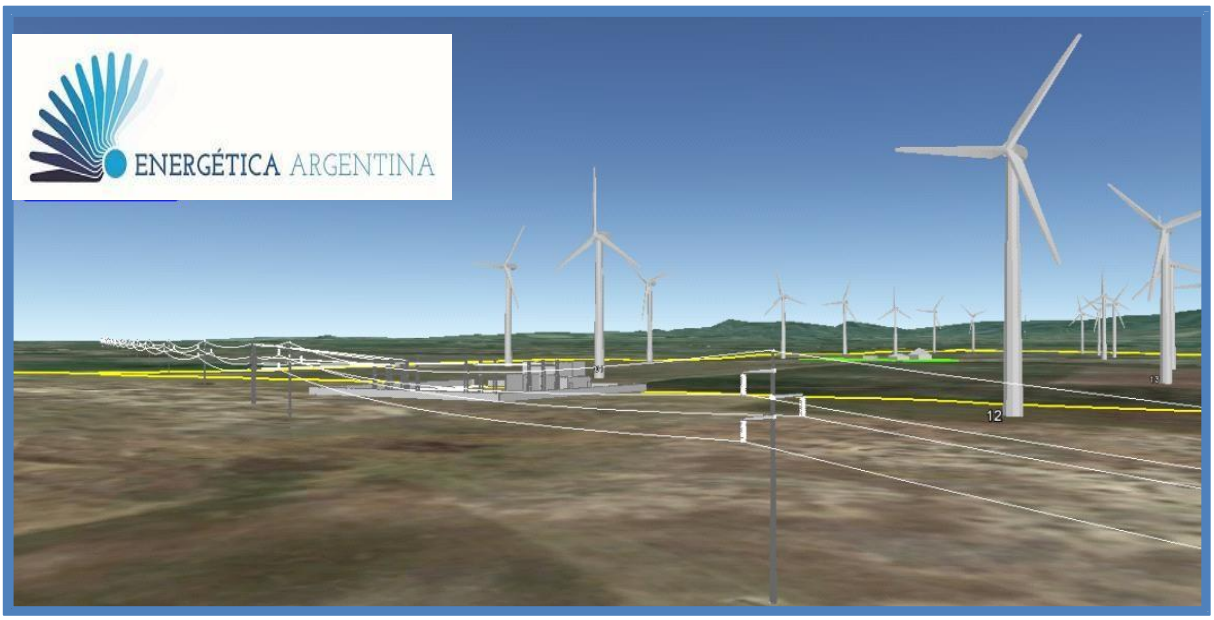
Investigation on Environmental AWARENESS ADDENDUM N°2 CENTRAL EÓLICA ENERGÉTICA I

PARTIDO DE TORNQUIST

PROVINCIA DE BUENOS AIRES

REPÚBLICA ARGENTINA



August 2018

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1. COMPANY THAT REQUESTS THE ENVIRONMENTAL DOCUMENT

Company Name	Energética Argentina S.A.
Address	1023 Carlos Pellegrini, 9° Floor. Autonomous City of Buenos Aires
Representative of the Company	Rubén Zaia Business Development Manager
Tel/Fax	+54 11 48722959.
Electronic mail	Ruben.zaia@aes.com
Web Page	https://www.aesargentina.com.ar/
Company Main Activity	Electric Power Generation

2. COMPANY THAT ELABORATED THE ENVIRONMENTAL DOCUMENT

Full Name	ICONO SRL.
Address	53 Villarino. (B8000JIA) Bahía Blanca - Buenos Aires - Argentina
Tel/Fax	Tel (+ 54291) 4556484 / Fax (+ 54291) 4521352.
Electrónic mail	Ruben.zaia@aes.com
Web Page	https://www.aesargentina.com.ar/

3. TECHNICAL MANAGER

Nombre completo	Mario Rubén Tami.
Address	Humberto Primo 560 - (8000) Bahía Blanca - Buenos Aires.
Tel/Fax	+54 291 4637306.
Electrónic mail	Ruben.zaia@aes.com
Job	Electrical Engineer Mg in Environmental Impact Evaluation Mg in Renewable Energies
Registration Number	N° 53098 College of Engineers, Buenos Aires Province.
Professional Registry N° 4156	Provincial Agency for Sustainable Development (OPDS), Buenos Aires Province

4. TECHNICAL DEPARTMENT THAT ELABORATED THE ENVIRONMENTAL DOCUMENT

Full Name	Professional Degree - Specialty
Tami, Mario Rubén	Electrical Engineer - Ms. in Environmental Impact Evaluation.
Alonso, Guillermo	Electrical Engineer.
Corvatta, Vivian	Licenciate in Geology.
Long, María Andrea	Licenciate in Biology - Dr. in Botany. Carrizo, Martín
Andrés	Licenciate in Biology.

5. ACCREDITATION DOCUMENTS

Organismo Provincial para el Desarrollo Sostenible — **ORIGINAL**

Liquidación 515093
Fecha de Emisión 22/05/2018
- / -

Arancelamiento

Gastos por Cuenta de Terceros
Gobernación I.P.M.A. Dirección Provincial de Saneamiento y control del Medio
Decreto 4677/97

Código de Barras Mesa de Entradas OPDS N° 275518

Nombre ICONO SRL
Domicilio VILLARINO Nro 53
Localidad BAHIA BLANCA
Tel. 0291-453-1352/455-
Cuit 30-66416214/4

Cód.	Descripción	Serie	Desde	Hasta	Cantidad	Unitario	Subtotal
22	INSCRIP. DE CONSULTORAS Y ORGANISMOS PRI				1	3,540.0000	3,540.0000
						Total	3,540.00

Recibí el importe correspondiente según el siguiente detalle:

la suma de pesos tres mil quinientos cuarenta

Corresponde a los siguientes periodos:

ORGANISMO PROVINCIAL PARA E.. DESARROLLO SOSTENIBLE DEPARTAMENTO TESORERIA PAGADO

Departamento de Tesoreria, La Plata 22/05/2018

Responsable por opds

Recibí conforme el detalle de la presente liquidación

Responsable por Firma

Organismo Provincial para el Desarrollo Sostenible

ORIGINAL

Liquidación 515092
Fecha de Emisión 22/05/2018

Arancelamiento

Gastos por Cuenta de Terceros
Gobernación I.P.M.A. Dirección Provincial de Saneamiento y control del Medio
Decreto 4677/97

- / -

Código de Barras Mesa de Entradas OPDS N° 275515

Nombre TAMI MARIO RUBEN
Domicilio HUMBERTO 1° Nro 560
Localidad BAHIA BLANCA

Tel. 0291-15-4637306
Cuit 27-17140110/4

Cód.	Descripción	Serie	Desde	Hasta	Cantidad	Unitario	Subtotal
2.1.	INSCRIP. DE PROFESIONAL POR AÑO -EVAL. I				1	700.0000	700.0000
						Total	**700.00**

Recibí el importe correspondiente según el siguiente detalle:

la suma de pesos setecientos

Corresponde a los siguientes períodos:

ORGANISMO PROVINCIAL PARA EL DESARROLLO SOSTENIBLE
DEPARTAMENTO TESORERIA
PAGADO

Departamento de Tesorería, La Plata 22/05/2018

Responsable por opds

Recibí conforme el detalle de la presente liquidación

Responsable por Firma

CHAPTER 02

DESCRIPTIVE MEMORY

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DESCRIPTIVE MEMORY

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CHAPTER 02

DESCRIPTIVE MEMORY

1. INTRODUCTION

The current document constitutes the updated Descriptive Memory of the Energetic Wind Power Plant 1, to be developed approximately at 26km South of the city of Tornquist, near the Paraje García del Río, Tornquist District, Buenos AIres Province, Argentine Republic.

The Energetic Wind Power Plant 1 is a private venture, property of the company Energética Argentina S.A. which will be built in the same site of the rural property indicated in the Study of Environmental Impact (EIA- 09/02/2012) and Addendum at EIA (13/06/2016).

The update of the Descriptive Memory arises as a consequence of the venture promoting company´s decision to make some modifications to the Project, mainly based on the change of the wind turbines. The machines will have similar power per unit (of 3.2 MW and 3.325 MW) and the Wind Farm will maintain the similar total power already installed (from 99.2MW to 99.75MW); consequently, there will be a reduction of one unit in the machines to be installed.

The projection of the Wind Centre has been designed through the installation of 30 wind turbines Nordex-Acciona, model AW132/3300TH120, class IEC IIB.

As it was indicated in previous environmental studies, the electric energy produced by the Wind Farm will be evacuated into the Argentine System of Electrical Interconnection (SADI) through a new Transformer Station of 132/33/13.2KV 1x110/110/40 MVA; the site will have another similar transformer in cold generation reserve. For bridging the Wind Power Plant, it will be opened the LAT of 132KV between EE.TT Bahía Blanca (500/132 KV) and ET Tornquist (132/33/13,2 KV)

The collector electricity network will be built in the level 33 KV and it will be constituted by underground cables that will directly undertake the ET (MT/AT) Each wind turbine will provide with a step-up transformer 12/33 KV of 3,400 KVA and the corresponding cells in the 33 kV level for the bonding of the collector network circuits (located at the bottom of the simple concrete tower).

Down below there is a summary chart with the general description of the Project, drawn by Energética Argentina S.A.

General Description of the Project - Energetic Wind Power Plant 1	
Electrical Energy Transportation System and its Vinculation to SADI	**1- Transformer Station (MT/AT)** Level of Tension: 132/33/13,2 KV. Total Power Installed: 1x110/110/40 MVA. Length of access way to the ET: 1,585 Km (from neighborhood street). **2- Opening of Overhead Power Line in High Voltage and bonding to ET (MT/AT)** Level of Tension: 132 KV. Place of bonding to SADI: Between pickets N°151 and N°152 of the LAT in 132 KV (existing) between EE.TT Bahía Blanca and ET Tornquist. Configuration of the LAT opening: "U". Configuration of the structures: Overhear, double ternary. Length of the installation hollow: 50 meters
Wind Farm	**3- Total Power Installed: 99.75 MW.** It will be composed of 30 wind turbines Nordex-Acciona, model AW132/3300TH120 class IEC JIB and their complementary. Complementary: ▪ 2 Poles with meteorological stations; of 48 meters and 82 meters (existing). ▪ 30 foundations for wind turbines. ▪ 30 set-up platforms for wind turbines. ▪ 18,0 Km of internal ways to be constructed and 5,0 Km of access ways to realign. ▪ 22.0 Km of underground tubes for: - Collector of Electrical Energy Network in 33 KV- - Earthing System. System of Communication Network.

2. Geographic Location

As mentioned before the Wind Energy Plant will be developed in the same Rural Site.

The property is private and covers a total area of 950 hectares. It is conformed of 3(three) portions of countryside with the following cadastral identification:

Table N° 1 Identification fo Rural Property and cadastral information.

Name of the Rural Property	Cadastral Information					
	Province	Department	District	Circ	Lot	Surface area
A) Guanaco Chico.	Buenos Aires	Tornquist	3533	III	39. F	311 hectares
B) Reyrolles.	Buenos Aires	Tornquist	45.	VIII	569.	333 hectares
C) San Bautista Sur.	Buenos Aires	Tornquist	14852.	VIII	566	306 hectares

In Figure N°1 there is a picture taken from Google Images, the geographical location of the Wind Energy Plant projected, related to the cities of Tornquist, Tres Picos and Paraje García del Río. And in Figure N° 2 , the distribution of the three rural sites.

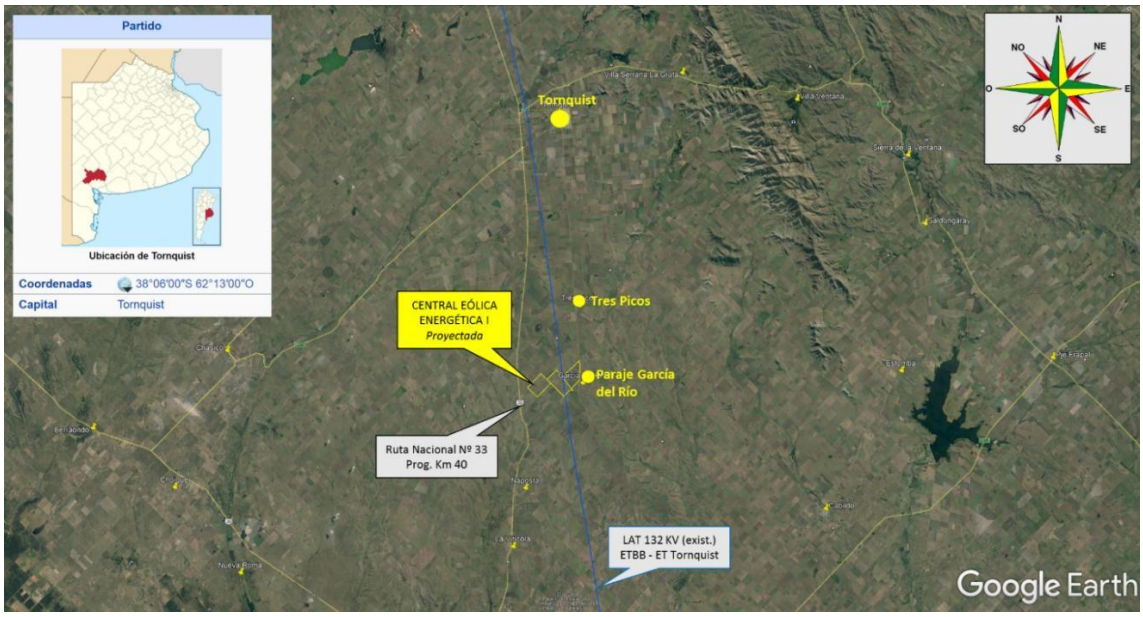


Figure N° 1 Google Image with the geographical location of the Wind Energy Centre

Figure N° 2 Google Image with the distribution of the three rural sites.

3. ACCESS ROADS TO THE PROJECT- LOGISTICS FROM ING WHITE PORT

The ways of access to the project area are the same indicated in previous environmental studies.

The rural sites (A, B and C) can be reached from the National Route N° 33 and public neighboring streets of firm land (approximate width 20 meters), which are in good condition. These are the accesses:

- The main access to the area of the Project will be from the National Route N°33 in the kilometer 40 that joins the city of Bahía Blanca with the city of Tornquist. Heading from Bahía Blanca, it is 40 km North, and then the progression indicated, approximately 4.7 Km. along a neighboring land street, in the Northeastern direction.
- From the progressing km. 47, the site can be reached as well travelling approximately 5 km. along a neighboring land street, in the Southeastern direction.
- One can reach the area of the Project, through a neighboring land road, that joins the town of Tres Picos with the Paraje García del Río.

The most important components (in relation to quantities, dimensions and weighs) are the 30 wind turbines that will be transported by sea from their country to the multipurpose quay of Engineer White Port.

The transportation of the components from Engineer White Port to the setting-up site will be done through land travel. The zone that will be affected by transportation truck circulation involves approximately 60 Km. The itinerary will be the following:

- Engineer White Port.
- 18 de Julio Avenue
- Section of the National Route N° 3
- Hundred and Fiftieth Road.
- Sections of the National Route N° 33 up the progressing Km40 (site of access to the Wind Energy Plant).

In Figure N°3 there is a Google Image of the general description of the land logistics for the transportation of the components (wind turbines) up to the mounting site.

Figure N° 3 Google Image with the land logistics up to the mounting site.

4. Node of Bridging to the National Interconnected System

It is important to highlight that the node of Bridging to the National Interconnected System by which the electric energy will be evacuated from the Wind Energy Plant is the same indicated in previous studies.

- Connecting Point: PDI 1140.

  Line in 132 KV between ET Bahía Blanca (500/132 KV) and ET Tornquist (132/33/13.2 KV).

In Figure N°4 the Geographical Single line Schematic location of the Wind Energy Plant and its connection to SADI is shown.

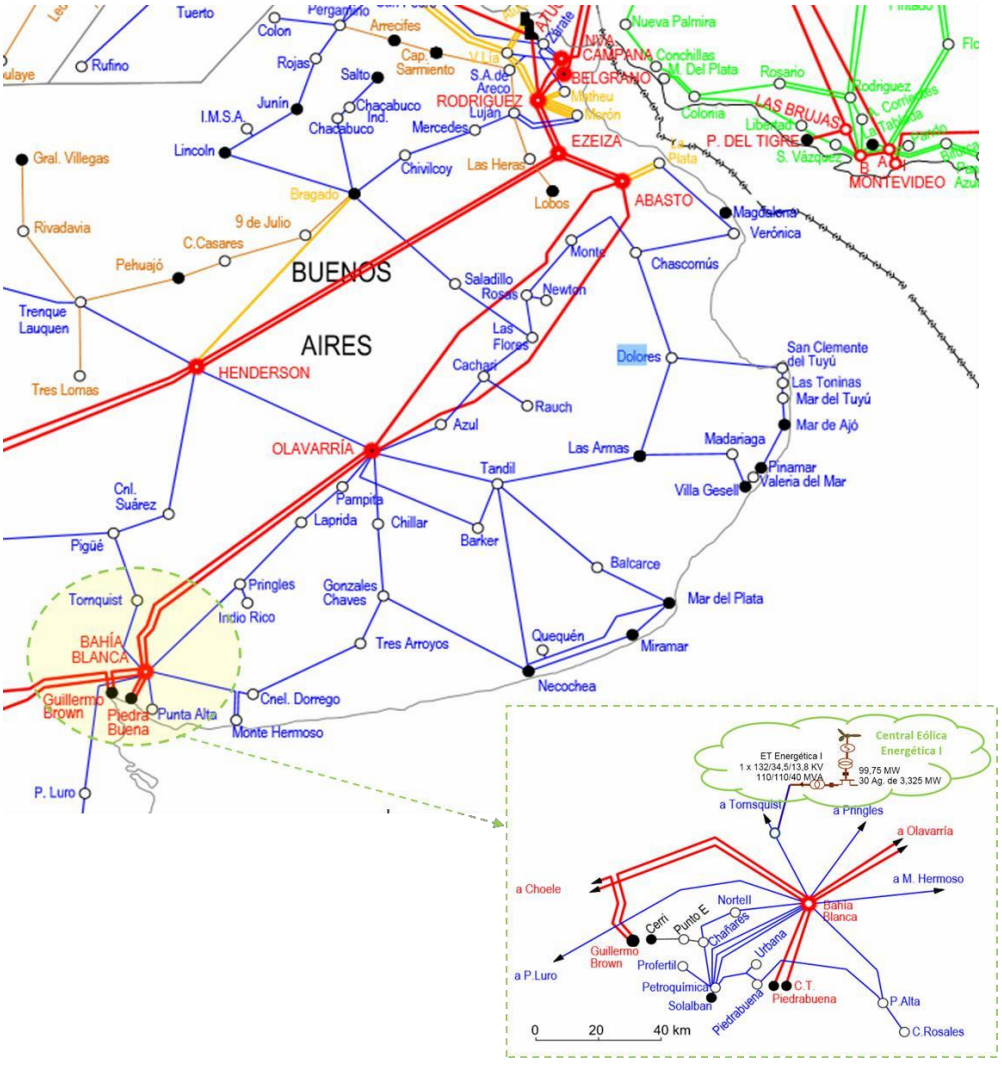


Figure N° 4 Geographical Single Line Schematic location of the Wind Energy Plant and its connection to SADI. Source: CAMMESA. With modification made by ICONO SRL

In Figure N°5 the Geographical Single line Schematic location of the Wind Energy Plant and its connection to SADI is shown.

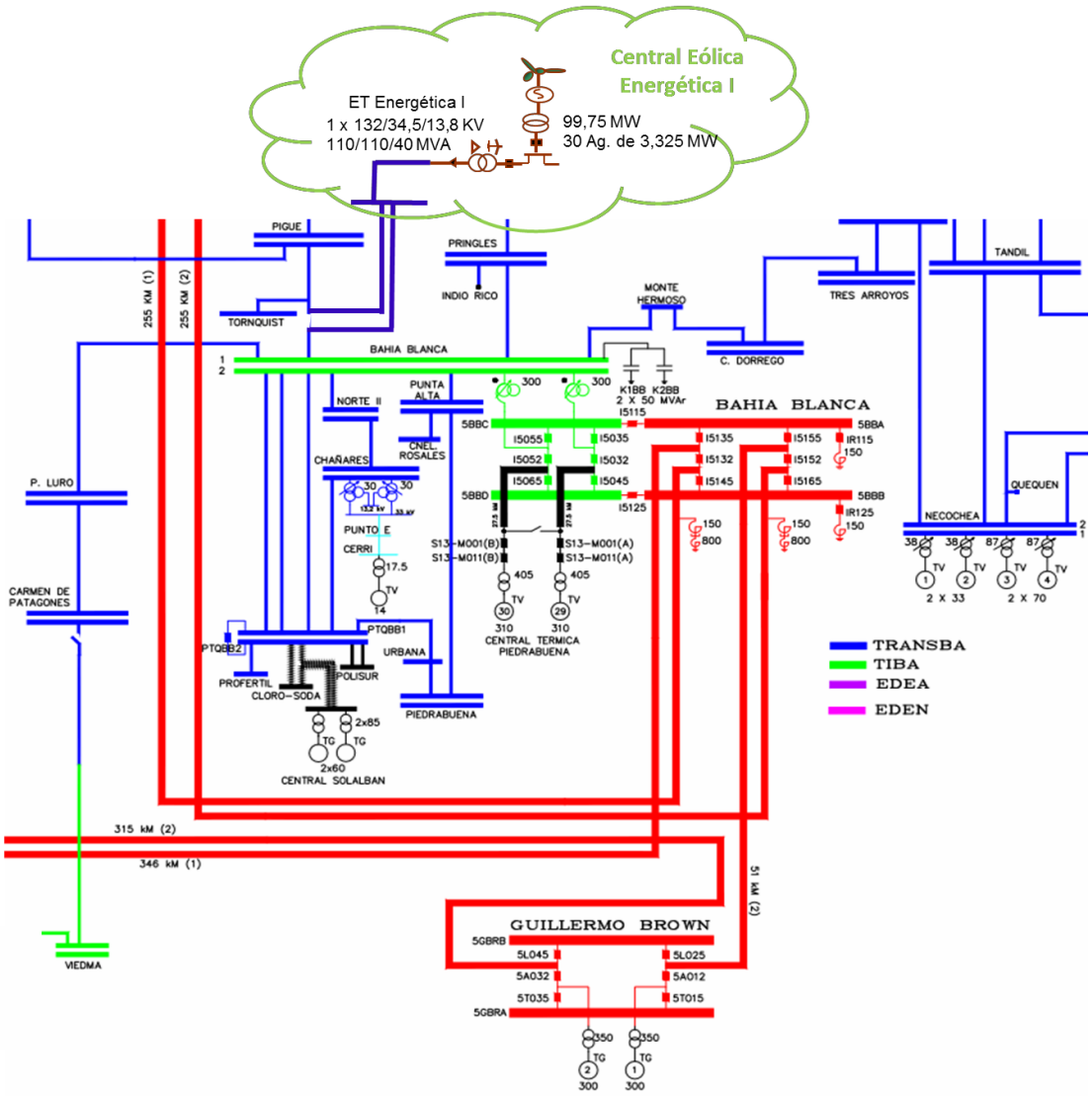


Figure N° 5 Geographical Single Line Schematic location of the Wind Energy Plant and its connection to SADI. Source: CAMMESA. With modification made by ICONO SRL

4.1. Single line Schematic of the Electric System

In Figure N° 6 it is shown the Electrical Single line Schematic simplified of the Transformer Station in Bahía Blanca of 500/132 KV 2x300 MVA , the facilities of 132 KV of the Wind Energy Plant and the cross-company limit.

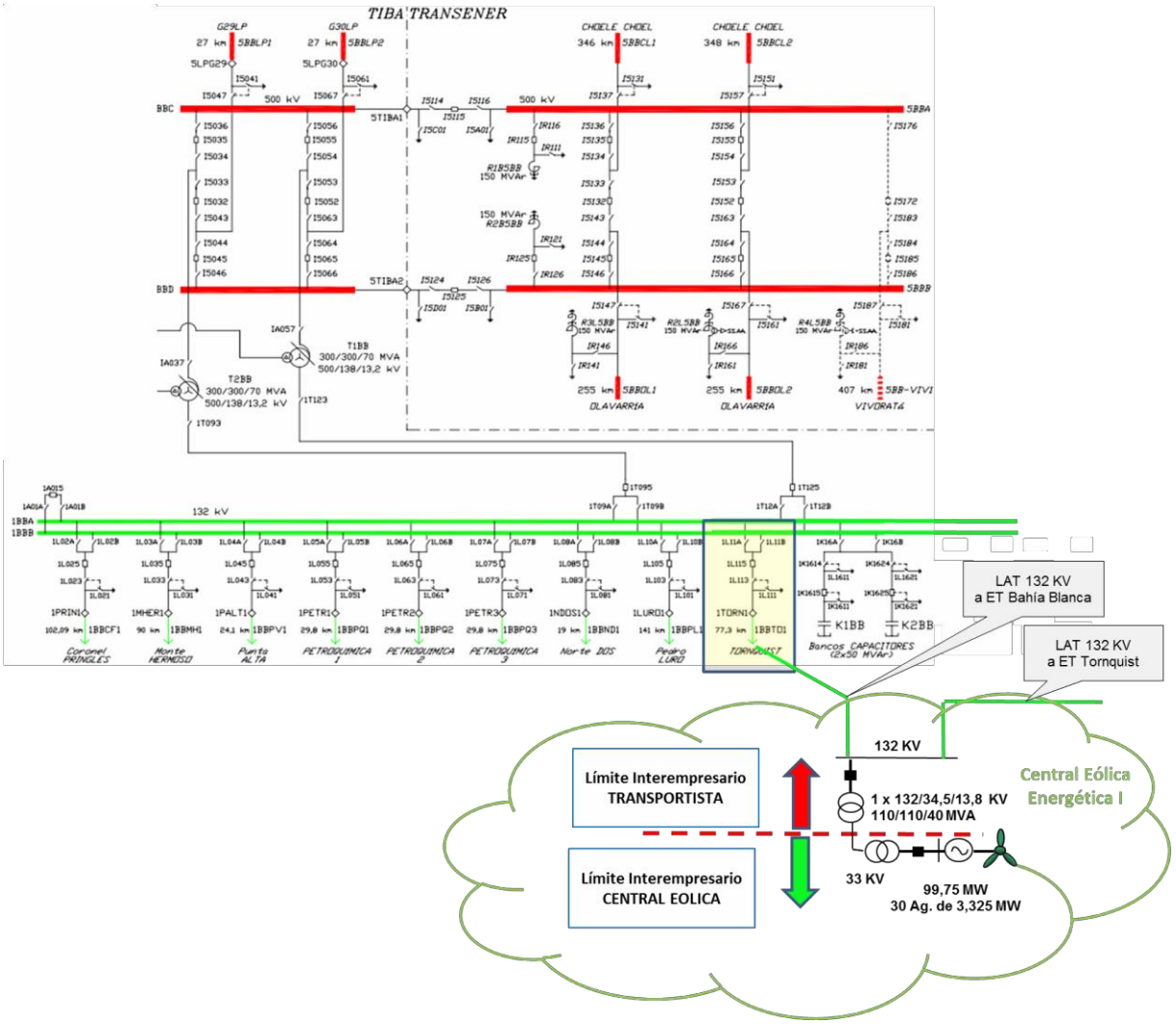


Figure N° 6 Simplified Electrical Single line Schematic of Bahía Blanca with the Wind Energy Plant and the cross-company limit (Energética Argentina S.A.- Transport)

5. Technical Description of the Project

5.1. Electric Energy Transport System

The electric energy produced by the Wind Plant will be evacuated through the Transportation System made up by the following facilities:

- Transformer Station (MT/AT)
- Opening of Overhead Power Line in High Voltage and bonding to ET .

The corresponding facilities to the Transportation System will not manifest significant modifications of the technical-building type, not even in the geographical location with respect to the Original Project.

5.1.1. Transformer Station (MT/AT)

The function of the Transformer Station (MT/AT) is that of increasing the level of tension from 33 KV, that corresponds to the internal network of connection of the Wind Plant, to the level of 132 KV.

The surface area of the site will be approximately 1.10 hectares (100m x 110 m) with the obligatory perimeter fencing. The access to the Transformer Station (for Transport Transba S.A) is anticipated to be done through a neighboring street located to the south of the Rural Property of "Reyrolles", by an internal path of the Wind Energy Plant, with an approximate extension of 1.585 Km (see Fig N°7).

In the Annex C.02.2 updated plans are presented, for the Plant and electrical installation of the Transformer Station projected.

Document Nº	Description
PEEN-EM-001-H1	General Plant.
PEEN-EE-001-H1	Single Line Schematic 132 KV.
PEEN-EE-001-H2	Single Line Schematic 33 KV. - Transba.
PEEN-EE-001-H3	Single Line Schematic 33 KV. - Wind
Energy Plant	

The design of the ET (MT/AT) will comply with the TECHNICAL SPECIFICATIONS DETERMINED FOR EXECUTION OF CIVIL WORK PROVIDED IN THE GUIDE FOR TRANSFORMER STATION DESIGN OF TRANSBA S.A. It includes mainly:

- Cleaning and preparation of the area.

- Construction of Civil Work.

  General

  Sewers.

  Perimeter Fencing

  Access Gates

  Rain drainage

  Concrete paving, for internal, principal and secondary roads.

  Boxes for the installation of power transformers with their respective flame-retardant walls.

  Foundations.

  - For the power transformers and lanes. It´s been anticipated the construction of oil containment systems, and a tank with enough capacity to store the possible oil leak of the machines of 110/110/40 MA (one in a cold generation reserve).
  - For the neuter reactor, limiting reactance and transformer of auxiliary services.
  - Light signal towers, guard cable, plant appliances and gantries. Electric

  conduits.

  Installation services (electric light, water supply, drainage system - including the building of a septic tank and cesspit. -)

  Safety signaling.

  Parking according to the characteristics of the area.

  Control facilities

  Control room.

  Cell room for 33 KV.

  Battery room.

  Restrooms.

  Office.

  Services

  Electric energy.

  Cold and hot water.

  Fire alarm. Anti-theft alarm.

Thermal control with air conditioner (hot-cold)

Telephone and signals.

Sewage.

- Electromechanical set-up - electrical connections and communication links.

Electromechanical Work in the open air.

Double bus bar in 132 KV.

Two output-field-lines in 132 KV.

One transformer field of 132 KV.

Buswork and cables.

Connections in 132 KV. Protection cable.

Earthen meshes.

Insulators of 132 KV.

Support insulators.

Two transformers of 132/34.5/13.8 KV, 110/110/40MVA (*).

One shortcut reactance for the neuter of 33 KV.

One transformer of auxiliary services 33/0.400 KV 250 KVA.

Connections in 33 KV.

Lightning, sockets and driving force.

Maneuvering platforms.

Fittings and ironworks.

(*) Note: The energy generated by the Wind Energy Plant will be evacuated by a transformer of 110 MVA; but other of equal characteristics is provided as a cold generation reserve to meet the demands in case of indisposition of the installed unit.

Electromechanical works in the inside

Five cells of 33 KV for the collector network of the Wind Energy Plant (5 collector circuits of underground aluminum cables insulated in XLPE).

One cell of 33 KV for the installation of the power transformer.

One cell of 33 KV for the installation of the extra services transformer.

One cell of 33 KV for the bank of reactive compensation capacitors.

Auxiliary services of CC and CA.

Commercial Measurement System (SMEC)

Measurement System of power quality.

Automatism DAG (incorporated to DAG COMAHUE).

Protections, control and communications for the network of 132 KV as well as for the Wind Energy Plant. In particular, the communication system and control will meet the requirements of CAMMESA and the Transportation regarding the Operating and Deliverance System -SOD (and its components SORT, SCOM, SMEC).

- Site Cleaning and final control.

In Annex C.05.1, the Affidavits are attached expressing that the equipment (power transformers 110/110/40MVA, and others) neither contain biphenyl polychlorides (PCBs), nor that they will store such products in the site.

5.1.2. Opening of LAT (132 KV) and bonding to the ET (MT/AT)

As said before the LAT (132 KV) that interconnects the ET Bahía Blanca with the ET Tornquist goes along the Rural Site "Reyrolles", in which eight structures of simple concrete are installed. The bonding with the ET (MT/AT) is anticipated to be done between pickets N° 151 and N° 152 (see Figure N° 7 and Figure N° 8).

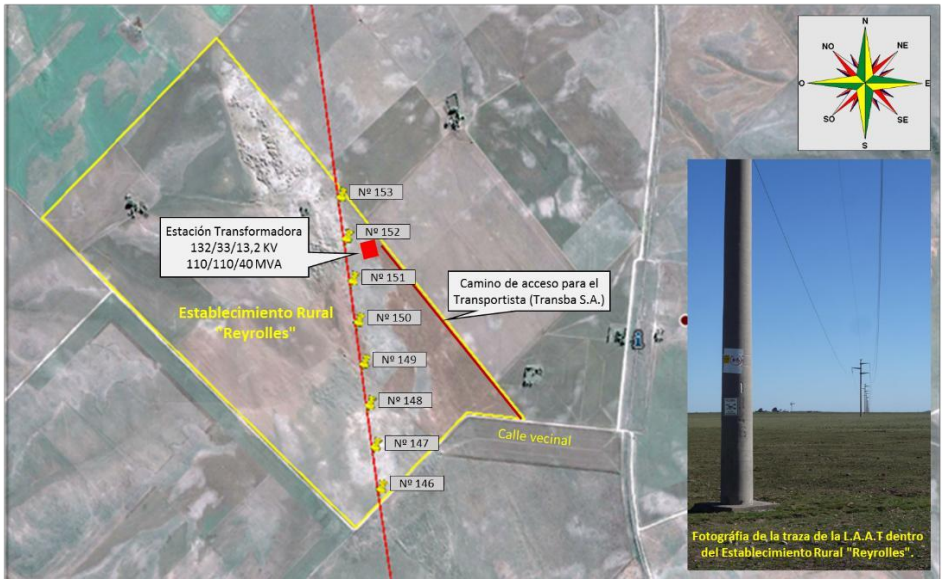


Figure N° 7 Opening of LAT Site and bonding to the ET (MT/AT)
Access way to ET for the Transportation

The aerial path between the Opening of LAT and the Installation to the Gate of the ET will be of approximately 50 meters. It will be constructed in a "U" form with double ternary bearings, with one conductor per phase and a guard cable. The bearings in the line will be poles of pre-stressed reinforced concrete and the phase conductor will be of the AI/Ac type 300/50 mm2 of the nominal section.

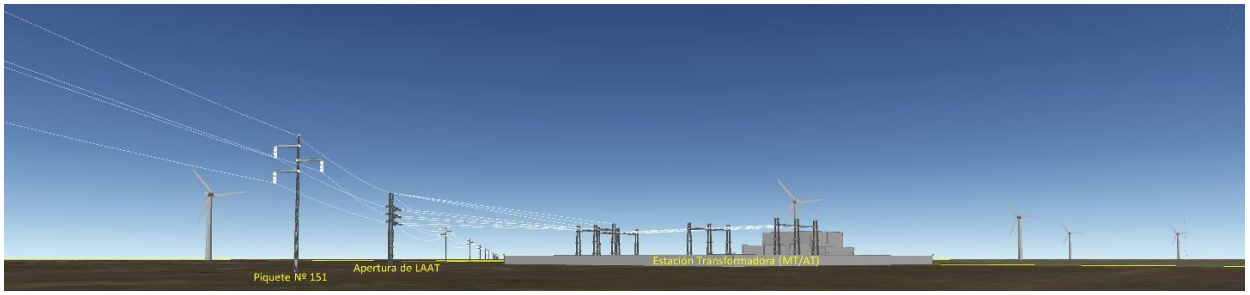


Figure N° 8 Photomontage of opening of LAAT (132 KV) and bonding to the ET (MT/AT)

5.2. Wind Farm

The update of the Project consists primarily on the change of the wind turbines for units of similar unitary power (of 3.2 MW and 3.325 MW) So, maintaining similar total power installed (from 99.2 MW to 99.75 MW), the number of wind turbines is reduced in one unit (from 31 units to 30). One important aspect is that the new wind turbines will be constructed with concrete towers.

5.2.1. Poles of Meteorological Stations

In Annex N° C.02.1 and previous environmental studies, it is specified the location of the poles and the main technical characteristics of the meteorological stations (data logger, sensors, etc.) With the new configuration of the Wind Plant the furthest wind turbine (N° 12) will be located approximately 5.2 km from the meteorological station (Tres Picos 2).

The meteorological stations provide information over eight years (installed in February and August 2010) with which it was possible to perform an analysis of the energetic production with a representative period of time.

5.2.2. Technical Specifications of the Wind Turbines

The 30 wind turbines selected for the Project are Nordex- Acciona, model AW 132/330o TH120, class IEC IIB of the type of three-blade propeller upwind rotor and they will have a nominal power of 3.325 MW.

They are regulated by a changing system of independent steps in each blade and they count with an active system of orientation. The control system enables the operation of the wind turbine to a variable speed maximizing the produced power in every moment, and minimizing the charges and the noise.

The towers will be or concrete, 118 meters long. They will be conformed by six parts united between them. Each part will be composed of united precast units, perfectly sealed with a mortar of high resistance between their upright joints. The joint between the parts is produced introducing steel bars of the superior part in the sheath of the inferior one and the subsequent sealing with mortar of high density of the horizontal joint.co

The concrete towers will be manufactured locally, in the Industrial plant in Bahía Blanca. In the following Figure N° 9 the main characteristics of the towers are shown, with images of stockpiling and the transportation of the precast units to the installation site.

Figure N° 9 Main characteristics of the concrete towers with images of the stockpiling and transportation.

The wind turbines will be a hundred and twenty meters hub (h: 120 m) and the diameter of the rotor will be of one hundred and two meters (d: 132 m); see Figure N° 10.

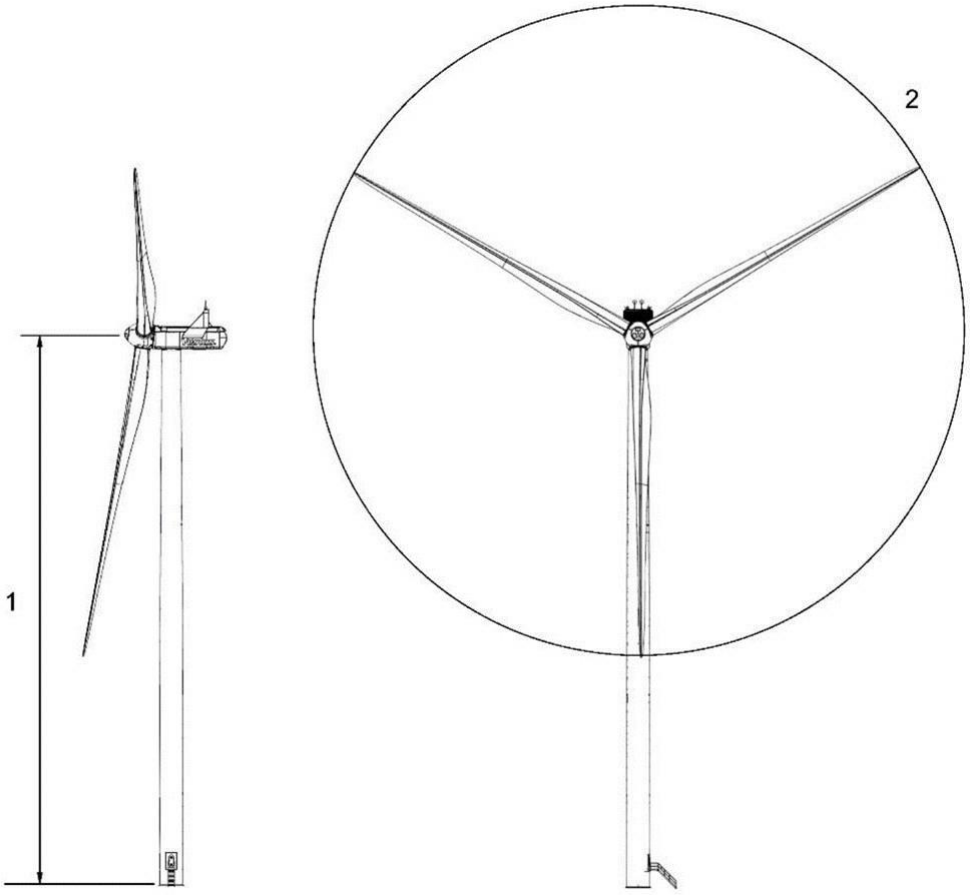


Figure N° 10 Dimensions of the wind turbine complete (1: 120m – 2: 132m).

In Figure Nº 11 the wind turbine is shown identifying the main components in the hub and in the nacelle.

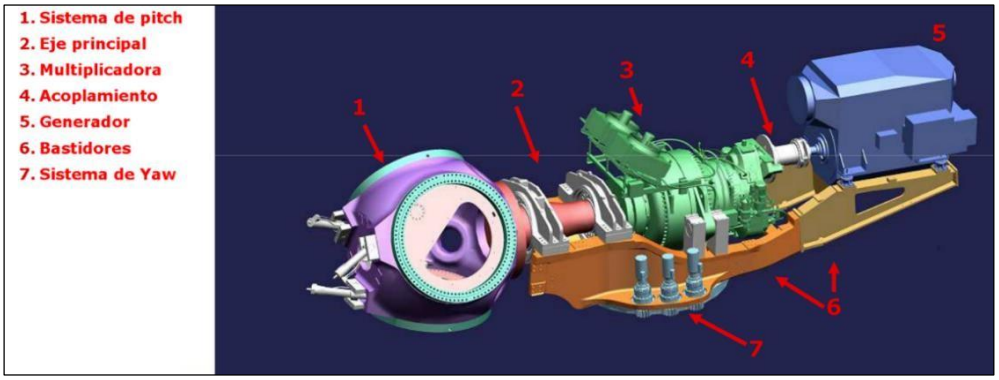


Figure N° 11 Image of the wind turbine with identification of the main component in the hub and the nacelle. Source: Energética Argentina S.A.

The wind turbine contains a multiplier box which is in charge of converting the low rpm that the rotor transmits into high rpm which are the ones that the generator needs to produce electricity. The multiplier box and all the lubrication system require approximately 1000 liters of oil.

In Annex C.02.3 these specific documents of the wind turbines are included:

- Technical specifications of the wind turbine.
- Power curve.
- Acoustic emission of the wind turbine.
- Beaconing system of the wind turbine.
- Plans Main Components disposition in the nacelle.
- General Plan of the wind turbine.

5.2.3. Distribution of wind turbines in the plant

In Annex C.02.2 the Layout with the new distribution of the wind turbines is shown. The Wind Energy Plant will be constructed in a flat site with some gentle hills; the height above sea level varies between 210 and 265 meters. The wind turbines will be disposed perpendicularly to the predominant wind direction, sufficiently separated between them in a way to reach the optimization of the wind resource development.

With reference to the update location of the turbines, in Annex C.05.1 there is a Note on permission in surroundings of neighboring roads, emitted by the Town Hall of Tornquist (September 14th, 2018)

The structure of the opening of LAT (132 KV), the Transformer Station (MT/AT) and the 30 wind energy turbines will all be distributed within the three Rural Properties in the following way:

- Rural Property "Guanaco Chico".
  Wind Turbines N°: 3, 4, 12, 13, 14, 15, 16, 17,18, 26 y 27.
- Rural Property "Reyrolles".
  Opening of LAT in 132 KV.
  Transformer Station (MT/AT)
  Wind Turbines N°: 5, 6, 7, 19, 20, 21, 22, 28, 29 y 30.

- Rural Property "San Bautista Sur" Wind Turbines

  N°: 1, 2, 8, 9, 10, 11, 23, 24 y 25.

In Table N° 2 there is an account of the new location, dimensions of the place and the maximum height (a.s.n.m.) of the 30 wind turbines.

Table N° 2 Location, dimensions of the site and maximum height of the turbines.

N° of Wind Turbine	South Latitude	West Longitud	Dimension of the site	Max height of the wind turbine	a.s.n.m. (metres)
1.	38º 20´ 35.68¨	62º 12´ 35.87¨	240	186.	426.
2.	38º 20´ 31.61¨	62º 12´ 20.22¨	250	186.	436.
3.	38º 21´ 26.05¨	62º 15´ 32.06¨	211.5.	186.	397.5.
4.	38º 21´ 26.05¨	62º 15´ 12.39¨	240	186.	426.
5.	38º 21´ 09.92¨	62º 14´ 20.73¨	225.7.	186.	411.7.
6.	38º 21´ 09.55¨	62º 14´ 04.17¨	230	186.	416.
7.	38º 21´ 08.21¨	62º 13´ 47.66¨	258.7.	186.	444.7.
8.	38º 21´ 08.32¨	62º 13´ 20.34¨	244.1.	186.	430.1.
9.	38º 20´ 53.77¨	62º 12´ 59.03¨	260	186.	446.
10	38º 21´ 02.49¨	62º 12´ 37.47¨	247.1.	186.	433.1.
11	38º 21´ 00.93¨	62º 12´ 18.87¨	240	186.	426.
12	38º 21´ 53.51¨	62º 16´ 06.09¨	214	186.	400.
13	38º 21´ 47.13¨	62º 15´ 51.73¨	220	186.	406.
14	38º 21´ 47.93¨	62º 15´ 35.28¨	235.2.	186.	421.2.
15	38º 21´ 46.59¨	62º 15´ 18.86¨	210.6.	186.	396.6.
16	38º 21´ 45.29¨	62º 15´ 02.47¨	206.5.	186.	392.5.
17	38º 21´ 43.32¨	62º 14´ 38.22¨	217	186.	403.
18	38º 21´ 27.23¨	62º 14´ 53.67¨	235.7.	186.	421.7.
19	38º 21´ 39.65¨	62º 14´ 13.66¨	240	186.	426.
20	38º 21´ 38.31¨	62º 13´ 57.02¨	240	186.	426.
21	38º 21´ 36.90¨	62º 13´ 39.61¨	255.5.	186.	441.5.
22	38º 21´ 35.31¨	62º 13´ 20.01¨	253.9.	186.	439.9.
23	38º 21´ 33.86¨	62º 13´ 02.06¨	250	186.	436.
24	38º 21´ 32.45¨	62º 12´ 44.73¨	250	186.	436.
25	38º 21´ 30.84¨	62º 12´ 27.65¨	247	186.	433.
26	38º 22´ 15.33¨	62º 15´ 37.81¨	220	186.	406.
27	38º 22´ 07.20¨	62º 15´ 08.75¨	210	186.	396.
28	38º 22´ 06.19¨	62º 13´ 38.89¨	250	186.	436.
29	38º 22´ 04.09¨	62º 13´ 15.05¨	250	186.	436.
30	38º 21´ 55.80¨	62º 12´ 58.28¨	255.9.	186.	441.9.

Geographic coordinates System of horizontal reference, WGS-84
Elevation: System of upright reference, Above sea level MSL

Source: Energética Argentina S.A.

5.2.4. Wind resource and energetic production

In Annex C.02.1, there is an updated document with the results of the measurement campaign and the estimated energetic production. It includes mainly:

- Measurement of wind resource Campaign.
- Evaluation of the wind resource.
- Evaluation of the energetic production.

5.2.5. Civil works and Infrastructure Facilities

Civil works and infrastructure facilities necessary for the materialization of the Wind Energy Park are:

- Roads and access routes.
- Mounting Platforms for the wind turbines.
- Foundations for the wind turbines.
- Collector Network (electric network, earthing system and communication links).

– **Roads and access routes.**

As indicated to EIA in the Addendum, the neighboring street corresponding to the Progressive km 40 of the National Route N° 33 will be the main access to the Project area; it is well preserved with firm land. It is approximately 20 meters' width, between wirings. A readjustment of approximately 5 km. is anticipated.

The adjustment will be re-compacted and outlined to receive the structural packet that ensures the bearing capacity and the geographical characteristics demanded by the provider and the assembly team.

The new configuration of the internal roads (between the wind turbines) will be an estimate 18.0Km long; 6,0 meters is the minimum width in order to permit the circulation of the main crane between them, without dismounting it. For its construction they must follow the guidelines indicated by the turbine manufacturer (see Annex N° C.02.2, "Document "Profile of internal roads").

- **Mounting Platforms**

In the wind turbine mounting platforms there will be distinguished the operative zones on one side and on the other the zones defined as stockpiling ones.

In the crane operative zones, the most important thing is to get the correct support for the main crane. Gravel will be used in case the area assigned to the platform were not able to balance the land profile to get the maxim slopes required.

Several turbine components will be located in the stockpiling zones to be raised by the cranes (main and auxiliary ones) from the platform.

The dimensions of the crane operative zone and the stockpiling zone of components for each turbine will be of approximately 3,680 m (including the foundation area); which shows a total surface area of approximately 11.0 hectares for the 30 machines.

For its construction they must follow the guidelines indicated by the turbine manufacturer (see Annex N° C.02.2, "Document "Mounting Platforms AW 132 TH 120").

- **Foundations for the wind turbines.**

The most important civil works for the Wind Energy Park correspond to the foundations of the turbines, whose concrete volume will be of 436 m3 for each foundation. This shows a total volume of approximately 13.080 m3 of structural concrete for the 30 machines. Although the dimensions are not major ones in relation to the area occupied by the park, the soil is a key element that will be much affected because of the significant movement of earth needed.

According to the supplier´s specifications they contain approximately 33.2 tons of steel (per unit), which shows a total amount of 996 tons of steel.

Quantities will be adjusted when the calculation report is done according to requirements of soil studies and current applicable regulations.

Geometrical characteristics of the foundations:

- Base diameter: 18,80m.
- Shaft diameter: 8,16m.

- Total height of the base: 2,25m.
- Heel height: 0,50m.

Typical Plan of turbine bases with conductor stockpiling, Figure N° 12.

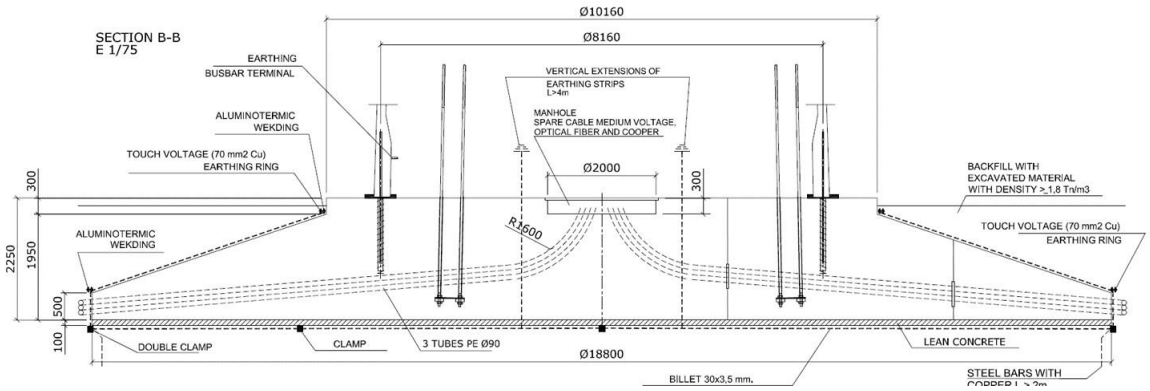


Figure N° 12 Typical Plan of wind turbine foundation.

For its construction they must follow the guidelines indicated by the turbine manufacturer (see Annex N° C.02.2, "Document "Foundations. Foundation type AW3000 TH120")

– **Collector Network (electric network, earthing system and communication links).**

The power generator is a three-phase asynchronous double-fed type, with reeling rotor and slip ring excitation. It contains 3 pairs of poles and a synchronous speed of 1000 rpm (50Hz) Turning speed of the rotor is variable and it adapts to wind speed. This is possible adapting rotor excitation to the angular speed of the rotor, so the power generates constant tension and frequency.

The generator is supported by a rear frame with four damper elements (Silent-Blocks), whose function is that of reducing the vibration extent and the noise.

The wind turbines will be connected to the collector network of the Wind Park at 33 KV level. For this it is necessary to include in each machine, a 12/33 KV -3400 KVA power transformer and protection cells and maneuver in half tension (33 KV). The power transformer will be that of the type submerged under biodegradable liquid, as a dielectric medium.

In Figure Nº 13 there is a scheme to connect the power generator to the network. And in Figure N° 14, the configuration of the components in the base of the wind turbine.

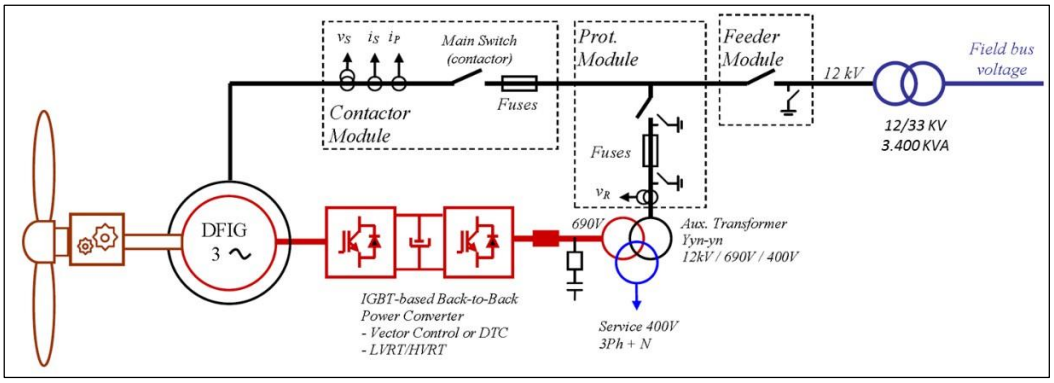


Figure Nº 13. Scheme to connect the generator to the network.

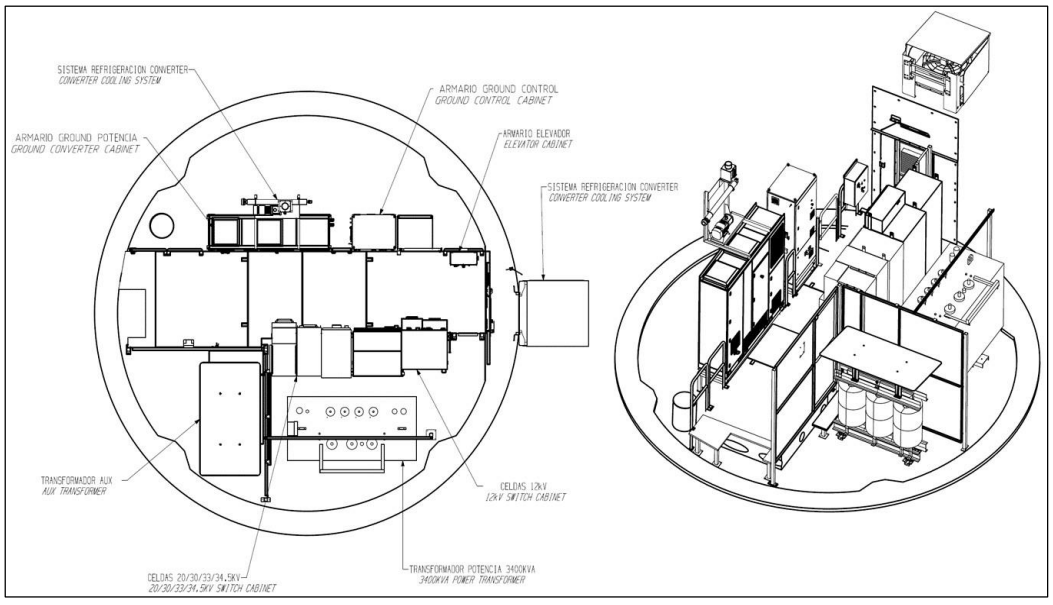


Figure N° 14 Configuration of the components in the base of the wind turbine.

