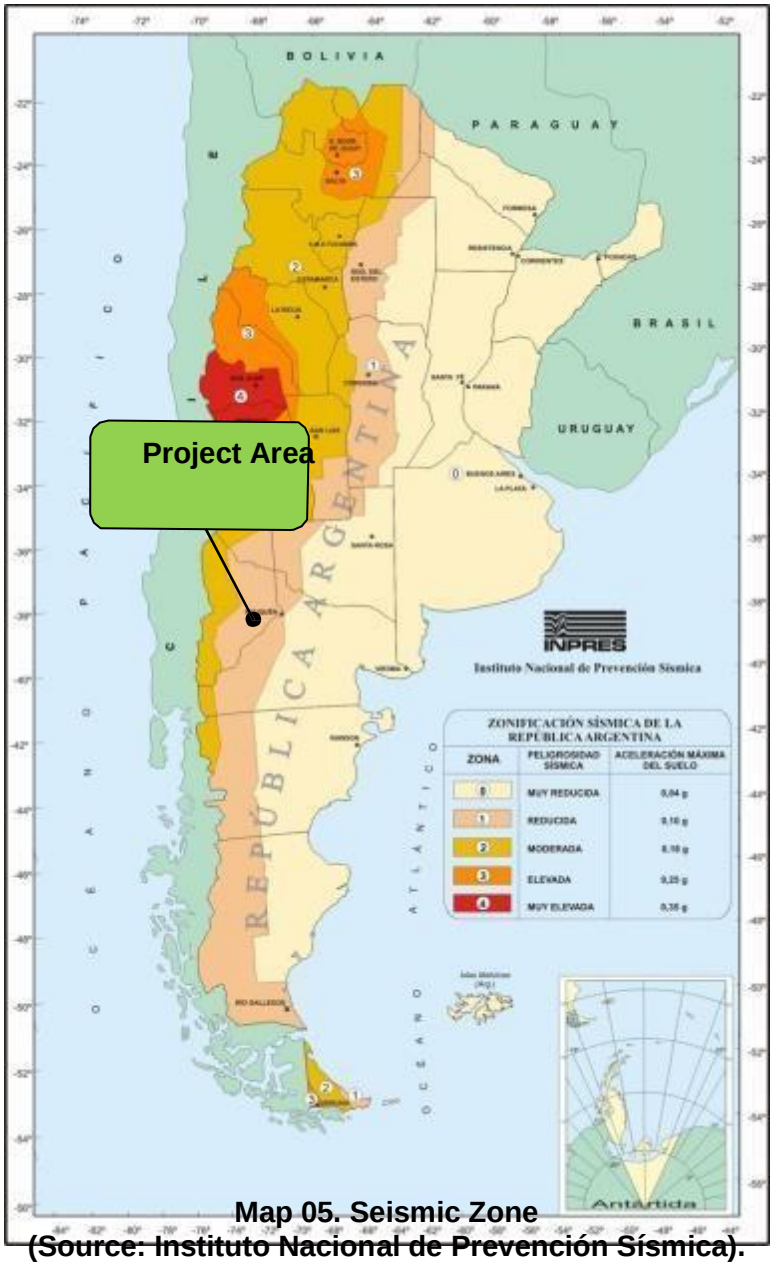
The evaluation analysis of the seismic danger in the last decades have been progressively improved with the use of geologic data that enable to get the seismic history of the active flaws. Historical and instrumental registers are extremely short in this portion of the South American continent as to reflect precision in the seismic values in the long term and conduct correct evaluations of the danger of earthquakes.

The seismic area in Argentina extends along the Andes from the Jujuy Province in the North, to the isle of Tierra del Fuego in the South. Nevertheless, as mentioned before, earthquakes have been scarcely documented.

Even though the register in the country of numerous earthquakes in historical times, there is no clear relation between their epicenters and the principal quaternary structures and in the majority of cases, they have not been recognized surfaces of historical breakages associated.

Except in the case of the earthquakes in 1944 and 1977, in Albardón and Caucete (San Juan), and in 1949 in Tierra del Fuego, during the quakes there were no evidences of superficial breakages. Nevertheless, in some cases seismic events have been related to the trace of flaws and structures with evidences of quaternary tectonic activity, located in the surroundings of the epicenters.

As can be seen in the map, the location zone is within zone 1: reduced seismic danger.

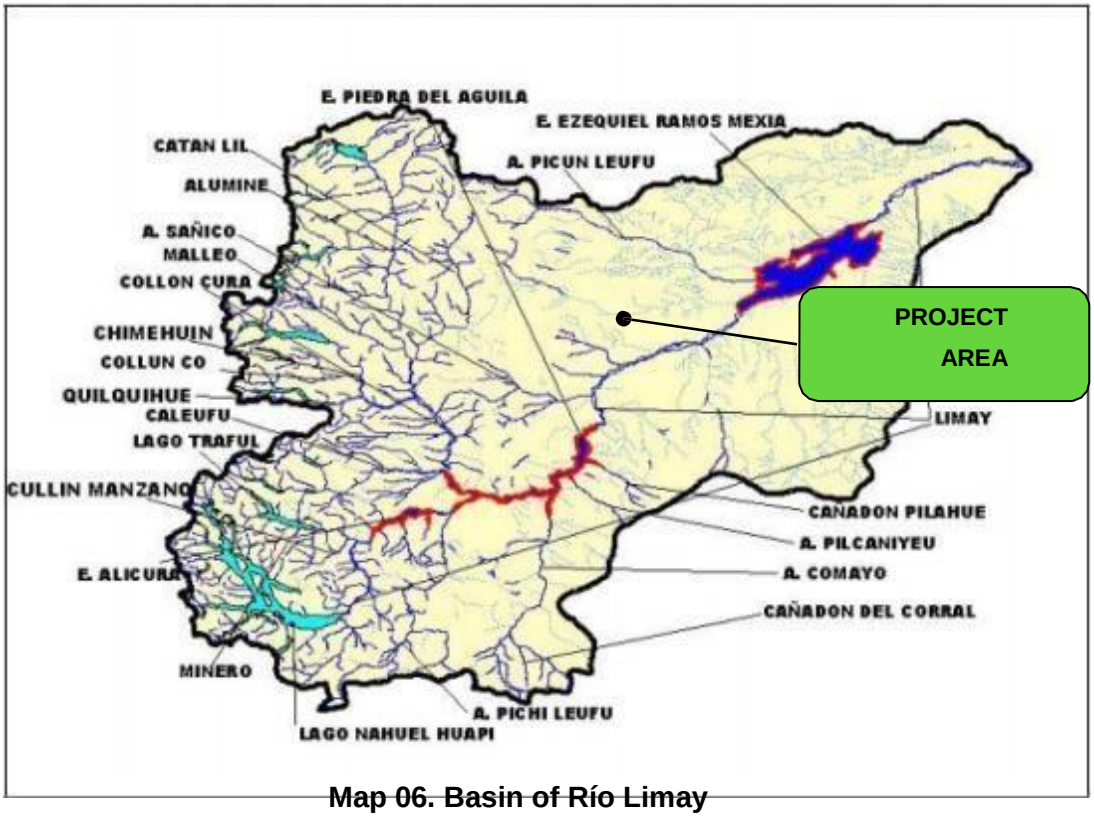


Map 05. Seismic Zone
(Source: Instituto Nacional de Prevención Sísmica).

7.1.6 SUPERFICIAL WATER RESOURCES

Next to the area of study, towards the SE it the basin of the Río Limay which presents a trace with direction SO-NE within the territory of Neuquén, draining a surface of 34.617 Km with an estimated module of 650 m3/seg. From its origin, in the Nahuel Huapi Lake, flows up to the joint with the Río Neuquén, to give birth to the river Negro.

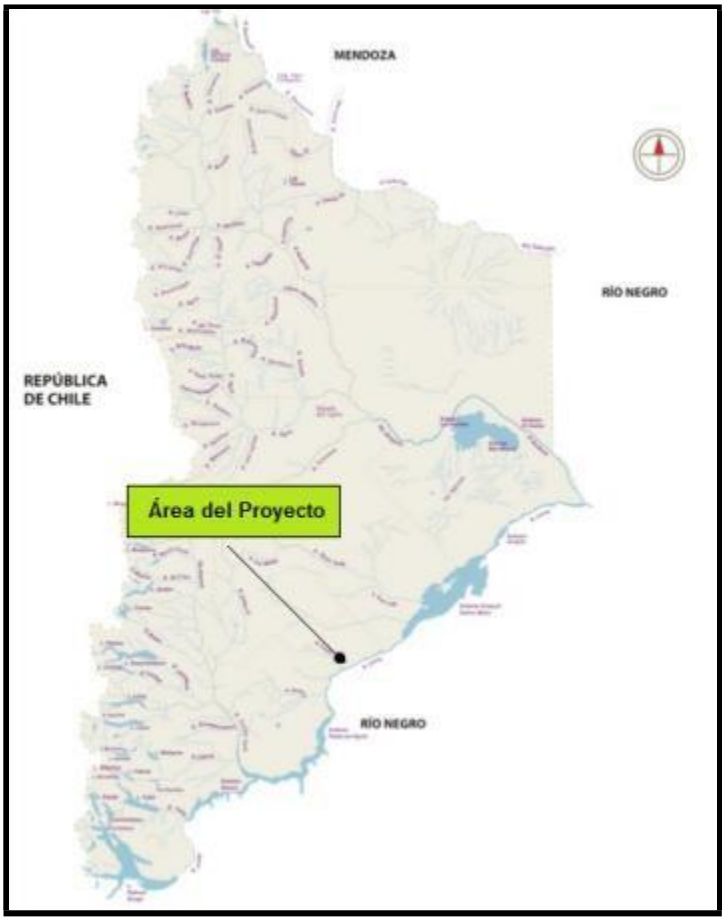
The high course of the Río Limay as well as its main streams, the rivers Traful and Collón Curá, has a water regime of rain-snow origin softened by the presence of natural lakes located in the origin of almost all its important streams. The natural water regime is defined by three periods and one double flood wave. The first one from May to August, when the majority of the rain over the basin occurs, high and irregular water flows are registered. Snow precipitations accumulate until the end of spring, when the melting starts causing the second flood wave from September to December. In this period high and irregular water flows are registered, favored by the accumulation of water in the basin lakes. In the period January-April the volume of water stored in the lakes maintain the regular water flows in a decreasing form. Dryness is habitual at the end of summer and extends towards the beginning of the autumn rain.



Map 06. Basin of Río Limay

Towards the sector NE of the Area of the Project, we can mention the dick, also called artificial lake, Exequiel Ramos Mexía[1] and the stream Picún Leufu. The dick Exequiel Ramos Mexía was formed from the endication of the río Limay, with the aim of ending regular floods, increase irrigation water areas and produce hydroelectric energy. It is also used for tourist navigation, sport fishing, tourism and recreation. Other dick near the surroundings is that of Piedra del Águila located to the South of the Area of Study. It is formed from the endication of the río Limay, downstream of the convergence with the river Collón Curá, with the aim of ending regular floods and produce hydroelectric energy. Rivers Limay and Collón Cura are stream of Río Limay. The compensating dick is the Pichi Picún Leufú.

Even though the wind park will be located in the zone of the Río Limay, the activity will not generate modifications in the natural courses of water.



Map 07. Hydrographic Map of the Province of Neuquén

[1] Denominación de la Subsecretaría de Recursos Hídricos de la Nación.

During the field study no courses of permanent water and/ or runoffs have been observed inside the area of the project. Only important runoffs were observed in the external sectors of the area of the project which are duly documented in the graph below. During the field investigation, any "mallines" (swampy prairies characteristic of the Patagonia) were identified

Picture 07 Runoffs view out of the site of the Project Area (39°50'19.6"S; 69°54'02.3"W)

Picture 08 Runoffs view out of the site of the Project Area (39°50'44.4"S; 69°54'54.5"W)

The localization of the runoffs have been identified in the hydro geologic map of local scale that is attached in the Annexes.

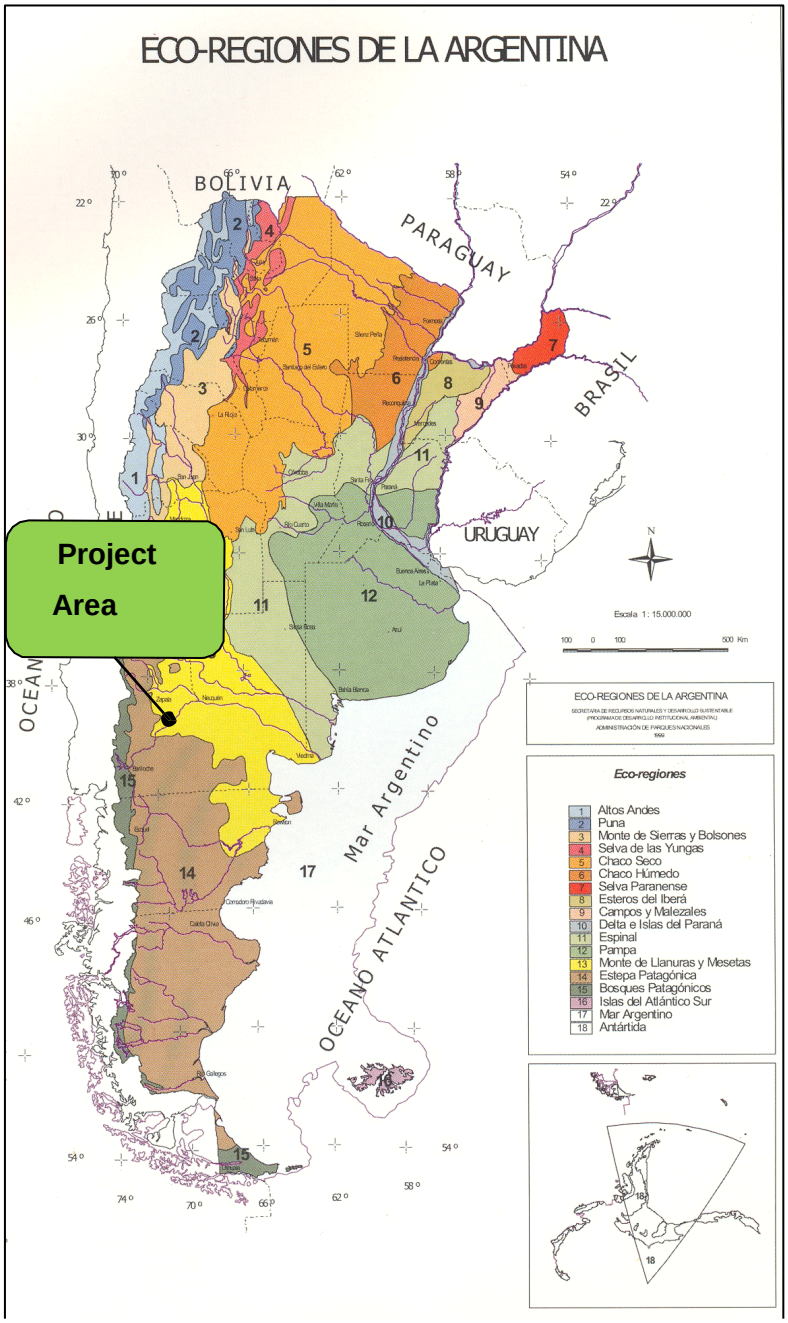
7.1.7 UNDERGROUND WATER RESOURCES

The hydrologic characteristics of the medium sector of the basin of the Río Limay correspond to the modern flood which is integrated by well selected sediments with low content of fine materials. They correspond to sediments of big grading, such as boulder, gravel and coarse sand. The water supply is local and comes directly from rain precipitations or the fusion of seasonal snow. Water movement is verified initially in a vertical form from the surface of the gravel until it touches contact with the sediments of lower permeability, which in general are related to the continental and marine sediments from the Tertiary Age. The downhill plus the presence of coarse and permeable material in the deposits ease to a rapid drainage of the underground water that avoid the storage. They generally have fresh or brackish waters depending on the characteristics of the mineral components in the scree through which the water drains. Given the characteristics of the project no affectation of the underground waters is predicted.

7.2 BIOTIC MEDIUM

The area of the Project is classified as the eco region called Monte of Plateaus and Grasslands.

The vegetable physiognomy of the monte is a steppe of 1 to 3 m height, characterized by the presence of jarillas (gender Larrea) This type of bush predominates either in the plateaus as in the slopes of the river terraces and in the low plain lands. As regards the fauna, it is rich in species of mammals of cave-like habits. As part of the studies of Base Line, during the investigation the Study of Biota Base Line in which the fauna and flora of the area of the project was evaluated. This study is attached in the Annexes.



Map 08. Eco-regions
(Source: Secretaría de Ambiente y Desarrollo Sustentable de la Nación, Buenos Aires.

7.2.1 INTRODUCED AND NATIVE FLORA

The vegetation corresponds to the Fitogeographic Province of Monte. The predominant fisiognomy is that of medium steppe with an average vegetal coverage of 20 to 40 %.

Down below some species that eventually may be seen according to these strata are indicated:

Strata	Common Name	Scientific Name
Bush	Jarilla hembra	*Larrea divaricata*
	Black Monte	*Bougainvillea spinosa*
	Matasebo	*Montte aphylla*
	Piquillín	*Condalia microphylla*
	Jarilla macho	*Larrea cuneifolia*
	Zampa	*Atriplez lampa*
	Alpataco	*Prosopis alpataco*
	Pingo pingo, tramontana	*Ephedra chilensis*
	Molle	*Schinus polygamus*
	Yaoyin	*Lycium chilense*
	Chilladora	*Chuquirag aerínacea*
	Fabiana	*Fabiana peckii*
	Thyme	*Acantholippia* seripihoides
	Male Thyme	*Verbena seriphioides*
	Picanilla	*Cassia aphylla*
	Jarilla crespa	*Larrea nítida*
	Palo azul	*Cyclolepsis genistoides*
	Retamilla	*Neosparton aphyllum*
	Manca caballo	*Prosopidastrum globosum*
	Vidriera	*Suaeda divaricata*
	Charcao gris	*Senecio filaginoides*
Herbáceo	Botón de oro, melosa	*Grindelia chiloensis*
	Coirón	*Stipa speciosa*
	Pasto hilo, unquillo	*Poa lanuginosa*
	Peludilla	*Plantago patagónica*
	Pastito cuarentón	*Schismus barbatus*

Table 11. Vegetation of the Project Area (Source. INTA)

During the field investigation 1**3 sampling sites were established, which will be used a posteriori in the Environmental Monitoring Plan.** In such sites the identification of species and the development of biologic indicators was conducted as part of the Study of Base Line. The identified species , determined indicators, conclusions of the the Study , as well as the SIG Map local scale of flora are attached to the Annexes.

Picture 09 Study of the flora.

7.2.2 INTRODUCED AND NATIVE FLORA

From the zoogeographical point of view, the area of study is located within the Andino-Patagonic area The species reflect media conditions, showing adaptability to rigorous conditions, as water or vegetation scarcity, or suffering the brunts of autumn--winter coldness. Within the species that eventually may be identified in the area of study, there are:

Mammals

Scientific Name	Common name
Dolichotis patagonum	Patagonic hare
Lycalopex griseus	grey fox
Oncifelis geoffroyi	gato montes
Oncifelis colocolo	gato de pajonal
Lepus europaeus	European hare
Conepatus chinga	skunk
Zaedyus pichiy	piche patagónico
Lontra provocax	huillín

Table 12. Mammals that can be found the Project Area

Reptiles

Scientific Name	Common name
Bothrops ammodytoides	Yarará ñata
Micrurus altirostris	Coral
Phylodrias trilineatus	Culebra
Chelonoidis donosobarrosi	Tortoise
Liolaemus sp	lizard

Table 13. Reptiles that can be found the Project Area

Birds

Given the potential affectation of the Wind Energy Park over the birds, in the Annexes it is presented a table with th different species announced below identifying their international status of conservation (JUCN) and of national conservation (Argentinian Birds), if it is the case of a migration type, if its presence is frequent, the degree of sensibility related to the project and the risk of incident occurrence in the different stages of the project and in particular in the Operation Stage.

Scientific Name	Common name
Tyto alba	Lechuza de Campanario
Athene cunicularia	Lechuzita de las vizcacheras
Cyanoliseus patagonus	Loro Barranquero
Eudromia elegans	Martineta común
Phalcoboenus australis	Matamico
Elanus leucurus	Milano Blanco
Sicalis luteola	Misto común
Neoxolmis rubetra	Monjita Castaña
Poospiza ornata	Monterita canela
Thraupis bonariensis schulzei	Naranjero
Rhea americana	Ñandu común
Rhea pennata	Ñandu petiso / choique
Columba livia	Paloma común
Columba maculosa	Paloma manchada
Columba picazuro	Paloma picazuró
Speculanas specularis	Pato de anteojos
Nothura maculosa	Perdiz
Hymenops perspicillatus	Pico de Plata
Serpophaga griseiceps	Piojito trinador
Troglodytes aedon chilensis	Ratona común
Lessonia rufa	Sobrepuesto
Tyrannus melancholicus	Suriri real
Vanellus chilensis	Tero Común
Tyrannus savama	Tijereta
Columba picui	Torcacita común
Zenaida auriculata chrysauchenia	Torcaza
Agelaioides badius	Tordo músico
Molothrus rufaxillaris	Tordo pico corto
Molothrus bonariensis	Tordo renegrido
Bubo virginianus magellanicus	Tucurere
Phrygilus carbonarius	Yal carbonero
Phrygilus fruticeti	Yal negro
Turdus amaurochalinus	Zorzal chalchalero
Turdus falcklandii magellanicus	Zorzal patagónico

Scientific Name	Common name
Asthenes baeri	Canastero chaqueño
Asthenes pyrrholeuca	Canastero coludo
Asthenes modesta	Canastero pálido
Asthenes patagonica	Canastero patagónico
Polyborus plancus plancus	Carancho
Picoides mixtus berlepschi	Carpintero bataraz chico
Colaptes campestris capestroides	Carpintero campestre
Colaptes melanochloros leucofrenatus	Carpintero real
Milvago chimando	Chimango
Zonotrichia capensis	Chingolo
Pyrocephalus rubinus	Churrinche
Leptasthenura aegithaloides pallida	Coludito cola negra
Phrygilus gayi caniceps	Comesebo andino
Vultur gryphus	Condor
Sporophila caerulescens	Corbatita común
Phytotoma rutila	Cortarramas
Myiopsitta monachus calita	Cotorra
Cranioleuca pyrrhophia	Curutié blanco
Diuca diuca	Diuca común
Muscisaxicola maculirostris	Dormilona chica
Phoenicopterus chilensis	Flamenco chileno
Bubulcus ibis	Garcita huevera
Agriornis murina	Gauchito chico
Agriornis micropterus	Gaucho común
Circus cinereus	Gavilán ceniciento
Parabuteo unicinctus	Gavilán mixto
Larus dominicanus	Gaviota cocinera
Pygochelidon cyanoleuca	Golondrina barranquera
Progne modesta elegans	Golondrina negra
Progne tapera fusca	Golondrina parda
Tachycineta leucopyga	Golondrina patagonica
Falco peregrinus	Halcón peregrino
Falco femoralis	Halcón plomizo
Falco sparverius cinnamominus	Halconcito colorado
Fumarius rufus	Hornero
Sicalis lebruni	Jilguero austral
Sicalis flaveola	Jilguero dorado
Cathartes aura jota	Jote de cabeza colorada
Coragyps atratus	Jote Cabeza Negra

Scientific Name	Common name
Geranoaetus melanoleucus	Águila mora
Buteo albicaudatus	Aguilucho alas largas / Gavilan de cola blanca
Buteo ventralis	Aguilucho Cola Colorada
Buteo polyosoma	Aguilucho común
Caprimulgus longirostris	Atajacaminos
Theristicus melanopis	Bandurria Austral
Upucerthia dumetaria	Bandurria común
Eremobius phoeniculus	Bandurria patagónica
Pseudoseisura lophotes argentina	Cachalote castaño
Pseudoseisura gutturalis	Cachalote pálido
Ammodramus humeralis xanthomus	Cachilo ceja amarilla
Anthus correndera	Cachirla común
Anthus furcatus	Cachirla uña corta
Anairetes parulus	Cachudito pico negro
Mimus satuminus	Calandria grande
Mimus patagonicus	Calandria mora
Mimus triurus	Calandria real
Stigmatura budytoides flavocinerea	Calandrita

Table 14. Birds that can be found in the Project area.

