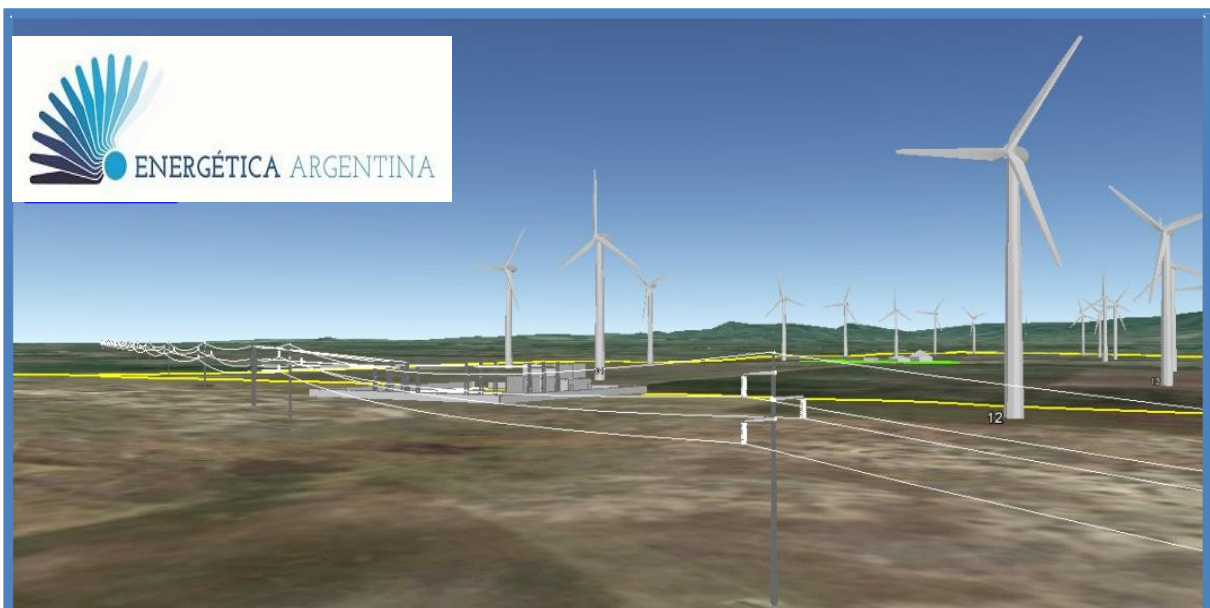




**Investigation on Environmental
AWARENESS
ADDENDUM N°2
CENTRAL EÓLICA ENERGÉTICA I
PARTIDO DE TORNQUIST
PROVINCIA DE BUENOS AIRES
REPÚBLICA ARGENTINA**



August 2018

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness N° 2 Wind Energy Centre 1	 ENERGÉTICA ARGENTINA
Doc. Nº: CEEN-IA-2655-08/18		Date 15/08/2018 Rev: A Page 1 of 2

General Index

Chapter 01 General information

1. Company that requests the environmental document
2. Company that elaborated the environmental document
3. Technical Manager
4. Technical Department that elaborated the environmental document
5. Accreditation document

Chapter 02 Descriptive Memory

1. Introduction
2. Geographic Location
3. Access roads to the Project- Logistics from Ing White Port
4. Node of bridging to the National Interconnected System
5. Technical Description of the Project
6. Overview table of the Project
7. Preparatory Stage of the site and construction
8. Operative Stage and Maintenance
9. Work Schedule
10. Estimated total funding cost
11. Annex C.02
 1. Study of Evaluation Tool for the Wind Resource and Power Generation
 2. Building Plans
 3. Technical Specifications of the Wind Turbines
 4. Schedule of the Planned Preparations for Project Development

Chapter 03 Environmental Baseline

1. Introduction
2. Update Reports and Environmental Baseline Amplification

Chapter 04 Specific Studies

1. Introduction
2. Annex C.04
 1. Analysis of the Surface affected by the Wind Power Plant
 2. Analysis of Noise Effects produced by wind turbines
 3. Analysis of Shadow Effects produced by wind turbines
 4. Analysis of Low Frequency Fields and the Corona Effect
 5. Analysis of the Production Intake of "Clean" Electric Energy into the Regional System
 6. Analysis of the Possible Contribution in Reduction of Emission Factors
 7. Analysis of Energy Production Effect on the saving of Methane Tankers.

Chapter 05 Addendum Report N° 2

1. Presentation
2. Antecedents
3. Introduction
4. Public Enquiry Documents
5. Descriptive Memory of the updated Project
6. Evaluation Methodology on environmental impact
7. Information research
8. Environmental Baseline
9. Identification and Evaluation on environmental impact
10. Analysis of environmental impact related to the updated Project
11. Mitigation Actions and Environmental Management Plan
12. Conclusion
13. Annex C.05
 1. Documents/Notes and Affidavits related to the Project
 2. Dangerous and/or Chemical Substances, fuel, other substances that will be deposit in the site - HDS

Chapter 01

General information

Chapter 01

General information

Index

1.	COMPANY THAT REQUESTS THE ENVIRONMENTAL DOCUMENT	3
2.	COMPANY THAT ELABORATED THE ENVIRONMENTAL DOCUMENT	3
3.	TECHNICAL MANAGER.....	3
4.	TECHNICAL DEPARTMENT THAT ELABORATED THE ENVIRONMENTAL DOCUMENT	4
5.	ACCREDITATION DOCUMENTS	5

1. COMPANY THAT REQUESTS THE ENVIRONMENTAL DOCUMENT



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Tel/Fax	+54 11 48722959.
Electronic mail	Ruben.zaia@aes.com
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Company Main Activity	Electric Power Generation

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Registration Number	N° 53098 College of Engineers, Buenos Aires Province.
Professional Registry N°	4156 Provincial Agency for Sustainable Development (OPDS), Buenos Aires Province

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Doc. N°: CEEN-IA-2655-08/18		Date 15/08/2018 Rev: A Page 4 of 6

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.

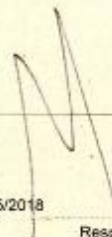
5. ACCREDITATION DOCUMENTS


Organismo Provincial para el Desarrollo Sostenible		ORIGINAL	Liquidación 515093				
Arancelamiento			Fecha de Emisión 22/05/2018				
Gastos por Cuenta de Terceros Gobernación I.P.M.A. Dirección Provincial de Saneamiento y control del Medio Decreto 4677/97			- / -				
Nombre ICONO SRL			Código de Barras Mesa de Entradas OPDS N° 275518				
Domicilio VILLARINO Nro 53			Tel. 0291-453-1352/455-				
Localidad BAHIA BLANCA			Cuit 30-66416214/4				
Cód.	Descripción	Serie	Desde	Hasta	Cantidad	Unitario	Subtotal
2.2	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:




 Departamento de Tesorería, 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

Recibi el importe correspondiente según el siguiente detalle:
la suma de pesos setecientos

Corresponde a los siguientes periodos:

ORGANISMO PROVINCIAL PARA EL
DESARROLLO SOSTENIBLE
DEPARTAMENTO
TESORERIA
PAGADO



Departamento de Tesorería, La Plata 22/05/2018

Responsable por opds

Responsable por Firma

CHAPTER 02

DESCRIPTIVE MEMORY



 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	Study on Environmental Awareness Addendum N°	
<p>Doc. N°: CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date 15/08/2018 Rev: A Page 2 of 36</p>

CHAPTER 02



DESCRIPTIVE MEMORY

Index

1.	INTRODUCTION	4
2.	Geographic Location	6
3.	Access roads to the Project- Logistics from Ing White Port	7
4.	Node of bridging to the National Interconnected System	9
4.1.	Single line Schematic of the Electric System	11
5.	Technical Description of the Project	12
5.1.	Electric Energy Transport System	12
5.1.1.	Transformer Station (MT/AT)	12
5.1.2.	Opening of LAT (132 KV) and bonding to the ET (MT/AT)	15
5.2.	Wind Farm	16
5.2.1.	Poles of Meteorological Stations	16
5.2.2.	Technical Specifications of the Wind Turbines	16
5.2.3.	Distribution of wind turbines in the plant	19
5.2.4.	Wind resources and energetic production	21
5.2.5.	Infrastructure Facilities	21
6.	Overview table of the Project	28
7.	Preparatory Stage of the site and construction	30
7.1.	Workroom	30
7.2.	Services	32
7.3.	Machinery and equipment required for the construction	33
7.4.	Staff involved in the Project	34
8.	Operative Stage and Maintenance	35
8.1.	Electric Energy Transport System	35
8.2.	Wind Farm	35

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p>	
<p>Doc. N°: CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date 15/08/2018 Rev: A Page 3 of 36</p>

- 8.2.1. Staff involved in the Project (O&M) 35
- 9. Work Schedule 35
- 10. Estimated total funding cost 35
- 11. Annex C.02 36

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 4 of 36

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).

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 5 of 36

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	<p>1- Transformer Station (MT/AT)</p> <p>Level of Tension: 132/33/13,2 KV.</p> <p>Total Power Installed: 1x110/110/40 MVA.</p> <p>Length of access way to the ET: 1,585 Km (from neighborhood street).</p> <p>2- Opening of Overhead Power Line in High Voltage and bonding to ET (MT/AT)</p> <p>Level of Tension: 132 KV.</p> <p>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.</p> <p>Configuration of the LAT opening: "U". Configuration of the structures: Overhear, double ternary.</p> <p>Length of the installation hollow: 50 meters</p>
Wind Farm	<p>3- Total Power Installed: 99.75 MW.</p> <p>It will be composed of 30 wind turbines Nordex-Acciona, model AW132/3300TH120 class IEC JIB and their complementary.</p> <p>Complementary:</p> <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> - Collector of Electrical Energy Network in 33 KV- - Earthing System. <p>System of Communication Network.</p>

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.

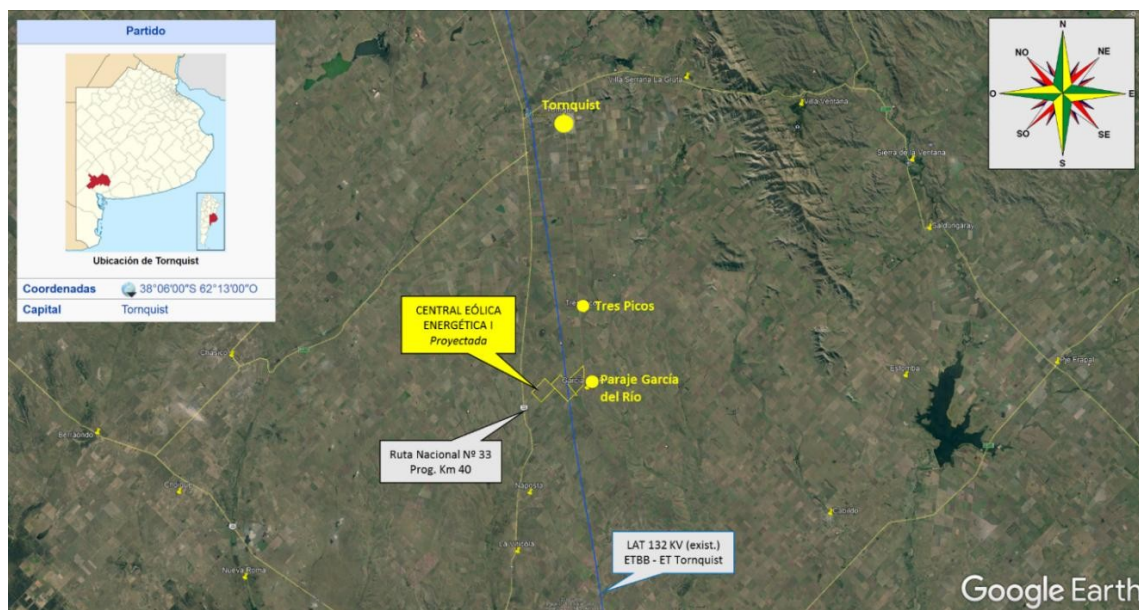


Figure N° 1 Google Image with the geographical location of the Wind Energy Centre



 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p>	
<p>Doc. N°: CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date 15/08/2018 Rev: A Page 7 of 36</p>





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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N° 2 Wind Power Centre 1	
Doc. N°: CEEN-IA-2655-08/18		Date 15/08/2018 Rev: A Page 8 of 36

The most important components (in relation to quantities, dimensions and weights) 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.

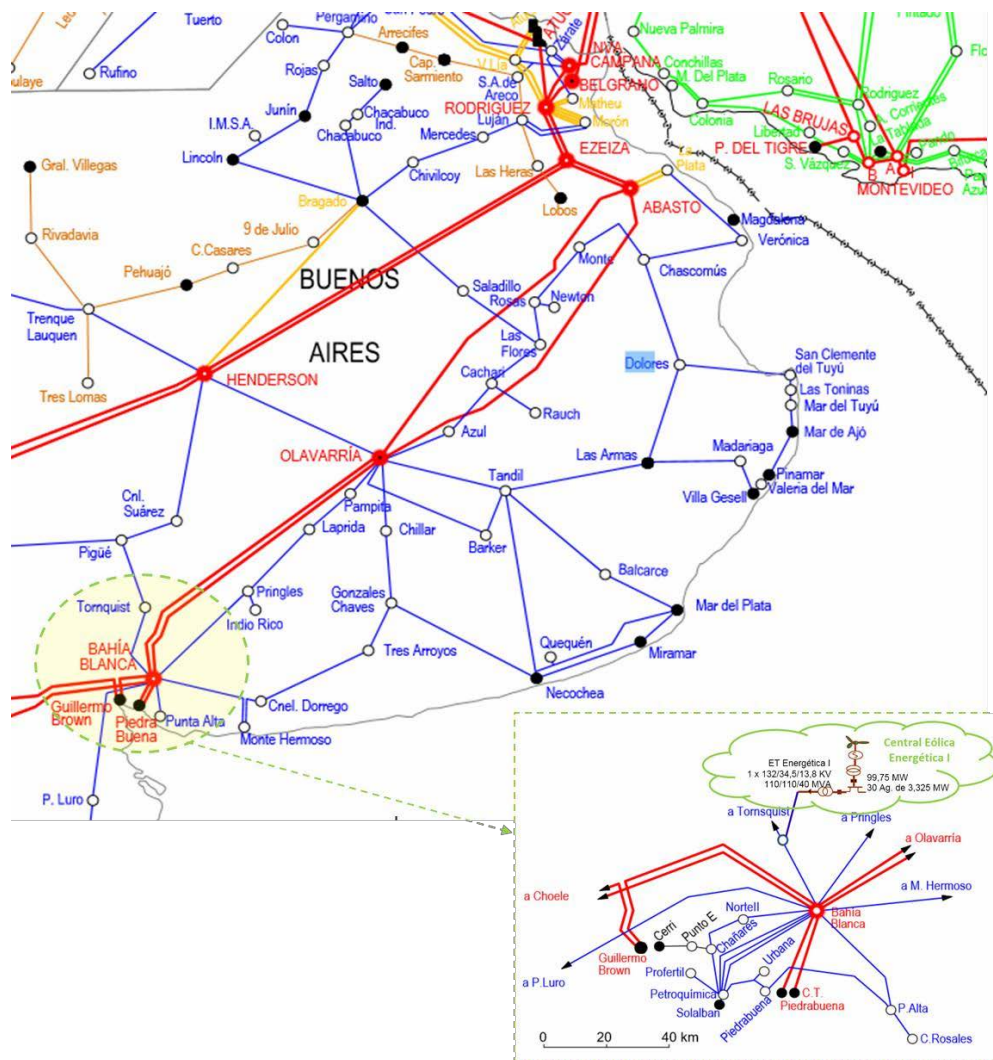


Figure N° 4 Geographical Single Line Schematic location of the Wind Energy Plant and its connection to SADI. Source: CAMMESA. With modification made by ICONO SRL

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.