Source: Energética Argentina S.A.

Accordingly, each generator contains an individual substation which includes:

- A 12/33 KV set-up transformer of 3.400 KVA nominal power.
- A set of 33 KV bars (see Figure N° 15) with transformer input cell and output cells to the collector network. The output to the collector network depend on the cell position in the wind farm (end of line, intermediate wind turbine, others).

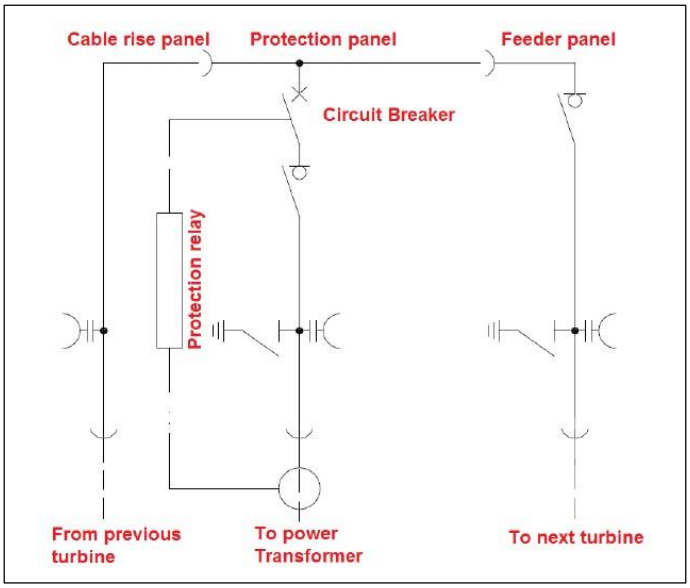


Figure Nº 15. Typical set-up of the cells in 33 KV.

The electric network of the Wind Energy Park will be underground type; it is in charge of collecting the energy produced by each wind turbine in the 33 KV level and take it to the Transformer Station (MT/AT), where it will be set up to a 132 KV level and delivered to the SADI. It will count with the corresponding systems of Control, Remote control, Measurement and Communication, etc., located in the building of the Operative Centre and Control of the Wind Energy Centre (see Figure N°16)

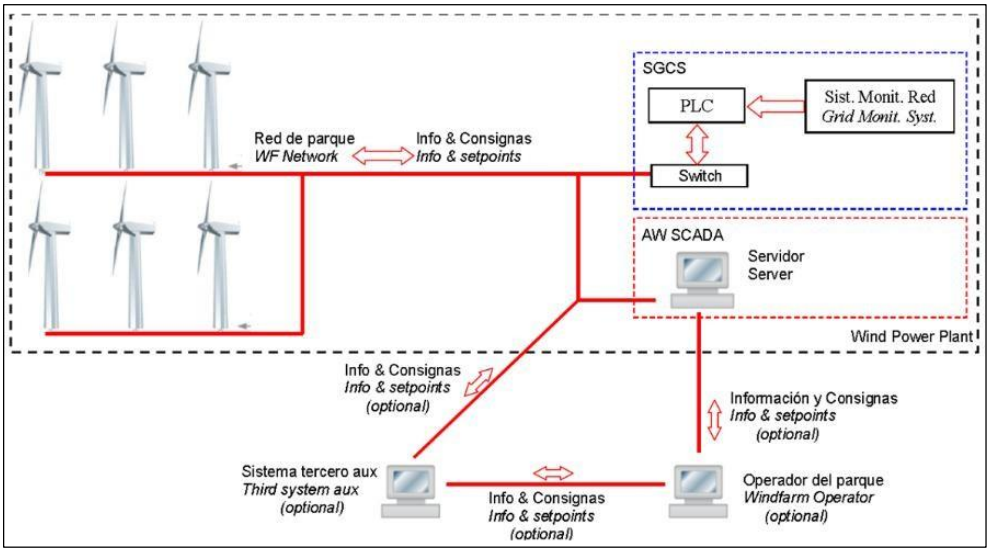


Figure N° 16 General Control System of the Wind Energy Plant.

Source: Energética Argentina S.A.

It is anticipated the installation of five (5) collector circuits implemented through underground aluminum single-pole wires type XLPE in 33 KV (with nominal sections between the parts of: 120 mm^2, 150 mm^2, 185 mm^2, 240 mm^2, 300 mm^2, 400 mm^2, 500 mm^2 and 630 mm^2), independently related to the Transformer Station (MT/AT). The circuits will be conformed in the following way:

- 1 circuit of 5 wind turbines.
  5 units x 3.325 MW = 16.625 MW.
- 3 circuits of 6 wind turbines.
  6 units x 3.325 MW = 19.95 MW.
- 1 circuit of 7 wind turbines.
  7 units x 3.325 MW = 23.275 MW.
- Total Power: 1 x 16,625 MW + 3 x 19,95 MW + 1 x 23,275 MW = 99,75 MW.

The underground ducts cover a total of 22.0 Km long. The conductors will be installed in trenches of approximately 1.10 meters depth and a sufficient width to enable the adequate laying according to the typical underground mounting schemes of the collector network.

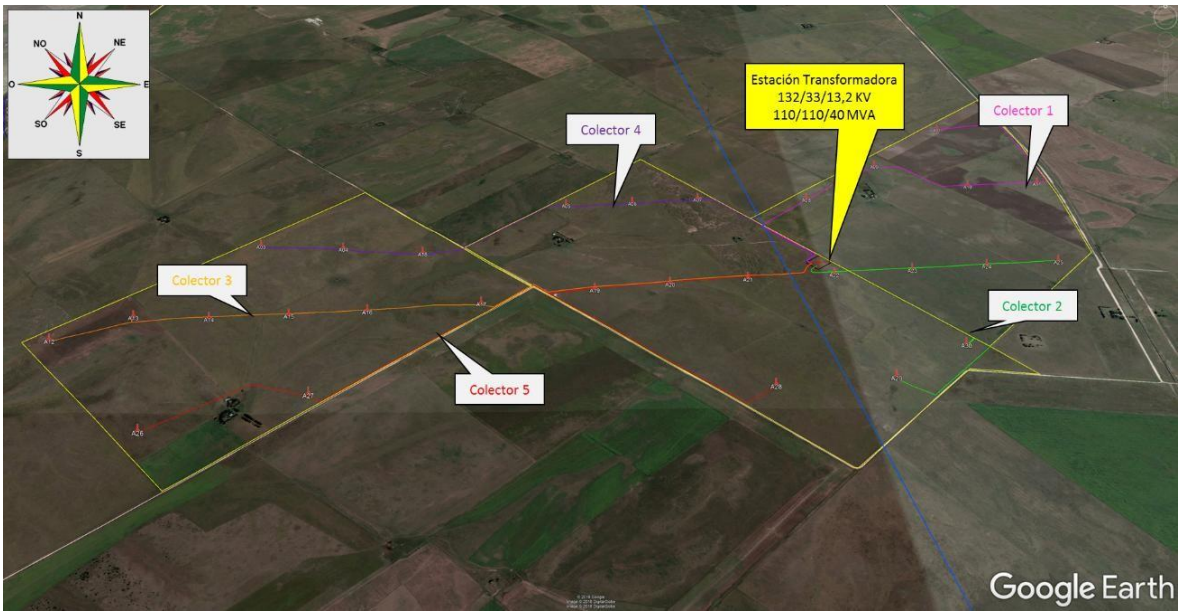


Figure N° 17 Google Image with the collector circuits implemented with underground wiring.

In Annex C.02.2, there is a single line diagram of the collector system in 33 KV and the detail of trenches and medium power typical ducts.

On the same sandy mantle and at the same level of the power wiring, also the earthing cable will be installed in bare copper wire of 50 mm2, which will be bounded to the earthing system of each wind turbine and to the Transformer Station; and the optic fiber cables for the communication and control of the wind turbines.

On the sand filling there will be installed a mechanical protection (bricks, plastic plates, others). Then, the filling is completed and the rest of the trench is compressed with 30 centimeter depth of the signaling tape, warning about the presence of electrical wiring. Finally, endurance and insulation tests take place, along with continuity and sequence of phases, as well as dielectric rigidity.

6. Overview table of the Project

Summary Chart with technical data of the Project.

Overview of the Wind Energy Park.	
Affected countryside - total surface.	Three (3) portions of countryside -950 hectares.
Poles of Meteorological Stations	Two (2) 48m and 82m poles. Installed on February 9th and August 24th, 2012.
Total Power Installed:	99.75 MW.
Quantity of wind power turbines	30 units
Net energy production.	436.905 MW-h/Year.
Capacity Factor.	50,0%.
Internal Electricity Network of the P.E and connection to ET - Transformation level of each wind energy turbine - Tension level of the service network. - Configuration. - Line type. - Transformers MT. Type. Nominal Frequency. Connection Group. Quantity Location. - Number of cells in MT (33 KV). Location. - Number of circuits. Configuration of circuits	12 KV a 33 KV. 33 KV. Radial. Undergroun d. Relation: 12/33 KV. Nominal Power: 3.400 KVA. Three-faced, submerged in biodegradable liquid. 50 Hz. Dyn11 30 units In the bottom part of the tower (concrete) 30 units with transformer inlet and output/s to the network. In the bottom part of the tower (concrete) 5(five) circuits in all. - 1 circuit of 5 wind turbines. 5 units x 3.325 MW = 16.625 MW. - 3 circuits of 6 wind turbines. 6 units x 3.325 MW = 19.95 MW. - 1 circuit of 7 wind turbines. 7 units x 3.325 MW = 23.275 MW. - Total Power: 99.75
Approximate length of access road (to readapt). Approximate length of internal roads (to construct).	5.0 Km. 18,0 Km, of 6,0 meters useful width
Foundation Platforms (including the foundation of the wind turbine). - Approximate Individual Surface. - Approximate Total Surface.	3.680 m^2. 110.400 m^2 (11,0 hectares).

Technical Specifications of the Wind	
Trademark- Model	Nordex-Acciona -AW132/3300 TH120, class IEC IIB.
Wind Turbine Power.	3.325 MW.
Hub Height	120 meters
Lowest Speed Limit of Operation.	3,0 m/sec
Highest Speed Limit of Operation.	25 m/sec
Power Generator. Type. Nominal Power: Nominal Frequency. Speed System. Nominal Power. Power Factor. Protection System.	 Asynchronous, 6 poles, double-fed. 3,390 KW. 50 Hz. 680 -1,365 rpm 12,000 V. 0.93. PDI 54.
Gearbox.	It is composed of 3 combined stages, two planetary and a parallel one.
Pitch system.	It enables to vary the holding torque of each blade, when turning in its longitudinal axis. The system has two objectives: – Regulate the power generated by high winds. – Aerodynamic Brake in case of controlled or emergency shutdown.
Tower. Type. Length. Tower Access. Superficial treatment - Color.	 Tubular, of concrete (six sections). 118 meters Gate, with lock. Painted - RAL 7035 (light grey).
Nacelle. Approximate dimensions. Material / liquid containment. Color.	 4,089 (width) x 4,270 (height) x 15,973 (long) meters. The cover protection of the nacelle will be of glass-fiber reinforced polyester. The bottom part has the form of a bath tub, so any liquid substance that is spilt in the interior, will pass to a retention system. RAL 7035 (light grey).
Rotor Number of blades. Diameter. Rotation speed of operation.	 3 units 132 meters Variable. 7.0 ...../14.0 rpm 13.720 m^2.

Hub Material / protection	 Cast iron /Epoxy. The nose cone protects the hub from adverse weather conditions. It´s manufactured with glass-fiber reinforced polyester.
Blades Material. Length. Approx. weight Color.	 Glass-fiber reinforced polyester, with a soft outer plate to protect the materials from UV radiation. 64.7 meters 16,400 tones+/- 3% (unit). RAL 7035 (light grey).
Foundations. Main Characteristics. - Volume of concrete (per unit) - Volume of concrete (total) - Quantity of steal (per unit) - Quantity of steal (total)	 Round-section pads of 18.8 meters of diameter. The preparatory level suggested by soil studies will be 2.250 meters under the natural level of the ground. The bottom part will have a cylindrical section, then tapered to finish in a cylindrical pedestal of approximately 8.16 meters diameter over which the turbine tower base will be anchored. 436 m^3. 13.080 m^3. 33,2 tones. 996 tones.
Noise level.	108,5 dB(A).
Service life (indicated by manufacturers).	20 years.

7. Preparatory Stage of the site and construction

7.1. Workroom

So stated in the Original Project there will be a workroom which will be located in the same building. That is to say, in the access way to the Rural Property of "Reyrolles" (see Figure N° 18), in the geographical coordinates: 38°21'41.09" South, 62°14'22.50" West.

At present the site already counts with electric energy coming from an air Transformer Station 13,2/0,4-0,231 KV of 63 KVA; in case or need it is anticipated the installation of an additional generating set catered by diesel fuel. Besides, the site has one drilling and a submersible pump for water withdrawal.

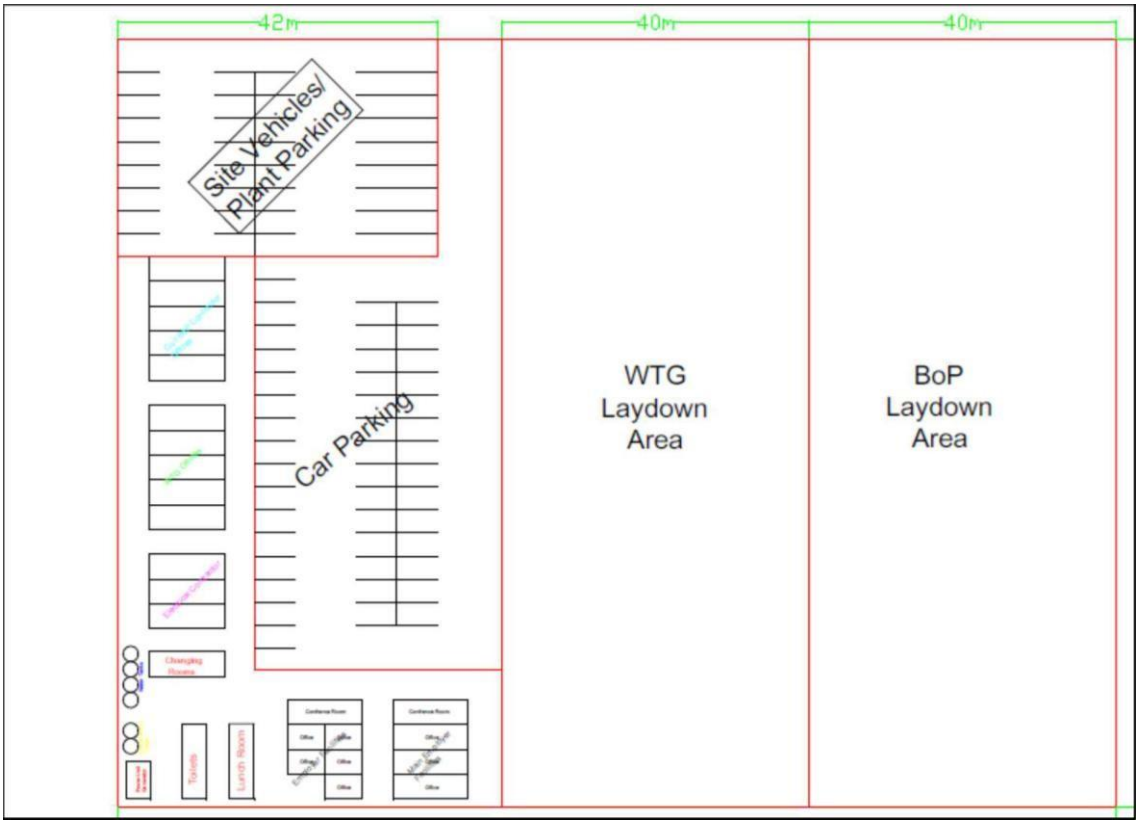


Figure N° 18 Google Image with the location of the general workroom and prep Layout.

Source: Energética Argentina S.A.

The workroom will have a total surface of approximately 1.10 hectares and will provide the following areas:

- A guard´s hut.
- Trailer for office Energética Argentina S.A.
- Trailer for office Civil Work Contractor.
- Trailer for office Electromechanical Work Contractor.
- Trailer for office Founding Work Contractor.
- Trailer for infirmary and first aids.
- Restrooms (chemical toilets) and changing room.
- Distribution and storage of water.
- Infirmary.
- Laboratory.
- Canteen.
- Warehouses, storehouses and lockers.
- Specific storehouse for dangerous and/or chemical substances, and others.
- Open stockpiling Zone.
- Waste Management Area
- Decanting pool, to wash the elements that have been in contact with the concrete.
- Parking space for vehicles.
- Perimeter fencing, safety fencing, work safety posters and signals, others.

7.2. Services

So said by Energética Argentina S.A., the Contractor will dispose of the following services in the work:

- Surveillance.
- Employee transport.
- Catering.
- Infirmary and first aids.

7.3. Machinery and equipment required for the construction

The machinery and equipment required for the construction site will be similar to those indicated in previous environmental studies. According to the promoter of the Project they will need:

Heavy equipment /transport:

- Caterpillars or crawler excavators.
- Bulldozer.
- Articulated off-road dump truck
- Packer roller.
- Motor grader.
- Trencher.
- Backhoe loader.
- Loader.
- Bobcat.
- Main and secondary cranes.
- Transport trucks.
- Dump truck.
- Hydro crane truck.
- Tanker.
- Mixer truck.
- Concrete pump truck.
- Employee transport.
- Auxiliary pickups.

Light equipment and/or tools:

- Diesel fuel or gasoline generators
- Compressor.
- Lightning Tower.
- Extraction pumps.
- Gasoline and electrical vibrator.

- Gasoline and electrical concrete mixers.
- Concrete pump.
- Vibratory plates.
- Welding equipment.
- Electric welder.
- Angle grinder.
- Electric circular saw.
- Electrical tables and extensions.
- Ceramic cutting machine.
- Vibratory Rule.
- Electric or jackhammer.
- Ladders.
- Hand tools.
- Slings and hoisting elements.
- Wiring and tightening wire machines.
- Multiple tools.

Observation: So said by Energética Argentina S.A. there is no anticipation of installing a concrete plant in the Wind Energy Center site. The concrete elaborated will be bought to third parties and transported to the site through mixer trucks of 6/8 m3 of capacity.

7.4. Staff involved in the Project

The staff required for different works will be approximately 172 people, employed directly, with different professional knowledge and skills needed for these types of activities.

In this respect it is important to emphasize that Nordex-Acciona, providers of the wind turbines, has anticipated the installation of a Plant for manufacturing concrete towers, in the industrial area of the city of Bahía Blanca. This will benefit the providers of products and services already in the area, as well as the hiring of local manpower.

8. Operative Stage and Maintenance

8.1. Electric Energy Transport System

The operation and maintenance of the Transport System will be under the charge of the Network Transport and the Operator in the Wind Energy Centre according to the boundary limits already established. Particular conditions of operation will be set up in due course, prior to the entering of the energetic venture service.

8.2. Wind Farm

The operation will meet the requirements established by CAMMESA for the deliverance of Centers, and the proper characteristics of the operation in the Wind Energy Park, classified as type A according to a Study of Access for Transport Capacity. The study was performed by Energética Argentina S.A. in total agreement with Annex 40 of the Procedures by CAMMESA.

For the operation the Wind Energy Center will dispose of a Control Center which will meet all the requirements specified in Annexes 24 and 25 of the Procedures by CAMMESA, so it will provide a System of Operation in real time or SOTR and System of Communication or SCOM, in answer to the requirements of the operation in real time by SADI.

According to the data informed by the wind turbine manufacturer, there will be seven (different) types of maintenance in each wind energy unit with the following regularity: a) every six months; b) annual; c) biennial; d) triennial; e) every four years; f) every five years and g) every ten years.

8.2.1. Staff involved in the Project (O&M)

During the operation and maintenance stage of the Wind Energy Park, it is anticipated the direct contracting of 10 people.

9. Work Schedule

In Annex C.002.4, the Work Schedule is provided for the work development and other activities associated to the preparation stage and construction.

10. Estimated total funding cost

The estimated total cost of the work will be of U$S 119.000.000 (VAT not included)

Bridging the Energetic Wind Center to the SADI: It includes supply and mounting of: - Transformer Station (MT/AT) - Opening of Aerial Power Line in 132 KV and bond to ET.	US$ 17.500.000 (VAT not included)
Supply and mounting of: - 30 wind energy turbines (complete). - Roads, platforms, foundations and drainage works. - Underground Collector Network in 33 KV, earthing system and communication links.	US$ 101.500.000 (VAT not included)

11. Annex C.02

C.2.1 Study of Evaluation Tool for the Wind Resource and Power Generation

C.2.2 Building Plans

C.2.3 Technical Specifications of the Wind Turbines

C.2.4 Schedule of the Planned Preparations for Project Development

Annex C.02.1

Study of Evaluation Tool for the Wind Resource and Power Generation

Study of Evaluation Tool for the Wind Resource and Power Generation

Index

Study of Evaluation Tool for the Wind Resource and Power Generation

1. INTRODUCTION

The present document provides a brief evaluation of the wind resource and the estimation of the energetic production of the Wind Energy Center 1, targeted to obtain results on the application in the Addendum N° 2 to the Environmental Impact Study of the Project.

2. Evaluation of the wind resource.

2.1. Characteristics of the Poles and Meteorological Stations.

The energetic venture provides two pole with their correspondent meteorological stations. The location of these devices is shown in the following figure (see sites with Tres Picos 1 and 2)

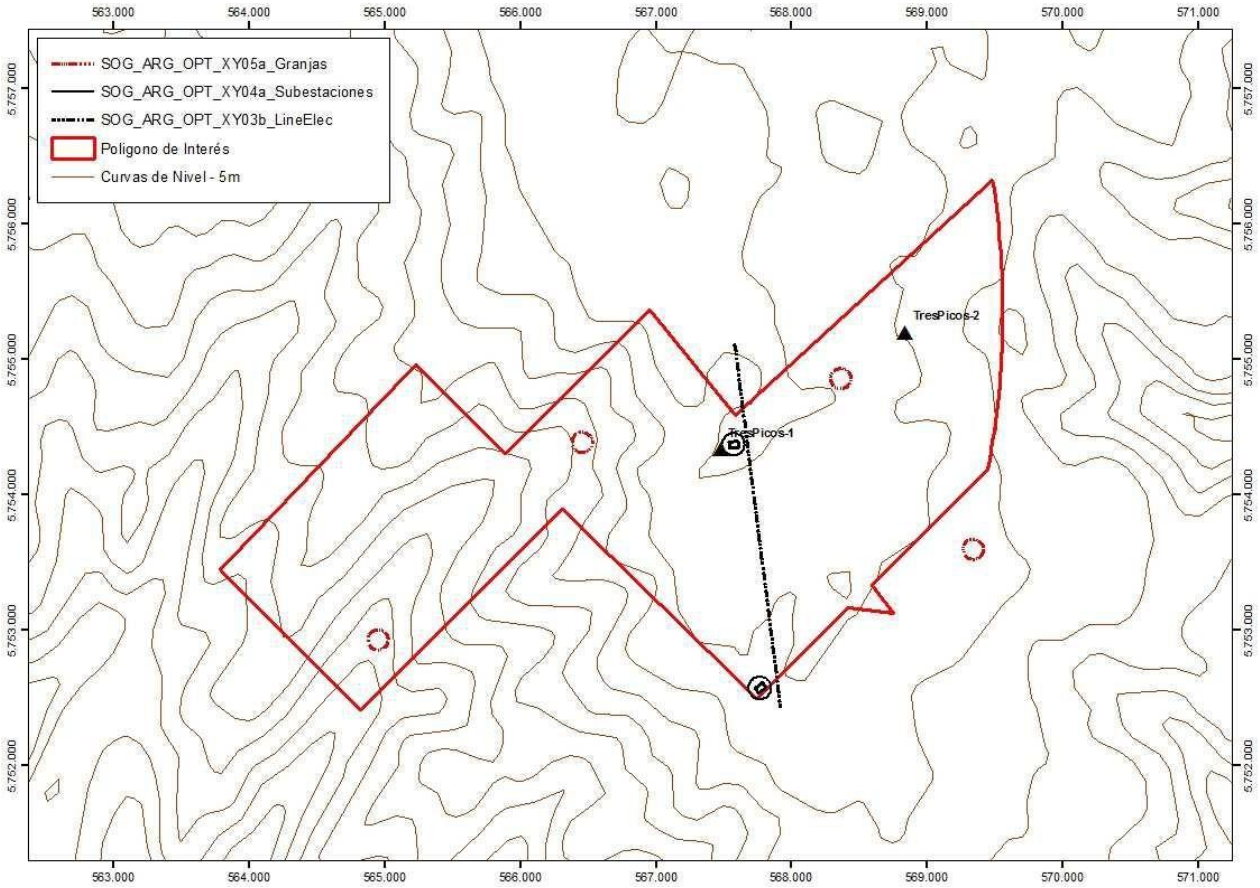


Figure N° 1 Image with the location of two poles and meteorological stations.

Source: EIA Original, Icono srl (09/02/2012).

2.2. Measurement of wind resource Campaign.

The Project provides a data report over eight years of "in situ" measurements, which represents a very significant period to cover the analysis of energetic production of the Wind Energy Center. Down below the characteristic data of the poles and sensors installed in the site are shown.

- Pole N° 1, called "Tres Picos 1": It is located in the coordinates Lat: - 38.356567°, Long: -62.227633°; size 48m and its approximate elevation is of 263 meters above sea level. There are data reports since 09/02/2010.

  There is a wind speed at two levels (48 m and 30 m), the direction at one level (46.5 m) and the pressure and temperature at 2.5 m.
- Pole N° 2, called "Tres Picos 2": It is located in the coordinates Lat: 38.3487°, Long: -62.212133°; size 82m and its approximate elevation is of 244 meters above sea level. There are data reports since 24/08/2010.

  There is a wind speed at five levels (82 m. 80 m. 60 m, 48 m and 40m), the direction at three levels (80m, 58.5 m and 38.5 m) and temperature at 7.0 m.

Figure N° 2 Photographs of the two poles and equipment installed in the site.

Source: Own.

2.3. Characteristics of the wind resource.

Through continuous report of the meteorological variables "in situ" and its subsequent processing, the following results were registered in respect to the prevailing direction of the wind, its frequency, energy and speed distribution at the top of pole N° 2 (see Figure N° 3)

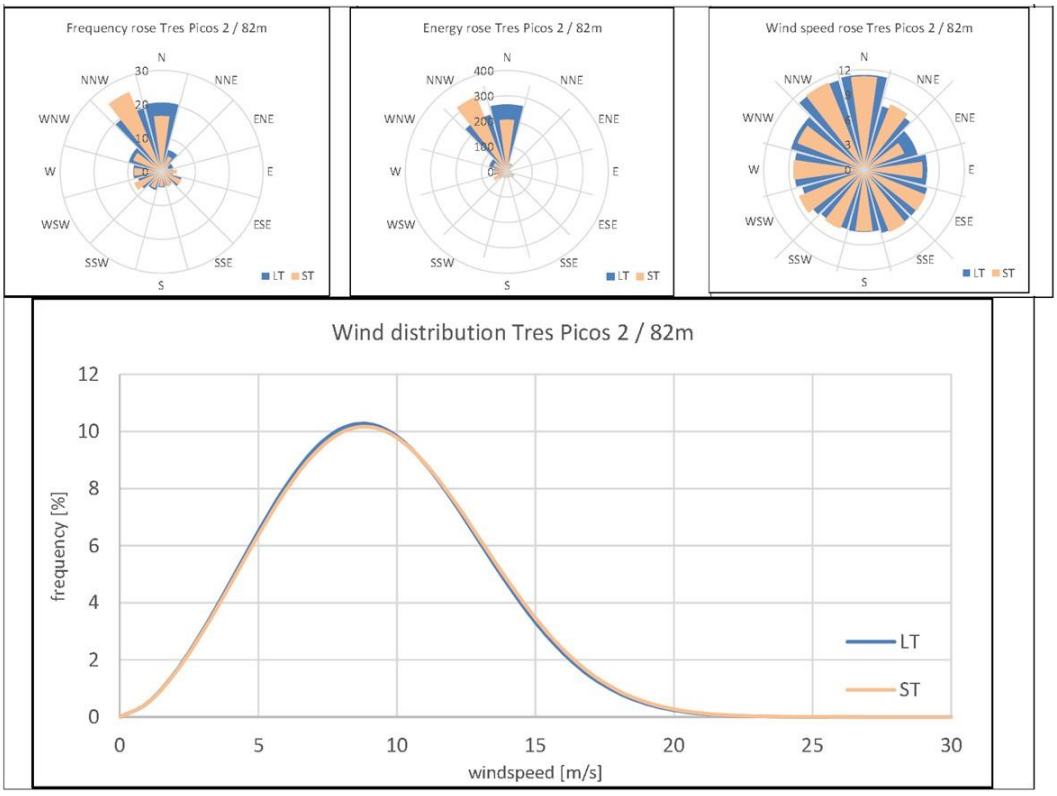


Figure N° 3 Compass cards (frequency, energy, speed) and distribution of frequencies.

Source: Energética Argentina S.A.

3. Evaluation of the energetic production.

From the point of view strictly energetic the production of electric energy from the wind only produces positive environmental impact. The objective followed in this report is to prepare an estimation of the electric generation of the Wind Energy Park in order to evaluate the environmental aspects, leaving behind the thorough determination of energy production.

In Figure N° 4 there is a Layout of the Wind Energy Center with the location of the pole and the wind energy turbines, with the new configuration of the Wind Energy Park. With the new configuration of the Wind Plant the furthest wind turbine (N° 12) will be located approximately 5.2 km from the meteorological station (Tres Picos 2).

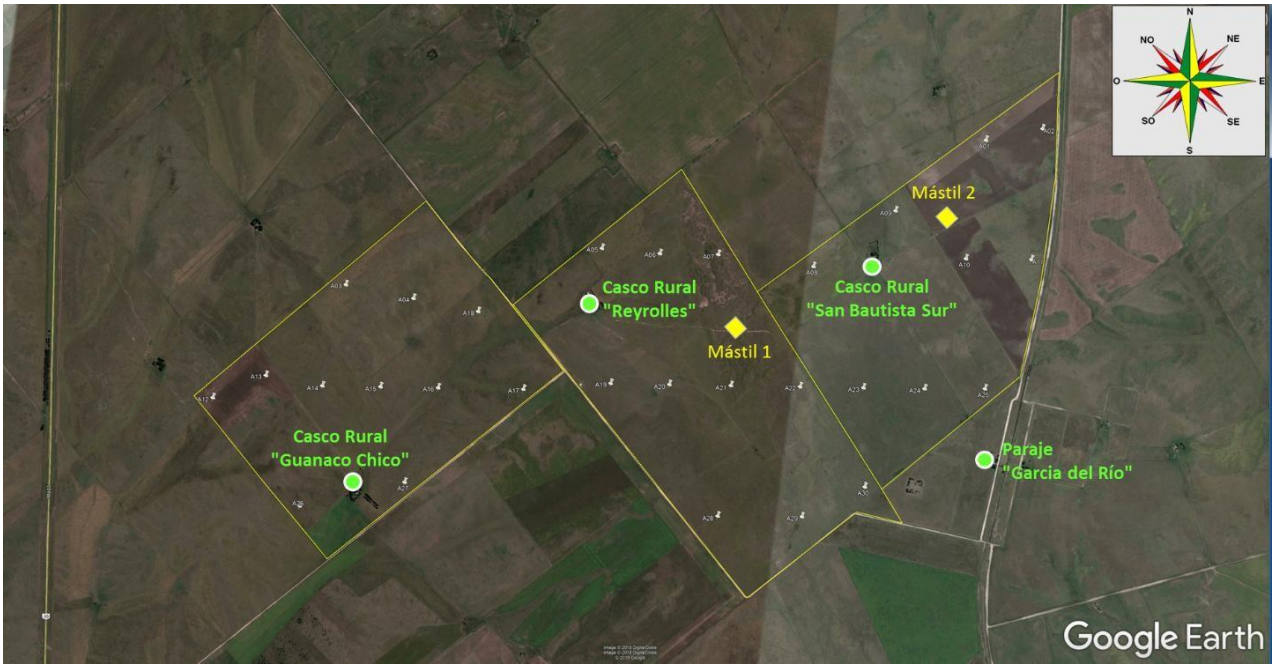


Figure N° 4 Wind Energy Center Layout

Source: Energética Argentina S.A.

The Wind Energy Center will be conformed of 30 wind energy turbines Nordex-Acciona AW 132/3300 TH 120, class JEC2B. In Figure N° 5 there is the generator power curve, from which the estimated annual production of the electric energy in the Wind Energy Center is determined.

Wind Speed (m/s)	Dynamic Power (kW)	Wind Speed (m/s)	Dynamic Power (kW)
3.0	31	14.0	3325
3.5	89	14.5	3325
4.0	177	15.0	3325
4.5	280	15.5	3325
5.0	405	16.0	3325
5.5	560	16.5	3325
6.0	743	17.0	3325
6.5	963	17.5	3325
7.0	1219	18.0	3325
7.5	1515	18.5	3325
8.0	1844	19.0	3325
8.5	2202	19.5	3325
9.0	2571	20.0	3325
9.5	2903	20.5	3325
10.0	3159	21.0	3325
10.5	3280	21.5	3325
11.0	3310	22.0	3325
11.5	3325	22.5	3325
12.0	3325	23.0	3325
12.5	3325	23.5	3325
13.0	3325	24.0	3325
13.5	3325	24.5	3325
		25.0	3325

Figure N° 5 Power Curve of the Wind Energy Turbine Nordex-Acciona, model AW132/3300 TH120 IEC2B.

Down below in Table N° 1 there are the data provided by Energética Argentina S.A. with reference to the estimated productions of the Wind Energy Center, the resultative capacity factor and equivalent hours.

Table N° 1

Wind Power Centre 1		
Net Energetic Production (MW-h/YEAR)	Capacity Factor (%).	Equivalent hours (Hs/Year)
436,905	50.0.	4,369.0.

Annex C.02.2

Plans

Plans

1. INTRODUCTION

This Annex contains the plans corresponding to the Addendum N° 2 at the Environmental Impact Study of the Wind Energy Center.

Document N° Description

--- Wind Energy Center Layout (13/09/2018)

PEEN-EM-001-H1 Transformer Station General Plant

PEEN-EE-001-H1 Transformer Station Single line Schematic 132 KV.

PEEN-EE-001-H2 Transformer Station Single line Schematic 33 KV. - TRANSBA

PEEN-EE-001-H3 Transformer Station Single line Schematic 33 KV. - Wind Energy Plant

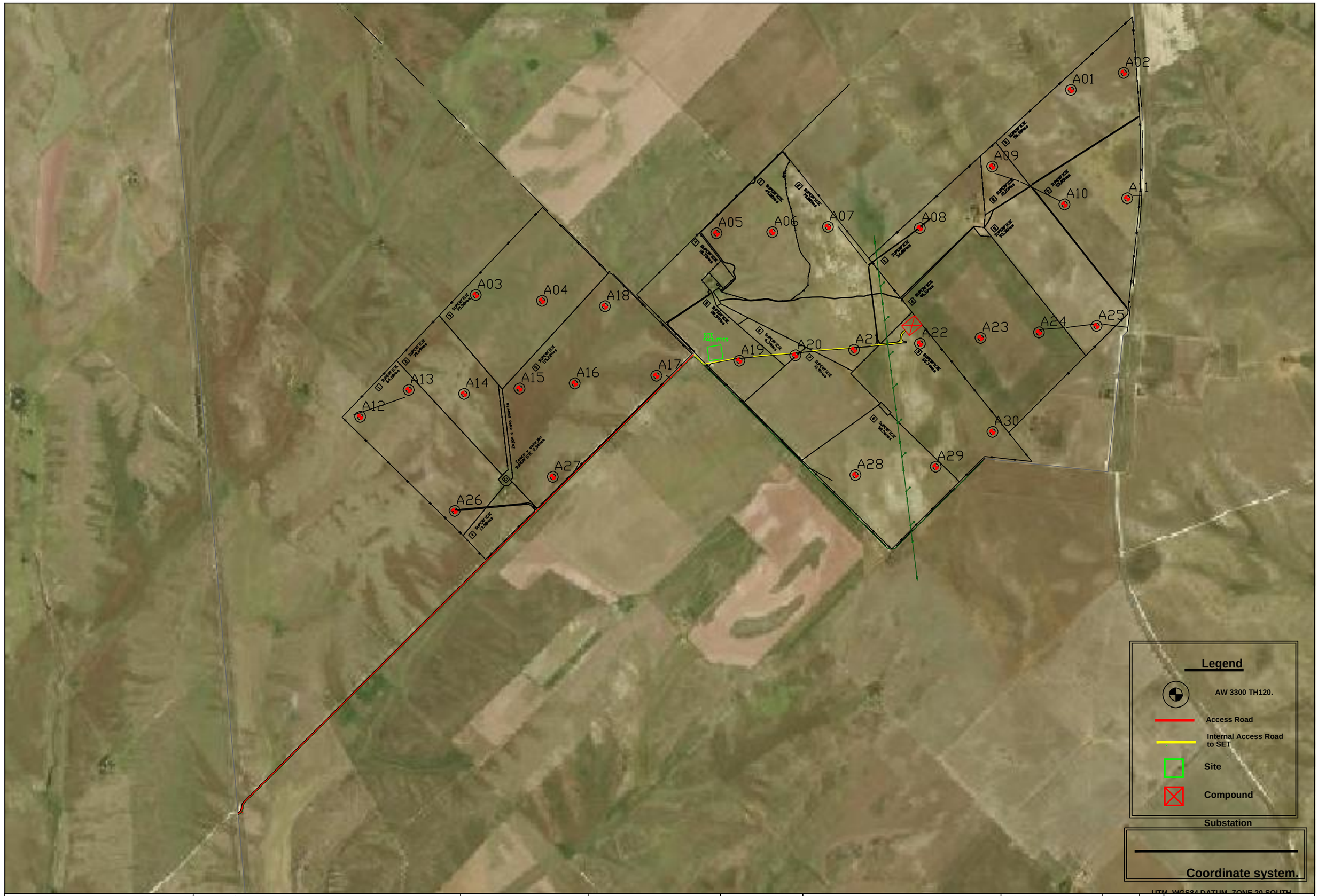
------- Single line Diagram in 33 KV

DG200522 Foundations Foundation type AW3000 TH120

-------- Trenches - Plan of cable type sections

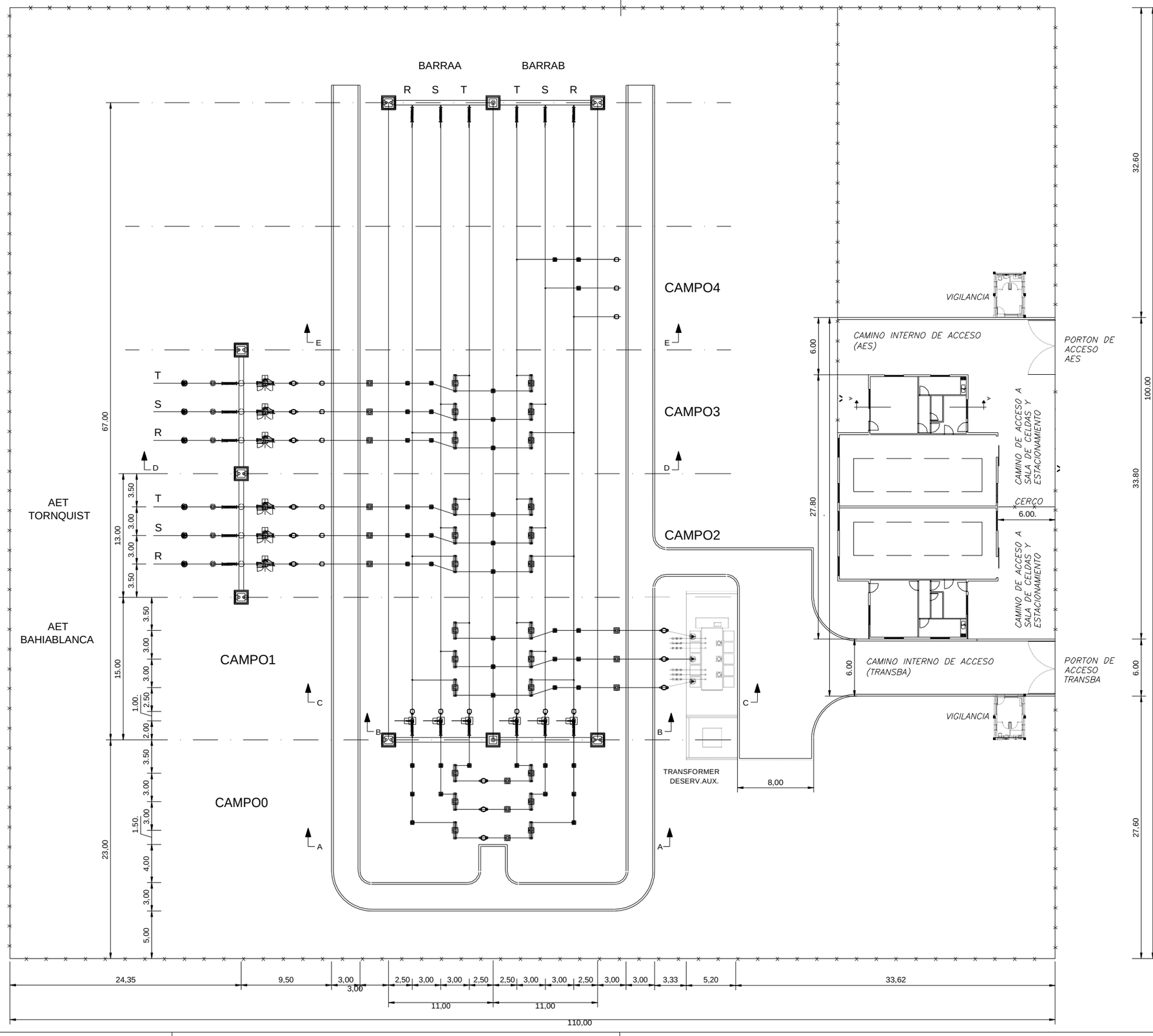
-------- Profile type of internal roads.

---------Mounting Platforms AW 132 TH120.



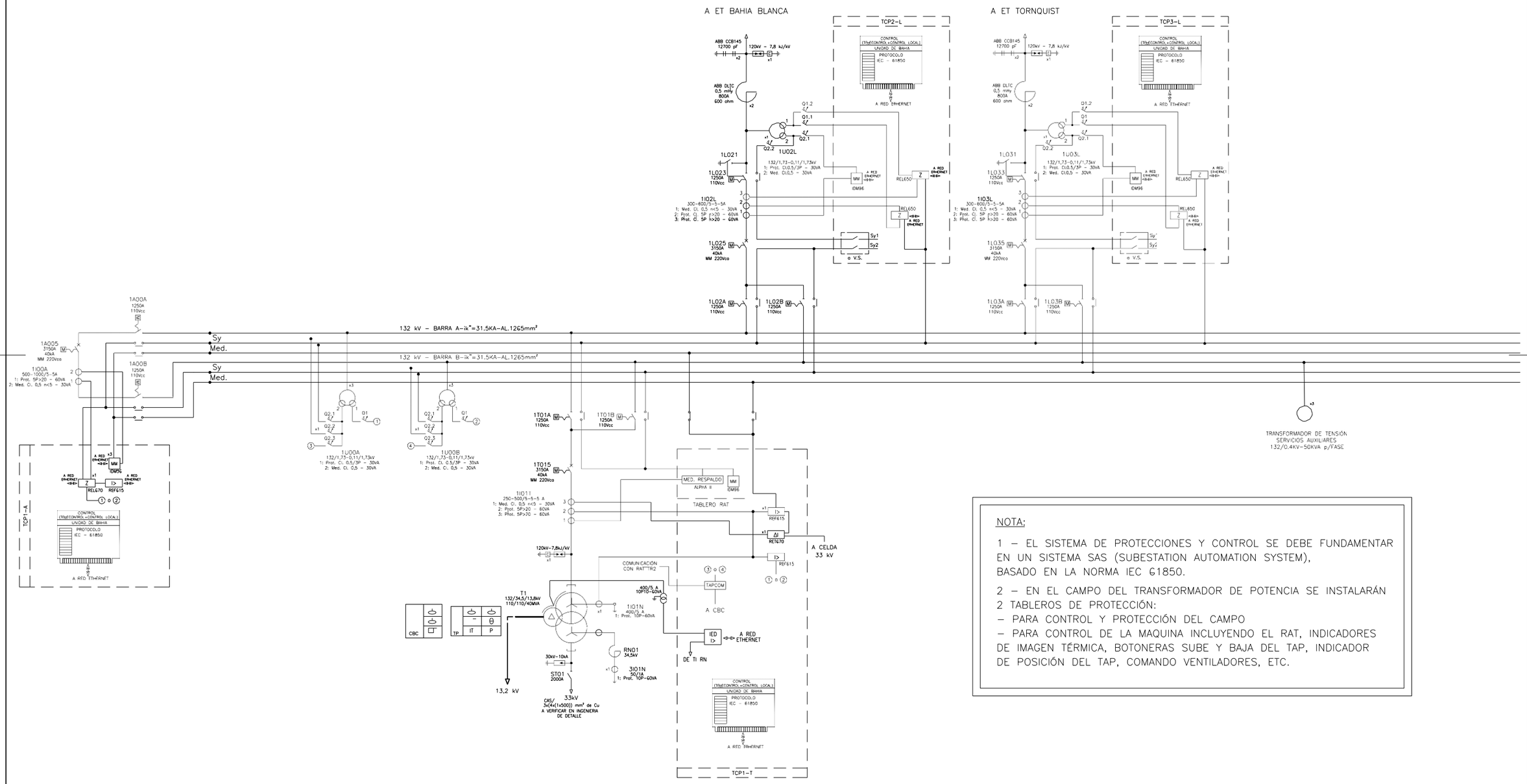
Company	Project Title	Author	Created	Range / Format	Designation	N° of Plan / Page	Revisión
NORDEX acciona Windpower	3 Picos Wind Farm	Raquel Cabeza	13/09/2018	A3	AW132 3.3 MW TH120		

R. No.	Description
1.	Emision



ESIN CONSULTORA S.A.	Obra:	TITULO: PLANTA GENERAL				DOCUMENTO N°:
	PROYECTO: PARQUE EÓLICO ENERGÉTICA I	HOJA 1 DE 1	DOCUMENTO: PEEN–EM–001	ESC: S/E	REV. 0	

CAMPO 00 ACOPLAMIENTO + MEDICIÓN DE TENSIÓN Y P.A.T. DE BARRAS	CAMPO 01 TRAFO T1 132/33 kV	CAMPO 02 LAT 132 kV A ET BAHIA BLANCA	CAMPO 03 LAT 132 kV A ET TORNQUIST	CAMPO 04 TRANSFORMADOR SS.AA.	CAMPO 05 TRANSFORMADOR T2 132 kV/BT (FUTURO)



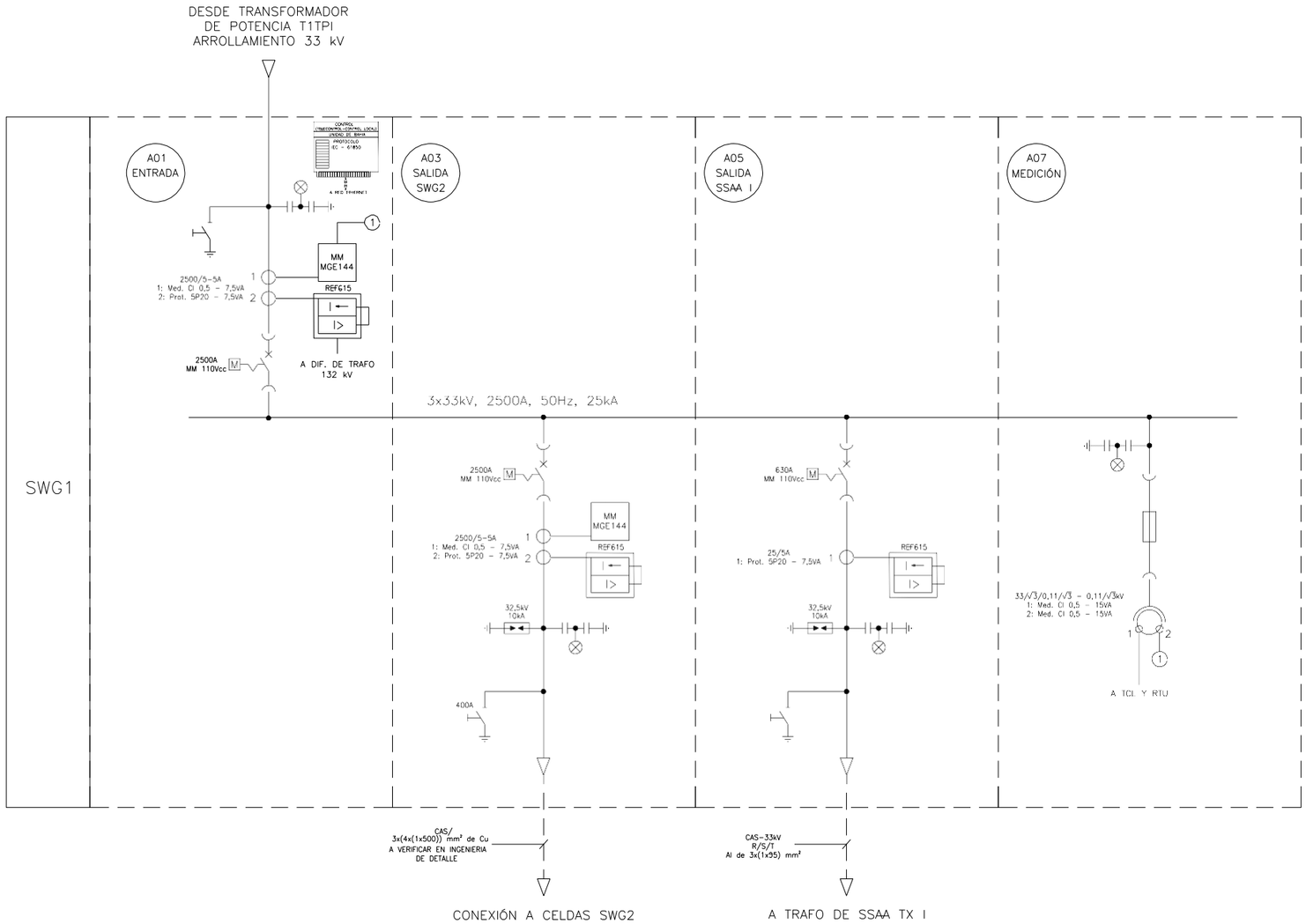
NOTA:

1 – EL SISTEMA DE PROTECCIONES Y CONTROL SE DEBE FUNDAMENTAR EN UN SISTEMA SAS (SUBESTATION AUTOMATION SYSTEM), BASADO EN LA NORMA IEC 61850.

2 – EN EL CAMPO DEL TRANSFORMADOR DE POTENCIA SE INSTALARÁN 2 TABLEROS DE PROTECCIÓN:
– PARA CONTROL Y PROTECCIÓN DEL CAMPO
– PARA CONTROL DE LA MAQUINA INCLUYENDO EL RAT, INDICADORES DE IMAGEN TÉRMICA, BOTONERAS SUBE Y BAJA DEL TAP, INDICADOR DE POSICIÓN DEL TAP, COMANDO VENTILADORES, ETC.