During the field investigation, as part of the Study of Biologic Base Line, 8 transections of 100 meter x 2 meter width each one were established The results of the investigation of species (direct and indirect identification), the indicators generated and the conclusions are in the study attached in the Annexes.

Picture 10 Study of Fauna

7.2.3 THREATENED SPECIES

As part of the theoretical underpinnings and for its use as reference, there is a development of a filtered list of the previous tables of species potentially present in the zone and their state of conservation according to the "Red List" of the International Union of Conservation of Nature (www.iucnredlist.org) These species are qualified as Almost Threatened o more.

FAMILY	SPECIES	Common Name	State of conservation
Rheidae	*Pterocnemia pennata*	Choique	Vulnerable,
Accipitridae	*Buteo ventralis*	Aguilucho Cola	Almost
Caviidae	*Dolichotis patagonum*	Mara	Almost
Dasypodidae	*Zaedius pichyi*	Piche	Vulnerable,
Felidae	*Felis concolor*	Puma	Vulnerable,
Camelidae	*Lama guanicoe*	Guanaco	Vulnerable,
Testudinidae	*Chelonoidis donosobarrosi*	Tortoise	Vulnerable,

Table 15. List of threatened species (Source. www.uicnredlist.org)

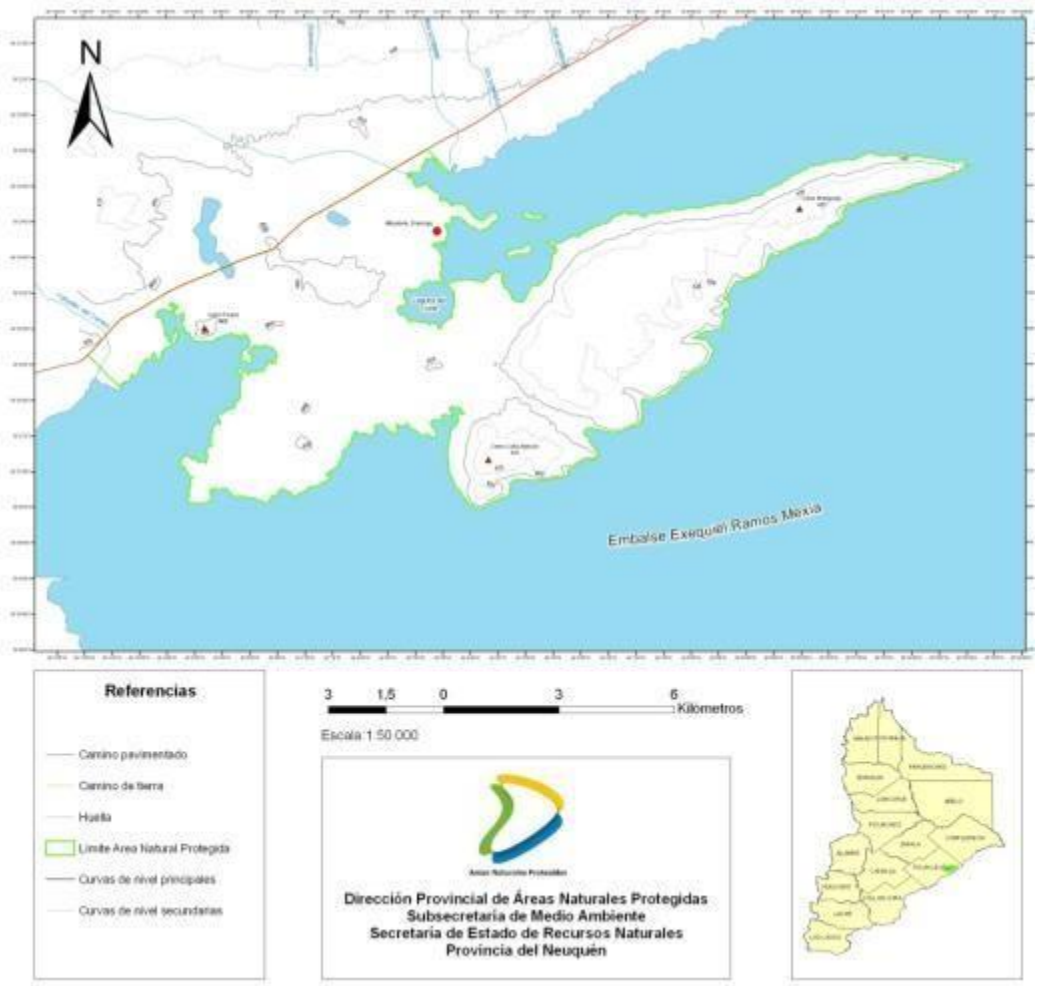
7.2.4 PROTECTED NATURAL AREAS

The polygon of the Project is not located within any of the Protected Natural Areas. The nearest one id the Protected Natural Area El Mangrullo
with 9.240 has., located at 64 Km North in straight line from the area of the Project.

It was created in 1996 (by Decree N° 1320) as a Reserva de Uso Múltiple- Category VIII of the UICN2- in the Cabo Alarcón Penynsula, with the aim of preserving the ecosystem, re-establish the general ecological balance and protect the samplings of bush and woody species and the wild fauna in perpetuity, in the frame of objectives established in the international norms for the conservation of nature. Even though aquatic birds represent the bulk of the faunistic cast, the most prominent if the flamingo austral (Phoenicopterus chilensis), which in small groups are often seen in coastal environments and dick overflows.

The steppe birds also give the place great interest as AICA[3] (NE08). There are registers of the rhea (Rhea americana), probably being the most southern record in the occidental portion of its distribution and occasionally the choice (Rhea pennata) scarce nowadays, also registered in several occasions. Among the endemic species of Argentina the yal carbonero (*Phrygilus carbonarius*), the monterita canela (*Poospiza ornata*), the cacholote pardo (*Pseudoseisura gutturalis*) that nests in the place and the monjita castaña *(Neoxolmis rubetra*) can be found. In winter the chorlo cabezón (*Oreopholus ruficollis*) arrives at the place and in the coastal sector the pitotoy chico (*Tringa flavipes*) and the pitotoy grande (*T. melanoleuca*) can be found in summer.

[2] Unión Internacional para la Conservación de la Naturaleza. Nowadays this categorization is redefined, and is equivalent to Categroy VI of the UICN called Resources Resservation.
[3] Important Areas for the Conservation of Birds.



Map 09. Protected Natural Area El Mangrullo

Threatened Species /AICA		NEO8
Scientific Name	Common name	
Phoenicopterus chilensis	Flamenco austral	NT
Rhea americana	Ñandú	NT
Rhea pennata	Choique	NT

Category NT Almost threatened-VU Vulnerable, EN: Danger

Table 16. Threatened Species in the AICA.

Even though the project does not affect directly the Protected Natural Area El Mangrullo**,** due to the presence of migration birds in the list of species that inhabit it and it is unknown if the area of the project might be used as migration passage , the present report must be extended during the Construction Stage by the implementation of a Monitoring Plan for Birds.

7.2.4.1 AVIFAUNA AND WIND ENERGY PARKS

The relation between Wind Energy Parks and its potential affectation over the birds and fauna is in process of study in the world level. According to what is mentioned in the Document of Position of Wind Energy Parks and Birds of the Sociedad Española de Ornitología. (SEO/Birdlife) of 2012, the location of wind energy parks may affect the birds of the place due to:

- **Collisions** that may cause the direct mortality by crash with the blades in movement or with the tower.
- Disturbances that may provoke that the birds change their habitats due to the presence of the wind park, as the possibility of generating a barrier effect that may fragment the connection between the feeding areas, wintering period, breeding and migration (migration birds).

Birds of prey constitute other group of birds liable to be affected due to their large size, for using high sites to stay and in several cases, for being attracted by carrion. It is to be indicated that during the field study there were not identified exemplars dead or alive of this type of birds.

Migration birds constitute a group that may be affected by the presence of the wind station. Having in mind the disposition of space for the equipments in the field this situation is reduced. It is considered that migration birds follow roads that they regularly use, nevertheless , according to new information and consulted sources (Asociación Ornitológica del Plata), it cannot be asserted the existence of migration birds in the Area of the Project. Migration routes of birds in Argentina are extensive are still there are no studies of careful monitoring to study in detail this particular displacement of the species.

7.3 PERCEPTIVE MEDIUM

The intrusion of any artificial element in a natural envrionment provokes an alteration in the landscape. In general terms, the visual affectation of the wind parks is directly proportional to the number of wind turbines, the size of them (height of the tower, length of the blades) and the distance of coating color respect to the color range of the setting, and is inversely proportional to the distance of the potential observer of the landscape where the wind turbines are placed.

The location zone stands for having less than 3% slop, the development of poor soils in terms of productivity and the dominion of species like the Grindelia Chiloensi, Prosopis Alpataco and Stipa Spinosa of medium coverage. The plateau enables an open panoramic view delimited softly by the surrounding geoforms.

Picture 11 View of the plateau landscape of the area of the Project.

Conducting a qualitative analysis of the potential affectation of the project over the landscape the following aspects must be taken into consideration:

- Presence The absence of a wind energy turbine implies the disappearance of its visual affectation. The higher the quantity of wind turbines, the higher the area of visual affectation.
- Location. The zone is not within a mountainous frame, which is considered of higher landscape sensibility. The wind turbines will not be visible from the routes which is the site with more possibility of incidence of the project. It will only be seen the upper part of the fence by the passers-by who may go through the rural roads and by those who inhabit the near rural house (puesto) located outside the area of the project.
- Architecture of the wind energy park. The simplicity of the disposition pattern of the wind turbines makes them easily be perceived as an ordered distribution, which may result attractivve or not for the observer. To this, other elements of the park must be added like auxiliary buildings and internal roads.
- Color of the wind turbine. The tower, the nacelle and the rotor may be painted according to the surrounding landscape, in order to reduce the visual affectation of the equipment. The disadvantages of this camouflage consists on the potential affectation of the birds that overflow the zone and the difficult visualization under unfavorable weather conditions, on the part of ariplanes (sport, military or regular transport) with the risk of collision.
- Beaconing Required as a form of making wind turbines visible, through the collocation of a beaconing system according to the type and quantity required by the ANAC(Asociación Nacional de Aviación Civil). In counter position, the nearest towns. during the night will visualize intermittent lights although this is not the case due to the distances to the nearest populated centers.
- Rotation speed: A wind turbine moving its blades in a slower way may have less affectation over the perceptive medium. As the length of the blades increases, its rotation speed is reduced. That is, large wind turbines, like the ones used in the present Project, have a lower rotation speed, so the visual affectation is reduced.
- Shadow effect. The shadow that is projected by high structures, may potentially affect occasional drivers and/or passers-by, since the rotor blades chop the sun light intermittently, generating a shadowflicker. Even though the shadowflickers are:

harmless in terms of health and safety, in certain circumstances may be disturbing. This effect is dimmed with rotation rates of 17 rpm in three-blade wind turbines Given that there are no near inhabitants of permanent residence this effect will be considered despicable.

- Solar reflection. The reflect and flickers that a wind turbine produces is due to the incidence of solar light on the blades. As a way of quantifying this it is considered the rotor color and the distance to the nearest urban settlements. To reduce this affectation, antireflex paint will be used in the equipments and distances superior to 10 times the rotor diameter respect to the urban settlements.

Following are the different views of the Project Area, obtained during the field study.

Picture 12 Panoramic view (39°50'15.21"S; 69°45'58.97"W)

Picture 13 Panoramic view (39°50'30.02"S; 69°45'43.59"W)

During the field study they were identified as existing landscape affectations in the Area of the Project of the electric lines of 132 kV and 500 kV and the gas pipeline "Cordillerano" of the Transporadora de Gas del Sur SA. It is important to indicate that, even though the affectations are not seen in the landscape as part of the hydro carbon industry, the area of the project, is located within a zone with permits of exploration of hydro carbon (Área Bajada Colorada), under concession to the company Americas Petrogas Argentina.

Picture 14 LAT View
(39°50'15.5"S;
69°45'40.2"W)

Out of the area of the project, at a distance of 250 m approximately to the South, there is a rural post. To the North of the Area of the Project and at a distance of 2.000 m there is an inactive oil well (YPF. Nq.HS.es-1) which belongs to the company Americas Petrogas Argentina SA

There is no evidence of the presence of operating quarries.

Picture 15 Rural Post outside the area of the Project, occasionally used (39°45'10.1"S; 69°49'24.7"W).

Picture 16 Inactive location view (YPF.Nq.HS.es-1) out of the area of the project (39°43'03.8"S; 69°45'56.6"W)

7.3.1 VISUAL IMPACT

Resolution N° 77/98 of the Secretaria de Energía mentions that in all facility for electric generation and transmission the relation between the work and the landscape must be considered in its most direct aspects, this is by the physical interference of the structures, the supporting structures, the towers and the conductors, as well as its indirect aspects with respect to the degradation of the observer´s perception of the natural, architectural, historical or landscape areas, since they represent an intrusion in such context. The Resolution indicates that project designers must base in three(3) important aspects to identify the sensibility of the natural resources, predict the impact and reduce the adverse visual impact: visibility, context and intensity, which together form the conceptual structure of the evaluation of such impact. To perform the photomontage the NR 237 was considered for its high traffic and potential affectation. The same is far located at 4000 meters approximately, in straight line to the Wind Park.

Following is the photomontage that has been made to evaluate the visual impact of the wind park together with th methodology suggested by the Secretaría de Energía. This photomontage was generated by WINDPRO® it was determined that the Wind Park Vientos Neuquinos I, will not be visible from RN 237.

Picture 17 Photomontage View from National Route N° 237 (39°48'27.91"S; 69°42'32.54"W)

The majority of the methods of diagnosis or inventory of visual quality have a subjective component. Consequently, to evaluate this impact subjectivity and the criteria of the authors will be applied. It is to be mentioned that inasmuch as the objects move away from the spectator, their details turn to be less noticed. Mopu (1984) indicates that this has two immediate consequences for the analysis of visibility:

- The quality of the visual perception diminishes inasmuch as the distance increases;
- and It is possible to fix a distance, in relation to the peculiarities of the zone of study, from which it is not interesting to continue with the analysis of visibility.

Thus, the major part of the visibility analysis adopt a weighting system to ponder what is observed at a distance. For example, Steinitz (1979), in a landscape study about the North River in Massachussetts, uses three zones in relation to the distance:

Zone	Distance (m)	Weight
Near	0-200	1
Medium	200-800	1/3
Far	800-2600	1/9

Table 17 - Pondering of the Zones of Visibility by Steinitz.

In base of this method, from the sectors of the Provincial Route N° 237 the wind energy turbines will be invisible elements in the landscape.

To evaluate the impact intensity in this sector it was applied a quali -quantitative methodology which consists on answering several questions that categorize the zone of influence and the form of impact. To each answer corresponds a score, and these scores will be summed up afterwards. This variable takes values in the interval 18-180 range that does not constitute an easy-reading or interpretation scale. For this reason the variable has been transformed mathematically and assimilated to a scale of 1-12 to adapt it to the scale of intensity values corresponding to the methodology of evaluation selected. As well, it has been assigned a characteristic color to each range for its better interpretation.

Visual Impact	Range	Color.
Low	1-4	
Moderate	5-8	
High	9-12	

The questions are distributed into 3 groups:

Visibility of the park

Visibility context

Visual intensity

Visibility of the park

The park is located within the Area of Escenic Value.

Very high	
High	
Moderate	
Low	1

The park is located in a Topographic level

Superior for the Principal Observer	1
At the same level than the Principal Observer	
Inferior for the Principal Observer	

The Visibility of the park for the Principal Observers results Seasonal

The park is always visible	
The park is visible in Critical Periods	
The park is visible in non Critical Periods	
The park is not visible throughout the year	1

The visual obstruction of the park is

Very important	
Moderately important	
Of little importance	2

The principal observers of the park are located in

Parked Private Property	
Residential zone	
Re creative zones	
Zone of Schools/ Public Buildings/ Hospitals	
Rural zone	2
Industrial zone	
commercial zone	
close to urban zone	
routes	
Degrades areas	

The park visually blocks Important Panoramas for the zone

Yes, it produces important visual blockage	
Yes, but it produces moderate visual blockage	
No, it does not produce visual blockage of any Panorama	1

Visibility Context

The surroundings of the park correspond to:

Parked Private Property	
Residential zone	
Re creative zones	
Zone of Schools/ Public Buildings/ Hospitals	
Rural zone	2
Industrial zone	
commercial zone	
close to urban zone	
routes	
Degrades areas	

There are other similar parks existing at a certain distance

More than 2500 meters o Non - existing in the zone.	1
Between 1000 and 2500 m	
Less than 100o m	
Contiguous	

In which of the following situations will the Principal Observers of the park be?

Their houses	1
Public places	
Their jobs	
In transit	2

The characteristics of the park are incompatible with the context

Yes, because it results a strange structure for its context	
Yes, because it is within an area of projects already defined	
Yes, but for its constructive characteristics, which may be adapted	
No, its characteristics are compatible to its context	2

Is it possible that exists opposition to the installation of the Project due to its visual impact?

It requires hiding through complex shield or is impossible to hide.	
It permits to use Vegetation shields	
It does not require hiding	1

The mounting of the park will require camouflage

It requires hiding through complex shield or is impossible to hide.	
It permits to use Vegetation shields	
It does not require hiding	10

Visual Intensity

For the Principal Observer the park is considered a structure

Very prominent	
Relatively prominent	8
Little prominent	

The contrast of the line of background

Very important	
Moderately important	6
Of little importance	

For the Principal Observer, the visual perception of the park is

A structure contiguous in its immediate context (<100m)	
A structure relatively close (100 m < observer<500m)	
A far structure (>500m)	1

The park must be considered a Structure of Duration

Permanent	
Not so permanent	5
Temporal	

The park must be considered a Structure of Expansion

Very extended (large occupation of space)	
Little extended	4
Punctual	

The scale in the park respect to other visual elements of the context is

Much larger	10
SImilar	
Smaller	

The visual impact comprises the three matrices that involve visibility, context and intensity, with the final results that follow. The variable of visual impact was constituted for the evaluator to interpret easily the level of visual impact reached by the project. This variable comes up from the mathematical average of the scores in each question.

Matrix	Subtotal impact value
Visibility	8
Context	18
Intensity	34
Total	60
Visual Impact (Intensity scale s/Conesa, 1 to 12) **Low impact**	3

Table 18. Value Visual Impact

7.4 CULTURAL AND SOCIOECONOMIC MEDIUM

7.4.1 DEMOGRAPHIC INFORMATION

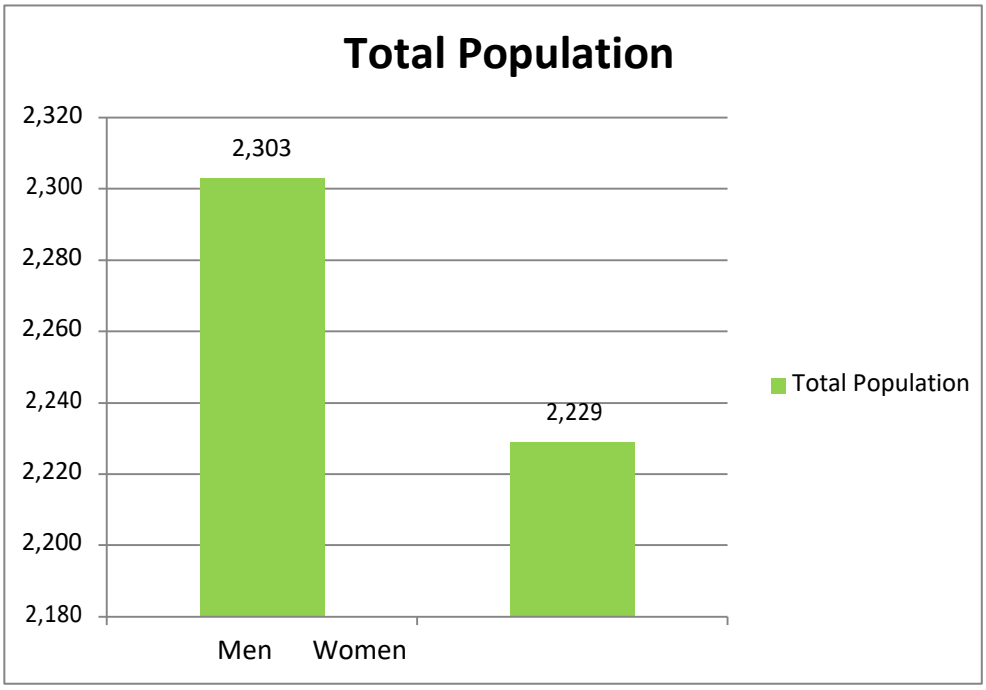
Collón Curá Department is located in the sector South-East of the Neuquén Province It has a surface of 5730 Km2 Piedra del Águila is the city head of the department, it is located on RN N°237 at a distance of 225 Km from Neuquén Capital, at 206 Km from San Carlos de Bariloche, at 93 Km from Picún Leufú and at 168 Km from CutralCó-Plaza Huincul.

At the moment of the preparation of this report, there are no official data from the Censo Nacional de Población, Hogares y Viviendas 2010 for the city of Piedra del Águila, nevertheless there is official information for the Collón Curiá Department, so it is for that reason that this information will be used for the description of the socio-economic indicators of the area.

The Censo Nacional de Población of 2010 gave account of a population of 4532 inhabitants for the Collón Curá Department. From this total, 50.8% are men and 49.2%, women. Masculinity rate is 103,3.

Department	Sex		Total Population
	Men	Women	
Collón Curá	2303	2229	4532

Table 19. Population of Collón Curá Department
(Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).



Graph 06 Distribution of Population of Collón Curá Department (Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).

7.4.2 Company Main Activity

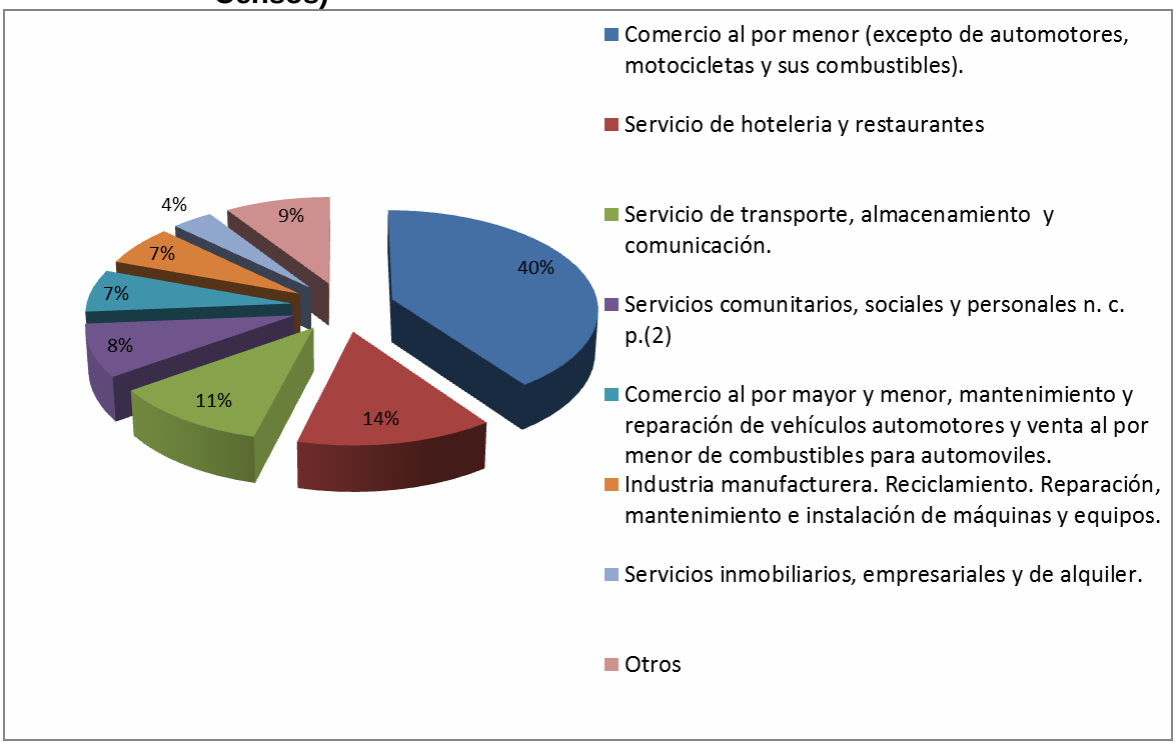
The main economic activities of the region correspond to retail shop and in a minor proportion hotels and restaurants.