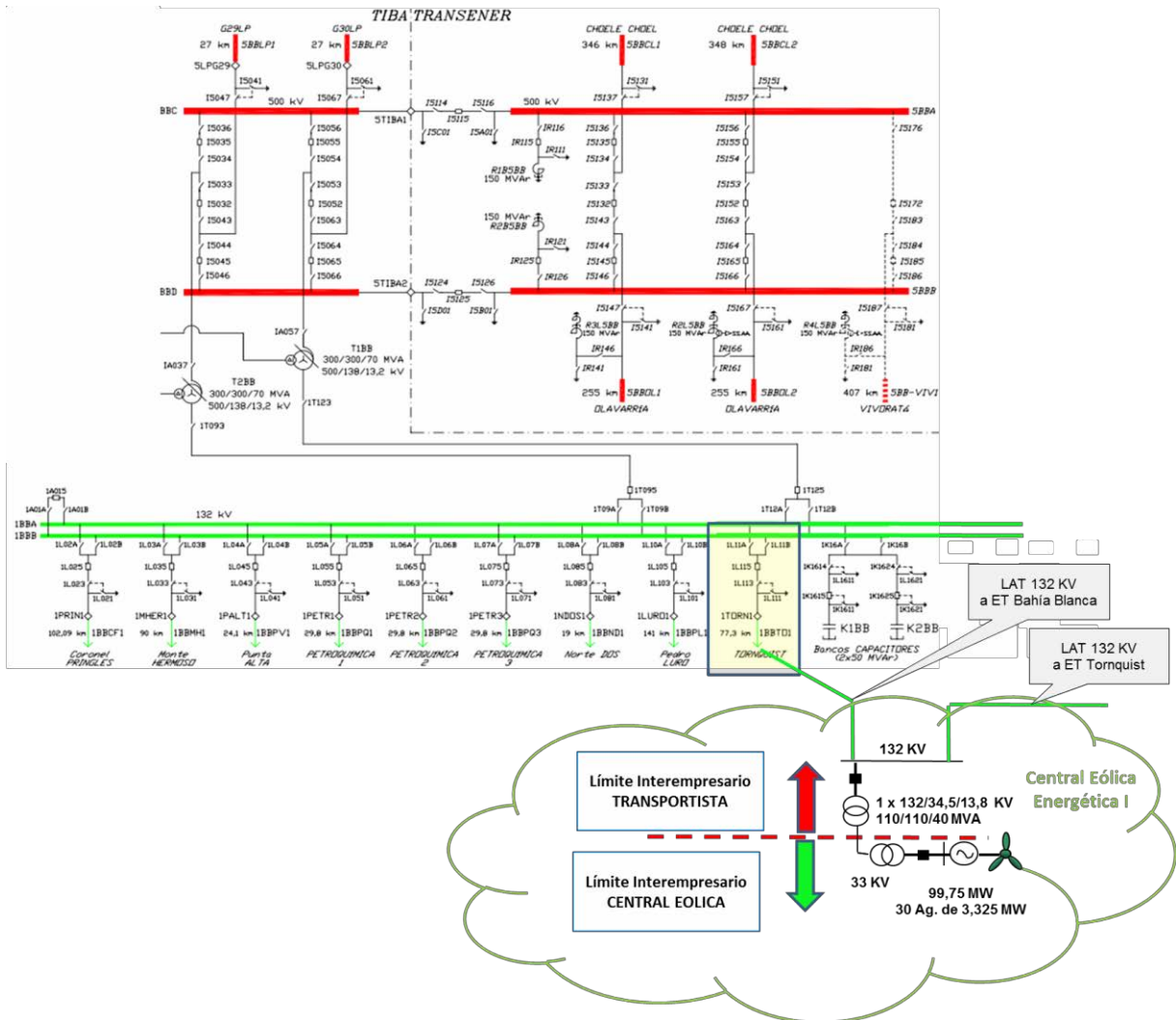




Figure N° 6 Simplified Electrical Single line Schematic of Bahía Blanca with the Wind Energy Plant and the cross-company limit (Energética Argentina S.A.- Transport)

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	Study on Environmental Awareness Addendum N°	
<p>Doc. N°: CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date 15/08/2018 Rev: A Page 12 of 36</p>

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 N°	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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 13 of 36

- 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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 14 of 36

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.

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p> <p>2</p> <p>Wind Power Centre 1</p>	
<p>Doc. N°: CEEN-IA-2655-08/18</p>		<p>Date 15/08/2018 Rev: A Page 15 of 36</p>

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).

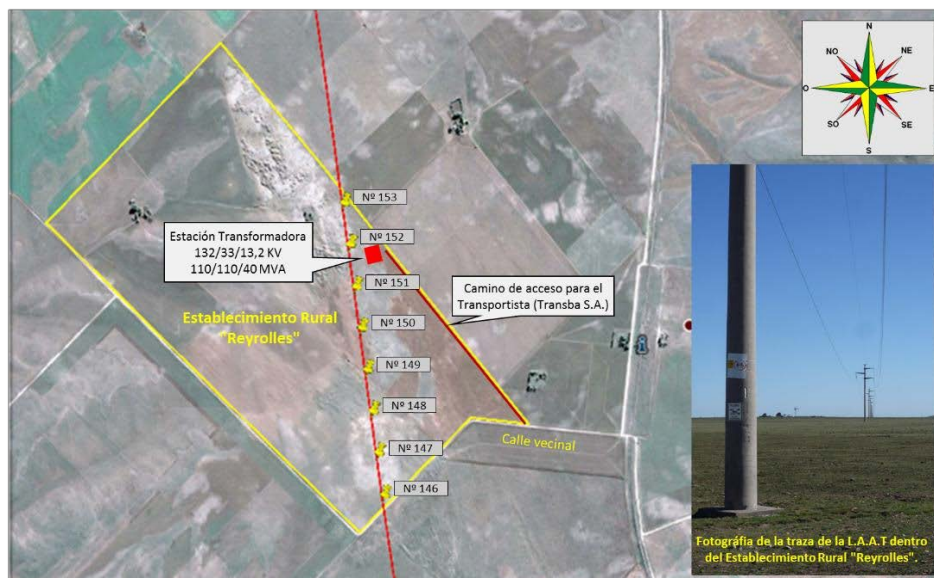




Figure N° 7 Opening of LAT Site and bonding to the ET (MT/AT)
Access way to ET for the Transportation

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N° 2 Wind Power Centre 1	
Doc. N°: CEEN-IA-2655-08/18		Date 15/08/2018 Rev: A Page 16 of 36

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 Al/Alc type 300/50 mm² of the nominal section.

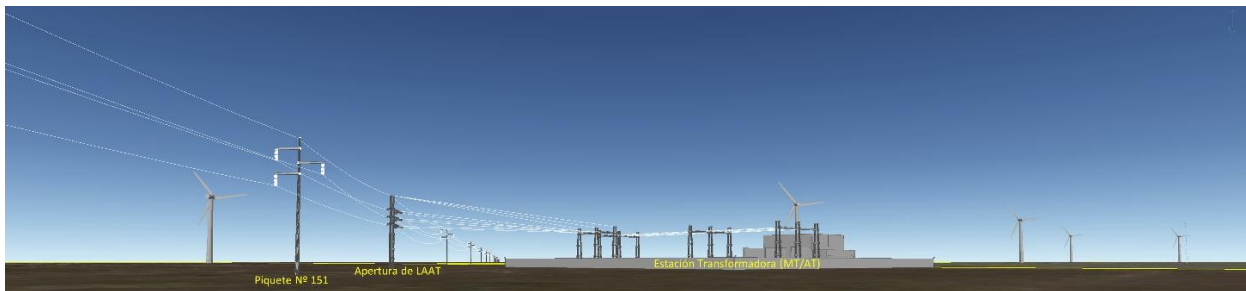


Figure N° 8 Photomontage of opening of LAAT (132 KV) and bonding to the ET (MT/AT)

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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 17 of 36

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.

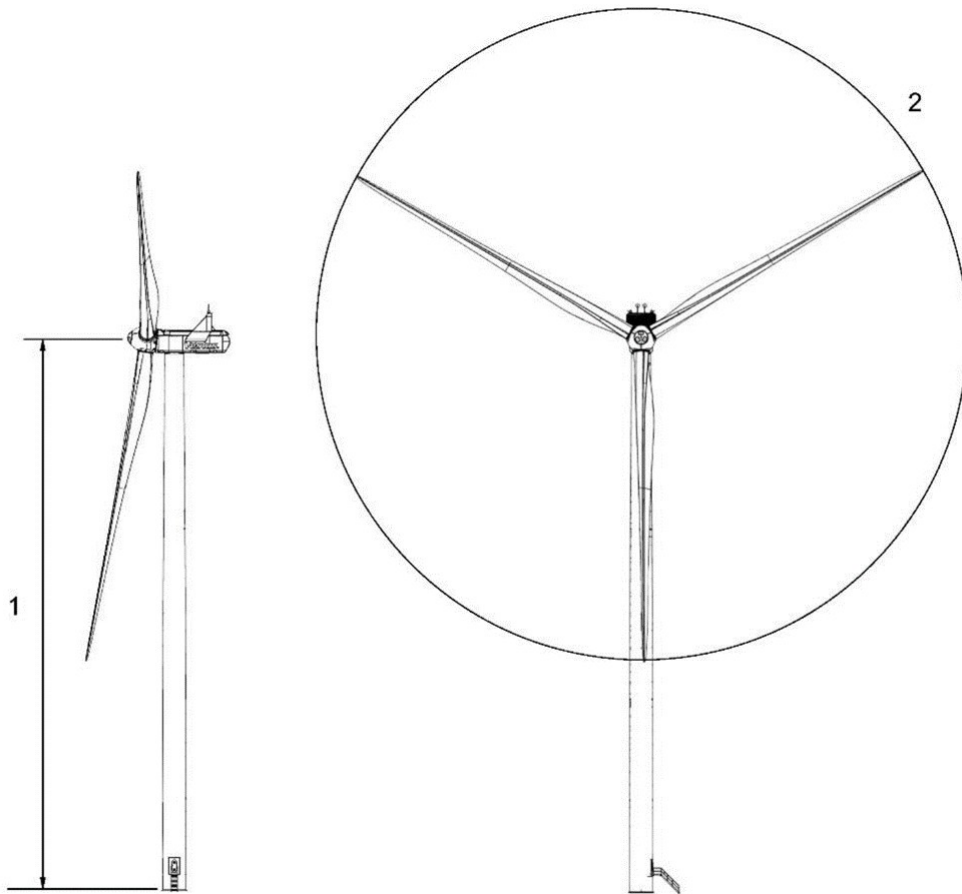


Figure N° 10 Dimensions of the wind turbine complete (1: 120m – 2: 132m).

In Figure N° 11 the wind turbine is shown identifying the main components in the hub and in the nacelle.

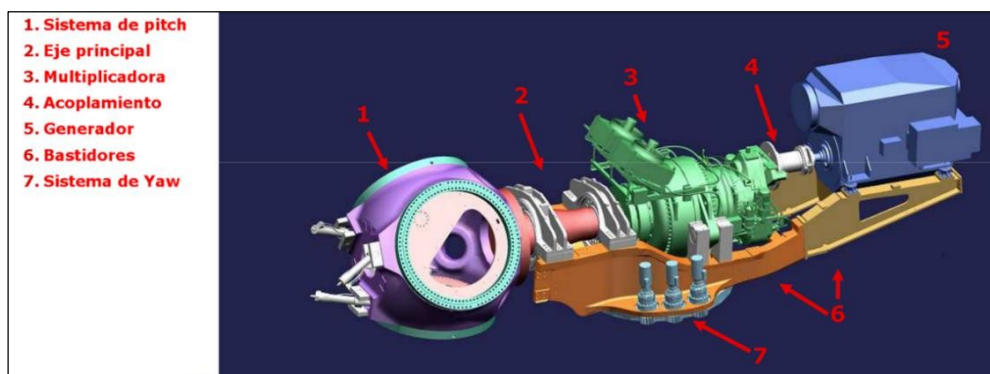




Figure N° 11 Image of the wind turbine with identification of the main component in the hub and the nacelle. Source: Energética Argentina S.A.

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Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 19 of 36

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.
- Beacons 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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 20 of 36

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

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 21 of 36

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").

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 22 of 36

– **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.