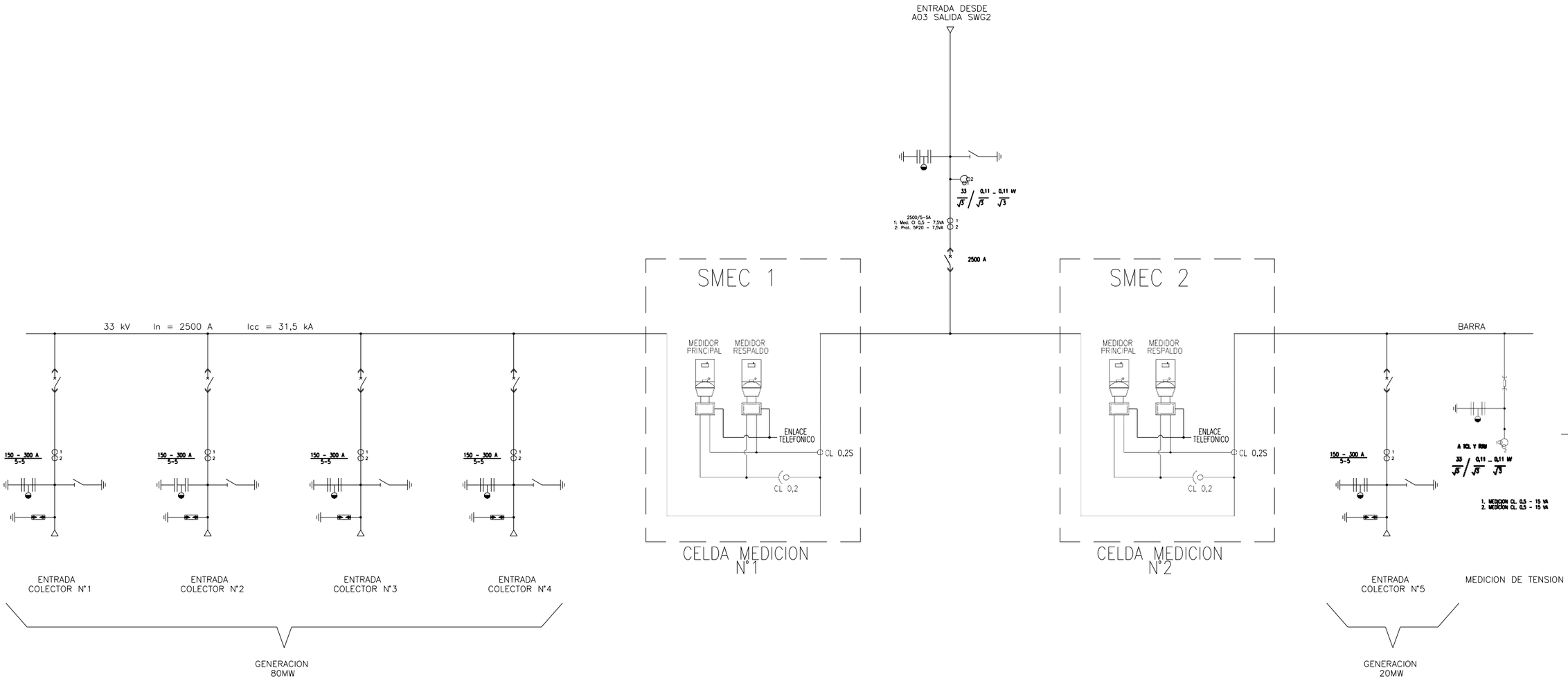
ESIN CONSULTORA S.A.	Obra:	TITULO: ESQUEMA UNIFILAR 132 kV				DOCUMENTO N°:
	PROYECTO: PARQUE EÓLICO ENERGÉTICA I	HOJA 1 DE 3	DOCUMENTO: PEEN-EE-001	ESC: S/E	REV. 0	

(CELDAS 33 kV LADO PLAYA – TRANSBA)

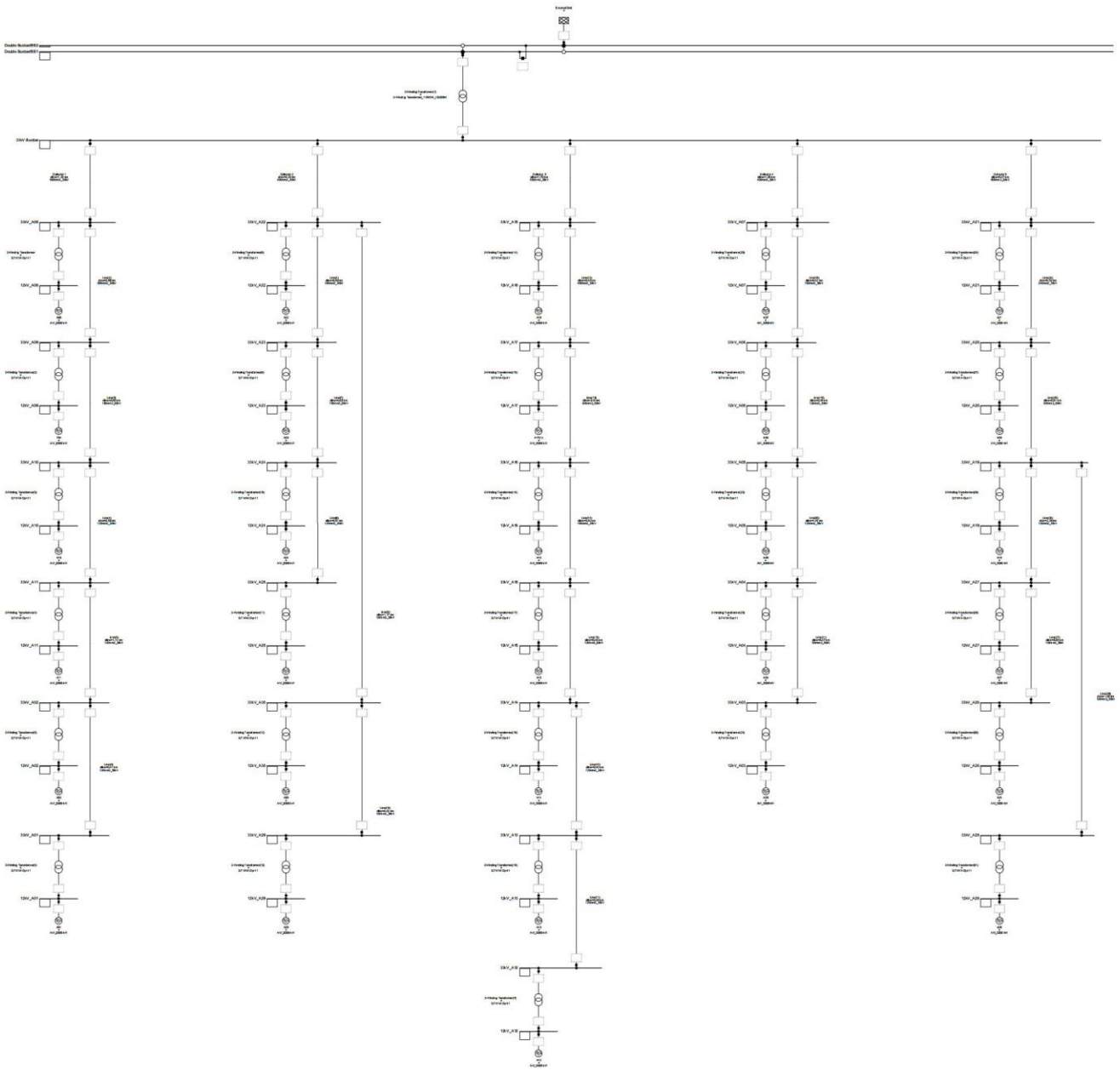


ESIN CONSULTORA S.A.	Obra:	TITULO: ESQUEMA UNIFILAR 33 kV – TRANSBA					DOCUMENTO N°:
	PROYECTO: PARQUE EÓLICO ENERGÉTICA I	HOJA 2 DE 3	DOCUMENTO: PEEN-EE-001	ESC: S/E		REV. 0	

CELLS33 kV - ENERGETIC I



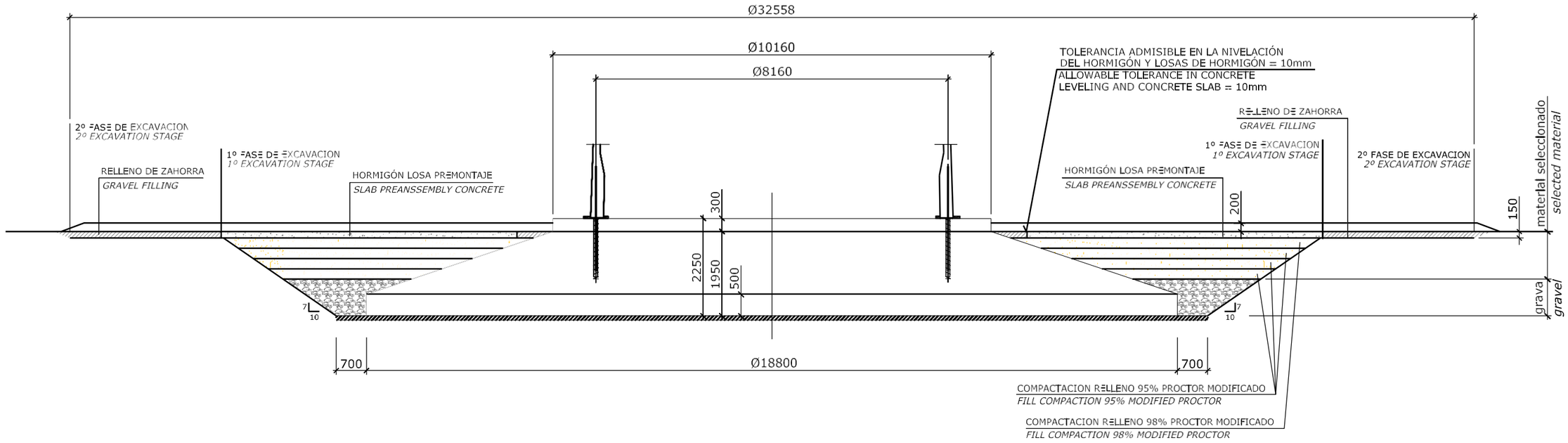
ESIN CONSULTORA S.A.	Obra:	TITULO: ESQUEMA UNIFILAR 33 kV – PARQUE EÓLICO				DOCUMENTO N°:
	PROYECTO: PARQUE EÓLICO ENERGÉTICA I	HOJA 3 DE 3	DOCUMENTO: PEEN–EE–001	ESC: S/E	REV. 0	



NORDEX acciona Windpower	Título del proyecto: 23456789:56;;<= 6= 8>?6@A3B	Autor: 7C	Creado: DEFGHE	Escala / Formato: A3	Designación: JJKL6M:N9O:36734N8B8>A3P	N° de Plano / Hoja	Revisión

R. No.	Descripción
0	Emisión

AW3000 300 Kpa



LAS CANTIDADES Y TIPOS DE COMPONENTES DE LAS IMÁGENES MOSTRADAS PUEDEN VARIAR EN FUNCIÓN DEL MODELO DE AEROGENERADOR

QUANTITY AND TYPE OF COMPONENTS MAY CHANGE DEPENDING ON WIND TURBINE MODEL

NOT VALID
FOR CONSTRUCTION

REV / *REV*	FECHA / *DATE*	REALIZADO / *CREATED*	MODIFICACION / *MODIFICATION*
B	01-06-15	MGB	NUEVA DISTRIBUCIÓN SOLERAS DE PREMONTAJE CAMBIO DENOMINACIÓN PLANO *NEW DISTRIBUTION PRE-ASSEMBLY SLABS. CHANGE DRAWING NAME*
A	23-12-14	MGB	CREACIÓN DEL PLANO / DRAWING CREATE

MATERIAL / *MATERIAL*

TOLERANCIAS GENERALES / *GENERAL TOLERANCES*

PESO / *WEIGHT (kg)*

	DIBUJADO *DRAWN*	COMPROBADO *REVISED*	APROBADO *APPROVED*
NOMBRE *NAME*	MGB	JCM	MNP
FECHA *DATE*	01-06-2015	01-06-2015	01-06-2015

ESCALA / *SCALE* 1/100

DENOMINACIÓN

EJEMPLO CIMENTACIÓN AW3000 TH120 MACIZA

NAME

FOUNDATION EXAMPLE AW3000 TH120 SOLID

acciona Windpower

PLANO Nº / *DRAWING Nº* DG200522

REVISIÓN / *REVIEW* B

HOJA Nº / *SHEET Nº* 3-5

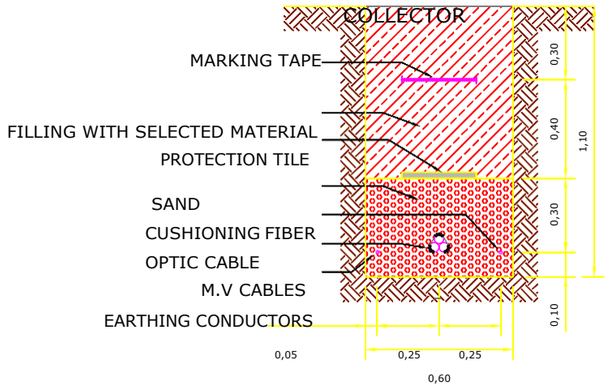
FORMATO / *FORMAT* A3

CABLE TRENCH SECTIONS

TRENCH TYPE A

1 MV

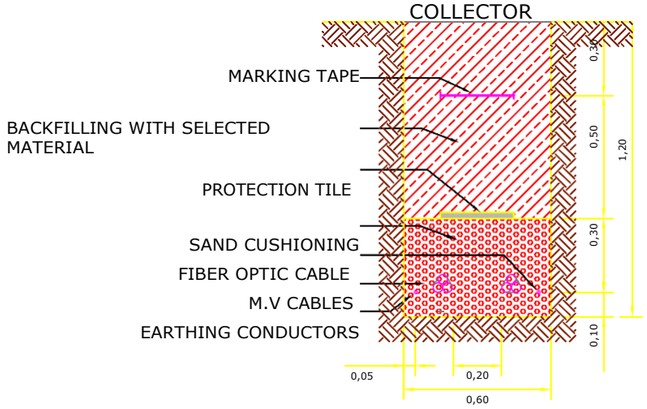
COLLECTOR



TRENCH TYPE B

2 MV

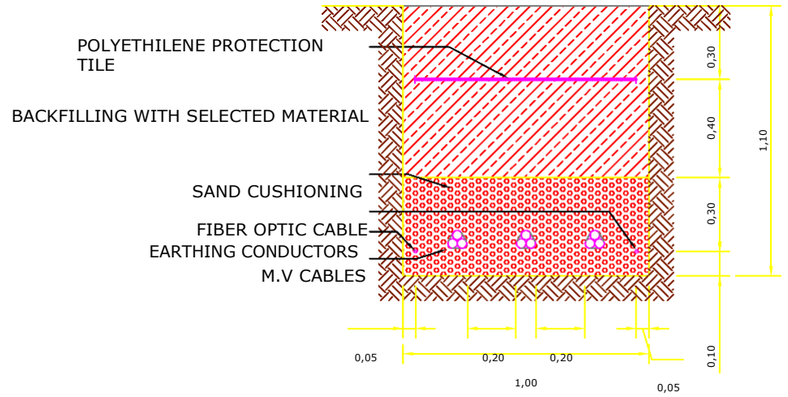
COLLECTOR



TRENCH TYPE C

3 MV

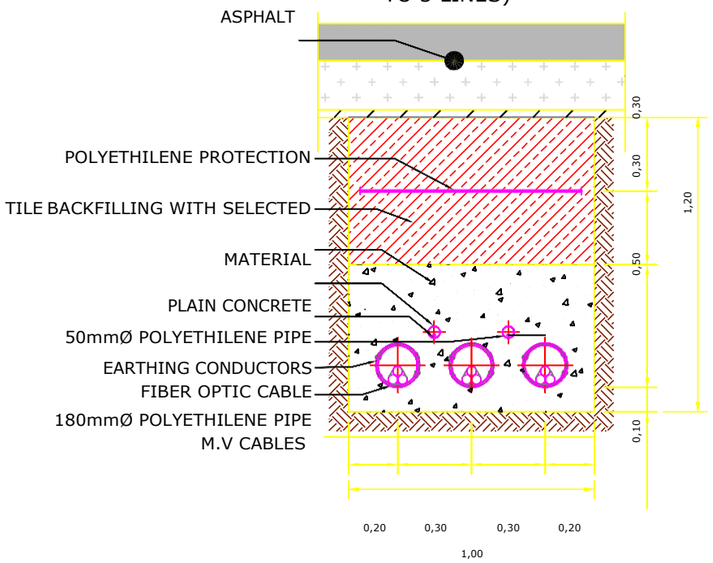
COLLECTOR



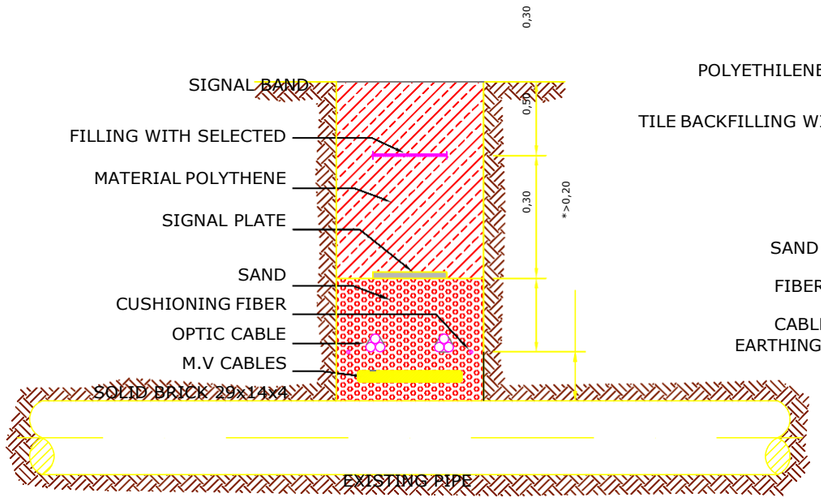
ROAD

CROSSING (UP

TO 3 LINES)



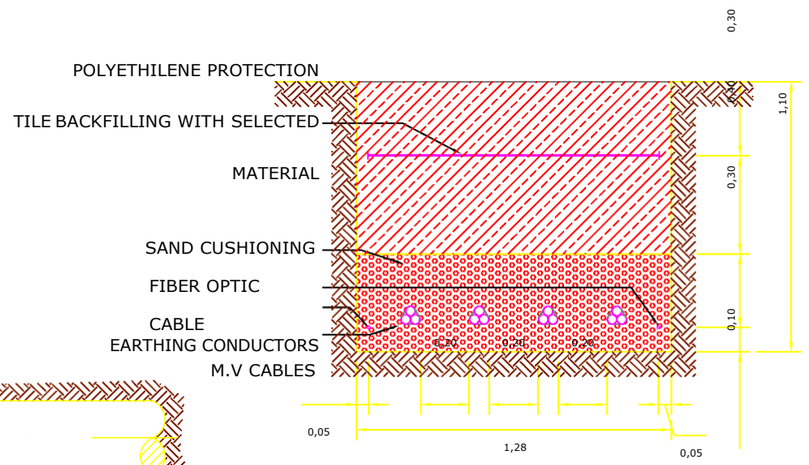
CROSSING WITH OTHER SERVICES



TRENCH TYPE C

4 MV

COLLECTOR



NOT VALID FOR CONSTRUCTION

*TECHNICAL CONSIDERATIONS	
ROAD CROSSINGS WILL BE PERPENDICULAR IF POSSIBLE	
TRENCHES WILL BE PARALLEL TO WIND FARM INTERNAL ROADS	
THE DEPTH BETWEEN SURFACE AND THE BOTTOM PART OF THE CABLES WILL NOT BE LESS THAN 0,80 M. IN CASE OF CROSSING THIS DISTANCE WILL NOT BE LESS THAN 1 M.	
COMPACTION OF SELECTED MATERIAL	95% OF MODIFIED PROCTOR TEST (AASHTO T180)

***NOTE**

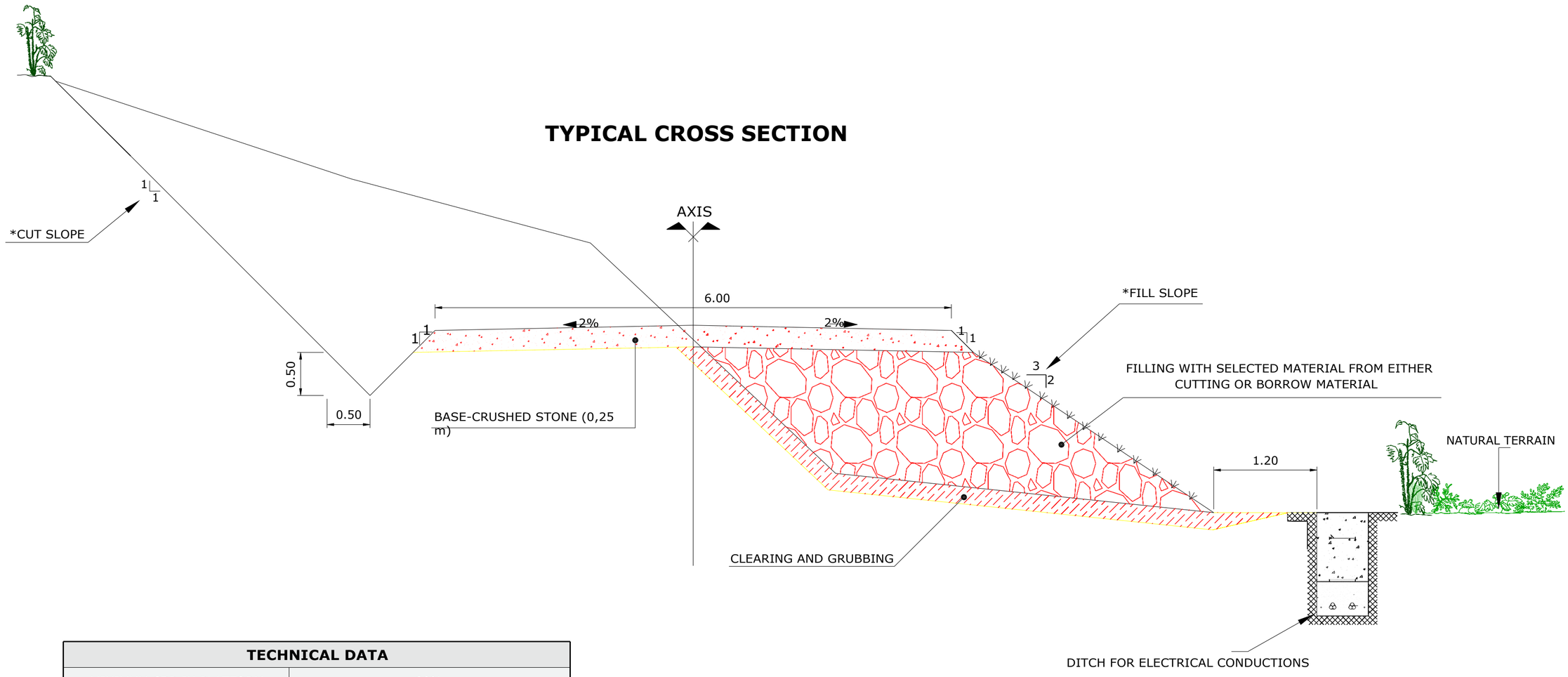
FOR DISTANCES HIGHER THAN 20 CM NO PROTECTION IS

R. No.	Description	Date	R.Date

Company	Project title	Drawing title	Drawing No.	Scale	Coordinate system	Designed	Date
	CABLE TRENCH SECTIONS	Leon Nel	Sheet	Format		Approved	Date

NEEDED.

TYPICAL CROSS SECTION



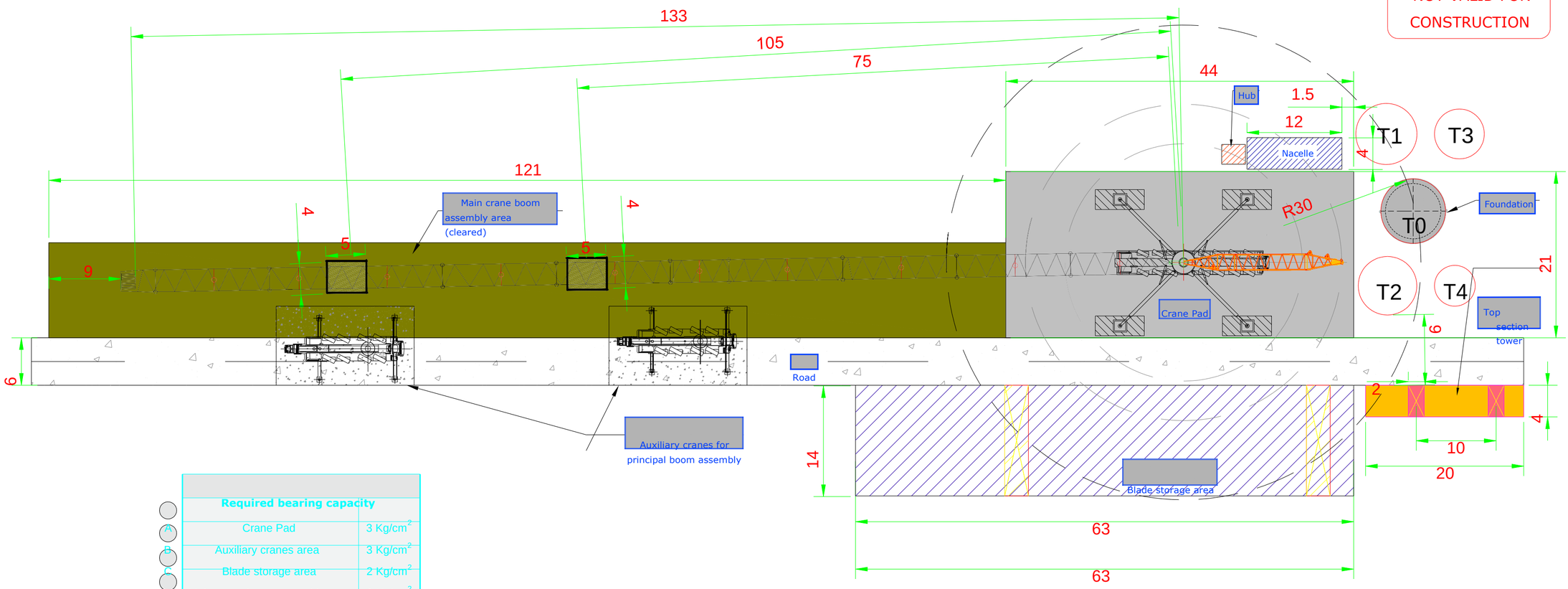
TECHNICAL DATA	
MINIMUM CBR IN PLATFORM	20%
COMPACTION OF FIRM	98% OF MODIFIED PROCTOR TEST (AASHTO T180) IN BASE
	95% OF MODIFIED PROCTOR TEST (AASHTO T180) IN SUBBASE
DESIGN REFERENCE WEIGHT FOR TRANSPORT VEHICLE AXLE	12 TON
***NOTE**	
BOTH CUT AND FILL SLOPE WOULD CHANGE DEPENDING ON THE FINAL SOIL CONDITIONS.	

NOT VALID FOR CONSTRUCTION

Company	Title	Author	Created	Range / Format	Designation	N° of Plan / Page	Revisión	R. No.	Description
NORDEX acciona Windpower	Wind Farm AW132 TH 120	Leon Nel	12/01/2018	A3	Typical internal road cross section			1	Emision

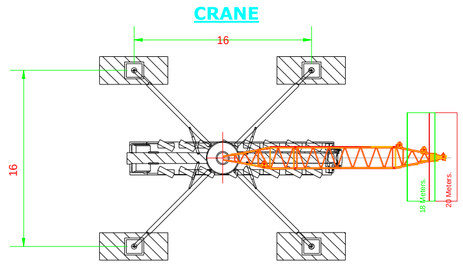
STANDARD CRANE PAD

NOT VALID FOR CONSTRUCTION

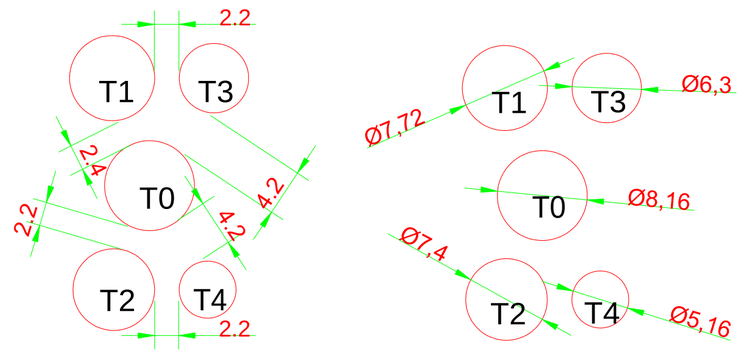


	Required bearing capacity
Crane Pad	3 Kg/cm²
Auxiliary cranes area	3 Kg/cm²
Blade storage area	2 Kg/cm²
Main crane boom assembly area	2 Kg/cm²
Nacelle storage area	2 Kg/cm²

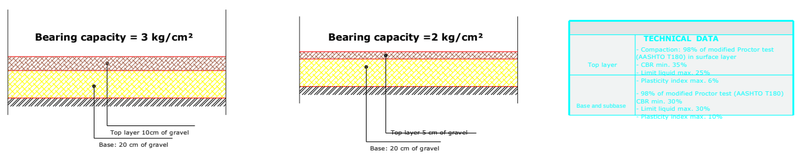
CRANE



TOWER SECTION PRE-ASSEMBLY PAD



PROPOSED CRANE HARDSTAND CROSS SECTION



	TECHNICAL DATA
Top layer	- Compaction: 98% of modified Proctor test (AASHTO T180) in surface layer - CBR min. 35% - Limit liquid max. 25% - Plasticity index max. 6%
Base and subbase	- 98% of modified Proctor test (AASHTO T180) CBR min. 30% - Limit liquid max. 30% - Plasticity index max. 10%

Company	Title Project	Author	Created	Range	Designation	Plan N°		R. No.	Description
NORDEX acciona Windpower	Wind Farm Tres Picos	Leon Nel	12 012	2	018	For mat	A3		Obligatory Specifications Pre-

Annex C.02.3

Technical Specifications of the Wind Turbines

Technical Specifications of the Wind Turbines

1. INTRODUCTION

This Annex contains the main technical specifications of wind energy turbine selected for the Project.

2. Technical Specifications of the Wind Turbines

These documents were provided by Energética Argentina S.A.

- Technical specifications of the wind turbine.
- Power curve.
- Acoustic emission of the wind turbine.
- Beaconing system of the wind turbine.
- Plans Main Components disposition in the nacelle.
- General Plan of the wind turbine.

- Rev	Date	Description of the revision
"A"	31/10/17	Elaboration
"B"		
"C"		
"D"		
"E"		

Performed	Reviewed	Approved
EGM	JAL	MNP
31 -10 -	31 -10	31 -10 -2017

In case of doubt the Spanish version will prevail

acciona Windpower	**TECHNICAL SPECIFICATION**	DATE: 31/10/17 Revision : A
	AW 132/3300 IEC IIB TH120 WIND TURBINE	AUTHOR: EGM CHECKED: JAL APPROVED: MNP

ROTOR	Number of blades	3
	Orientation	Upwind
	Diameter	132 m
	Swept area	13.720 m^2
	Rotational direction	Clockwise
	Rotational speed	Variable - 7 … 14 rpm
	Hub height	120 m
	Power regulation	Full span blade pitch
	Over speed control	Full span blade pitch
	Rotor shaft tilt angle	5º
	Nominal tip speed	85.5 m
	Cone angle	5°
BLADES	Material.	GRE
	Total length	64.7 m
	Weight range	16400 kg ± 3% / blade
	Pitch	Full span
	Aerodynamic Brake	Full feathering
HUB	Hub type	Cast iron
	Protection	Epoxy
PITCH SYSTEM	Pitch bearings	Double row four point contact bearing
	Actuation	Hydraulic
	Linkage	Through hydraulic cylinders
	Failsafes	Accumulators on hub
DRIVE TRAIN	Gearbox	3 stages, 2 planetary / 1 parallel
	Gearbox nominal power	3630 kW.
	Gearbox ratio	1:97 (50 Hz) / 1:117 (60 Hz)
	Input speed	Variable - 7 … 14 rpm
	Output speed	Variable - 680 … 1365 rpm (50 Hz)
		Variable - 816 … 1638 rpm (60 Hz)
	Lubrication	Pressure and splash with oil cooler / oil filter
ROTOR SHAFT	Type	Forged hollow shaft
	Supporting	2 bearings
DRIVETRAIN BEARINGS	Type	Double spherical roller bearings
PARKING BRAKE	Type	Single disk
	Location	High speed shaft
YAW SYSTEM	Type	Double row four point contact bearing
	Slewing gear	external
	Slewing gear / yaw drive pinion ratio	11,2 1
	Braking system	Hydraulic Calipers
	Yaw drives system	Electrical motor gears

YAW GEARS AND MOTORS	Type	Planetary 4-5 stages
	Ratio	1:1430
	Yaw rate	0.09 rpm @ 50 Hz / 0.11 rpm @ 60 Hz
	Motor types	Asynchronous 4 poles
	Voltage / Frequency	230/400 V - 50-60 Hz.
	Power rating / Motor speed	3 kW / 1450 rpm @ 50 Hz
		3.5 kW / 1740 rpm @ 60 Hz
HYDRAULIC POWER UNIT	Oil pump capacity	90 l/min
	Motor types	37 kW.
	Voltage / Frequency	380 V / 50-60 Hz
	Blade accumulator	2 x 20 l
	Principal accumulator	20 l
GENERATOR	Type	6 poles, double feeding
	Insulation Classes (stator/rotor)	F / H
	Rated Power	3390 kW.
	Degree of protection	PDI 54.
	Frequency	50/-60 Hz.
	Voltage	12000 V.
	Power factor (short-circuited rotor)	0.93
	Speed range	680 … 1365 rpm (50 Hz)
		816 … 1638 rpm (60 Hz)
CONTROL SYSTEM	Power control	Converter Control Unit
	Master processor	Programmable Logical Controller
	Interface	Scada
	Power factor correction	Programmable by software
TOWER	Type	Tubular concrete
	Tower height	118 m
	Material.	Post-tensioned pre-casted concrete
	Access to the tower	Door with lock system
	Access to nacelle cabin	Ladder or elevator
OPERATING DATA	Cut-in wind speed	3 m/s
	Cut-out wind speed	25 m/s
	Nominal power	3300 kW.
	Operation temperature range	-10°C to +40°C
	Survival temperature range	-20°C to +50°C

POWER CURVE FOR TRES PICOS WIND FARM AW132/3300

- Rev	Date	Description of the revision
A	18/12/2017	First issue
"	24/10/2018	Power enhancement
"	25/10/2018	Grid frequency correction
"		
E		

Performed	Reviewed	Approved
aruiz9 2018.10.25 09:28:33	jaristegui 2018.10.25 3:45:00 PM +02'00'	Núñez Polo, Miguel 2018.10.25 15:46:36 +02'00'

In case of doubt, the Spanish version shall prevail.

1 INTRODUCTION

This document shows the calculated dynamic power curve for the AW132/3300 wind turbine with the following characteristics.

- Ø rotor: 132 m
- Blade: AW64.7/-2
- 50 Hz grid

This power curve is an enhanced power mode for the AW132/3300 wind turbine.

2 DYNAMIC POWER CURVE

This power curve for the AW132/3300 AW64.7-2 is valid for these conditions:

- Undisturbed flux with turbulence intensity inside the
  range: Lower limit: 6%
  Upper limit: $11*(0.75*V_{hh}+5.6)/V_{hh}$ %
- Inflow angle inside a range between -10 deg and 5 deg. Positive values correspond to upward flow.
- Wind shear inside a range between 0 and 0.4
- Undamaged and clean blades
- Grid voltage inside +/-5% of nominal value
- Temperature inside a range between -20°C and +35°C
- Air density equal to 1.18 kg/m^3

Wind speeds considered are 10-min averages at hub height.

Power curve test should be performed with generation of reactive power and wind farm algorithms deactivated.

Calculated power corresponds to 12 kV turbine terminals.

The power curve measurement will be done according to IEC-61400-12-1 guide-line and MEASNET recommendations.

Thrust coefficients are provided only for informative purpose.

Electrical capabilities of AW132/3300 have been defined to be fulfilled for a maximum ambient temperature of 35ºC and an installation below 1000 m.a.s.l. As because electrical capabilities are based on a relation between active power, reactive power, voltage range and temperature; the necessary derating to operate above 35ºC of ambient temperature could be obtained by derating the active power or the reactive power.

If the rated reactive power capability of ±1200kVAr is required, the active power of 3300kW can be delivered between -20ºC and 35ºC. Rated active power at 40ºC will be 3150kW in these conditions. Linear interpolation for rated active power calculation between 3300kW at 35ºC and 3150kW at 40ºC can be considered for intermediate temperature values.

If the rated reactive power capability is not required, the active power of 3300kW can be delivered inside temperature range between -20ºC and 40ºC. Rated reactive power until 35ºC will be +-1200kVAr and at 40ºC will be +-355kVAr. Linear interpolation for rated active power calculation be- tween 3300kW at 35ºC and 3150kW at 40ºC can be considered for intermediate temperature values.

Wind Speed (m/s)	Dynamic Power (kW)
3.0	31
3.5	89
4.0	177
4.5	280
5.0	405
5.5	560
6.0	743
6.5	963
7.0	1219
7.5	1515
8.0	1844
8.5	2202
9.0	2571
9.5	2903
10.0	3159
10.5	3280
11.0	3310
11.5	3325
12.0	3325
12.5	3325
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21.5	3325
22.0	3325
22.5	3325
23.0	3325
23.5	3325
24.0	3325
24.5	3325
25.0	3325

Table N° 1 Theoretical dynamic power curve

Wind Speed (m/s)	Thrust coefficient
3.0	0.9647
3.5	0.9350
4.0	0.9048
4.5	0.8647
5.0	0.8468
5.5	0.8396
6.0	0.8332
6.5	0.8219
7.0	0.8024
7.5	0.7775
8.0	0.7471
8.5	0.7075
9.0	0.6479
9.5	0.5817
10.0	0.5260
10.5	0.4715
11.0	0.4036
11.5	0.3506
12.0	0.3050
12.5	0.2663
13.0	0.2344
13.5	0.2090
14.0	0.1868
14.5	0.1676
15.0	0.1511
15.5	0.1372
16.0	0.1248
16.5	0.1141
17.0	0.1044
17.5	0.0961
18.0	0.0887
18.5	0.0824
19.0	0.0763
19.5	0.0709
20.0	0.0659
20.5	0.0617
21.0	0.0576
21.5	0.0542
22.0	0.0506
22.5	0.0478
23.0	0.0449
23.5	0.0424
24.0	0.0402
24.5	0.0382
25.0	0.0362

Table N° 2 Thrust coefficient

- Rev A	Date	Description of the revision
"A"	05/07/17	Initial release

SCI	E.S.S.	MNP
05 -07 -	05 -07	05 -07 -2017

In case of doubt the Spanish version will prevail

1. Introduction

The levels of Estimated Sound Power (L_{wa}) are shown for turbine AW132/3300.

These values of sound power are valid only under these conditions:

- Network tension under +2.5% of the nominal value.
- Generation of reactive power and control algorithms of the park, deactivated.
- Temperature within the range of -20ºC and +40ºC
- Without icing conditions, that is, temperature higher that +5°C and relative humidity under 80%
- Nacelle gates and tower base closed for the measured turbine as well as all the others which are at sight.

Wind speeds represented are referred to the height of 10 meters above the ground level. To extrapolate all other speeds to the hub height, IEC61400-11:2002 Ed.2.1. must be applied. A typical value of the longitude of roughness length is 0.05m, although this value depends on the concrete field.

1. INTRODUCTION

Estimated Sound Power levels (L_{wa}) are provided for the AW132/3300 wind turbine.

These sound power levels are valid only for the following conditions:

- Grid voltage below +2.5% of nominal value
- Generation of reactive power and wind farm algorithms deactivated
- Temperature inside a range between -20ºC and +40ºC
- No iced conditions. Temperature above +5ºC and relative humidity below 80%
- Nacelle and ground doors closed for either measured wind turbine and everyone in sight

The represented wind speeds are referenced to a height of 10 meters above ground level. For the extrapolation to other hub height wind speed IEC 61400-11:2002 Ed.2.1 has to be applied. A typical value of roughness length is 0.05m; however, it depends on the site terrain.

2. Levels of Sound Power 2. **Sound Power Levels**

Wind speed at 10m height (m/s)	**6**	**7**	**8**	**9**	**10**
Wind speed at 120m height (m/s) [z_0=*0.05m*]	8.8	10.3	11.8	13.2	14.7
Sound Power Level (dBA) TH120	**108.5**	**108.5**	**108.5**	**108.5**	**108.5**

Wind speed at 10m height (m/s)	**6**	**7**	**8**	**9**	**10**
Wind speed at 84m height (m/s) [z_0=*0.05m*]	8.4	9.8	11.2	12.6	14.0
Sound Power Level (dBA) T84	**108.5**	**108.5**	**108.5**	**108.5**	**108.5**

Note: It is assumed the roughness length of 0.05m for the extrapolation of speed at the height of the hub.

NOTE Roughness length of 0.05m is assumed to the hub height wind speed extrapolation

3. Apparent Sound Roughness Level Guaranteed

The maximum level of apparent sound level guaranteed will include a tolerance to consider measurement uncertainty. Tolerance is equal to combined standard uncertainty defined in norm IEC 61400-11:2002 Ed.2.1 and is applied to the level of sound power reported in section 1 and to the results of the test. As a reference value, a typical combined standard uncertainty is ≤ 1dB.

Measures will be done in the positions defined in the norm IEC 61400-11 Ed. 2.1. The analysis of data will be conducted according to norm IEC 61400-11

3. Apparent Sound Power Level Guaranteed

The guaranteed max apparent sound power level will include a tolerance to account for measurement uncertainty. The tolerance is equal to the standard combined uncertainty defined in IEC 61400-11:2002 Ed.2.1 and is applied to both the sound power level reported in section 1 *and* the test result. For reference purposes, a typical standard combined uncertainty is ≤ 1dB.

Measurements are to be carried out at the reference position as defined in IEC 61400-11 Ed. 2.1. The data analysis must be carried out according to IEC 61400-11 Ed. 2.1

4. Tonality

It can be expected a tonal audibility of ΔL_a ≤ 2dB along the whole operational range.

4. Tonality

A tonal audibility of $\Delta L_a \leq$ 2dB can be expected over the entire operational range.

5. Octave Bands

Only for informative purposes the maximum range of octave bands expected is shown (not guaranteed)

5. Octave Bands

Maximum expected octave band spectra are provided for informational purposes only (not guaranteed).

Octave Bands	32	63	125	250	500	1000	2000	4000	8000
L_{wa} (dBA)	73.6	84.7	98.1	103.8	103.0	99.5	97.9	95.9	89.3

Values represented for the wind speed bin associated with the highest sound power level

AW3000

Rev	Date	Description of the revision
"A"	*23/02/2009*	*Elaboration / First Edition.*
"B"	*03/02/2012*	*Add mid-tower lighting system*
"C"	*04/03/2015*	*Update standard obstruction light models and UPS Nacelle Pictures Update standard obstruction light models and UPS. Nacelle pictures.*
"D"		

Performed	*Reviewed*	*Approved*
LHL	E.S.S.	MNP
04 -03 -2015	04 -03 -2015	04 -03 -2015

In case of doubt the Spanish version will prevail

1. OBJECT

The wind energy turbines Acciona Wind power AW3000 will be signaled to fulfil the requirement of local administrations of air navigation.

In this document two types of signaling are described. In any case, notification and AW coordination with the client are necessary.

- Light signals.
  - Nacelle beacons.
  - Tower beacons a half height.
- Structure Painting
  - Tower signaling (painting)
  - Rotor signaling (painting)

2. NACELLE BEACONS.

These beacons can be installed in the nacelle in conformity with Annex 14 of ICAO and the corresponding civil area administration

Depending on the requirements of the place where they are installed they can be day or night lights

The current models are lights of average intensity with LED technology and they take photoelectric cell, the control and the automatic synchronization system with other beacons.

Down below the two options are shown:

1. AIM

Different lighting and marking options are available for Acciona Wind power AW3000 wind turbines based on meeting specific local regulations, particularly aviation navigation requirements.

Two main marking systems are described in this document. These marking systems require notification and coordination with the customer:

- Light signals
  - Nacelle lighting system
  - Mid-tower lighting system
- Structure painting
  - Tower marking (paint)
  - Rotor marking (paint)

2. OBSTRUCTION LIGHTS

Obstruction lights in compliance with ICAO Annex 14 and the corresponding Civil Aviation Administration can be installed on AW3000 WTG's.

Day and/or night time operation is possible, depending on the specific site requirements.

The current references are medium intensity lights with LED technology, integrated photocell, monitoring and automatic flash synchronization between lights.

Two standard options are described in the table below:

	Day time mode	Day time mode
Option	20.000cd	2.000cd
A	off	2.000cd

"

Figure N° 1 Medium intensity light

In case the aviation local authorities for a specific project require another type of obstruction light, depending on the case low/medium/high intensity, its integration in the turbine can be studied.

These lights can be used as single light or as multiple light systems, ensuring proper synchronization and communication.

In case the aviation local authorities for a specific project require another type of obstruction light, depending on the case low/ medium/ high intensity, its integration in the turbine can be studied.

These lights can be used as single light or as multiple light systems, ensuring proper synchronization and communication.

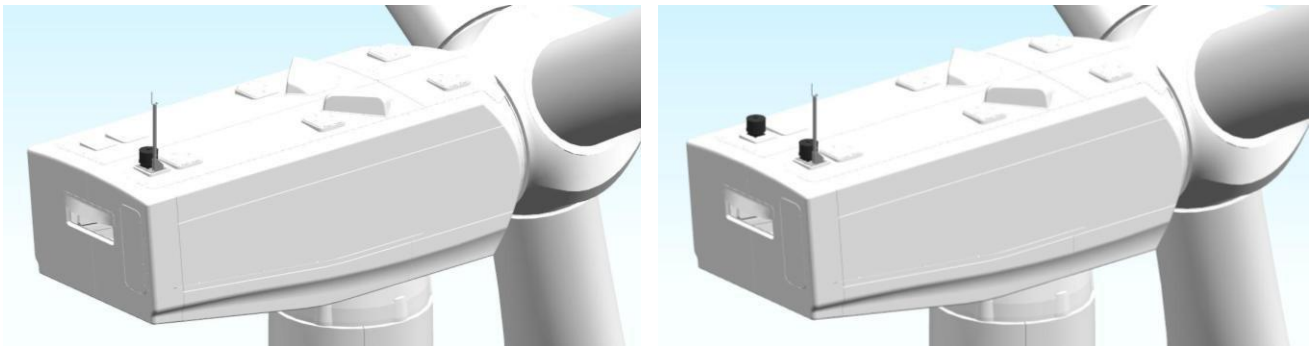


Figure 2. Obstruction light(s) in nacelle

The obstruction light system can be integrated in the SCADA system, rising an alarm in case of failure (and with no impact to turbine operation).

An extra kit for providing an uninterrupted power supply (UPS) for 12 hours for the obstruction lights is available if required.

3. MID-TOWER LIGHTING SYSTEM:

As per the criteria of the FAA and other marking standards, the point for requiring lights in an intermediate height is to make the obstacle visible from any direction.
This means the lights shall be installed in a height is not hidden by the blades.

The system consists of three red steady low intensity lights installed on the outside of the tower, along a ring at the middle of the tower and is visible from all viewing angles. It is anticipated that mid-level lightning may be required for structures with ground-tip heights above 150 meters and 500 feet (USA)

Figure N° 3 UPS

The obstruction light system can be integrated in the SCADA system, rising an alarm in case of failure (and with no impact to turbine operation).

An extra kit for providing an uninterrupted power supply (UPS) for 12hours for the obstruction lights is available if required.

3. Mid-tower lighting system

As per the criteria of the FAA and other marking standards, the point for requiring lights in an intermediate height is to make the obstacle visible from any direction.
This means the lights shall be installed in a height is not hidden by the blades.

The system consists of three red steady low intensity lights installed on the outside of the tower, along a ring at the middle of the tower and is visible from all viewing angles. It is anticipated that mid-level lighting may be required for structures with ground-tip heights above 150 meters and 500 feet (USA).

Figure 4. Low intensity light

4. TOWER MARKING

If required, the bottom and upper section of the tower can be painted using alternated colored stripes. In the picture below an example is shown:

4. TOWER MARKING

If required, the bottom and the upper section of the tower can be painted using alternated colored stripes. In the picture below an example is shown:

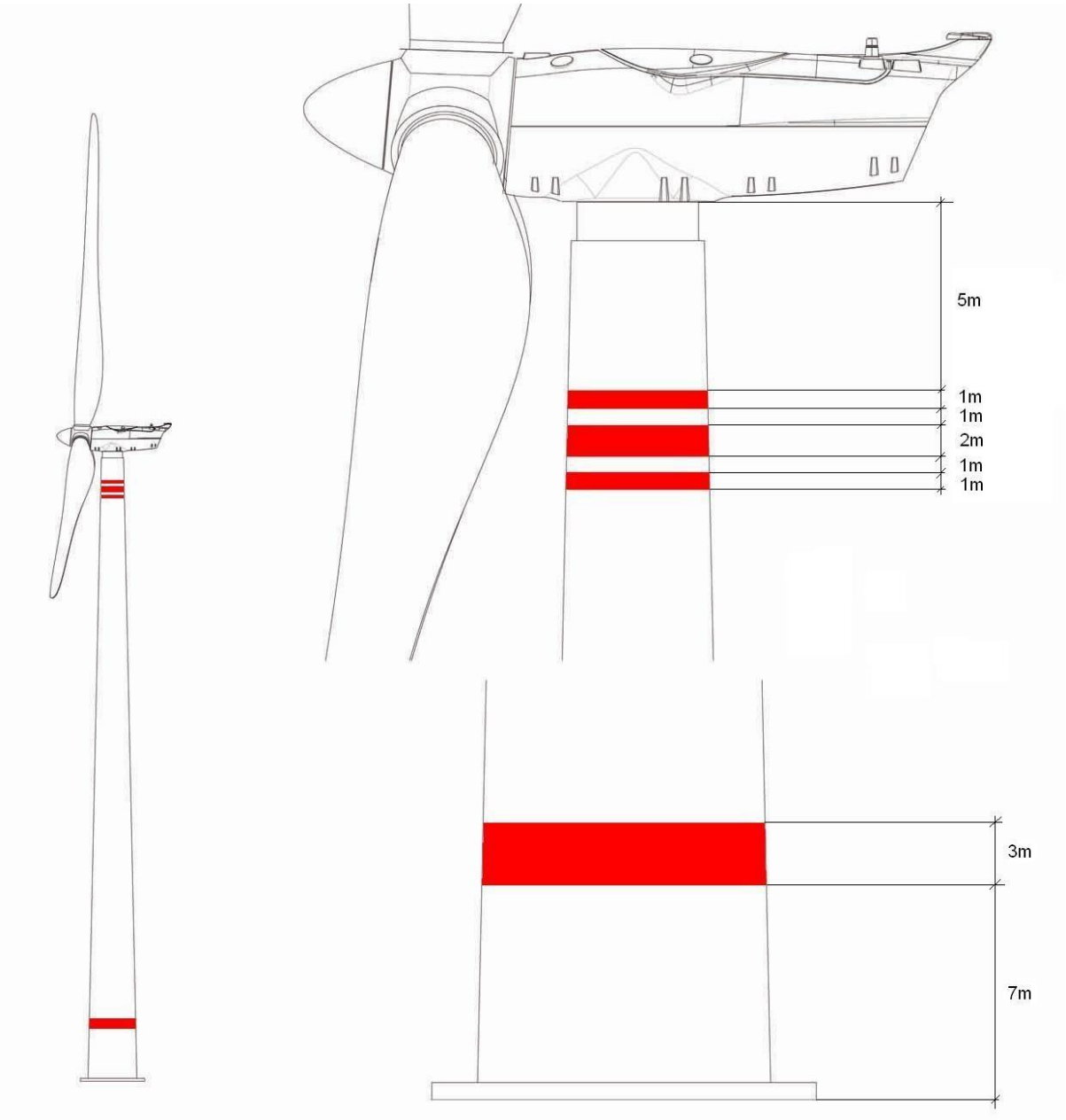


Figure N° 5 Tower marking

5. PARTIAL ROTOR MARKING

Several painted patterns consisting of colored stripes at the blade tips are available. In the picture below an example is shown:

5. PARTIAL ROTOR MARKING

Several painted patterns consisting of colored stripes at the blade tips are available. In the picture below an example is shown:

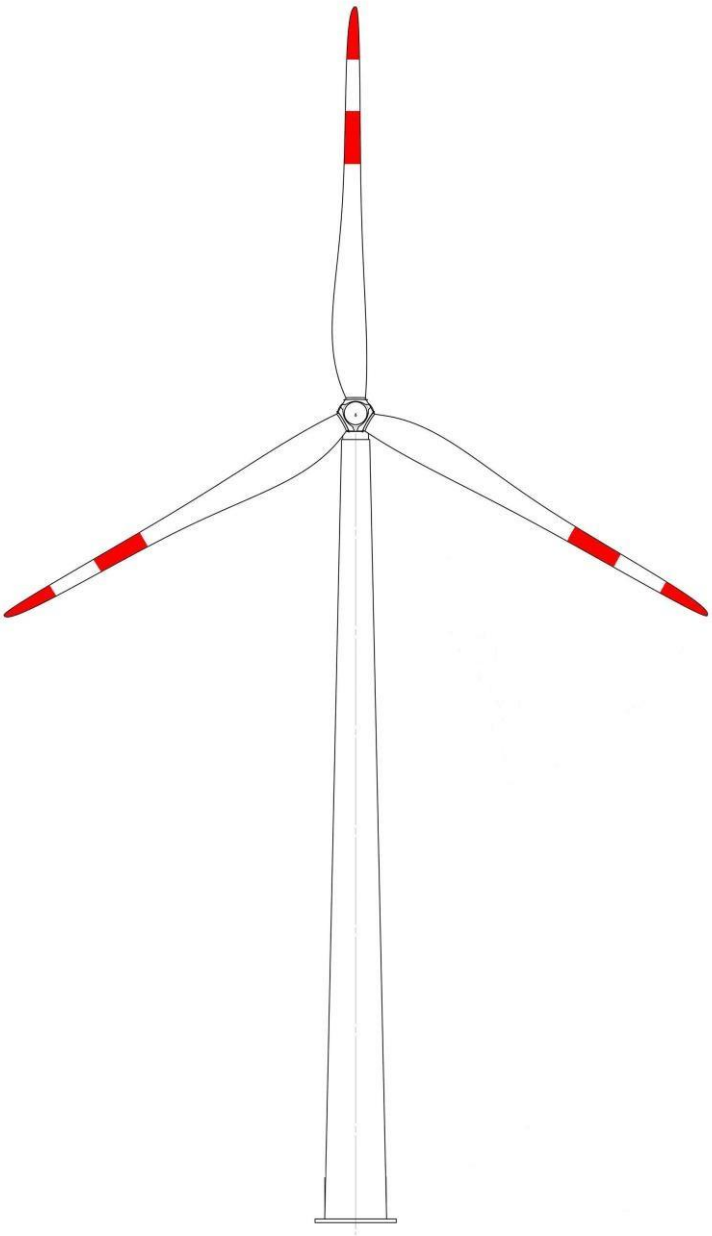
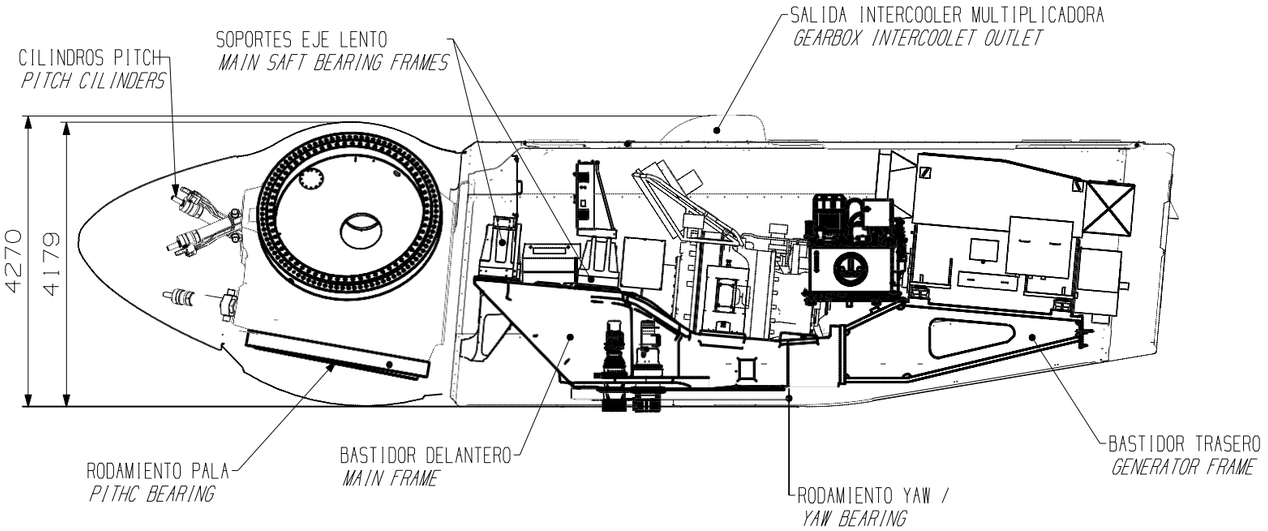
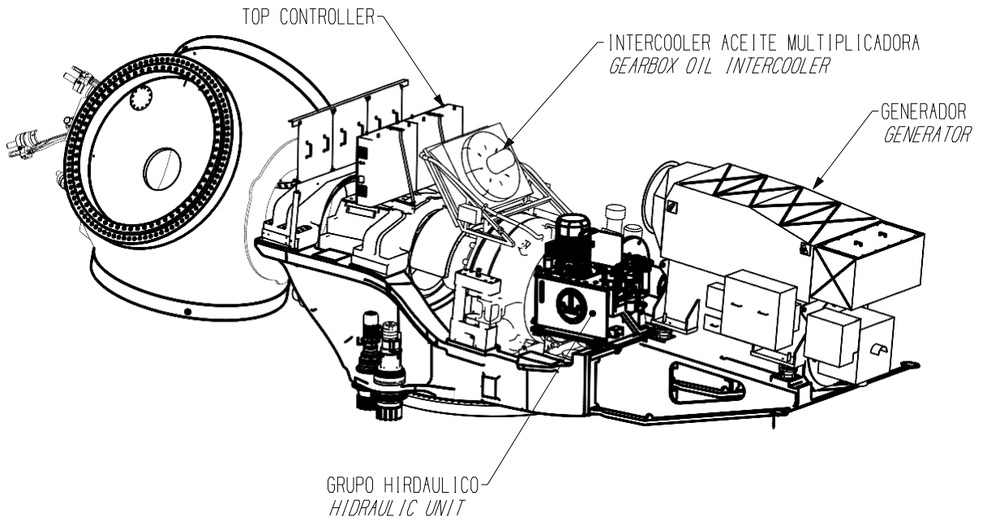
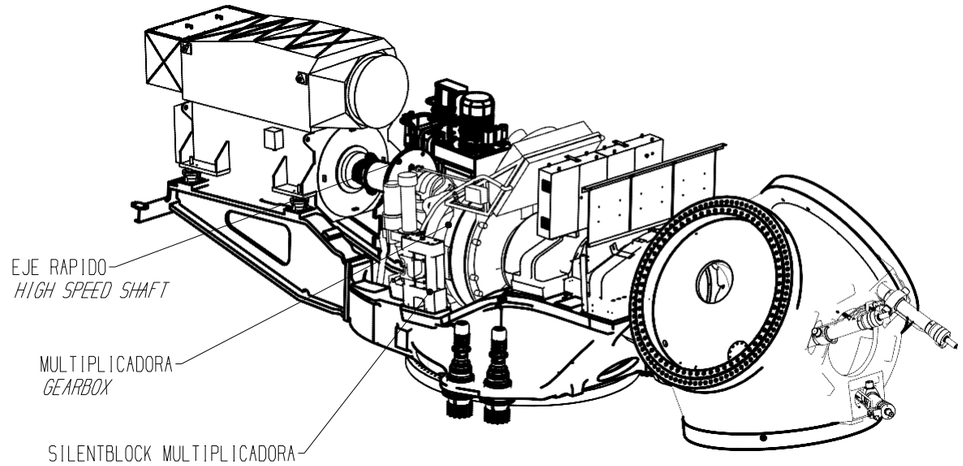
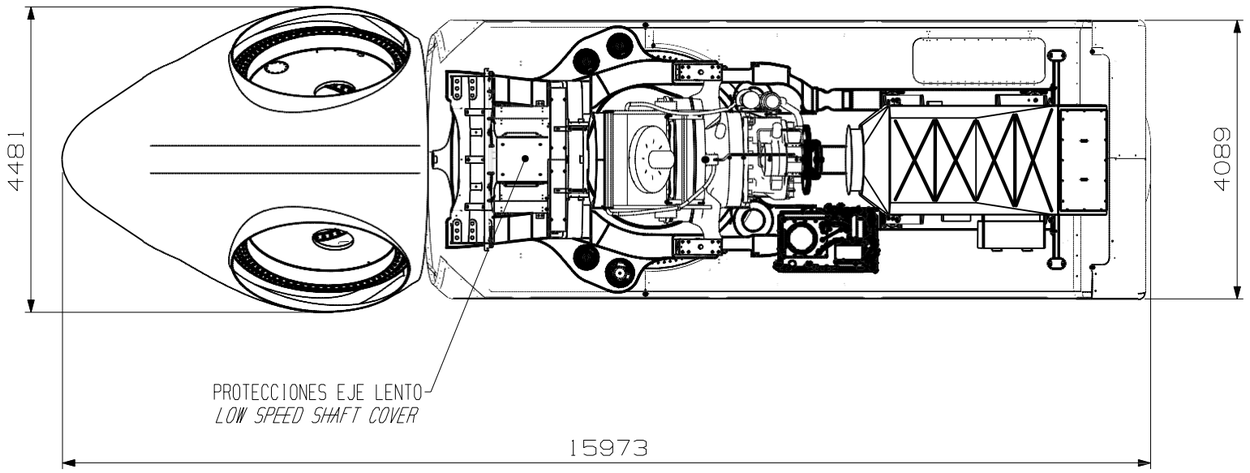