If it is considered the number of economic units existing in Collón Curá Department from 1995 and up to 2013 it is possible to state that it has been produced an economic growth in the district, because this quantity has shown a permanent increase in that period. If it is considered the people employed in the different sectors, it is observed that commerce and services are the ones that generate most jobs.

The area is within a zone with Permits for hydro carbon Exploration (Área de Bajada Colorada), which belongs to the company Americas Petrogas Argentina SA

Activity	Year
Commerce (retail) (except automobiles, motorcycles and their fuels)	122
Hotels and restaurants	42
Transport service, storage and communication	34
Community, social and personal services	26
Commerce (retail and wholesale), maintenance and repair of automobiles and retail sale of fuels for automobiles.	21
Manufacturer industry Recycling Repair, maintenance and installation of machines and equipment.	20
Real state services, business and renting services.	11
Social and health services	6
Electricity, gas and water supply	5
Construction	5
Wholesale commerce and in commission except automobiles and motorcycles.	4
Personal effects and household goods repairs	3
Financial mediation, insurance services and administration of funds (pensions)	2
Mining and quarring.	1
Public administration, defense and social security	1
Teaching	1

Table 20. Collón Curá Department, (Fuente. Dirección Provincial de Estadística y Censos)



Graph 07 Collón Curá Department, (Source: Dirección Provincial de Estadística y Censos)

Graph 08 Economic units
(Source: Dirección Provincial de Estadística y Censos)

7.4.3 SOCIO-ECONOMIC INDICATORS

Considering the socio-economic indicators in Collón Curá Department, we found that 89.8% of the houses is provided with a water network, while 64% has sewerage drain, and 78.8% has gas connection to a network.

On the other side, considering construction materials , we noticed that for the most part they have ceramic floors, tiles, mosaic, marbles, wood or carpets, with metal sheet roof and ceiling.

[4] Registro Provincial de Unidades Economicas (REPUE), according to the information provided by Town Halls, Comisiones de Fomento and the Dirección Provincial de Industria y Comercio.

Water Provision and origin	Type of sewerage system				Without toilet	Total houses
	To a public networ k	To Septic tank and Cesspit	To cesspit	To holw, earth excavation		
Total	**841**	**177**	**204**	**44**	**50**	**1,316**
By piping inside the house	828	163	158	13	20	1,182
Public Network	827	141	111	-	4	1,083
Borehole with motor pump	1	4	6	-	-	11
Borehole with manual pump	-	1	-	-	-	1
Well	-	7	21	4	11	43
Transport with a tank	-	3	1	1	-	5
Water from rain, river, canal, stream or dick	-	7	19	8	5	39
Outside the house but inside the site	13	10	31	25	17	96
Public Network	13	6	7	1	10	37
Borehole with motor pump	-	-	-	-	-	-
Borehole with manual pump	-	1	1	-	-	2
Well	-	1	12	12	4	29
Transport with a tank	-	-	-	4	2	6
Water from rain, river, canal, stream or dick	-	2	11	8	1	22
Outside the site	-	4	15	6	13	38
Public Network	-	1	-	-	1	2
Borehole with motor pump	-	-	-	-	-	-
Borehole with manual pump	-	-	-	1	1	2
Well	-	3	7	4	8	22
Transport with a tank	-	-	-	-	-	-
Water from rain, river, canal, stream or dick	-	-	8	1	3	12

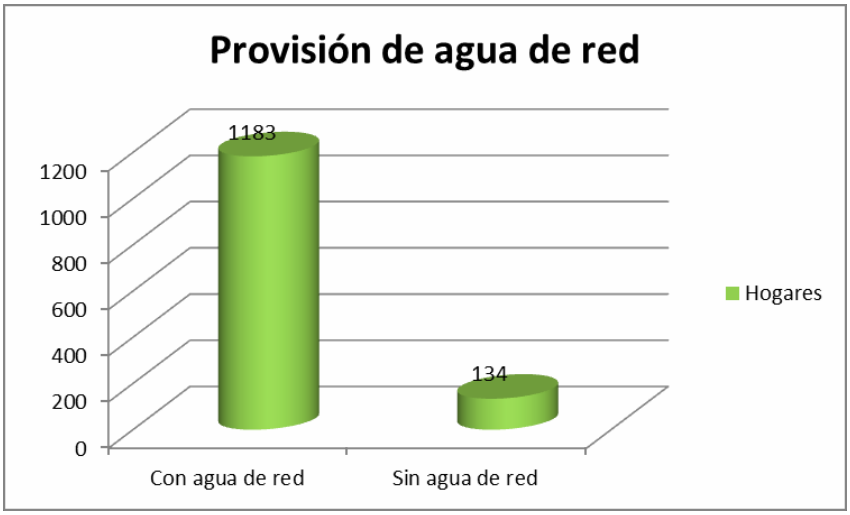
Table 21. Water Provision and origin
(Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).

Predominant material of the exterior of the roof and ceiling	Floor material				Total houses
	Ceramic, mosaic, marble, woord, or carpet	Cement or fixed bricks	Land or loose bricks	Others	
Total	**945**	**327**	**24**	**20**	**1,316**
Asphalt cover or membrane with ceiling	11	6	-	1	18
Asphalt cover or membrane with ceiling	2	-	-	-	2
Tile or crockery with ceiling	17	1	-	-	18
Tile or crockery with ceiling	5	5	-	-	10
Tile with ceiling	90	7	-	-	97
Tile with ceiling	2	1	-	-	3
Metal with ceiling	675	251	4	17	947
Metal without ceiling	21	27	6	1	55
Fiber cement sheet or plastic with ceiling	108	10	-	-	118
Fiber cement sheet or plastic without ceiling	1	3	-	-	4
Carton sheet with ceiling	6	8	3	-	17
Carton sheet without ceiling	1	4	11	1	17
Cane, plank, or straw with clay, straw with ceiling	-	1	-	-	1
Cane, plank, or straw with clay, straw without ceiling	-	-	-	-	-
Others with ceiling	6	2	-	-	8
Ohterss without ceiling	-	1	-	-	1

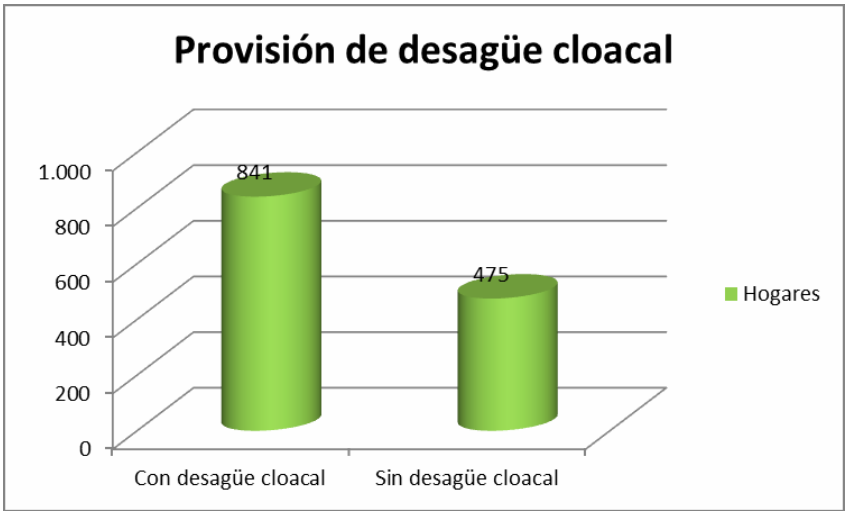
Table 22. House Materials
(Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).

Fuel used maily for cooking	Type of house								Total houses
	House	Rancho	Casilla	Appartment	Rented unit	Room in hotel or tenenme nt	Room not built to inhabit	Mobile house	
Total	**1,223**	**20**	**4**	**42**	**24**	**2**	**1**	**-**	**1,316**
Network gas	970	1	2	41	20	2	1	-	1,037
Gas in bultk	7	-	-	-	-	-	-	-	7
Gas in tubes	6	1	1	-	-	-	-	-	8
Gas in cylinder	159	11	1	1	4	-	-	-	176
Electricity	-	-	-	-	-	-	-	-	-
Wood or coal	77	7	-	-	-	-	-	-	84
Other	4	-	-	-	-	-	-	-	4

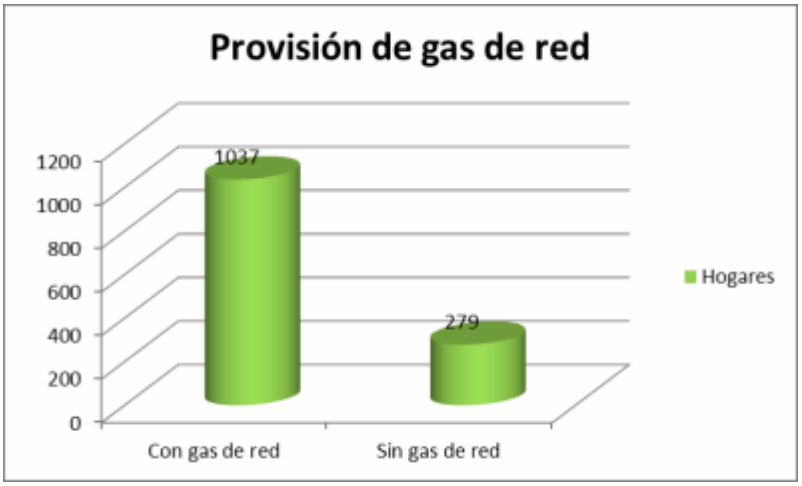
Table 23. Fuel for cooking
(Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).



Graph 09 Water Network Provision
(Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).



Graph 10 Provision of sewerage system
Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).



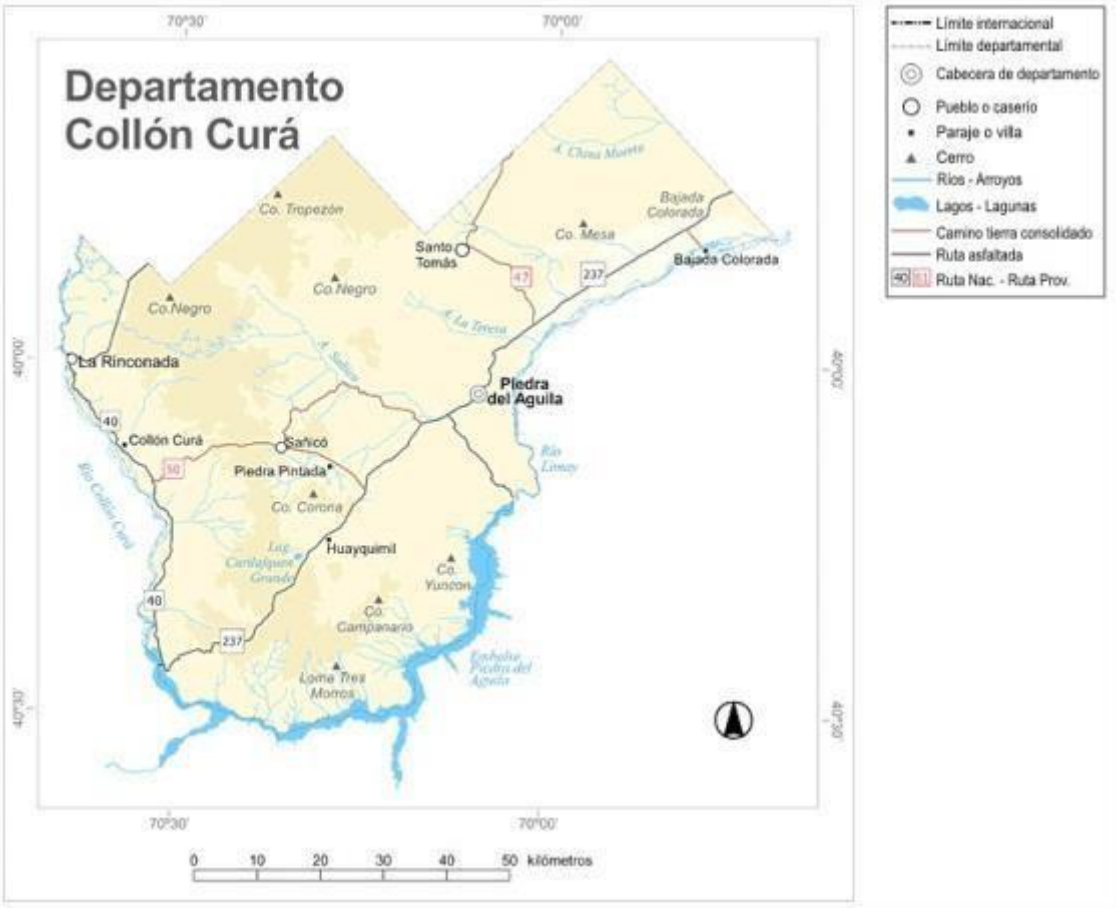
Graph 11 Gas Network Provision
Source: INDEC. Censo Nacional de Población, Hogares y Viviendas 2010).

This indicates a good access to basic services (water, gas and sewerage system) in most of the houses in the department

7.4.4 SERVICE INFRASTRUCTURE

Communication Network

The area of the Project is connected to the road network through Provincial Route N°47 and National Rout N° 237



Map 10. Collón Curá Department,

Hydroelectric Central Piedra del Águila

In 1983 the construction of the Hydroelectric Central Piedra del Águila started, located over the Río Limay at 25 Km of the city of Piedra del Águila, in the paraje called Villa Rincón Chico and has today a capacity to evacuate

14.000 cubical meters per second; different to other dams in the province, this central has an impressive dick of concrete, of 173 meter height which contains a seasonal dick of 24.000 has.. The central was built with the aim of regulating the water flow in flood seasons and generate hydroelectric energy.

Public Services

Drinking water supply systems in the city is provided by the Town Hall, the natural gas is provided by the company Camuzzi Gas del Sur, while the electric service is provided by the Ente Provincial de Energía del Neuquén (EPEN)

EDUCATION

In relation to the educative system, we can say that the city has educational coverage from Kindergartten to Primary and Secondary Schools.

Hospitals

Piedra del Águila has a public hospital with a level of complexity (III) located at 170 meters of the NR Nº237.

Archaelogical Museum of Piedra del Águila

The museum located in the city of Piedra del Águila, was opened in 1998. In its elements of exposition shows the history of the city and archaeological materials rescued before the construction of the dams Alicurá and Piedra del Águila. Among them it is important to mention Cueva Traful which presents a sequence of 10.000 years.

Picture 18 Town Hall of Piedra del Águila

Picture 19 Kindergartten N° 34

Picture 20 Tourist Information Office

Picture 21 Archaelogical Museum of Piedra del Águila

7.4.5 INDIGENOUS PEOPLES

In the Area of the Project there are no indigenous peoples communities that may be affected by the installation of the Wind Energy Park

In the Collón Curá Department the community Ancatruz is present in the Parajes Zaina Yegua, Paso Yucón , Piedra Pintada y Sañizo, at 30 Km of Piedra del Águila. This community is formed by approximately 80 families, with an estimated population of 320 people, formed mostly by adults.

Picture 22 Location of the Community Ancatruz respective the area of the proyect (Red Circle)

7.4.6 PALEONTHOLOGY AND ARCHAEOLOGY

The Area of the Project is located in a region of much paleontologist and archaeologist importance, evidenced by numerous scientific studies.

The studies in the investigation area of Piedra del Águila enabled to detect a diversity of sites with prehistoric evidence. The investigations were developed considering the following contexts:

(a) Zones of low height under 600 m over sea level It comprises the riverbed of the Río Limay from dam Alicurá until the city of Piedra del Águila, including the mouth of the Río Collón Cura and the streams Pichi-leufú and Comallo.

(b) Lagoons located 900m height over sea level.

(c) Zones of medium and high altitudes out the riverbed of the Río Limay, between 600 and 1100m above sea level.

(d) Basin of the stream Sañicó, near Piedra del Águila. The surfaces of the plateau show sandy deposit of big grading, product of overflows. The valley forms a wind passage where there are some sandy accumulations. This basin borders on the South a large basalt plateau.

The works done showed a regional development almost without interruptions, that chronologically extended from approximately 10.000 years AP up to an stage that is manifested in its late settlements.

From an archaeologist approach, the investigation centered in the subsistence in relation to the importance of the guanaco, mollusks, rodents and the vegetable recollection in the prehistoric diet; availability and use of raw lytic materials related to the temporal range of the occupations and use of space, noting aspects such as the correlation of geo forms and human activities. Prehistoric investigations were completed with those conducted by several indigenous communities, basically in the reserva mapuche of Ancatrúz and rural groups or criollos which, by different reasons, established outside the area.

Formación Candeleros

Furthermore, Formación Candelero has contributed with on of the most important fauna of fossil reptiles described up to date for the Late Cretaceous of the Cuenca Neuquina. Among them, there are a great variety of sauropod dinosaurs such as Andesaurus delgadoi (Calvo & Bonaparte, 1990) Limaysaurus tessonei (Calvo &

Salgado, 1.995), Nopcsaspondylus alarconensis (Apesteguía, 2.007) and Rayososaurus agrioensis (Bonaparte, 1.996).

Among the theropod dinosaurs are the Giganotosaurus carolinii (Coria & Salgado, 1.995; Calvo & Coria, 1.998) and the Buitreraptor gonzalezorum (Makovicky et al., 2.005) and the Ekrixinatosaurus novasi (Calvo et al., 2.004). Remains of the ornithopod iguanodóntidos are marked for these deposit by Coria et al. (2.007). The deposits of this unit in the area Villa El Chocón and Picún Leufú, are equally rich in footprints of vertebrates. In these levels several icnoespecies assigned to dinosaurs sauropods (Sauropodichnus giganteus; Calvo, 1.991), dinosaurios terópodos (Abelichnus astigarrae, Bressanichnus patagonicus, Deferrariischnium mapuchensis and Picunichnus benedettoi; Calvo, 1.991), dinosaurios ornitópodos (Sousaichnium momettae y Limayichnus major; Calvo, 1.991) and pterosaurios (Pteraichnus sp., Calvo & Lockley, 2.001) have been described.

As a consequence of the fossil richness of the region, in 1993 it was decided to open the Archaeologic Museum of Piedra del Águila, among the materials it has an important sample of the cultural sequence of the Cueva Traful I; fauna and tools found in Alero Arias and Alero del Puente; pieces concerning human occupation in the American Continent, and other data that reflect the archaeological activity- an important sample of the cultural sequence of the Cueva Traful I; fauna and tools found in Alero Arias and Alero del Puente; pieces concerning human occupation in the American Continent, and other data that reflects the archaological activity.

In the Area of the Project there is no presence of deposits of paleonthologic or archaeologic interest.

Before any discovery produced on occasion of the execution and operation of the project we will proceed as it is established by current regulations, reporting the paleontologic findings to the Authority of Application, polce or Town Hall, suspending the tasks in the site.

The compnay will condunct the Study of the Archaeologic and Paleontologic Base Line prior to the beginning of the Construction stage.

7.4.7 DUCTS

As it can be seen in the map of anthropic affectation, attached to the Annexes, in the area of the Project there are tracing lines for gas. According to this the Company has executed this Project considering the NAG 100 of ENARGAS (Minimum Argentinian Norms of Safety for the Transport and Distribution of Natural Gas and other Gases through Piping) in particular in all related to: (i) minimum safety distances to place the foundations of the wind turbines and the wiring for them,(ii) bonding road tracing between the equipment; (iii) the need of conducting an analysis of the cathodic/anodic protections to determine the potential affectation of corrosion over the ducts.

8 LEGAL FRAME

Within the regulations that are cited below, those are mentioned which may have any implicancies over the present Project either in the Province or Nation.

8.1 NATIONAL ENVIRONMENTAL AND LABOR LEGISLATION

- NATIONAL LETTER OF CONSTITUTION **Art. 41.** It is established the environmental right of all inhabitants (health, balanced, suitable for human development and in order that the the activities of production satisfy the present needs without compromising future generations; and have the obligation to preserve it) **Art. 43.** Every person can lodge quick action of protection, as long as there is no other more appropriate legal means" ... They can lodge this action against any form of discrimination and in relation to the rights that protect the environment...." **Art. 124.** It recognizes the original domain given to Provinces on their natural resources. This original domain gives the Provinces the power of police and jurisdiction over their natural resources.

- **National Law Nº 19.587.** Administrative easement of electro ducts, which regulates the condition of property restrictions originated in the necessity of expansion of the electric transport system.

- **National Law Nº 19.587 and Decree Nº 351/79. About hygiene and safety in the place of work** It establishes the basic guidelines for a preventive policy in mitigation and control of labor risks.

- **Law Nº 20.284.Preservation of the wind resource.** It establishes that all sources of atmospheric contamination are regulated and that each Province determines the maximum levels of emission.

- **Law Nº 22.421. Fauna Conservation and recuperation.** This federal Law refers to hunting, harassment, capture or destruction of breedings, nests,

eggs or lairs, the possession, transit, profit, commerce and transformation of wild fauna and its products or sub products.

- **Law Nº 22.428. Soil conservation and recuperation .** It declares of general interest the conservation and recuperation of the productive capacity of the soils.

- **National Law Nº 24.051.** Dangerous Wast and Decree N° 893/03 It regulates the generation, manipulation, transpor, treatment and final disposition of dangerous waste.

- **National Law Nº 24.065. Generation, transport and distribution of Electric Energy.** It regulates the activities of generation, transport and distribution of electricity. It considers the functions of the ENRE to apply regulations to which electricity producers, transporters, distributors and users must attach to in relation to safety measures, norms and technical procedures.

- **National Law Nº 24.071. Fight against Desertification** It anticipates the application of efficient and strategic measures in the long term for the sustainable development of zones affected by drought and soil degradation.

- **Law Nº 24.449 and Decree Nº 779/95.National Law of transit, limits over contaminant emissions, noise and parasitic radiation.**

- **National Law Nº 25.019 and Decree Nº 1597/99. Wind and Solar Energy** It declares of national interest the electric generation of wind and solar energy along the national territory and establishes the mechanisms to proper the development of projects

- **National Law Nº 25.557. Labor risks** prevention of risks and the repair of damage suffered by manpower that derive from work. It creates the figure of the ART as a private comptroller over the conditions of Hygiene and Safety in the work environment.

- **Law N° 25.612. Integral Management of Industrial waste and Service activities.** It establishes the minimum budget of environmental protection over the integral management of industrial origin and of service activities, which are generated in all the national territory and derived from industrial processes or service activities.

- **Law N° 25.670. PCBs and Decree N° 853/07. Budgets for Management and Disposal** It establishes the minimum budgets of environmental protection for the management and disposal of the PCB, in all the national territory

- **National Law Nº 25.675. General of the Environment** This lae of public order, has established in our country an impressive juridic order, with substantial and procedural dispositions, regulatory of Art 41 of the National Letter of Constitution which establishes that the environmental damage "will generate first and foremost the obligation to recompose".

- **National Law Nº 25.688.** Environmental Management of Water Regime This law establishes the minimum environmental budget for the preservation of water, its advantage and rational use.

- **National Law Nº 25.743 and Decree Nº 1022/04.** Protection of the Archaeologic and Paleontologic Heritage. It establishes that archaeologic and paleontologic materials found belong to the State domain with jurisdiction in the place of the discovery

- **National Law Nº 25.831. Free access to Environmental Information** It establishes the minimum budgets of environmental protection to guarantee the right of access to environmental information that is found under the State knowledge, either in the national context , as well as provincial, local and of the City of Buenos Aires, and of self-governing entities and companies of public service providers, either public, private or mixed.

- **National Law Nº 25.916.** Household Waste Management It establishes the

minimum budgets for household waste management.

- **National Law N° 26.190. Renewable Energy Sources.** Promotion scheme destined to the production of Electric Energy with renewable sources.