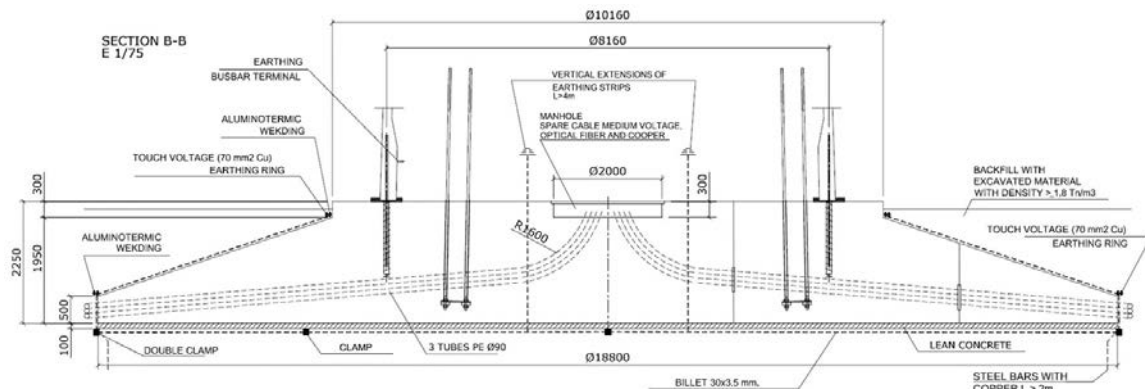


Figure N° 12 Typical Plan of wind turbine foundation.



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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N° 2 Wind Power Centre 1	 Date 15/08/2018 Rev: A Page 24 of 36
Doc. N°: CEEN-IA-2655-08/18		

In Figure N° 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.

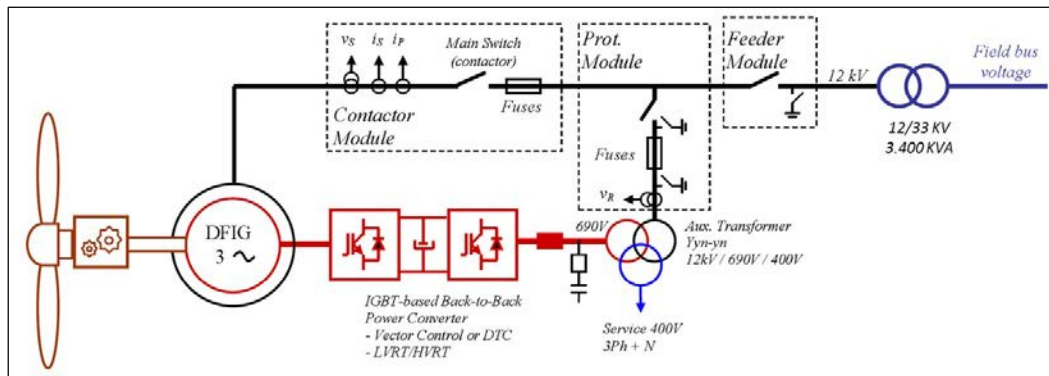


Figure N° 13. Scheme to connect the generator to the network.

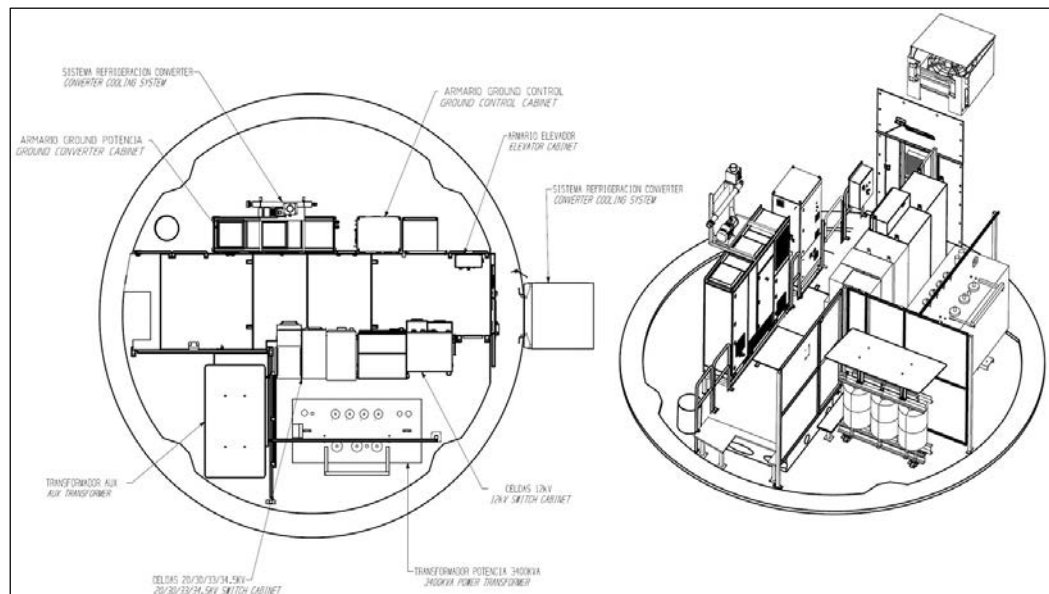


Figure N° 14 Configuration of the components in the base of the wind turbine.

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).

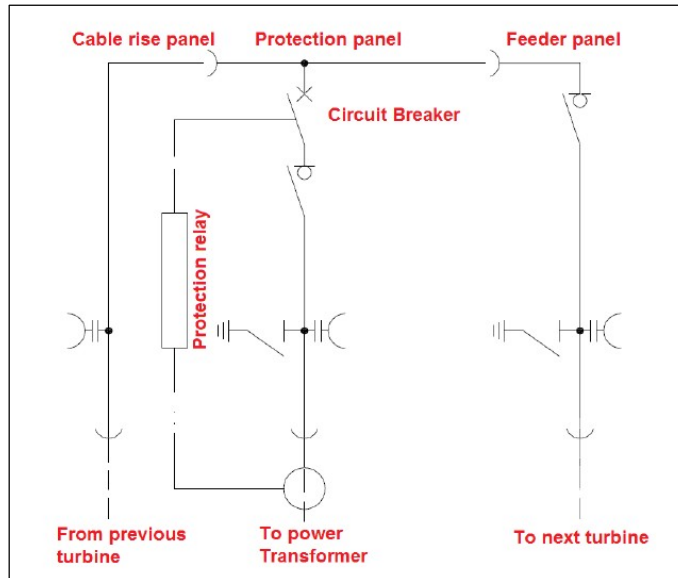


Figure N° 15. Typical set-up of the cells in 33 KV.

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)

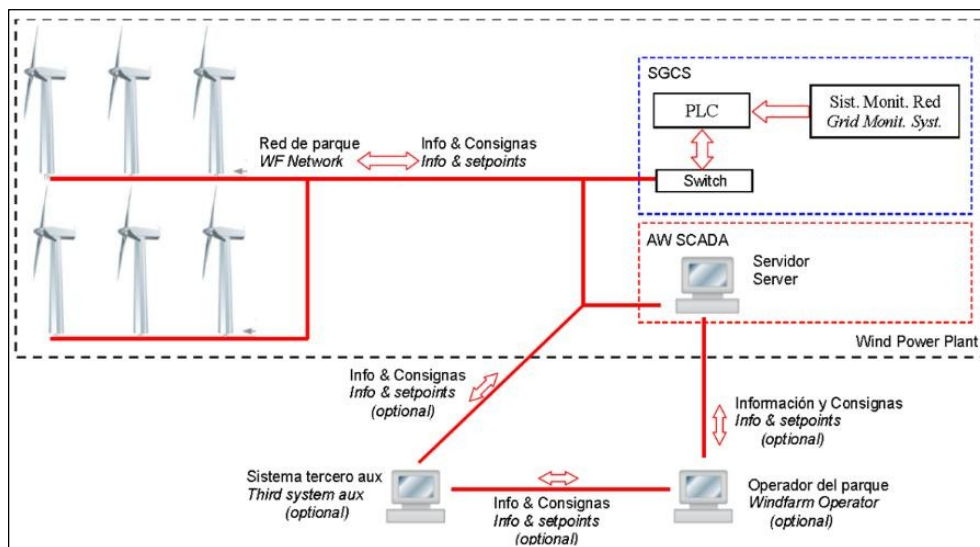




Figure N° 16 General Control System of the Wind Energy Plant.

Source: Energética Argentina S.A.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N°: CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 26 of 36

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 mm², 150 mm², 185 mm², 240 mm², 300 mm², 400 mm², 500 mm² and 630 mm²), 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.

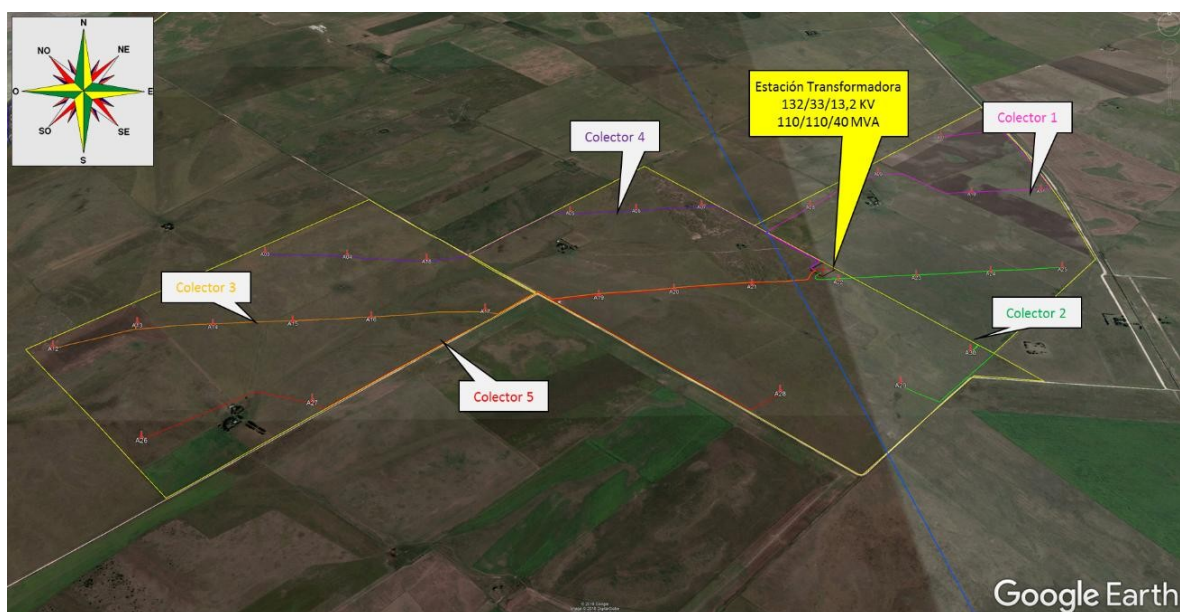






Figure N° 17 Google Image with the collector circuits implemented with underground wiring.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 27 of 36

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.



 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 28 of 36

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	12 KV a 33 KV.
- Transformation level of each wind energy turbine	33 KV.
- Tension level of the service network.	Radial.
- Configuration.	Underground
- Line type.	d.
- Transformers MT.	Relation: 12/33 KV. Nominal Power: 3.400 KVA.
Type.	Three-faced, submerged in biodegradable liquid.
Nominal Frequency.	50 Hz.
Connection Group.	Dyn11
Quantity	30 units
Location.	In the bottom part of the tower (concrete)
- Number of cells in MT (33 KV).	30 units with transformer inlet and output/s to the network. In the bottom part of the tower (concrete)
Location.	
- Number of circuits.	5(five) circuits in all.
Configuration of circuits	<ul style="list-style-type: none"> - 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).	5.0 Km.
Approximate length of internal roads (to construct).	18,0 Km, of 6,0 meters useful width
Foundation Platforms (including the foundation of the wind turbine).	
- Approximate Individual Surface.	3.680 m ² .
- Approximate Total Surface.	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.	Asynchronous, 6 poles, double-fed.
Nominal Power:	3,390 KW.
Nominal Frequency.	50 Hz.
Speed System.	680 -1,365 rpm
Nominal Power.	12,000 V.
Power Factor.	0.93.
Protection System.	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: <ul style="list-style-type: none"> – Regulate the power generated by high winds. – Aerodynamic Brake in case of controlled or emergency shutdown.
Tower.	
Type.	Tubular, of concrete (six sections). 118
Length.	meters
Tower Access.	Gate, with lock.
Superficial treatment - Color.	Painted - RAL 7035 (light grey).
Nacelle.	
Approximate dimensions. Material	4,089 (width) x 4,270 (height) x 15,973 (long) meters.
/ liquid containment.	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.
Color.	RAL 7035 (light grey).
Rotor	
Number of blades.	3 units
Diameter.	132 meters
Rotation speed of operation.	Variable. 7.0/14.0 rpm
	13.720 m ² .

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 30 of 36

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.

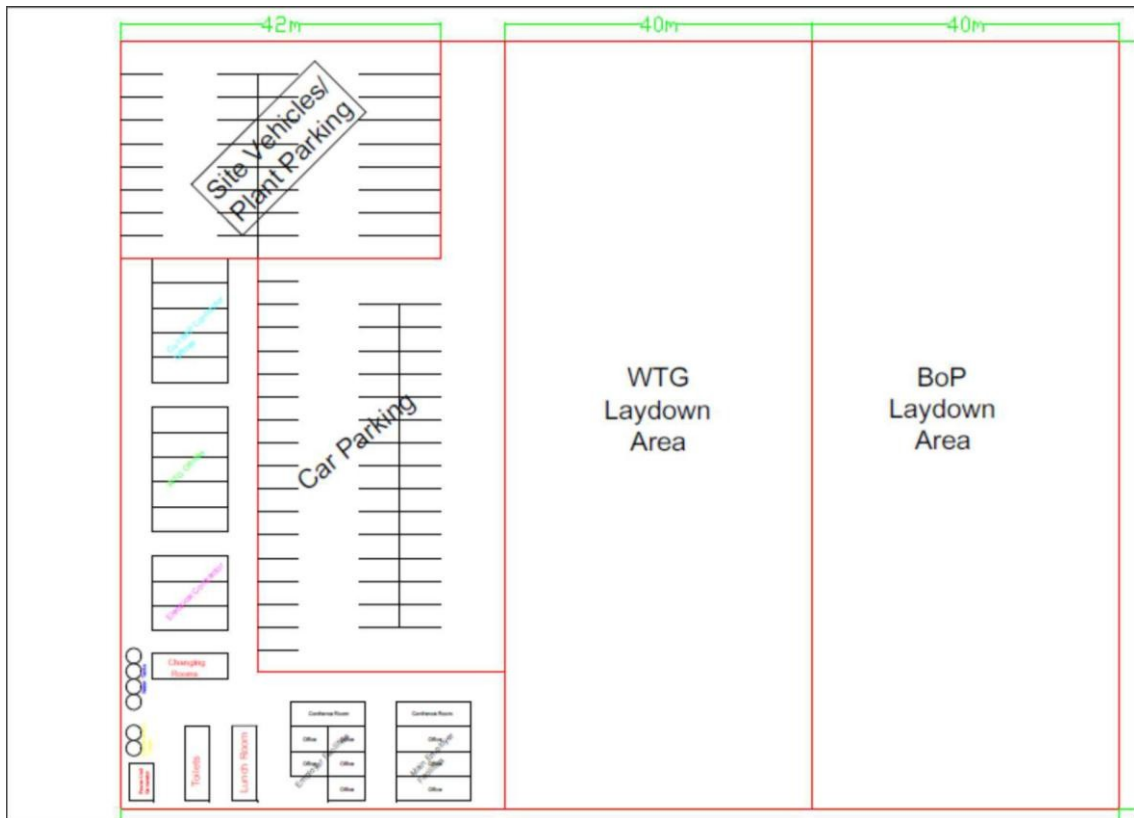




Figure N° 18 Google Image with the location of the general workroom and prep Layout.