Figure N° 6 Rotor marking









LAS CANTIDADES Y TIPOS DE COMPONENTES DE LAS IMAGENES MOSTRADAS PUEDEN VARIAR EN FUNCION DEL MODELO DE AEROGENERADOR /
QUANTITY AND TYPE OF COMPONENTS MAY CHANGE DEPENDING ON WINDTURBINE MODEL

REV/*REV*	FECHA /*DATE*	REALIZADO /*CREATED*	MODIFICACIÓN / *MODIFICATION*
E	16-05-17	JIL	ACTUALIZAR PLANO CON MULTIPLICADORA / *UPDATE DRAWING WITH GEARBOX*
D	23-09-14	DSV	ACTUALIZAR PLANO CON CARCASA MODULAR / *UPDATE DRAWING WITH MODULAR NACELLE COVER*
C	03-04-13	JIL	ACTUALIZACION DE PLANO / *DRAWING UPDATE*
B	11-02-13	ARO	ACTUALIZACION GENERAL MAQUINA Y DENOMINACION / *GENERAL MACHINE AND NAME UPDATE*
A	10-11-10	OFG	CREACIÓN DEL PLANO / *DRAWING CREATION*

MATERIAL / *MATERIAL*

TOLERANCIAS GENERALES / *GENERAL TOLERANCES*

PESO / *WEIGHT (kg)*

	DIBUJADO *DRAWN*	COMPROBADO *REVISED*	APROBADO *APPROVED*
NOMBRE *NAME*	JIL	JCM	MNP
FECHA *DATE*	16-05-2017	16-05-2017	16-05-2017

ESCALA / *SCALE*

DENOMINACIÓN

DISPOSICION EQUIPOS NACELLE AW3000

NAME

AW3000 NACELLE EQUIPMENT ARRANGEMENT

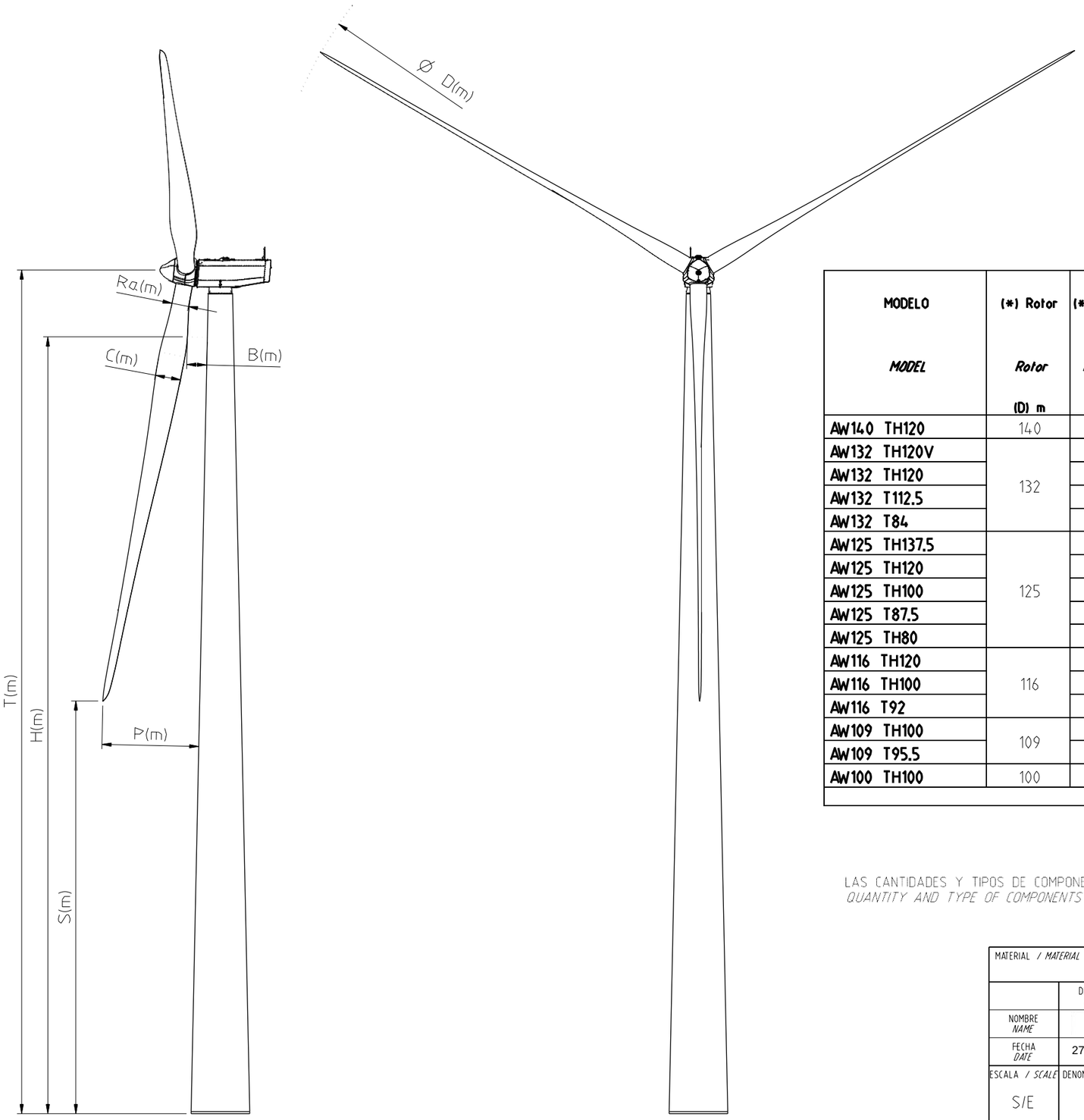
acciona Windpower

PLANO Nº / *DRAWING Nº*: DG200237

REVISIÓN / *REVIEW*: E

HOJA Nº / *SHEET Nº*: 1-1

FORMATO / *FORMAT*: A3



MODELO *MODEL*	(*) Rotor *Rotor* (D) m	(*)Altura buje *Hub height* (T) m	(*) Pala-torre (Mínima distancia) *Blade-tower (Minimum distance)* (B) m	(*) Raiz de pala *Blade root* (Ra) m	(*) Cuerda pala máxima *Maximum Blade chord* (C) m	(*) Pala-suelo (a mínima distancia pala-torre) *Blade-ground (at minimum distance blade-tower)* (H) m	(*) Punta pala-torre *Blade tip-tower* (P) m	(*) Punta pala-suelo *Blade tip-ground* (S) m
AW140 TH120	140	120	3,54	2,40	3,70	86,33	13,3	51,15
AW132 TH120V	132	120	2,52	2,40	3,70	110	12,7	54,9
AW132 TH120		120	2,88	2,40	3,70	110	12,6	55,10
AW132 T112.5		112.5	2,93	2,40	3,70	102,55	13,74	47,36
AW132 T84		84	2,86	2,40	3,70	74	13,75	18,90
AW125 TH137.5	125	137.5	2,88	2,40	3,70	128	12,50	76,00
AW125 TH120		120	2,88	2,40	3,70	110	12,50	58,60
AW125 TH100		100	2,88	2,40	3,70	90	12,50	38,60
AW125 T87.5		87.5	2,88	2,40	3,70	77	13,50	25,90
AW125 TH80		80	2,88	2,40	3,70	70	12,50	18,50
AW116 TH120	116	120	2,88	2,40	3,70	110	11,80	63,00
AW116 TH100		100	2,88	2,40	3,70	90	11,80	43,00
AW116 T92		92	2,89	2,40	3,70	82	12,70	35,00
AW109 TH100	109	100	-	2,414	3,946	-	-	-
AW109 T95.5		95.5	-	2,414	3,946	-	-	-
AW100 TH100	100	100	-	2,414	3,85	-	-	-
(*) Dimensiones aproximadas / *Approximate dimensions*								

LAS CANTIDADES Y TIPOS DE COMPONENTES DE LAS IMAGENES MOSTRADAS PUEDEN VARIAR EN FUNCION DEL MODELO DEL AEROGENERADOR
QUANTITY AND TYPE OF COMPONENTS MAY CHANGE DEPENDING ON WIND TURBINE MODEL

REV/*REV*	FECHA/*DATE*	REALIZADO/*CREATED*	MODIFICACIÓN / *MODIFICATION*
K	27-02-18	MSZ	AÑADIDA TH120V. ACTUALIZACIÓN TABLA *TH120V ADDED. UPDATED TABLE DIMENSIONS*
J	20-09-17	JIL	DESCRIPCION ACTUALIZADA / *UPDATED DESCRIPTION*
I	25-08-17	MSZ	AÑADIDA ALTURAS BUJE 112.5 Y ROTOR AW140. ACTUALIZACIÓN TABLA *112.5 HUB HEIGHT AND AW140 ROTOR ADDED. UPDATED TABLE DIMENSIONS*
H	31-03-16	MSZ	AÑADIDA ALTURAS BUJE 80, 84 y 137.5. ACTUALIZACIÓN TABLA *80, 84 AND 137.5 HUB HEIGHT ADDED. UPDATED TABLE DIMENSIONS*
A	14-06-11	ARO	CREACIÓN DEL PLANO / *DRAWING CREATION*

MATERIAL / *MATERIAL*

TOLERANCIAS GENERALES / *GENERAL TOLERANCES*

PESO / *WEIGHT (kg)*

	DIBUJADO *DRAWN*	COMPROBADO *REVISED*	APROBADO *APPROVED*
NOMBRE *NAME*	H.S.E	JCM	MNP
FECHA *DATE*	27-02-2018	27-02-2018	27-02-2018

ESCALA / *SCALE*: S/E

DENOMINACIÓN

PL. GENERAL AEROGENERADOR AW3000

NAME

GENERAL ARRANGEMENT OF AW3000

acciona Windpower

PLANO Nº / *DRAWING Nº*: DG200274

REVISIÓN / *REVIEW*: K

HOJA Nº / *SHEET Nº*: 1-1

FORMATO / *FORMAT*: A3

Annex C.02.4

Schedule of Planned Preparations for Project Development

Schedule of the Planned Preparations for Project Development

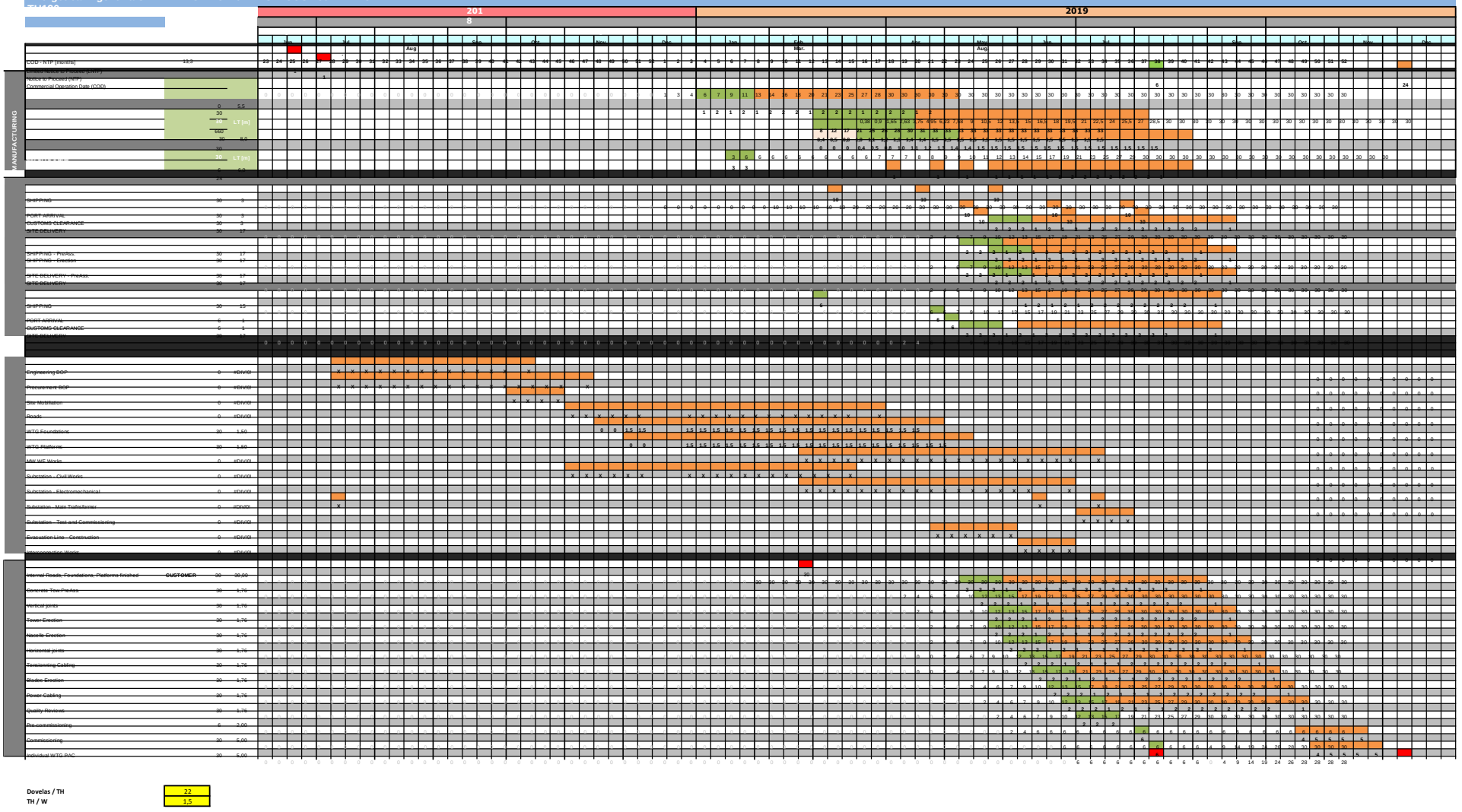
1. INTRODUCTION

Schedule of Planned Preparations of Project Development

This Annex has been provided by Energética Argentina S.A.

acciona Windpower

Energética Argentina SA - ENERGÉTICA I/ TRES PICOS - 30 x AW132



Dovelas / TH	22	
TH / W	1,5	

CHAPTER 03.

Environmental Baseline

CHAPTER 03.

Environmental Baseline

Index

CHAPTER 03.

Environmental Baseline

1. INTRODUCTION

By virtue of modifications the energetic venture proprietor anticipates to be developed in the Project presented under File OPDS N° 2145 - 9512/16, in the present report there is an amplification and update of the Environmental Baseline, with respect to the Biotic Context.

The site of the Wind Energy Center has not been modified with respect to EIA (Original and Addendum). It is located South of the Buenos Aires Province, in the Tornquist Distric, next to Paraje García del Río and at approximately 5 Km from the city of Tres Picos, taking as a reference the Northeast vortex of the Project. (see Figure N° 1).

So, the characterization of the receiver environment in which the Project is placed is clearly described in Point 7, named "Baseline" of the Original EIA (Date: 09/02/2012).

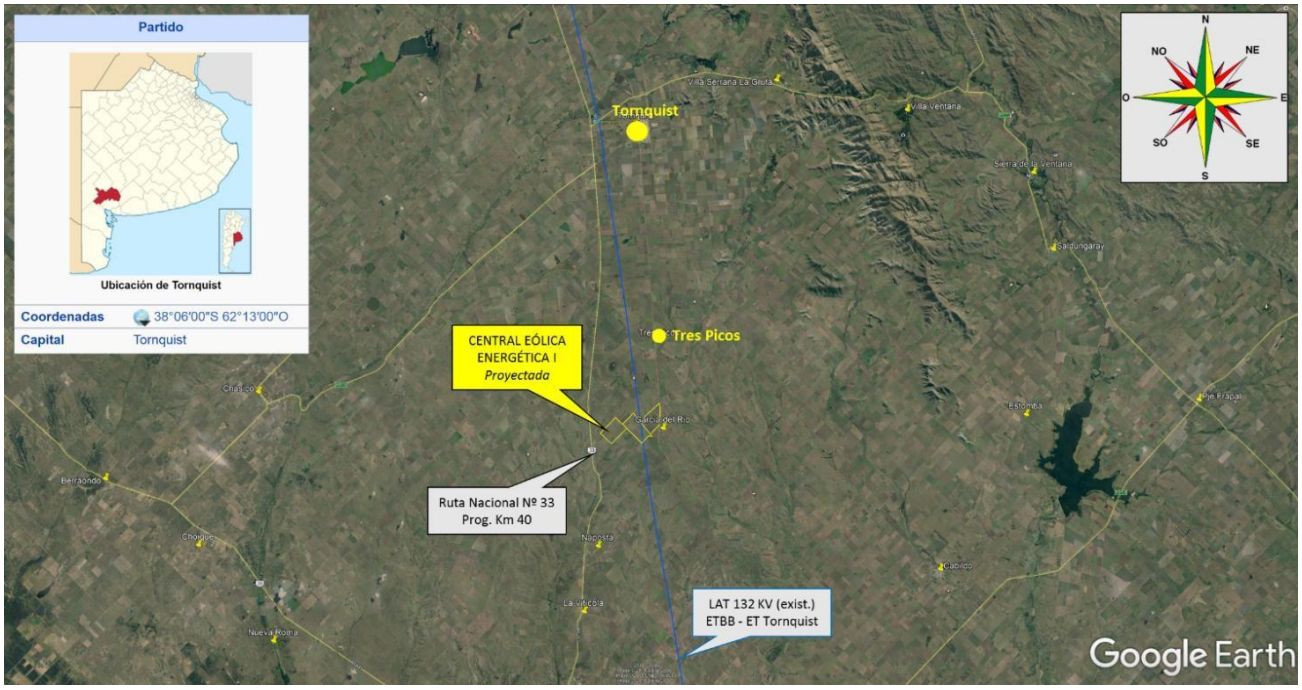


Figure N° 1 Google Image with the geographical location of the Project.

Even though the Project will be located in a rural area where the main activities are agriculture and farming, the three properties and their proximal context are highly modified by infrastructure works of local, regional and national importance. Among them, these are the most prominent ones:

- High voltage aerial line of 132 KV.

  Property of Transba S.A. It bonds the ET Bahía Blanca with the ET Tornquist; it crosses North to South the Rural Property "Reyrolles".
- Medium voltage aerial lines of 13,2 KV (rural).

  Property of Cooperativa of Tornquist. They provide electric energy to the three rural properties, among others.
- Rails and railway station.

  Near the Rural Property of "San Bautista Sur" and "Reyrolles". There is also the "Paraje García del Río", which has an ancient railroad building (inhabited) and the ex-school N° 22 of the Buenos Aires Province.
- National Route N° 33

  At the moment the route trace is being modified into a highway of two lanes (with two driving lanes each other), separated by a central quarry of 23.30 meter wide).

Figure N° 2 Google Image showing infrastructure works around the Project.

For the above said, at the moment the study area has a strong anthropic alteration; the fauna of these plots of land is limited mainly to those species that have adapted to live with human presence in disturbed areas.

2. Update Reports and Environmental Baseline Amplification

Two reports corresponding to the Biotic Context of the Project environment are added below.

- Baseline Report: Flora and vegetation, (August 24th, 2018)
- Baseline Report: Fauna, (September 4th, 2018).

Energetic Wind Center Project I

BaselineReport: Flora and Vegetation

Long, M.A.

Date: 24/8/18

INTRODUCTION

Study Sector Setting in the phyto geographical regional area

The sector analyzed is located in the foot-of-the-mountain area, to the Southwestern of the Sierras Australes from Buenos Aires. The diverse topography represents an ecotone or transitional sector between the topographical areas of La Pampa and Espinal (Morello *et al.* 2012) and it receives the influence of typical mountain flora. For this reason, the area encases great botanic and conservation interest when it presents little anthropic transformation.

As typical features of this ecotone, there are two strata: the lower one, herbaceous, that does not reach the half meter height, and the upper one, with 2 or 3 meter-high shrubs In the herbaceous stratum grass called flechillas (*Amelichloa*, Jarava, *Nassella*, *Piptochaetium*)predominates, and other native species join the *Bromus*, *Pappophorum*, *Poa*, *Bothriochloa*, *Aristida*, *Melica*, *Chascolytrum*, among others (Cabrera 1971; Frangi & Bottino 1995). In a lesser extent, there are other herbaceous families and shrubs: Asteracead, Oxidaceae, Malvaceae and from the Verbena family. An important feature for the conservation is the presence of terrestrial orchids. In the area there are two of the species representative of the South of Buenos Aires: *Bipinnula pennicillata* y *Brachystele dilatata*. Besides, as an unusual feature there can be ferns.

Because of the agricultural and farming use, most of the ecological region of Pampa is transformed almost in full, mostly without its characteristic flowers. The fields that have not been worked or are in rest, often have high percentage of herbs and exotic shrubs, an abundance of yellow flowers (*Diplotaxis tenuifolia*), Russian thistle (*Salsola kali*), thistle *(Carduus thoermeri*), among others.

STUDY AREA

It includes three fields in the proximities of García del Río, in the District of Tornquist, Buenos Aires. The coordinates of the quarters in each field are:

Plot A: Guanaco Chico Field: 38°22'11.09"S - 62°15'21.82"O Plot
B: Reyrolles Field: 38°21'22.69"S - 62°14'20.94"O
Plot C: San Bautista Sur Field: 38°21'5.31"S - 62°13'3.49"O

OBJECTIVES:

- Evaluate plant diversity.
- Estimate the vegetable coverage and the percentage of bare land.
- Identify interesting botanic species with biologic, eco systemic or cultural value.
- Classify the field sectors in their value for conservation by flower signaling in the winter period.
- Suggest management recommendations with emphasis to protect native vegetation and minimize the impact on species in danger.

METHODOLOGY

- **Sampling sites:** Each field was divided into homogeneous sectors with respect to management and general type of landscape.

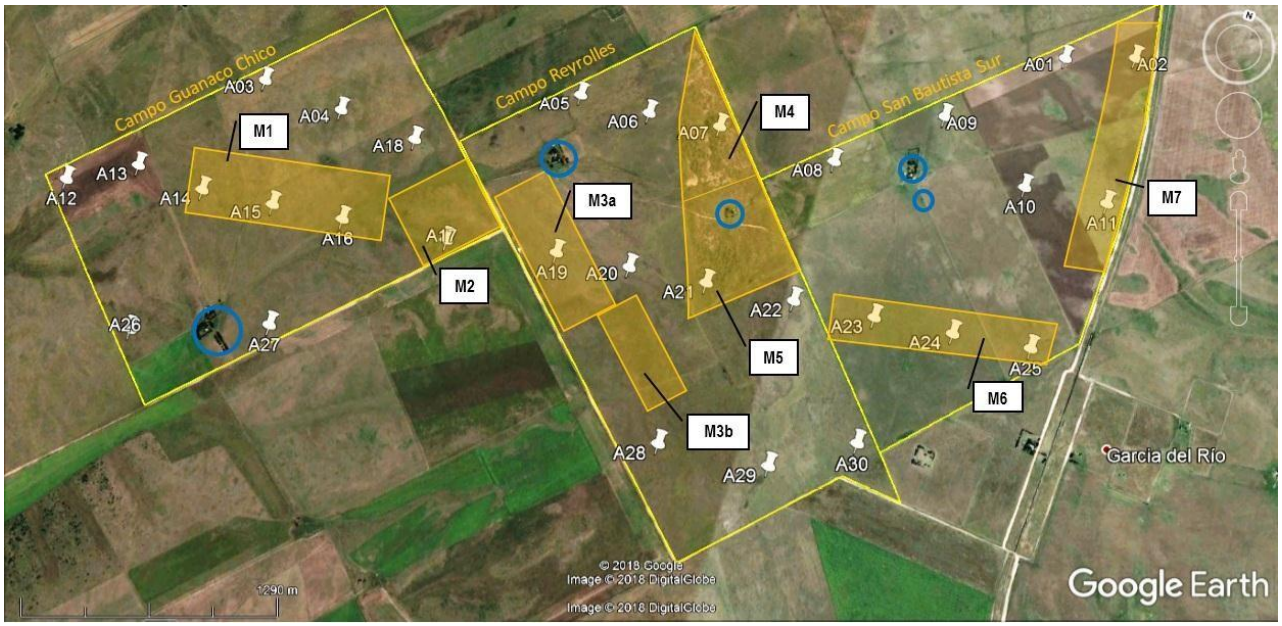


Figure 1- Image of the sector where the wind turbines of the Energetic Wind Center I Project will be located. The different lots are detailed: Campo Guanaco Chico, Reyrolles y San Bautista Sur (yellow-framed), location of the wind turbines (white), and sampling sites (M1 to M79). Blue circles point out tree-observation sites, which resulted all of cultivated origin.

- **For flower diversity and identification of botanic species of interest:**

In each sampling sector (M1 to M7) random walks were performed for the collection of botanic samples and the preparation of a list with presence/absence of species.

In the case of species of difficult identification in the field, samples were taken to determine identification with especial bibliography, under binocular magnifier glass in the office. The period in which the study was performed is not the proper one for identification of flowers (end of August), because most of the perennial species are in vegetative state, without flowers or fruit (which are the ones used in the identification of taxon) and most of the annual ones are barely in a seedling state. So, the flowery richness and its abundance in this time of the year is underestimated with respect to other values that can be obtained during springtime.

Considering taxonomic determinations, it is stated the name given to a tentative sample, indicated as "cf." i.e., name to be confirmed, or if it is only known its genre but not its species (sp.). For the identification of the seedling state,

rosette or vegetative, Fernández *et al.* was consulted. (2016) and specialized works for certain taxon.

For the native species conservation status Delucchi (2006) and the database of endemic plants from Argentina and the Southern Cone (PlanEAR) were consulted and their geographical distribution was considered. For this report, the categories of conservation risks indicated in Table 1 were employed.

Table 1- Categories of extinction risk for native species in function by Delucchi (2006), database of PlanEAR, UICN and geographical distribution information.

Risk Category	Definition
CR: In critical danger	The species is considered in extremely high risk of extinction in wild state. It includes species that have demonstrated a strong shrink in its distribution, there is a generalized menace in their habitat and/or are endemic (exclusive of a reduced area).
IN: Lightly endangered	The species run minor risk of extinction, but there are signs that their populations are at present under threat by a shrinkage in their habitat and/or for being endemic that face anthropic alterations or use.
VU: Vulnerable	The species runs potential risk of extinction. There are anthropic alterations that may cause shrinkage of the population, especially if they are endemic.
NP: No at risk	The species is not under any risk of extinction neither at short or medium term, and on the contrary it shows signs of expediency in face of environmental degradations.
SD: No data	It has not been studied or data are insufficient.

- **Estimation of abundance of species**

These fields contain sections already worked out, where the cultivation covers practically 100% of the field. In these sectors only surveys of the surrounding flora that develops in little patches or in the borders of the cultivated land were carried out. The census of abundant species was developed only in the areas of natural pastures (M2, M3, M4, M5 and M5, M7 in Figure 1). The estimation was done in two ways: a) By land: through the examination of the three sections randomly within each of the sampling areas already mentioned, where it was estimated the coverage of each species in 1 m2 range; b) By air: the previous visual estimation was corroborated through drone-taken aerial images from 30 m height.

- **Presentation of the flower and vegetation information:**

The totality of species in each sector were listed. For each of them it was indicated: a) data pm the species: scientific name, current name (if any), family; origin

(native, cosmopolitan or exotic) and the category of conservation (if any); b) data on the presence/absence in each sector.

Classification of field sectors for recommendations:

The fields were classified in grassland areas of low, moderate and high value of conservation. The presence of the following species is used as indicators of the environmental quality:

Area of moderate value of conservation:

- Grassland: more than 40% of the coverage of native grass, with the presence of one or more species belonging to the genres *Amelichloa, Nassella, Jarava, Paspalum, Piptochaetium, Panicu, Bromus, Melica and Bothriochloa.*
- Shrubs: presence of *Prosopidastrum angusticarpum*, *Discaria americana*, *Baccharis* spp., *Acanthoscylus buniifolius*, *Aloysia gratissima*, *Caesalpinia gilliessii*, *Gutierrezia mandonii*, only if they have a coverage inferior to 30% (otherwise it is assumed as a history of intensive grazing).

Area of high value of conservation:

- If, besides the elements of the previous situation, there is recognition of:
  - rare or endemic species (according categories provided by Rabinowitz *et al.* 1986)
  - species in danger of extinction (under any of the existing categories)
  - species that might have any particular value of conservation: ecologic, cultural or economic service.

RESULTS

In Table 2 the study of species and census of abundance are shown, and there are interest data for some plants, which correspond to the site where the Electrical Wind Energy Center I Project will be developed

A total of 64 species of vascular plants were studied, with 62% (n=39) native ones, coming from the South Cone, and some of them endemic ones, which means with a reduced area of distribution, in this case, the center of Argentina. The 38% are exotic species, circumscribed mostly in cultivation areas or high pastures. In general terms, the area presents a native-exotic proportion lesser than that estimated for a natural grassland in pristine condition (3:1).

The three fields to which this project correspond present a vegetation coverage of 100% with very small areas of barren soil (generally sandstone or gavel). Nevertheless, the plant composition is not equal all along the sample areas (signaled as M1 to M7 in Figure 1).

Guanaco Chico Field: (Figures 2,4 to 7) two different areas are distinguished from the floristic point of view where the wind turbines will be located:

- Area of high value of conservation: The sampling sector M1 is a cultivated land, with a few patches of natural grassland and abundance of exotic or occasional species, associated to anthropic modifications.
- Area of high value of conservation: The sector M2 (Figure 2) instead, is an area of grassland with 50% of the coverage with *Amelichloa caudata*, and the occasional presence of two types of shrubs (less than 20%): *Discaria americana* (native) and *Prosopidastrum angusticarpum* (endemic of the rough soils in San Luis, La Pampa, Southwestern part of Buenos Aires, Neuquén and North of Río Negro). This composition and relative abundance of the species named are indicators of the conservation value assigned.

Reyrolles Field: (Figures 3,8 to 11) patches of vegetation corresponding to Figure 1 , from M3 (a and b), M4 and M5 were evaluated.

- Area of high value of conservation: The M3 sector corresponds to grassland similar to M2 (Guanaco Chico Field) but with diversity somewhat higher, a 30% of *Amelichloa caudata* and 40% of *Nassella sp*., both typical species of native grassland. As surrounding shrubs (in lower proportion and lesser height than in M2) native species of shrubs Margyricarpus *pinnatus* and *Discaria americana* were found.
- Areas of high value of conservation: sector M4 and M5 The first one constitutes a zone of soft hills with sandy soil, and the second, next to the first one, is more regular with a layer not so sandy but with more gravel. In both, vegetation changes considerably with respect to the surrounding area, with the influence of being near the foot of the grove in SIerras Aurstrales of Buenos Aires. The *Nassella* y *Piptochaetium* have a

moderate to low coverage, with surrounding species typical of that at the foot of the mountains: *Dichondra sericea*, Oxalis *articulata*, *Discaria americana*, *Adesmia incana*, *Hysterionica pinnifolia*, *Margyricarpus pinnatus*. Two relevant findings are: a terrestrial orchid, *Bipinnula penicillata* (Figures 10 and 11) and a tiny fern with very primitive features, *Ophioglossum crotalophoroides* (Figure 9), with various individuals distributed along the area between M4 and M5. Both species encase great interest from the point of view of the conservation or for being scarce and sensible to anthropic modifications.

San Bautista Sur Field: (Figures 12 and 13) covers sectors M6 and M7.

- Area of low value of conservation: in its mayor part the field contains cultivation lands, completely transformed (sector M6).
- Area of moderate value of conservation: sector M7. It is a grassland covered by *Amelichloa ambigua* (50% coverage); *Nassella* sp. (30%), with surrounding species like *Acaena myriophylla* and *Hysterionica pinnifolia*.

TABLE 2- Study of species, estimation of abundance (like percentage of coverage) and data of botanic interest, for the Project CE Energética I. Study developed at the end of August, 2018.

References: M1 a M7, sampling areas. LOT A -Guanaco Chico Field: M1= cultivated area; M2= rough hills. LOT B- Reyrolles Field: M3= natural grassland; M4= sandland hills; M5= antenaes. LOT C- San Bautista Sur Field: M6= cultivated land; M7= patch of grassland near the fencing. In gradation of colour and number: 0= absent; 1= present with very low coverage; 20%-30 %, moderate coverage; 40%-50% high coverage; >80% very high coverage. ; presence of species of high value of conservation in low abundance. Categories of conservation (under definitions in Table 1): CR= critical danger; EN= moderate danger; VU= vulnerable; NP= no danger; SD= no data.

Relieved species	Guanaco Chico M1	Guanaco Chico M2	Reyrolles M3	Reyrolles M4	Reyrolles M5	San Bautista Sur. M6	San Bautista Sur. M7	Origin	Category of conservation	Plant Outline	Family
Acaena myriophylla	0	0	0	0	0	0	1	native	VU	sub shrub	Rosaceae
Adesmia incana	0	0	0	0	1	0	0	native	VU	perennial herb	Fabaceae
Amelichloa caudata	1	50%	30%	20%	0	0	50%	native	IN:	perennial herb	Poaceae
Anemone decapetala	0	0	0	1	0	0	0	native	VU	perennial herb	Ranunculaceae
Aphanes parodii	0	1	1	1	0	0	1	native	NP	annual herb	Rosaceae
Baccharis ulicina	1	0	0	1	0	0	1	native	NP	sub shrub	Asteraceae
Bipinnula pennicillata	0	0	0	1	0	0	0	native	CR	perennial herb	Orchidaceae
Bothriochloa barbinodis	0	1	1	0	0	1	0	native	NP	perennial herb	Poaceae
Bowlesia incana	80%	1	0	1	1	0	1	native	NP	annual herb	Apiaceae
Bromus cf *aulethicus*	0	0	0	0	0	1	1	native	IN:	perennial herb	Poaceae
Cardus thoermeri	0	1	0	0	0	0	0	adventicia	_	perennial herb	Asteraceae
Carex bonariensis	1	0	0	1	0	0	0	native	VU	perennial herb	Cyperaceae
Centaurea sp.	1	0	0	0	0	1	1	adventicia	_	perennial herb	Asteraceae
Centunculus minimus	0	0	0	1	0	0	0	adventicia	_	annual herb	Primulaceae
Chaptalia cf *integerrima*	0	0	1	0	0	1	1	native	VU	perennial herb	Asteraceae
Chevreulia sarmentosa	1	1	1	1	0	0	0	native	NP	perennial herb	Asteraceae
Cliococca selaginoides	0	0	0	0	1	0	0	native	VU	perennial herb	Linaceae
Conyza sp.	1	1	0	0	0	0	0	native	SD	perennial herb	Asteraceae

Crop or Weed	40%	0	0	0	0	80%	0	SD	SD	herb	SD
Daucus pusillus	0	0	0	0	0	0	1	native	NP	annual herb	Apiaceae
Dichondra sericea	0	0	0	0	1	0	0	native	VU	perennial herb	Oleaceae
Diplotaxis tenuifolia	1	0	0	0	0	0	1	adventicia	_	perennial herb	Brassicaceae
Discaria americana	0	1	1	1	0	0	0	native	VU	shrub	Rhamnaceae
Eragrostis curvula	0	0	0	0	0	0	1	adventicia	_	perennial herb	Poaceae
Erodium cicutarium	50%	1	1	0	0	1	1	adventicia	_	annual herb	Geraniaceae
Erodium moschatum	0	0	0	0	0	0	1	adventicia	_	annual herb	Geraniaceae
Fissidens sp.	1	1	0	0	0	0	0	native	SD	moss	Fissidentaceae
Fumaria agraria	0	0	0	0	0	1	1	adventicia	_	annual herb	Papaveraceae
Galium richardianum	0	0	0	0	1	0	0	adventicia	_	perennial herb	Rubiaceae
Gamochaeta coarctata	1	1	1	1	1	1	1	native	SD	perennial herb	Asteraceae
Gamochaeta falcata	1	1	0	0	0	1	1	native	SD	perennial herb	Asteraceae
Geranium molle	1	0	0	0	0	0	0	adventicia	_	annual herb	Geraniaceae
Habranthus cf *tubispathus*	1	0	0	0	0	0	0	native	VU	perennial herb	Amaryllidaceae
Hedeoma medium	0	0	0	0	1	0	0	native	IN:	sub shrub	Lamiaceae
Hirschfeldia incana	1	0	0	0	0	1	0	adventicia	_	annual herb	Brassicaceae
Hypochaeris sp.	1	0	1	1	0	1	1	native	SD	perennial herb	Asteraceae
Hysterionica pinnifolia	0	0	0	1	0	0	1	native	VU	sub shrub	Asteraceae
Juncacea sin identificar	0	0	0	0	0	0	1	native	SD	perennial herb	Juncaceae
Lepidium aletes	0	0	0	1	0	0	0	native	VU	perennial herb	Brassicaceae
Lepidium didymum	0	0	0	0	0	1	0	native	NP	annual herb	Brassicaceae
Lolium perenne	1	1	0	0	0	0	0	adventicia	_	perennial herb	Poaceae
Malva sylvestris	0	0	0	0	0	1	0	adventicia	_	perennial herb	Malvaceae
Margyricarpus pinnatus	0	0	1	1	0	0	0	native	IN:	crawling shrub	Rosaceae
Medicago minima	80%	0	0	1	0	1	1	adventicia	_	perennial herb	Fabaceae
Micropsis spathulata	0	1	0	1	0	0	0	native	VU	perennial herb	Asteraceae
Nassella sp.	1	1	20%	20%	0	0	30%	native	CR	perennial herb	Poaceae

Ophioglossum crotalophoroide	0	0	0	1	1	0	0	native	CR	perennial herb	Ophioglossaceae
Opuntia microdasys	0	0	0	0	0	0	1	adventicia	_	suculenta	Cactaceae
Oxalis articulata	1	1	0	1	1	0	0	native	VU	perennial herb	Oxalidaceae
Oxalis perdicaria	0	0	0	1	0	0	0	native	NP	perennial herb	Oxalidaceae
Panicum bergii	0	0	1	0	0	0	0	native	VU	perennial herb	Poaceae
Pappophorum vaginatum	1	0	0	0	0	1	1	native	VU	perennial herb	Poaceae
Parietaria debilis	0	0	0	1	0	0	0	adventicia	_	annual herb	Urticaceae
Piptochaetium sp.	1	1	0	20%	0	1	1	native	VU	perennial herb	Poaceae
Prosopidastrum	0	1	0	0	0	0	0	native	CR	shrub	Fabaceae
Rumex sp.	0	1	0	0	0	0	0	adventicia	_	perennial herb	Polygonaceae
Samolus valerandi	1	0	0	0	1	1	1	native	NP	perennial herb	Primulaceae
Schinus molle	0	0	0	0	0	1	0	adventicia	_	tree	Anacardiaceae
Senecio madagascariensi	1	0	0	0	0	0	0	adventicia	_	perennial herb	Asteraceae
Silybum marianum	1	1	0	0	0	1	1	adventicia	_	perennial herb	Asteraceae
Solanum atriplicifolium	1	0	0	0	0	0	0	adventicia	_	perennial herb	Solanaceae
Stellaria media	0	0	0	1	0	1	1	adventicia	_	annual herb	Caryophyllaceae
Taraxacum officinale	1	0	0	0	0	1	1	adventicia	_	perennial herb	Asteraceae
Veronica arvensis	0	0	0	1	0	0	0	adventicia	_	annual herb	Plantaginaceae

Figure 2: Area of floristic interest in Guanaco Chico Field(M2). It constitutes a flowering of rough and loose stones , which presents native original grassland and two shrub species typical of the foot-of-the-mountain vegetation: *Discaria americana* (native) and *Prosopidastrum angusticarpum* (endemic). Area of the orange range: 15 hect approx.

Figure 3: Sight of the area of floristic interest in Reyrolles Field (sector M4 and M5). It is a sandy flowering with natural grassland and the presence of vulnerable species among others: terrestrial orchid Bipinnula *pennicillata* and *Ophioglossum crotalophoroides*. Range area: 53 has approx.

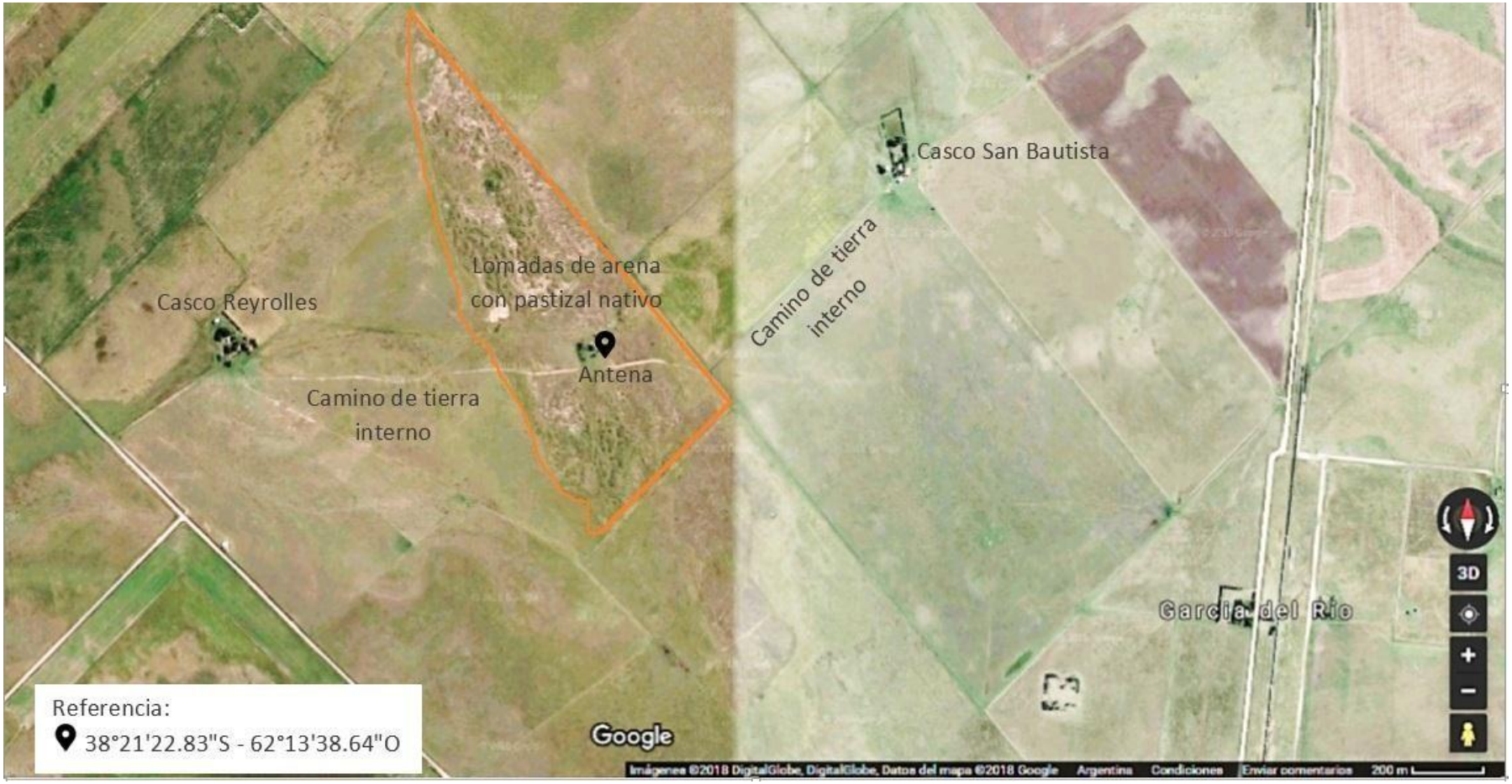


Figure 4- Guanaco Chico Field, sector M1, correspondent to cultivated field.

Figure 5- Guanaco Chico Field, sector M2, view of the grassland *Amelichloa ambigua.*

Figura 6- *Prosipidastrum angusticarpum* endemic species of the centre of Argentina (Sector M2)

Figure 7- *P. angusticarpum*, detail of flowers (Reference Photo for recognition- Source: IBODA).

Figure 8- Reyrolles Field, sandy hills in sector M4 with grassland.

Figure 9- *Ophioglossum crotalophoroides*, fern in danger of conservation. A pendil was used a reference for the size. (Sectors M4 and M5).

Figure 10- *Bipinnula pennicillata*, terrestrial orchid of conservation interest in the sector M4 (two individuals signaled with arrows and circles)

Figure 11- *B. pennicillata*, detail of the flower that blooms in springtime, as well as the basal leaves from Figure 10 they wither (Reference photo, source: IBODA).

Figure 12- San Bautista Sur Field (sector M6) cultivated area.

Figure 13- San Bautista Sur Field. View of the sector with native grassland in M7.

Management Recommendations

The sectors where the wind turbines will be located differ in environmental quality:

a) The sectors indicated in Figure 1 as M2 (Guanaco Chico Field), M3, M4 and M5 (Reyrolles) and M7 (San Bautista Sur) are located between the main areas where mitigation tasks of the impact on the soil movement and the placing of roads, mills and towers will take place. In all these sites the activity will affect patches of native grassland which receives the influence of the foothills of the Sierras Australes Bonaerenses. In the particular case of M4 and M5, it is added that there exist two main species for conservation categorized as in critical danger (Table 2).
b) Sectors M1 (Guanaco Chico Field) and M6 (San Bautista Sur), present great alterations caused by agriculture and farming, with no importance from the botanic point of view. In general, the Tornquist District presents a moderate risk (6-50 mg/ has year) with respect to wind erosion, while it maintains a vegetable coverage (Silenzi *et al.* 2011).

Due to seasonal weather in the region, the peak in maximum growth and flowering of plants happens between ends of October and ends of December (Marban & Bahía 2015). The blossoming enables the detection of plenty of species and improves the certainty in the identification of them. For more information about flower diversity in the sites affected by the Project, it is recommended to perform a new study of the flora during the period of November-December.

To solve the extraction of flora and the presence of bare land and barren soil, it is recommended the application of any of the following actions, or their application in a combined way:

ASSISTED TRANSLOCATION

The assisted translocation with the aims of preserving species consists of their movement in a programmed way, from one site to the other where they can develop properly (UICN 2012). Even though it is rather risky for the survival of the species, it is a possibility of mitigation action, for rare of threatened plants which grow in sites with future modification. (Rosselló-Graell 2002). In this case, it is recommended to do the assited translocation of the species Bipinnula *pennicillata* and *Ophioglossum crotalophoroides*, of the sectors M4 and M5 (and of any other similar species similar in rareness which may be detected in other time of the year). The process of assisted translocation has several stages (Rosselló- Graell 2002): the first one is that of selecting the receiver site, where the species will have a better probability to survive. The most alike are the ecological conditions of the new site and the original one, the best probability of survival of the translocated species will be. In the case of the aforementioned species, they can be taken to other sites within the limits of their original distribution, and to improve their survival at the long run, their introduction in other protected areas in the zone is suggested: Provincial Park Ernesto Tornquist (Ruta Pcial 76, Km 222) and Reserva Sierras Grandes (Sierra de la Ventana), both dependant from OPDS. The second stage is that of selecting the mayority of individuals to move and the strategy of transplantation, which may consist of extracting soil panels or individual plants

with covered or bare root (the decision between economising efforts or maximising survival). In the case of the species in Reyrolles, the specialist in charge will decide the best way to perform the translocation. The third stage is the implementation, where the species is translocated, and the fourth stage is that of the caring to get a full rooting in the new site (implant), and the monitoring of the survival and estate of the species once they have been implanted. So, if this mitigation action is carried out, it must be assured the maintenance of a specialist that monitors the process until the plants develop on their own, period which the specialist will evaluate in relation to the vitality of the plants.

It is suggested the contact with a specialist in translocation of native plants with preservation purposes, with ample experience in the flora from Buenos Aires:

Tec. Univ. Mauro Fossati Botanic Garde of Agronomy – National University of Buenos Aires E-mail: cyathea_australis1@hotmail.com

SPONTANEOUS RESTOCKING OF EMPTY SPACES FROM SEED SOURCES OF NEIGHBOURING POPULATIONS

RESTOCKING ASSITED THROUGH ROLLS OF NATIVE SPECIES SEEDS

The sites of relieved grassland (M2, M3, M4, M5 and M7) present less floristic diversity than the expected for a pasture not submitted to grazing. The species found there are those the surviving livestock does not consume (no palatable), missing or growing in a low proportion the palatable ones.

The removal of soil for the development of the Wind Farm Project will leave a big area of barren land, with no vegetation at all. This may bring severe consequences due to wind and rain erosion, and due to the withdrawal of native species of grassland that already are in severe retraction (Bilenca & Miñarro 2004). The restocking of these bare lands from souces of surrounding grassland seeds might prove a quick solution, economical and operative, but as so said, it will recover only some few species of the hundred native grassland in the area, under optimal conditions. To avoid this, it is possible to enrich the zones with barren land using rolls of native grassland. (Castillo & Marino 2012; Parera & Carriquiri 2014, Figure 14). They are produced by cultivating native grassland in quarters without working, borders of fencing and neighbouring roads. The rolls are fitted into the site, they are dismantled and distributed so that the seeds can be dispersed. The same dried grass serves as a protection so the wind and rain do not remove them until germination. To get a good plant growth, these actions must be done once the heavy machine work is done. But, on the other side, during the works are done, there is the risk of blast and washing of the soil. It is recommended to enrich the soil in the removed sector with other species, especially leguminous plants which are nitrogen fixing. (Milano 2018).

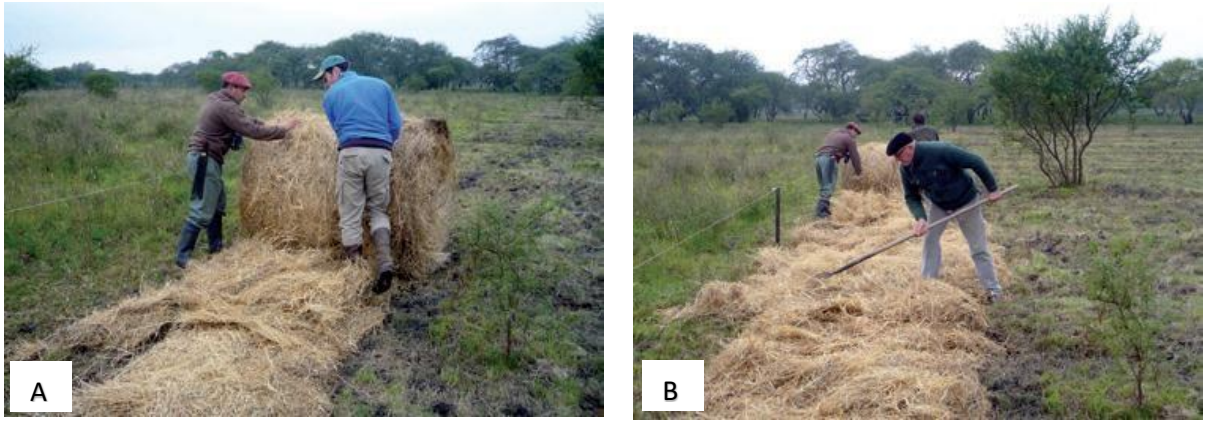


Figure 14- Recovering of degraded soil from rolls of native pastures cultivated in places with grassland of good quality. A- The rolls are dismantled on the ground to be treated. B- Then it is dispersed by hand to get a better distribution of the seeds. (Source: Casillo & Marino 2012).

MONITORING OF THE PROCESS OF RESTAURATION OF THE VEGETAL COVERAGE IN THE AFFECTED SECTOR.

The district of Tornquist is considered in its mayor part as an area of high biodiversity in the national and international range. (Crisci *et al.* 2001; Frangi & Bottino 1995; Kristensen & Frangi 1995). So, monitoring is recommended during preconstruction and construction stages, and as far as possible, up to two subsequent spring-summer periods, when the aspects detailed in Table 3 are attended:

Table 3- Tentative Scheme for a monitoring of the restoration process of the sector

Actions	Moment suggested to make
• Observe that the vegetable cover advances in areas that have been left with bare land.	Immediately after the construction process.
• Detect the presence of invader species (Check database: I3N Argentina) which have advanced with the soil removal and the introduction of machinery.	Stage of preconstruction, construction and post construction, immediate to the final stage.
• If translocation or replanting measures have been applied, check their implantation and installation. are successful.	Months after the remediation action.