- **Civil Code. Art. 1.113**. The obligation of that who has caused damage is extended to damages caused by those under his dependency, or by the things that he serves from , or has under his care. In the event of damage caused with things, the owner or guardian, to be exempted from responsibility, he must demonstrate that there is no fault on his part; but if the damage were caused by the risk or vice of the thing, it will only be exempted of total or partially responsibility certifying the fault of the victim or of a third party for whom he must not respond. If the thing has been used against the owner´s or guardian´s will expressed or presumed, he will not be responsible. **Art. 2.499**. There will be trepidation of possession, when by a new work that will be started in properties that do not belong on the holder, whatever the class, the possession of this suffers an impairment that yields the benefit of that executing the new work. Whoever fears that a building or any other thing may derive in a damage to his goods, may denounce this fact to a judge with the ends of adopting precautionary measures. **Art. 2.618**. The disturbances caused by smoke, heat, odors, lights, noise, vibrations or similar damage due to the exercise of activities in neighboring properties will not exceed the normal tolerance having in mind the conditions of the place and even though exists administrative authorization for them. According to circumstances of each case, judges may dispose the action for damages or the termination of those disturbances. In the application of this disposition the judge must appease the requirements of the production and respect due to the regular use of the property; similarly he will have in mind the priority in use. The trial will process summary proceeding.

- **Criminal Code. Second Book - Of the crimes. TITLE VII- Offenses against public safety Ch IV - Offenses against public health Poisoning or adulterating Art. 200.** It will be repressed with reclusion or prison of three to ten years, he who poison or adulterate, in a dangerous way for the health, drinking waters or food or medicine substances, destined to the public use or the consumption of a community of people. If the fact is followed by the death of

person, the punishment will be ten to twenty five years of reclusion or prison. Note: original text according to Law Nº23077.

8.2 NATIONAL ENVIRONMENTAL AND LABOR LEGISLATION

- **Law Nº 263 and Resolution Nº 699/03. Code of Fiscal Lands** It establishes the management of areas called fiscal lands.

- **Law Nº 899 (modified by Law N° 2613). Water Code** It establishes the guidelines for the conservation and protection of surface and undergroung water sources

- **National Law Nº 1.347.** Adherence to the National Law of soil conservation and use.

- **Law Nº 1,763 and Resolution Nº 181/00.** Creation of EPAS and Quality of waste waters

- **Law Nº 1.875 and Decree N° 2.656/99 (ordered by Law Nº 2.267).** Preservation, conservation, defense and improvement of the Environment. It establishes guidelines for environmental evaluations, the different types of activities and the level of detail of the mentioned evaluations, the sanction regime, among others. In **Resolution N° 592/99** it is established the general actions to follow to preserve physical resources **(**water, air and soil) as well as biotic resources (flora and fauna). It establishes general guidelines, prohibitions, especial authorizations, the empowerment through the Declaration of Environmental Impact and the implementation of the Environmental Management Plan considering the creation of public hearings as a form of citizen participation, from the informative point of view non-binding to the development of the project. In the Annex V of the Decree N° 422//13

it is established (in point 47) that wind parks will require the development of a Stude of Environmental Impact

- **Law Nº 1.914.** It modifies all articles 25-29 of Law N° 1.875.

- **Law Nº 2.257, Law N° 2.325 and Decree Nº 2.711/97. Historical, Archaeologic and Paleontologi Heritage.** It establishes the guidelines for the care and conservation of the historical, archaeological and paleontological heritage of the Neuquén Province.

- **Law Nº 2.267 and Decree Nº 2,656/99.** Guiding Principles for the Preservation, Conservation, Defense and Improvement of the Environment. Ordered by Law Nº 1.875.

- **Law Nº 2.648. Urban Solid Waste (RSU) Management** It establishes the guidelines and minimum budgets for the adequate management of the Urban Solid Waste (RSU)

- **Decree Nº 2.911/97 Registro Provincial de infractores ambientales.**

- Decree Nº 1.485/12 **Sewage Effluent Treatment** In the Annex XV of the DR N°2656 it establishes Norms and Procedures for the treatment of industrial sewage liquids. In its guidelines it establishes that the Environmental Impact Studies(EIS) must count with the approval of the effluent treatment system by SSMAyDS. It is forbidden the use of absorbing pits, drainage networks and disposal pits in situ as a uniqur means of treatment of liquid effluents. It establishes the need of meeting the requirements of dumping the liquids treated and/or its final disposal.

- Provision Nº 795/09 It establishes the analysis methodologies of grounds contaminated with HTP in soil and water

8.3 LEGISLATION SPECIFIC OF THE ENERGETIC SECTOR

- **National Law Nº 25.019 and Decree Nº 1.597/99. National Regime of Wind and Solar Energy** It backs up the generation of wind energy with a subvention and a deferment in tax payment.

- **National Law Nº 26.190 and Decree Nº 562/2009. "Régimen de Fomento Nacional para el Uso de Fuentes de Energía Renovables destinada a la Producción de Energía Eléctrica".** It promotes the use of them for subventions and tax exemption.

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- Provision Nº 220/2007 **Spot Operations** It establishes the possibility of incorporating new strategies for the generation of energy to the Mercado Eléctrico Mayorista (MEM)

- **Resolution SE Nº 475/87**, about the presentation of the evaluation of environmental impact before the Subsecretaría de Planificación Energética, of the different alternatives suggested in the energetic projects and environmental studies conducted in all their stagaes, as well as a program of environmental control and monitoring during the service life of the work.

- **Resolution SE Nº 304/99**, Condiions and requirements that holders of wind energy centers producing energy must fulfill to enter the MEM.

- **Resolución SE Nº 15/92**, modified the **Resolutions SE Nº 77/98 and SE Nº 297/98.** It establishes the Manual of Environmental Management of the Electric Transport System of Extra High Tension It indicates the Environmental Conditions that electric facilities of transmission lines and transformer and/or compensating station must meet.

- Resolution ENRE Nº 1725/98 It resolves that for the construction and/or operation of facilities of transport and/or distribution of electricity the submitters

must present to ENRE, an evaluation study of environmental impact with respect ot the guidelines of **Resolution SE Nº 77/98**. In its Annex it is indicated the Criteria and Guidelines for the elaboration of Reports on Environmental Impact to be presented to ENRE.

- Resolution ENRE Nº 171/95 Underground Electric Facilities of H.T, M.T. and LT Enclosures of transformation Medium Tension/Low Tension. It establishes general norms to ensure the enclosures of all type in different facilities which avoid the entrance of non authorized third parties, if there is no intentional action.

- Resolution ENRE Nº 1832/98 Safety Norms for the Execution of Electric Works in Public Road. It establishes norms to consider for the execution of works in Public Roads by distributor companies or its contractors, as fencing, posters, etc.

- **Resolution ENRE N° 5/2000 and N° 401/2000.** Locking requirements of Transformer Centers The resolution requires the companies the lock change in all the transformation centers for others with securer characteristics and that they do not enable the access to the facilities by non authorized third parties.

- Resolution ENRE Nº 311/2001 Guidelines of Minimum Contents for the Public Safety System in the facilities of distributor companies. The resolution requires distributor companies the formulation and start-up of a Safety Plan, that has as main focus on prevention, analysis of risks and actions to avoid them. Ten plans are determined whose fulfillment ensures public safety: Plan of detection and correction of anomalies of installations in the public road; prevention and maintaining of installations in the public road plan; control, register, analysis and prevention of accidents plan; plan of presentation of claims for public safety; control plan of works in the public road ; plan of investigation and normalization of aerial lines of low and medium tension; control

plan of transformer chambers; plan of signalling in the public road; training and authorization plan for the personnel of the distributor company and its contractors, subcontractors and providers that execute public safety tasks; and plan of analysis and prevention of specific unusual events (fires, localized floods, etc.).

- Resolution ENRE Nº 57/2003 Guidelines of Minimum Contents for the Public Safety System in the facilities of distributor companies. The resolution requires distributor companies the formulation and start-up of a Safety Plan, that has as main focus on prevention, analysis of risks and actions to avoid them. As in resolution ENRE N° 311/01, it requires the implementation of Plans for public safety.

- Resolution ENRE Nº 33/2004 Technical norms on obstacles and posters in support installations of High Tension lines, which comprise an normalization plan of the existing lines and adds it to Public Safety Systems.

- Resolution ENRE Nº 39/2004 Procedural norms for the notification and claims on public safety of the distributor companies by INTERNET, since March 2004.

- Resolution ENRE Nº 86/2005 Technical norm on safety conditions that pillars and link-ups of low tension must have for the connections of the distributor companies to users.
- Resolution ENRE Nº 114/2005 Technical norm that establishes minimum conditions of safety against fires which transformation centers must have in private properties, including a normalization plan to be conducted in the Systems of Public safety of distributor companies.

- **Resolution ENRE N°773/2005.** Procedural norm that establishes a sanction system on topics related to Public safety for transport companies of electric energy of high and extra high tension.

- Resolution ENRE Nº 805/2005 Procedural Norm that establishes minimum frequencies of revision of installations in public road which distributor companies must fulfill according to Safety Public Systems.

- Resolution ENRE Nº 384/2006 Technical norm on outdoor transformation centers which establishes minimum parameters that these centers must fulfill.

- Resolution ENRE Nº 444/2006 Technical norm that approves the Regulation for external Head lines AEA version 2003 only for tensions lower than 66 kV, with introduction of technical changes and the addition of a procedure that includes the jointly participation of Town Halls.

- Resolution ENRE Nº 451/2006 Technical norm on over charges of level distribution (Boxes) in which it is determined the safety conditions that plastic boxes must have to be installed in public road. This norm is complemented with a plan to change all fuses of the lira type existing in those boxes.

- Resolution ENRE Nº 1098/2006 Modifier of Res ENRE 86/05 norm on safety conditions for Pilars and link-ups of Low Tension for the connections of distributor companies to users.

- Resolution ENRE Nº 497/2007 Modifies Res N° 805/2005 and modifies the minimum frequencies of revision of installations in public road which distributor companies must fulfill according to Safety Public Systems.

- **Resolution ENRE N° 653/2007.** Technical norm that approves the Regulation for external Head lines AEA versio 2003 for Low Tension, with introduction to technical changes.

- Resolution ENRE Nº 682/2007 Guidelines of Minimum Contents for the public safety system of the installations of proprietor companies of Private High Tension Lines authorized by S E , art 31. Summary version of Res N° 57/03

- Resolution ENRE Nº 683/2007 Technical Guidelines for the Installations of low tension with basic conditions for safety in neighborhood type "A" within the frame Agreenment celebrated to collaborate with Town Halls in the area of concession, Buenos Aires and the Ministerio of Acción Social.

- Resolution ENRE Nº 643/2008 Technical norm which approves the Regulation for Transformer Centers of medium to low tension of the AEAA with introduction of technical changes.

- Resolution ENRE Nº 129/2009 Technical norm that applies compulsorily for the realization of new installations, the Regulation for external underground lines of electric energy of the AEA with introduction of technical changes.

- Resolution ENRE Nº 331/2009 Technical norm that modifies Res 401/2000 replacing the Standard British norm for lock of the transformation centers by norm UNE (updated)

- Resolution ENRE Nº 37/2010 It established the approval of Regulation for external head lines of Medium and High Tensio of the AEA (version 2003) only for tensions over 66 kV, with incorporation of technical modifications.

- **Resolution ENRE N° 597/2010.** It establishes preventive measures to avoid accidents or incidents in the realization of underground works in the public road through the handling of plans on the part of the distributor company to the contractors that work in the public road, by means of Town Halls.

- Resolution ENRE Nº 225/2011 Technical norm that approves a new regulation for the connection of residential users cancelling res ENRE N° 207/95 about installations in properties

- Resolution ENRE Nº 289/2011 Norm that restricts the installation and use of wood monopole platforms of a power over a 3 x 40 kVA for safety reasons.

- Resolution ENRE Nº 400/2011 Norm that approves minimum conditions to implement the Signaling of Electric Installations in the Public road through the application of the "Regulation for the signaling of Electric Installations in the Public Road of the AEA", with the introduction of technical changes.

- Resolution ENRE Nº 401/2011 Norm that approves the "Guidelines for works of underground electric wiring near gas conducting pipes", elaborated with ENARGAS.

- Resolution ENRE Nº 421/2011 Guidelines of Minimum Contents for the Public Safety System in the facilities of distributor companies. It replaces a Res ENRE N° 311/2011 since 1/07/2012 introducing improvements.

- Resolution ASPA Nº 01/2011 Procedural norm for the revision of daily reports through Internet connected to Res ENRE 421/2011.

- **NAG 100 of ENARGAS** (Minimum Argentinian Norms of Safety for the Transport and Distribution of Natural gas and Other gases through piping).

9 IDENTIFICATION, DESCRIPTION AND ESTIMATION OF ENVIRONMENTAL IMPACT

9.1 PERMANENT IMPACTS

According to Res ENRE N° 1725/98 the matrices of Evaluation of Environmental Impact must present a chart whose columns and lines must indicate the factors over which projects produce or may produce some impact and the stages of the projects where these affectations will occur. In each of them the union the the matrices cells must indicate the qualification of specific impact for the following ponding factors.

Sign	+ (Beneficial)	S/A (no affectation)	- (Harmful)
Duration	T (Temporal)		P (Permanent)
Intensity	E (High)	M (Medium)	L (Low)
Dispersion	F (Focused)		D (Disperse)

Table 24. Pondering of impacts

It must be shown in a summary chart, the number of impacts collected for each combination of permanent pondering factors

A table must be made where there are the Negative Permanent Impacts identified where it is visualized the level environmental Impact produced.

Following the methodology proposed by ENRE the impacting actions of the Project will be described, afterwards a qualitative valuation of the identified impacts is done, then these impacts are described and finally the matrix of identified permanent impacts will be presented

9.2 POTENTIALLY IMPACTING ACTIONS OF THE PROJECT

Considering the tasks to be done during the different stages in the Wind Energy Project Vientos Neuquinos I, the actions with possibilities of producing an affectation to the environment in each stage will be established first.

9.2.1 CONSTRUCTION STAGE

Activity	Tasks
Soil Movement	It refers to soil movements connected to the construction of foundations, crane platforms, temporal/permanent facilities, Temporal Waste Area, Stockpiling of supply /equipment area, trenching, Sewage effluent treatment system, among others. The temporal or permanent disposition of material resulting of soil movement is included.
Circulation and operation of vehicles	It refers to the circulation and operation of heavy equipment (excavators, loaders, bulldozer, etc), trucks, cranes for the movement of the materials and supplies (including mixers), trucks and cranes for the installation of wind energy turbines and light vehicles for personnel transport.
Operation of electric generator equipment	It refers to the operation of electric generator equipmennt as a source of energy in support to work tasks.
Construction of permanent facilities.	It refers to mounting tasks of the wind turbines, the construction of the main sub station, control and maintenance building, sewage effluent treatment, among others.
Grubbing and clearance of the	It refers to site cleaning actions related to the withdrawal of the vegetable coverage.
Filling, leveling, scarification and re planting activities	It refers to readjustment actions in the landscape with the objective of mitigating impacts to finish the foundation works, trenching and internal roads.
Inadequate waste management	It implies the inadequate management of solid and semi solid waste: ferrous (scrap), domestic (food, packages, etc) and dangerous (grease or whatever solid element contaminated with derived hydrocarbons); dangerous liquid waste (fuel, oils for vehicles and transformers) and liquid effluents from restroom (black waters) and canteen/ kitchen (gray waters).
Soil Compacting	It refers to activities tending to improve soil resistance to transit improving its capacity of charge.

Table 25. Impacting Actions Construction Stage.

9.2.2 OPERATION AND MAINTENANCE STAGE

Activity	Tasks
Circulation and operation of vehicles	Ir refers to the circulation of vehicles during maintenance tasks or the circulation and operation of trucks/cranes during annual maintenance tasks or the repairs for contingencies occurred in the wind turbines.
Presence of permanent facilities.	It refers to the presence of all permanent installations of the wind energy park, principal sub station, control and maintenance building, among others.
Operation of the wind energy turbines	It refers to the operation of the wind energy turbines and the maintenance tasks.
Inadequate waste management	It implies the inadequate management of solid and semi solid waste: ferrous (scrap), domestic (food, packages, etc) and dangerous (grease or whatever solid element contaminated with derived hydrocarbons); dangerous liquid waste (fuel, oils for vehicles and transformers) and liquid effluents from restroom (black waters) and canteen/ kitchen (gray waters).
WIND ENERGY GENERATION PROCESS	It refers to the benefits for the quality of life of people derived from the use of wind energy turbine as a clean source of electric energy.

Table 26. Impacting actions OPERATIVE STAGE AND MAINTENANCE

9.2.3 DEPARTURE STAGE

Activity	Tasks
Dismantling of the wind turbines.	It refers to the dismantling and withdrawal of parts of the wind energy turbines. It includes the dismantling of parts and the collocation in transport vehicles.
Circulation and operation of	It refers to the circulation and operation of heavy equipment (excavators, loaders, bulldozer,etc) trucks and cranes for withdrawing scrap and demolition remains.
Filling, leveling, scarification and re planting activities	It refers to readjustment actions in the landscape with the objective of mitigating impacts to finish the foundation works, trenching and internal roads.
Inadequate waste management	It implies the inadequate management of solid and semi solid waste: ferrous (scrap), domestic (food, packages, etc) and dangerous (grease or whatever solid element contaminated with derived hydrocarbons); dangerous liquid waste (fuel, oils for vehicles and transformers) and liquid effluents from restroom (black waters) and canteen/ kitchen (gray waters).
WIND ENERGY GENERATION PROCESS	It refers to the lose of benefits for the quality of life of people derived from the use of wind energy turbine as a clean source of electric energy.
Demolition work /withdrawal of foundations and permanent installations.	It refers to the excavation tasks, the withdrawal of wind energy turbine foundations and the withdrawal of the principal sub station /other facilities.
Unemployment	It refers to the generation of unemployment because of dismissal of direct personnel and the reduction of job posts of service companies related to the Wind Energy Park.

Table 27. Impacting Actions Deconstruction Stage.

9.3 ENVIROMENTAL FACTORS POTENTIALLY IMPACTED

According to what has already been described about the physical, biotic and socio economic media, factors and sub factors have been identified that may be affected by the actions of the Project.

System	Mediu	Factor	Subfactor		Description
Physical Natural	Inert	**Air**	Quality of air		It represents the perception through the senses of particulate material and combustion gases. It includes the affectation by greenhouse gases in the ozone layer.
		Water	Surface water		It represents the affectation of the permanent surface water resources (water courses, lagoons and lakes) temporal ones (low and slips-up)
			Underground water		It represents the affectation over the water table.
		Soil	Topography		It represents the affectation over the geoforms.
			Soil Science		It represents the chemical or physical alteration of the soil surface horizon
			Erosion		It represents the soil or rock degradation and transport that produce different agents (wind, water, temperature, human activity, etc)
			Restriction to the soil use.		It represents the limitiation in the soil use as a consequence of the activity of the Project
	Biotic	**Vegetation**	Shrub layer	Habitat quality	It represents the affectation over the habitat quality, understood as the capacity of the environment to provide the appropriate conditions for the persistence of an individual and/or the
				Biodiversity	It represents the affectation in the diversity of exemplars present in the Area of the Project
				Species in danger	It represents the affectation over the species in danger of extinction according to the classification of the
			Herbaceous Layer	Habitat quality	It represents the affectation over the habitat quality, understood as the capacity of the environment to provide the appropriate conditions for the persistence of an individual and/or the
				Biodiversity	It represents the affectation in the diversity of exemplars present in the Area of the Project
				Species in danger	It represents the affectation over the species in danger of extinction according to the classification of the
			Flora in Natural Protected Areas	It represents the affectation over flora species present in the Natural Protected Areas near the Project Area	

System	Mediu	Factor	Subfactor		Description
Physical Natural	Biotic	Fauna	Mammals	Behavior	It represents the affectation in the behavior of individuals facing external stimuli that receive from the environment It comprises mitigation actions, adaptation, alimentary habits and breeding, among others.
				Habitat quality	It represents the affectation over the habitat quality, understood as the capacity of the environment to provide the appropriate conditions for the persistence of an individual and/or the population It comprises ations over the sites of shelter, feeding and reproduction.
				Biodiversity	It represents the affectation in the diversity of exemplars present in the Area of the Project
				Species in danger	It represents the affectation over the species in danger of extinction according to the classification of the Red List of the
			Birds	Behavior	It represents the affectation in the behavior of individuals facing external stimuli that receive from the environment It comprises mitigation actions, adaptation, alimentary habits and breeding, among others.
				Habitat loss	It represents the affectation over the habitat quality, understood as the capacity of the environment to provide the appropriate conditions for the persistence of an individual and/or the population It comprises ations over the sites of shelter, feeding and reproduction.
				Biodiversity	It represents the affectation in the diversity of exemplars present in the Area of the Project
				Species in danger	It represents the affectation over the species in danger of extinction according to the classification of the Red List of the
			Microfauna	Behavior	It represents the affectation in the behavior of individuals facing external stimuli that receive from the environment It comprises mitigation actions, adaptation, alimentary habits and breeding, among others.
				Habitat loss	It represents the affectation over the habitat quality, understood as the capacity of the environment to provide the appropriate conditions for the persistence of an individual and/or the population It comprises actions over the sites of shelter, feeding and reproduction.
				Biodiversity	It represents the affectation in the diversity of exemplars present in the Area of the Project
				Species in danger	It represents the affectation over the species in danger of extinction according to the classification of the Red List of the
			Fauna in Natural Areas Protected	It represents the affectation over fauna in Natural Protected Areas near the Project Area	
	Perceptive	Landscape	Visual Incidence	It represents the affectation over the visual perception of the permanent population near the area of the project and for occasional passers-by	

System	Mediu	Factor	Subfactor	Description
Socioeconomic	Socioeconomic	**Personnel**	Personnel Health	It represents the affectation over the psychophysic health of the personnel and the labor risks related to the tasks.
			Direct and indirect	It represents the affectation over local people´s occupation for the development of job sources.
		Nearby Population ´s Health	Disturbance noises to the neighborho	It represents the affectation over health and quality of life of the population nearby relatied to auditive disturbances and psychophysical stress which it produces.
			Other affectations over the population´s health	It represents the affectation over the population´s health nearby due to the exposition to external agents like : particular material in suspension; growth in the road flow; electromagnetic fields; flickering produced by the sunshine between the blades that rotate; among others.
		Socioeconomic Context	Economic Activity	It represents the affectation over regional economy with the modification of monetary flow.
			Cultural Heritage	It represents the affectation over cultural, historic, archaeological and paleontological resources.
		Infrastructure	Electric	It represents the locally and regional affectation of the electric infrastructure. It comprises the construction of a LAT of connection, the variation in the regional capacity installed and the subsequent modification of the energetic matrix.
			Roads	It represents the affectation of the terrestrial transport formed by national and provincial roads, neighboring roads, etc It comprises the variation in the transit flow, the modification of the road passages, among others.

Table 28. Impacted factors and sub factors.

9.4 METHODOLOGY FOR IMPACT ESTIMATION

The methodology to be used in the estimation of the impacts was based in what is exposed by V.Conesa Fernández Vitora (Methodological guidelines for the evaluation of the environmental impact, 1997) where a Matrix is stated with double input, called cause-effect matrix, in which columns environmental factors and impacting actions are stated.

The **Impact Importance is an** qualitative estimation which arises from the incidence degree or the intensity of alteration produced, as the characterization of the effect which correspond to certain features of the qualitative type, such as: extension, type of effect, period of manifestation, persistence, reversibility, recoverability , synergy, accumulation and periodicity which are estimated individually

by the multidisciplinary team. The significance of such elements is described below.

1. Sign The impact sign alludes to the beneficial (+) or harmful (-) influence of the different actions that will act over the different factors considered.

2. Intensity (IN) It refers to the degree of incidence of the action over the factor, that ir, the degree of destruction over th factor.

3. Extension (EX) It refers to the theoretical area of influence of the impact in relation to the environment of the project divided the percentage of area in which the effect is suffered.

4. Moment (MO) It refers to the manifestation of the impact or moment of time that passes between the appearance of the action and the moment of the affectation over the environment.

5. Persistence (PE) It refers to the estimated time which the effect persists since its appearance and from which the affected factor would return to its initial conditions. Persistence is independent of the reversibility.

6. Reversibility (RV) It refers to the posibiltiy to return to initial conditions prior to the impacting action by natural means once it stops acting on the environment.