Source: Energética Argentina S.A.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 32 of 36



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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 33 of 36

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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 34 of 36



- 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.

 Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 35 of 36

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)

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Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date 15/08/2018 Rev: A Page 36 of 36



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

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date 15/08/2018 Rev: A Page 2 of 7</p>

Study of Evaluation Tool for the Wind Resource and Power Generation

Index

1.	INTRODUCTION	3
2.	Evaluation of the wind resource.	3
2.1.	Characteristics of the Poles and Meteorological Stations.....	3
2.2.	Measurement of wind resource Campaign.....	4
2.3.	Characteristics of the wind resource.....	5
3.	Evaluation of the energetic production.	5

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date 15/08/2018 Rev: A Page 3 of 7</p>

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)

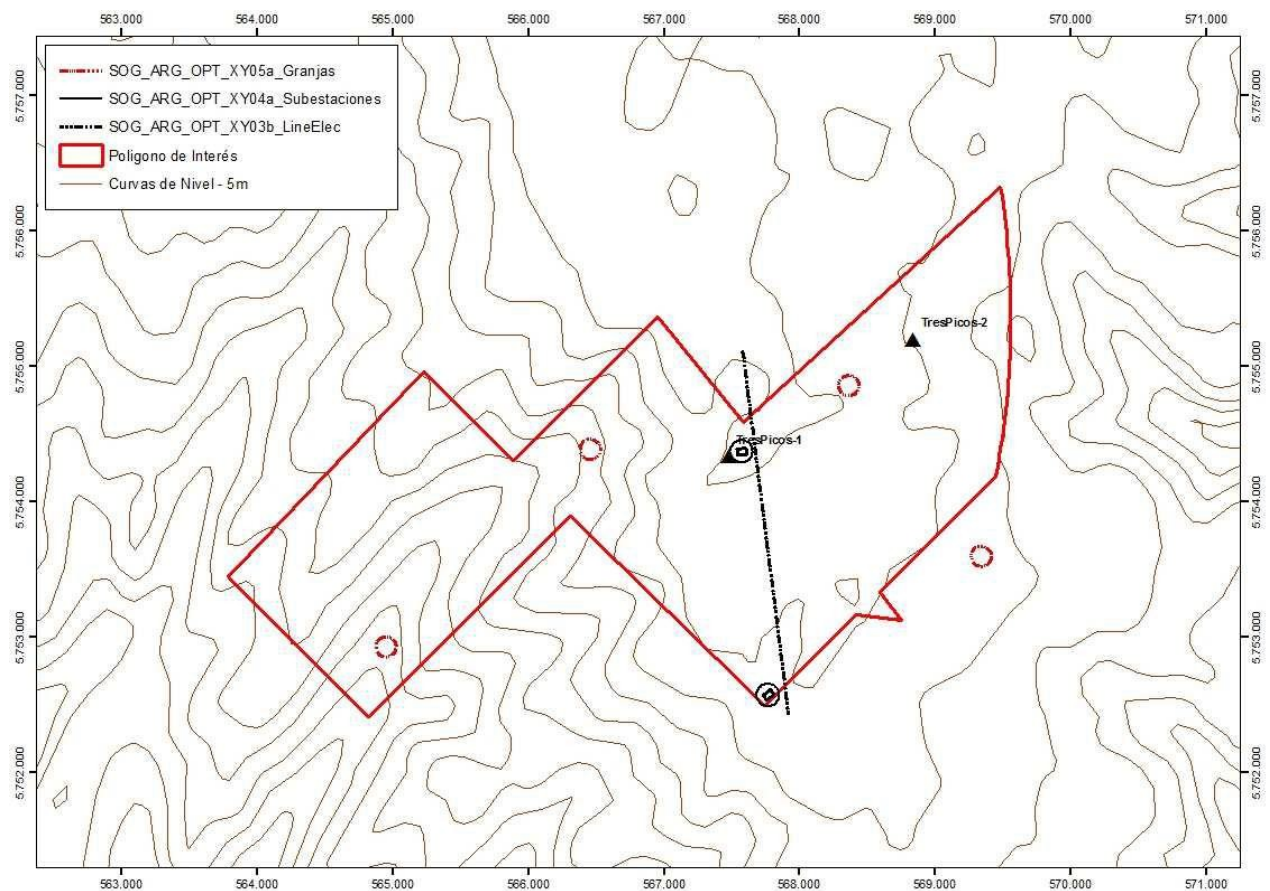




Figure N° 1 Image with the location of two poles and meteorological stations.

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

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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)

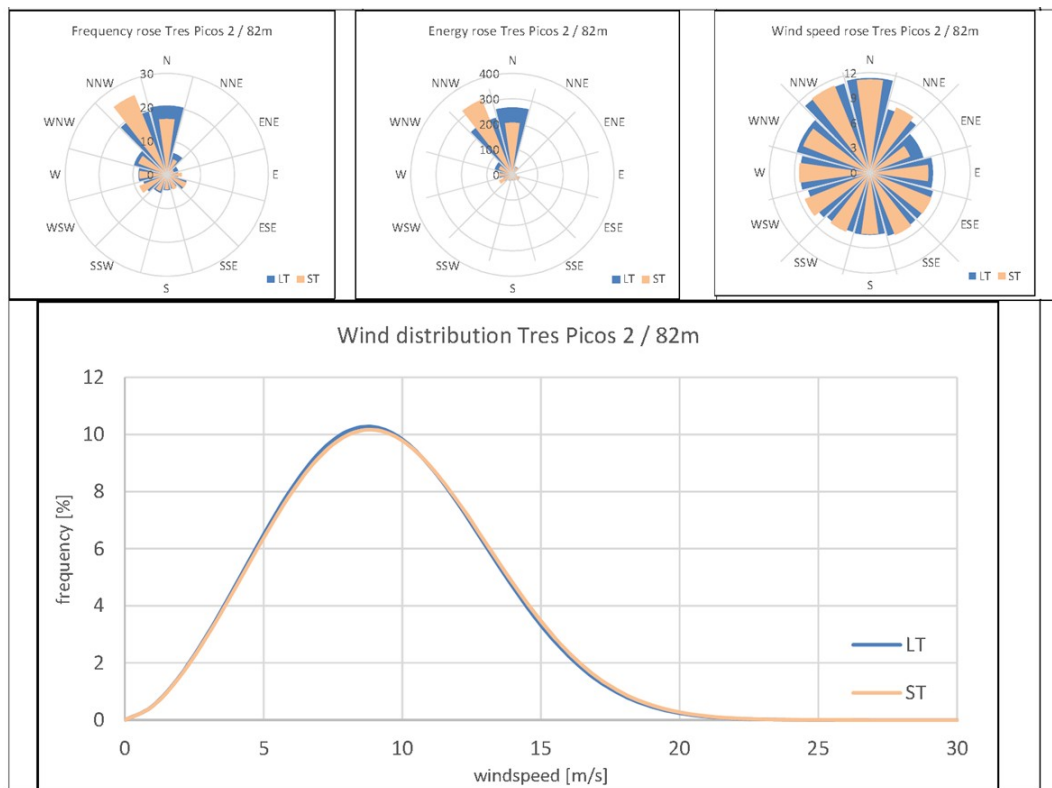


Figure N° 3 Compass cards (frequency, energy, speed) and distribution of frequencies.

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.

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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

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<p>Doc. N° CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date 15/08/2018 Rev: A</p>

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.



Legend

-  AW 3300 TH120.
-  Access Road
-  Internal Access Road to SET
-  Site
-  Compound

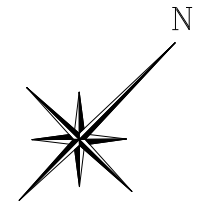
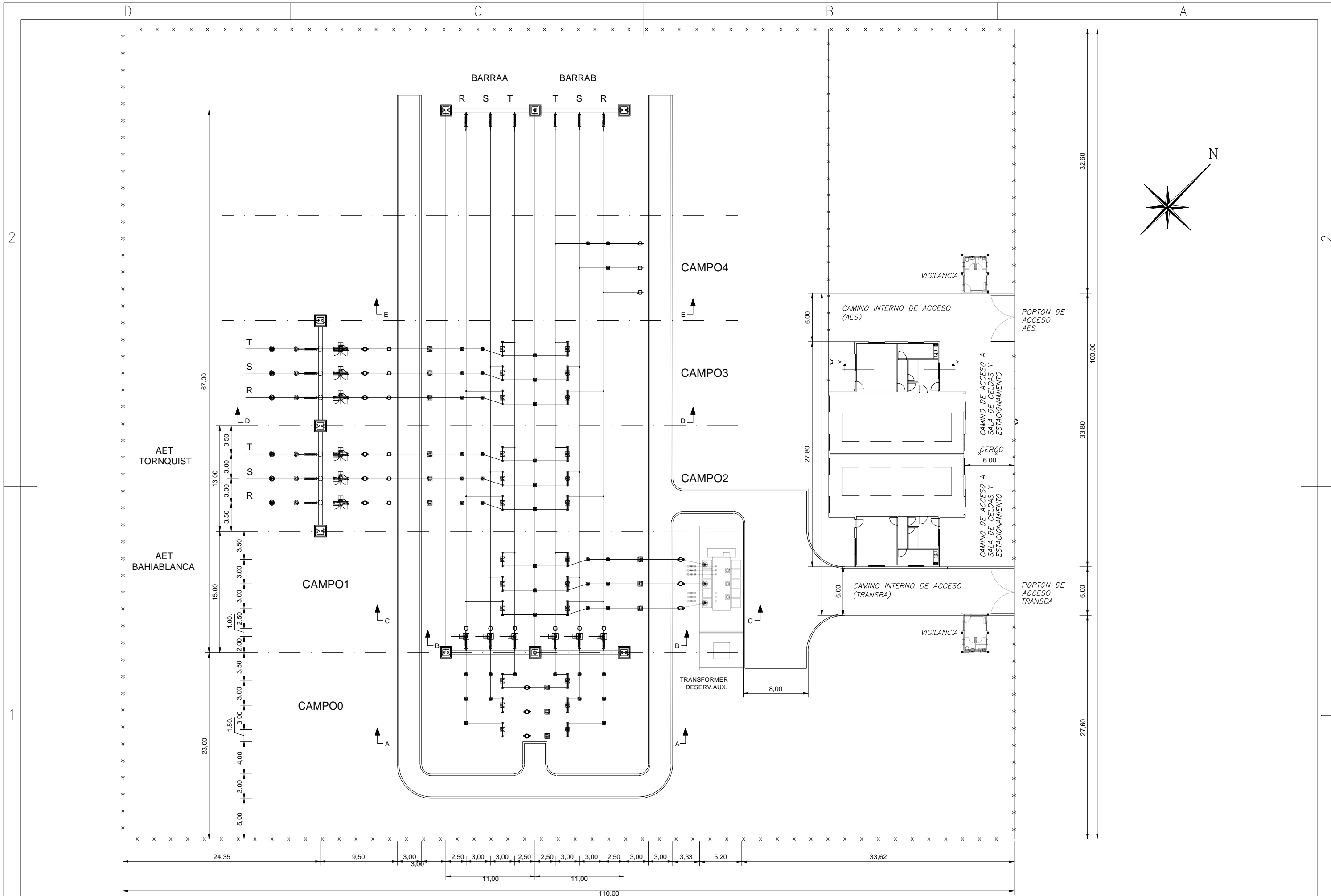
Substation

Coordinate system.