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Report of the baseline of Energetic Wind Center I:
Fauna Carrizo Martín Andrés
Date: 4/09/2018

Area of Study

The site of the future Wind Farm is located South of Buenos Aires province, in the District of Tornquist, near Paraje García del Río and approximately at 5 Km from the town of Tres Picos (Figure Nº 1).
The lots that compose the site are at 20 kilometers of an important area for the conservation of birds (AICA). It is about **AICA (BA14)**: Sierras Australes de Buenos Aires (Figure 2).
It covers the Sierras Australes which encase special interest for some birds of patagonic-andino origin and that represent isolated populations that inhabit almost exclusively in the mountain peaks and high valleys, where they breed. Such is the case of the canastero pálido (*Asthenes modesta),* the gaucho serrano *(Agriornis montana),* the jilguero austral *(Sicalis lebruni)* and the piquitodeoro común *(Catamenia analis)*. As well some species of different ensembles live in the place, like those of the Arbustal de Llanura Árido, of Mild Grassland and of Grassland. There have been detected also some endemic cases from Argentina: the espartillero pampeano (*Asthenes hudsoni),* the cacholote pardo *(Pseudoseisura gutturalis)* and the monjita castaña *(Neoxolmis rubetra*). One species of restricted distribution, the monjita chocolate (*Neoxolmis rufiventris*), reaches the area in winter (Di Giacomo 2007).

With the aim of establishing the diversity of the fauna in the area of the Wind Energy Center I there is a data baseline and it is suggested a monitoring schedule for the area which enables the fulfillment of objectives to establish:

- The number of species in existence in the site and their seasonal variation.
- The presence of threatened species.
- The migrant status of the species in existence.
- Activity and seasonal abundance of bats.
- Preliminary recommendations and the suggestion of a tentative schedule for monitoring 2018/2019.

Figure 1. Location and limits (in red) of the future Wind Farm site.

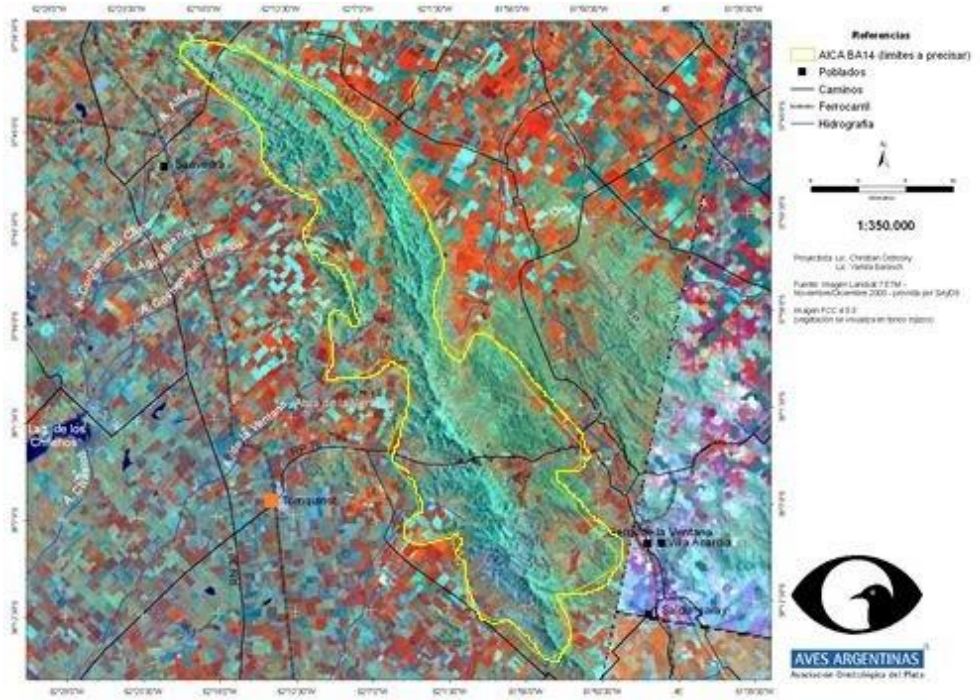

Figure 2. AICA BA14 Sierras Australes de Buenos Aires.

Birds

The avifauna of the region is well documented and it is known about 330 species of birds for the Southwest of Buenos Aires, of which 25% present a migratory behavior (Belenguer et al. 1993, Petracci et al. 2018).

For the District of Tornquinst there are approximately 180 species of birds registered at present (Doiny Cabré y Lejarraga 2015)

During the two studies during August 2018, 142 species were registered in the site of the future Energetic Wind Center, 3 of which are in danger of extinction (Table 1).

Common Name	Scientific Name	Migratory Status	Threatening Status in	Status UICN-BirdLife
Ñandú	*Rhea americana*	R	VU	NT
Inambú Común	*Nothura maculosa*	R	NA	LC
Martineta	*Eudromia elegans*	R	NA	LC
Colorada	*Rhynchotus rufescens*	R	NA	LC
Chiflón	*Syrigma sibilatrix*	R	NA	LC
Bandurria Austral	*Theristicus melanopis*	Mp	NA	LC
Jote Cabeza Negra	*Coragyps atratus*	R	NA	LC
Cauquén común	*Chloephaga picta*	Mp	AM	LC
Milano Blanco	*Elanus leucurus*	R	NA	LC
Gavilán Ceniciento	*Circus cinereus*	R	NA	LC
Carancho	*Caracara plancus*	R	NA	LC
Chimango	*Milvago chimango*	R	NA	LC
Halconcito Colorado	*Falco sparverius*	R	NA	LC
Tero Común	*Vanellus chilensis*	R	NA	LC
Chorlito Cabezón	*Oreopholus ruficollis*	Mp	NA	LC
Gaviota Capucho Café	*Larus maculipennis*	R	NA	LC
Paloma Doméstica**	*Columba livia*	R	NA	LC
Paloma Picazuró	*Columba picazuro*	R	NA	LC
Paloma Manchada	*Columba maculosa*	R	NA	LC
Torcaza	*Zenaida auriculata*	R	NA	LC
Torcacita	*Columbina picui*	R	NA	LC
Loro Barranquero	*Cyanoliseus patagonus*	R	AM	LC
Cotorra	*Myiopsitta monachus*	R	NA	LC

Pirincho	*Guira guira*	R	NA	LC
Lechuza de Campanario	*Tyto alba*	R	NA	LC
Lechucita Vizcachera	*Athene cunicularia*	R	NA	LC
Carpintero Campestre	*Colaptes campestris*	R	NA	LC
Bandurrita Común	*Upucerthia dumetaria*	Mp	NA	LC
Hornero	*Furnarius rufus*	R	NA	LC
Leñatero	*Anumbius annumbi*	R	NA	LC
Pico de Plata	*Hymenops perspicillatus*	Mp	NA	LC
Golondrina Ceja Blanca	*Tachycineta leucorrhoa*	Mp	NA	LC
Ratona Común	*Troglodytes aedon*	R	NA	LC
Calandria Grande	*Mimus saturninus*	R	NA	LC
Cachirla Común	*Anthus correndera*	Mp	NA	LC
Misto	*Sicalis luteola*	R	NA	LC
Chingolo	*Zonotrichia capensis*	R	NA	LC
Cachilo Ceja Amarilla	*Ammodramus humeralis*	R	NA	LC
Verdón	*Embernagra platensis*	R	NA	LC
Loica Común	*Sturnella loyca*	R	NA	LC
Cabecita Negra Común	*Carduellis magellanica*	R	NA	LC
Gorrión	*Passer domesticus***	R	NA	LC
References: R=resident, Mp=Partial Austral Migrant , Ma=Austral Migrant, MN= Nearctic Migrant				
References of threatening status in Argentina: NA= not threatened, VU=vulnerable; AM= threatened ,EN= In danger.				
References of threatening status UICN/Birdlife International: LC: Minor Preoccupation, NT: Nearly Threatened, VU: Vulnerable, EN: In danger, CR: Critical Danger				

Table 1. Birds registered within the site during the investigation

In the area of the future Wind Farm there are 6 species which potentially may be present or use the aerial space, and that are at least under one of the categories of danger at a national level (MAyDS and AA, 2017), and three of which are also under international categories of danger (UICN/BirdLife International) (Table 2)

Common Name	Scientific Name	Migratory Status	Status en Argentina	UICN- BirdLife
Batitú	*Bartramia longicauda*	Mn	VU	LC
Loica Pampeana	*Sturnella defilippi*	Mp	AM	VU
Gavilán Planeador	*Circus buffoni*	R	VU	LC
Monjita Castaña	*Neoxolmis rubetra*	Mp	VU	LC
Espartillero Pampeano	*Asthenes hudsoni*	Mp	AM	VU
Tachurí Canela	*Polystictus pectoralis*	Ma	VU	NT
References: R=resident, Mp=Parcial Austral Migrant , Ma=Austral Migrant,Mn= Nearctic Migrant				
References of threatening status in Argentina: NA= not threatened, VU=vulnerable; AM= threatened, EN= In danger.				
References of threatening status UICN/Birdlife International: LC: Minor Preoccupation, NT: Nearly Threatened, VU: Vulnerable, EN: In danger, CR: Critical Danger				

Table 2. Threatened Species of potential presence in the site.

Preliminary Recommendations. Birds

It is suggested that through a methodology of counting points and vantage points *investigations should continue in order to establish the presence, abundance, seasonal presence and use of the aerial space for all the* species in general, with particular emphasis in the ones mentioned below:

Ñandú (*Rhea americana*) vulnerable (VU). Present in the site and the fields around the site, point census will permit to establish their presence and abundance during the construction stage.

Cauquén Común (*Chloephaga picta*) Threatened(AM). Observed in very low numbers in the field where they stay little time and continue their migratory journey. Samplings with frequency are suggested to establish their abundance and use of the aerial space (see schedule).

Loro Barranquero *(Cyanoliseus patagonus)* Threatened (AM).Present in the site, sampling along a year may permit the use of the aerial space.

Monjita castaña (*Neoxolmis rubetra)* vulnerable (VU). Partial Austral Migrant has been registered in bands in the proximities during its migratory path. Samplings will permit to establish if the species is present in the site.

Gavilán Planeador (*Circus buffoni*) vulnerable (VU). Present in the zone, point census

will permit to establish their presence and abundance during the pre-construction stage.

Loica Pampeana *(Sturnella defilippii)* in danger(EN). The counting points during the whole year will permit to establish their presence and potential use for nesting in the place.

Tachurí Canela (*Polystictus pectoralis*) vulnerable (VU). It is austral migrant; it is not discarded that it may be present in the area. The point census will permit to establish their presence and abundance during the pre-construction stage.

Batitú *(Bartramia longicauda).* threatened (AM) Species that breeds in the Northern Hemisphere and visits us during summer. Its presence is known in the zone and it is not discarded that it might be present in the site or use the aerial space.

Espartillero Pampeano *(Asthenes hudsoni)* threatened (AM) inhabitant of pajonales and espartillares it is not discarded that it might be present in the zone. The point census will permit to establish their presence and abundance during the pre-construction stage.

The numerous Migrant species known in the zone, either austral ones and those which come from the Northern Hemisphere, require special attention to establish if the use the site or it is within their migratory path.

Mammals

Even though terrestrial mammals are not in danger of collision with the wind turbines, these might be affected by the different human activities like truck circulation, traffic, constructions, maintenance works, noise generation, the increase of human presence, etc. To this it must be added the insfrastructure of the turbines, new roads or electrical wiring that may affect the species within or near the Wind Park, making them leave the area or avoid it, what is translated as a shrinking in the life quality of their habitat or directly the loss of it, as a result of the current explotation of the place.
How this impact is manifested on the animals will depend on the ecological role of each species.

The site where the Energeti Wind Center I Project is developed, presents a strong anthropic alterarion and is anticipated that the mammals present in the zone are those which tolerate high environmental modifications and the human presence.

These species are confirmed to be present in the site:

El **Zorro gris** (*Lycalopex gymnocercus*), present in the site, it is abundant and highly distributed, even in places modified by humans. It is hunted for being considered harmful for the sheep cattle and fowl. (Canevari y Vaccaro, 2007).

The **Liebre europea** (*Lepus europaeus),* present in the site, it is a species introduced which lives in all kind of environment and generally prefers open zones. It has crepuscular and night habits and it is also seen in the day in places where it is not observed or pursuited (Canevari y Vaccaro, 2007).

The Vizcacha *(Lagostomus maximus)* present in the site. It is abundanct and without any problem of conservation mainly in the national range, but in the Buenos Aires Province has almost disapperaed in the North because it is hunted for its meat and for being considered harmful for agriculture. (Canevari y Vaccaro, 2007). Photo 1 and 2.

The **Peludo** (*Chaetophractus villosus*) present in the site, it lives in mainly open zones like grasslands, scrublands and savannahs, and also in environments modified by men. It is abundant and well distributed, of mainly nightly habits, although in winter can also be active during the day (Canevari y Vaccaro, 2007). Photo 3.

The **Mulita Pampeana** (*Dasypus hybridus*) present in the site, it is active day and night and in Argentina it is considered potentially vulnerable.

The Gato **del Pajonal** *(Leopardus colocolo*) present in the site, it lives in the grasslands, pastures, shrubs, and open woods. It is quite tolerant to modified environments. It suffers high pressure of hunting because it is considered extremely harmful. It is considered Vulnerable in the national level and near threat (NT) by UICN.

Photo 1. Viscacha Caves photographed in the site.

Photo 2. Vizcacheras photographed in the site.

Photo 3. Peludos Caves photographed in the site.

Preliminary Recommedations for mammals

Bats constitute the group of mammals for which there is enough information of the negative impact Wind Farms have over the different species as a result of collisions. For many places the knowledge about what species are present is scarce and/ or in other cases null. As a first measure it is recommended to implement a monitoring program during the pre-construction stage for over one-year term, which permits to establish the presence and abundance of the different species. Such study will be done through

the use of methodologies of ultrasound samplings.

In the case of the **Xenatros** (peludos and mulitas) as a first measure it is recommended to prepare a ***protocol of procedures for*** the staff that works in the Wind Park, which established the steps to take in case of encounters with the species of the group in order to guarantee the survival of the animals that inhabit the site during the construction stage.

In the case of the **Gato de Pajonal** it is suggested to investigate the zone, to establish its abundance in the place and to spread the voice among the population in order to raise awareness about the situation.

FINAL CONSIDERATIONS

Wind energy has undeniable value in the production of clean energy and as a tool to fight against climate change, nevertheless, it is not exempt of negative impacts over the fauna where two of the most affected groups are birds and bats.

Collisions, inconveniences and displacements, the barrier effect and habitat destruction are the main renown negative factors. It is important to do a correct sampling during the pre-construction stage to obtain truthful information that permits to take measures in order to minimize potential impacts.

There is a tentative schedule of monitoring 2018/2019 for the Energetic Wind Center I which counts with:

- For birds, the sampling will be monthly. It is advisable to double efforts (fortnightly) during the migration season of Cauquenes (period May/August).
- For the group of chiropters, the use of ultrasound with monthly sampling.
- It is advised that the information obtained be contrasted with that of other wind projects neighbor to the site with the aim of enriching the Adaptation Management Plan of each of them in a way that the results permit taking better decisions having in mind the synergy effect at a regional level.

	2018					MONTH						2019
ACTIVITY	S	O	N	D	E	F	M	A	M	J	J	A
1) Summer Migrant Birds												
2) Winter Migrant Birds (Cauquenes, etc)												
3) Bats												

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Chapter 04

Specific Studies

Chapter 04 Specific Studies

Index

Chapter 04 Specific Studies

1. INTRODUCTION

in this document a series of specific studies done are incorporated having in mind the project range and the Wind Center environment receiver.

The particular characteristics of the project and the environment receiver vulnerability determine which are the environmental factors over which it is necessary to focus the study and analyze in detail.

2. Annex C.04

Below there are some reports, whose goal is to evaluate potential environmental impacts (positive or negative) of the Wind Energy Center.

C.4.1. Analysis of the Surface affected by the Wind Power Plant

C.4.2. Analysis of Noise Effects produced by wind turbines

C.4.3. Analysis of Shadow Effects produced by wind turbines

C.4.4. Analysis of Low Frequency Fields and the Corona Effect

C.4.5. Analysis of the Production Intake of "Clean" Electric Energy into the Regional System

C.4.6. Analysis of the Possible Contribution in Reduction of Emission Factors

C.4.7. Analysis of Energy Production Effect on the saving of Methane Tankers.

Annex C.04.1

Analysis of the Surface affected by the Wind Power Plant

Analysis of the Surface affected by the Wind Power Plant

Index

ANALYSIS OF THE SURFACE AFFECTED BY THE WIND POWER PLANT

1. INTRODUCTION

This report contains an estimation of the actual surface that will be affected by different facilities that make up the Project, during the stages of preparation, construction and set-up of the Wind Energy Center.

Wind Energy Parks have very different characteristics in reference to the occupation of surfaces, compared to other power stations of different electric energy. They require an ample surface for a good advantage of wind resources, but the actual use of the affected surface is much less that the required ground for an adequate exploitation of that source of renewable energy.

There is actual advantage of the soil in the sites where they will be installed: The Transformer Station and mounting areas for the Wind Energy Turbines, cable ducts, internal roads and the workroom (see Figure N° 1)

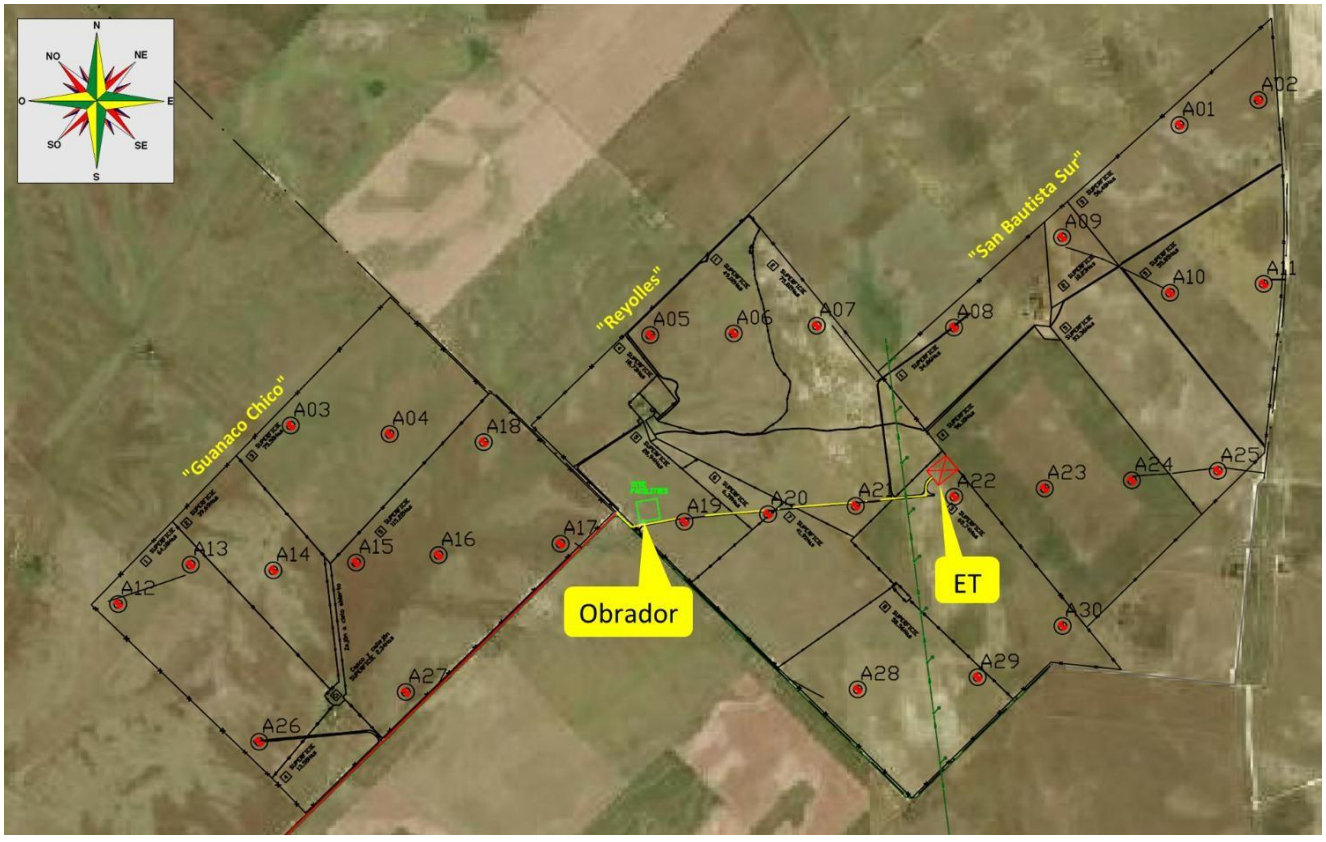


Figure N° 1 Google Image with the location of the facilities necessary for the project.

2. ESTIMATE ON THE AFFECTED SURFACE

2.1. PREPARATORY STAGE OF THE SITE AND CONSTRUCTION

In Table N° 1 there is an estimate of the occupation of the minimal surface that will be affected during the preparation and construction stages of the Wind Energy Center.

Table N° 1 Minimum Affected Surface. PREPARATORY STAGE OF THE SITE AND CONSTRUCTION

#	Description	Dimensions	Affected surface (m2)
1	Area assigned to the Transformer Station. Perimeter Fencing.	110m x 100m	11,000
2	Underground Collector Network Area (underground ducts in 33 KV, PAT earthing system and communication links).	22.000m x 2,5[1]m	55,000
3	Area assigned to foundations, mounting platforms and temporary storage of components for the Wind Energy	30 x 3680 m^2	110,400
4	Area assigned for internal roads.	18,000m x 6m	108,600
5	Area assigned for the workroom.	Gl.	11,000
		Total	296,000

Note (1): It is assumed that 2.5 meters is the width that comprises the trench and the ridge of soil adjacent during the duct construction stage, up to its final cover.

For illustration, in Figure N° 2 there are two photographs where the area occupied by the internal road, the foundation and the mounting platform of a wind energy turbine can be seen; Source: Acciona Energía (internet).

Figure N° 2 Photographs where the area occupied during the installation of a wind energy turbine can be observed.

So we can conclude that during the preparation and construction stage the total surface affected by the work will be of approximately 29.6 has.

2.2. OPERATIVE STAGE AND MAINTENANCE

In Table N° 2 there is an estimate of the occupation of the minimal surface that will be affected during the preparation and construction stages of the Wind Energy Center.

Table N° 2 Minimum Affected Surface. Operative Stage and Maintenance

#	Description	Dimensions	Affected surface (m2)
1	Area assigned to the Transformer Station. Perimeter Fencing.	110m x 100m	11,000
2	Area assigned for each wind energy turbine.	Gl.	110,400
3	Area assigned for internal roads.	18,000m x 6m	108,600
		Total	230,000

Total affected area (hectares)	23,0
Percentage of the total surface (950 hectares)	2.42%

It is not considered the surface that will be affected by underground ducts, because once the trench is covered the surface can be used to continue with the rural activity.

3. CONCLUSION

During the preparation and construction stage of the Wind Energy Center the total surface affected will be of approximately 29.6 hectares and during the operative stage, of 23 hectares.

As indicated in the Addendum EIA, the permanent occupation of the area affected by infrastructure works of the Wind Energy Center will be of 2.4% of the total surface of the site (3 portions of the field).

Rural production (agriculture and farming) and the installation of the new venture with energetic purposes match completely; the field can support both activities without difficulties.

Annex C.04.2

ANALYSIS OF NOISE EFFECTS PRODUCED BY WIND TURBINES

ANALYSIS OF NOISE EFFECTS PRODUCED BY WIND TURBINES

1. INTRODUCTION

This Annex contains the Analysis of Sound Effects produced by Wind Energy Turbines in the environment of the Wind Energy Center.

This report was developed using the calculation software "WindPRO 3.2.701 by EMD International A/S, *Noise".* The same was provided by Energética Argentina S.A. and elaborated by Nordex Energy Spain, S.A:

Project:

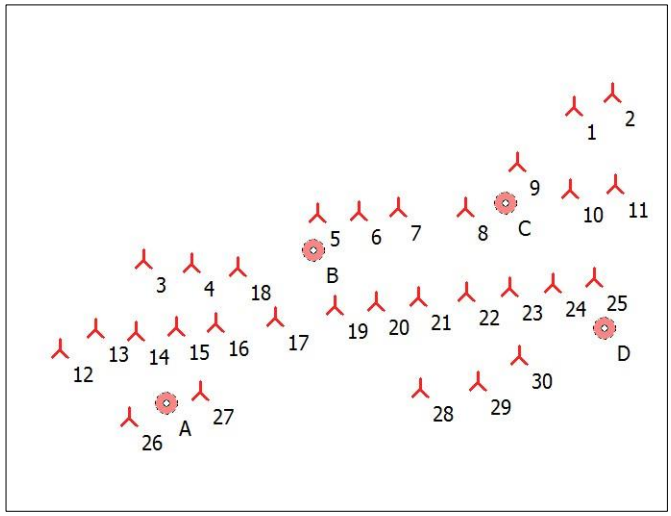
20180525_AR_TresPicos_MAG_05

Licensed user:
NORDEX ENERGY SPAIN, S.A.
Av. Innovation City 3 ES-31621
Sarriguren
+34 948720535
Iker Mateos / imateos@nordex-online.com
Calculated:
11/09/2018 8:55/3.2.701

DECIBEL - Main Result

Calculation: 20180911_AR_Tres Picos_Noise study_R05-V11

Noise calculation model:
ISO 9613-2 General
Wind speed at 10 m height (m/s)
8.8 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0.2
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones Model:
5.0 dB(A)
Height above ground level, when no value in NSA object:
2.0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0.0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:75,000
New WTG
Noise sensitive area

WTGs

	Easting	Southing	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones
1	569.039	5,755,805	240.0	A01	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
2	569.420	5,755,927	250.0	A02	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
3	564.750	5,754,326	211.5	A03	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
4	565.227	5,754,284	240.0	A04	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
5	566.485	5,754,771	225.7	A05	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
6	566.887	5,754,779	230.0	A06	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
7	567.288	5,754,817	258.7	A07	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
8	567.951	5,754,808	244.1	A08	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
9	568.472	5,755,252	260.0	A09	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
10	568.993	5,754,979	247.1	A10	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
11	569.445	5,755,023	240.0	A11	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
12	563.917	5,753,448	214.0	A12	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
13	564.267	5,753,642	220.0	A13	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
14	564.666	5,753,614	232.5	A14	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
15	565.065	5,753,652	210.6	A15	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
16	565.463	5,753,689	206.5	A16	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
17	566.052	5,753,745	217.0	A17	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
18	565.681	5,754,244	235.2	A18	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
19	566.649	5,753,853	240.0	A19	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
20	567.053	5,753,891	240.0	A20	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
21	567.476	5,753,931	255.5	A21	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
22	567.952	5,753,976	253.9	A22	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
23	568.388	5,754,017	250.0	A23	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
24	568.809	5,754,057	250.0	A24	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
25	569.224	5,754,103	247.0	A25	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
26	564.598	5,752,770	220.0	A26	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
27	565.305	5,753,015	210.0	A27	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
28	567.486	5,753,028	250.0	A28	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
29	568.065	5,753,088	250.0	A29	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No
30	568.474	5,753,340	255.9	A30	Yes	Acciona Windpower	AW132/3300/-3.300 MVA.	3.300	132.0	120.0	USER	Level 0 - Calculated - DG200506-A - 09-2014	8.8	107.1	No

Calculation Results

Sound level

Noise sensitive area					Demands	Sound level		Demands fulfilled ?
No.	Name	Easting	Southing	Z [m]	Imission height [m]	Noise [dB(A)]	From WTGs [dB(A)]	Distance to noise demand [m]	Noise
A	D01	564,967	5,752,909	210.0	2.0	50.0	49.7	42	Yes
B	D02	566,441	5,754,409	230.0	2.0	50.0	49.9	15	Yes
C	D03	568,357	5,754,859	250.0	2.0	50.0	49.8	38	Yes
D	D04	569,320	5,753,611	250.0	2.0	50.0	46.6	238	Yes

Licensed user:
NORDEX ENERGY SPAIN, S.A.
Av. Innovation City 3 ES-31621
Sarriguren
+34 948720535
Iker Mateos / imateos@nordex-online.com
Calculated:
11/09/2018 8:55/3.2.701

DECIBEL - Main Result

Calculation: 20180911_AR_Tres Picos_Noise study_R05-V11

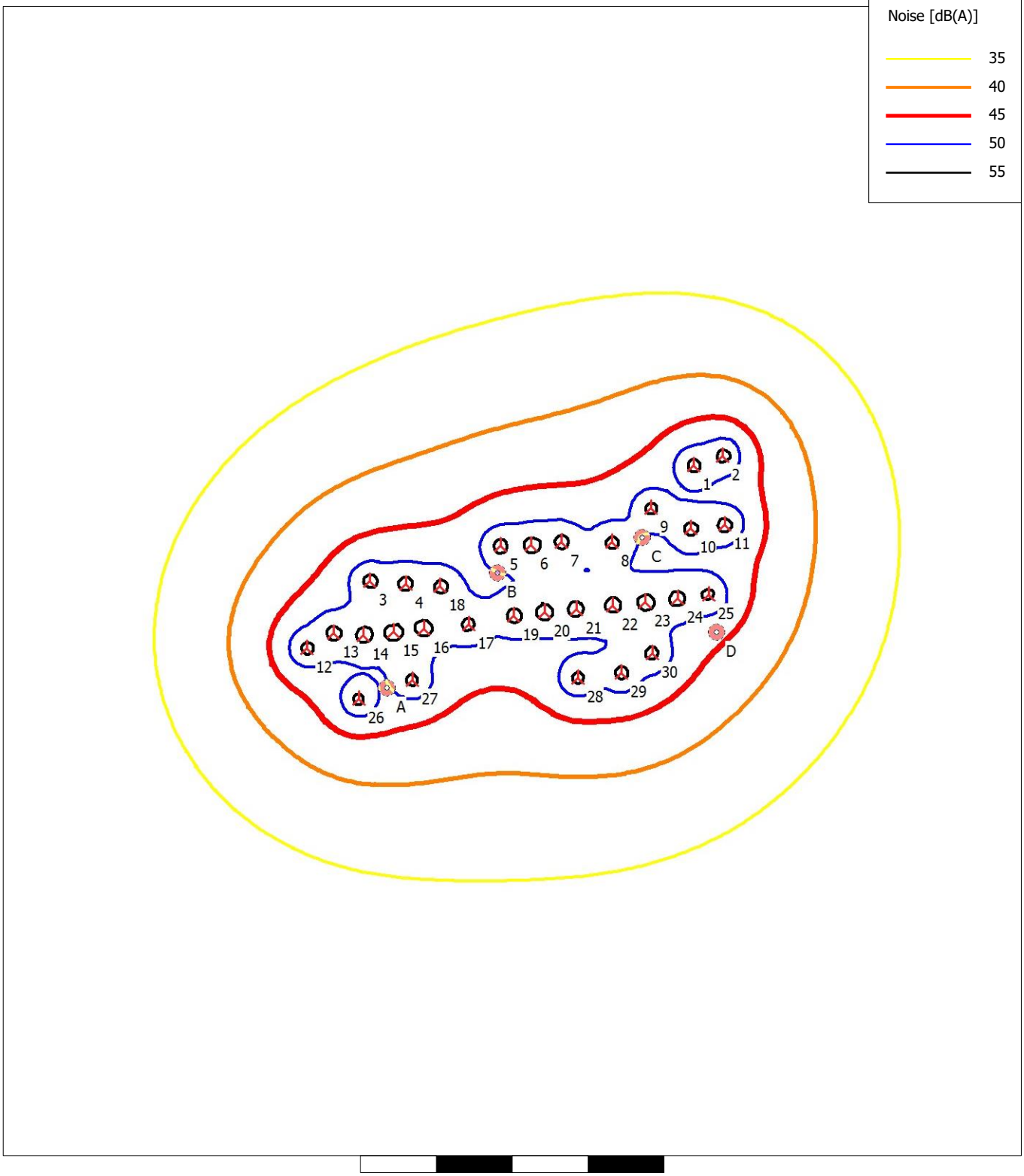
Distances (m)

WTG	A	"	"	"D"
1	4997	2949	1166	2212
2	5379	3343	1507	2318
3	1433	1693	3646	4625
4	1399	1221	3182	4148
5	2402	365	1874	3063
6	2680	579	1472	2699
7	3004	940	1070	2363
8	3537	1562	409	1818
9	4216	2199	409	1847
10	4527	2615	647	1407
11	4952	3066	1100	1418
12	1180	2701	4659	5405
13	1013	2305	4267	5053
14	766	1945	3895	4654
15	749	1571	3506	4255
16	924	1215	3122	3858
17	1370	770	2560	3271
18	1514	778	2746	3694
19	1929	594	1982	2682
20	2306	802	1624	2284
21	2709	1140	1280	1871
22	3170	1572	972	1416
23	3596	1986	843	1017
24	4010	2394	921	678
25	4421	2800	1150	501
26	394	2467	4301	4796
27	354	1798	3566	4059
28	2522	1732	2028	1924
29	3103	2093	1795	1359
30	3533	2297	1524	888

Licensed user:
NORDEX ENERGY SPAIN, S.A.
Av. Innovation City 3 ES-31621
Sarriguren
+34 948720535
Iker Mateos / imateos@nordex-online.com
Calculated:
11/09/2018 9:14 AM/3.2.701

DECIBEL - Map 8.8 m/s

Calculation: 20180911_AR_Tres Picos_Noise study_R05-V11



Map: Blank map , Print scale 1:75,000, Map center UTM (south)-WGS84 Zone: 20 East: 566,681 North: 5,754,348

New WTG

Noise sensitive area

Noise calculation model: ISO 9613-2 General Wind Speed (m/s) 8.8 m/s
Height above sea level from active line object

Annex C.04.3

ANALYSIS OF SHADOW EFFECTS PRODUCED BY WIND TURBINES

ANALYSIS OF SHADOW EFFECTS

PRODUCED BY WIND TURBINES

1. INTRODUCTION

This Annex contains the Analysis of Sound Effects (flickering) produced by Wind Energy Turbines in the environment of the Wind Energy Center.

This report was developed using the calculation software "WindPRO 3.2.712 by EMD International A/S, *Shadow".* The same was provided by Energética Argentina S.A. and elaborated by Nordex Energy, USA Inc.

Project:
20180525_AR_TresPicos_MAG_05

Licensed user:
NORDEX USA Inc.
300 South Wacker Drive, Suite 1500
US-CHICAGO, IL 60606
312 386 4137
Gabriel / gantonietti@nordex-online.com
Calculated:
9/24/2018 12:36 PM/3.2.712

SHADOW - Main Result

Calculation: 20180924_AR_Tres Picos_Noise R05-V11_Shadow

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [CHILLAN]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12.12	10.93	8.47	5.90	3.60	2.75	3.90	5.07	6.52	8.57	9.95	10.25

Operational hours are calculated from WTGs in calculation and wind distribution: WAsP_TresPicos2_120m_20y

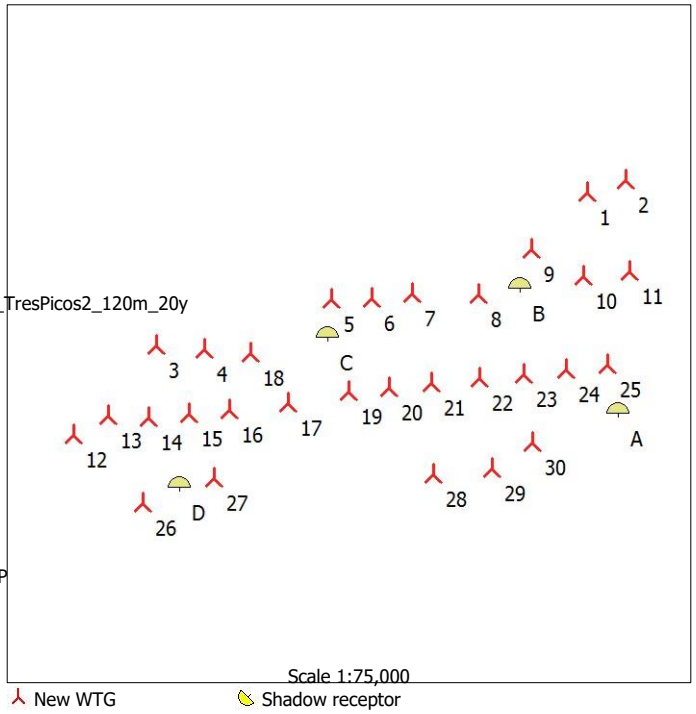
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
1,770	584	308	294	528	382	401	490	615	719	881	1,701	8,674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: TresPicos_SRTM_UTM WGS84_10m_MAG_O
Obstacles used in calculation
Eye height for map: 1.5 m
Grid resolution: 1.0 m

All coordinates are in
UTM (south)-WGS84 Zone: 20



WTGs

	Easting	Southing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m/s]	[dB(A)]
1	569.039	5,755,805	240.0	A01	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
2	569.420	5,755,927	250.0	A02	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
3	564.750	5,754,326	211.5	A03	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
4	565.227	5,754,284	240.0	A04	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
5	566.485	5,754,771	225.7	A05	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
6	566.887	5,754,779	230.0	A06	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
7	567.288	5,754,817	258.7	A07	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
8	567.951	5,754,808	244.1	A08	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
9	568.472	5,755,252	260.0	A09	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
10	568.993	5,754,979	247.1	A10	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
11	569.445	5,755,023	240.0	A11	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
12	563.917	5,753,448	214.0	A12	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
13	564.267	5,753,642	220.0	A13	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
14	564.666	5,753,614	232.5	A14	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
15	565.065	5,753,652	210.6	A15	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
16	565.463	5,753,689	206.5	A16	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
17	566.052	5,753,745	217.0	A17	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
18	565.681	5,754,244	235.2	A18	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
19	566.649	5,753,853	240.0	A19	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
20	567.053	5,753,891	240.0	A20	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
21	567.476	5,753,931	255.5	A21	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
22	567.952	5,753,976	253.9	A22	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
23	568.388	5,754,017	250.0	A23	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
24	568.809	5,754,057	250.0	A24	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
25	569.224	5,754,103	247.0	A25	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
26	564.598	5,752,770	220.0	A26	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
27	565.305	5,753,015	210.0	A27	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
28	567.486	5,753,028	250.0	A28	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
29	568.065	5,753,088	250.0	A29	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5
30	568.474	5,753,340	255.9	A30	Yes	Acciona Windpower	AW132/3300/-3.300	3.300	132.0	120.0	1.713	12.5

MVA

Licensed user:
NORDEX USA Inc.
300 South Wacker Drive, Suite 1500
US-CHICAGO, IL 60606
312 386 4137
Gabriel / gantonietti@nordex-online.com
Calculated:
9/24/2018 12:36 PM/3.2.712

SHADOW - Main Result

Calculation: 20180924_AR_Tres Picos_Noise R05-V11_Shadow

Shadow receptor-Input

No.	Easting	Southing	Z	Width	Height	Elevation a.g.l.	Degrees from south cw	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]	[°]		[m]
A	569,318	5,753,619	250.0	1.0	1.0	1.0	0.0	90.0	Fixed direction	2.0
B	568,361	5,754,858	250.0	1.0	1.0	1.0	0.0	90.0	Fixed direction	2.0
C	566,442	5,754,395	228.5	1.0	1.0	1.0	0.0	90.0	Fixed direction	2.0
D	564,962	5,752,916	210.0	1.0	1.0	1.0	0.0	90.0	Fixed direction	2.0

Calculation Results

Shadow receptor

No.	Shadow, worst case: Shadow hours per year [h/year]	Shadow, worst case: Shadow days per year [days/year]	Shadow, worst case: Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
A	61:18	94	0:50	24:38
B	130:18	164	1:12	55:42
C	81:32	164	1:00	36:33
D	60:54	66	1:08	24:11

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	A01	12:00	12:00
2	A02	12:00	12:00
3	A03	3:10	1:15
4	A04	10:46	4:26
5	A05	12:00	12:00
6	A06	4:50	1:55
7	A07	11:53	4:52
8	A08	121:45	52:13
9	A09	12:00	12:00
10	A10	12:00	12:00
11	A11	12:00	12:00
12	A12	12:00	12:00
13	A13	12:00	12:00
14	A14	12:00	12:00
15	A15	2:54	1:06
16	A16	12:00	12:00
17	A17	12:00	12:00
18	A18	32:29	1:22 PM
19	A19	12:00	12:00
20	A20	12:00	12:00
21	A21	26:33	1:26 PM
22	A22	8:07	3:55
23	A23	12:00	12:00
24	A24	12:00	12:00
25	A25	12:00	12:00
26	A26	60:54	24:11
27	A27	12:00	12:00
28	A28	12:00	12:00
29	A29	10:01	8:51
30	A30	42:30	5:06 PM

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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NORDEX USA Inc.
300 South Wacker Drive, Suite 1500
US-CHICAGO, IL 60606
312 386 4137
Gabriel / gantonietti@nordex-online.com
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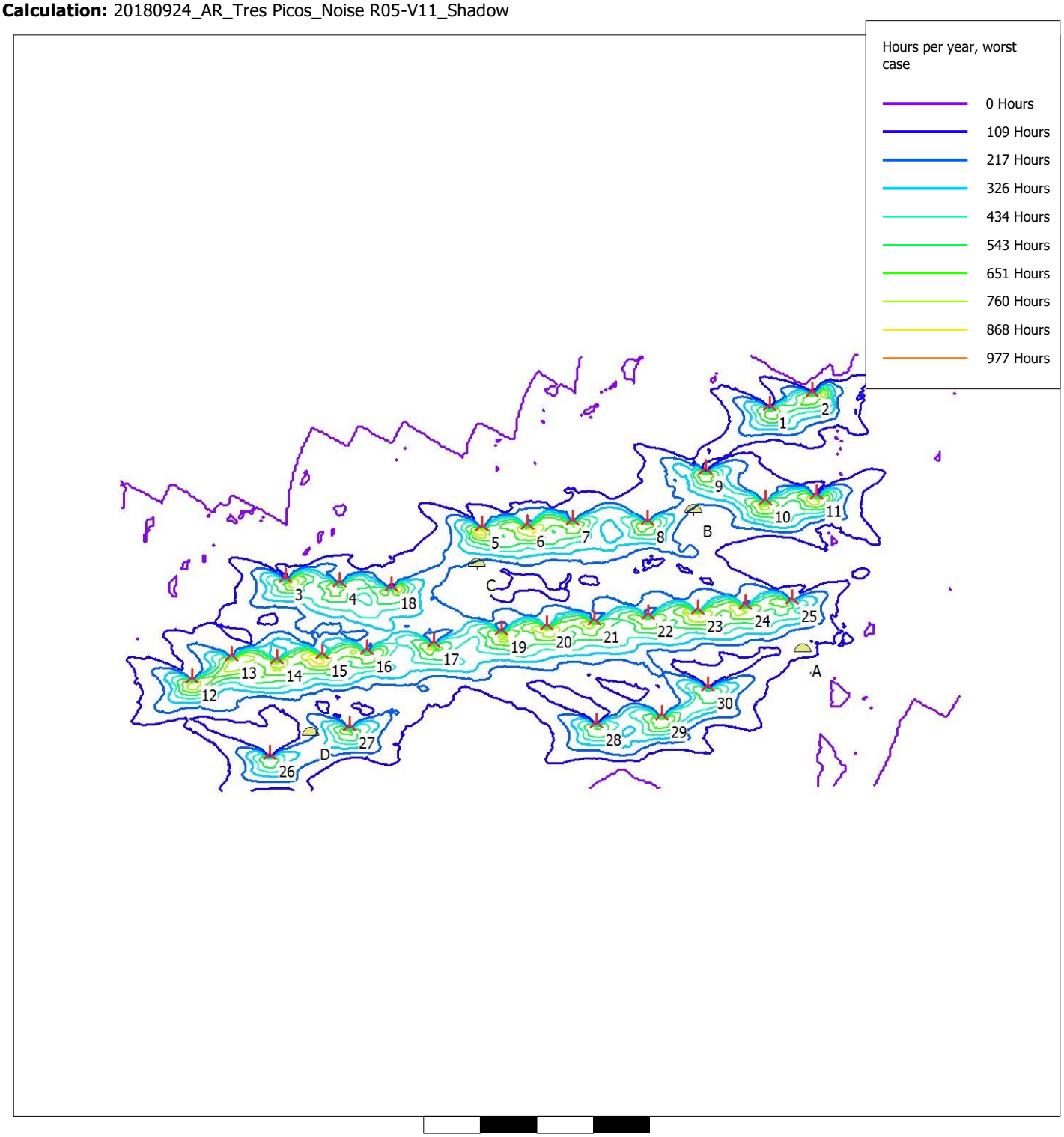
SHADOW - Map

Calculation: 20180924_AR_Tres Picos_Noise R05-V11_Shadow



Map: Blank map , Print scale 1:50,000, Map center UTM (south)-WGS84 Zone: 20 East: 567,000 North: 5,754,340

New WTG

Shadow receptor

Flicker map level: Height Contours: TresPicos_SRTM_UTM WGS84_10m_MAG_OPT.map (1)

Annex C.04.4

ANALYSIS OF LOW FREQUENCY FIELDS AND THE CORONA EFFECT

ANALYSIS OF LOW FREQUENCY FIELDS AND THE CORONA EFFECT

Index

ANALYSIS OF LOW FREQUENCY FIELDS AND THE CORONA EFFECT

1. INTRODUCTION

This report contains the analysis of low frequency fields and the corona effect produced by new facilities required for the functioning of the Wind Energy Center I.

One of the most important aspects from the environmental point of view are the electromagnetic effects originated about the environment by electric facilities of high and medium tension. Particularly , in the present Annex electric field intensity(CE), magnetic induction (CM) and the audible noise levels (RA) and electromagnetic interference (RI) in case of the presence of the corona effect, framed in the Resolution 77/98 of the Energy Secretary.

Estimations has been done using the "ad hoc" program developed by ICON srl that permits to determine the levels of the electric field, magnetic fiels, radio interference and noise audible by the corona effect. The results of this program have been validated with results provided by the declared literature in the References of the present report.

A very important aspect to highlight in this study is that the Original Project has been modified, identifying two relevant evaluation zones with greater access to the public which are:

a) The zone where the High Tension Line is developed and where it will be vinculated to the Wind Energy Park.
b) The zone where the collector network of 33 KV of Wind Energy Park is developed.

Given that the Project area is crossed by the High Tension Line of 132 KV between the Transformer Station in Bahía Blanca and the Transformer Station in Tornquist, where the Wind Energy Park will be vinculated, it contains an analysis of the electromagnetic fields in it to demonstrate that the new Project will not modify them adversely.

2. ANALYSIS FO CE, CM, RI AND RA OF ELECTRODUCTS IN 132 KV

In the Project area the presence of magnetic fields under the existence of high tension electric ducts determine the electric and magnetic field levels of the aerial Electric ducts of 132 KV that crosses the Project area. It corresponds to LAT of 132 KV of TRANSBA which is developed between the Transformer Station in Bahía Blanca and the Transformer Station in Torquist.

Considering the opening of the electric duct of 132 KV already in existence and the hollow of supply pipeline at the Transformer Station of the WInd Energy Center, the electomagnetic fields are of the same magnitud that the ones corresponding to LAT 132 KV.

2.1 ELECTRIC FIELD

In point 4.1 of the Annex, Resolution 77/98 of the Energy Secretary , it is established that the superior limit value of the electric field not disrupted, for the lines in condition of nominal tension and the conductor at maximum annual temperature, is 3 KV/m in the hedge of the serving strip and out of it , at 1.0 meter from the ground.

In the same point in the Resolution 77/98, where the limit for the level of the electric field is specified, in any position, it should be the same of the contact currents for a pilot case: child on wet land and big vehicle on dry pavement should not exceed the security limit of FIVE THOUSAND AMPERES (5mA)".

With the electric fiel levels obtained it can be assured that the contact current for the pilot case that is especified in Resoluton 77/98 will result sensibly less to 5mA.

The electric field originated by electric ducts 132 KV are only dependent on the simple three-face system existing that crosses the field where the Project is developed.

In Figure N° 1 it is shown the distribution of the electric field of the electric duct in existence, which corresponds to the LAT of 132 KV, between the Transformer Station Bahía Blanca (ETBB)- Transformer Station of the Wind Energy Park (ET PE ENERGETICA I) and between the latter and the Transformer Station Tornquist of TRANSBA (ETTO).

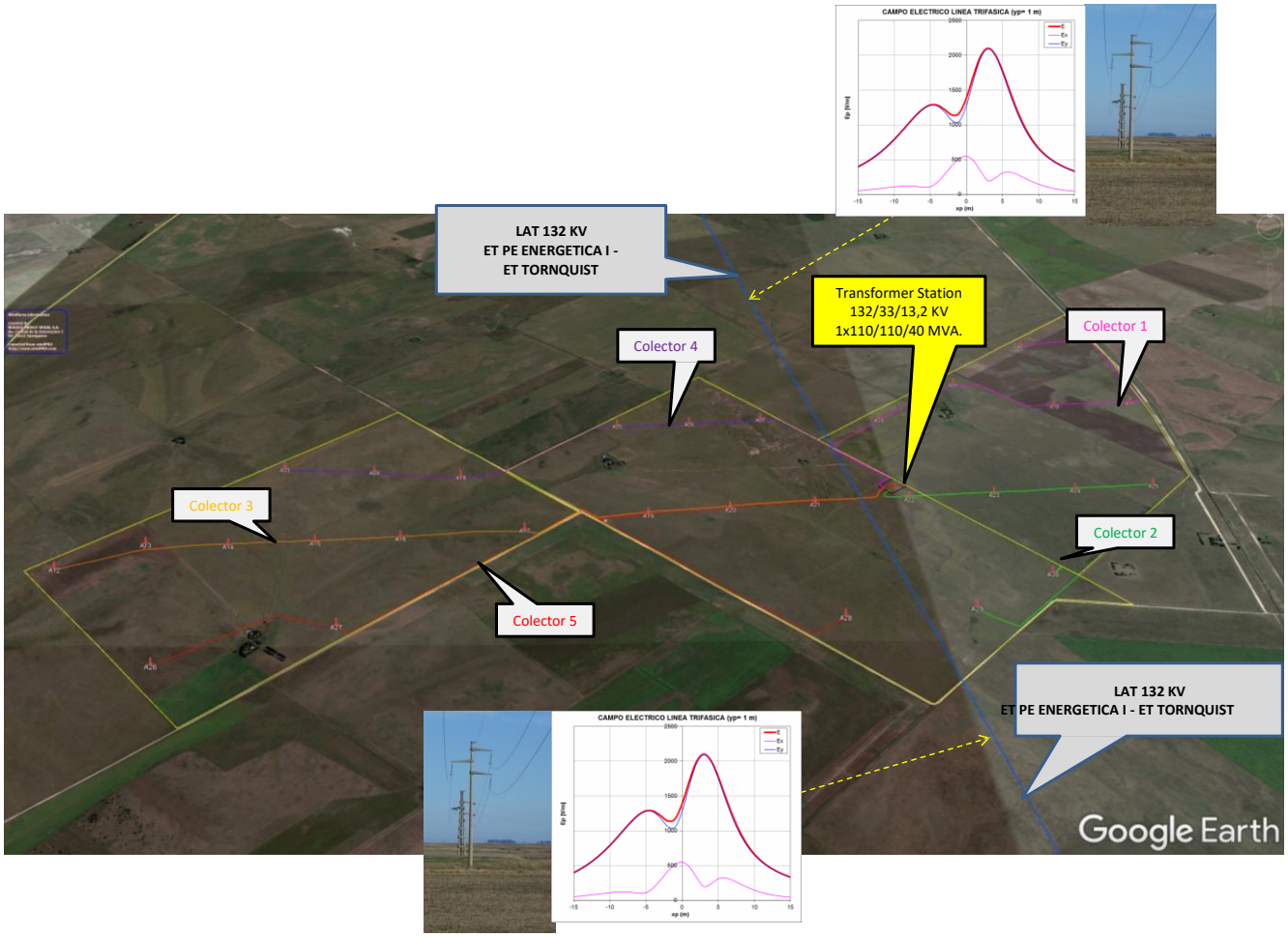


Figure N° 1

It is important to highlight that the Electric Fields originated by the High Tension Line will not be modified by the presence of the new Wind Energy Park given that they depend on the electric duct tension and not of the charge.

2.2 MAGNETIC FIELD

In point 4.2 of the Annex, Resolution 77/98 of the Energy Secretary , it is established that the superior limit value of the magnetic induction for the lines in conditions of maximal tension defined by the thermal limit of the conductors, is 25 μ T (250mG) in the hedge of the serving strip and out of it at 1.0 meter from the ground.

The aerial electric duct of 132 KV in existence creates magnetic fields that are function of the charging current which circulates through the conductors. Given that the estimation done in the magnetic field is done at a maximum capacity of transmission, the presence of the Wind Energy Park will not influence in the levels indicated.

given that the modification in the power flows by the High Tension Line will never reach the limits admissible of transmission considered for the estimation of the magnetic field level originated by such electric duct.

In Figure N° 2 it is shown the magnetic field originated by the circulation of current obtained at the maximum transmission capacity of each electric duct of High Tension.

The magnetic field levels obtained are registered under the limit admitted established in the point 4.2 of the Annex I of the Resolution 77/98 of the Energy Secretary.