7. Recoverability (MC) It refers to the possibility of total or partial reconstruction, of the affected factor as consequence of the project, that is the possibility of recovering its initial conditions prior to the performance, by means of human intervention (introduction of corrective measures)

8. Sinergy (SI) This feature considers the reinforcement of two or more simple effects. The total component of the manifestation of simple effects, caused by actions that act in simultaneous, is superior to that expected in the manifestation of effects when the actions that cause them act independently, not simultaneously.

9. Accumulation (AC). It established the progressive increase of the manifestation of such effect, when it persists continuously or repeatedly by the action that generates it.

10. Effect (EF) It refers to the cause-effect relation, or the way of manifestation of the effect over a factor, as consequence of an action

11. Periodicity (PR) It refers to the regularity of the manifestation of the effect, cyclical or reccurrent (periodic effect), unexpectedly in time (irregular effect), or

constant in time (continuous effect).

The variability of each one of these elements is presented in the following table.

NATURALEZA		INTENSIDAD (IN) (Grado de destrucción)	
Impacto beneficioso	+	Baja	1
Impacto perjudicial	-	Media	2
		Alta	4
		Muy Alta	8
		Total	12
EXTENSION (EX) (Área de influencia)		**MOMENTO (MO) (Plazo de manifestación)**	
Puntual	1	Largo plazo	1
Parcial	2	Medio plazo	2
Extenso	4	Inmediato	4
Total	8	Critico	(+4)
Critico	(+4)		
PERSISTENCIA (PE) (Permanencia del efecto)		**REVERSIBILIDAD (RV)**	
Fugaz	1	Corto plazo	1
Temporal	2	Medio plazo	2
Permanente	4	Irreversible	4
SINERGIA (SI) (Refuerzo entre efectos simples)		**ACUMULACION (AC) (Incremento progresivo)**	
Sin sinergismo (simple)	1	Simple	1
Sinérgico	2	Acumulativo	4
Muy sinérgico	4		
EFECTO (EF) (Relación causa-efecto)		**PERIODICIDAD (PR) (Regularidad de la manifestación)**	
Indirecto (secundario)	1	Irregular y discontinuo	1
Directo	4	Periódico	2
		Continuo	4
RECUPERABILIDAD (MC) (Reconstrucción por medios humanos)			
Recuperable de manera inmediata	1		
Recuperable a medio plazo	2		
Mitigable	4		
Irrecuperable	8		

Table 29. Estimation of the impact importance

Impact importance (I) Each sub factor is analized by means of matrices, respect the actions with potential impact affectation , using the following equation

Equation 01. Impact importance

Pondered Impact Importance (IP). With the objective of determining the relative importance of each subfactor respect to the others analyzed it is considered a base of 1000 unit of importance (UIP) for the totality of them. This base of 1000 UIP is used to calculate the pondering or each sub factor.

The pondering value of each environmental sub factor arises from the analysis conducted by the interdisciplinary team according to the field investigation and the experience on previous similar works. As reference it is established below the range of pondering used in UIP and its meaning respect to its degree of importance in the potential affectation frame of the project.

Pondering range (in UIP)	Degree of importance	Development
o to 30	Low	Sub factor with low or null probability of suffering affectation by impacting actions of the project.
31 to 70	Medium	Sub factor with probability of suffering affectation by impacting actions of the project.
71 to 100	High	Sub factor with high probability of suffering affectation by impacting actions of the project or high environmental sensibility

Taking each of the pondering and dividing it for the base of 1000 UIP the Percentage of Pondering of each sub factor is obtained.

$$\frac{\quad}{\quad}$$

Equation 02. Percentage of pondering

The percentage of pondering is applied to each of the estimations of Impact Importance obtained generating as a result the Importance of Pondered Impact.

Equation 03. Pondered Impact Importance (IP).

Matrices of Impact Analysis For each stage of the project, each

matrix cell is completed first with the values obtained applying equation o1 in the impact analysis of each impacting action (lines) over each sub factor (columns). According to this equation the results may vary between a minimum of 13 and a maximum of 100. Secondly, applying equations 02 and 03 the IP is obtained.

In summary, the value of Impact Importance (I) obtained by the impacting action over the sub factor is collocated in the first column of each one of the individual matrices of affectation for each one of the sub factors. In the second column (contiguous cell to value I) the value of Pondered Impact Importance (IP) is collocated. Once completed the cells , a color that represents the degree of severity of affectation (positive/negative) caused by the action over the sub factor (see Annex- Matrices of impact of the EIS) is assigned using the color ranges down below.

Negative values			
Compatible (I less or equal to 25)	**Moderate (I between 26**	**Severe (I between 51**	**Critical (I over 75)**

Positive values			
Compatible (I less or equal to 25)	**Moderate (I between 26**	**Severe (I between 51**	**Critical (I over 75)**

In the Matrices of Impact Analysis are added:

(i) values of Impact Importance (I) of the lines and columns.

- The sum of the values in the lines, enables to obtain the accumulative impact of the action over the different sub factors.
- The sum of the values in the columns, enables to obtain the affectation of the different impacting actions over the sub factor.

(ii) values of Pondered Impact Importance (IP) of the lines and columns.

- The sum of the values in the lines, enables to obtain the pondered accumulative impact of the action over the different sub factors.
- The sum of the values in the columns, enables to obtain the pondered affectation of the different impacting actions over the sub factor.

9.5 MATRIX RESULTS OF THE ENVIRONMENTAL ANALYS

To facilitate the visualization of the results obtained by the analysis matrices of impact we have generated tables with percentages obtained for each stage of the project where it is mentioned the affectation as Negative (harmful) or Positive (beneficial) The information of the analysis of each matrix of the different stages of the project has been written in the files elaborated for each sub factor (see Annex - Files of Impact fo Sub factors) In these files it is specified

- **Absolut percentage of affectation over the sub factor** This percentage indicates in absolute value the affectation of all the actions over the sub factor and its percentage relation respect to the sum of all the values of impacted sub factors.
- Impacting Actions All especific actions that potentially affect the sub factor.
- Location. The site where the impacting actions will take place
- **Impacts.** They are the affectations expected over the sub factor
- **Description of impacts** The impacts are described, the actions that potentially give origin and the possible consequences of the impacts.

9.5.1 CONSTRUCTION STAGE

Impacting Actions	Absolute percentage of the Impacting Action	Affectation
Filling, leveling and scarification process.	27.03%	Positive
Soil Movement	18.91%	Negative
Grubbing and clearance of the site	14.61%	Negative
Generation of waste	14.27%	Negative
Circulation and operation of vehicles	12.63%	Negative
Construction of permanent facilities.	6.42%	Negative
Operation of electric generator equipment	5.67%	Negative
Soil Compacting	0.48%	Positive

Table 30. Impacting actions according to the contribution to the absolute global impact of the Construction Stage

Impacting Actions	Relative percentage of contribution of the Impacting Action	Affectation
Filling, leveling and scarification process.	28.26%	Positive
Soil Movement	17.44%	Negative
Generation of waste	15.07%	Negative
Grubbing and clearance of the site	12.43%	Negative
Circulation and operation of vehicles	10.02%	Negative
Construction of permanent facilities.	6.35%	Negative
Operation of electric generator equipment	5.95%	Negative
Soil Compacting	4.47%	Positive

Table 31. Impacting actions according to the contribution to the relative (pondered) global impact of the Construction Stage

Analyzing the previous tables it can be appreciated that either in absolute terms, as in relative terms the highest percentage of the impacting actions are negative (72,49 % in the absolute analysis and 67,27 % in the pondered analysis). The percentage increase of the positive values from one analysis to the other is related to the importance of estimation that was given to the sub factors as Behavior (Mammals and Birds) during their pondering. Due to this, the positive affectation of the impacting action of filling, leveling, scarification process and re planting increases notably in its percentage of influence respect to the other impacting actions This reflects the compromise of the company in the development of restoration and reconstitution tasks at the end of the Construction Stage.

System	Medium	Factor	Subfactor	Absolute % of Affectation over the sub factors	Affectation
Socio economic	Socio economic	Socioeconomic Context	Economic Activity	13.42%	Positive
Socio economic	Socio economic	Personnel	Direct and indirect job.	11.86%	Positive
Physical Natural	Inert	Air	Quality of air	9.62%	Negative
Socio economic	Socio economic	Personnel	Personnel Health	8.95%	Negative
Physical Natural	Inert	Soil	Soil Science	6.79%	Negative
Physical Natural	Perceptive	Landscape	Visual Incidence	5.82%	Negative
Physical Natural	Biotic	Fauna	Birds (Behavior)	4.55%	Negative
Physical Natural	Biotic	Fauna	Habitat quality	4.55%	Negative
Physical Natural	Biotic	Fauna	Habitat quality	4.33%	Negative
Physical Natural	Biotic	Fauna	Mammals (Behavior)	4.33%	Negative
Socio economic	Socio economic	Nearby Population´s Health	Other affectations over the population´s health	3.50%	Negative
Physical Natural	Biotic	Fauna	Microfauna (habitat quality)	2.98%	Negative
Socio economic	Socio economic	Nearby Population´s Health	Disturbance noises to the neighborhood (IRAM 4062)	2.83%	Negative
Physical Natural	Biotic	Fauna	Microfauna (Comportamiento	2.24%	Negative
Socio economic	Socio economic	Infrastructure	Roads	2.16%	Negative
Socio economic	Socio economic	Infrastructure	Electric	2.16%	Negative
Socio economic	Socio economic	Socioeconomic Context	Cultural Heritage	2.09%	Negative
Physical Natural	Inert	Soil	Topography	2.09%	Negative
Physical Natural	Inert	Soil	Erosion	1.64%	Negative
Physical Natural	Biotic	Vegetation	Herbaceous Stratum (Habitat	1.04%	Negative
Physical Natural	Inert	Water	Underground water	1.04%	Negative
Physical Natural	Biotic	Vegetation	Bush Stratum (Habitat quality)	0.97%	Negative
Physical Natural	Inert	Water	Surface water	0.67%	Negative
Physical Natural	Biotic	Vegetation	Bush Stratum (Habitat	0.15%	Negative
Physical Natural	Biotic	Vegetation	Herbaceous Stratum	0.15%	Negative
Physical Natural	Inert	Soil	Restriction to the soil use.	0.07%	Positive

Table 32. Affectations over the absolute sub factors Construction Stage

Medium	Factor	Subfactor	Relative % of Affectation over the sub factors	Affectation
Socio economic	Socioeconomic Context	Economic Activity	19.65%	Positive
Socio economic	Personnel	Direct and indirect job.	17.36%	Positive
Inert	Air	Quality of air	14.08%	Negative
Perceptive	Landscape	Visual Incidence	8.51%	Negative
Socio economic	Personnel	Personnel Health	8.19%	Negative
Inert	Soil	Soil Science	7.45%	Negative
Biotic	Fauna	Birds (Behavior)	3.33%	Negative
Socio economic	Nearby Population´s Health	Other affectations over the population´s health	3.21%	Negative
Biotic	Fauna	Mammals (Behavior)	3.17%	Negative
Inert	Soil	Topography	1.91%	Negative
Biotic	Fauna	Microfauna (Behavior)	1.64%	Negative
Biotic	Fauna	Mammals (Habitat quality)	1.58%	Negative
Socio economic	Infrastructure	Roads	1.58%	Negative
Socio economic	Nearby Population´s Health	Disturbance noises to the neighborhood (IRAM 4062)	1.56%	None
Socio economic	Socioeconomic Context	Cultural Heritage	1.53%	Negative
Socio economic	Infrastructure	Electric	1.19%	Negative
Biotic	Fauna	Habitat quality	0.83%	Negative
Biotic	Vegetation	Herbaceous Stratum (Habitat quality)	0.76%	Negative
Biotic	Vegetation	Bush Stratum (Habitat quality)	0.71%	Negative
Inert	Soil	Erosion	0.60%	Negative
Biotic	Fauna	Microfauna (habitat quality)	0.55%	Negative
Inert	Water	Surface water	0.37%	Negative
Inert	Water	Underground water	0.19%	Negative
Biotic	Vegetation	Bush Stratum (Habitat Quality)	0.03%	Negative
Biotic	Vegetation	Herbaceous Stratum (Habitat	0.03%	Negative
Inert	Soil	Restriction to the soil use.	0.01%	Positive

Table 33. Affectations over the relative sub factors Construction Stage

Of the analysis of affectation over the sub factors considering the absolute values it can be appreciated that exists an important positive incidence in the Direct and Indirect Employment and the Economic Activity. Both constitute the 25,28 % of the affected factors. Analyzing these sub factors in the relative analysis we appreciate that the percentage increases reaching 37% due to the important pondering that both sub factors had. Such situation is due to the sub factors mentioned before are related to the generation of employment and cash flow during the construction and mounting tasks of the wind park. The salaries that direct and contracted personnel earn possibly increase the consumption of goods and services in the region. Other collateral effect are related to services and products that the company consumes, which will increase the economic activity in general.

Respect to the sub factors affected negatively , those which are typically associated to the construction process are highlighted in the absolute and relative analysis: Air quality, Personnel Health; Soil Science and Visual Incidence. In the case of negative affectation of the sub factor Others, the sub factor Nearby Population´s Health is related to the risks of traffic accidents originated by the circulation of the turbine parts and/or of the heavy machinery used in the work.

In the tables of sub factor analysis there are no factors that do not have affectation to ease the reading.

9.5.2 OPERATIVE STAGE AND MAINTENANCE

Impacting Actions	Absolute percentage of the Impacting Action	Affectation
WIND ENERGY GENERATION PROCESS	33.25%	Positive
Operation of the wind energy turbines	31.94%	Negative
Presence of permanent facilities.	18.85%	Negative
Inadequate waste management	10.99%	Negative
Circulation and operation of vehicles	4.97%	Negative

Table 34. Absolute Impacting actions according to the contribution to the global impact of the Operation and Maintenance Stage

Impacting Actions	Relative percentage of contribution of the Impacting Action	Affectation
WIND ENERGY GENERATION PROCESS	38.51%	Positive
Presence of permanent facilities.	25.30%	Negative
Operation of the wind energy turbines	22.13%	Negative
Inadequate waste management	12.12%	Negative
Circulation and operation of vehicles	1.93%	Negative

Table 35. Relative Impacting actions according to the contribution to the global impact of the Operation and Maintenance Stage

In the Operation and Maintenance Stage the pondering of the factors does not evidence a great change over the absolute analysis, which indicates that there existed a correct tendency during the estimation of the different sub factors, as well as the analysis of the influence of impacting actions over them. Also it is appreciated the positive importance of the start-up of the wind energy park as an alternative source of energy in replacement of those that use fossil fuels or hydroelectric source (32,25% in the absolute analysis and 38.51% in the relative analysis). Analyzing the negative actions, that of mayor importance(absolute) is related to the operation of wind turbine equipment given it influence over all the sub factors affected by this type of projects.

System	Medium	Factor	Subfactor	Absolute % of Affectation over the sub factors	Affectation
SOCIO Economic	Socio economic	Socioeconomic Context	Economic Activity	16.90%	Positive
SOCIO Economic	Socio economic	Personnel	Direct and indirect	12.68%	Positive
Physical Natural	Perceptive	Landscape	Visual Incidence	9.86%	Negative
SOCIO Economic	Socio economic	Personnel	Personnel Health	8.17%	Negative
SOCIO Economic	Socio economic	Infrastructure	Electric	7.04%	Positive
Physical Natural	Biotic	Fauna	Birds (Behavior)	6.90%	Negative
Physical Natural	Biotic	Fauna	Mammals (Behavior)	6.20%	Negative
Socio economic	Socio economic	Nearby Population´s Health	Other affectations over the population´s health	5.77%	Negative
Socio economic	Socio economic	Nearby Population´s Health	Disturbance noises to the neighborhood (IRAM 4062)	5.77%	Negative
Physical Natural	Biotic	Fauna	Habitat quality	4.51%	Negative
Physical Natural	Inert	Air	Quality of air	4.37%	Positive
Physical Natural	Biotic	Fauna	Birds (Bio diversity)	2.68%	Negative
Physical Natural	Biotic	Fauna	Birds (Species in danger)	2.68%	Negative
SOCIO Economic	Socio economic	Infrastructure	Roads	2.25%	Negative
Physical Natural	Inert	Soil	Restriction to the soil use.	2.25%	Negative
Physical Natural	Biotic	Fauna	Habitat quality	1.97%	Negative

Table 36. Absolute affectations over the sub factors in the Operation and Maintenance Stage.

Medium	Factor	Subfactor	Relative percentage of affectation over the sub factors	Affectation
Socio economic	**Socioeconomic Context**	Economic Activity	19.3%	Positive
Perceptive	**Landscape**	Visual Incidence	13.4%	Negative
Socio economic	**Personnel**	Direct and indirect employment	10.9%	Positive
Socio economic	**Infrastructure**	Electric	9.1%	Positive
Socio economic	**Personnel**	Personnel Health	8.2%	Negative
Biotic	**Fauna**	Birds (Behavior)	7.9%	Negative
Socio economic	**Nearby Population´s Health**	Other affectations over the population´s health	6.2%	Negative
Socio economic	**Nearby Population´s Health**	Disturbance noises to the neighborhood (IRAM 4062)	5.8%	Negative
Inert	**Air**	Quality of air	5.0%	Positive
Biotic	**Fauna**	Habitat quality	3.9%	Negative
Biotic	**Fauna**	Mammals (Behavior)	3.5%	Negative
Inert	**Soil**	Restriction to the soil use.	1.93%	Negative
Biotic	**Fauna**	Birds (Bio diversity)	1.9%	Negative
Biotic	**Fauna**	Birds (Species in danger)	1.5%	Negative
Socio economic	**Infrastructure**	Roads	1.0%	Negative
Biotic	**Fauna**	Habitat quality	0.6%	Negative

Table 37. Relative affectations over the sub factors in the Operation and Maintenance Stage.

From the analysis of the sub factors affected during the Operation and Maintenance Stage is obtained that the affectations over the sub factors are related to the Economic Activity and Direct and Indirect Employment (positive feature). They are related , among others, to the potential uprise of service companies to perform the maintenance of the Wind Energy Park. It is important to mentioned as well the Sub factor Electric Infrastructure, which is related to the improvement in the energetic matrix of the region for a new form of energy source of sustainable characteristics. Contrasting the absolute analysis with the relative one it is appreciated that the second increases its positive percentages as a result of the important pondering of the sub factors previously mentioned.

Negative affectations over the sub factors of greater importance during the Operation and Maintenance Stage coincide in both analysis. They are: Behavior of Birds, Personnel Health (due to risk tasks to be developed during the maintenance tasks) , Visual Incidence, the Behavior of Mammals and Quality of habitat of Birds. They are all inherent to the activities proper of wind parks, which as any other human activity affects the environment in which it is developed. These affectations deserve Preventive and Mitigation measures that have been developed in the files of each sub factor. The implementation of these measures will enable the Company to reduce the percentages pointed. Analyzing the affectation over the sub factor Population´s Health, even though it is negatively impacted for potential actions (circulation and operation of vehicles, operation of wind turbines), its affectation is compensated by the positive action of the use of wind energy sources which contribute to the reduction of the use of fuels that generat greenhouse effect favoring the reconstruction of the Ozone Layer.

9.5.3 DEPARTURE STAGE

Impacting Actions	Absolute percentage of the Impacting Action	Affectation
Filling, leveling, scarification and re planting activities.	33.40%	Positive
Dismantling of the wind turbines.	30.87%	Positive
Inadequate waste management	11.06%	Negative
WIND ENERGY GENERATION PROCESS	10.22%	Negative
Unemployment	8.64%	Negative
Circulation and operation of vehicles	5.27%	Negative
Demolition/withdrawal of foundations and permanent installations.	0.53%	Negative

Table 38. Absolute Impacting actions according to the contribution to the global impact of the Departure Stage

Impacting Actions	Relative percentage of contribution of the	Affectation
Dismantling of the wind turbines.	29.82%	Positive
Filling, leveling, scarification and re planting	28.25%	Positive
Inadequate waste management	11.71%	Negative
Unemployment	10.91%	Negative
WIND ENERGY GENERATION PROCESS	10.75%	Negative
Demolition/withdrawal of foundations and permanent installations.	5.01%	Negative
Circulation and operation of vehicles	3.55%	Negative

Table 39. Relative Impacting actions according to the contribution to the global impact of the Departure Stage

Given that in the Departure stage there are tasks tending to reverse the affectations or sources of generation of impact will finish, the actions with a higher percentage of affectation are of a positive character: filling, leveling, scarification process and re planting, and dismantling of wind turbines Positive actions have an important contribution due to the fact that the Project does not imply large installations of difficult dismantling and that the Company have created them with the objective of enabling the recomposition of the Area of the Project to its initial state. It is appreciated a substantial difference in the action of greater percentage of affectation. In the case of the absolute analysis, the same is related to the inadequate waste management. When applying the pondering it is appreciated the increase of the action of unemployment given its influence over sub

factors of important estimation like the Economic Activity.

System	Medium	Factor	Subfactor	Absolute percentage of affectation over the	Affectation
Physical Natural	**Inert**	**Air**	Quality of air	12.40%	Negative
SOCIO Economic	**Socio economic**	**Personnel**	Personnel Health	10.79%	Negative
Socio economic	**Socio economic**	**Socioeconomic Context**	Economic Activity	9.30%	Positive
Socio economic	**Socio economic**	**Personnel**	Direct and indirect employment	7.23%	Positive
Physical Natural	**Biotic**	**Fauna**	Habitat quality	6.88%	Positive
Physical Natural	**Inert**	**Soil**	Restriction to the soil use.	6.66%	Positive
Socio economic	**Socio economic**	**Infrastructure**	Electric	5.74%	Negative
Physical Natural	**Biotic**	**Vegetation**	Bush Stratum (Habitat quality)	5.17%	Positive
Physical Natural	**Biotic**	**Fauna**	Habitat quality	4.71%	Positive
Socio economic	**Socio economic**	**Nearby Population´s Health**	Disturbance noises to the neighborhood (IRAM 4062)	4.71%	Positive
Physical Natural	**Biotic**	**Fauna**	Microfauna (habitat	3.90%	Positive
Socio economic	**Socio economic**	**Infrastructure**	Roads	3.33%	Negative
Physical Natural	**Biotic**	**Vegetation**	Herbaceous Stratum (Habitat	3.10%	Positive
Physical Natural	**Perceptive**	**Landscape**	Visual Incidence	2.41%	Positive
Physical Natural	**Biotic**	**Vegetation**	Bush Stratum (Habitat Quality)	2.30%	Positive
Physical Natural	**Biotic**	**Vegetation**	Herbaceous Stratum (Habitat	2.30%	Positive
Physical Natural	**Biotic**	**Fauna**	Birds (Bio diversity)	1.95%	Positive
Physical Natural	**Biotic**	**Fauna**	Birds (Species in danger)	1.95%	Positive
Physical Natural	**Inert**	**Water**	Surface water	1.26%	Positive
Socio economic	**Socio economic**	**Nearby Population´s Health**	Other affectations over the population´s health	1.03%	Negative
Physical Natural	**Inert**	**Soil**	Soil Science	0.92%	Positive
Physical Natural	**Inert**	**Soil**	Topography	0.80%	Positive
Physical Natural	**Biotic**	**Fauna**	Mammals (Behavior)	0.46%	Positive
Physical Natural	**Biotic**	**Fauna**	Birds (Behavior)	0.46%	Positive
Physical Natural	**Inert**	**Soil**	Erosion	0.23%	Positive

Table 40. Affectations over the absolute sub factors Construction Stage

System	Medium	Factor	Subfactor	Relative percentage of affectation over the sub factors	Affectation
SOCIO Economic	**Socio economic**	**Socioeconomic Context**	Economic Activity	15.21%	Positive
Physical Natural	**Inert**	**Air**	Quality of air	14.48%	Negative
Socio economic	**Socio economic**	**Personnel**	Personnel Health	12.61%	Negative
Socio economic	**Socio economic**	**Personnel**	Direct and indirect employment	10.54%	Positive
Socio economic	**Socio economic**	**Infrastructure**	Electric	8.05%	Negative
Socio economic	**Socio economic**	**Nearby Population´s Health**	Disturbance noises to the neighborhood (IRAM 4062)	5.50%	Positive
Physical Natural	**Perceptive**	**Landscape**	Visual Incidence	5.07%	Positive
Physical Natural	**Biotic**	**Vegetation**	Bush Stratum (Habitat quality)	4.83%	Positive
Socio economic	**Socio economic**	**Infrastructure**	Roads	3.89%	Negative
Physical Natural	**Biotic**	**Fauna**	Birds (habitat quality)	3.22%	Positive
Physical Natural	**Biotic**	**Vegetation**	Herbaceous Stratum (Habitat	2.90%	Positive
Physical Natural	**Biotic**	**Fauna**	Microfauna (habitat	2.74%	Positive
Physical Natural	**Biotic**	**Fauna**	Habitat quality	2.20%	Positive
Physical Natural	**Inert**	**Soil**	Restriction to the soil use.	1.56%	Positive
Physical Natural	**Inert**	**Soil**	Soil Science	1.29%	Positive
Socio economic	**Socio economic**	**Nearby Population´s Health**	Other affectations over the population´s health	1.21%	Negative
Physical Natural	**Inert**	**Soil**	Topography	1.13%	Positive
Physical Natural	**Inert**	**Water**	Surface water	0.59%	Positive
Physical Natural	**Biotic**	**Vegetation**	Bush Stratum (Habitat Quality)	0.54%	Positive
Physical Natural	**Biotic**	**Vegetation**	Herbaceous Stratum (Habitat	0.54%	Positive
Physical Natural	**Biotic**	**Fauna**	Birds (Biodiversity)	0.46%	Positive
Physical Natural	**Biotic**	**Fauna**	Birds (Species in danger)	0.46%	Positive
Physical Natural	**Biotic**	**Fauna**	Birds (Behavior)	0.43%	Positive
Physical Natural	**Biotic**	**Fauna**	Mammals (Behavior)	0.43%	Positive
Physical Natural	**Inert**	**Soil**	Erosion	0.16%	Positive

Table 41. Affectations over the relative sub factors Construction Stage

Form the analysis of the affectation of the sub factors during the Departure Stage it is marked as the sub factor with greatest affectation the Economic Activity and Direct and Indirect Employment (both with positive character). Even though the closure of wind energy park implies the ending of jobs, during the tasks of dismantling of the equipment there is a flow generation of economic movement in the region and on the other side it is considered that the existence of other wind energy parks indicate that service companies developed in the region were re localized giving services to other enterprises of similar characteristics. The other sub factors in order of importance in the pondered analysis are related to environment recomposition actions and that affect positively over the sub factors Quality of Habitat in the herbaceous and bush strata, in the birds and mammals Negative affectations over the sub factors are related to the activities to perform during the work (personnel health and diffused emissions that affect air quality) in a similar way to the analyzed in the Construction Stage.