UTM, WGS84 DATUM, ZONE 20 SOUTH

Company  	Project Title 3 Picos Wind Farm	Author Raquel Cabeza	Created 13/09/2018	Range	Designation AW132 3.3 MW TH120	N° of Plan	Revisión	
				Format A3		Page		
							R. No.	Description
							1.	Emission

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Obra:
 PROYECTO: PARQUE EÓLICO ENERGÉTICA I

TÍTULO: PLANTA GENERAL

HOJA 1 DE 1

DOCUMENTO: PEEN-EM-001

ESC: S/E

REV. 0

DOCUMENTO N°:

D

C

B

A

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 TORNUIST

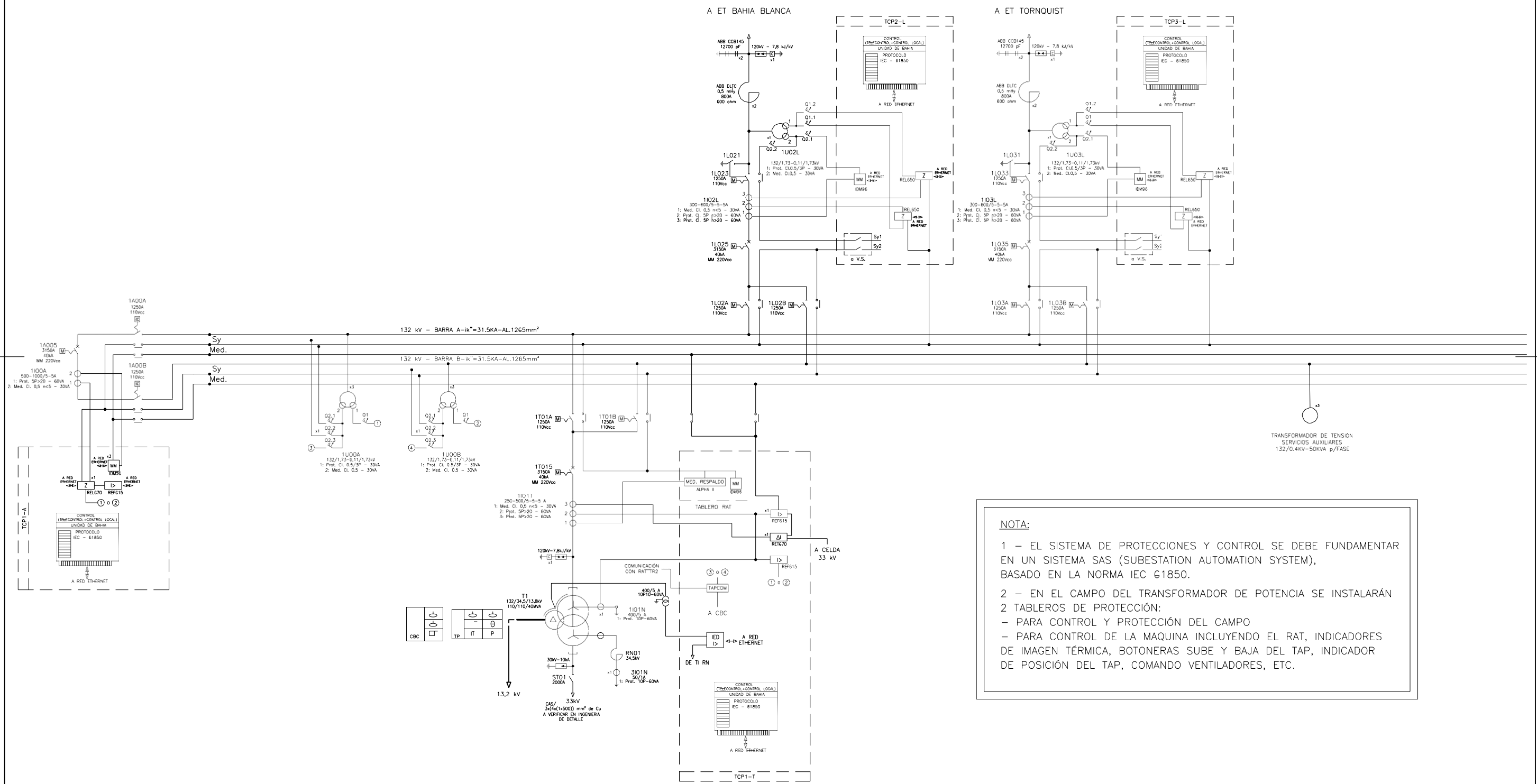
CAMPO 04
TRANSFORMADOR SS.AA.

CAMPO 05
TRANSFORMADOR T2 132 kV/BT
(FUTURO)

2

2

1



NOTA:

- 1 - EL SISTEMA DE PROTECCIONES Y CONTROL SE DEBE FUNDAMENTAR EN UN SISTEMA SAS (SUBSTATION 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.

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Obra:
PROYECTO: PARQUE EÓLICO ENERGÉTICA I

TITULO: ESQUEMA UNIFILAR 132 kV

HOJA 1 DE 3

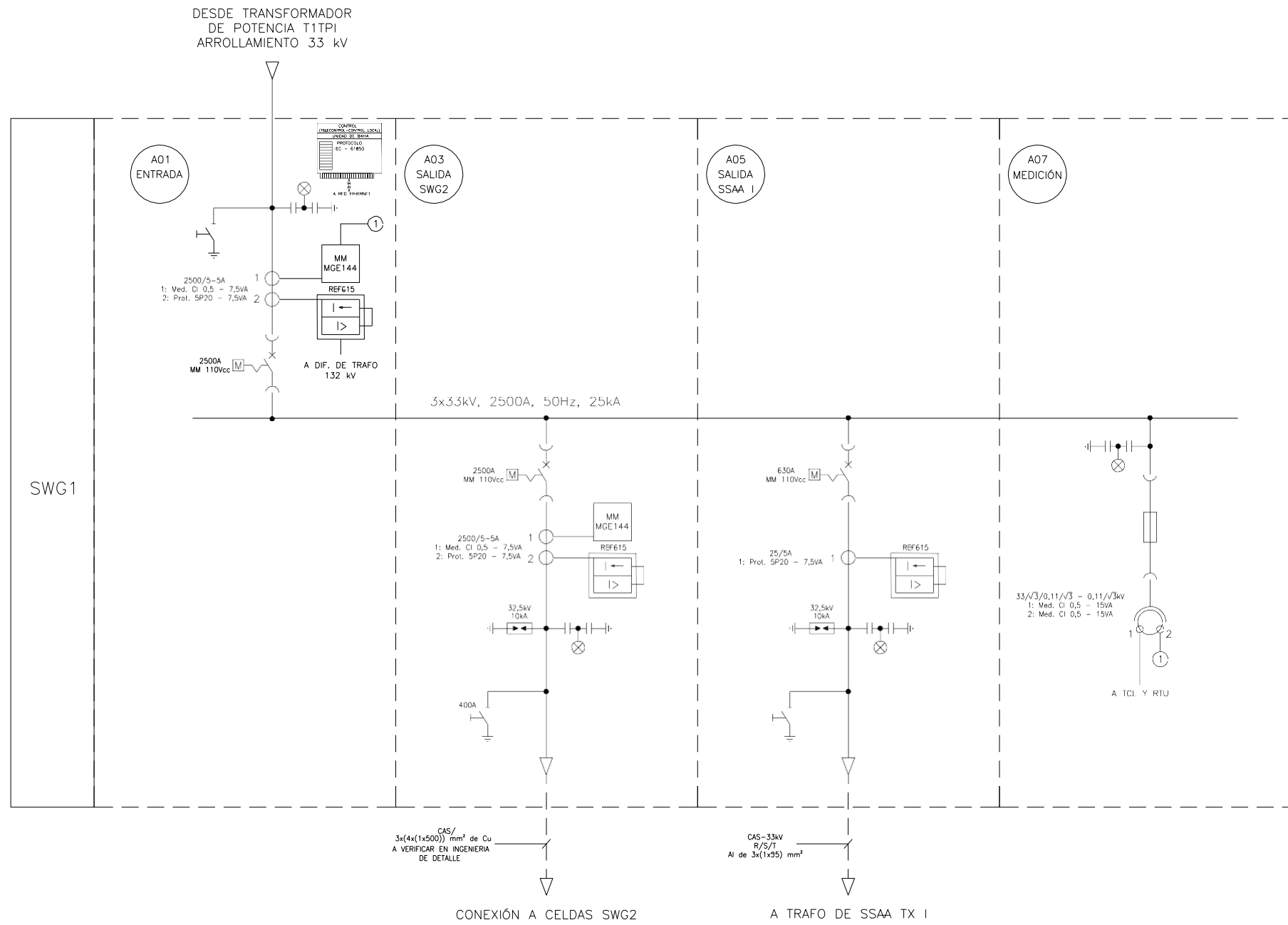
DOCUMENTO: PEEN-EE-001

ESC: S/E

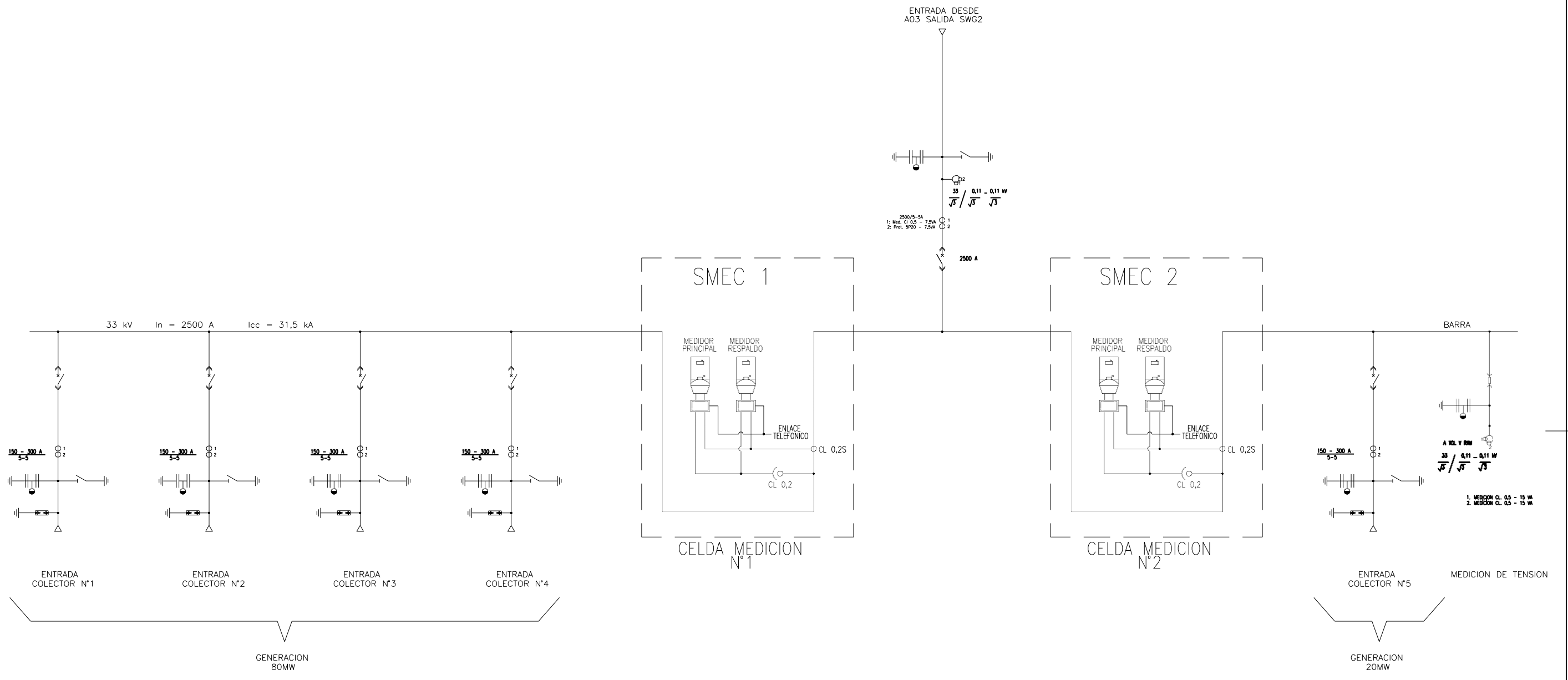
REV. 0

DOCUMENTO N°:

(CELDAS 33 kV LADO PLAYA – TRANSBA)



CELLS33 kV - ENERGETIC I

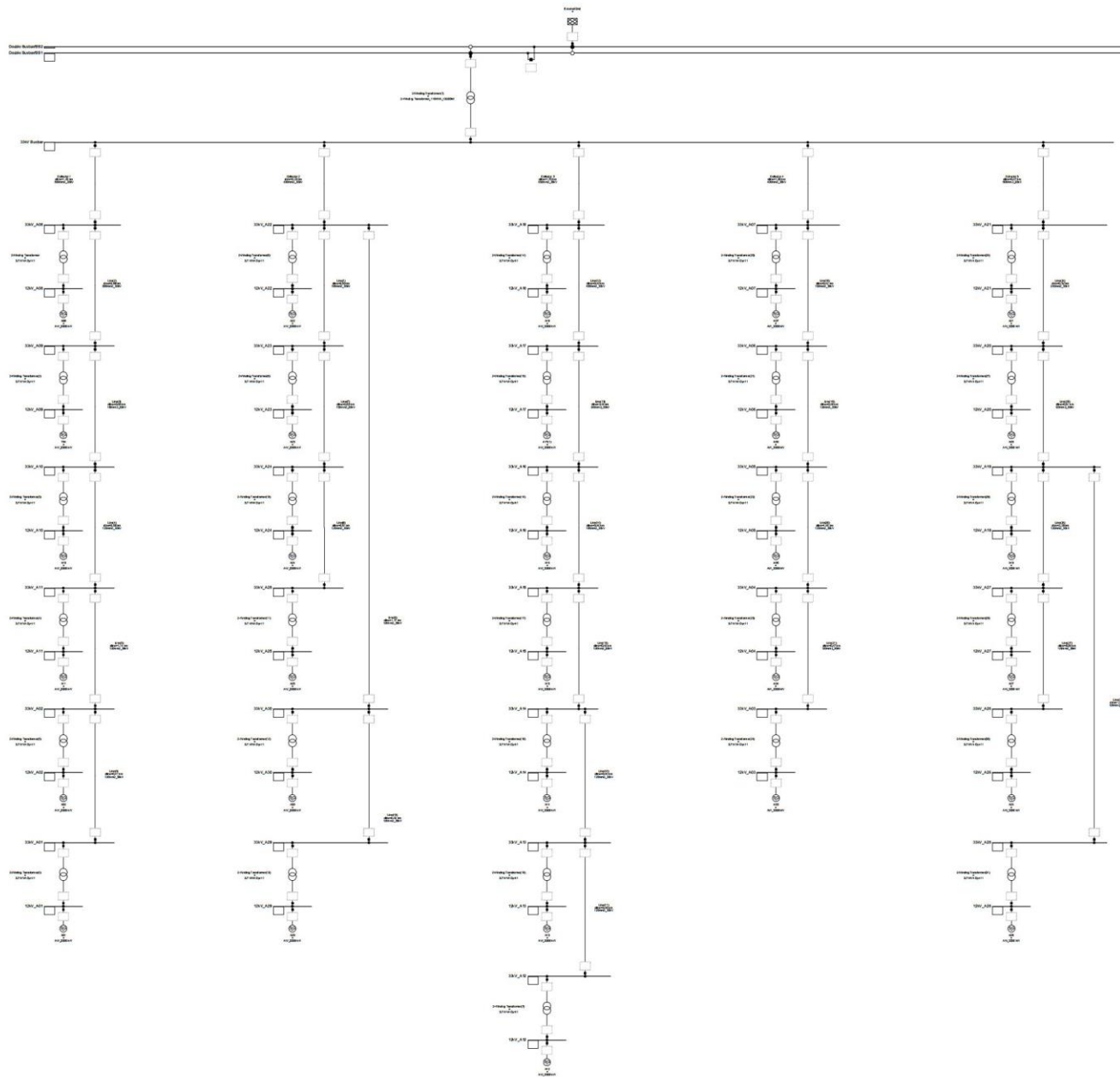


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Obra:
PROYECTO: PARQUE EÓLICO ENERGÉTICA I