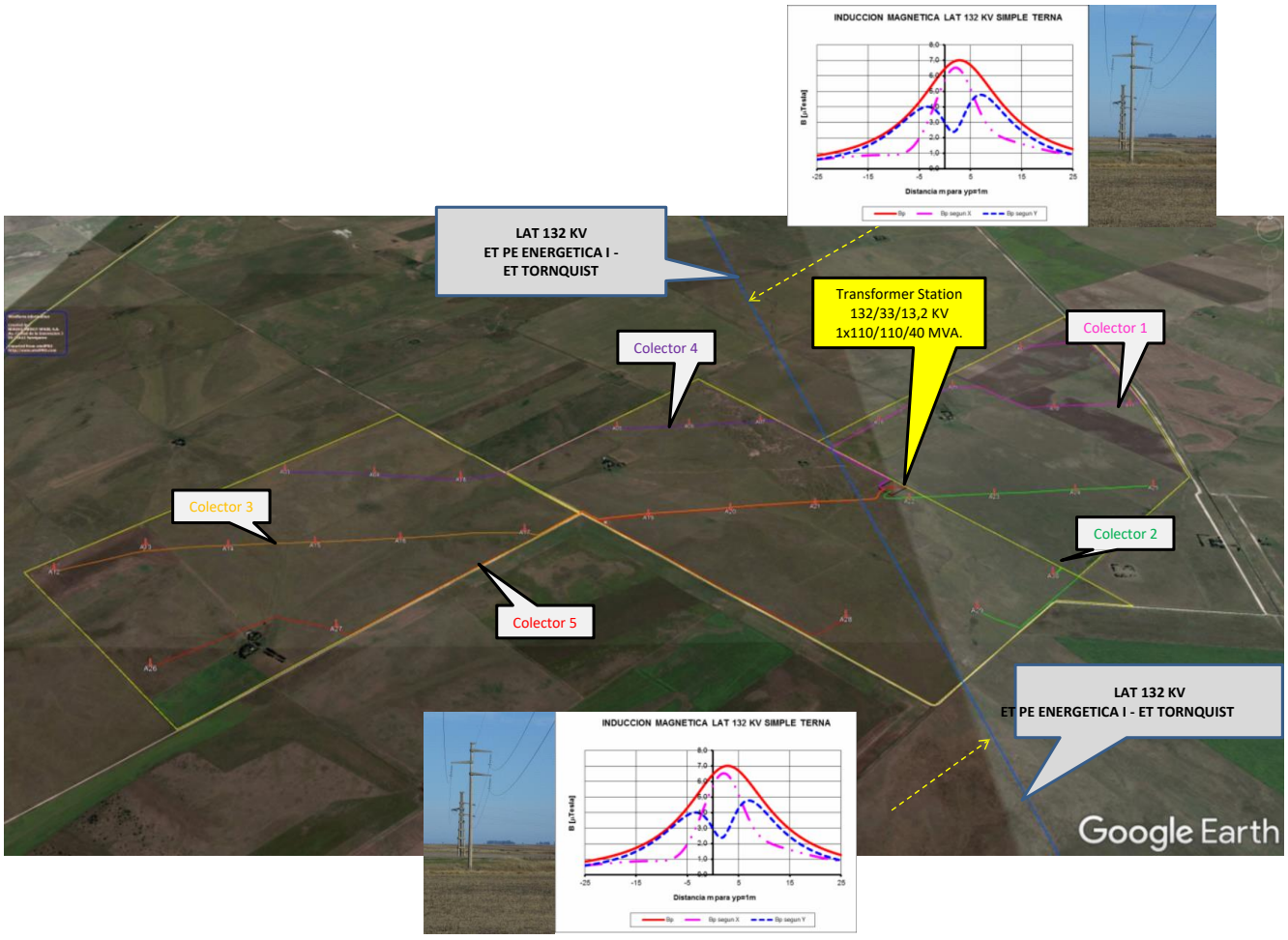


Figure N° 2

2.3 RADIO INTERFERENCE AND AUDIBLE NOISE

The electromagnetic interference originated by an aerial line of transmission is characterized by being a highly unstable phenomenon. The main cause for this instability is the superficial state of

the conductors that is unpredictable and unmeasurable in practical terms, for the analytic prediction of the interference level is ideal.

Naturally it also depends on weather conditions by which the course of the electric duct develops. On the other hand, the dependence of the geometric configuration of the conductors and semi-conductors if it has them, quantity of three-phase systems, heights with respect to the ground, disposition of guard cable/s and size of the conductors are all parameters perfectly modeled.

The radio interference levels (RI) and audible noise (RA) increase with the level of tension, and experience shows that they are really relevant for operative tensions superior to 300 KV.

In this particular case, the area affected by the Peoject only has one Line of 132 KV in existence which progresses between ETBA and ET Tornquist and is over which the estimation of RI and RA levels are done, and they are verified as of the admitted limits established by Resolution 77/98.

2.3.1. RADIO INTERFERENCE

In the point 2.1 of Annex I of the Resolution 77/98 of the Energy Secretary it is established that the maximum level of radio interference is 54 dB during 80% in daytime, measured at a minimum horizontal distance of 5 times the height of the aerial line in its suspension poles or towers.

The level distribution of radio interference determined for a frequency of 1.0 MHz and under the condition of wet conductor, is that shown in Figure N° 3.

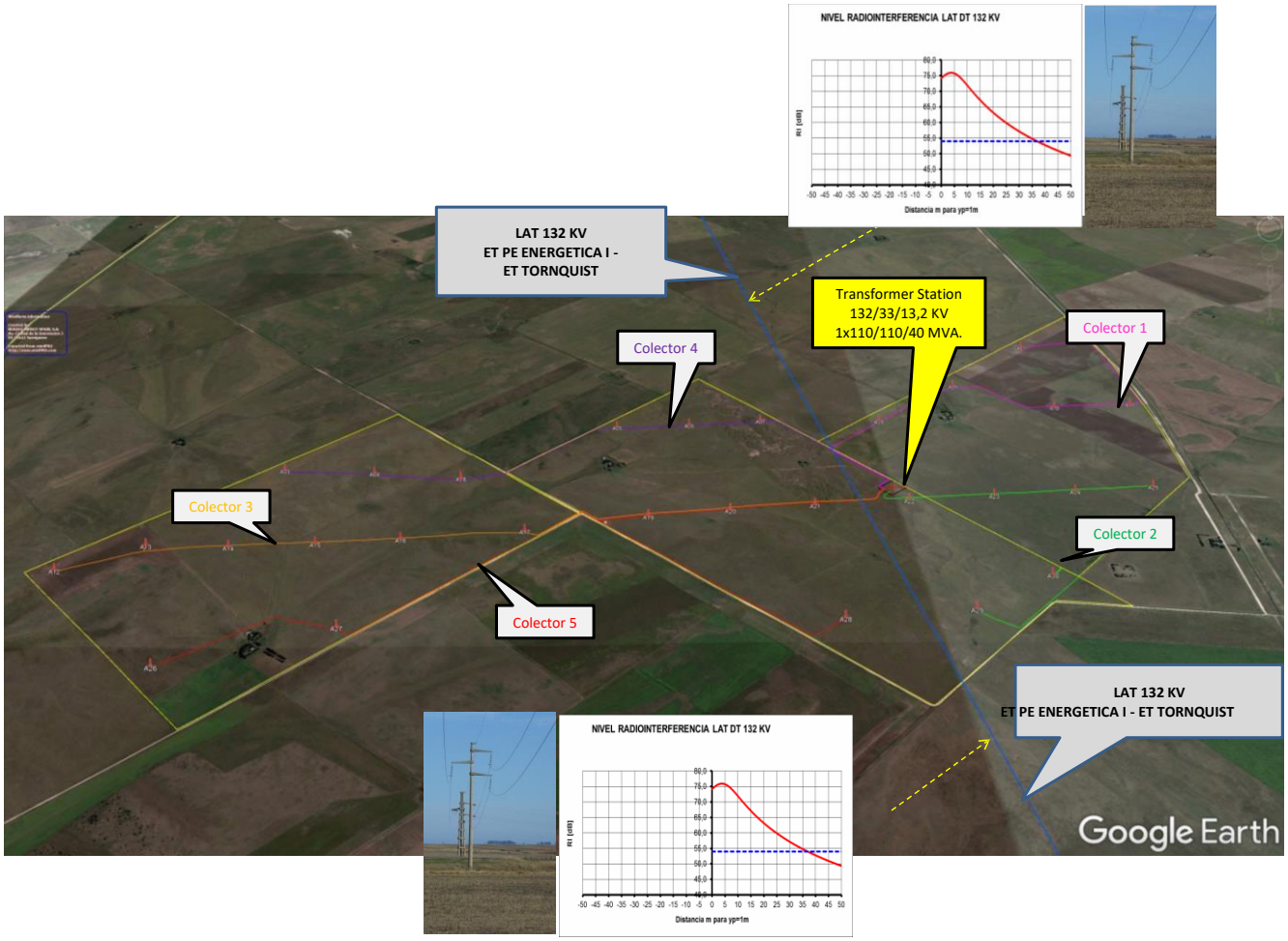


Figure N° 3

As can be seen the radio interference levels calculated are fewer that the limit of 54 dB established by the Resolution 77/98 for a distance of 5 times the height of the line.

These are levels in the existing facilities which the presence of the Energy Park will not affect.

2.3.2. AUDIBLE ACOUSTIC NOISE

In the point 2.2 of Annex 1 of the Resolution 77/98 of the Energy Secretary it is established that the maximum level of audible noise will not exceed 53 dB. This value must not be passed 50% of the times in conditions of wet conductor in the limit of the serving strip from the center to the course of the LAT.

In Figure N° 4 it is shown the distribution of the audible noise estimated of the aerial LAT at different distances of the axis of the course and at 1.0 meter height for the case L50-rain.

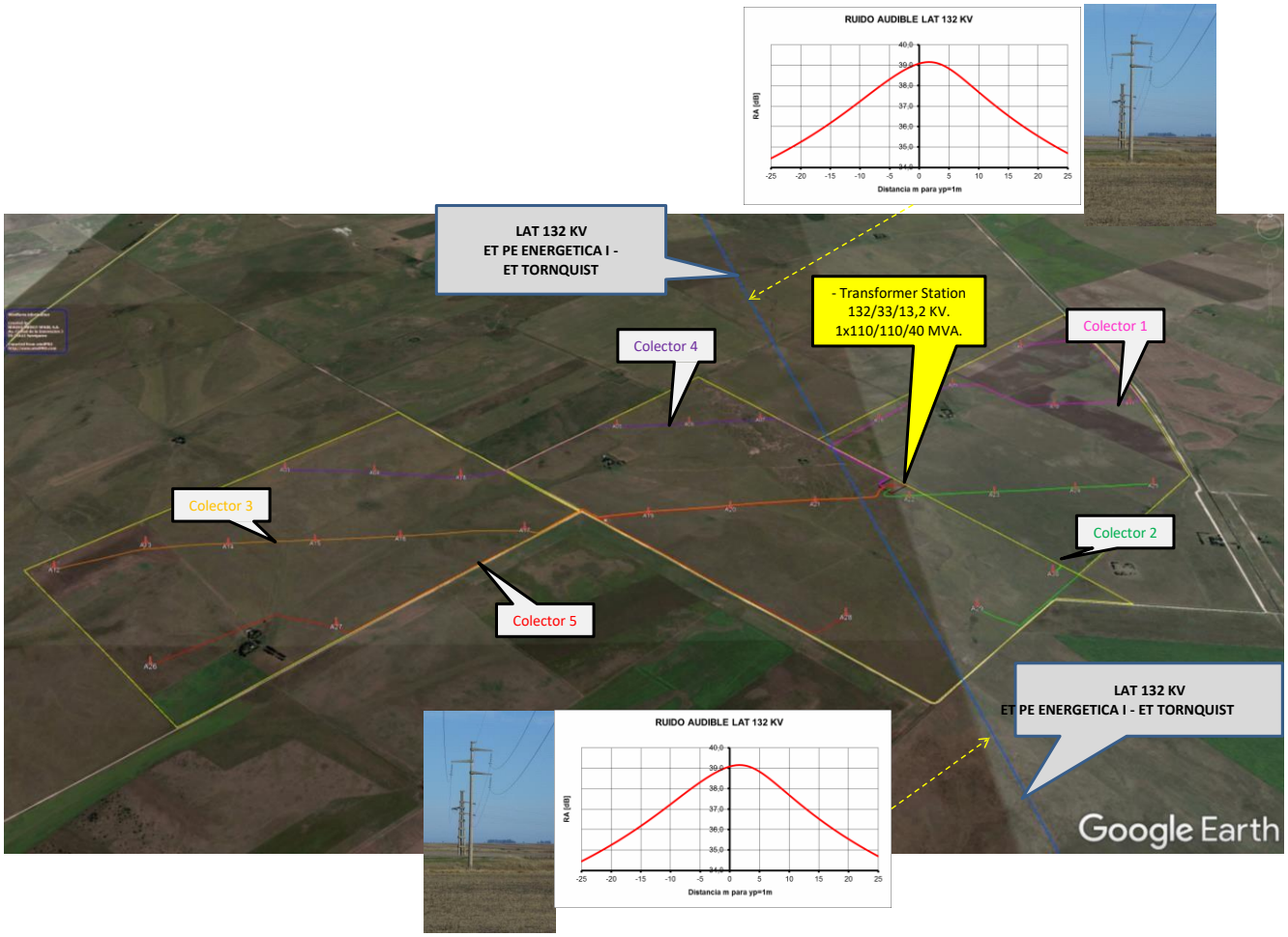


Figure N° 4

As can be seen the audible noise levels RA(dBA) estimated, originated by the corona effect under the presumed conditions, are lower than the maximum level established as limit by the Resolution 77/98 of the Energy Secretary.

It is important to say that the Wind Energy Park I has no influence over these audible noise levels.

3. ANALYSIS OF ELECTRO MAGNETIC FIELDS OF LOW FREQUENCY IN THE WIND ENERGY PARK. Respect to the electromagnetic contamination inside the Wind Energy Park, the most affected zone is the one corresponding to the course of the medium tension collector network.

The collector network of medium tension was designed through an underground course of cables of 33 KV single -pole wires insulated in reticulated polyethylene XLPE.

3.1 ELECTRIC FIELD

Wires of 33 KV adopted in the project have a metallic shield, which is connected to earth (or potential zero) in its both ends. For this designed condition, the cables of the collector network will have a confined electric field within them, because the metallic shield constitutes a "Farady cage", so the field intensity will be null in the outer side of the wires.

3.2 MAGNETIC FIELD

In Figure N° 5 there are the results of the estimation of the magnetic field at 1.0 meter over ground level and for different conditions of mounting.

In the zones where the collectors course only have one three-phase wiring system, the magnetic induction is the lowest, being under 2 μT in the parts which group 5 wind energy turbines.

In the zones with three-system grouping it is increase the magnetic field level reaching levels of 4 μT, under the limit level of 25 μT established in current regulation.

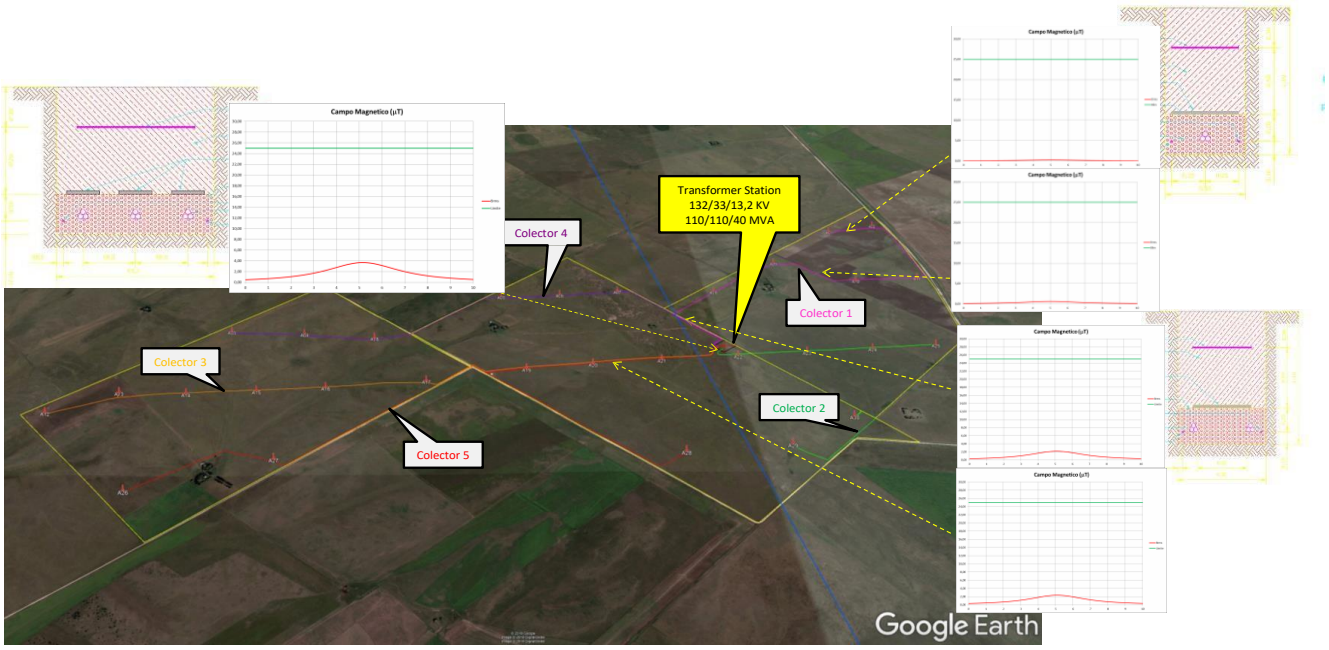


Figure N° 5

4. CONCLUSIONS

From the results obtained in the estimations done, under the presuppositions adopted, for the environmental parameters analyzed in the present Annex to the Addendum N° 2 of the Environmental Impact Study, the aerial electric duct of 132 KV in existence and the perimeter of the Transformer Station of 132 /33 KV of the Wind Energy Park, meet all the requirements in the Resolution 77/98 of the Energy Secretary.

Considering the inside of the Transformer Station of the Wind Energy Park, there are no evaluations given that it is not possible for the operation and maintenance personnel to access to it.

Respect to the levels of magnetic induction of the collector network of the Wind Energy Plant are verified maximum limits accepted by ENRE reaching maximum levels of 4 μT, quite under the limit of 25μT accepted by current regulations in Argentina. While, with respect to the electric field of the collector network of medium tension, because it is underground its effect is null. On the other hand, in normal operation the wind energy turbines, the underground collector network does not add radio interference, corona or audible noise effects.

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Annex C.04.5

ANALYSIS OF THE PRODUCTION CONTRIBUTION

OF "CLEAN" ELECTRIC ENERGY TO THE REGIONAL SYSTEM

ANALYSIS OF THE PRODUCTION CONTRIBUTION OF "CLEAN" ELECTRIC ENERGY TO THE REGIONAL SYSTEM

Index

ANALYSIS OF THE PRODUCTION CONTRIBUTION OF "CLEAN" ELECTRIC ENERGY TO THE REGIONAL SYSTEM

1. INTRODUCTION

The objective of the present study is to evaluate the effect of the contribution of electric energy from wind resource, related to the regional consumption of electricity and particularly of the Tornquist District.

It is to be named that the Energetic Wind Center I will add its generation to the National Interconnected System through the new Transformer Station (132/33/13,2 KV) which will be located between ET Bahía Blanca and ET Tornquist, as of an opening in the LAT of 132 KV which TRANSBA S.A. operates, in the province of Buenos Aires.

2. CONTRIBUTION OF "CLEAN" ELECTRIC ENERGY PRODUCTION TO THE REGIONAL SYSTEM

To determine what the production of electric energy that the Wind Energy Center might add in the regional energetic demand represents, it has been taken as reference the demand supplied by the Cooperativas Eléctricas in: Chasicó, Felipe Sola, Sierra de la Ventana, Saldungaray and Tornquist.

In Table N° 1, it is shown the data provided by the electric energy demand and the number of clients by category of the Tornquist District. Following, in Table N° 2, it is shown the results of the relation estimates in percentages between electric energy production of the WInd Energy Center and the annual demand supplied by the local Cooperativas.

Table N° 1

Supplier Entity-	Electric Energy Demand (MW-h/Año) - Per Category and Total								
	Residential	Comercial	Industrial	5-	A. Public	Official	Elect. Rural	Other	Total
Coop. de Chasico	181	261			61		663		1,167
Coop. de Felipe Sola	27	4				11	181		223
Coop. de S. de la Ventana	2,686	3,927			708		193		7,515
Coop. de Saldungaray	1,252	869		29	432		260	67	2,908
Coop. de Tornquist	6,577	7,119	751		1,448		1,802		17,696
Total	10,723	12,181	751	29	2,649	11	3,098	67	29,509

Supplier Entity-	Number of Users- Per category and total								
	Residential	Comercial	Industrial	5-	A. Public	Official	Elect. Rural	Other	Total
Coop. de Chasico	77	39			2		146		264
Coop. de Felipe Sola	14	2				3	48		67
Coop. de S. de la Ventana	1,601	402			1		22		2,026
Coop. de Saldungaray	659	132		1	1		58	18	869
Coop. de Tornquist	3,823	670	1		4		400		4,898
Total	6,174	1,245	1	1	8	3	674	18	8,124

Note (1): Data available in the WEB, http://www.energia.gob.ar (Year 2016).

Table N° 2

Structure of the regional market			
Category	Clients (1)	% Energy	MWh (1)
Residential	6,174	36.3%	10,723
Comercial	1,245	41.3%	12,181
Industrial	1	2.5%	751
Sanitary Services	1	0.1%	29
Public Lightning	8	9.0%	2,649
Official	3	0.0%	11
Rural Electrification	674	10.5%	3,098
Others	18	0.2%	67
Total	8,124	100.0%	29,509

Total Generated by the Wind Energy Center "Energetica I"	436,905
Total demand of the Tornquist District (%)	6.75
Total to be contributed to the Regional Electric	93.25

3. CONCLUSION

As it can be seen in Table N° 2 the average individual consumption per year of electric energy of the "Residential Category Users" is of 1.736,80 KW-h/Year (144.73 KW-h/Month). This is to say that the production of the Wind Energy Center might supply 251.557 users of this category.

Besides, it can be said that the 30 wind energy turbines might supply the total demand (annual) provided by the Electric Cooperativas of the Tornquist DIstrict (6.7% of the generation) and the rest might be supplied by the Regional Electric System (93.25%); see Figure N° 1.

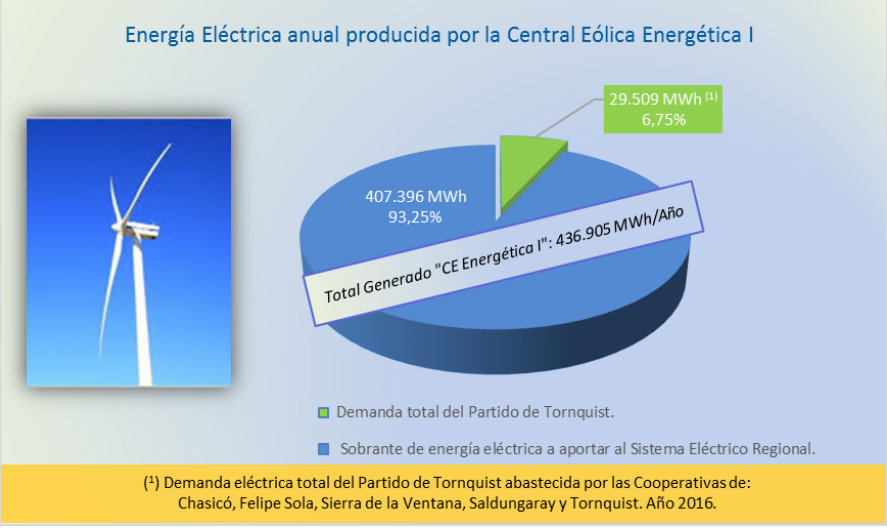


Figure N° 1 Effect of the Contribution of "Clean" Electric Energy in the Regional System

Annex C.04.6

Analysis of the Possible Contribution in Reduction of Emission Factors

ANALYSIS OF THE POSSIBLE CONTRIBUTION IN REDUCTION OF EMISSION FACTORS

Index

ANALYSIS OF THE POSSIBLE CONTRIBUTION IN REDUCTION OF EMISSION FACTORS

1. INTRODUCTION

The present report contains the analysis of the reduction in emission factors that 30 Nordex-Acciona wind energy turbines, model AW132/3300 TH120 of the Wind Power Center may add, compared to the production of the Thermal Centre whose energetic resources are: natural gas, fuel oil, coal or gas oil.

2. OBJECTIVE

The objective of the present report is to estimate the earning in tones equivalent in petrol, of carbon dioxide (CO2), oxide nitrogen (NO2), sulfur dioxide (SO2) and the particle material (PM) associated, which is obtained through the electric energy generation that the 30 wind energy turbines of the Wind Power Center may produce.

3. METHODOLOGY

In a Thermal Power Center in operation emissions may be determined by measurements in the funnel or in the evacuation ducts of the pollutants generated in the several processes, or through the theoretical estimate applying emission factors.

For this case in particular, we will use the emission of factors. This factor is a medium value which determines the quantity of a pollutant emitted to the atmosphere, by a certain activity associated to the emission of that pollutant.

Energy balances which express in tones equivalent to petrol TEP) and the conversion made are done in base of the lower calorific power (LCP) of each of the fuels.

3.1. DATA USED FOR THE ESTIMATION

3.1.1. Lower calorific value of the fuels

In Table N° 1 the lower calorific power of fuel (LCP) used in the thermal park in our country.

Table N° 1 Calorific power of each fuel.

Natural Gas	8.300 Kcal/m^3
Fuel Oíl.	9.800 Kcal/Kg.
Coal (National Calorific Equivalent)	5.400 Kcal/Kg.
Gas Oil.	10.200 Kcal/Kg.

3.1.2. Emission factors by fuel type

For estimations of CO2 emissions, the specific emission factors for each type of fuel are adopted, indicated in Table N° 2, which are the ones recommended by EPA (Environmental Pollution Agency) and the guides of IPCC (Intergovernmental Panel and Climate Change) in tnC/TJ. In our country CAMMESA and the Energy Secretary use them.

Table N° 2 CO2 emission factors for each fuel.

Natural Gas	15,3 (EPA)
Fuel Oíl.	21,25 (EPA)
Sub-bitiminous Coal	26,2 (IPCC)
Gas Oil.	20,2 (EPA)

3.1.3. Thermal generation and fuel consumption

In Table N° 3 there are the consumption data of fuel in the thermal park statistically obtained by CAMMESA for 2014.

Table N° 3 Fuel Consumption Data for 2014.

Year N°	Thermal generation-GWh	Natural Gas (dam^3)	Fuel Oíl. (tn)	Coal (tn)	Gas Oil.
2014	82,606	14,355,409	2,717,285	1,004,377	1,484,395

With the data obtained in the previous table and the values indicated by the LCP of the fuels, it is obtained the tonnes equivalent in petrol and the carbon dioxide production associated (see Table N° 4).

Table N° 4

Denomination	Natural Gas	Fuel Oíl tn	Gas Oíl tn	Mineral Coal tn
TEP	502,204	11,032,749	2,465,763	1,401,973
CO_2 (tn)	2,182,023	27,993,218	8,689,363	4,696,440

It can be seen that in 2014 to produce 82,606 GWh of thermal generation, there has been an emission of 43,561,044 Tn of CO2. This equals an average specific emission of 0.527 Tn of CO2/MWh

For the most severe estimation of the three parameters regulated by Resolution SE N° 182/95, oxide nitrogen (NOx), sulfur dioxide (SO2) and particle material (PM) ratios of emissions are adopted corresponding to the situation of the situation of the Generation Park of the National Interconnected System(SIN),

In Table N° 5 the parameters mentioned and the respective national values equivalent per unit of generated energy are presented.

Table N° 5

Denomination	National Equivalent Kg / MW-h Generated
NOx	0.95
SO_2	0.34
MP	0.03

4. ANALYSIS OF THE POSSIBLE CONTRIBUTION IN REDUCTION OF EMISSION FACTORS

With the aim of determining the reduction of emission factors of the energetic venture, it is used the values of energy produced by the Wind Energy Center in a one-year period and the data of the specific average emission obtained by data available in CAMMESA.

The reduction of emission of pollutants in the atmosphere during one-year period that might add the Wind Energy Center is shown in Table N° 6.

Table N° 6

Total generated MW-h/Año	Total of CO2 Tn	Total of NOx Tn	Total of SO2 Tn	Total of MP Tn
436,905	230,396	415	149	13

Note: Data corresponding to the energetic production have been taken by Energética Argentina S.A.

In Table N° 7 there are estimated the emission factors of pollutants which might be avoided during the service life of the Wind Energy Center, making a contribution to the Global Climate Change Program. For the estimation it is taken a period of 20 years of sustained production, according to data provided by the wind energy turbine manufacturer.

Table N° 7

Total generated MW-h/ 20 Years	Total of CO2 Tn	Total of NOx Tn	Total of SO2 Tn	Total of MP Tn
8,738,100	4,607,920	8,300	2,980	260

Annex C.04.7

ANALYSIS OF ENERGY PRODUCTION EFFECT ON THE SAVING OF METHANE TANKERS.

ANALYSIS OF ENERGY PRODUCTION EFFECT ON THE SAVING OF METHANE TANKERS.

Index

ANALYSIS OF ENERGY PRODUCTION EFFECT ON THE SAVING OF METHANE TANKERS.

1. OBJECTIVE

The objective of the present study is to evaluate the quantity of methane tankers that are required to produce the same quantity of electric energy that might generate the Wind Energy Center, whose energetic production will be injected in the National Interconnected System (SADI).

2. INTRODUCTION

It is public knowledge that in the Argentine Republic due to the lack of Natural Gas (GN) we had to resort to the importation of Liquid Natural Gas (GNL) due to reasons which are out of reach in this investigation.

The provision of GN to the Gas Natural Transportation System in the Argentine Republic is obtained from the gas in a liquefied state and it is transported by special ships called "methane tankers". It is regasified in a vessel designed for that especial purpose (regasification vessel). Then, in a gasified state, it is introduced in the national network through a gas duct which connects the quay with th network mentioned. Regularly methane tankers bring the GBI from producer countries to the quay, where they stay moored to the regasification vessel.

Such venture is localized in the distal end of the estuary of Bahía Blanca, at 1 Km East of Puerto Cuatreros, at 6Km approximately of Puerto Galván on the Northerm shore, at approximately 2 Km from General Cerri , and at 10 Km approximately from TGS Plant of General Cerri. In General, Cerri TGS processes natural gas, using the facilities of Puerto Galván for the storage, reception and delivery of the products obtained.

In Figure N° 1 there are two photographs with the site of the regasification vessel and the methane tankers in action.

Figure Nº 1.

Mainly the GN obtained from GNL is used as primary fuel by the Thermal Power stations. As an example, Figure N° 2 illustrates the Thermal Power Station Luis Piedra Buena of 2x310 MW, installed in the city of Bahía Blanca (Buenos Aires Province).

Figure N° 2 Photograph of the Thermal Power Station Luis Piedra Buena.

In Figure N° 3 it is illustrated the Power Station of Combined Cyle, as such it is installed in Loma de la Lata (Neuquén Province) with three TG of 375 MW and one TV of 178 MW.

Figure N° 3 Photograph of the Power Station of Combined Cycle, Loma de la Lata.

3. METHODOLOGY

The methodology used is based on determining the volume of Natural Gas consumed per year in one of the most efficient Thermal Power Stations as those of combined cycle, considering that it has such a size that generates the energy equivalent to that produced by the Wind Energy Park analyzed

Then, the volume of Natural Gas is changed into Liquid Natural Gas. Finally, from the volume of GNL that the methane tankers transport, it may be determined the quantity of vessels that can be earned considering that the production of a Power Station of Combined Cycle is substituted by one Wind Energy Station.

4. DATA USED FOR THE ESTIMATION

4.1. Lower calorific value of the fuels(LCV)

In Table N° 1 it is indicated the LCV of the GN used in the thermal park in our country for the Stations with Natural Gas as fuel.

Table N° 1 LCV of the GN

Natural Gas.	8.300 Kcal/m^3

4.2. Data of the Stations of Combined Cycle and conversion factors.

For the estimation of the natural gas consumption in a Station of Combined Cycle, the following data were considered:

Table N° 2 Data of the Station of Combined Cycle.

Specific consumption thermal generation (Heat rate)	MJoule/MWh	10,962
Calorific value GN	Kcal/m^3	8,300
Conversion factor	MJoule/Kcal	0.004184

4.3. DATA ON THE CAPACITY OF METHANE TANKERS

In Table Nº 3 typical transport capacity of Methane Tankers is indicated. Table N° 3 Transport capacity of GNL of Methane Tankers.

	Capacidad (m3)	Eslora (m)	Manga (m)	Calado (m)
Qmax	266.000	345	55	13,7
Qflex	216.000	315	50	13,6
170´s	170.000	290	45,8	12,9
151´s	151.000	291	43,4	12,4
138´s	138.000	284,4	43,4	12,4

5. ESTIMATION OF EARNING OF METHANE TANKERS.

In Table N° 4 the results of the estimation is presented.

Table N° 4

Characteristic data of the Wind Energy Station Energética I		
Installed Power Annual	MW	99.75
Energy generated.	MWh	436,905

Characteristic data of the Station of Combined Cycle (fuel: gas)		
Annual energy produced	MWh	436,905
Specific consumption thermal generation	MJoule/MWh	10,966
Calorific value GN	Kcal/m^3	8,300
Conversion factor	MJoule/Kcal	0.00418554
Volume of GN/Year required by C.C.C.	m^3/year	137,914,590
Volume of GN/Year required by C.C.C.	m^3/year	226,089

Requirement of GNL		
Volume GNL transported/methane tanker	m^3/Tanker	138.000
Number of tankers	Tankers/GNL	**1,64**

6. CONCLUSION

It can be concluded that to produce the annual electric energy estimated of the Wind Energy Station, may avoid the importation of approximately 1,6 Methane Tankers per year, whose associated cost is approximately U$S 25.906.000. Apart from all the implications that it takes. For example: a) Reduction of environmental risk intrinsic of this activity; b) reduction of energy expenditure associated to the charging, transportation and discharging of GNL related to the methane tanker, among others.

CHAPTER 05

ADDENDUM REPORT N°2

CHAPTER 05

ADDENDUM REPORT N°2

Index

CHAPTER 05

ADDENDUM REPORT N°2

1. PRESENTATION

The present document corresponds to the Addendum Report N° 2 to the Environmental Impact Study (EIA) of the Wind Energy Station Energética I, to be developed next to the Paraje García del Río, in the Tornquist District, Buenos Aires Province, Argentine Republic, presented according File OPD N° 2145-9512/16.

It emerges due to modifications presented in the Project presented by the company Energética Argentina S.A. in the Addendum (13/06/2016) and Declared Environmentally Suitable according to Resolution OPDS N° 2351/16- August 2nd, 2016.

2. ANTECEDENTS

Down below there is a comparative chart with the general description of the Original project and the sequence of modifications (Addendum and Addendum N°2) of the Wind Energy Station.

Wind Energy Station Tres Picos and II EIA Original (09-022012) SOGESIC S.A	**Wind Energy Station Energética I Addendum to EIA (13-06-2016)**	**Wind Energy Station Energética I Addendum N° 2to EIA (15-08-2018) Energética Argentina S.A.**
Transport System of the Wind Energy Plant.		
Connection Point to the SADI PDI Nº: 1140. Opening un "U" of the Line in 132 KV between ET Bahía Blanca (500/132 KV) and ET Tornquist (132/33/13.2 KV). Between Pickets N° 151 and N° 152	Connection Point to the SADI Idem to EIA Original.	Connection Point to the SADI Idem to the Adenda at EIA.
Transformer Station (MT/AT) 132/33 /13.2 KV 2x110/110/15 MVA.	Transformer Station (MT/AT) Idem to EIA Original.	Transformer Station (MT/AT) 132/33 /13.2 KV 1x110/110/40 MVA. On machine left on cold reserve.
Wind Farm		
Comprised by 73 wind energy turbines Trademark: Guodian United Power. Model: UP77-1500 KW. Rotor 77 meters Hub Height 80 meters Complementary:	Comprised by 31 wind energy turbines Trademark: Siemens. Model: SWT 113-3,2 MW. Rotor 113 meters Hub Height 92.5 meters Complementary:	Comprised by 30 wind energy turbines Trademark: Nordex-Acciona. Model: AW132/3300, TH120. Rotor 132 meters Hub Height 120 meters Complementary:

3. INTRODUCTION

The wind Energy Station Energética I is a private venture, property of the company Energética Argentina S.A. which will require an investment of approximately U$S 119.000.000 (VAT not included).

Summary Chart with the update general description of the Project.

General Description of the Project - Wind Power Plant Energética 1	
Electrical Energy Transportation System and its bonding to SADI	**1- Transformer Station (MT/AT)** Level of Tension: 132/33/13,2 KV. Total Power Installed: 1x110/110/40 MVA. Length of access way to the ET: 1,585 Km (from neighborhood street). **2- Opening of Overhead Power Line in High Voltage and bonding to ET (MT/AT)** Level of Tension: 132 KV. Place of bonding to SADI: Between pickets N°151 and N°152 of the LAT in 132 KV (existing) between EE.TT Bahía Blanca and ET Tornquist. Length of the installation hollow: 50 meters
Wind Farm	**3- Total Power Installed: 99.75 MW.** It will be conformed of 30 wind turbines Nordex-Acciona, model AW132/3300TH120 class IEC JIB and their complementary. Complementary: ▪ 2 Poles with meteorological stations; of 48 meters and 82 meters (existing). ▪ 30 foundations for wind turbines. ▪ 30 set-up platforms for wind turbines. ▪ 18,0 Km of internal ways to be constructed and 5,0 Km of access ways to realign. ▪ 22.0 Km of underground tubes for: - Collector of Electrical Energy Network in 33 KV- - Earthing System. System of Communication Network.

In Table N° 1 there is a summary of the Wind Energy Park (Addendum) and Updated.

Table N° 1

	Addendum Project at EIA	Addendum Project N° 2 at EIA
Wind Farm	▪ Total Power Installed: 99.2 MW. ▪ Quantity of wind power turbines 31 units ▪ Total Production of energy 430.276 MW-h/Year. ▪ Capacity Factor. 49,5%. ▪ Number of sites- total surface. 3 - 950 has. ▪ Internal Electricity Network of the P.E and connection to ET Transformation level of each wind energy turbine 0.69 KV a 33 KV. Tension level of the service network. 33 KV. Configuration. Radial. Line type. Underground. ▪ Approximate length of internal roads. 20.8 Km. ▪ Approximate length of underground ducts. 23.1 Km. ▪ Wind Energy Turbine Trademark: Siemens. Model: SWT 113-3,2 MW. Generator Type: Synchronic, PMG Wind Turbine Power. 3.2 MW. Gearbox. None Hub Height 92.5 meters Rotor Diameter 113 meters Rotation speed: Variable - 6.5 … 15.8 rpm Power Regulation: Pitch, with variable speed. "Swept area": 10.000 m^2. Noise level. 107,5 dB(A).	▪ Total Power Installed: 99.75 MW. ▪ Quantity of wind power turbines 30 units ▪ Total Production of energy 436.905 MW-h/Year. ▪ Capacity Factor. 50,0%. ▪ Number of sites- total surface. 3 - 950 has. ▪ Internal Electricity Network of the P.E and connection to ET Transformation level of each wind energy turbine 12 KV a 33 KV. Tension level of the service network. 33 KV. Configuration. Radial. Line type. Underground. ▪ Approximate length of internal roads. 18.0 Km. ▪ Approximate length of underground ducts. 22.0 Km. ▪ Wind Energy Turbine Trademark: Nordex-Acciona. Model: AW132/3300, TH120. Generator Type: Asynchronous, 6 poles, double-fed. Wind Turbine Power. 3.325 MW. Gearbox. SI (oil quantity 1.000 liters) Hub Height: 120 meters Rotor Diameter 132 meters Rotation speed: Variable - 7.0 … 14.0 rpm Power Regulation: Pitch, with variable speed. "Swept area": 13.720 m^2. Noise level. 108,5 dB(A). Concrete and iron for foundation volume: 436 m^3 -33.2

4. PUBLIC ENQUIRY DOCUMENTS

Under compliance of current legislation, Energética Argentina S.A. made the required arrangements in the Town Hall of Tornquist, in the Energy and Mining Ministry, and in the National Administration of Argentinian Civil Aviation (ANAC), among others, with reference to the update of permits and authorizations for the modifications done in the Project.

In Annex C.05.1 Documents/Notes associated to the Project are added with the presentation in due course.

5. DESCRIPTIVE MEMORY OF THE UPDATED PROJECT

In Chapter 02 there is an updated technical description of the wind energy turbines selected and the works expected to be developed for the Project.

5.1. GENERAL ASPECTS RELATED TO THE UPDATED PROJECT

5.1.1. Electric Energy Transport System

The installations corresponding to the Transport System of Electric Energy of the Wind Energy Plant will not have any representative modifications with reference to the Project presented in previous environmental studies.

The opening of the electric line in 132 KV will undertake directly to the Transformer Station (MT/AT) with the same technical and building characteristics.

In relation to the total power installed, in the EIA (Addendum) it was predicted the installation of two transformers with power 132/33/13.2 KV- 2x110/110/15 MVA; in the present study (Addendum N°2) it is predicted the installation of one transformer of 132/33/13.2 KV - 1x110/110/40 MVA but one machine is left under cold reserve.

The number of collector circuits between wind energy turbines predicted for the place of the interior Cells in 33 KV are equal to the ones indicated in the EIA (Addendum); that is to say there will be five (5) independent circuits comprised by underground conductors.

5.1.2. Wind Farm

The update of the Project is associated mainly to the change of the wind energy turbines. The machines will have similar power per unit (of 3.2 MW and 3.325 MW) and the Wind Farm will maintain the similar total power already installed (from 99.2MW to 99.75MW); consequently, there will be a reduction of one unit in the machines to be installed.

(31 units to 30 units). The modifications related to the Wind Energy Project can be summarized as:

- The different technical characteristics of the Wind energy turbines (technology, dimensions, etc.).
- The wind energy turbines will be built with towers of concrete (to be developed locally).
- Lesser number of wind turbines (one less)
- The different geographical distribution of the wind turbines in the site.
- Internal Roads: They will have similar technical and building characteristics and they will be 6-meter width of minimal use. The crosses and curves will be slightly affected in their dimensions, due to the higher length of the blades of the new wind energy turbines (long rigid structures of approximately 64.7 meters).

  Road distribution will be different due to the new configuration of the Wind Energy Park.
- Collector Network: The circuits will have similar technical and building characteristics, but they will be distributed differently due to the new configuration of the Wind Energy Park. There are differences in the dimensions of the conductors but with the same number of collector circuits.
- Foundations for the wind turbines. The bedrock of the base of concrete was modified (octagonal to circular bedrock). According to preliminary studies, the depth of the excavations for the new wind energy turbines will be less (from 3.60m to 2.25m).
- Mounting Platforms for the wind turbines: They will have a different geometrical configuration but of similar technical and building characteristics.

5.1.3. Workroom

As indicated in the Original Project, the workroom will be installed in the entrance of the Rural Property "Reyrolles".

So said by Energética Argentina S.A. there is no anticipation of installing a concrete plant in any of the three sites where the Wind Energy Center will be built. The concrete elaborated will be bought to third parties and transported to the site through mixer trucks of 6/8 m3 of capacity.

5.1.4. Waste disposal and liquid effluent treatment

Prior to the beginning of the activities the Work Contractor must present **the Waste Disposal and Effluent Treatment Program** which will be adapted to General Programs of the Developer of the Project.

For an adequate treatment of solid, semi-solid and liquid waste prior to the beginning of the work, the following will be specified:

- Points of generation.
- Stage of segregation and weighing (in the place of generation or workroom)
- Temporary storage in the workroom (according to the type of waste).
- Transport (authorized operators).
- Treatment (authorized operators).
- Final Disposition (authorized operators)

Waste

According to that indicated by Energética Argentina S.A., all the Contractor companies must classify waste "in situ" in the following way:

- Domestic ones.
- Recyclable and /or reusable ones.
- Dangerous ones.
- Of the construction (inert ones).
- Generated by weeding.

Figure N° 1 Classification of the waste in the work.

a. Domestic waste

The gathering of domestic waste will be done no later than every 24 hours, changing the bags in the waste bins. They must be taken to the "Temporal Waste holding tank- DTR", and then be integrated into the zone or departmental collection circuit. The final disposition will be the rubbish dumps in the community of Tornquist or Tres Picos. The transport will be done through an operator with authorized vehicles, or by the company that is in charge of the facility cleaning.

In this respect it is advisable to coordinate the corresponding steps with the Town Hall in Tornquist:

- Secretaria de Desarrollo / Dirección de Medio Ambiente.
  + 54 291 6414250 / 4292272 / 4941075.
  agenciadesarrollo@tornquist.gov.ar.

b. Recyclable and /or reusable waste.

As stated by Energética Argentina S.A., for the treatment of recyclable and/or reusable waste, there will be a contract with local recyclabe companies. Among others, they are:

- Recycling shed. Lamela Street between Sarmiento Av and Vergara; Tornquist.
- Saldungaray Recycling Plant. Cooperativa de Trabajo “3 R”; Saldungaray.
- De la Bahía Recycling Site. +54 291 4519978 Paunero 349; Bahía Blanca.
- EcoPlant +54 291 456-3808. dgambiental@bb.mun.gba.gov.ar; General Daniel Cerri.

c. Dangerous Waste

Within a sector of the DTR there will be a specific area for the "Hazardous waste". The site will be delimited clearly and will be tagged with the correspondent signal. It must have a fire extinguisher ABC type according to the fire charge of the storage site, and it must have a kit of absorbent material for the place, which will be used in case of potential spill.

The storage in a specific site will be done in especial container bins/units with lids, barrels or buckets with a ring closure or drums with lid. They must be stored in a cover zone, well aired and on an adequate base (non-permeable) to avoid soil affectation. The liquefied waste must have its corresponding retaining container in case of possible spill.

The obligations of the especial waste generator are:

- Inscription in the Provincial Registry of Generators and/or Operators of Especial Waste, to get the official certificate of authorization.
- Pay annually the corresponding especial tax.
- Take a registry of operations.
- Contract operators and authorized transport.
- Have the legal documents of transport, certificates of treatment and final disposition.

d. Construction waste (inert ones).

This waste will be generated mainly in different fronts of the work (foundations of the wind turbines, Transformer station, opening of the LAT, crosses of ducts with internal roads, among others). They are:

- Debris in general.
- Concrete debris.
- Parts of crossheads, brackets, linkages, columns, other.
- Parts of wooden formwork for the foundations.

They will be tried to be reused in the work, or storage them in the correct containers or in areas conditioned for that end, with protection of perimeter security.

It will be predicted the quantity needed of dumpers or containers in special sectors where they are continuously generated. All the dumpers will have a legible sign with identification at the side parts, resistant to water and outdoor conditions.

The remaining waste from the construction that are not disposed in dumps, must not interfere with vehicle or staff transportation within the work. They must be piled up with protection of perimeter security and they must be localized correctly to avoid the obstruction of circulation roads.

For the recollection, transport and final disposition it is recommended to coordinate actions with the Town Hall of Tornquist; Area: Secretaria de Desarrollo / Dirección de Medio Ambiente.

e. Waste Generated by weeding.

The mowing of vegetable species will be limited exclusively to the workroom zone, of the Transformer Station, of the foundations of structures of the LAT, of the 30 mounting platforms of the

wind energy turbines, of the underground ducts and roads. In this respect the engineering stage has predicted not to affect any zone with tree species.

The weeding actions will be programmed according to the development of the work, following a schedule of activities provided for the project. In this respect some sectors will be conditioned in the frontal part of the work, where the waste generated by vegetable species will be deposited. The storage will be done in clear places, easily-cleaned and accessible for recollection.

Special attention should be paid in the temporary dump places in order to avoid any difficulties (fire). Given the characteristics of the site, it is not expected a great deposit of waste.

It is absolutely forbidden to burn all or any of this type of waste.

It is considered convenient that the waste of vegetable species coming from weeding activities are used as nourishment for the soil that may need them given the characteristics of biodegradability.

For the recollection, transport and final disposition it is recommended to coordinate actions with the Town Hall of Tornquist; Area: Secretaria de Desarrollo / Dirección de Medio Ambiente.

Liquid Effluents

Independently of the origin or type of effluents (rain, industrial or sewage) it is completely forbidden the spill of waste liquids that may pollute natural resources. They must be collected and controlled prior their dumping in any surface of water (superficial or underground). There are three types of liquid effluents which will be generated during the work execution. They are:

- Sewage effluents.
- Effluents from the washing of elements of concrete.
- Effluents from the washing of equipment and machines.

a. Sewage effluents.

These effluents will be generated in the sewage zone of the workroom and in the front part of the the work, due to the use of chemical toilets. Collection and treatment of the sewage effluents will remain under the charge of

the company that is giving the service. It must have the corresponding authorization and the permits authorized for the dumping of effluents.

b. Effluents from the washing of elements of concrete.

Even though it is not predicted the installation of a concrete plant in any of the three sites where the Wind Energy Plant will be built, it is presumable that there will be liquids coming from the washing of elements that have been in contact with the concrete and the hoppers of the trucks that transport them. (mixer).

For the above said, it is predicted the installation of a decanting pool (in a place to be defined within the area assigned to the workroom) coated with material agropol non-permeable (see Figure N°2) to avoid the drainage into the soil. The pool will have a level of maximum filling over which it will not be possible to do other cleanings. Once the water is evaporated and having been generated the solid waste, the latter will be disposed as inert waste.

In case of being necessary, the remaining water must be treated adequately through atmospheric trucks according the characteristics of the effluents. Before its final disposition, it will be analyzed to verify previously the values of permitted disposals.

Below there is a typical sketch of a decanting pool. The same must be identified with a sign, it must contain adequate signage and a security perimeter fencing.

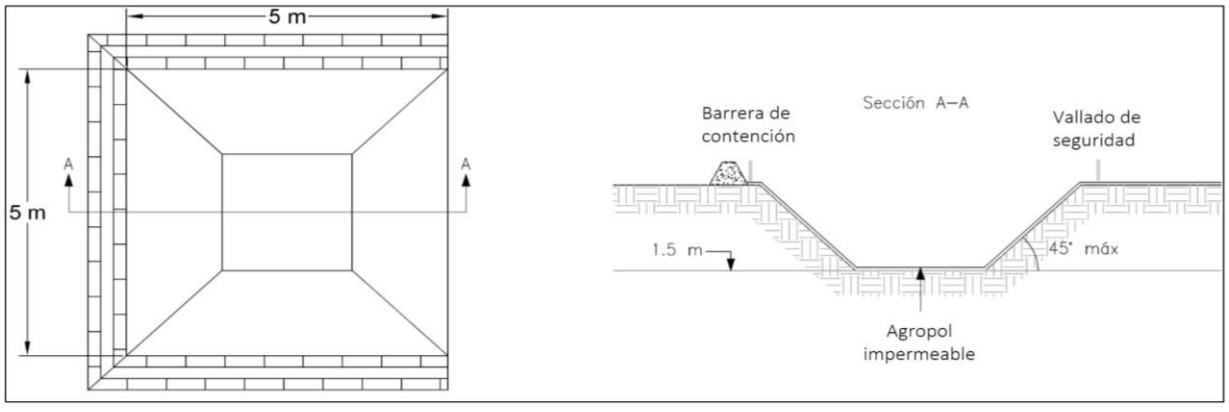


Figure N° 2 Sketch of the Decanting Pool.

c. Effluents from the washing of equipment and machines.

The washing of equipment and machines for maintenance will be done outside the site of the work; in service stations or workshops authorized to that end.

In case of being necessary a sector will be prepared (inside the workroom) to contain the effluents resulting from the washing of machines, tools, parts or spare parts in general. Measures should be considered to avoid an eventual spill into the soil.

Residual liquids generated are characterized for having oils, grease, hydrocarbons, suspended solids, detergents and the concentration of different pollutants. They should be deposited in drums/containers and they will be disposed considering the legislation for the treatment of dangerous waste.

5.1.5. Treatment of dangerous and/or chemical substances, others that will be stored in the site

Prior to the beginning of the activities the Work Contractor must present **the Waste Disposal and Effluent Treatment Program** which will be adapted to General Programs of the Developer of the Project.

The dumping site for dangerous and/or chemical substances, fuels, oils, greases, paints, thinner, etc, will be placed within the workroom, in a special part assigned for it. It must be delimited and signaled properly with signs and protected from the sun and the rain.

In the case of liquid substances, they must have non-permeable floor and contention with adequate capacity for the control of eventual spills by leakage or accidental spillage.

Substances that might react if they are together, or that may be non-compatible between them, flammable or reactive, won´t be placed in the same room. There will be a detail of substances stored, with safety specifications and the actions to take in case of spill or fire.

In the Annex N° C.05.2, a list is added of the dangerous and/or chemical substances, fuels, etc, that will be stored in the site with their corresponding safety data sheets (HDS).

5.1.6. Areas of lending materials

Lending materials needed for filling and leveling jobs of the different works of infrastructure (roads, platforms of mounting energy turbines, Transformer Station, workroom, etc.) will be obtained from an authorized site for extraction (within the site) and the surplus products from excavations. (wind energy turbines). Energética Argentina S.A. is doing the necessary arrangements in this respect in the Town Hall of Tornquist for the temporary permission (construction stage of the work).

Prior to the beginning of the activities the Contractor will present the correspondent authorization emitted by the Town Hall in Tornquist or whoever is under concern. Once the works have finished, the affected areas must be restored and adequate to the surrounding geography, in order to favor the recomposition of the vegetable coverage and guarantee the runoff of superficial waters into natural drainages of the soil.

5.1.7. Collection of aggregates

The aggregates required for the elaboration of concrete will be obtained from the quarries of third parties enabled for the development of this activity. The Builder of the work must:

- Verify that the companies providing the aggregates have the corresponding Declaration of Environmental Impact of the quarry, according to what is established in the Code of Mining (National Law N° 24.585) called "On the environmental protection for the mining activity"; and with the permits or licenses (two-yearly update of the DIA) emitted by competent authority in the Province.
- Optimize the use of materials/products needed for the construction of the work, considering the consumption of natural resources.

5.1.8. Underground Water Resource Operation

According to the report by Energética Argentina S.A. the water volume required for the construction of the work and the supply of the workroom will be obtained in the site of the Wind Energy Plant (underground water resource).

The Constructor is obliged to have a global plan of water resource. It must be analyzed the total need of the work, considering the supplying site/s and the determination of maximum flow rate possible to extract, in order not to alter the hydrogeological conditions of the system.

At present the site has a perforation for water extraction of approximately 50 meter-depth, located near the workroom, in the geographical coordinates: 38°21'41.44" South, 62°14'21.96" West.

In this respect the Constructor of the work will be responsible to arrange the permits and concessions needed for the temporary exploitation of the underground water resource.

6. EVALUATION METHODOLOGY ON ENVIRONMENTAL IMPACT

As indicated in previous studies (EIA Original and Addendum), the methodology of identification and environmental evaluation of the Project is framed in the integration of new "clean" technologies, coming from a renewable source of energy like the wing, for the generation of electric energy, its transformation, its transport and its final commercialization.

Given that the characteristics of construction and functioning of the Project (Addendum) are similar to the update Project that includes roads, civil works, electromechanical works, electric works and communication links among others, it is assumed that the activities during the preparation, construction and functioning stages are the same as those identified and evaluated in previous environmental studies.

For the evaluation of environmental impact, the following stages have been structured:

Stage I	Data Search
Stage II	Environmental baseline- Characterization of the environment.
Stage III	Identification and Evaluation on environmental impact Analysis of environmental impact related to the updated Project
Stage IV	Mitigation Actions and Environmental Management Plan
Conclusion	

7. INFORMATION RESEARCH

For the preparation of the present Addendum at the EIA the following information has been provided by Energética Argentina S.A.:

- Updated Project Work.
- Documents with technical specifications of the wind energy turbines (Source: Nordex-Acciona).
- Sound and shadow reports (flickering) produced by wind turbines.
- Original Study of Environmental Impact (EIA 09-02-2012) and Addendum (EIA 13-06-2016).
- ResolutionOPDS Nº 2351/16 (2nd August, 2016). Corresponds to File Nº 2145 - 9512/16.
- Notes, Declarations and documents associated to the Project (Town Hall of Tornquist, Ministry of Energy and Mining, ANAC, among others)

The specific information has been taken from the following data:

- Norms and legal regulations applicable to the work.
- Mapping, plans and sketches of the area (in national, provincial and local terms).
- Urban plans of the zone.
- Reports, technical and scientific articles referred to the several topics to evaluate.
- Documents of sector and energetic statistics
- Bibliographical collection. Unpublished reports and personal communications.
- Meetings with local referents.
- Consultation to specialists in person or by mail.
- Consultation to proprietors and administrative personnel in the rural properties near the sites.
- Field work, with "in situ" acknowledgment, which consisted in:
  - Identification of areas with environmental sensitivity, from the natural, ecologic and scenery point of view.
  - Investigation of soil use in the areas of study.
  - Identification of the resources: soil, water, species of flora and fauna, units of vegetation.
  - Superficial and stratigraphic explorations on the site.
  - Photographic study of the zone.