9.6 MATRIX RESULTS OF PERMANENT ENVIRONMENTAL ANALYSIS

According to what is required by ENRE , below , it is analyzed for each Stage of the project and for each sub factor the qualitative characteristics of the affectation of the different impacting activities.

Factor	Subfactor		Sign	Duration	Intensity	Dispersion
Air	Quality of air		-	T	L	D
Water	Surface water		-	T	L	F
	Underground water		-	T	L	F
Soil	Topograph		-	T	M	F
	Soil		-	P	M	F
	Erosion		-	P	M	D
	Soil Use		+	P	M	F
Vegetation	Shrub layer	Habitat quality	-	T	M	F
		Biodiversity	-	T	M	F
		Species in danger	S/A			
	Herbaceous layer	Habitat quality	-	T	M	F
		Biodiversity	-	T	M	F
		Species in danger	S/A			
	PROTECTED NATURAL AREAS		S/A			
Fauna	Mammals	Behavior	-	T	E	D
		Habitat quality	-	T	M	D
		Biodiversity	S/A			
		Species in danger	S/A			
	Birds	Behavior	-	T	M	D
		Habitat quality	-	T	M	D
		Biodiversity	-	T	M	D
		Species in danger	-	T	L	D
	Microfauna	Behavior	-	T	L	D
		Habitat quality	-	T	L	D
		Biodiversity	S/A			
		Species in danger	S/A			
	PROTECTED NATURAL AREAS		S/A			
Landscape	Visual Incidence		-	T	L	D
Personnel	Personnel Health		-	T	E	F
	Direct and indirect employment		+	T	E	D
Nearby Population´s Health	Disturbance noises to the neighborhood (IRAM 4062)		S/A			
	Others		-	T	E	D
Socioeconomic Context	Economic Activity		+	T	E	D
	Cultural Heritage		-	P	E	F
Infrastructure	Electric		-	P	E	D
	Roads		-	T	E	D

Table 42. Affected sub factors in the Construction Stage

Factor	Subfactor		Sign	Duration	Intensity	Dispersion
Air	Quality of air		+	P	E	D
Water	Surface water		S/A			
	Underground water		S/A			
Soil	Topograph		S/A			
	Soil		S/A			
	Erosion		S/A			
	Soil Use		S/A			
Vegetation	Shrub layer	Habitat quality	S/A			
		Biodiversity	S/A			
		Species in danger	S/A			
	Herbaceous layer	Habitat quality	S/A			
		Biodiversity	S/A			
		Species in danger	S/A			
	PROTECTED NATURAL AREAS		S/A			
Fauna	Mammals	Behavior	-	P	M	D
		Habitat quality	-	P	L	D
		Biodiversity	S/A			
		Species in danger	S/A			
	Birds	Behavior	-	P	E	D
		Habitat quality	-	P	M	D
		Biodiversity	-	T	M	D
		Species in danger	-	T	M	D
	Microfauna	Behavior	S/A			
		Habitat quality	S/A			
		Biodiversity	S/A			
		Species in danger	S/A			
	PROTECTED NATURAL AREAS		-	T	M	D
Landscape	Visual Incidence		-	P	M	F
Personnel	Personnel Health		-	T	E	F
	Direct and indirect employment		+	T	M	F
Nearby Population´s	Disturbance noises to the		-	T	E	F
	Others		-	T	E	F
Environment Socioeconomic	Economic Activity		+	T	E	D
	Cultural Heritage		S/A			
Infrastructure	Electric		+	P	E	D
	Roads		-	T	L	D

Table 43. Affected sub factors OPERATIVE STAGE AND MAINTENANCE

Factor	Subfactor		Sign	Duration	Intensity	Dispersion
Air	Quality of air		-	T	L	D
Water	Surface water		+	P	L	D
	Underground water		S/A			
Soil	Topograph		+	P	M	F
	Soil		+	P	E	F
	Erosion		+	P	E	F
	Soil Use		+	P	E	F
Vegetation	Shrub layer	Habitat quality	+	P	E	F
		Biodiversity	+	P	E	F
		Species in danger	S/A			
	Herbaceous layer	Habitat quality	+	P	E	F
		Biodiversity	+	P	E	F
		Species in danger	S/A			
	PROTECTED NATURAL AREAS		S/A			
Fauna	Mammals	Behavior	+	T	M	D
		Habitat quality	+	P	M	D
		Biodiversity	S/A			
		Species in danger	S/A			
	Birds	Behavior	+	T	E	D
		Habitat quality	+	P	E	D
		Biodiversity	S/A			
		Species in danger	S/A			
	Microfauna	Behavior	+	T	M	D
		Habitat quality	+	P	M	D
		Biodiversity	S/A			
		Species in danger	S/A			
	PROTECTED NATURAL AREAS		+	P	M	F
Landscape	Visual Incidence		+	P	E	F
Personnel	Personnel Health		-	T	E	F
	Direct and indirect employment		-	P	E	D
Nearby Population´s	Disturbance noises to the		+	P	M	F
	Others		+	P	M	F
Environment Socioeconomic	Economic Activity		-	T	E	D
	Cultural Heritage		S/A			
Infrastructure	Electric		-	P	E	D
	Roads		-	T	M	D

Table 44. Affected sub factors in the Departure Stage

	Stage		
	Construction	**Operation and**	**Departure**
+ PEF			8
+ PED		2	1
+ PMF	1		4
+ PMD			2
+ PLF			
+ PLD			1
Total	**1**	**2**	**16**

Table 45. Total positive sub factors permanently affected

	Stage		
	Construction	**Operation and**	**Departure**
- PEF	1		
- PED	1	1	2
- PMF	1	1	
- PMD	1	2	
- PLF			
- PLD		1	
Total	**4**	**5**	**2**

Table 46. Total negative sub factors permanently affected

During the Construction Stage most of the affectations are of temporal character and only are observed two negative permanent characteristics over the sub factors erosion and soil science. These impacts may be mitigated with concrete actions of prevention of soil blast and reducing vegetation grubbing. On the positive affectation, this is related to the diversification of the soil use, given that wind energy projects live together with other current uses like farming and hydro carbon industry giving value to the site.

Negative permanent affectation that are released from the analysis of the Operation and Maintenance Stage of the wind park are related to the sub factors of Visual Incidence, the Behavior and Quality of Habitat of Mammals and Birds. Birds and mammals may be affected in their sites of feeding, nesting and/or shelter. The positive affectations are related to the reduction of emission of greenhouse gases for the use of sustainable energy sources in replacement of fossil and hydroelectric sources. Besides, a permanent improvement in the energetic matrix in the region is appreciated, being this of high positive impact.

During the Departure Stage, given its characteristics, most of the sub factors are impacted permanently. Due to the fact that the Company has planned to perform activities of restoration, most ot the impacts are positive ones. Only the sub factor direct and indirect employment and electric infrastructure are seen as negative one, due to the closure of the wind park.

10 ENVIRONMENTAL MANAGEMENT

10.1 IMPACT PREVENTION AND MITIGATION MEASURES

Down below there are general measures of prevention and mitigation of impact for all the Stages of the Project. Specific measures for impacting actions are in each of the Files of Impact over each Sub factor (see Annex)

For the explanation of the different Prevention and Mitigation Measures corresponding to each Stage of the Project, down below are indicated the responsible person for each one of them:

Stage	Responsible
Construction	Safety and Environment Leader of the Company Contractors
Operation and Maintenance	Safety and Environment Leader of the Company Contractors Maintenance Leader
Departure	Safety and Environment Leader of the Company Contractors Maintenance Leader

Table 47. People responsible for the application of Prevention and Maintenance Measures.

10.1.1 GENERAL PREVENTION MEASURES

- For the entrance and exit in the Area of the Project, only the access roads and pre existing services will be used, which will be conditioned for that end,
- Vehicle and people transit will be minimized. All road signs must be respected and roads and areas will be moistened, if necessary, to avoid the generation of suspended particles.
- The water used to moisten the roads will be provided from the nearest city, from a loading point, prior authorization by local authority, or it will be the water obtained from the sewage effluent treatment in the compact plant. In this case , it will be asked the authorization to the EPAS for the dumping, prior the beginning of the Construction Stage.
- Vehicle parking will be done in different sectors previously delimited and identified in the access Area of the Project and far from any agent that may cause fire.

- Alll vehicles that enter the Area of the Project will be in perfect conditions, avoiding oil and/or fuel spills .
- There must be established the prohibition of lighting fire in the Area of the Project, given the existence of vegetation highly combustible. There will be posters and signs to indicate the Risk of Fire.
- Vehicle circulation at speeds higher than 20 km/h will be banned , placing adequate road posters in roads /access and training the personnel in the procedures of driving inside the Area.
- It will be required that contractors exhibit the Vehicle Technical Inspection of the vehicles in order to reduce diffuse emissions of combustion gases and the generation of noise coming from the vehicles that lack maintenance.
- Vehicle maintenance will be done outside the Area of the Project. If these tasks are done in the Area of the Project, they must be done protecting the soil with a polyethylene film of medium density.
- It must be established the prohibition to move the personnel and machinery out of the work areas and roads, in order to avoid unnecessary affectations to the herbaceous stratum. If it is strictly necessary, it must circulate over the vegetation, to minimize the effects on the media.
- The personnel, the contractors and any third parties will be trained in specific topics related to Waste Management, Safety and Hygiene and Environment.
- The personnel will be trained in the procedure of reporting in case of archaeological/paleontological finding.
- Correct Waste Management must be conducted. For that, procedures of classification by generation currents must be implemented, training the personnel Such procedures must be informed to contrator companies. The Company must create a temporal treatment site for waste.
- In case the waste might be blown by the wind (cartons, papers, packing tapes, etc.) it is convenient that the containers have a net to avoid their blast.

- CWhen weather conditions are extreme that they may imply risk over the personnel, equipment or other environmental factors, tasks will be suspended until it ends. On days with intense wind tasks will be suspended.
- It will be forbidden the affectation on purpose of the cattle, and indigenous flora and fauna.
- Maintain the vegetation structure with emphasis in small to mmedium bushes since they are important sources of feeding and nesting for birds, small mammals and cuises for their cave-like lifestyle.
- When cutting the bushes, in the sectors needed, trim the excess so the vegetation will have more possibilities of recovery and the structure is maintained.
- It will be prohibited to throw waste and remains of cables and those contaminated by dangerous substances in open trenches.
- It must be prohibited alcohol and drug consumption in the Area of the Project.
- The personnel will be provided with all the protection equipment needed to ensure the conditions of healthiness and safety that the hygiene and safety norms currently established. They will be trained in their use.
- The Company and contractors must have all the corresponding personal accident insurance or ART, as the case may be, according to current labor legislation.
- The personnel must have the psychophysical exam previos to the beginning of his activity in the Project..
- The medical area of the temporary facilities will be equipped to give first aids (antiophidic serum) and must have skilled personnel.
- Dangerous sectors must be signalled with warning posters
- The facilities that work with electric power must be de-energized when tasks are performed there.
- Fixed facilities, vehicles, and transformer equipment are required to have authorized fire extinguishers, according to current regularions.
- Special tools, equipments and heavy vehicles, must be handled by skilled workers.

- In the case of needing welding activities, the strong winds that run in the zone and the frequency of them makes it essential exercise caution, avoiding the propagation of sparks.
- All vehicles will be operated by personnel skilled in the practice of professional driving.

10.1.2 GENERAL MITIGATION MEASURES

- The personnel in general will be trained to give first aids.
- Within the plan of tasks responsibilities must be well defined , for each working team , according to the Management Plan.
- All requirements of safety must be fulfilled, such as posters, signs, permanent communication, verification of the use of safety elements, team coordination, etc
- It will be encouraged the minimization of work time.
- Trenches for the underground wiring must be open the shortest time possible.
- In case of a spill of dangerous substances, this must be contained, and the affected sector must be assisted collecting the spill and disposing the contaminated material to the Temporal Waste Area. There must be a containers with absorbent powder , sand or diatomite to spread over it and a plastic shovel to collect the soil affected for its dumping in a container of 200 liters with lid.
- During the construction it will be the least soil movement possible (given the conditions of the plateau) respecting the preestablished measures and dimensions already said, to produce the least alteration in the landscape (principally geoforms, soil and vegetation).
- In case of trimming the monte, if it is necessary, try the process of soil scarification to favor the re-colonizing of the native vegetation species or try a re-planting immediately with the aims of recovering the habitat of the local fauna..
- Given the flat nature of the site, soil movement connected to the adaptation of roads of access and services must be

mínimum avoiding activities of leveling or slope trimming and performing the activities exclusively in the paths that must be removed; and avoid extending out of the limits, either for the circulation of machinery and/or spills of remaining material.

- Fencing, side roads, marks in the roads and /or any other minor rural work that must have been affected must be maintained.
- In case that during the circulation of machinery, equipment circulation and material transportation, fences or tranqueras were damaged, when finishing the tasks they must be repaired, to avoid conflicts.
- Slopes and drainage lines modified by roads of access must be periodically maintained.
- Waste produced during the tasks will have an appropriate final disposal. One alternative may be to use dumpers to put them temporarily.
- Before the start-up of the Wind Energy Park, it must be assured that it is in perfect conditions for operation. For that, a series of operations will be performed including , among others, the verification of the foundation compaction , control of the laboratory results of materials of all the foundations and towers, situation of circulation through all the passages for future maintenance, control of the grounding strap, etc (Operation stage)
- The facilities that work with tension must be well-signalled.
- All the facilities prone to generate explosions or fires must have an adequate preventive system against fire or with sensors, and all the sectors must be equipped with special fire extinguishers for electric incidents.
- Road signs of approximation must be exhibited in the roads of access.

10.2 RESTORATION MEASURES

The restoration measures of the affected sectors that must be performed during the Departure Stage with the objective of reducing the environmental impacts that might be produced are announced below.

- Preliminary environmental evaluation to verify that there are no signs of environmental passives.
- Reestablishment of the geomorfology of the area developing filling tasks in trenches and open pits (ex foundation basis) respecting the lithology profile of the soil.
- Generation of conditions that ensure the natural recuperation of the flora of the zone, including soil scarification tasks planting native species,considering for that action the distributions, coverage and diversity of species present identified in the Study of Base Line.
- Any road not required after the Departure Stage must be scarified and re planted with native species following the methodology previously mentioned.

10.3 RECOMPOSING MEASURES OF THE ENVIRONMENTAL PASSIVE

In case the preliminary environmental evaluation at the beginning of the Departure Stage indicates the presence of environmental passives, procedures will be conducted for the recomposition of the affected sectors according to environmental current regulations.

11 ENVIRONMENTAL MONITORING PLANS

Below are indicated the monitors and studies to be conducted, indicating the means, the analyzed parameter, the location monitor points, the quantity of samplings and their regularity. Besides, it is indicated the methodology of analysis and monitoring, as well as the quantification limit of the method and the guiding level according to current regulation.

11.1 CONSTRUCTION STAGE

Medium	**Work environment**
Parameter	Breathable Particle Material fraction (PM10)
Location point	Sites to be indicated in the work sectors Two samplings in the foundation environment of the wind turbine equipment. Two samplings in the environment of the wiring trenches. One sample to be specified.
Quantity of samples:	5
Sampling frequency	Every two months
Methodolog	
Sampling	**Analysi**
NIOSH 600. Low flow bomb Equipped with cyclone and filter of PVC of 10 µm -size pore	NIOSH 600 Five-decimal figure scale. Drying stove
Quantification limit of the method	0,03 mg/m^3
Guiding level	3 mg/m^3
	Ley Nacional N° 19.587 – Decreto Reglamentario 351/79 – Resolución 295/03 - Anexo IV

Medium	**Work environment**
Parameter	**Noise in the work environment**
Location point	Sites to be indicated in the work sectors One measuring in the office sector One measuring in the canteen sector Two samplings in the foundation environment of the wind turbine equipment. Two samplings in the environment of the wiring trenches.
Quantity of samples:	6
Sampling frequency	Every two months
Methodolog	
Sampling	**Analysi**
Annex Resolution SRT Nº 85/12 With a measuring equipment of integrated sound level (decibel measuring device) or a dosimeter, that meet at least the requirements indicated for instruments Class or Type 2, established in norms IRAM	Does not apply
Quantification limit of the method	Does not apply
Guiding level	85 dB (8 hour-working day)
	Ley Nacional N° 19.587 – Regulation Decree 351/79 – Resolution 295/03 - Annex IV

Medium	**Work environment**
Parameter	**Thermal stress**
Location point	Sites to be indicated in the work sectors Two samplings in the foundation environment of the wind turbine equipment. Two samplings in the environment of the wiring trenches.
Quantity of samples:	4
Sampling frequency	Annual
Methodolog	
Sampling	**Analysi**
Annex III Resolution SRT N° 295/03 With a measuring device for thernal charge.	Does not apply
Quantification limit of the method	- 5 °C
Guiding level	To be established according to the conditions of exposure of the worker according to National Law N° 19.587 - Regulation Decree 351/79- Resolution 295/03 -Annex III

Medium	Drinking water
Parameters	**1**.- Bacteria analysis (coliform bacteria , escherichia coli, Pseudomonas aeruginosa and mesophilic bacteria). 2.- Physicochemical (turbidity, color, odor, pH, residual aluminum , arsenic, cadmium, cyanide, zinc, chloride, copper, chrome, chloride, total harshness, fluoride, total iron, manganese, mercury, nitrate, nitrite, silver, lead, total solids dissolved and sulphate.
Location point	Sites to be indicated in the work sectors One measuring in the canteen sector One measuring in the kitchen sector One measuring in the
Quantity of samples:	3
Sampling frequency	1- Bacteria analysis Every six months 2- Physicochemical Annual
Methodolog	
Sampling	**Analysi**
SM 1060 using sterilized containers of the adequate volume for the sampling (500 ml-capacity). Latex gloves will be used to avoid contact with the liquid, close the container hermetically and put them in a refrigerating container with coolants. If the samplings comes from a faucet, this must have bee previoulsy esterilezed.	**1**.- Bacteria analysis: coliform bacteria (SM 9221 B); escherichia coli (SM 9221 F); pseudomonas aeruginosa (SM 9213 F); mesophilic bacteria (SM 9215). 2- Physicochemical turbicity (SM 2130 B); color (SM 2120 C); odor (SM 2150 B); pH (SM 4500 H-B), residual aluminum (SM 3111-D); arsenic (SM 3114 C); cadmium (SM 3111 B); cyanide (SM 4500 Cn C/E); zinc (SM 3111 B); chloride (SM 4500 Cl B); copper (SM 3111 B);chrome (SM 3111 B); total harshness (SM 2340 B); fluoride (SM 4500 F D); total iron(SM 3111 B); manganese (SM 3111 B); mercury (SM 3112 B);nitrate (SM 4500 NO3 E); nitrite (SM 4500 NO2 B); silver(SM 3111 B); lead(SM 3111 B); total solid dissolved (SM 2450 C) and sulphate (SM 4500 SO42 E).
Quantification limit of the method	**1- Bacteria analysis** coliform bacteria (absent); escherichia coli (absent); pseudomonas aeruginosa (3 NMP/100ml); mesophilic bacteria (500 UFC/ml). **2- Physicochemical** turbicity (3 NTU); color (5 u Pt-Co); odor (absent); pH (0,01), residual aluminum (0,1 mg/lt); arsenic (0,01 mg/lt); cadmium (0,005 mg/lt); cyanide(0,001 mg/lt); zinc (0,005 mg/lt); chloride (5 mg/lt); copper (0,001 mg/lt);chrome (0,02 mg/lt);total harshness (0,5 mg/lt); fluoride (0,2 mg/lt);total iron (0,01 mg/lt); manganese(0,01 mg/lt); mercury (0,0003 mg/lt); nitrate (5 mg/lt); nitrite (0,05 mg/lt); silver (0,005 mg/lt); lead (0,005 mg/lt); total solid dissolved (1 mg/lt) and sulphate (5 mg/lt).
Guiding level	**1- Bacteria analysis** coliform bacteria (3 NMP); escherichia coli (absent in 100 ml); pseudomonas aeruginosa (absent in 100 ml); mesophilic bacteria (UFC/ml 500). **2- Physicochemical** turbicity (3 NTU); color (5 u Pt-Co); odor (absent); pH (6,5 – 8,5), residual aluminum (0,20 mg/lt); arsenic (0,05 mg/lt); cadmium (0,005 mg/lt); cyanide (0,10 mg/lt); zinc (5 mg/lt);chloride (350 mg/lt);copper (1 mg/lt);chrome (0,05 mg/lt); total harshness (400 mg/lt); fluoride (1,7 mg/lt); total iron (0,30 mg/lt); manganese (0,10 mg/lt); mercury (0,001 mg/lt); nitrate (45 mg/lt); nitrite (0,10 mg/lt); silver (0,05 mg/lt); lead (0,05 mg/lt); total solid dissoved (1500 mg/lt) and sulphate (400 mg/lt).
	Ley Nacional N° 19.587 – Regulation Decree 351/79 – Resolution 295/03

Medium	**Soil**
Parameter	**Total Petrol Hydro carbons(HTP); lead; copper; zinc and chrome.**
Location point	Sites to be determined according the Study of Soil Base Line
Quantity of samples:	7
Sampling frequency	At 50% of the Construction Stage At the end of the Construction Stage
Methodolog	
Sampling	**Analysi**
ASTM 1452/09 "Standard Practice for Soil Exploration and Sampling by Auger Borings". Clean containers must be used with the adequate volume for the sampling (500 gr capacity). Latex gloves will be used to avoid contact with the solid and close the container hermetically once the sampling is collected. The sampling must be collected at a medium depth of 30 cm and must be formed by material coming from different excavations in an area of one square meter.	HTP (EPA 8015 B); lead (SM 3111 B); copper (SM 3111 B); zinc (SM 3111 B); and chrome (SM 3111 B)
Quantification limit of the method	HTP (20 mg/kg MS); lead (0,005 mg/kg); copper (0,001 mg/kg); zinc (0,005 mg/kg)y chrome (0,02 mg/kg).
Guiding level	HTP (does not contain, the Dutch List is considered as reference); lead (1 mg/g); copper (0,5 mg/g); zinc (1,5 mg/g) and chrome Ley Nacional N° 24.051 – Regulation Decree 831/93 – Table 9- Agricultural Use

Medium	**Effluent of the Treatment Compact Plant**
Parameter	Coliformes; escherichia coli ; pseudomonas aeruginosa mesophilic bacterias; pH, total solids dissolved ; DBO and
Point location	At the exit side (inspection camera) of the sewage treatment compact plant.
Quantity of samples:	1
Sampling frequency	Every two months
Methodolog	
Sampling	**Analysi**
SM 1060 using sterilized containers of the adequate volume for the sampling (500 ml-capacity). Latex gloves will be used to avoid contact with the liquid, close the container hermetically and put them in a refrigerating container with coolants. If the sampling comes from a faucet, this must have be previously sterilized.	Coliform (SM 9221 B); escherichia coli (SM 9221 F); pseudomonas aeruginosa (SM 9213 F); mesophilic bacteria (SM 9215); pH (SM 4500 H-B), total solid dissolved (SM 2450 C); DBO y DQO.
Quantification limit of the method	Coliform (absent); escherichia coli (absent); pseudomonas aeruginosa (3 NMP/100ml); mesophilic bacteria (500 UFC/ml), pH (0,01 total solid dissolved (1 mg/lt), DBO y BQO
Guiding	Law 899 (Dto. 7910/99) and Provincial Decree 1485/12.