TITULO: ESQUEMA UNIFILAR 33 kV - PARQUE EÓLICO
HOJA 3 DE 3 DOCUMENTO: PEEN-EE-001 ESC: S/E REV. 0

DOCUMENTO N°:



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Título del proyecto
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Autor
 7C

Creado
 DEFGHE

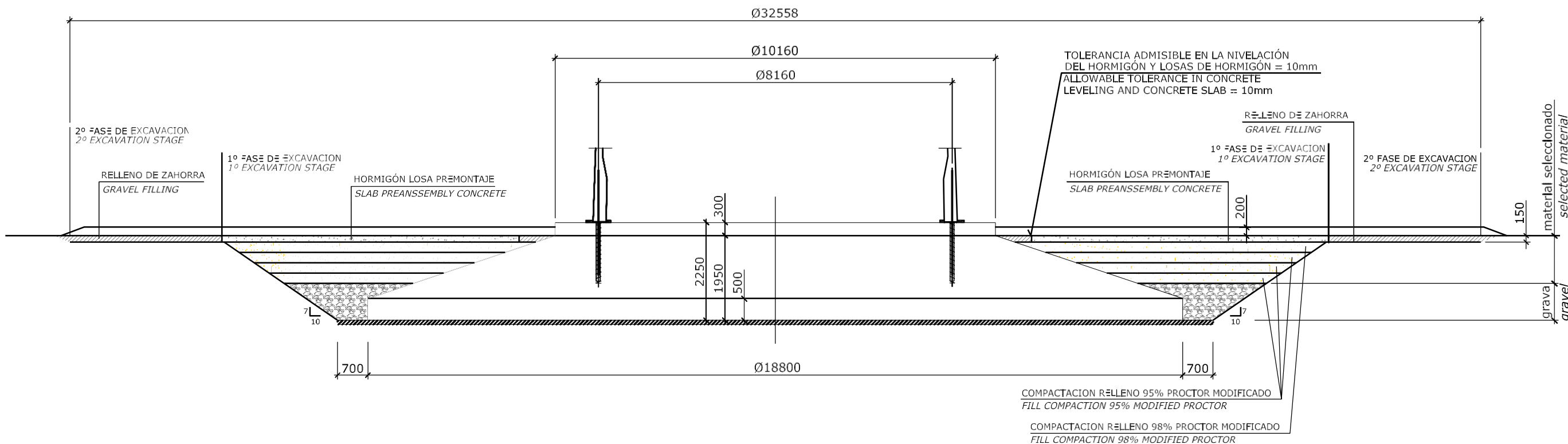
Escala
 Formato
 A3

Designación
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N° de Plano
 Hoja

R. No.	Descripción
0	Emisión
Revisión	

AW3000 300 Kpa



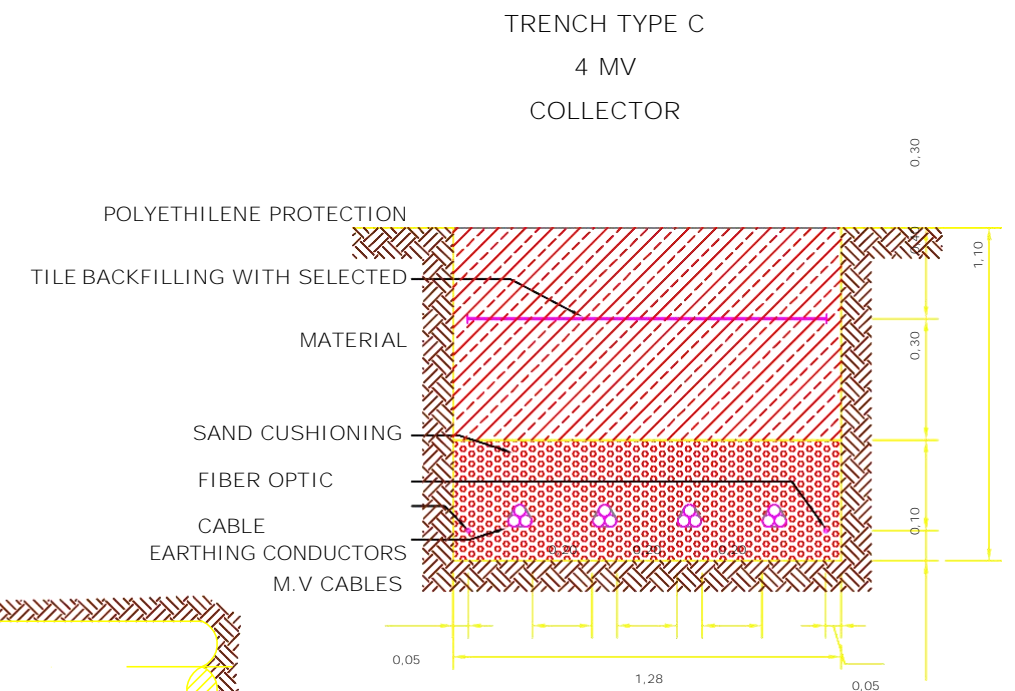
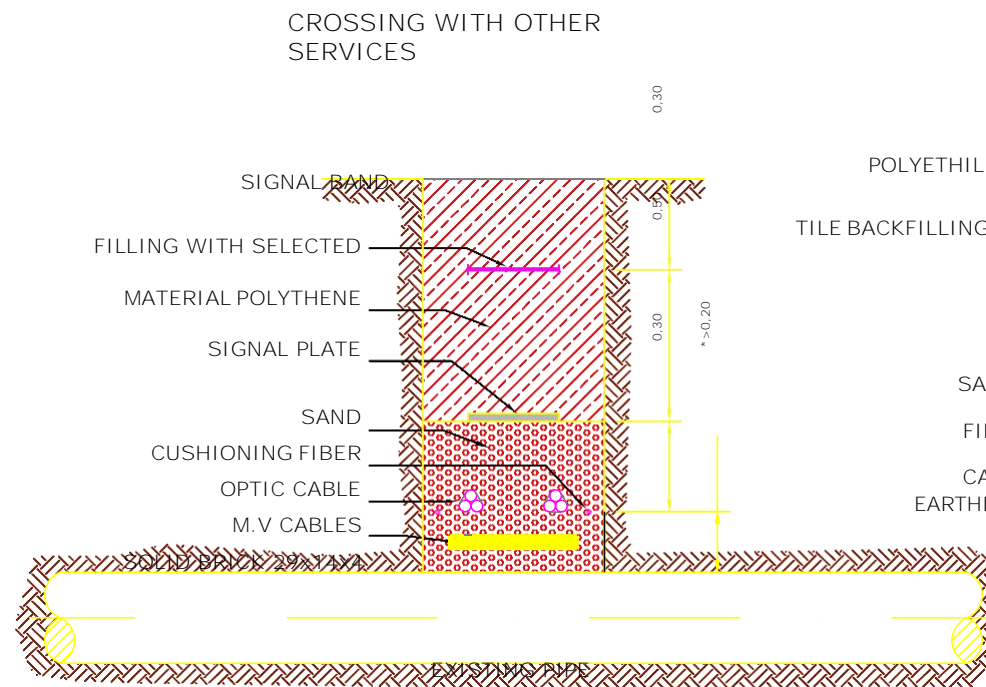
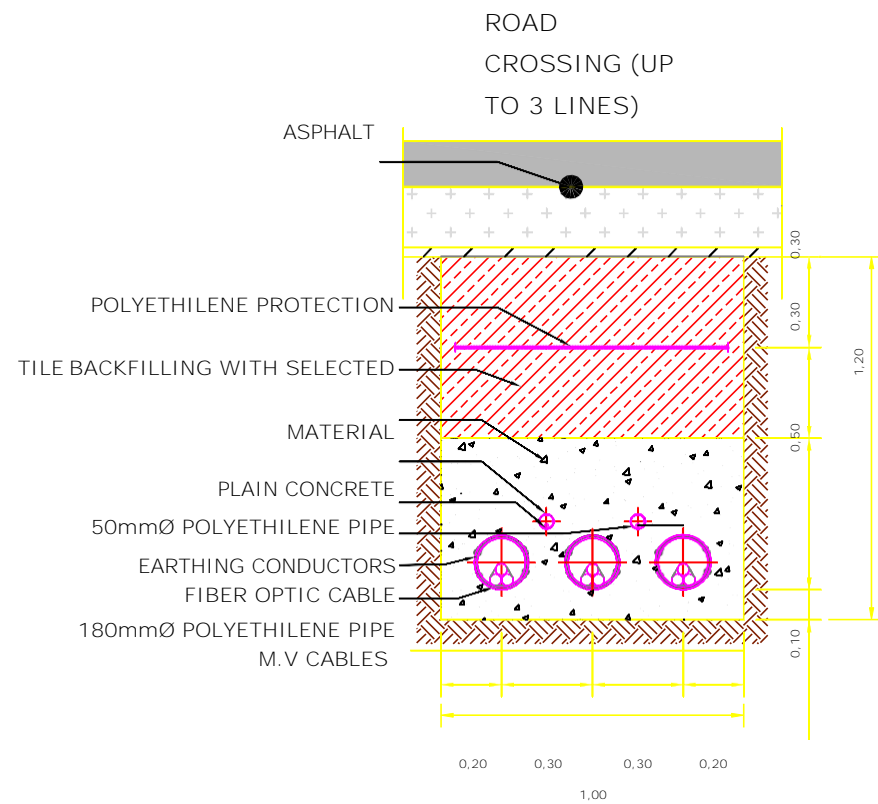
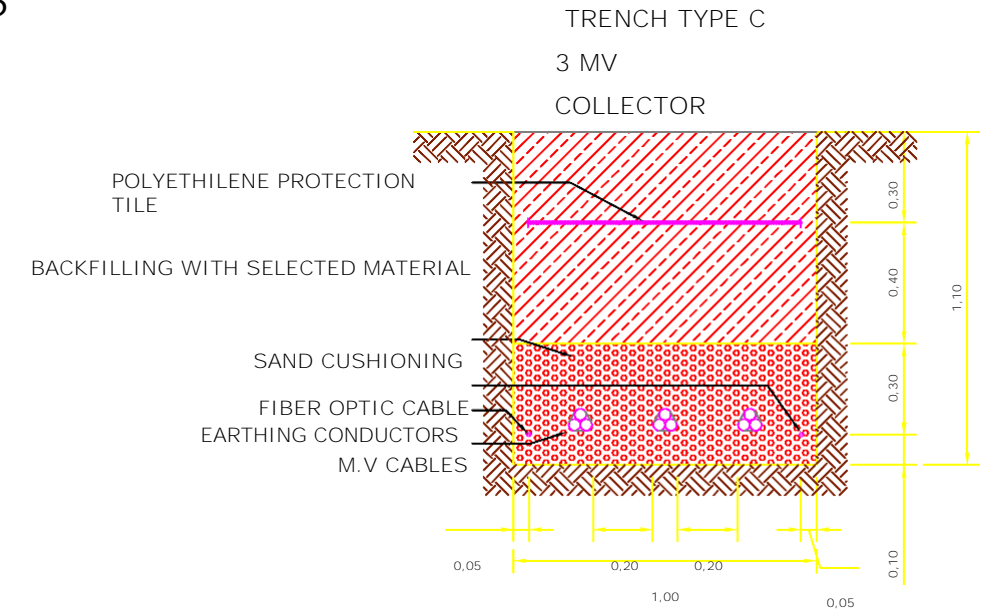
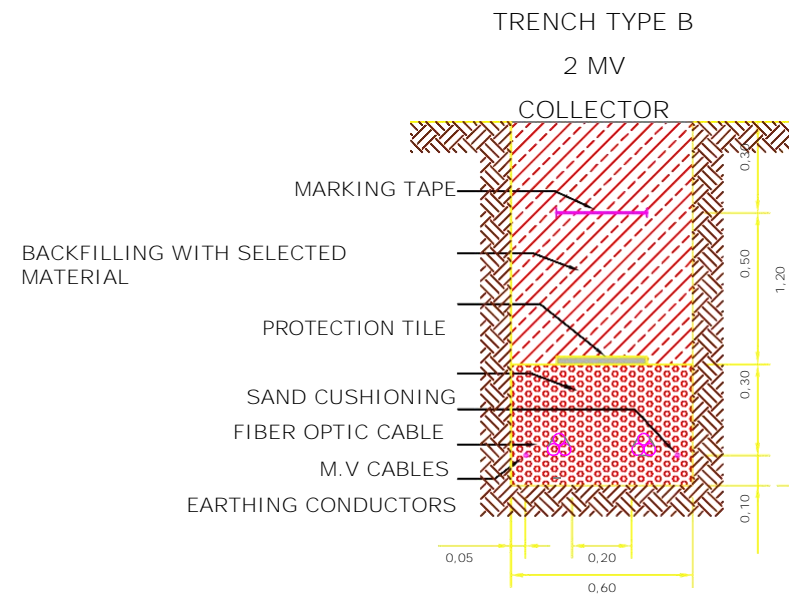
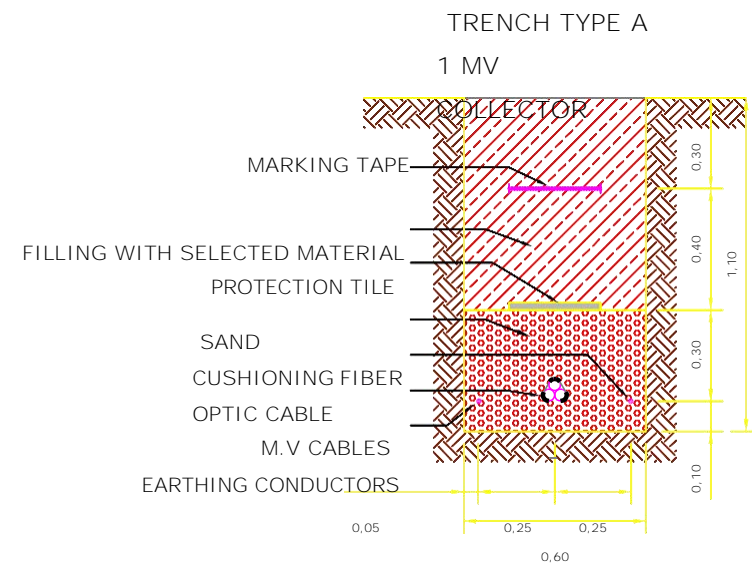
NOT VALID
FOR CONSTRUCTION