8. ENVIRONMENTAL BASELINE

The rural properties where the Wind Energy Station will be built are the same as those indicated in previous environmental studies. In this respect, in Chapter 03 of the present Addendum, two updated reports of the Environmental Baseline are added, in reference to the Biotic Medium of the surrounding site where the energetic venture will be installed.

9. IDENTIFICATION AND EVALUATION ON ENVIRONMENTAL IMPACT

The identification and evaluation of potential impacts associated to the modifications done in the Engineering Project of the Wind Energy Station have been structured according the following procedure:

A. Identification of the stages of the Project
B. Identification of the activities or actions of the Project
C. Identification of the components of the Influential area

D. Analysis of environmental impact related to the updated Project

9.1. Identification of the stages of the Project

The following stages are considered for the development of the Project:

- PREPARATORY STAGE OF THE SITE AND CONSTRUCTION
- Operative Stage and Maintenance
- Closing Stage and leaving the site.

9.2. IDENTIFICATION OF THE ACTIVITIES OR ACTIONS OF THE PROJECT

The considerations taken into account to identify the activities or actions that might have any environmental consequences are based on:

- Technical information of the projected work, updated.
- Environmental regulations where the work is framed on.
- The experience of the consulting team.

The potential contingencies are considered as emergency that must be under control through a specific plan to avoid or minimize environmental damage. During the construction stage of the work these extraordinary events are associated to spills, fires or explosions, accidents at work and of transportation. And during the operative and maintenance stages, these events are associated to withdrawal of service of the Wind Energy Station for adverse weather conditions, fires or explosions, attacks, etc.

The following are different activities that may generate environmental impact and that may come into play in different ways on the receiving medium.

PREPARATORY STAGE OF THE SITE AND CONSTRUCTION

In this stage the following activities or actions which might produce relevant effects on the environment have been predicted.

a. Mounting and functioning of the workroom.

From the beginning of the work to the final stage the mounting of a workroom. has been predicted. It comprises the following activities:

- Clearance of the soil and vegetal coverage.
- Circulation of light vehicles.

- Circulation/use of trucks, heavy machinery and equipment.
- Generation and transport of waste.
- Generation and transport of liquid effluents.
- Generation of jobs.

b. Adaptation and construction of roads (of access and internal of the Wind Park)

It has been predicted the adaptation of 5 km of roads of access and the construction of 18 km (6 meter-width of use).

It comprises the following activities:

- Clearance of the soil and vegetal coverage.
- Filling, compacting and leveling of the soil.
- Circulation of light vehicles.
- Circulation/use of trucks, heavy machinery and equipment.
- Generation and transport of waste.
- Generation of jobs.

c. Preparation of the soil and construction of civil works in general.

It refers to the preparation of the soil and the construction of civil works for: the opening of the LAT in 132 KV the Transformer Station, the foundations of the wind energy turbines and mounting platforms, etc. Besides, the construction of the collector network (22km) for the wiring cables of electric energy, earthing systems and communication links.

It comprises the following activities:

- Clearance of the soil and vegetal coverage.
- Excavations and trenches.
- Filling, compacting and leveling of the soil.
- Circulation of light vehicles.
- Circulation/use of trucks, heavy machinery and equipment.
- Generation and transport of waste.
- Generation of jobs.

d. Mounting Platforms for the wind turbines. General wiring system.

Once the civil and infrastructure works have been done, the assemblage and mounting of the wind energy turbines is made. Following that, electric connections, earthing systems and communication links.

It comprises the following activities:

- Circulation of light vehicles.
- Circulation/use of trucks, heavy machinery and equipment.
- Generation and transport of waste.
- Generation of jobs.

e. Dismantling of the workroom, cleaning and re composition of the site.

When the final stage of construction is finished, it comes the dismantling of the workroom, cleaning and restoration of the site, in a way to get it in similar natural conditions of the initial state.

It comprises the following activities:

- Restoration of the area.
- Circulation of light vehicles.
- Circulation/use of trucks, heavy machinery and equipment.
- Generation and transport of waste.
- Generation of jobs.

Operative Stage and Maintenance

In this stage the following activities or actions which might produce relevant effects on the environment have been predicted.

- Presence of the components of the work (opening of LAT ET (MT/AT) and the Wind Energy Farm).
- Analysis of Low Frequency Fields and the Corona Effect
- Generation of noise.
- Generation of vibrations.
- Generation of the shadow effect (flickering)
- Improvement in the electric supply.
- Production of "clean" energy supplied to the regional system-
- Generation and transport of waste.
- Generation of jobs.

9.3. IDENTIFICATION OF THE COMPONENTS OF THE INFLUENTIAL AREA

To establish the potential grade of affectation reached in the natural environment, including its dynamics and interactions, it is proceeded to identify the environmental components of the area of influence potentially affected by the different activities of the work. In Table N°2 the components of the environmental system are identified and analyzed in each medium (physical, biologic, socio-economic and cultural)

Table N° 2 Identification of the components of the Influential area

#	Environmental System		
Components	Natural Medium		Socio-economical Medium
	Physi	Biologic	
	Soil Wat er	Flora and vegetation Fauna Ecosystems	Social aspects Economic aspects Cultural aspects.

10. ANALYSIS OF ENVIRONMENTAL IMPACT RELATED TO THE UPDATED PROJECT

The particular characteristics of the project and the environment receiver vulnerability determine which are the environmental factors over which it is necessary to focus the study and analyze in detail. For the above said, in Chapter o4 it is incorporated to the Addendum a series of reports of specific studies done that have been done taking into consideration the project range and the environment receiver.

The modifications are:

- New machine selected for the project.
- New quantity and distribution of the wind turbines in the site, considering the re-location of infrastructure works (roads, collector network, foundations and mounting platforms).

In Table N° 3 there is summary comparing the Project (Addendum) and the Updated on (Addendum N° 2) in relation to the characteristics in design of the different components that form each project; and after that, in Table N°4 a comparative summary indicating the percentage of variation.

Table N° 3 Comparative Summary in relation to the characteristics of design (Ad and Ad 2).

Addendum Project at EIA	Addendum Project N° 2 at EIA
▪ Quantity of wind power turbines 31 units ▪ Internal Roads (6 meters of minimum use) Approximate length: 20.8 Km. ▪ Approximate length of underground ducts. 23.1 Km. ▪ Foundations for the wind turbines. Type and dimensions: Octagonal (Φ19,8m) - Prof: 3,6m. Total volume of excavations: 1.109 m^3. Total volume of concrete: 587 m^3. Total quantity of iron: 62 tones. ▪ Mounting Platforms for the wind turbines. App Surface required: 2.200 m^2.	▪ Quantity of wind power turbines 30 units ▪ Internal Roads (6 meters of minimum use) Approximate length: 18.0 Km. ▪ Approximate length of underground ducts. 22.0 Km. ▪ Foundations for the wind turbines. Type and dimensions: Octagonal (Φ18,8m) - Prof: 2,25m. Total volume of excavations: 935 m^3. Total volume of concrete: 436 m^3. Total quantity of iron: 33,2 tones. ▪ Mounting Platforms for the wind turbines. App Surface required: 3.680 m^2.

Table N° 4 Comparative Summary in relation to the characteristics of design (Ad and Ad 2).

Description	Addendum Project at EIA	Project Ad. Nº 2 to EIA	Percentage of
▪ Quantity of wind power turbines	31 units	30 units	-3.2%
▪ Approximate length of internal roads.	20.8 Km.	18.0 Km.	-13.5%
▪ Approximate length of underground ducts.	23.1 Km.	22.0 Km.	-4.8%
▪ Foundations for the wind turbines.			
Total volume of excavation	34.379 m^3.	28.050 m^3.	-18.4%
Total volume of concrete:	18.197 m^3.	13.080 m^3.	-28.1%
Total quantity of iron:	1.922 Ton.	996 Ton.	-48.2%
▪ Mounting Platforms for the wind turbines.			
Approximate Total Surface.	68.200 m^2.	110.400 m^2.	+61.9%

In the previous table it can be observed that the total volume of earth extracted for the foundations decreases (-18%), the volume of concrete (-28%) and the quantity of iron (-48%).

The surface required for the mounting platforms, increases (+61.9%), mainly because the tower dimensions and the blades for the new machines. And consequently, for the bigger size of the main crane and of the area of maneuvers required for the mounting operations.

Following, the environmental impacts are analyzed associated to the modifications included. Even though there are no different impacts from the ones detailed in previous studies, they may affect in a different way. For that reason, it was made a new analysis of environmental impacts related to:

- New localization of components (turbines) of the Wind Energy Station.
- Presence and functioning of the wind turbines.

10.1. ENVIRONMENTAL IMPACT RELATED TO THE LOCALIZATION OF COMPONENTS

10.1.1. Soil use affectation and use of the space

Soil Use

The project will be placed in a rural area where the main activity is agriculture and farming. Part of the surface in the site where the Wind Energy station will be or its surroundings is affected by infrastructure works of great impact in the local, regional and national level, among which are:

- High voltage aerial line of 132 KV.
  Property of Transba S.A. It bonds the ET Bahía Blanca with the ET Tornquist; it crosses North to South the Rural Property "Reyrolles". In this portion of field, eight structures of concrete are installed and the wiring system of approximately 2.1km.
- Medium voltage aereal lines of 13,2 KV (rural).
  Property of Cooperativa of Tornquist. They provide electric energy to the three rural properties, among others.
- Rails and railway station.
  Near the Rural Property of "San Bautista Sur" and "Reyrolles". There is also the "Paraje García del Río", which has an ancient railroad building (inhabited) and the ex-school N° 22 of the Buenos Aires Province.
- National Route N° 33

At the moment the route trace is being modified into a highway of two lanes (with two driving lanes each other), separated by a central quarry of 23.30 meter wide).

The new topographic distribution of the wind turbines and the complementary works will not affect the existing infrastructures, rural headquarters, or tree groups present in the rural properties or in the zone.

In Annex C.05.1 two Notes are attached. They have been sent by the Town Hall in Tornquist in relation to the possibility of Soil Use and the authorization for the new location of the wind energy turbines in neighboring roads.

Space occupation.

In Annex C.04.1 there is a detailed analysis of the surface that the new configuration of the Wind Energy Station will affect.

PREPARATORY STAGE OF THE SITE AND CONSTRUCTION

- The temporary occupation of the surface that will be affected by different components of the Wind Station will be of approximately 29.6 has.

OPERATIVE STAGE AND MAINTENANCE

- The permanent occupation of the surface that will be affected by different components of the Wind Station will be of approximately 23 has.

  As well as indicated in the EIA (Addendum) the real and permanent occupation of the soil affected by the different works will be of 2.4% of the total surface of the site (950has).

The rural properties are under agricultural and farming activity; this activity and the exploitation of the wind resource with energetic ends are perfectly compatible, with which the soil can easily host both activities. It is considered that this environmental impact is negative, of low level and of punctual extension.

10.2. ENVIRONMENTAL IMPACT RELATED TO THE PRESENCE AND OPERATION OF WIND ENERGY TURBINES

As it was said before keeping similar total power installed in the Wind Energy Park (from 99.2MW to 99.75MW) the number of wind turbines was diminished in one (from 31 to 30, that is -3.2%).

In the following table it is shown the technical characteristics most representative of the wind turbines, in which base the analysis will be done.

Table N° 5 Technical characteristics of the Wind Energy Turbines of the Project (Addendum) and Updated.

Addendum Project at EIA	Addendum Project N° 2 at EIA
▪ Wind Energy Turbine Trademark: Siemens. Model: SWT 113-3,2 MW. Generator Type: Synchronic, PMG Nominal Power: 3,2 MW Frequency: 50 Hz. Generation tension 0.690 KV. Gearbox. None Hub Height 92.5 meters Rotor Diameter 113 meters Maximum height of the wind turbine: 149 meters Rotation speed: 6,5 - 15,8 rpm. Power Regulation: Pitch, with variable speed. Barren area. Per unit: 10.000 m^2. Total Wind Farm: 310.000 m^2.	▪ Wind Energy Turbine Trademark: Nordex-Acciona. Model: AW132/3300, TH120. Generator Type: Asynchronous, 6 poles, double-fed. Nominal Power: 3,325 MW. +3,9%. Frequency: 50 Hz. Generation tension 12 KV. Gearbox. SI (App quantity of oil 1.000 Lit.). Hub Height 120 meters +29,7%. Rotor Diameter 132 meters +16,8%. Maximum height of the wind turbine: 186 meters +24,8%. Rotation speed: Variable - 7.0 … 14.0 rpm Power Regulation: Pitch, with variable speed. Barren area. Per unit: 13.720 m^2. +37,2%. Total Wind Farm: 411.600 m^2. +32,8%. Color (blades, hub, trench, tower): RAL 7035 (light grey). Noise level. 108,5 dB(A). +0,9%.

Updated analysis of the potential environmental impacts associated to the presence and functioning of the new wind energy turbines includes:

- Analysis of Noise Effects produced by wind turbines
- Analysis of Shadow Effects produced by wind turbines
- Affectation by Low Frequency Fields and the Corona Effect
- Affectation of flora and fauna
- Affectation of fauna
- Affectation of the landscape quality
- Affectation of aerial security
- "Clean" electric energy production
- Emission factors avoided to the atmosphere
- Wind Energy Turbine production on the earning of methane tankers

10.2.1. Analysis of Noise Effects produced by wind turbines

The noise produced by the wind turbines is defined depending its origin, mechanic or aerodynamic type. The level of noise reached by the new wind turbines is of 108.5 dB(A), which represents an increment of +0.9% in reference to the machine used in the previous project.

The mechanic noise is that produced by the mechanic parts in movement, like transmission, electric generator, position system, fans, and hydraulic engines, among others. This noise is transmitted by the openings of the nacelle and by the surface of the tower. At present it it relatively low, due to a better engineering preoccupied to avoid vibrations; joints and bonds are used, through elastic muffles in the main components of the nacelle, and the acoustic insulation.

The aerodynamic noise is the dominant part of the acoustic impact produced by the wind turbine. It is caused by the air flow acting on the blades of the rotor and when it goes through the tower; it is produced mainly in the tips of the blades and the back part of them. Consequently, at a higher speed of turn greater will be the noise produced. The aerodynamic noise is of the wide band type, moduled in amplitude, and it can be described as a whistling.

In Annex N° C.04.2, a detailed report is presented with the results obtained from the study of the noise that will be produced by the wind turbines in the context of the Project (through a simulation technique). For that we used the calculation software “WindPRO 3.2.701 by EMD International A/S, Noise.

From the results obtained by estimation, it is predicted that the properties identified as "Internal Receptors: A,B and C" are in the order of 49.7 db(A9, 49.9dB (A) and 49.8 respectively. And the identified as "External Receptor: D, Paraje García del Río” is in the order of 46,6 db(A), (see Figure Nº 3).

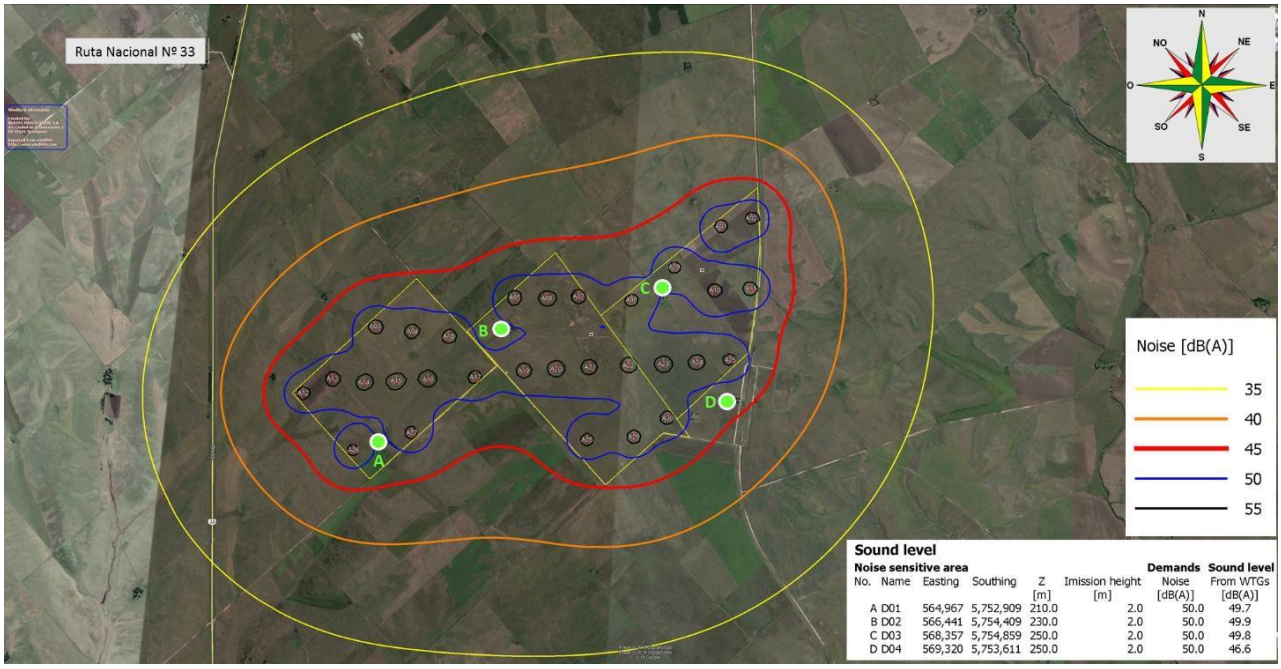


Figure N° 3 Map of noise emitted by the wind energy turbines of the Wind Energy Station.

Source: Calculation software “WindPRO 3.2.701 by EMD International A/S, Noise.

For what was said before, it can be concluded that the inhabitant that are in the properties mentioned will not be affected, given the noise in background produced by the wind over the tree curtain that surround them and over the rural properties will be stronger than the noise produced by the closest wind energy turbines.

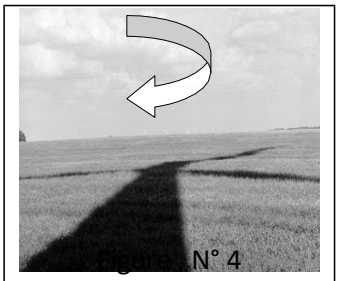
Wind Energy Parks are located in areas where the win is normal and so the noise in background is common. At present, in the area where the project will be placed, sound emissions correspond to noise in the background produced by the wind. It is considered that this environmental impact is negative, of medium level and of punctual extension and permanent duration (service life of the project).

The noise source of mayor relevance after the wind turbines remits to the operation of the power transformer, which will be located within the perimeter of the ET (MT/AT). The project predicts the operation of 1 transformer of power 132/33/13.2 KV 110/110/40 MVA (Manufacturing Standards: IEC 60076); the sound focus reaches the highest level of emission against the transformer and the value is Leq = 82 dB(A).

With basis of the information generated in this study and what is established in current regulations, the levels of noise produced by the wind turbines must be monitored and registered, verifying the compliance of the norms IRAM 4062/16, called "Disturbing noising to the neighborhood", (SE 304/99 and ENRE 0197/2011, Article 4a and b; for Wind Energy Turbines).

10.2.2. Analysis of shadow effects (flickering) produced by wind turbines

Within the environmental impacts that the project produces the shadow effect (flickering) has been identified, projected by the wind turbines in neighborhood areas, when the sun is visible.



N° 4

Analysis of Shadow Effects produced by wind turbines Source: NEG-MICON.

It is possible that the flickering effect may cause disturbances in people and the fauna that live in the area of the venture. The wind turbines, as other high structures, can create high shadows when the sun is down.

It is called shadow effect (flickering) the change produced in the intensity of light caused by the shadow projected on the ground, vegetation or infrastructure in proximities of the wind turbine (see Figure N° 4).

This effect occurs under certain specific combined conditions. When:

- The sun is shining and is in a low angle (at dawn or sunset).
- The wind turbine is located directly between the sun and the property affected.
- There is enough energy in the wind to make the blades of the turbine move.

In the Argentine Republic there is no specific regulation to consider in relation to disturbances made by the shadow of wind turbines over the potential affected ones. At an international level it is common practice to apply to Guides on Environment, Health and Safety for the Wind Energy (MASS) that recommend that: "*…considering the worst hypothesis, the duration predicted by such effects for*

part of a sensible receptor they verify that it does not exceed the 30 hours per year, or 30 minutes a day in the worst period in which the flickering takes place".

In Annex N° C.04.3, a detailed report is presented with the results obtained from the study of the shadow that will be produced by the wind turbines in the context of the Project (through a simulation technique). For that we used the calculation software "WindPRO 3.2.712 by EMD International A/S, Noise.

From the results obtained, it is predictable that neighboring areas of the project (app up to 1700 meters) may be affected by the shadow effect (flickering) produced by the wind turbines, (see Figure N° 5).

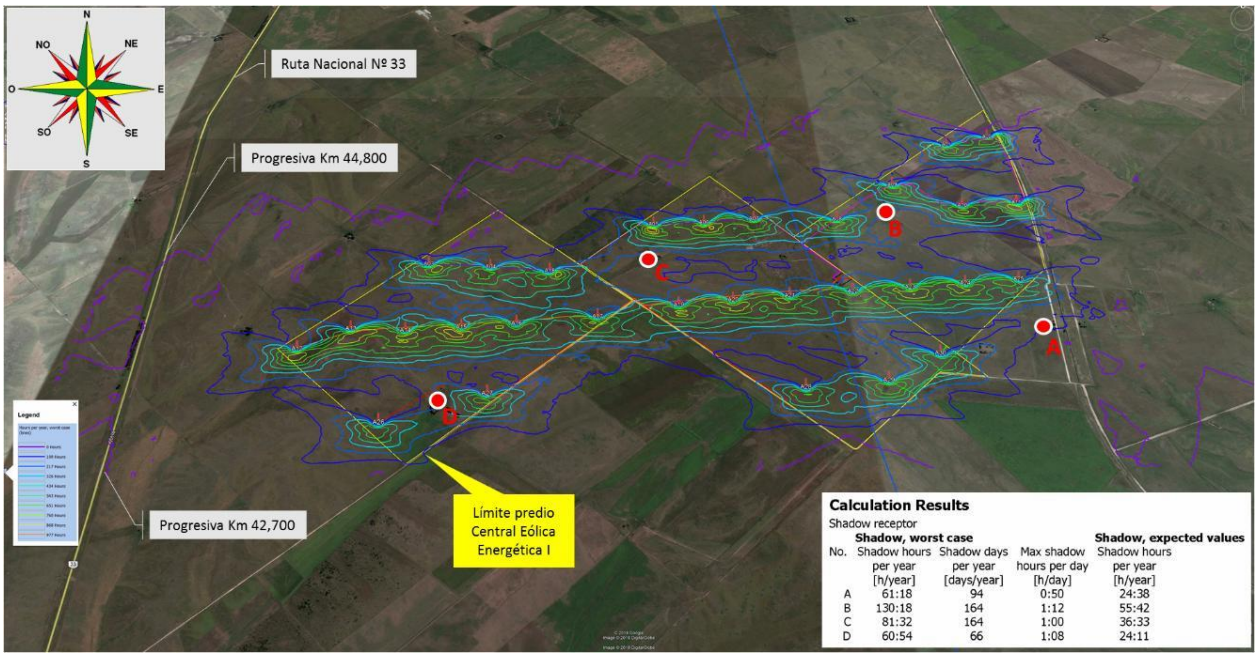


Figure N° 5 Map of shadows (flickering) emitted by the wind energy turbines of the Wind Energy Station. Source: Calculation software "WindPRO 3.2.712 by EMD International A/S, Noise.

The rural properties within the site of the Wind Power Station identified as "B,C and D" will be the sites most affected by the shadow effect: it will also be affected the rural property in the neighboring site (Paraje García del Río) identified as "A".

Even though there is no regulation that might rule this effect and with the basis of the studies done, Energética Argentina S.A. must inform the potential affected neighbors by this environmental parameter. In this sense, there must be done a Study of the effect, once the Wind Farm is put into functioning.

Shadow (flickering) by wind turbines (to all affected receptors), in windows or opening facilities where specific activities are done and that may disturb people. With this information we will have the source that produces the effect and the environmental factors that with no doubt will vary the estimations done. With the results obtained, we will proceed if necessary, to implement specific ways of mitigation measures.

National Route N° 33 at about 2.1Km (Progression Km42.700 and Progression Km 44.800) can be affected by the shadow (flickering) projected by the wind turbines of the Wind Energy Farm. For this reason, it must be communicated to the authorities of the National Roads and Highways Bureau of Argentina about the environmental affectation in the road mentioned. It is understood that it might be prudent to put signs, between the Progression indicated, to call the attention and mark the potential existence of this effect.

Applying the protection measures indicated, it is considered that this environmental impact is negative, of medium level and of punctual extension and permanent duration (service life of the project).

10.2.3. Affectation by Low Frequency Fields and the Corona Effect

One of the most important aspects from the environmental point of view are the electromagnetic effects originated about the environment by electric facilities of high and medium tension. Particularly, in the present study these are evaluated: electric field intensity(CE), magnetic induction (CM) and the audible noise levels (RA) and electromagnetic interference (RI) in case of the presence of the corona effect, framed in the Resolution 77/98 of the Energy Secretary.

The admitted levels established in Annex 1 of the regulation mentioned above are detailed below:

I. In point 4.1 of the Annex, it is established that the superior limit value of the electric field not disrupted, for the lines in condition of nominal tension and the conductor at maximum annual temperature, is 3 KV/m in the hedge of the serving strip and out of it, at 1.0 meter from the ground.

II. In point 4.2 of the Annex, it is established that the superior limit value of the magnetic induction for the lines in conditions of maximal tension defined by the thermal limit of the conductors, is 25 μ T (250mG) in the hedge of the serving strip and out of it at 1.0 meters from the ground.

III. In the point 2.1 it is established that the maximum level of radio interference is 54 dB during 80% in daytime, measured at a minimum horizontal distance of 5 times the height of the aerial line in its suspension poles or towers.

IV. In the point 2.2 it is established that the maximum level of audible noise will not exceed 53 db. This value must not be passed 50% of the times in conditions of wet conductor in the limit of the serving strip from the center to the course of the LAT.

A very important aspect to highlight in this study is that there have been identified two relevant evaluation zones with greater access to the public which are: a) the zone where the High Tension Line progresses (132KV) and where it will be bonded to the Wind Energy Park; and b) the zone where the collector network will be developed of 33 KV of the Wind Energy Park.

Given that the site is crossed by the LAT (132 KV) that joins the ET Bahía Blanca and the ET Tornquist, from which the ET (MT/AT) of the Wind Energy Park will be undertook, an analysis of electromagnetic fields will be done to demonstrate that the new project will not modify them adversely.

Estimations have been done using the "ad hoc" program developed by ICON srl that permits to determine the levels of the electric field, magnetic fields, radio interference and noise audible by the corona effect. The results of this program have been validated with results provided by the declared literature in the References of the present report.

In Annex N° C.04.4 a detailed report is presented with the results obtained for the updated project. With the estimations done for all the environmental parameters analyzed, we can conclude that it meets the requirements in the Resolution 77/98 of the Energy Secretary. It is considered that this environmental impact is negative, of medium level and of punctual extension and permanent duration (service life of the project).

Furthermore, in function of the proper characteristics of the operation of the project and of current regulations, the intensities of the electric field, magnetic induction and the levels of audible noise and radio interference in case of presence of the corona effect must be monitored, in the frame of the Resolution 77/98 of the Secretary of Energy.

10.2.4. Affectation of flora and fauna

In Chapter 03 of the present Addendum, a report on the Biotic Medium with flora and vegetation present in the project area is included. The objective of the report is:

- Evaluate plant diversity.
- Estimate the vegetable coverage and the percentage of barren land.
- Identify interesting botanic species with biologic, eco systemic or cultural value.
- Classify the field sectors in their value for conservation by flower signaling in the winter period.
- Suggest management recommendations with emphasis to protect native vegetation and minimize the impact on species in danger.

During the preparation and construction, the vegetation will be affected in the sectors where the works will be done. (ET, trenches for ducts, foundations and mounting platforms for the wind turbines) and in the workroom. The project requires the opening of new sites where soil removal and vegetable coverage will be done. It is not predicted to affect any of the sites with tree species (which are punctual in the three sites) with any infrastructure works.

The soil and the vegetation associated are element which will be sensibly affected, due to the big movement of earth that is required. Once the work is over, the surfaces affected temporarily will be covered preserving the organic soil and respecting the measures of restitution of the fertile layer, that is why with a correct treatment of the area it will be recomposed gradually. It is considered that this environmental impact is negative, of medium level and of punctual extension and permanent duration (service life of the project).

Other aspect that might affect the vegetation is the occurrence of spills of pollutant substances (hydrocarbons, oils, lubricants/refrigerants, etc.) used in vehicles (transport, etc.) and the machinery used for the work. In this case the affectation will be rather small and the environment does not ease the scattering of the fluid. Nevertheless, there will be plans to control the potential event. To this respect, it is important to mention that all the vehicles and machinery that come into the site must be in good condition of maintenance and have the certificate of Technical Verification for vehicles updated, consequently it is rather improbable its occurrence.

As said in the Environmental Report indicated previously, it is recommended to implement a daily Monitoring Plan, during the pre-construction and construction stage of the work, and possibly up to two subsequent spring-summer periods. The same will be oriented to make Recommendations of Treatment indicated (see Chapter 03 Baseline Report- Flora and vegetation).

During the operation and maintenance stage it is not expected to harm the vegetation. In case of required, the transport vehicles will not circulate outside the Wind Energy Park roads where there is vegetable coverage; and they will not operate equipment (cranes, etc.) outside the areas assigned to each wind turbine.

On the other side, the probability of occurrence of spills with pollutant substances (hydrocarbons, oils, etc.) in the soil and vegetation is quite limited due to: A) safety measures and those for prevented maintenance proper of each turbine; B) vehicles and machinery that enter the site should be in good state of maintenance; and C) training with good environmental practices with which the personnel assigned for these tasks of maintenance count.

10.2.5. Affectation of fauna

The energetic venture will develop in an environment affected by intensive agricultural and ecological systems destined to the production of agriculture and farming, and also highly modified by anthropic actions. So, the fauna present in the site is rather scarce; it is limited mainly to those species that have adapted to live with human beings, in disturbed areas.

As well, in Chapter 03, a report of amplification and update of the Biotic Medium, with fauna present in the area of the Project is included. The objective of the report is:

- The number of species in existence in the site and their seasonal variation.
- The presence of threatened species.
- The migrant status of the species in existence.
- Activity and seasonal abundance of bats.
- Preliminary recommendations and the suggestion of a tentative schedule for monitoring 2018/2019.

With the basis of what has been developed in the report of Baseline (fauna), it is recommended to implement a Monitoring Plan oriented to make recommendations (about birds and mammals) and a Schedule (2018-2019) suggested in the report. The same must be continued during the two first years in the operation/maintenance stage, and according to the results obtained there will be modifications (frequency and mitigation measures), for the continuation of the Adaptive Treatment Plan.

10.2.6. Affectation of the landscape quality

The visual impacts associated to Wind Energy Farms come from the wind turbines installed (quantity, distribution, height, color of components, etc.) and to their functioning (rotor movement).

The social perception of the impact over the landscape of these type of projects contains certain degree of subjectivity, where several positions arise. Some sectors consider "wind Mills" a sign of environmental progress and an element of touristic attraction in the region, and welcome a new form of "clean" energy; others consider that wind turbines constitute an intrusion in the landscape creating a negative visual impact.

The project will be developed in rural properties, where there are no public at all for uses of recreation or tourism, or it presents an environment of visual attraction with valuable scenery.

It has been taken as a reference and of valuable scenery the Cerro Tres Picos, given that it is the highest point in the Buenos Aires Province and from which summit all the town can be seen (1.243 m). The lineal distance from the hill to the Northern vortex of the site is of 30km (see Figure N° 6).

Even though the region has several sight for tourism, one of the preferable places is the Provincial Park Ernesto Tornquist. It is located at a lineal distance approx. of 34 km from the site.

So, the selected sites for the project are relatively distant from the main centers of touristic attraction. It can be said that the wind turbines will be appreciated by travelers that circulate a section of the National Route N° 33, only from certain specific places at more than 1.15 Km from the nearest machine (N° 12). It is considered that this environmental impact is negative, of medium level and of punctual extension and permanent duration (service life of the project).

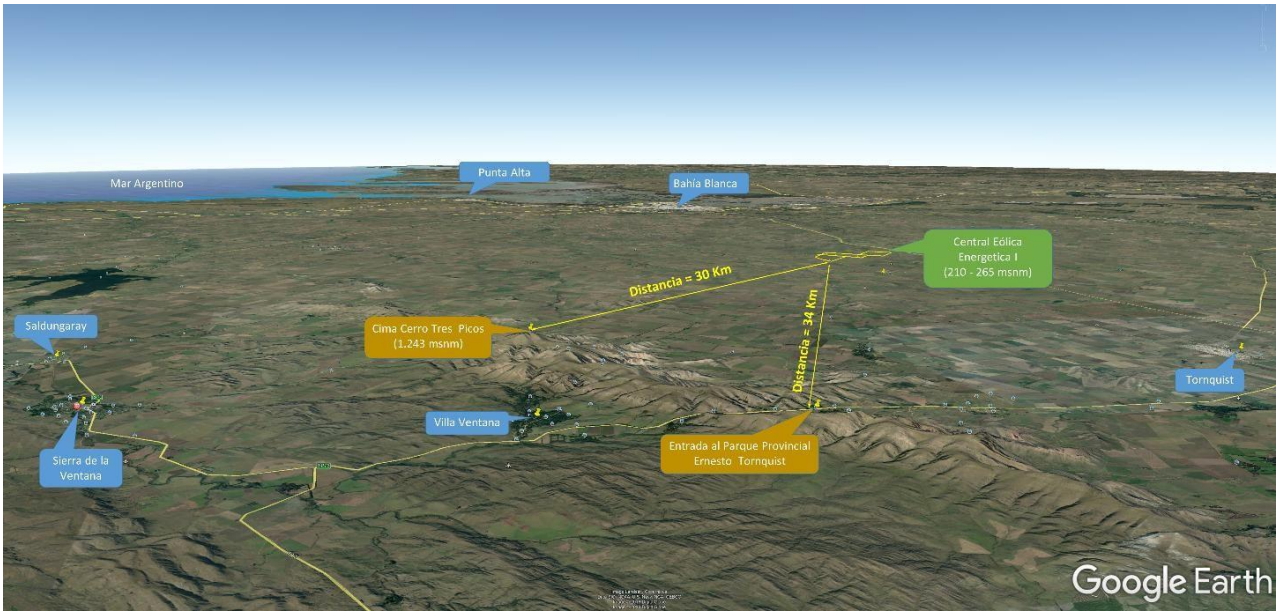


Figure N° 6 Google Image with the location of the Wind Energy Station projected, and the approximate distances to the summit of Cerro Tres Picos and to the entrance of the Part Ernesto Tornquist.

In figure N° 7 (A,B,C and D) there are some simulations with different views where the visual affectation that the wind turbine will produce to observers that may circulate by National Route N°33 and by the neighboring roads.

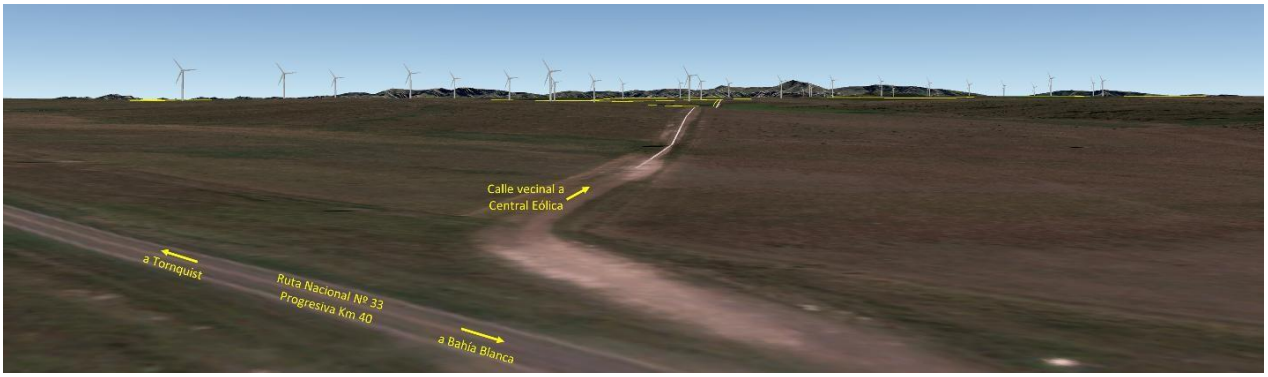
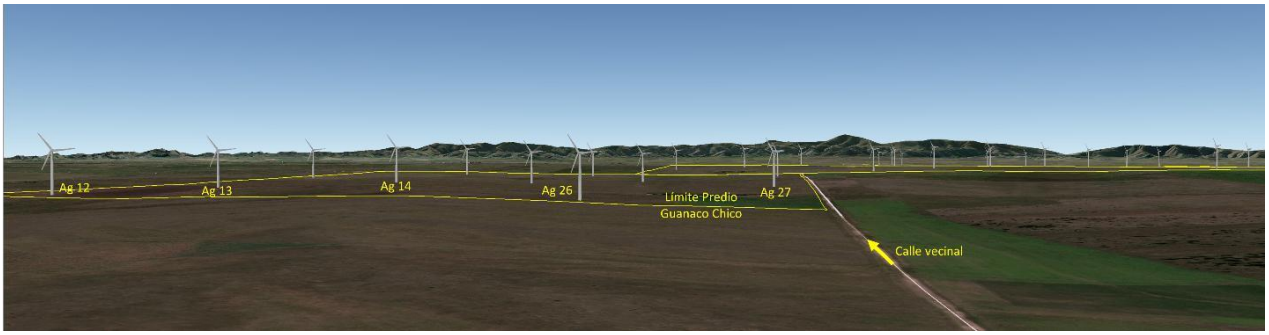
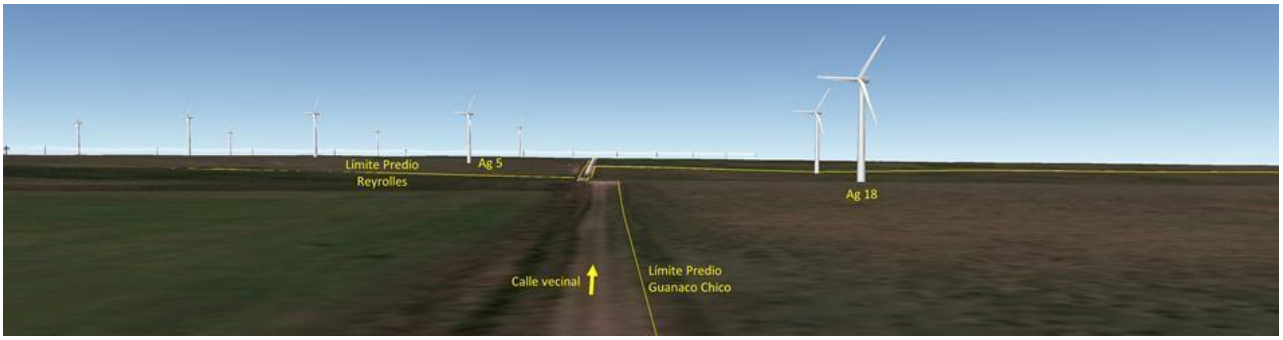


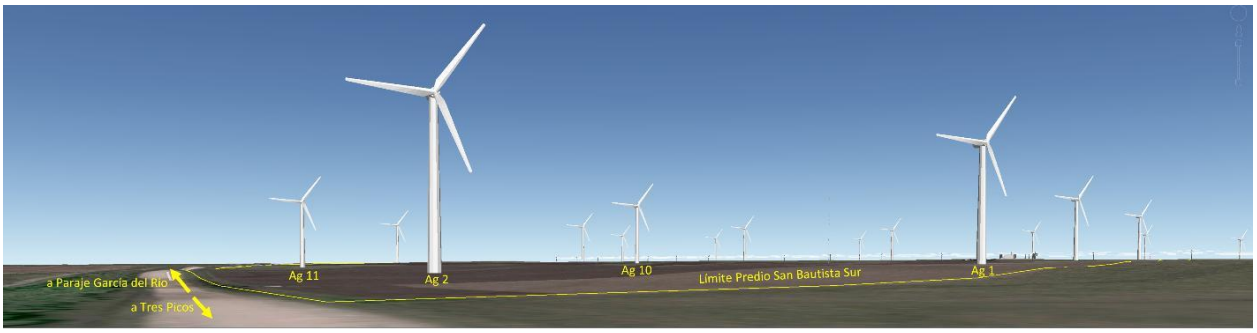
Figure N° 7 Image with a view of the wind turbines from: A) National Route N° 33



B) Neighboring road to "Guanaco Chico" (Progression km 40)



C) Neighboring road to "Guanaco Chico" and "Reyrolles"(Progression km 47)



D) Neighboring road to "San Bautista Sur" (from Tres Picos to Paraje García del Río).

10.2.7. Affectation of aerial security

The new wind turbines will reach a maximum height of 186 meters, that is 37 meter more that the machines used in the EIA (Addendum).

They count with signaling units according to International Regulations, the wind turbines AW300 have two types of signs (see Annex C.02.3 Document "Signaling System") They are:

- Light signals.
  Nacelle beacons.
  Tower beacons a half height.
- Structure Painting Tower
  signaling (painting) Rotor
  signaling (painting)

According to the Aeronautical Code of the Argentine Republic, there must be a study of prefeasibility of height before the Dirección de Tránsito Aéro depending of the Administración Nacional de Aviación Civil (ANAC) to the ends that this administration does the corresponding evaluation of the project.

Energética Argentina is making all the arrangements to update the project (see Annex C.05. Note "Ref.: Authorization for the installation of the Wind Energy Park"). From the evaluation that the Aeronautical authority makes, there will certain measures of signaling and ligh beacons of the updated project.

Considering the project characteristics and current regulations , a continuous Monitoring Plan will be implemented to verify the correct functioning of the beacons in the wind turbines. Under this consideration, there are no prediction that the venture might affect the aerial security, if if meets the requirements solicited by the authorities.

10.2.8. Emission factors avoided to the atmosphere

In Annex C.04.6 there is an analysis of the reduction in emission factors that 30 Nordex-Acciona wind energy turbines, model AW132/3300 TH120 of the Wind Power Center may add, compared to the production of the Thermal Centre whose energetic resources are: natural gas, fuel oil, coal or gas oil.

The reduction of emission of pollutants in the atmosphere during one-year period that might add the Wind Energy Center is shown in Table N° 6.

Table N° 6 Emission factors avoided to the atmosphere

Total generated MW-h/Año	Total of CO2 Tn	Total of NOx Tn	Total of SO2 Tn	Total of MP Tn
436,905	230,396	415	149	13

Considering a service life of 20 years, according the information provided by the wind turbine manufacturer, we can say that the project permits that the Wind Energy Station provide the electric system approximately 8,738,100 MW-h/in 20 years.

In Table N° 7 there are estimated the emission factors of pollutants which might be avoided during the service life of the Wind Energy Center, making a contribution to the Global Climate Change Program.

Table N° 7 Emission Factors avoided to the atmosphere during the service life of the project.

Total generated MW-h/ 20 Years	Total of CO2 Tn	Total of NOx Tn	Total of SO2 Tn	Total of MP Tn
8,738,100	4,607,920	8,300	2,980	260

10.2.9. "Clean" electric energy production

In the present Addendum we evaluated the effect of the contribution of electric energy which might be obtained from the wind resource, with relation to the regional consumption of electricity and particularly to the demand supplied by the Cooperativas Eléctricas of: Chasicó, Felipe Sola, Sierra de la Ventana, Saldungaray and Tornquist.

It is to be named that the Wind Farm will add its generation to the National Interconnected System through the new Transformer Station (132/33/13,2 KV) which will be located between ET Bahía Blanca and ET Tornquist, as of an opening in the LAT of 132 KV which TRANSBA S.A. operates, in the province of Buenos Aires.

In Annex N° C.04.5 a document is presented where it is shown that the 30 wind turbines might contribute to the system the energy demanded annually by approximately 251,557 "Users of a Residential Category". Besides, it can be said that the 30 wind energy turbines might supply the total demand (annual) provided by the Electric Cooperativas of the Tornquist DIstrict (6.7% of the generation) and the rest might be supplied by the Regional Electric System (93.25%). So, the impact produced by the generation of "clean" electric energy coming from a renewable resource like the wind is considered of a highly positive level.

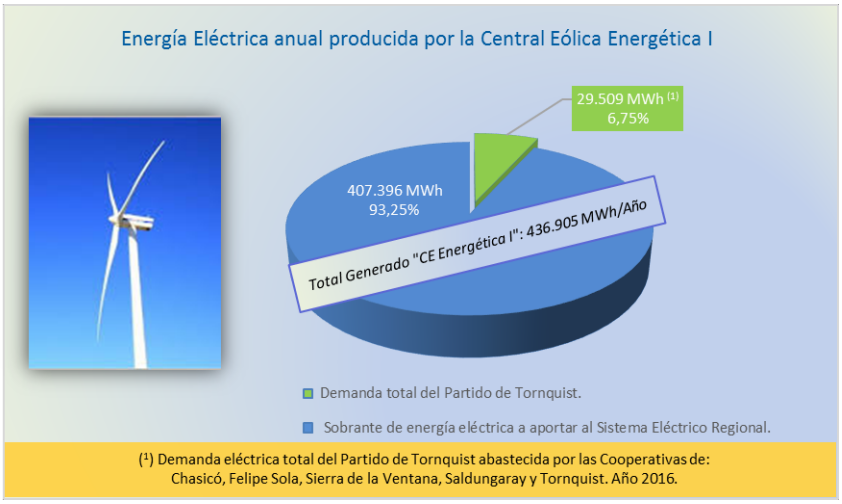


Figure N° 8 Effect of the Contribution of "Clean" Electric Energy in the Regional System

10.2.10. Wind Energy Turbine production on the earning of methane tankers

The objective of the present study is to evaluate the quantity of methane tankers that are required to produce the same quantity of electric energy that might generate the Wind Energy Center, whose energetic production will be injected in the National Interconnected System (SADI).

In Annex N° C.04.7, there is a report in which it is shown that with the energetic production predicted for the Wind Energy station it might be possible to avoid the importation of approximately 1.6 Methane Tankers per year, whose associated cost is approximately U$S25,906,000. Apart from all the implications that it takes. For example: a) Reduction of environmental risk intrinsic of this activity; b) reduction of energy expenditure associated to the charging, transportation and discharging of GNL related to the methane tanker, among others.

11. Mitigation Actions and Environmental Management Plan

The Environmental impact associated to the updated project that might affect in a negative form any component of the receptor medium does not differ from those evaluated in previous environmental studies.

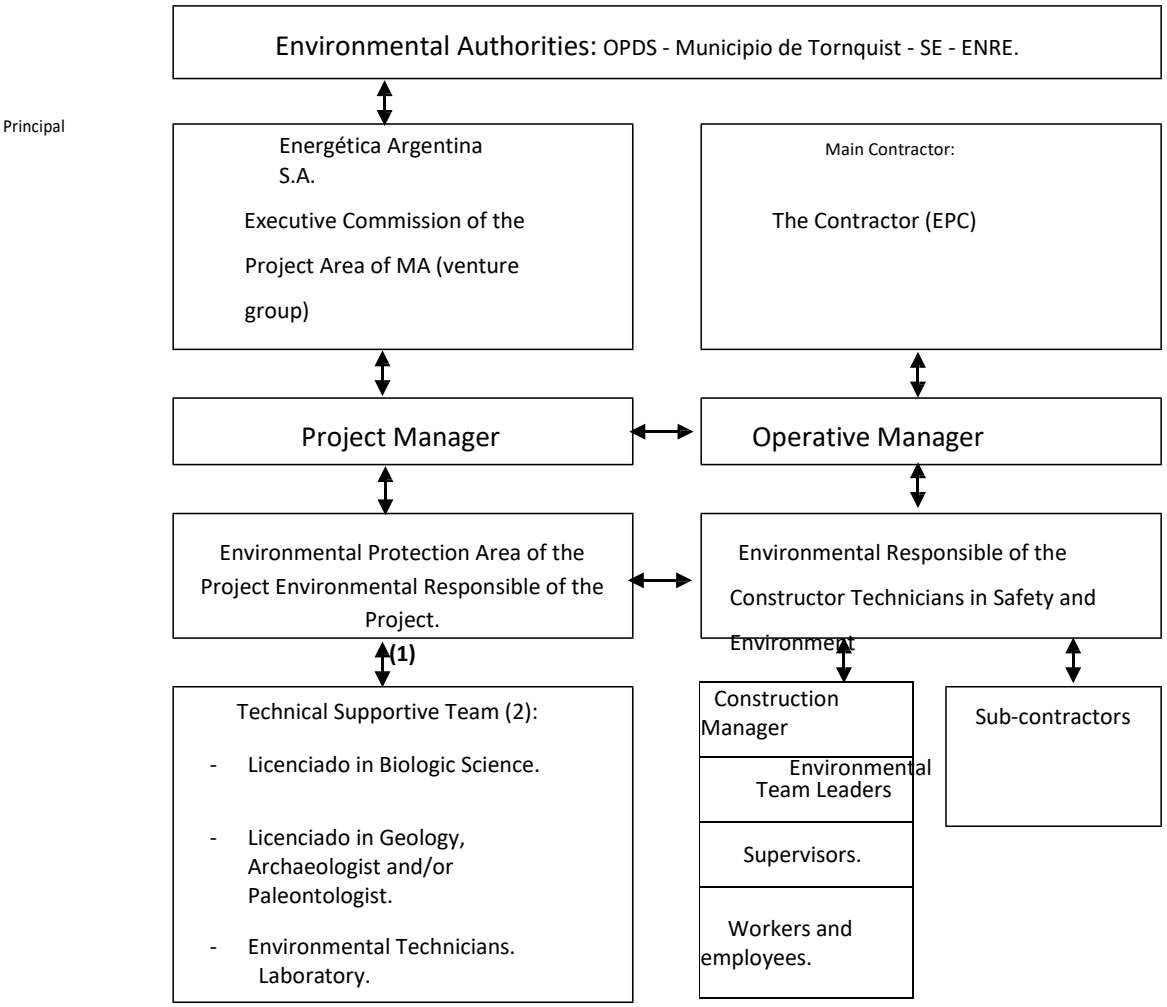
So, environmental protection measures required for the present study have already been investigated, which should be adapted as soon as the different activities are performed with all the modifications that may be needed.

As well, they are added in the present Addendum in the reports of Environmental Baseline, Biotic Medium- see Recommendations of treatment: a) Flora and vegetation; and b) Fauna.

In this respect it is important to mention that all the Plans, Programs and Audits will be developed in the frame of the Environmental Management System of the Energética Argentina company
S.A. and or of whom it is designed as the Constructor and Operator of the Wind Energy Farm. For all said the PGA must be "adapted" and presented to the corresponding administration offices once the Executive Project has been elaborated, prior the beginning of the work.

According to what is said in OPDS N° 2351/16, the company Energética Argentina S.A. must have in its organization an Area of Environmental Protection under a professional in charge with the specialty in the matter, whose function will be that of coordinate all the specific activities of the Environmental Management Plan (PGA) and Monitoring of the environmental parameters in all the stages of the Project (construction, exploitation and leaving).

Following there is the functional organization chart of the work which will be defined in detail prior to the beginning of the activities (construction stage).



(1) According to the requirement indicated in the Resolution OPDS Nº 2351/2016, Annex I, Item III, Point 19, the proponent and responsible of the Project will have in his organization an Environmental Protection Area under a professional in charge with specialty in the subject matter, and whose function will be that of coordinate the specific activities of the PGA, among others.

(2) The support team will collaborate with technical assistance in the Environmental Protection Area, in function of the necessities and especial requirements of the Project.

In compliance with current regulations, before the beginning of the activities, Energética Argentina S.A. must have with an environmental insurance and a restoration fund, according to the General Law of the Environment N° 25.675 Article N° 22.

11.1. ENVIRONMENTAL MONITORING PROGRAM

PREPARATORY STAGE OF THE SITE AND CONSTRUCTION

Prior to the beginning of the activities, the Constructor must show the corresponding plan, defining the points that will be monitored, the frequency and the quantity of samples, among others. Following there are the general guidelines of the environmental parameters to monitor:

A. Quality of air (PM10)

   Location. Area of material extraction for lending and work fronts.

   Frequency: To determine according the work progress.

   Quantity of samples: To determine.

B. Level of sound pressure Work noise.

   Location. In the area assigned for the workroom, in the RT (AT/MT) and in the work fronts.

   Frequency: To determine according to work progress.

   Quantity of samples: To determine.

C. Treatment of flora and vegetation.

   Location. In the area assigned for the workroom, in the RT (AT/MT) and in the work fronts. (roads, underground ducts, foundations and mounting foundations of the wind turbines)

   Frequency: Periodic inspection, up to the end of the work.

   The Plan will be oriented to make recommendations of Treatment indicated in Chapter 03 Baseline Report- Flora and Vegetation).

D. Fauna Treatment

   Location: to be determined in the context of the project area.

   Frequency: To determine.

   The Plan is oriented to make the Recommendations (of birds and mammals) and the Schedule (2018-2019) suggested in Chapter 03. Baseline Report- Fauna.

OPERATIVE STAGE AND MAINTENANCE

The Operator must specify the corresponding plan once received the facilities built, defining the points that will be monitored before and after the start-up of the Wind Energy Station.

The sites where the measurements will be done and their frequency will be defined according the requirements determined by the Ente Nacional Regulador de la Electricidad (ENRE), the Orgnismo Provincial para el Desarrollo Sostenible (OPDS- Buenos AIres Province), the Dirección de Recursos Naturales (Buenos Aires Province) and the Operator of the Wind Energy station.

The electrical and environmental parameters to monitor are the following:

a) Electric Field-Res ENRE 1.724/98-.

b) Magnetic Field- Res ENRE 1.724/98-.

c) Radio Interference-Res SE 77/98; publication CISPR18/1; 18/2; 18/3-.

d) Path and contact tension (Technical Specifications ex AyEE N° 75 Norm IRAM 2281-II and IV).

e) Audible NoiseIEC651-1987; IRAM4074-188 Measurement of tension and sound Levels and 4062/16).

f) Earthing Systems (Technical Specifications ex AyEE N° 75 Norm IRAM 2281-II and IV).

g) Noise Level (IRAM 4062/16) -Res. SE 304/99 y ENRE 197/2011, Art 4 a) and b) for Wind Energy Turbines. (1)

h) Vibrations (IRAM 4078/89) -Res. ENRE 197/2011, Art 4 c) for Wind Energy Turbines.

i) Impact record of birds-Res. ENRE 197/2011, Art 4 d)for Wind Energy Turbines.

j) Solid and semi-solid waste -Res ENRE 197/2011, Art 4 e)for Wind Energy Turbines

k) Beaconing for the wind turbines.

l) Treatment of Flora and Fauna (continuation of the preparation and constructions stage) Monitoring must continue up to two subsequent spring-summer period to the construction stage.

m) Treatment of Fauna (continuation of the preparation and construction stage) Monitoring must continue during the two first years in the operation/maintenance stage, and according to the results obtained there will be modifications (frequency and mitigation measures), for the continuation of the Adaptive Treatment Plan.

(1) According to current regulation, the levels of noise produced by wind energy turbine will be registered annually and after the occurrence of extraordinary natural phenomenon.

12. CONCLUSION

From the analysis done in the present Addendum N° 2 to the EIA, it is important to emphasize that the modifications included in the updated Project do not incorporate significant affectations to the environment with respect to the EIA (Addendum) presented under File OPDS N° 21 45- 9512/16 and declared environmentally suitable under Resolution OPDS N° 2351/2016.