11.2 OPERATIVE STAGE AND MAINTENANCE

Medium	**Work environment**
Parameter	**Noise in the work environment**
Location points	Sites to be indicated in the work sectors Two samplings in the base of the wind turbine equipments One measuring in the transformer sector
Quantity of samples:	3
Sampling frequency	Annual
Methodolog	
Sampling	**Analysi**
Annex Resolution SRT Nº 85/12 With a measuring equipment of integrated sound level (decibel measuring device) or a dosimeter, that meet at least the requirements indicated for instruments Class or Type 2, established in norms IRAM	Does not apply
Quantification limit of the method	0.01 dB
Guiding level	85 dB (8 hour-working day)
	Ley Nacional N° 19.587 – Regulation Decree 351/79 – Resolution 295/03 - Annex IV

Medium	**Work environment**
Parameter	**Lighting**
Location points	One in the personnel offices One in the park control offices Two inside the nacelle of the wind turbine
Quantity of samples:	4
Sampling frequency	Annual
Methodolog	
Sampling	**Analysi**
Annex Resolution SRT Nº 84/12 Using a measuring equipment of light intensity (luxometer)	Does not apply
Quantification limit of the method	1 Lux
Guiding level	To be established according to the conditions of exposure of the worker according to National Law N° 19.587 - Regulation Decree 351/79- Resolution 295/03 -Annex V

Medium	Compact Plant Effluent Treatment
Parameter	Coliform; escherichia coli ; pseudomonas aeruginosa mesophilic bacterias; pH, total solids dissolved ; DBO and
Point location	At the exit side (inspection camera) of the sewage treatment compact plant.
Quantity of samples:	1
Sampling frequency	Annual
Methodolog	
Sampling	**Analysi**
SM 1060 using sterilized containers of the adequate volume for the sampling (500 ml-capacity). Latex gloves will be used to avoid contact with the liquid, close the container hermetically and put them in a refrigerating container with coolants. If the sampling comes from a faucet, this must have be previously sterilized.	Coliform (SM 9221 B); escherichia coli (SM 9221 F); pseudomonas aeruginosa (SM 9213 F); mesophilic bacteria (SM 9215); pH (SM 4500 H-B), total solid dissolved (SM 2450 C); DBO y DQO.
Quantification limit of the method	Coliform (absent); escherichia coli (absent); pseudomonas aeruginosa (3 NMP/100ml); mesophilic bacteria (500 UFC/ml), pH (0,01 total solid dissolved (1 mg/lt), DBO y BQO
Guiding	Law 899 (Dto. 7910/99) and Provincial Decree 1485/12.

11.1 DEPARTURE STAGE

In this Stage the same parameters used during the Construction Stage will be used

12 BIRD MONITORING PLAN

12.1 GENERAL OBJECTIVE

To characterize in one year time, in different seasons, bird communities present in the area of study, in such a way to have information available to evaluate the project impact on them.

12.2 SPECIFIC OBJECTIVES

- Describe, in terms of abundance, richness, diversity and equity the community of birds present in the area of influence of the project.
- Determine if possible, sites of nesting
- If there are migration species, establish their potential origin and final destination in a way to approximate the migration route.
- Characterize the potential and real impact caused by the project over the community of birds existing in the area.
- Report about the modifications and/or mitigation actions required to reduce the risk of bird collision.

12.3 MONITORING METHODOLOGY

12.3.1 Point Counting Method

Point counting is the main monitoring method for terrestrial birds in several countries due to its efficacy in all types of grounds and habitats, and the utility of the data obtained. The methods enables to study the annual changes in bird population in fixed points, different specific compositions according the type of habitat and patterns of abundance of each species. The counting point method is often the most appropriate one in the majority of the cases and has been adopted as a standard monitoring method. (1.995).

In this methodology, the observer stays in a fixed point and takes notes of all the birds seen and heard in a limited area (50 m radio) during a period of a deterrmined

period of time (10 minutes). Between point and point, the observer moves on feet. During the study the observer has to record the number of birds found in the area of the Project.

12.3.2 EQUIPMENT

For the activity, the observer needs binoculars, a notebook , a pencil, a watch, a map of the zone under study and the guide of birds in the zone of study Counting points are indicated in the map and, if necessary, the can also be marked in the field with stakes, so the points can be found in following monitoring activities.

12.3.3 SELECTION OF POINTS

The transect points will be located in a systematic way at random, either if it is in a road or far from it. The systematic marking of the points in a grid is advisable and will help to place the points at predetermined and regular distances along the transect points. If the objective is to estimate population patterns in the totality of one unit of management, the point will be distributed in a regular form by all the unit, or along a transect point network, without paying attention to the configuration of the different habitats (Ralph, Geupel, Pyle, Martin, DeSante & Milá, 1996). The minimum distance between the counting points is 250 m. The birds counted in previous points will not be counted again (Ralph, Geupel, Pyle, Martin, DeSante,$& Milá, 1996) For the present Monitoring Plan the distance used between the counting points will be 500m.

12.3.4 DATA COLLECTION SYSTEM

To carry out the field task, it will be used the "Direct Registry of Data" It consists on registering the birds (dead or alive) detected directly on the data sheet.

The data sheet will have the following information:

- Province.
- Project
- Sampling Point (PM)
- Date: day, month and year.
- Campaign n° : indicating the number of visits along the year
- Observer: name of the observer
- Number of the counting point: two-figure number
- Quantity of dead birds
- Quantity of birds alive
- Indirect evidence of the presence in the area (nests, eggs, etc)

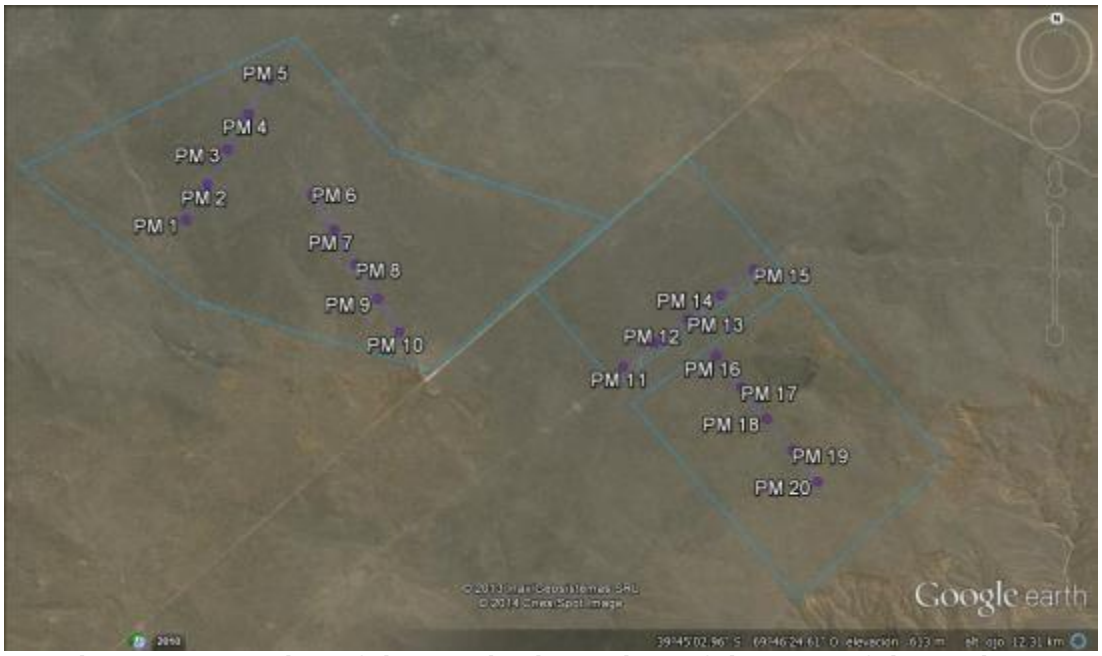
12.3.5 TIME OF SAMPLING

The samplings will be done at dawn and sunset Preferably it will start 15 minutes before sunrise up to 10:00 am and 2 hours before sunset, up to 15 minutes after sunset.

The times will be kept to compare the probability of detection of different species among the different points.

12.4 LOCATION OF THE MONITORING SITES

Following the methodology suggested, below are the different transect points of monitoring selected (determined according the areas of each project) with a total distance of 2000 m and fractioned every 500 m in different monitoring points



Picture 23 Location of the monitoring points of the Area of the Project

Transect point	MONITORING POINT	COORDINATES	
		LATITUD	LONGITUD
A	PM 1.	39°44'28.01"S	69°49'36.75"W
	PM 2.	39°44'13.57"S	69°49'26.88"W
	PM 3.	39°43'59.13"S	69°49'17.32"W
	PM 4.	39°43'44.55"S	69°49'7.46"W
	PM 5.	39°43'30.45"S	69°48'57.85"W
B	PM 6.	39°44'15.21"S	69°48'32.26"W
	PM 7.	39°44'28.62"S	69°48'19.67"W
	PM 8.	39°44'41.87"S	69°48'7.52"W
	PM 9.	39°44'55.00"S	69°47'55.13"W
	PM	39°45'7.70"S	69°47'43.14"W
C	PM	39°45'16.47"S	69°45'46.00"W
	PM	39°45'6.21"S	69°45'30.05"W
	PM	39°44'55.94"S	69°45'13.94"W
	PM	39°44'45.65"S	69°44'57.72"W
	PM	39°44'34.91"S	69°44'41.13"W
D	PM	39°45'10.08"S	69°44'58.06"W
	PM	39°45'21.99"S	69°44'44.05"W
	PM	39°45'33.75"S	69°44'29.94"W
	PM	39°45'45.76"S	69°44'15.84"W
	PM	39°45'57.70"S	69°44'1.68"W

Table 48. Transect point coordinates of monitoring

12.5 MONITORING PERIOD

The monitoring period of birds is planned for a whole year, with the aims of observing the four seasons (Spring, Summer, Autumn, Winter) and so cover in a complete way any period of nesting, migration, etc that may be created in the area under study. Given that in the area of study there are no important water courses, wetlands, ecologic reservations, and/or any area of ecologic interest relevant that indicates an important presence of species, the observation during 5 days per period is considered effective.

These are the monitoring periods with their influence and days

MONITORING PERIOD	Period (months)	MONITORING FREQUENC	Days of observation
Breeding season	From October to December (Spring)	1	5
Migration season	From January to March (Summer)	1	5
	From July to August (Winter)	1	5
Monitoring out of the migration season	From April to June (Autumn)	1	5

Table 49. BIRD MONITORING PLAN

13 COMMUNICATION ACTIONS

Within the measures to consider for an adequate Environmental Management, it is suggested that the Company communicates the nearby community, informing through brochures or direct dialogue, the advantages of the Project and the tasks that will be performed mainly during the Construction Stage (soil movement, transport, among others)

14 CONTINGENCY PLAN

Given that the project is in a development stage there is no Contingency Plan. The authorization of dumping will be issued at the beginning of the Construction Stage.

15 EXECUTIVE SUMMARY

The objective of the Wind Energy Park Vientos Neuquinos I is the construction and start-up of a Wind Energy Park located 7.0 km North of Paraje Bajada Colorada, 38.5km NE of the city of Piedra del Águila and 49.0SE of the town Picún Leufú, in the Department of Collón Curá, Neuquén Province, in the Paraje Bajada Colorada, National Rout N°237, km 1.391.

Vientos Neuquinos I S.A is un corporation created specifically to the development of the park mentioned. This company is performing all the investigations and managements according to the requirements of the Mercado Eléctrico Mayorista (MEM), CAMMESA, ENRE, EPEN and the Environmental and Sustainable Development Department. Once obtained all the permits and approvals , the Company, will start the management stage of the purchase contract of energy, the integration of capital needed for the installation, construction, operation and maintenance of the wind energy park; thus fulfilling its social goal.

The Project of the Wind Energy Park has the objective of placing 50 wind energy turbines and infrastructure related to the capacity of quick insertion in the National Interconnected System connecting with LAT of 132 kV TS I Chocón - Piedra del Águila operated by EPEN. At present Argentina has a strong dependence on fossil fuels and water as a source of electric energy. The activity of the Project has the object to collaborate with the reduction of this dependency al the national and at a global level with the reduction of emissions of Greenhouse Effect Gases from thermal stations.

This WInd Energy Park has as specific objectives:

- Obtain a more diversity of energetic sources, to ensure less dependence of fossil and hydroelectric resources.
- Ensure satisfaction of the energetic demand reducing costs in the long turn.

- Guarantee a reliable supply through adequate energetic infrastructure.
- Develop an energetic plan respectful of the environment.
- Favor the development of synergy between the competitive objectives, security of supply and environmental safety.
- Creating jobs in the region during the Construction Stage (engineering, infrastructure, civil and electric works and installation) and during the Operation Stage (maintenance, service, management).
- Collaborate in the reduction of environmental impact replacing more contaminating energies of worse effects in the environment.
- Mitigate the generation of Environmental Passives once the service life of the project has finished.
- Collaborate in the strengthening of ecologic and environmentl conscience of the people considering the use of sustainable energy supply systems.

During the Construction Stage, the project will increase local and regional demand of: (i) services: accommodation for the workers, food consumption ,soil movement, personnel transportation, car renting, car repairing, provision of water, among others; (ii) supplies: work materiasl, electric materials, fuel and oil, among others; (iii) manpower: specialized workers (welders, electricians, engineers, mechanics, etc) and technical personnel for permanent facility mounting

Once the Operation Stage has started and given the characteristics of sustainability of the project, it will enable the region to have energy resources that will enhance its energetic matrix, diversifying generation sources and trying to mitigate risks implied by the use of hydroelectric sources in particular during drought seasons. To consolidate the energetic matrix will enable the region to have an industrial, social and economic growth. Given that the increase in energy demand is an indicator intimately connected to the economic development , industrial growth and

the improvement in the quality of life, it is estimated that it will increase being required alternative sources of energy generation like the one mentioned in the present study. In the region, the development of the hydro carbon sector, the improvement in the quality of life, as well as the number of inhabitants give evidence of potential energetic necessities in the long and short run. The start-up of the Wind Energy Park will satisfy rapidly and in a sustainable way the provision of additional energy from the hydroelectric source.

On the other side, wind energy projects are compatible with the current and potential use of the soil in the area of the project (extensive farming and hydro carbon activity). These types of projects do not restrict, modify or affect the micro economy of the population, but revalue the use of the ground to employ the wind resource which is generally sub used only for water extraction (water mills).

It must be mentioned as well that the increase of more projects to the regional scale will enable the development of supply service companies of wind energy parks maintenance with the subsequent creation of new jobs and specialties.

Given the type of Project, after finishing the Departure Stage the risk of generation of Environmental Passives which can affect the health of future generations is minimum.

Finally, the Project will keep to the norms and requirements related to social impacts and will consider the participation of the community in regards the promotion of information about the technological characteristics and its affectation to the environment. These topics have already been taken into consideration during the preparation of the present report. In this sense, it will be considered that the communities are informed in every moment and that their opinions will be respected and applied. It is also guaranteed the training and education, no only in the transmission of technology, but in an ample transference of knowlege

related to the services required by this type of enterprises in their Operation Stage.

About the location

The Project is located over an area of fiscal property in the Neuquén Province. The **Fiscal Lot has been set apart by the Neuquén Province , so that Vientos Neuquinos ISA develops its project.** The Area assigned to the Project is 2.603 has of which 0.9% will be used for the placement of infrastructure.

The Area of interest is located over a plateau and soft undulation zone and altitude varies between 550 and 650 msnm. These characteristics together with the absence of natural obstacles and the high speed media of the wind in the zone, contribute in a positive was with the objectives and development of the Project. Within the consideration of its location, it can be mentioned that it is near RN N° 237 (it can be reached from RP N° 47), there are no sites of indigenous peoples , there are evidences of the use of land for cattle and there are ducts for the transportation of hydro carbon industry products..

About general technical aspects of the project

For the project 50 wind energy turbine equipment VESTAS V80/2.0 MW will be used: VESTAS Turbines have a three-blade rotor and self-regulating inclination and orientation. They have a rotor diameter of 90 m which operates using the OptiSpeed TM Turbines will be equipped with the OptiTip® system , pitch regulation special system (inclination of the attack angle) VESTAS. With OptiTip®, blade inclination angles are constantly regulated to the optimal position according to the wind regime **The purpose of this system is to improve energy production as well as the sound emission level.**

The turbine will be equipped with an aerodynamic braking system, which will stop the rotation in case it is needed. This braking system will perform a change in the attack angle of the blades taking the rotation speed of the rotor to the desired control value. Besides, there will be a disk brake system which will be located in the axis of high speed of the multiplier.

axis of high speed of the multiplier. This brake will only be activated by hand pulsating the emergency stop inside the turbine.

Given that potentially the blades of a wind turbine may reflect electromagnetic waves, the height of the wind energy turbine and its blade-length are important elements to consider in the design. Potential electromagnetic interference are related to terrestrial telecommunications (radio AM/FM, radio links, among others), aerial radio navigation systems and radar systems. The location of the Wind Energy Park respect to nearby towns and the height of the equipments make us assume that the affectations by electromagnetic interference will occur in the radius of 1 to 2 Km from the wind energy equipment , being perceived by the Company employees, passers-by and rural settlers in the nearest work station.

Wind energy equipment are coated with anti reflecting coating (matte) reducing the risks of sudden glare by sunlight over the blades of the equipment.

To avoid risks for the airplanes that circulate through the zone, the equipment will have the adequate beaconing system with paint and lights according to the required by aerial authorities. The foundations of the wind energy turbines will be connected to a steel mesh which will act as earthing and each equipment will have a lightning rod. Auxiliary Electric installations also will count with inbuilt earthing and lightning rods.

The wind energy turbine position has been given considering the predominant directions of the wind. So, the distribution of the wind turbines has been projected in a perpendicular form to the direction of predominant winds. It has been kept a minimum distance between the foundations of the wind turbines of 7 to 8 rotor- diameter in perpendicular direction to predominant winds. This separation is enough to guarantee a good rendering and reduce the turbulence produced by wind turbines, minimize the risk of the chain effect

in the event of a detachment of a turbine part or a falling of a tower

The project has a service life of 20 years since its start-up.

About the Construction Stage.

During the Construction Stage the following actions are anticipated:

- The transportation by truck of the equipment and accesories brought by ship from the port of Bahía Blanca to the site of location respecting transit regulations and communicating previously the activities to the population and authorities.
- The adaptation of the existing slopes of access and the construction of internal roads.
- The construction of platforms for crane works
- The construction of foundations for the wind turbines and trench excavation for underground wiring.(communication, electric interconnection and protection).
- The mounting of the wind turbine equipment and the underground wiring in the site
- The construction of a Transformer sub station, control facilities for the personnel (auxiliaries) and service (compact system of sewage effluent treatment and storage sector of dangerous waste).

For the development of work tasks it is anticipated the placement of temporal facilities. They will be formed by (i) an area of supply and construction material stockpiling; (ii) a temporal site for Waste Management provided with dumpers with lid located inside a pan for spill containment;
(iii) (iii) a parking lot for heavy equipment and another for light vehicles; (iv) a deposit for lubricants; (v) restrooms for the personnel equipped with a compacting system of gray and black waters according the indication by current environmental regulations and authorized by environmental authority at the beginning of the Construction

Stage; (vi) a metallic tank for fuel storage (gasoil) of 30 m^3 capacity with characteristics indicated by current regulation of the Secretaría de Energía de la Nación and of the environmental requirements for this type of faciliies; (vii) PRFV tank for drinking water and sanitary use and canteen (10 m^3); (viii) a sentry of access control. All the sectors will be properly delimited with perimeter fencing with gates for access. There will be external and internal lighting and portable generators. Internal and access roads will have signs and posters signaling risks and prevention. There will be extinguishers according to what is indicated by study of charge and the vehicles will have flame arresters. **It is predicted that the temporary facilities will occupy a surface of 5.000 m2.**

The equipment and supplies to be used in the work will be provided by local and/or regional contractors duly authorized. In the case of provision of aggregates, it will be required that the contractor company will present the duly legal authorization for their extraction by the Subsecretaría de Minería e Hidrocarburos de la Provincia which will be presented to environmental authority prior to the beginning of the works.

The material removed from foundation excavations and trenches will be stored considering the identified edaphic sequence and it will be stored in the surroundings (one meter). It must be covered with polyethylene of medium density to avoid its blast by wind erosion. The same will be used in the filling tasks of the site of the foundations and trenches. In case there is excess material, it will be used for filling and stabilization of the internal roads or deposited where the environmental authority indicates.

Considering the availability of local infrastructure and the presence of local providers of reinforced concrete, the concrete for the foundations will be generated in situ by a temporal plant installed in the surrounding of the workroom. The characteristics of such plant will be informed prior to the beginning

of the Construction Stage considering the technology reported by the selected provider. Such plant must fulfill the measures tending to avoid the affectation of the environment. Such measures will be informed previously to the beginning of the works through the development of a specific study for that activity. The foundations include a foundation slab of 17 m for 17 m (289m2) formed by concrete with steel core, of approximately 2 m height in the border and 2.6 m up to the base of the tower. It will be visible at the ground level the concrete plinth with tubular form (of 4.15 m diameter) that fixes the steel cylindrical-conical tower to the foundation. The excavation volume of the wind turbine will be approximately 578 m3 . Considering the 50 wind turbines, the total movement of soil related to the excavations of foundations will be of 28.900 m3. The quality of the concrete will be determined by the test tubes with samples of the material in authorized laboratories

For internal roads there will be minimum tasks of construction of new roads. Roads will be conditioned in a way that the conditions required for their traffic ability will not be modified by weather events. Road mapping will enable the adequate natural drainage of the zone. For that pipings will be installed in cross points with natural runoffs that enable the natural liquid flow and avoid water accumulation. The localization of runoffs will be identified in the hydro geologic map of local scale that is attached in the Annexes. It is anticipated the construction of approximately 24 Km of new roads, which means a surface of 168.000 m2 equivalent to 0.6% of the soil surface

During the mounting activity and for subsequent maintenance tasks cranes will be used for the hoisting of the constitutive parts of the wind turbines. For the movement of these equipments there will be required the construction of 50 mounting platforms, called "Staging Areas" (one for each generator) of 1.400 m2 each (35 m by 40 m)). Considering the totality of equipment, the affected area will be of 70.000 m2.

Each wind turbine mounting will be completed in one or two days, depending on the weather conditions. For the mounting, it will be obligatory to operate with two cranes of different sizes (600 tn and 100 tn), whose details will be specified in the subsequent stage of the Project. Firstly, the tower segments will be assembled Then, the nacelle will be installed in the upper part of the tower. Rotor blades will connect with

to the hub on the ground and the complete rotor will be mounted in the nacelle with crane help.