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

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
REV / REV	FECHA / DATE	REALIZADO / CREATED	MODIFICACION / MODIFICATION
MATERIAL / MATERIAL		TOLERANCIAS GENERALES / GENERAL TOLERANCES	
		PESO / WEIGHT (kg)	
NOMBRE / NAME	DIBUJADO / DRAWN	COMPROBADO / REVISED	APROBADO / APPROVED
FECHA / DATE	01-06-2015	01-06-2015	01-06-2015
ESCALA / SCALE	DENOMINACIÓN		
1/100	EJEMPLO CIMENTACIÓN AW3000 TH120 MACIZA		
	NAME		
	FOUNDATION EXAMPLE AW3000 TH120 SOLID		
PLANO N° / DRAWING N°		REVISIÓN / REVIEW	
DG200522		B	
HOJA N° / SHEET N°			
		3-5	
FORMATO / FORMAT		A3	

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CABLE TRENCH SECTIONS



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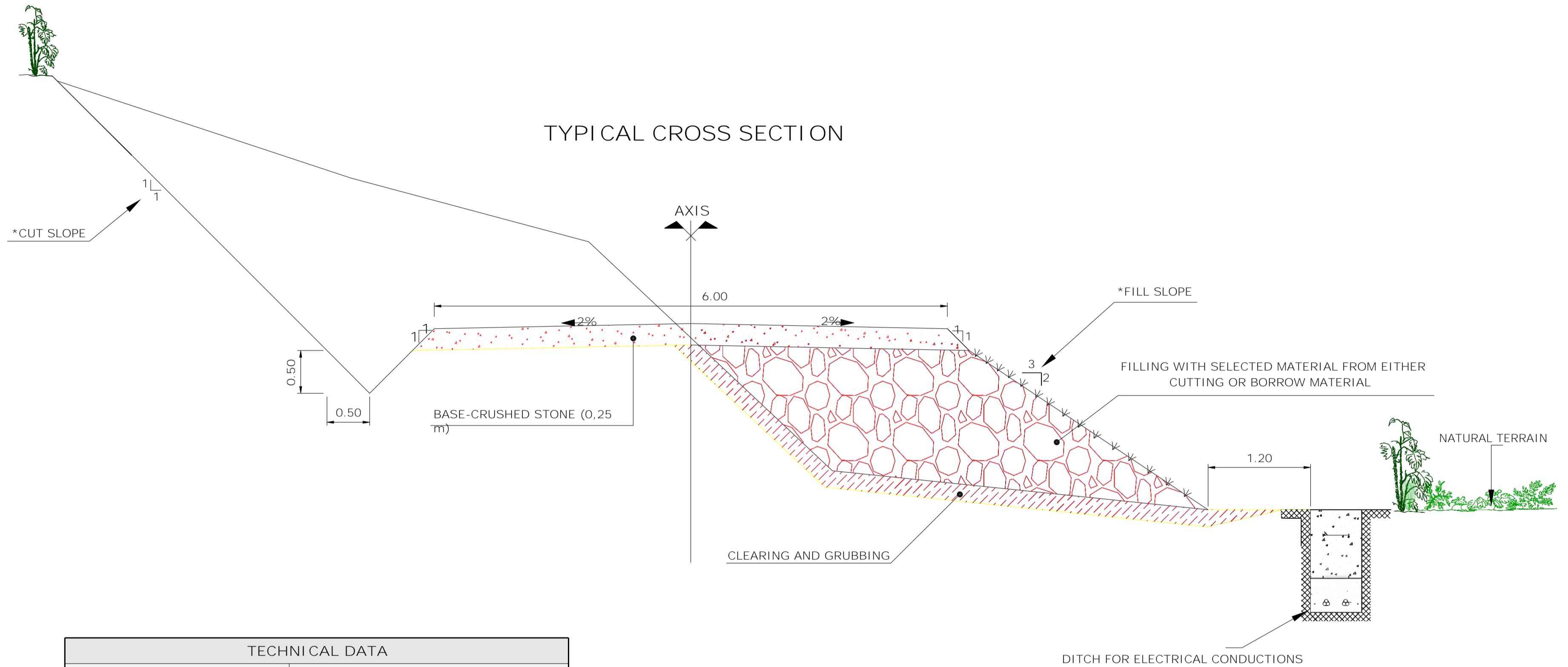
*TECHNICAL CONSIDERATIONS			
ROAD CROSSINGS WILL BE PERPENDICULAR IF POSSIBLE			
TRENCHES WILL BE PARALLEL TO WIND FARM INTERNAL ROADS			
THE DEPTH BETWEEN SURFACE AND THE BOTTOM PART OF THE CABLES WILL NOT BE LESS THAN 0,80 M. IN CASE OF CROSSING THIS DISTANCE WILL NOT BE LESS THAN 1 M.			
COMPACTATION OF SELECTED MATERIAL	95% OF MODIFIED PROCTOR TEST (AASHTO T180)		
Date	R. No.	Description	R.Date
Date		*NOTE	
FOR DISTANCES HIGHER THAN 20 CM NO PROTECTION IS			

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

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NEEDED.

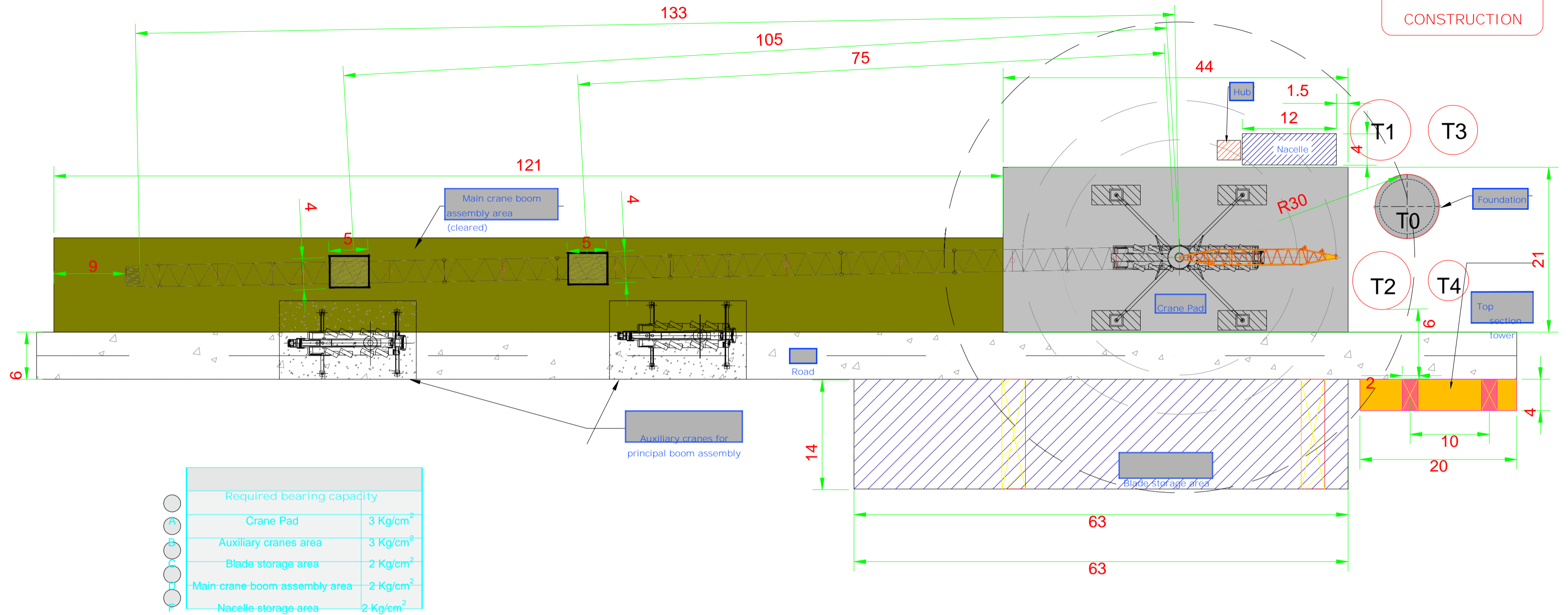


TECHNICAL DATA	
MINIMUM CBR IN PLATFORM	20%
COMPACTION OF FIRM	98% OF MODIFIED PROCTOR TEST (AASHTO T180) IN BASE
	95% OF MODIFIED PROCTOR TEST (AASHTO T180) IN SUBBASE
DESIGN REFERENCE WEIGHT FOR TRANSPORT VEHICLE AXLE	12 TON
*NOTE	
BOTH CUT AND FILL SLOPE WOULD CHANGE DEPENDING ON THE FINAL SOIL CONDITIONS.	

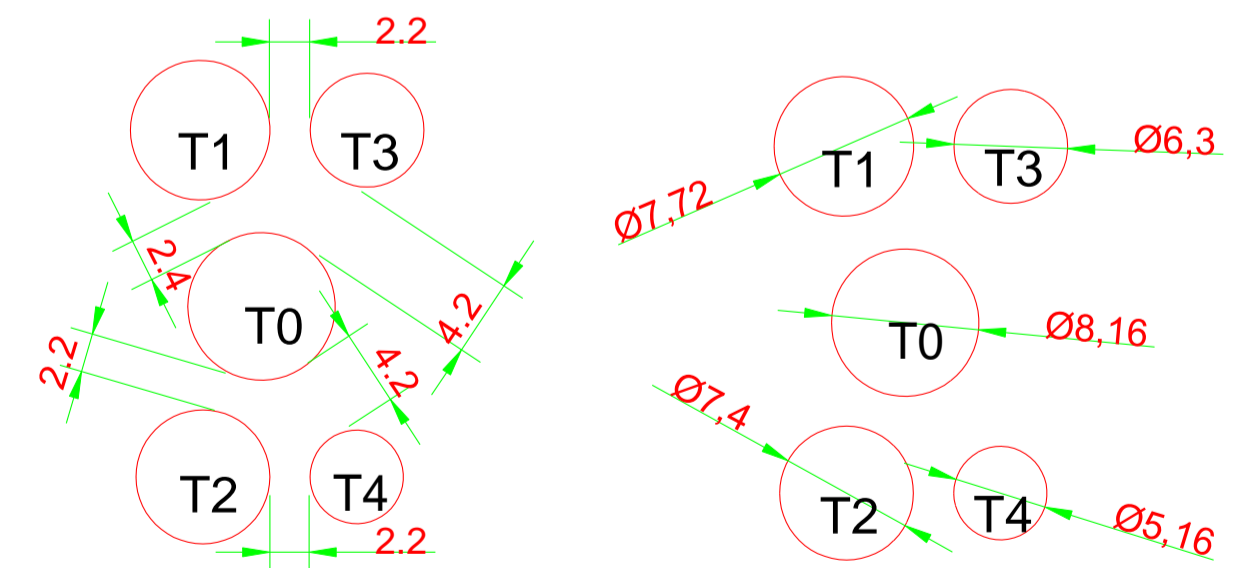
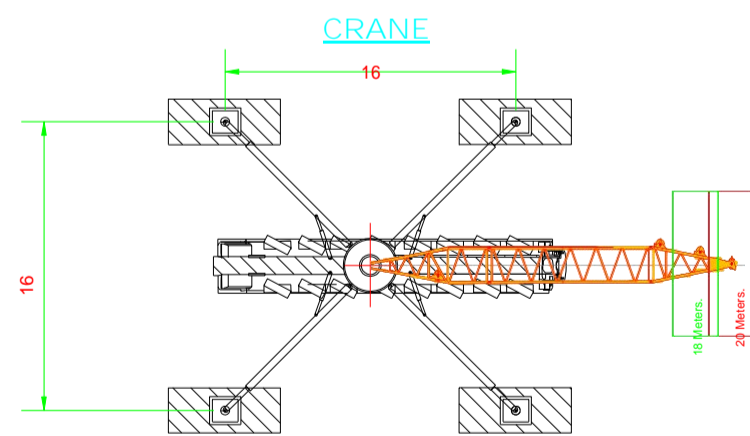
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STANDARD CRANE PAD

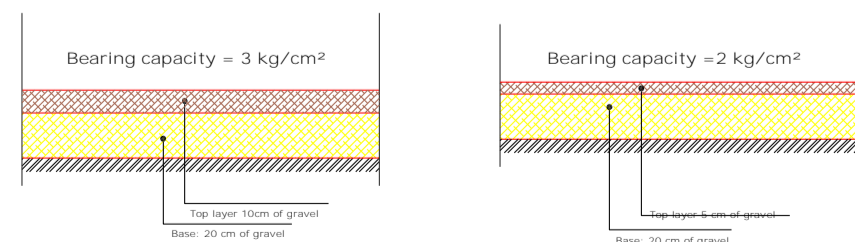
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TOWER SECTION PRE-ASSEMBLY PAD



PROPOSED CRANE HARDSTAND CROSS SECTION





TECHNICAL DATA	
Top layer	Comparison: 90% of modified Proctor test (AASHTO T198) in surface layer CBR min. 35% Level layer max. 100% Preloading index max. 5%
Base and subbase	90% of modified Proctor test (AASHTO T198) CBR min. 30% Level layer max. 30% Preloading index max. 100%

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Annex C.02.3

Technical Specifications of the Wind Turbines

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date 15/08/2018 Rev: A</p>

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"		

<p><i>Performed</i></p> <div style="text-align: center;">  31 -10 - </div>	<p><i>Reviewed</i></p> <div style="text-align: center;">  31 -10 </div>	<p><i>Approved</i></p> <div style="text-align: center;">  31 -10 -2017 </div>
--	---	---

	TECHNICAL SPECIFICATION	DATE: 31/10/17
	AW 132/3300 IEC IIB TH120 WIND TURBINE	Revision : A
		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	5°
	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

TECHNICAL SPECIFICATIONS

AW 132/3300 IEC IIB TH120 WIND TURBINE




3 3

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

	Mechanical Engineering Report	Doc. EI797
		Rev.: "C"
POWER CURVE FOR TRES PICOS WIND FARM AW132/3300		P. 1 / 5

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		

<p>Performed</p>  <p>aruiz9 2018.10.2 5 09:28:33</p>	<p>Reviewed</p>  <p>jaristegui 2018.10.25 3:45:00 PM +02'00'</p>	<p>Approved</p>  <p>Núñez Polo, Miguel 2018.10.25 15:46:36 +02'00'</p>
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In case of doubt, the Spanish version shall prevail.