The corresponding facilities to the Transportation System will not manifest significant modifications of the technical-building type, not even in the geographical location with respect to the Original Project.

The most significant environmental aspects in relation to the Wind Energy Station are represented by:

- The re-localization of the wind turbines inside the same rural properties; maintaining similar total power installed (from 99.2 MW to 99.75) and reducing in one unit the quantity of the wind turbines to be installed (from 31 to 30).
- The nw wind turbines will reach a maximum height of 186 meters, that is 37 meter more that the machines used in the EIA (Addendum).
- The new wind turbines will have concrete towers which will be manufactured locally in a Plant which will be installed in the Industrial Park of Bahía Blanca. This will benefit the providers of products and services already in the area, as well as the hiring of local manpower.

In the present report there is an amplification and update of the Environmental Baseline, with reference to the Biotic Medium. Considering plant information, the vegetation and fauna obtained in the site (three sites) and surrounding the project, it is convenient to follow the recommendations of treatment and monitoring schedules suggested,

The potential negative environmental impacts present a medium-to-low rate, and it is possible to mitigate them with the implementation of protection measures recommended, through a correct environmental treatment in each stage of the energetic venture.

As a conclusion of this evaluation, it results that the Wind Energy Station Project Energética I in the place selected is compatible to the context and is framed into current legal regulations, in all reference to environmental protection at a National, Provincial and local level.

13. Annex C.05

C.05.1. Documents/Notes and Affidavits related to the Project

C.05.2. Dangerous and/or Chemical Substances, fuel, other substances that will be deposit in the site - HDS

site - HDS

ANEXOC.05.1

DOCUMENTS/NOTES AND AFFIDAVITS RELATED TO THE PROJECT

I. Tornquist Town Hall
A) Feasibility for soil use.
B) Authorization for the location of the wind energy turbines in the surroundings of local neighboring roads, near García del Río.
C) Public Audience Act for "Wind Energy Park Project in the District".

2. Administración Nacional de Aviación Civil (ANAC) - Dirección de Aeródromos.
Authorization in height for the installation of the Wind Energy Park.

3. Ministry of Energy and Mining.
Authorization of entrance as Agent Generator of MEM.

4. Affidavits- Facilities free of PCBs.

Municipalidad de Tornquist
Intendente Municipal

TORNQUIST, June 6th, 2016.-

Note N°: **/16 -IM-**

TO THE PRESIDENT
OF THE WIND ENERGY PLANT ENERGÉTICA 1
Engineer **GUILLERMOS COCCOZ**

I am writing in my name of Tornquist Town Hall Mayor to give you the corresponding temporary authorization for the location of the Wind Energy Park in the following rural properties: Cadastral Naming: Circ 111 - Secc. Rural-Tia. 39f -Ptda. 3.533; Circ. VIII - Secc. Rural – Pla. 566 B – Ptda. 14.852; and Circ. VIII - Secc. Rural – Pla. 569 - Ptda. 45.

It is informed that this authorization will be under condition of presenting all the documentation requires by our Town Hall and that you can meet all the current National and Provincial regulations that may be necessary.

With no other matter to cover, yours Sincerely,

Sergio Bordoni
Tornquist Town Hall
Mayor

TO R NQ UIST
Town Hall

Tornquist, 14th September, 2018

Mr. Rubén Zaia
AES Renewable Energy
Director
S / D

Ref. Authorization for the location of the wind energy turbines in the surroundings of local neighboring roads, near García del Río.

By this writing I am saying to you that with reference to the location of the wind energy turbines of the AES company in the surrounding neighboring roads near Estación García del Río according to contract N° EOL 003 of the RenovAr Project- Ronda 2 and under the Assignation of priority of office in the frame of that disposed in the Resolution M.E. and M. N° 281 /2017 and the Disposition SSER N° 1 /2018 having taken in mind the Environmental Impact Study by OPDS with Resolution N° 2351 dated 2/8/2016, the Resolution 304/99 of the National Ministry of Energy, and the regulations of the Argentine Office of Roads and Highways Law 2193, you are authorized to locate the wind energy turbines only if its placement with respect to the wiring fencing that divides the neighboring road from the field, is calculated at least in base of the blade length added to the road width.

In the case of the wind energy turbines N° 02, 11, 30, 28, 29, according what it is manifested in the file sent on 11th September,2018 (Annex), they respect the minimum distance according the uniform width of 25m of partial roads (Art 6° of Law 2193), as they are located at 90m or more of the fencing line (blade 64m+ placement 25m= 89m). In the case of wind turbines N° 17 and 27, they are placed on a local internal neighboring road (without regulations that may specify the nominal width) that goes from the fencing 80m, whose width does not exceed 15m, so by this it is respected the minimum distance of placement (blade 64m+ placement 15m= 79m).

With no other matter, yours sincerely.

Mayor Sergio
Bordoni

TO R NQ UIST
Town Hall

Annex.

Evaluated location of the wind energy turbines. File sent by email ,September 11th by Javier Valy from AES Company.

Javier Valy paramí, Ruben Ignacio,Alfredo 11 sep

Gonzalo,

Buen dia.Tecomparto ellayoutdefinitivo para elparqueEnergética,con lasmodificaciones requeridas para cumplir con lasdistanciasdeseguridad y requisitosdel municipio de Tomquist y permitir el paso de la llne<1 deevacuación de losproyectos de PCR

Saludos,

Javier

"D" Javier Valy

Enviadoel:viernes, 17 de agosto de 2018 19:15

Para:'Gonzalo lparraguirre' <g^-!JjJIB_@gmail_com>

Asunto: RE:Parque Eólico Energética - Layoul30 Aeros Acciona

layout Energética

11 Km.

Mayor Sergio
Bordoni

RECORD OF A HEARING BY "WIND ENERGY FARM PROJECT IN THE DISTRICT"

In the city of Tornquist, at 14 days of the month of December of 2016, being 18.00 hours in the Board room of the Town Hall, they meet with the objective of holding the Hearing summoned by the Tornquist Town Hall and the Honorable Council, where the Argentine Energetic Company
S.A will present to the neighbors the detailed Wind Energy Plant Project proposed to be built in the surroundings of the town Tres Picos and the station García Del Río.

The following authorities are gathered: the holder of the title of the Development Agency of the Tornquist Town Hall, Dr. Gonzalo Iparraguirre; the Director or Environment of the the Town Hall of Tornquist, Ms Melisa Herrada; the councilor María Ofelia Skolak; the President of the company Energética Argentina S.A:, Engineer Guillermo Coccoz, accompanied by the Director and Technical Manager of Energética Argentina S.A, Engineer Agustina Peralta, the Commercial Manager of Energética Argentina S.A, Engineer Alejandro Hunko, and the Development Manager, Mr Agustín Marcenac; educational institutions interested in the training career about sustainable energy, as well as engineers and referents of the Cooperativas Eléctricas of the zone and general public.

The act is opened by Dr.Gonzalo Iparraguirre, who after saluting the people present, mentions the Hearing for the Wind Engery Park Project in the District", and thanks the authorities and the public in general.

The President of the company Energética Argentina, Engineer Guillermo Coccoz takes the floor and starts his speech with a power point, presenting the associated scheme of companies that boost the project and the work team that is conduction the project, and that is present in this Act to clear any doubts that may arise. Likewise, he describes the components of the wind energy farm and how they are integrated in the development of the project.

He continues showing the current energetic situation in Argentina, the characteristics

of the energy matrix and the impact of importations
of gas in the fiscal deficit in Argentina. In this context, he proposes the Wind Energy as part of the solution to this severe problem, describing the advantages of this renewable source of generation of electric energy, above

the conventional sources that domain the current energy matrix of this country. Furthermore, he informs the audience about the increase in wind energy in a global level during the last 10(ten) years; which are the countries with the highest development in the world; and in our region.

SContinuing with the presentation, engineer Guillermo Coccoz shows the evolution of wind energy in time, explaining technically how wind turbines

that will be installed in the project work, in function of the wind energy resource of the zone where it will be installed. Afterwards, he explains the excellency of this resource in Argentina in general, in the district of Torquist in particular.

The following topic in the presentation is the one referred to the Antecedents of Wind Energy in the country, how the new Law in Promotion of Renewable Energies (Law N° 27191) is implemented, and its main characteristics. Engineer Guillermo Coccoz continues explaining the selection mechanisms of the projects for the execution of electric energy supply contracts as of renwable sources, in function of this new law, and how the Wind Energy Farm Energética I is framed in one of these mechanisms.

From this moment, he starts to detail the particular characteristics of the Wind Energy Park Energética I, from its geographic location to the excellency of the wind energy resource in the site, reason for which the place was selected for the project. He also talks about the characteristics of modern wind energy turbines and how the technology progressed during the 7 years of development that the project has taken.

In this moment, there is room for the questions of the audiencce, where a representative of a local electric cooperative enterprise gives his opinion about the wind energy farm and the importance of energy supplying in the District of Tornquist.

Afterwards, the Headmaster of the Technical High School Nº 1 from Tornquist, Prof. Luis Quintana, inquires if there is a definite procedure about the technological transference for the installation of local industries that may provide supplies and services to these types of projects. Engineer Guillermo Coccoz explains that technology providers for these projects have already made contact with potential local suppliers, and inasmuch as these projects move forward in their developments, these ties will deepen, and local suppliers will provide their services to wind energy farms. It is also explained that due to financial issues of the projects, it is more difficult to integrate local supplies, since the local industry does not count with experience in this type of technology.

Later, after several exchange of ideas among the public and the technical team of the project, the representative of one of the most important industries in the District becomes interested in getting to know the technical characteristics of the protection systems that will be installed in the Transformer Substation of the Park. Engineer Alejandro Hunko steps in, and informs that all the equipment to be used in the Transformer Station are defined by the technical specifications of TRANSBA (the transport company of electric energy of Buenos Aires Province and operator of the High Tension Network where the wind farm will be connected). They also explain the operative characteristics of the wind park and its connection to the interconnected

national system.

Engineer Guillermo Coccoz suggests continuing with the presentation, telling that at the end there will be another moment to answer all the questions. He continues with the presentation describing the stages of construction of the wind park, telling about the periods of time needed, the resources to use, either economic and human, and the need to get local manpower for the work.

The next topic is the Study of Environmental Impact of the Project. They look into the means analyzed by the investigation, and they indicate and describe the Positive and Negative Impacts of the Installation of the Wind Energy Park Energética I, in the selected place, so the people in the Hearing can give their opinions with better knowledge of the physical, biologic, environmental and cultural impact of the project.

To end the presentation Engineer Guillermo Coccoz informs the audience about the Declaration of the Project as Environmentally suitable recognized by the OPDS (Provincial Institution for the Sustainable Development of the Buenos Aires Province), and he concludes by explaining the importance of installing the wind park as a means of generation of clean energy, replacing the import of methane tankers, supplying clean electric energy to more than 220.000 homes in the year, and reducing C02 emission in a volume equivalent to that produced by 1000.000 cars in a year.

Finally, he asks the attendees their opinions and comments about the installation of the wind farm Energética I in the area of the District of Tornquist, receiving positive answers about the initiative, and expressions of support by the different sectors.

Being 20.40 hours of the present day, having exposed the totality of the participants and not having formulated observations for the attendees in the Hearing, Dr Gonzalo Iparraguirre announces that the Hearing concludes, a record of it is issued. -----.

Dr.GONZAL IPARRAGUIRRE SECRETARY DEOESARROLID MUNICIPAUDAO Df TOROOUIST

MARIA OFELIA SKOLAK
PRESIDENTE BLOQUE
FRENTE PARA LA VICTORIA

Lic. Melisa Soledad Herrada
Directora de Medio Ambiente
MUNICIPALIDAD DE TORNQUIST

ENERGÉTICA ARGENTINA

Buenos Aires, 8th June, 2016.

Sirs

ADMINISTRACIÓN NACIONAL DE A V/ACIÓN CIVIL
INFRAESTRUCTURA YAERÓDROMOS
Reception Office

EXPTE. Nr-: ANC 20033/16

Ref. Authorization in height for the installation of the Wind Energy Park.

Dear Sirs,

As Legal Representative of the company ENERGÉTICA ARGENTINA S.A. I am pleased to address you to solicit authorization in height for the installation of the Wind Energy Park "Energética I", located in the District of Tornquist, in the Buenos Aires Province.

For that ends, we have fixed our legal address for communications in 1174 Corrientes Av, Floor 6 of the Autonomous City of Buenos Aires.

The Wind Energy Park "ENERGÉTICA 1" will be installed in three rural properties (Cadastral Naming: Circ **111** – Secc. Rural-Tia. 39 f – Ptda. 3.533; Circ. VIII - Secc. Rural – Pla. 566 B – Ptda. 14.852; and Circ. VIII - Secc. Rural – Pla. 569 - Ptda. 45) located in the surroundings of Paraje García del Río, of the Tornquist District, and will have a total of 31 (thirty-one) wind turbines.

Furthermore, we attach to the present letter the documentation that it detailed below:

- Statute of the Company certified by notary public.
- Form B- Petition of Authorization in Height Extense Objects.
- Plan of Location of the Wind Turbines, signed by competent professional.

ENERGÉTICA ARGENTINA

Yours sincerely.

Inga.Agustina Peralta
Director
ENERGÉTICA ARGENTI NA S.A.

República Argentina - Poder Ejecutivo Nacional
2018 - Año del Centenario de la Refonna Universitaria

Note:

Number: N0-2018-04518441-APN-DDYME#MEM

BUENOS AIRES CITY
26th January, 2018.

Reference: Notification RESOL-2018-18-APN-SECEE#MEM - EXP-S0 1:0239839/2016 - Admission of the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA as AGENT GENERATOR of the MEM for its Wind Energy Park Energética I

A: ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA (ESMERALDA 1394 Piso:4 Dpto:B - CABA),

With Copy A:

Dear Sirs:

By this means, I am notified about Resolution Nº 18 (RESOL-2018-18-APN-SECEE#MEM) signed by the Electric Energy Secretary of the National Electric Energy Office Engineer Mr. Alejandro Valerio SRUOGA at 25 days of the month of January, 2018.

Yours, sincerely.

Digitallysignad by GESTION DOCUMENTAL ELECTRONICA - GOE
DN:cn=GESTION DOCUMENíAL ELECTRON\CA •GDE,c=AR, o=MINISTERIO DEMODERNIZAC\ ON, ou;;;SECRETARIA DE MODERNIZAC ION AOMINI STRATIVA, seria!Numbe r=CUIT 30715117564
Date 201B.01 .26 09:53:04 -03'00'

German Dario Oberti
Director
Dirección de Despacho y Mesa de Entradas
Ministerio de Energía y Minería

Ministerio de Energía y Minería
Dirección de Despacho y
Mesa de Entrada
Dr. German Oberti
Director

ES COPIA
Ministerio de Energía y Minería
Dirección de Despacho
y Mesa de Entrada
Dr. Germán Oberti
DIRECTOR

República Argentina - Poder Ejecutivo Nacional
2018 - Año del Centenario de la Reforma Universitaria

Resolution

Number: RESOL-2018-18-APN-SECEE#MEM

BUENOS AIRES CITY
25th January, 2018

Reference: EXP-S01:0239839/2016 - Admission of the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA as AGENT GENERATOR
OR of the MEM for its Wind Energy Park Energética 1

WHEREAS Proceeding Nº SOl :0239839/2016 of the Registry of the MINISTRY OF ENERGY AND MINING, and

RESULTING:

That the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA petitioned its authorization as AGENT GENERATOR in the MERCADO ELÉCTRICO MAYORISTA (MEM) for its Wind Energy Station Energética I of ONE HUNDRED MEGAWATS (100 MW) of nominal power , installed in the District of Tomquist, BUENOS AIRES PROVINCE, connecting to the ARGENTINE SYSTEM OF INTERCONNECTION (SADI) in bars of THIRTY THREE KILOVOLTS (33 kV) of the new Transformer Station 132/33 kV, bonding to the High Tension Line of ONE HUNDRED THIRTY TWO KILOVOTS (132 kV) Bahía Blanca -Tornquist, jurisdiction of the EMPRESA DE TRANSPORTE DE ENERGÍA ELÉCTRICA POR DISTRIBUCIÓN TRONCAL DE LA PROVINCIA DE BUENOS AIRES SOCIEDAD ANÓNIMA (TRANSBA S.A.).

That by means of Note B-108130 - 1 of date 21st July, 2016 the COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA) informed that the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA meets the requirements demanded under Points 5.1 and 5.2 of the Annex 17 of the Procedures for its admission and administration of the MERCADO ELÉCTRICO MAYORISTA (MEM).

That by means of the Resolution Nº 2.351 with date 2nd August, 2016, the Provincial Organism for the Sustainable Development of the Buenos Aires Province determined to declare the Project Work called Wind Energy Park Energética I environmentally suitable.

That the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA has fulfiled the requirements of current legislation with respect to the presentation of documents about the association and commercial ends.

That the petition of admittance into the MERCADO ELÉCTRICO MAYORISTA (MEM) of the Wind Energy Park Energética I was published in the Official Bulletin of the Argentine Republic Nº 33.486 with date 20th October, 2016 without having received any objections that may disqualify the rendering of this resolution .

That the NATIONAL ADMINISTRATION OF THE WHOLESALE ELECTRIC MARKET REGULATION of the SUBSECRETARÍA DE ENERGÍA TÉRMICA, TRANSPORTE Y DISTRIBUCIÓN DE ENERGÍA ELÉCTRICA of the SECRETARÍA DE ENERGÍA ELÉCTRICA of the MINISTRY OF ENERGY AND MINING has taken note of its competence.

That Article 11 of the Resolution Nº 6 with date 25th January, 2016 of the MINISTRY OF ENERGY AND MINING, outsourced in the SECRETARY OF ELECTRIC ENERGY the faculties assigned to the ex-SECRETARY OF ENERGY of the ex-MINISTERIO DE PLANIFICACIÓN FEDERAL, INVERSIÓN PÚBLICA Y SERVICIOS, according Articles 35, 36 y 37 of Law Nº 24.065.

That the DIRECCIÓN GENERAL DE ASUNTOS JURÍDICOS of the MINISTRY OF ENERGY AND MINING has taken note of its competence.

That the faculties for the rendering of this resolution arise from that specified by Articles 35 and 36 of Law Nº 24.065 and by the Resolution Nº 25 with date 16th March, 2016 of the MINISTRY OF ENERGY AND MINING.

For that,

THE SECRETARY OF ELECTRIC ENERGY

RESOLVES:

ARTICLE 1º.- Authorize the admission of the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA as AGENT GENERATOR of the MERCADO ELÉCTRICO MAYORISTA (MEM) for its Wind Energy Park Energética I of ONE HUNDRED MEGAWATS (100 MW) of nominal power , installed in the District of Tomquist, BUENOS AIRES PROVINCE, connecting to the ARGENTINE SYSTEM OFINTERCONNECTION (SADI) in bars of THIRTY THREE KILOVOLTS (33 kV) of the new Transformer Station 132/33 kV, vinculated to the High Tension Line of ONE HUNDRED THIRTY TWO KILOVOTS (132 kV) Bahía Blanca -Tornquist, jurisdiction of the EMPRESA DE TRANSPORTE DE ENERGÍA ELÉCTRICA POR DISTRIBUCIÓN TRONCAL DE LA PROVINCIA DE BUENOS AIRES SOCIEDAD ANÓNIMA (TRANSBA S.A.).

ARTICLE 2°.- Inform the COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA) for the purpose of cost overrun that might be generated to the other agents of the MERCADO ELÉCTRICO MAYORISTA (MEM) and the penalties that may be paid by lenders of the FUNCIÓN TÉCNICA DEL TRANSPORTE (FIT) derived from eventual unavailability on the occasion of the admission this act authorizes, will be charged on the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA, title holder of the Wind Energy Station Energética I, in its bond with the SISTEMA ARGENTINO DE INTECONEXIÓN (SADI) in bars of THIRTY THREE KILOVOLTS (33kV) of the new Transformer Station 132/33 kV. To this effect the COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA) is enabled to effect the corresponding charges within the Seasonal Period in which such overrun or penalties are produced..

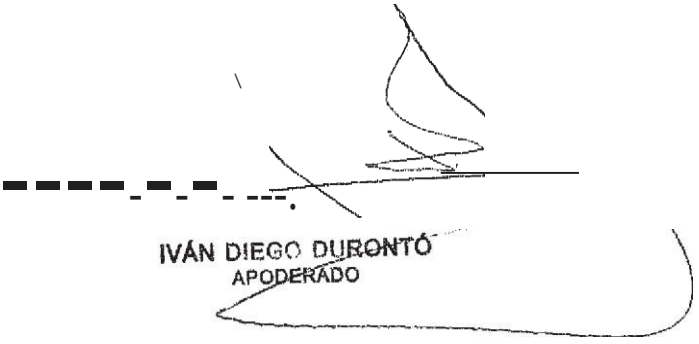
ARTICLE 3°- Notify the company ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA, the COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA), the EMPRESA DE TRANSPORTE DE ENERGÍA ELÉCTRICA POR DISTRIBUCIÓN TRONCAL DE LA PROVINCIA DE BUENOS AIRES SOCIEDAD ANÓNIMA (TRANSBA S.A.) and the ENTE NACIONAL REGULADOR DE LA ELECTRICIDAD (ENRE), decentralized organism acting in the MINISTRY OF ENERGY AND MINING.

ARTICLE 4°.- For communication and publication, deliver to the Dirección Nacional del Registro Oficial and file it.

gt% . d2 y11 ejand.ro Valerio
Location Autonomous City of Buenos Aires

Alejandro Valerio
Sruoga Secretario
Secretaria de Energía Eléctrica
Ministerio de Energía y
Minería

HEREBY I, Iván Diego Durontó, ID N" 23.471.261 and in my capacity of title holder of the company ENERGÉTICA ARGENTINA S.A., with legal address in 1023 Carlos Pellegrini Floor 9, of the Autonomous City of Buenos Aires, declare under loath that the equipment affected for the construction and subsequent operation of wind energy park do not and will not contain biphenyl polychlorides (PCBs) and that such products will not be stored in the site.



SAFETY DATA SHEET

HDS. Nro. 41.29

Date: 24/04/01

Company Sika Argentina S.A.I.C. ,
5250 Juan B. Albert - Caseros - Bs. A Telephone (011) 4734-3500

Product: ASPHALTIC MEMBRANE 35Kg c/ aluminum

Emergency telephones in case of ingestion: (01) 4658-7777 / (01) 4654-6648 Hospital Posadas

1.1 Chemical composition: Formula based on tarmac, mineral charges, additives, with intermediate films of polystyrene and external coating of aluminum.

1.2 State: Solid 1.3 Color: Black 1.4 Odor: -

2. PHYSICAL AND SAFETY DATA

2.1 Change of state:		
2.2 Density:		N.A.
2.3 Vapor pressure		N.A.
2.4 Viscosity		N.A.
2.5 Solubility in water:		Insoluble
2.6 pH:		N.A.
2.7 Flash point:		> 200 °C
2.8 Ignition temperature:		N.A.
2.9 Explosion limit:	Inferior: -	Superior: -
2.10 Thermal decomposition:		N.A.

2.11 Dangerous decomposing products -

2.12 Dangerous reactions: Nome is handled correctly

2.13 Additional Information: -

6. MEASURES IN CASE OF FIRE OR ACCIDENT

6.1 After leakage or spills: Remove mechanically and discard according to 5.5
Clean small quantities with turpentine

6.2 Extinction agents; Adequate: Foam, CO2, dry powder,

water Do not use: -

6.3 FIRST AIDS Take contaminated clothes off immediately. Wash contaminated skin with plenty of water and soap.
In case of eye contact, wash immediately under water jet for 15 minutes. See eye specialist
In case of ingestion or vapor inhalation, take to fresh air and search for medical help

6.4 Additional Information:

7. TOXICITY INFORMATION

No health damage with normal handling.

8. EGOGCER EGORORICAR INFORMATION

The product is slightly harmful for the acuatic environment. Do not discard on water streams of earth.

9. ADDITIONAL INFORMATION

This information corresponds only to this product and does not include caution measures that must be considered to apply the product, specially considering handling of welding torches or heaters needed for the application.

MATERIAL SAFETY DATA SHEET

Sika®-1

SECTION 1. IDENTIFICATION OF THE DANGEROUS CHEMICAL SUBSTANCE OR MIXTURE AND ITS SUPPLIER OR MANUFACTURER.

Product Name Sika®-1

Product Code: 100000014484

Type of product : liquid

Recommended use of the chemical product and use restrictions

Product use : Only for professional use.

Information about the manufacturer or provider

Sika Argentina S.A.I.C.

5250 Juan Bautista Alberdi
1678 Caseros/Buenos Aires
Argentina

Telephone 011-4734-3500

Fax : 011-4734-3555

Email failache.nestor@ar.sika.com tronico

Emergency Telephone: Posadas Hospital 98-82+54, 1146587777

SECTION 2. HAZARD IDENTIFICATION

SGA Classification

Skin irritation : Category 3

Skin sensitization: Category 1

Elements of GHS tag

Pictograms of danger

Caution

Danger Indications: H316 Skin rush

H
Attention
3

17 Can provoke skin rush

Safety Advice: **Prevention:**

P261 Avoid breathing powders/smokes/ gases/ mists/ vapors/ air sprays

Vapor pressure : 23 hPa (23 hPa)

Relative vapor density No data Density : approx.

1.05 g/cm3

Solubility

Hydrosolubility : No data Solubility in other solvents : No data

Partition coefficient : (n-octanol/water) : No data

Temperature of auto inflammation : No data

Temperature of decomposition : No data

Viscosity

Viscosity, dynamics: No data Viscosity,

cinematics : > 20,5 mm2/s

Explosive properties : No data Molecular

Weight : No data

SECTION 10. Stability and reactivity

Reactivity No dangerous reaction known under normal use.

Chemical stability: The product ir chemically stable.

Possible dangerous reactions: : Stable under recommended storage conditions.

Conditions to avoid: No data

Incompatible materials: No data It does not decompose if stored and applied as indicated

SECTION 11. TOXICOLOGIC INFORMATION

Acute toxicity No data

Corrosion/ skin irritation It causes skin rush.

duos.

Polluted containers: Empty the content left. Discard as product not used. Do not reuse empty containers.

SECTION 14. INFORMATION RELATED TO TRANSPORT.

International Regulations IATA-DGR

Goods with no danger Code- IMDG Goods with no danger

Bulk transport with arrangement to Annex II of the Convenio Marpool 73/78 and the IBC Code.

No applicable for the product as it is provided.

NCh 2190/382 Goods with no danger

SECTION 15. REGULATION INFORMATION

Environmental , safety and health specific regulation for the substance or mixture.

International convention on Chemical Weapons : 2,2',2''-nítrilotriethanol

(CWC) Programs about Toxic Chemical Products and precursors (Louisiana Administrative Co of , Tittle 33 Part V Section 10101, et seq)

Precursors and chemical essence substances : No applicable for the elaboration of narcotic substances.

SECTION 16. OTHER INFORMATION INCLUDED THAT FOR THE PREPARATION AND UPDATE OF SAFETY DATA SHEETS

The information contained in this safety data sheet corresponds to our level of knowledge at the publication date. All guarantees excluded. Our current general conditions for purchase are applied. Please, check the Product Data Sheet before the use and processing.

FILE FOR INTERVENTION IN CASE OF EMERGENCY (

j f **MATERIAL SAFETY DATA SHEET** MIRA 313

M U¿ut~y GOOD NOT DANGEROUS FOR ITS TRANSPORTATION

Issuer: W.R. GRACE ARGENTINA S.A. Risk number: Not dangerous

570 Primera Junta ONU N° : Not dangerous (B1878IPL) Quilmes, Buenos Aires, Argentina

Class and Division: Not

Physical State: Brown liquid. Incompatible with strong oxidant agents (class 5.1) acids and bases (class 8).

EPP: Use breathing, eye, and thermal protection and butyl gloves.

RISKS

- NOT FLAMMABLE , it does not autoignite, but it may be decomposed when heated and produce fire corrosive and/or toxic vapors

Health • IRRITANT; may cause irritation if ingested, inhaled or under skin contact.

Medium • All handling must consider local regulations and laws.

Abt • The material is stable. Nevertheless, avoid open fires and high temperatures.

3

IN CASE OF ACCIDENT

- Use appropriate personal protection elements
- Stop the leakage, if it is possible to do it without risks. Do not touch or tred over the spilled material.

Spills * Collect the product using sand, vermiculite, earth or inert absorbent material and clean or wash the contaminated area completely.

- Do not pour water directly over the spill or identity source of leak. Avoid water fluids entering in contact.
- Use dry chemical powder , foam, sand or CO2 Use the product according to the materials in the surroundings. DO NOT USE water jet directly.

FIRE * Move the containers in the area of fire if it can be done without risks.

- Make an overflow basin for the water that controls the fire , for disposal afterwards, no

Contamination * This material may be a dangerous waste.

Environmental * Comply with the legal recommendations established for its disposal.

- Call emergency medical service
- Take the victim to fresh air. Apply artificial breathing assistance if the victim does not breathe.
- Take off and insulate clothes or shoes that may be contaminated.

First ¨* Keep the victim under rest and with normal temperature.

Aids * In case of contact with the substance, wash skin and eyes immediately with water and soap at least for 20 minutes.

Information for * If there is lose of consciousness, apply oxygen.

the physician * Take the patient to a non-contaminated environment, keep the patient sheltered and calm.

This Emergency Intervention File is destined to Emergency Services .

Information or risks and safety for the characteristics in case of accidents that is consigned for each product are elaborated in base of the generic classification of each one. (risk number and ONU N°). So, the typical values of the physical properties included in this information are consigned with the sole purpose of emergency management and they must not be interpreted as technical specifications, of quality, or absolute limits of parameters for the different consignments of products.

EMERGENCY TELEPHONES

FIREFIGHTERS: 100

POLICE: 101/911

CIVIL DEFENSE: 103

MEDICAL EMERGENCY 107

SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY

Product NameWood

Product Code: 100000015754

Type of product : liquid

Recommended use of the chemical product and use restrictions

Product use : Reserved exclusively to professional useers.

Information about the manufacturer or provider Sika Argentina S.A.I.C.

5250 Juan Bautista Alberdu
1678, Buenos Aires,
Argentina.

Telephone011-4734-5000

Telefax :011-4734-5555

email failache.nestor@ar.sika.com Teléfono de emergencia :

Posadas Hospital 98-82011, 1146587777

SECTION 2. HAZARD IDENTIFICATION

SGA Classification
Not dangerous substance or mixture
Elements tagged GHS Not dangerous substance or mixture
Other dangers not classified None known.

SECTION 3. COMPOSITION/INFORMATION OF COMPONENTS

Substance /Mixture Mixture

Dangerous Components

Does not contain dangerous ingredients

SECTION 4. FIRST AIDS

General Recommendation: No danger that may require special measures of first aids

If inhaled: Take to fresh air

In case of skin contact. Take off contaminated clothes and shoes

piel	Discard washing with water and soap
In case of eye contact.	: Wash eyes with plenty of water as a caution measure. Take away lenses. Keep eyes wide open while washing.

By ingestion Wash mouth with water and after that drink plenty of water.
Do not offer milk or alcoholic drinks.
Never give anything to an unconscious individual.

Main symptoms and acute or retarded effects.	: No significant effects or risks are detected. See Section 11 for detailed health and symptoms information

Notes for the physician: Treat by symptoms.

SECTION 5. FIREFIGTING SAFETY MEASURES

Proper firefighting means	: Use extinguishing measures that are appropirate to the place and its surroundings.
Dangerous decomposing products	: No dangerous combustion products are identified.

Specific extinguishing methods : Standard Procedures for chemical fires.

Special protection equipment: In case of fire, protect yourself with an autonomous breathing equipment for firefighters against protection.

SECTION 6. MEASURES IN CASE OF ACCIDENTAL SPILLAGE

Warning related to the environment : No special environmental requirements are needed

Methods and material of contention and of cleaning : Clean with absorbent material (for example, a piece of cloth).
Keep the containers appropriately closed for their disposal.

SECTION 7. MANIPULATION AND STORAGE

Indications for fire and explosion protection : Normal dispositions of fire preventive protection

Safe manipulation advice : Individual protection equipment, see section 8.
No special manipulation is advised.
When handling chemical products, follow standard measures of hygiene.

Storage conditions : Keep the containers hermetically closed in a place

safe dry and well ventilated.

Store according to regulations Fióenclohadacle. revision: 2017.03.14

Materials that must be avoided : No special restrictions for storage with with other products.

SECTION 8. EXPOSURE CONTROL/INDIVIDUAL PROTECTION

Environmental Limit Value Components of professional exposure.

It does not contain substances with limit values of professional exposure.

Personal Protection : Use breathing protection unless there exists exit ventilation

Breathing Protection adequate or at least the exposure evaluation shows the exposure is within recommended parameters.

The filter class for the breathing apparatus must be adequate for the maximum concentration anticipated for the contaminant. (gas/vapor/spray/particles) that may be present when handling the material. If exceeds this concentration, there must be

Hand Protection Chemical - resistant and non-permeable gloves that meet approved standards must be used when there is handling of chemical products and the risk evaluation indicates that it is necessary

Eye protection : Eye protection that meets standard requirements approved must be used when risk evaluation indicates it necessary.

Skin and body protection : Select the body protection according the characteristics, concentration and quantity of dangerous substances, and the specific work place.

Hygiene Measures: Do not eat or drink during its use.

Do not smoke during its use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES.

Aspect :liquid

Color. No data

Odor : characteristic

Odor threshold: No data

pH: No data

Fusion Point / Freezing Point : No data

Boiling Point/ interval No data

Flash point: > 150 °C (>302 °F)
Method: Closed Cup (System)

Evaporation ratio: No data

Flammability : No data

Superior limit of explosion : No data

Highest limit of explosion : No data

Vapor pressure No data Relative vapor density :

No data

Density : approx.. 0,87 g/cm3 (20 °C (68 °F) ())

Solubility

Solubility in water: No data Solubility in dis solvents : No data

Coefficient of distribution octhanol/water : No data

Auto-flammation temperature : No data

Temperature of decomposition : No data

Viscosity

Viscosity, dynamics: No data Viscosity, cinematics : > 20,5 mm2/s (40 °C)

Explosive properties : No data Molecular Weight : No data

SECTION 10. Stability and reactivity

Reactivity : No dangerous reaction known under normal use. Chemical stability: The product is chemically stable.

Possible reactions: : No especial danger
Dangerous

Revision date: 2017.03.14

Conditions that mus be avoid No data

Incompatible materials: No data It does not decompose if stored and applied as indicated

SECCION 11, TOXICOLOGIC INFORMATION

Acute toxicity

No data

Corrosion or skin irritation Product:

Not classified in base of information available.

Sever lesions or eye irritation

Not classified in base of information available.

Breathing or skin sensibility

Skin sensibility Not classified in base of information available.

. Breathing sensibility: Not classified in base of information available.

Mutagenicity in germinal cells :

Not classified in base of information available.

Cacinogenicity :

Not classified in base of information available.

Toxicity for reproduction

Not classified in base of information available.

Specific toxicity in determined organs (stot)- unique exposure

Not classified in base of information available.

Specific toxicity in certain organs (stot) - repeated exposure Not classified in base of information available.

Aspiration toxicity

Not classified in base of information available.

SECTION 12. ECOLOGIC INFORMATION

Revision date: 2017.03.14

Ecotoxicity d

No data Persistency and degradability d No data

Potential of biocummulation No data Mobility in the soil No data Other adverse effects.

Product:

Complement ecologic information No data

SECTION 13. CONSIDERATIONS RELATED TO THE ELIMINATION

Elimination Methods.

Polluted containers: Empty containers must be taken to a site of appropriate handling for waste or disposal.

SECTION 14. INFORMATION RELATED TO TRANSPORT.

International Regulations

IATA-DGR

Not dangerous

Code -IMDG

Not dangerous

Bulk ransport with arrangement to Annex II of the Convenio Marpool 73/78 and the IBC Code.

Not applicable to the product

NCh 2190/382

Not dangerous

SECTION 15. REGULATION INFORMATION

Regulation and legislation in relation to safety, health and environment specific for the substance or mixture

Registry of Carcinogenic Substances and Agents : not applicable

International convention on Chemical Weapons : Not applicable (CWC)
Programs about Toxic Chemical Products
and Precursors (Louisiana Admisnistrative Co de. Title
33,Part V Section 10101 et. seq.)

Precursors and chemical essence substances : No applicable for the
elaboration of narcotic substances.

SECTION 16. OTHER INFORMATION

The information contained in this safety data sheet corresponds to our knowledge of level : 2017.03.14
knowledge in the moment of its publication All guarantees excluded. will be applied

Our current general conditions for purchase are applied. Please, check the Product Data Sheet before the use and processing.

REGULAR PETROL

AXIOK SAFETY DATA SHEET

pnernv Version: 1st March, 2018

IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name **Regular Petrol.**

Internal Code: .

Predicted Use: Fuel: _

PAN AMERICAN ENERGY LLC, Sucursal Argentina

Av. Leandro N. Alem 0182 (C1221AAT) Ciudad Autónoma de Buenos Aires,

Argentina Teléfonos para consultas técnicas: LUBRICANTS 2822-888-8288

_ FUELS 2822-555-3776, 2822-666-3776

Emergency Telephone (24 hours): 0-800-222-2933 (in Argentina)

+541151991409 (out of Argentina)

SECCIÓN II - HAZARD IDENTIFICATION

CLASSIFICATION (according the Globally Harmonized System)

PICTOGRAM

Flammable liquids (Category 2)
Skin Rush (Category 2)- Eye irritation (Category 2A)
Mutagenicity (Category 1B) - Carcinogenicity (Category 1B)
Reproductive Toxicity (Category 2).
Specific Toxicity in certain organs - sole exposure (Category 3) Danger by inhalation (Category 1)
Danger for aquatic environment - acute danger(Category 2) Danger for aquatic environment - danger in the long term (Category 2)

CAUTION	**PELIGRO**
DANGER INDICATIONS:	H225 - Flammable liquids and vapors. H324- Can be lethal in case of ingestion and penetration through respiratory tracks. H315 - Skin rush H319 - Causes severe eye irritation H336 - May cause sleepiness or vértigo. H342 - May cause genetic defects. H35Ü - May cause cancer.
SAFETY ADVICE:	

P212 Avoid heat, sparkles, open fires and other sources of ignition. No smoking.
P273 - Do not spread in the environment.
P282 - Use gloves, clothes and eye/face protection
P321 + P31p + P331 - IN CASE OF INGESTION : Call immediately an INTOXICATION CENTER / physician. Do not induce vomiting.

2018

CIQUIME Revised by: PAN AMERICAN ENERGY LLC,

Argentinian
SUSbsidiary

P303 + P361 + P353 - IN CASE OF SKIN CONTACT (or hair): Take contaminated clothes off immediately. Wash skin with water or take a shower

P304 + P340 - IN CASE OF INHALATION: Take the person to fresh air and maintain him in a position that may improve his breathing.

P305 + P351 + P338 - IN CASE OF EYE CONTACT: Wash with water for several minutes. Remove lenses when present and can be done easily. Continue with washing.

P370+ P378 IN CASE OF fire: Use water mist, foam, chemical powder or carbon dioxide (CO2) for extintion

P403 + P235 - Store in a well-ventilated place Keep Fresh.

P501 - Discard content/ container according to current national /international regulations.

ADDITIONAL INFORMATION

None

SECTIONIII - COMPOSITION / INFORMATION OF THE COMPONENTS

SUBSTANCE

Does not apply

MIXTURE

MIXTURE COMPONENTS	N° CAS	% WEIGHT	CLASSIFICATION
Gasoline	86090-81-5		Flam. Liquid 1; Skin Irrit. 2; Care. 1B; Muta. 1B. Repr. 2; STOT Single Eqp. 3; Asp. Tox. 1; Aquatic Acute 2; Chronic 2 Aquatic
Benzene	71-43-2	<	Flam. Liq. 2; Care. 1A; Muta. 1B; STOT RE 1; Asp. Tox. 1; Eye Irrit. 2: Skin Irrit. 2: Aquatic Acute 2

SECTION .V- FIRST AIDS

GENERAL MEASURES:	Avoid exposure to the product, taking the adequate requirements: See the physician, taking the safety sheet.
EYE CONTACT:	Rinse eyes immediately with water at least for 15 minutes and keep eyes open to guarantee the correct cleaning. and eyelid tissue. Washing the eyes in seconds is essential to reach extreme efficacy. If he/she wears lenses, remove them, after the first 5 minutes and then, continue. Wash
SKIN CONTAC:	immediately with water and soap after contact and during 15 minutes at least.. Take off contaminated clothes or shoes.
INHALATION:	Take the victim to fresh air. Keep calm. If he/she does not breathe, give artificial breathing assistance. Call physician.
INGESTION :	Do not induce vomiting. Wash mouth with water. Never give nothing orally to a non-conscious individual. Call physician. If the vomit is spontaneous, turn the victim on his/her side to reduce
SYMPTOMS :	inhalation: irritation in the nose, throat and lungs. May cause depression to the central nervous system. SKIN CONTACT: Skin rush. Injection at high pressure under the skin may cause severe damage. EYE CONTACT: May be irritant for the eyes.

Notes for the physician:

If ingested, the material may be aspirated by the lungs and cause chemical pneumonia. Treat properly. Give symptomatic treatment. For more information, see a physician. Prolonged and repeated exposure to benzene may cause severe lesions to the blood-forming organs and is associated to anemia and the subsequent development of acute myeloid leukemia.

SECTION V- FIREFIGTING SAFETY MEASURES

PROPER FIREFIGHTING MEDIA.

Use dry chemical powder , foam, sand or CO2 Use the product according to the materials in the surroundings. DO NOT USE water jet directly.

SPECIFIC DANGERS.

The container exposed to heat may explode unexpectedly and project dangerous fragments.
Vapors are heavier that the air and can be spread on the ground In case of fire it may release smokes and irritant and/or toxic gases, as carbon oxide and other substances derived from incomplete combustion.

SPECIAL FIREFIGHTING EQUIPMENT

Use autonomous breathing equipment. Clothes for structural protection for firefighters provide limited protection in case of fire. Only can it be effective in spill situations.
In important spills, use clothes with protection against chemical products, which is specifically recommended by the manufacturer. This may offer little or no thermal protection at all.

SPECIAL MEASURES OF FIREFIGTING SAFETY MEASURES

Spray containers with water to keep them cold. Cool containers with water jet far after the fire. Fight the fire from a maximum distance or use fixed support for hoses or regulators.
Prevent the water used for fire control or its dilution to let into the water inlets , drainages or streams.
Shuffle awy if there is an increasing sound from the safety mechanisms of

ventilation, or if the tank starts to lose color. ALWAYS keep yourself far from tanks involved in fire.

The hot product may cause violent explosions when entering in contact with the water, and the hot material projected may be projected and cause severe burns.

SECTION VI -MEASURES IN CASE OF ACCIDENTAL SPILLAGE

CAUTION AND EMERGENCY PROCEDURES:

Discard all sources of ignition (do not smoke, do ot use flare bombs, sparkles or flames in the area of danger) Stop the leak if it is possible to do it without risks. All the equipments used to handle the product must be earthed, Do not touch or tread . over the material spilled. Foam may be used to reduce the emission of vapors. Do not permit reusing the product spilled.

CAUTION OF THE MEDIA ENVIRONMENT:

Restrain the liquid with a dam or barrier. Prevent its entrance into navegable trenches, basements or confined spaces not contaminated.

CONTENTION AND CLEANING:

Collect the product using sand, vermiculite, earth or inert absorbent material and clean or wash the contaminated area completely. Dispose the water and waste collected into specially signaled containers for its elimination as chemical waste.

SECTION VII - HANDLING AND STORAGE.

CAUTION FOR SAFETY HANDLING:

Eating, drinking or smoking during its manipulation. is forbidden Avoid skin, eye and clothes contact. Wash you arms, hands, and nails after handling this product. Ease the access to safety showers and

	emergency eye rinse. Use equipment and clothes that avoid the accumulation of charge Store in a
SAFETY STORAGE CONDITIONS:	clean, dry and well-ventilated area. Protect from the sun. Do not smoke, weld or any work in any task that may produce flames or sparkles. in the storage area. Keep yourself far from strong oxidants Keep far from strong oxidant agents, acids and bases, halogens. Package material appropriated: that provided by the manufacturer. Code NFPA: 1 3 0
CONTROL PARAMETERS:	CMP (Res. MTESS 295/03): 300 ppm; Gasoline 0,5 ppm; Benzene CMP (Res. MTESS 295/03): 500 ppm; Gasoline CMP-C (Res. MTESS 295/03): N/D REL-TWA: 0,1 ppm, Benzene REL-STEL: 1 ppm, Benzene TLV-TWA (ACGIH): 300 ppm; Gasoline 0,5 ppm; Benzene
PROTECTION MEASURES:	Keep the working space ventilated. Normal ventilation for habitual operations of manufactures is generally adequate, local extractors must be used during operations that may produce or release big quantities of the product. In low or confined spaces mechanic ventilation must be provided.
BREATHING PROTECTION:	In the necessary cases, use breathing protection for organic vapors (A). Pay special attention to oxygen levels present in the air. If there are high releases, use autonomous breathing equipment

THERMAL PROTECTION:	To handle this product protective nitrile non-permeable gloves must be used (they must respect IRAM3607--36083609 and EN 374 norms), safety work clothes and shoes resistant to products.
EYE PROTECTION:	Splash- proof goggles must be worn products (that meet EN 166 requirements).

FORM AND SHAPE:	Clear liquid.
OLOR:	Aromatic.
Threshold odor:	N/D
COLOR:	Lightly yellowish
PH:	N/D
FUSION POINT:	N/D
BOILING POINT:	25°C a 215°C (77°F a 419°F)

FLASH POINT:	-40°C (-40°F) [ASTM D56]
EVAPORATION RATIO:	> 10 (butyl acetate n- = 1)
TEMP. OF AUTOIGNITION:	440°C (824°F)
TEMP. OF DECOMPOSING	N/D
FLAMMABILITY:	The product is fammable.
EXPLOSIVE INTERVAL:	1,0 % - 7,0%

VAPOR PRESSURE (38°C):		455 mmHg (60,5 kPa)
VAPOR DENSITY (AIR:1)		3
DENSITY(15°C):		0,72 g/cm^3
SOLUBILITY IN WATER:	:	Insignificant in water.
CONSTANT OF HENRY (20°c)	¿	N/D
COEF. of distribution (logKo/w):		N/D
VISCOSITY (cSt a 20°C):		0.9
Log Koc:		N/D
EXPLOSIVE PROPERTIES :		Not explosive According to column 2 of the Annex Vil del REACH, this study in not necessary because: there are no molecular groups associated to explosive properties
COMBUSTIBLE PROPERTIES		According to column 2 of the Annex Vil del REACH, the study is not necessary since : the substance , by it own chemical structure cannot react in an exothermic form with materials.
OTHER DATA:		None

SECTION X - STABILITY AND REACTIVITY

REACTIVITY	Not expected to produce reactions or decompositions of the product under normal conditions of storage. Does not contain organic peroxides. Not corrosive for metals. Does not react with watere.
Chemical stability:	The product is chemically stable and does not require stabilizers.
DANGEROUS REACTIONS:	Dangerous Polymerization is not expected .
CONDITIONS TO AVOID:	Static discharges, heat and pressure Avoid contact with surfaces surfaces (over 80°C)
DANGEROUS PRODUCTS OF DECOMPOSING	In case of overheating it may release irritant and toxic vapors. In case of fire, see Section 5
MATERIALS INCOMPATIBLES:	Keep far from strong oxidant agents, acids and bases, halogens.

SECCION 11, TOXICOLOGIC INFORMATION

EXPOSURE ROUTES:	by inhaling, skin or eye contract.
Severe effects	inhalation: irritation in the nose, throat and lungs. May cause depression Central Nervous System SKIN CONTACT: Skin rush. High pressure Injection under skin may cause severe damage.

	EYE CONTACT: May be irritant for the eyes. Ingestion: If ingested, may be aspired causing lung damage.
CARCINOGENICITY, MUTAGENICITY AND OTHER EFFECTS: Carcinogenic investigation).	Some components of this product are identified as higher or equal tha 0.1% that present characteristics of probalbe human carcinogenic, possible or confirmed by IARC (International Agency for
	ETA-DL50 oral (rat, cale.): > 5000 mg/kg ETA-DL50 der (rabbit, cale .): 2051 mg/kg ETA-CL50 inh. (rat, 4hs., cale.): > 5 mg/l
DATA IN ANIMALS:	Skin rush (rabbit, estimated) : irritant Eye irritation (rabbit, estimated): irritant Skin sensibility (guinea pig, estimates): not observed Breathing sensibility (guinea pig): not observed.

SECCION 11, TOXICOLOGIC INFORMATION

ECO TOXICITY	ETA-CE50 (O. mykiss, cale., 48 h): 8,1 mg/l ETA-CE50 (D. magna, cale., 48 h): 4,6 mg/l ETA-CE50 (D. magna, cale., 48 h): 3,2 mg/l ETA-CE50 (D. magna, cale., 48 h): 15.3 mg/l. ETA-CSEO (D. rerio, cale., 14 d): 0,2 mg/l ETA-
PERSITENCE AND DEGRADABILITY :	BIODEGRADABILITY (estimated): 75% in 28 days - easily biodegradable. PNEC (water): N/D PNEC (mar): N/D PNEC (mar): N/D This substance/mixture does not fulfill the criteria PBT in the Annex XIII of the REACH regulation.

SECCIÓN XIII - WASTE CONSIDERATION

BIOACCUMULATION:	Log Ko/w: N/D BIOACCUMULATION IN FISH - BCF (OCDE 305): 10 TO 2500. It has potential for bioaccumulate, nevertheless, the metabolism over physical properties may reduce bioconcentration or limit
MOVILITY:	LogKoc: N/D CONSTANT OF HENRY (20°c) N/D
AOX, CONTENT OF METALS:	Does not contain halogens or metals.

The product left as well as emplty containers must be eliminated according current legislation of Environmental protection laws and in particular of Dangerous Waste (National Law N° 24.051 and its regulations). The waste must be identified and disposed by an authorized company.

Warning of Empty Containers (where applicable): Empty containers may contain waste and thus be dangerous. Do not try to fill or clean containers without having the appropriate instructions. Empty drums must be purged, completely drained and stored until they a reconditioned or are eliminated permanently. Empty containers must be recycled, reused or eliminated through contractors duly qualified or authorized in concordance with official regulations. DO NOT PRESURE, CUT, WELD WITH HARD METALS OR SOFT ONES , OR WITH STRONG WELDING; AND DO NOT PUT ANY BARRIER, RECTIFY OR EXPOSE THOSE CONTAINERS TO FLAME, SPARKLES , STATIC ELECTRICITY OR ANY OTHER SOURCE OF IGNITION . SINC THEY MAY EXPLODE AND CAUSE DAMAGE OR DEATH.

SECCIÓN XIV- TRANSPORTATION INFORMATION

TERRESTRIAL TRANSPORT.

TRANSPORT NAME:	GASOLINE	
N° UN/ID:		
DANGER INDICATIONS:	3	
Packing group:	II	
Risk code:	3	
Limited and excepted quantity:	ADR 1L/E2	R. 195/97: 333 Kg

AIR TRANSPORT (ICAO/IATA)

Appropriate Name for shipping	GASOLINE	
N° UN/ID:	1203	At
DANGER INDICATIONS:	3	
Packing group:	II	
Instructions for passenger planes and cargo:	Y341, 1L/353, 5L	
Instructions for passenger planes and cargo:	364, 60L	
CRE:	3H	

TRANSPORTE MARÍTIMO (IMO)

Transport packages according Code IMDG

Appropriate Name for shipping	GASOLINE		
N° UN/ITS:	1203	At	
DANGER INDICATIONS:			
Packing group:	II		*'ly'*
EMS:	F-E; S-E		
Stowage and handling:	Category E		
Segregation:	-		
Marine Pollutant:	YES (naphtha)		

Transport name: UN 12203; GASOLINE; Class 3; PG II; MARINE POLLUTANT; Flash point -40°C (-40°F) c.c.

SECTION XV - USE REGULATION

Regulation and legislation in relation to safety, health and environment specific for the substance or mixture
No harm to the ozone layer(1005/2009/CE).
Volatile organic contents of the compositions (COV) (1999/13/EC) N/D

Safety Data Sheet according Resolution 801/2015 of the Superintendencia de Riesgos del Trabajo MTESS and the IRAM Law N° 41400 2013 - Safety Data File Format according to SGA. Resolution 295/2003 Ministerio de Trabajo, Empleo y Seguridad Social, República Argentina - Controls of environmental exposition.
Resolución 310/2003 Superintendencia de Riesgos del Trabajo, Ministerio de Trabajo, Empleo y Seguridad Social, República Argentina - Carcinogenic agents.
National Law N° 24.051 and its regulations, República Argentina - Dangerous waste Law Resolution195/97 Secretaría de Obras Públicas y Transporte, República Argentina General Regulation for the Transport of Dangerous Goods by roads.
European Agreement about International Transport of Dangerous Goods by roads. (ADR 2015) Regulation about International Transport of Dangerous Goods by railroads. (RID 2015)

International Maritime Code of Dangerous Goods (Amendment 38-16) IMO Code
IBC/MARPOL, IMO, Resolution MEPC 64/23/Add.1.
Regulations of the International Air Transport Association (IATA 56 ed. 2015) related to transport

of dangerous goods by air.

Sistema Globalmente Armonizado de Clasificación y Etiquetado de Productos Químicos, quinta edición revisada, 2015 (SGA 2015).

International Agency for Research on Cancer (IARC), clasificación de carcinógenos.

SECCIÓN XVI – OTRA INFORMACIÓN

N/A: not applicable
N/D: no data.
CAS Chemical Summary Services IARC: Agencia Internacional para la Investigación del Cáncer
ACGIH: American Conference of Governmental Industrial Hygienists.
TLV: Threshold limit value
TWA Time Weighted Average
STEL Short time Exposure Limit
REL: Recommended Exposure Limit PEL: Permitted Exposure Limit
INSHT: Institute of National Safety and Hygiene in Work
ETA: estimation of Acute toxicity. DL50. Average Lethal Dose
CL50. Average Lethal Concentration
CE50. Average Effective Concentration CI50. Average inhibitory Concentration
): Changes respective the previous version

The classification has been done in base of the chemical analogous and the information of the product.

SECTION 2: classification by analogy with other products, and in base of product data

VSeErsCiócnIÓ1N.09: Product data Number of HDS: 100000014484

Flammability according trial data SECTIONS 11 and 12 analogy with other products.

Acute toxicity: estimation method of acute toxicity.

Revision date: 2016.09.22

This information refers only to the product mentioned in the Section 1 and it will not be valid for other product(s) or any other process. This safety sheet provides safety and health information. The information corresponds to our knowledge , understanding , correct and complete and it is provided bona fide , but with no guarantee at all. The product must be used in applications consistent with our bibliography of the product. The individuals who handle this product, must be informed of the safety cautions recommended and must have access to this information. For any other use, the exposition must be assessed in such a way that it may be applied appropriate practices of handling and training programs to secure safety measures in the working site. In all cases it will be the user´s responsibility that this information be appropriate and complete for the especial use of this product.

Version:	1	1	Emission	1st March, 2018
Replaces :				
Elaborated by :	CIQUIME	Revised by:		PAN AMERICAN ENERGY LLC, Argentinian SUSbsidiary