The wind turbines will be totally interconnected by underground cables of medium tension (MT) of 33 kV. Together with this underground wiring the optical fiber will be disposed to communicate the wind energy station. Trenches will be 1.2 m deep and 0.6 m wide. This implies a soil removal of approximately 22.320 m3. The trenches will be carved pilling the removed material at the sides, respecting the edaphic horizons and covering them with polythylene of medium density. Once the wiring is finished, the trenches will be covered with this material and there will be actions of replanting and scarification activities with indigenous species as it was mentioned for the foundation excavations. Each generator will connect to underground cables through a medium tension cell located at the bottom of the tower. As well, by means of PVC pipes inserted , the cables will trace the respective trenches.

Each wind energy turbine will have a grounding strap which will meet the requirements of applicable laws. The grounding strap resistance, measured in each wind turbine without interconnection with the rest, will not be over 5Ω. To that effect, in each one, there will be installed electrodes of PAT needed (javelin, nude cooper cables), bonded to the frames of the concrete foundations and all the ground cables of the equipments.

All the system will be inspected and tested before the energizing. Underground wiring of a group of turbines will be connected to the 33 kV bar of the Transformer Station through a primary anti-arc cell, from where the power transformers will be connected to the transmission headline 132

To interconnect the Wind Energy Station to the Regional System Comahue, there will be a Transformer Station (TS) 132/33/13.2 kV - 2x63 MVA according to procedures of CAMMESA Annex 16 REGULATION OF CONNECTION AND USE OF THE ELECTRIC ENERGY TRANSPORT SYSTEM

Electric energy. The Transformer Station will have a typical architecture according to the regulations required by the transport company for this type of work. The site of the transformer station will be 120 m by 100 m. As a requirement in the design of any Transformer Station it will be essential the installation of a grounding strap mesh. It will be used to ensure that the potential of the TS will not exceed the maximum shift and contact tensions permitted for the operators´safety. Having in mind the danger that exists for high tension inside the Transformer Station there will be a safety perimeter fencing surrounding it. The fencing will be designed to reduce the risk of animals and strangers entrance. Over these fencings there will be a poster with ENTRANCE FORBIDDEN TO ANY PERSON FOREIGN TO THE COMPANY and the safety poster that indicates the RISK OF ELECTRIC SHOCK. Also there will be signs that indicate the personal protection equipment needed for the entrance. As part of the protection systems, the Transformer Station will require a lightning bolt and additional equipment like guard wires. For the connection of the project to the Sistema Argentino De Interconexión, there will be an opening of the LAT 132 kV "Chocón - Piedra del Águila" in the retention structure, geographic coordinates (39°44'33.55"S; 69°44'17.70"W).

To achieve the transference of energy from the wind energy turbines it is predicted the installation of two transformers with a power of (33/132 kV - 63 MVA). The transformers will be mounted over the bases of reinforced concrete. The safe separation between the equipment will be provided with firebreaks of concrete. As a coolant fluid it wiil be used oil free of PCBs The transformers will be located inside a pan for spill containment tending to prevent contingencies related to the loss of the coolant liquid Such pan will be connected to an underground cesspool deposit located inside a site for spill containment. In case of contingencies that imply the falling of the equipment and the spillage of the fluid, this will be trapped in the cesspool deposit and then withdrawn by trucks equipped with a pump and extraction of liquid systems to send them to their final disposal to a company authorized for its treatment.

There will be an auxiliary building adyacent to the TS. The installation will be of the wet type (reinforced concrete independent bearing with partitioning of masonry, and the roof coated with metal with good insulation.) It is a one-store building with a surface of 120 m2 approximately. In this building there will be (i) a workshop for the basic maintenance of the wind turbines; (ii) a canteen for the personnel; (iii) two meeting rooms; (iv) a training room; (v) a reception room for visitors;
(vi) a dormitory for the personnel; (vii) a restroom sector connected to the sewage effluent treatment approved by competent environmental authority; (viii) a security sentry with a toilet connected to the system previously mentioned; (ix) a stockpiling sector for spare parts;(x) a conditioned service room; (xi) a deposit for maintenance supplies. Next to the auxiliary building there will be an area of 25 m for 25 m destined to: (i) material stockpiling: 350m^2; (ii) a place for the generator;(iii) a tank for drinking water;
(iv) a temporary waste storage sector.

It is not predicted the construction of a LAT of 132 kV given that the site of the project is crossed by the LAT already mentioned.

Apart from the supplies for the construction work it is predicted the use of: (i) fuels(gasoil) and lubricants for the vehicles and electric generators; (ii) drinking water for the personnel and the preparation of food; (iii) electric energy provided by diesel generators.

There will be an adequate Solid and Semi Solid Wast Management which will identify and manage in situ the following: (i) waste from excavations and construction;(ii) ferrous waste;(iii) assimilable and domestic waste; (iv) dangerous waste; (v) pathogenic waste. Dangerous Liquid Waste will also be properly managed and as in the case of the solid and semi solid waste will be transported by a transport company according to

current environmental regulations and will be treated in a company authorized It is not anticipated the performance of maintenance of vehicles in the work sector. Their maintenance will be done in especialized workhops out of the area of the project in workshops located in the city of Neuquén.

As mentioned for grey and black waters coming from the sectors of personnel, they will be treated in a compacting plant according to the requirements of current legislation.

It is predicted that during the Stage there will be diffused emissions of particle material and combustion gases. The activities that produce noise are punctual and discontinuous in the surrounding of the Project Area.

Below there are studies, plans and reports that are under execution or have already been executed. They are attached to the Annexed or will be presented prior to the beginning of the Construction Stage to competent environmental authority.

- Electric Study. Stage I.
- Study of feasibility of the project and wind map
- Structural Soil Study
- Study of the soil base line
- Theorical studies of disturbing noise in the neighborhood
- Base line study of disturbing noises in the neighborhood
- Study of the “shadow flicker” effect
- Study of the Biota base line
- Archaeological and paleontological study
- Communication and transportation of the components of the wind turbines
- Plan
- Disassembling and withdrawal of temporary facilities Plan
- Study of fire charge in the facilities of the workroom
- Permit of dumping of liquid effluents treated by EPAS.

As mentioned the actions of negative affectation of grubbing and soil compacting will be mitigated at the end of the work by restoration tasks which will consist on the scarification activities and re planting with native species, planting exemplars according to the distribution and type of species determined in the Study of Base Line These actions will be developed in: (i) temporal roads; (ii) hoisting crane platforms; (iii) workroom site; (iv) trenching for underground wiring; (v) any sector that has been affected temporarily. All the temporary facilities as signs, fencing, work materials, and waste generated will be withdrawn once the Construction Stage has finished.

About the Operation and Maintenance Stage

Once in action, the Wind Energy Park will have the following plans: (i) Safety, health and environment; (ii) Operation and Maintenance. With the aims of guaranteeing the safety and protection of the functioning of the Wind Park there will be performed certain operative tasks like: (i) Induction and personnel training;(ii) programmed maintenance of the wind turbines, civil infrastructure and electric infrastructure;(iii) non programmed maintenance. For the maintenance tasks it is estimated a consumption of supplies like oil (gears and hydraulic systems), lubricant grease and cooling products.

Even though in this Stage the generation of waste will be small, it is predicted that there will be a solid and semi solid management with the following currents of generation: (i)ferrous); (ii) assimilables and domestic; (iii) dangerous. The treatment of dangerous liquid waste will be done in a similar way as in the Construction Stage. The generation of liquid effluents from the personnel sectors will be small related to the small number of permanent personnel Despite its little volume the Company anticipates it treatment through a compacting plant according to the requirements of environmental regulations.

With respect to gaseous emissions, they will be reduced and very little (related to the little traffic of maintenance vehicles in the area of the project)

Mechanic and aerodynamic noises will be produced due to the proper operation of the wind turbines. Given that there is no permanent population nearby, only the construction of eventual occupation (puestero) the monitoring using Norma IRAM 4062 is not considered relevant for this stage of the project.

About the Departure Stage.

During the Departure Stage dismantling tasks will be done in the facilities . They will be: (i) withdrawal of wind turbines and external electric lines
(ii) withdrawal of the undergroun channeling and foundations bases; (iii) withdrawal of the transformation station; (iv) withdrawal of perimeter fencing and posters; (v) closure of the facilities and shut down For these tasks it is anticipated the waste management and liquid effluent treatment similar to the announced in the Construction Stage. The gaseous emission and noise generation will be similar to what is announced in the Construction Stage.
Scarification tasks will be conducted tending to promote the natural re planting of the indigenous flora in all the areas affected with the aim of returning the environment and landscape to the its original setting, reducing the affectation that might have caused the anthropic activities conducted. Attention will be paid in the planting of indigenous species disponsing them on the ground according to the density , diversity and coverage identified in the base line.

About audits

During the SEI, a field investigation and base information were developed. With the information supplied by the Company and certified with the available in the meteorologic station Cutral CO (INTA) the parameters of temperature, winds, precipitations and humidity were established for the area of the project.

From field observation and analysis of the cabinet, the geology, geomorphology, edaphic, water resources and anthropic affectation characteristics were stated. With this information maps were elaborated and are attached to the Annexes.

It was observed that the area of the project is located in a zone of reduced seismic danger and the characterization of underground hydric resources was done. From field observation it was appreciated the the Area of the Project is plateau with no temporal runoffs (they are observed only outside the area of the project) The type of superficial soil is sandy. As part of the present study the Study of the Biota Base Line was done with the identification of flora and fauna, the development of transect points and indicators to be used as part of the Monitoring Plan The main vegetation is characteristics of the Province. Phytogeography of the Monte, mainly in bushes of medium height with an average coverage of 20 to 40%. From the zoogeographic point of view. The species reflect media conditions, showing adaptability to rigorous conditions, as water or vegetation scarcity, or suffering the brunts of autumn--winter coldness. As part of the theoretical underpinnings and for its use as reference, there is a development of a filtered list of the previous tables of species potentially present in the zone and their state of conservation according to the "Red List" of the International Union of Conservation of Nature (www.iucnredlist.org) The polygon of the Project is not located within any of the Protected Natural Areas. The nearest Protected Natural Area El Mangrullo is at 64Km North of the porject.

The location zone stands for having less than 3% slope, the development of poor soils in terms of productivity and the dominion of species like the Grindelia Chiloensi, Prosopis Alpataco and Stipa Spinosa of medium coverage. The plateau enables an open panoramic view delimited softly by the surrounding geoforms. The landscape is completed with anthropogenic interventions like the installation of electric networks (LAT) and the signaling of underground installations of ducts (gas duct "Cordillerano" of the company Transportadora de Gas del Sur SA) Out of the area of the project, at a distance of 250 m approximately to the South, there is a rural post.(39°45'10.1"S; 69°49'24.7"W). North of the Area of the Project and at a distance of 2.000 m, there is an inactive oil well (YPF.Nq.HS.es-1) which belongs to the company Americs Petrogas Argentina SA (39°43'03.8"S; 69°45'56.6"W).

As part of the analysis and according to the requirements by Resolution N° 77/98 of the Secretaria de Energía, the visual impact was analyzed with two methologies: (i) photomontage of the wind park using software WINDPRO®; done from Ruta Nacional N° 237 (39°48'27.91"S; 69°42'32.54"W) (ii) pondering method by weights according to Conesa. With the first method it was observed that the Wind Park will not be seen by passers-by. With the other, it was concluded that the visual impact will be low.

Considering the socioeconomic medium , the demographic information was analyzed; the economic activity in the region; the socioeconomic indicators and infrastructure of services for the city of Piedra del Águila (closest populated point). In the Area of the Project there are no indigenous peoples communities that may be affected by the installation of the Wind Energy Park The closest is the mapuche community Ancatruz, located at 30 Km from Piedra del Águile (70 Km frm the project area) Given the importance of the area in the potentiality of archaeologic and paleontologi findings, a Study of the Base Line will be conducted and presented prior to the beginning of the Construction Stage.

As it can be seen in the map of anthropic affectation, attached to the Annexes, in the area of the Project there are tracing lines for gas. According to this the Company has executed this Project considering the NAG 100 of ENARGAS (Minimum Argentinian Norms of Safety for the Transport and Distribution of Natural Gas and other Gases through Piping) in particular in all related to: (i) minimum safety distances to place the foundations of the wind turbines and the wiring for them,(ii) bonding road tracing between the equipment; (iii) the need of conducting an analysis of the cathodic/anodic protections to determine the potential affectation of corrosion over the ducts.

It is important to say that during the field investigation there were no environmental passives detected.

About the legal frame

For the development of the present study, current environmental and labor regulations of provincial and national range were analyzed Furthermore, the Resolutions of ENRE specific fot the topic were taken as legal theoretical underpinning. Also, the NAG 100 of ENARGAS (Minimum Argentinian Norms of Safety for the Transport and Distribution of Natural gas and Other gases through piping) was considered for the analysis.

It is to indicate that the National State has developed a legal frame tending to promote renewable energies. These are the specific laws for the sector:

- **National Law Nº 25.019 and Regulation Decree Nº 1.597/99. National Regime of Wind and Solar Energy** It backs up the generation of wind energy with a subvention and a deferment in tax payment.
- **National Law Nº 26.190. "Régimen de Fomento Nacional para el Uso de Fuentes de Energía Renovables destinada a la Producción de Energía Eléctrica".** It promotes the use of them for subventions and tax exemption.
- Provision Nº 220/07 **Spot Operations** It establishes the possibility of incorporating new strategies for the generation of energy to the Mercado Eléctrico Mayorista (MEM)

On its part, the Neuquén Province has specific regulations tending to promote these types of projects.

- Provincial Decree Nº 1.837/09 It declares special interest in the generation of energy through renewable sources. Through this regulation, the sites of the Area of the Project were permanently reserved and with ends to public use, in favor of ADI NQN S.E.P. (Agencia para la promoción y Desarrollo de Inversiones del Neuquén, Sociedad del Estado Provincial), among others, according to the provincial interest declared in article 2º of the Provincial Law Nº 2.596, and what is indicated in article 39 of Provincial Law Nº 263 (T.O. -Res. Nº 669/2.003 de la H. Legislatura Provincial), for the development of investment proyects of generation, transport and distribution of electric energy coming from wind energy that is conducted by itself or through third parties.

With respect to the present study, it has been conducted applying **Law Nº 1.875 and Decree N° 2.656/99, in accordance with Annex V of the Decree N° 422/13 that indicates the need of conducting this type of Studies for Wind Parks.**

About the environmental evaluation of permanent impacts

According to Res ENRE N° 1725/98 the matrices of Evaluation of Environmental Impact must present a chart whose columns and lines must indicate the factors over which projects produce or may produce some impact and the stages of the projects where these affectations will occur. In each of them the union the the matrices cells must indicate the qualification of specific impact for the following ponding factors.

Sign	+ (Beneficial)	S/A (no affectation)	- (Harmful)
Duration	T (Temporal)		P (Permanent)
Intensity	E (High)	M (Medium)	L (Low)
Dispersion	F (Focused)		D (Disperse)

The activities to be developed by the Company were analyzed from the current regulations mentioned before and were evaluated the three stages of the Project:

- Construction
- Operation and

Maintenance - Departure

Following the methodology proposed by ENRE the impacting actions of the Project will be described, afterwards a qualitative valuation of the identified impacts is done, then these impacts are described and finally the matrix of identified permanent impacts will be presented

During the Construction Stage most of the affectations are of temporal character and only are observed two negative permanent characteristics over the sub factors erosion and soil science.

Erosion and Soil Science These impacts may be mitigated with concrete actions of prevention of soil blast and reducing vegetation grubbing. On the positive affectation, this is related to the diversification of the soil use, given that wind energy projects live together with other current uses like farming and hydro carbon industry giving value to the site.

Negative permanent affectation that are released from the analysis of the Operation and Maintenance Stage of the wind park are related to the sub factors of Visual Incidence, the Behavior and Quality of Habitat of Mammals and Birds. Birds and mammals may be affected in their sites of feeding, nesting and/or shelter. The positive affectations are related to the reduction of emission of greenhouse gases for the use of sustainable energy sources in replacement of fossil and hydroelectric sources. Besides, a permanent improvement in the energetic matrix in the region is appreciated, being this of high positive impact.

During the Departure Stage, given its characteristics, most of the sub factors are impacted permanently. Due to the fact that the Company has planned to perform activities of restoration, most ot the impacts are positive ones. Only the sub factor direct and indirect employment and electric infrastructure are seen as negative one, due to the closure of the wind park.

About the environmental evaluation through matrix of pondered estimation of impacts

The methodology to be used in the estimation of the impacts was based in what is exposed by V.Conesa Fernández Vitora (Methodological guidelines for the evaluation of the environmental impact, 1997) where a Matrix is stated with double input, called cause-effect matrix, in whose columns environmental factors and impacting actions are stated. The **Impact Importance is a** qualitative estimation which arises from the incidence degree or the intensity of alteration produced, as the characterization of the effect which correspond to certain features of the qualitative type, such as: sign, extension, type pf effect, period of ,manifestation,

persistence, reversibility, recoverability , synergy, accumulation and periodicity which are estimated individually in function of the experience and the characteristics of the project evaluated in the field and certified with bibliography and information provided by the Company of the Project.

For this project were identified 36 potential sub factors that by be affected by any of the impacting actions identified in the different stages of the project. Each one of the analysis of sub factors enable the construction of files with individual analysis in which the 3 stages are observed, there is a characterization and development of the impacting action, its affectation on the sub factor and actions are recommended for the prevention and mitigation indicating the degree of priority in its application and the effectiveness expected. These files are in the Annex

With the objective of determining the relative importance of each subfactor respect to the others analyzed it is considered a base of 1000 unit of importance (UIP) for the totality of them. This base of 1000 UIP is used to calculate the pondering or each sub factor.
The pondering value of each environmental sub factor arises from the analysis conducted by the interdisciplinary team according to the field investigation and the experience on previous similar works.

For each Stage of the Project, each matrix cell is completed first with the values of Impact Importance in the analysis of each impacting action (lines) over each sub factor (columns). According to this equation the results may vary between a minimum of 13 and a maximum of 100. The contiguous cell is completed with the relative or pondered importance The matrices obtained are attached to the Annexes and indicate the degree of affectation of un sub factor with respect to the other in each stage of the project.

Of the analysis of affectation over the sub factors considering the absolute values it can be appreciated that exists an important positive incidence in the Direct and

Indirecty Employment of the Economic Activity Both constitute the 25,28 % of the affected factors. Analyzing these sub factors in the relative analysis we appreciate that the percentage increases reaching 37% due to the important pondering that both sub factors had. Such situation is due to the sub factors mentioned before are related to the generation of employment and cash flow during the construction and mounting tasks of the wind park. The salaries that direct and contracted personnel earn possibly increase the consumption of goods and services in the region. Other collateral effect are related to services and products that the company consumes, which will increase the economic activity in general.

Respect to the sub factors affected negatively , those which are typically associated to the construction process are highlighted in the absolute and relative analysis: Air quality, Personnel Health; Soil Science and Visual Incidence. In the case of negative affectation of the sub factor Others, the sub factor Nearby Population´s Health is related to the risks of traffic accidents originated by the circulation of the turbine parts and/or of the heavy machinery used in the work.

In the Operation and Maintenance Stage the pondering of the factors does not evidence a great change over the absolute analysis, which indicates that there existed a correct tendency during the estimation of the different sub factors, as well as the analysis of the influence of impacting actions over them. Also it is appreciated the positive importance of the start-up of the wind energy park as an alternative source of energy in replacement of those that use fossil fuels or hydroelectric source (32,25% in the absolute analysis and 38.51% in the relative analysis). Analyzing the negative actions, that of mayor importance(absolute) is related to the operation of wind turbine equipment given it influence over all the sub factors affected by this type of projects.

From the analysis of the sub factors affected during the Operation and Maintenance Stage is obtained that the affectations over the sub factors are related to the Economic Activity and Direct and Indirect Employment (positive feature). They are related , among others, to the potential uprise of service companies to perform the maintenance of the Wind Energy Park. It is important to be mentioned that

that the Sub factor Electric Infrastructure, which is related to the improvement in the energetic matrix of the region for a new form of energy source of sustainable characteristics. Contrasting the absolute analysis with the relative one it is appreciated that the second increases its positive percentages as a result of the important pondering of the sub factors previously mentioned.

Negative affectations over the sub factors of greater importance during the Operation and Maintenance Stage coincide in both analysis. They are: Behavior of Birds, Personnel Health (due to risk tasks to be developed during the maintenance tasks) , Visual Incidence, the Behavior of Mammals and Quality of habitat of Birds. They are all inherent to the activities proper of wind parks, which as any other human activity affects the environment in which it is developed. These affectations deserve Preventive and Mitigation measures that have been developed in the files of each sub factor. The implementation of these measures will enable the Company to reduce the percentages pointed. Analyzing the affectation over the sub factor Population´s Health, even though it is negatively impacted for potential actions (circulation and operation of vehicles, operation of wind turbines), its affectation is compensated by the positive action of the use of wind energy sources which contribute to the reduction of the use of fuels that generat greenhouse effect favoring the reconstruction of the Ozone Layer.

Given that in the Departure stage there are tasks tending to reverse the affectations or sources of generation of impact will finish, the actions with a higher percentage of affectation are of a positive character: filling, leveling, scarification process and re planting, and dismantling of wind turbines Positive actions have an important contribution due to the fact that the Project does not imply large installations of difficult dismantling and that the Company have created them with the objective of enabling the recomposition of the Area of the Project to its initial state. It is appreciated a substantial difference in the action of greater percentage of affectation. In the case of the absolute analysis, the same is related to the inadequate waste management. When applying the pondering it is appreciated the increase of the action of unemployment given its influence over sub factors of important estimation like the Economic Activity.

Form the analysis of the affectation of the sub factors during the Departure Stage it is marked as the sub factor with greatest affectation the Economic Activity and Direct and Indirect Employment (both with positive character). Even though the closure of wind energy park implies the ending of jobs, during the tasks of dismantling of the equipment there is a flow generation of economic movement in the region and on the other side it is considered that the existence of other wind energy parks indicate that service companies developed in the region were re localized giving services to other enterprises of similar characteristics. The other sub factors in order of importance in the pondered analysis are related to environment recomposition actions and that affect positively over the sub factors Quality of Habitat in the herbaceous and bush strata, in the birds and mammals Negative affectations over the sub factors are related to the activities to perform during the work (personnel health and diffused emissions that affect air quality) in a similar way to the analyzed in the Construction Stage.

About the environmental management

As mentioned before, together with the analysis of the impacted environmental sub factors mitigation and prevention actions have been elaborated. Such actions have been summarized and more actions were added to the general application of the work. For the application of such actions , the responsible personnel has been identified in each stage of the project. As well, restoration and environmental passive recomposition measures have been established during the Departure Stage.

In this study the Environmental Monitoring Plan suggested by the Company is presented for each Stage of the Project. It is also developed the Bird Monitoring Plan where the monitoring methodology, equipment, data collection, sampling times, location of transect points and period of monitoring are suggested, Finally, basic guidelines for the communicative actions to the population are indicated

Conclusions.

As it is evidenced in the development of the present study, the Wind Energy Park Project Vientos Neuquinos I in its different stages has a positive potentiality either for the zone of influence as for the Neuquén Province and the country. The most important aspects are related to:

- The generation of temporal sources of employment (Construction and Departure Stages) using the knowledge of the population in the region related in particular to the building industry and mounting tasks.
- The generation of sources of permanent employment during the Operation and Maintenance Stage, related to the personnel that operate the Wind Energy Park and the workers of regional service companies for the maintenance.
- The diversification of the energetic matrix with the improvement in supply safety which will collaborate in the industrial development and the economic growth of the Province
- To collaborate, together with other wind projects with the consolidation of the wind leadership of the Nequén Province.

Most of the negative affectations over the environment will occur in a temporal way during the Construction Stage. The operation and Maintenance Stage, differently to most of the industrial processes, has a high percentage of positive affectations to the environment , showing the positive impact of these types of projects. The Departure Stage on its part is characterized by having an important number of permanent positive affectations to the environment showing that these type of projects have impacts which are reversible when ended applying the correct environmental management.

Finally, wind energy projects, due to the use of the wind as renewable resource permit the reduction of greenhouse effect gases helping with the quality of life improvement in the global scale.

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