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	Mechanical Engineering Report	Doc. EI797
		Rev.: "C"
POWER CURVE FOR TRES PICOS WIND FARM AW132/3300		P. 2 / 5

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/m³

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 guideline and MEASNET recommendations.

Thrust coefficients are provided only for informative purpose.

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	Mechanical Engineering Report	Doc. EI797
		Rev.: "C"
POWER CURVE FOR TRES PICOS WIND FARM AW132/3300		P. 3 / 5

Electrical capabilities of AW132/3300 have been defined to be fulfilled for a maximum ambient temperature of 35°C 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 35°C of ambient temperature could be obtained by derating the active power or the reactive power.

If the rated reactive power capability of $\pm 1200\text{kVAr}$ is required, the active power of 3300kW can be delivered between -20°C and 35°C. Rated active power at 40°C will be 3150kW in these conditions. Linear interpolation for rated active power calculation between 3300kW at 35°C and 3150kW at 40°C 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 -20°C and 40°C. Rated reactive power until 35°C will be $\pm 1200\text{kVAr}$ and at 40°C will be $\pm 355\text{kVAr}$. Linear interpolation for rated active power calculation between 3300kW at 35°C and 3150kW at 40°C can be considered for intermediate temperature values.

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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
13.0	3325
13.5	3325
14.0	3325
14.5	3325
15.0	3325
15.5	3325
16.0	3325
16.5	3325
17.0	3325
17.5	3325
18.0	3325
18.5	3325
19.0	3325
19.5	3325
20.0	3325
20.5	3325
21.0	3325
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

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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

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- Rev A	Date	Description of the revision
"A"	05/07/17	Initial release
 05 -07 -	 05 -07	 05 -07 -2017

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 -20°C and +40°C
- Without icing conditions, that is, temperature higher than +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 -20°C and +40°C
- No iced conditions. Temperature above +5°C 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 $\leq 1dB$.

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 $\leq 1dB$.

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 $\Delta L_a \leq 2\text{dB}$ along the whole operational range.

4. Tonality

A tonal audibility of $\Delta L_a \leq 2\text{dB}$ 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


	GENERAL DOCUMENT GENERAL DOCUMENTATION	Doc. DG200178
		Rev.: "C"
AW3000 SISTEMA BALIZAMIENTO AW3000 OBSTACLE MARKING AND LIGHTING		P. 1 / 6

AW3000



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

<p><i>Performed</i></p> <div style="text-align: center;">  LHL 04 -03 -2015 </div>	<p><i>Reviewed</i></p> <div style="text-align: center;">  E.S.S. 04 -03 -2015 </div>	<p><i>Approved</i></p> <div style="text-align: center;">  MNP 04 -03 -2015 </div>
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	GENERAL DOCUMENT	Doc. DG200178
	GENERAL DOCUMENTATION	Rev.: "C"
AW3000 SISTEMA BALIZAMIENTO AW3000 OBSTACLE MARKING AND LIGHTING		P. 2 / 6

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.

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.

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

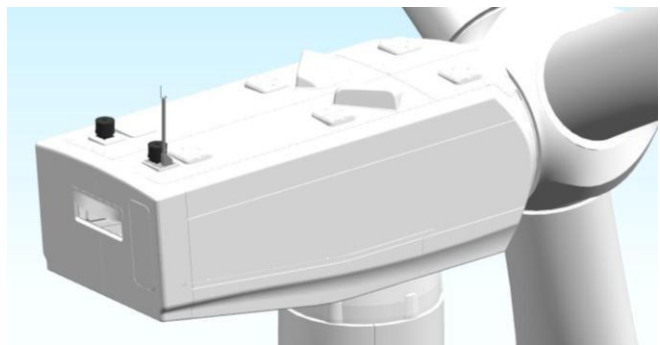
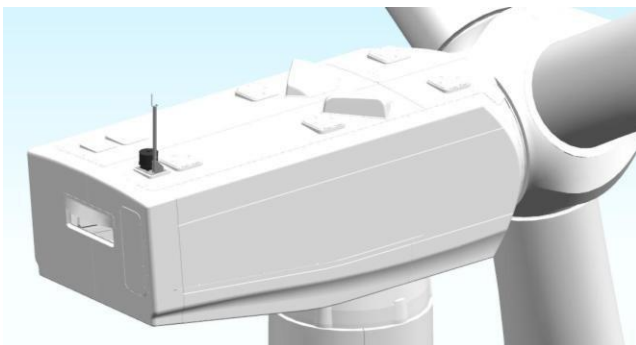



Figure 2. Obstruction light(s) in nacelle

	GENERAL DOCUMENT	Doc. DG200178
	GENERAL DOCUMENTATION	Rev.: "C"
AW3000 SISTEMA BALIZAMIENTO AW3000 OBSTACLE MARKING AND LIGHTING		P. 4 / 6

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).

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.

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:

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.

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.

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)

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 N° 3 UPS



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:

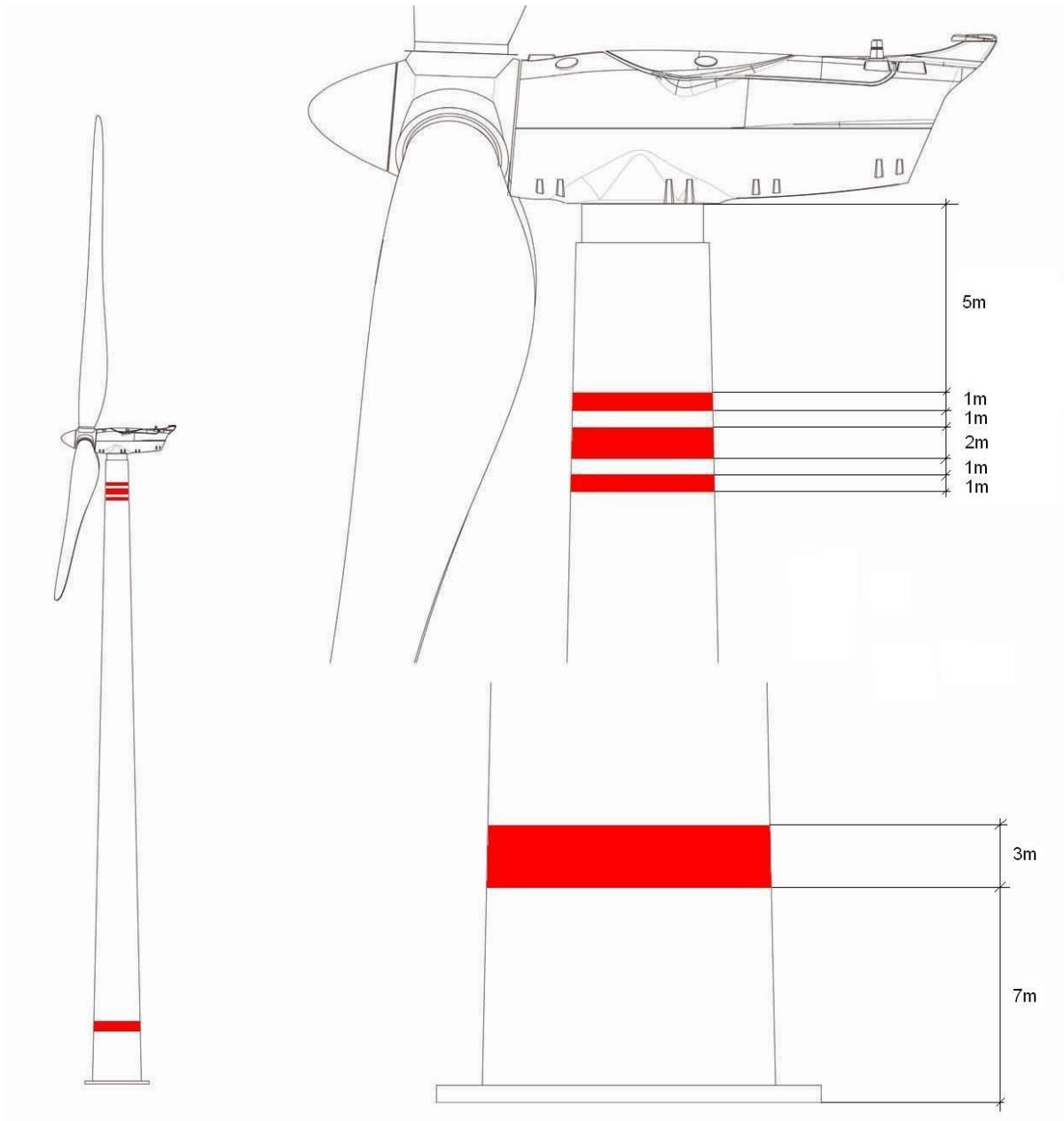



Figure N° 5 Tower marking

	GENERAL DOCUMENT	Doc. DG200178
	GENERAL DOCUMENTATION	Rev.: "C"
AW3000 SISTEMA BALIZAMIENTO AW3000 OBSTACLE MARKING AND LIGHTING		P. 6 / 6

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:

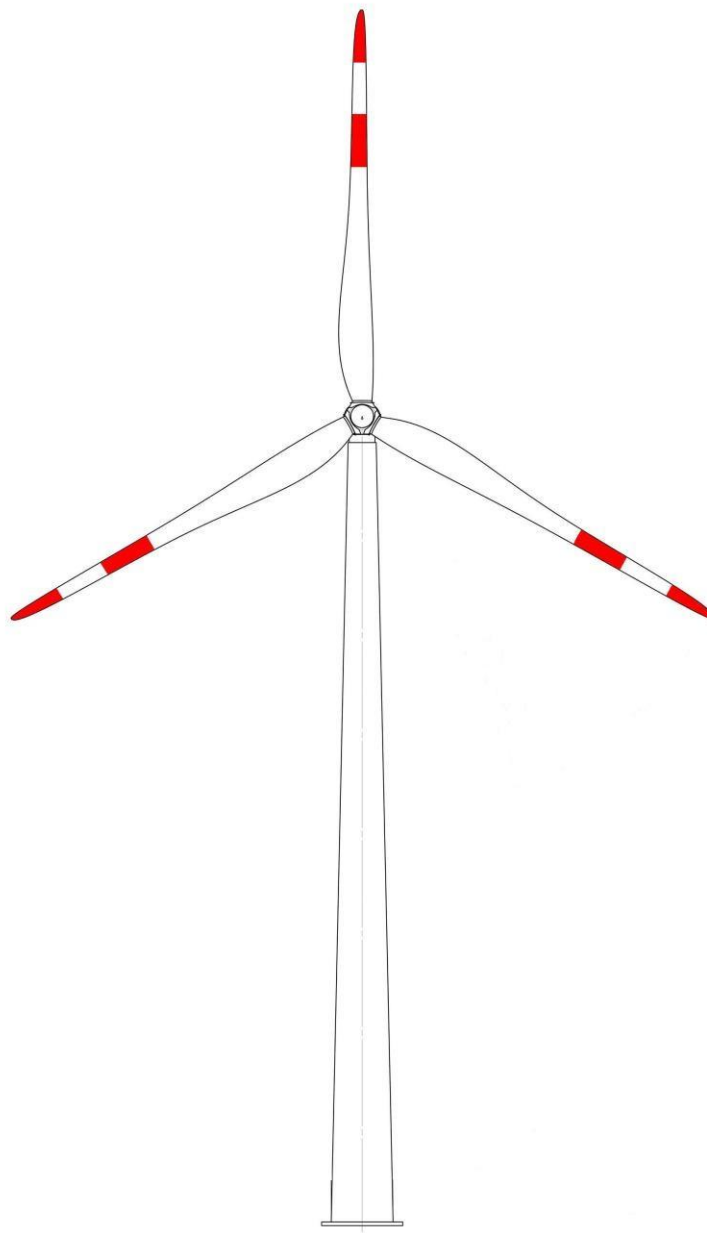
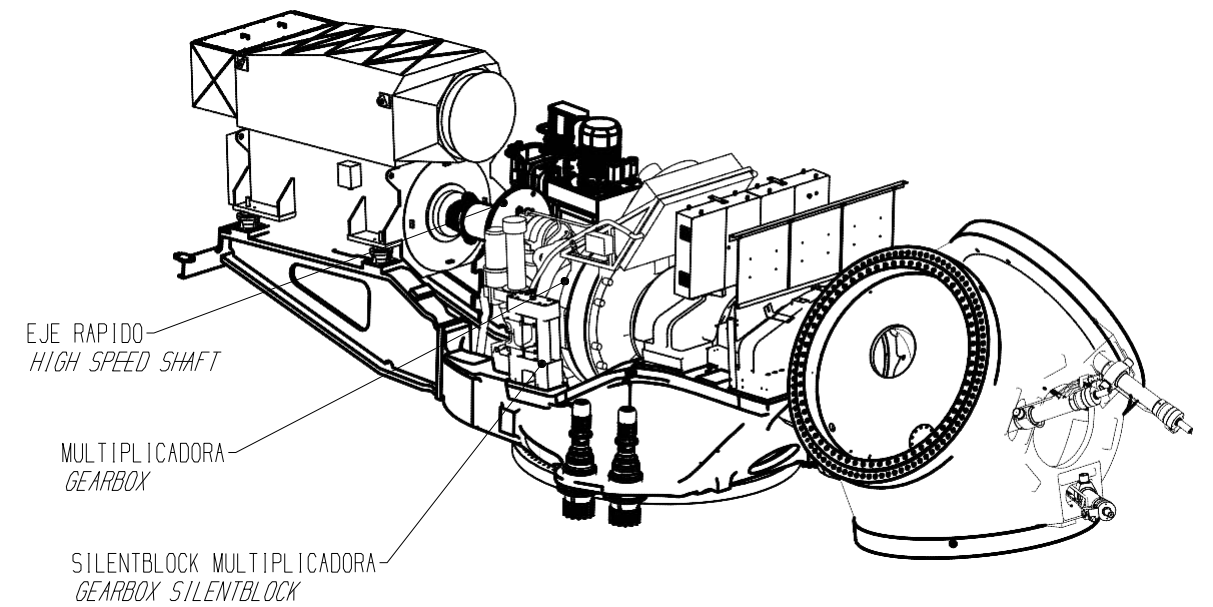
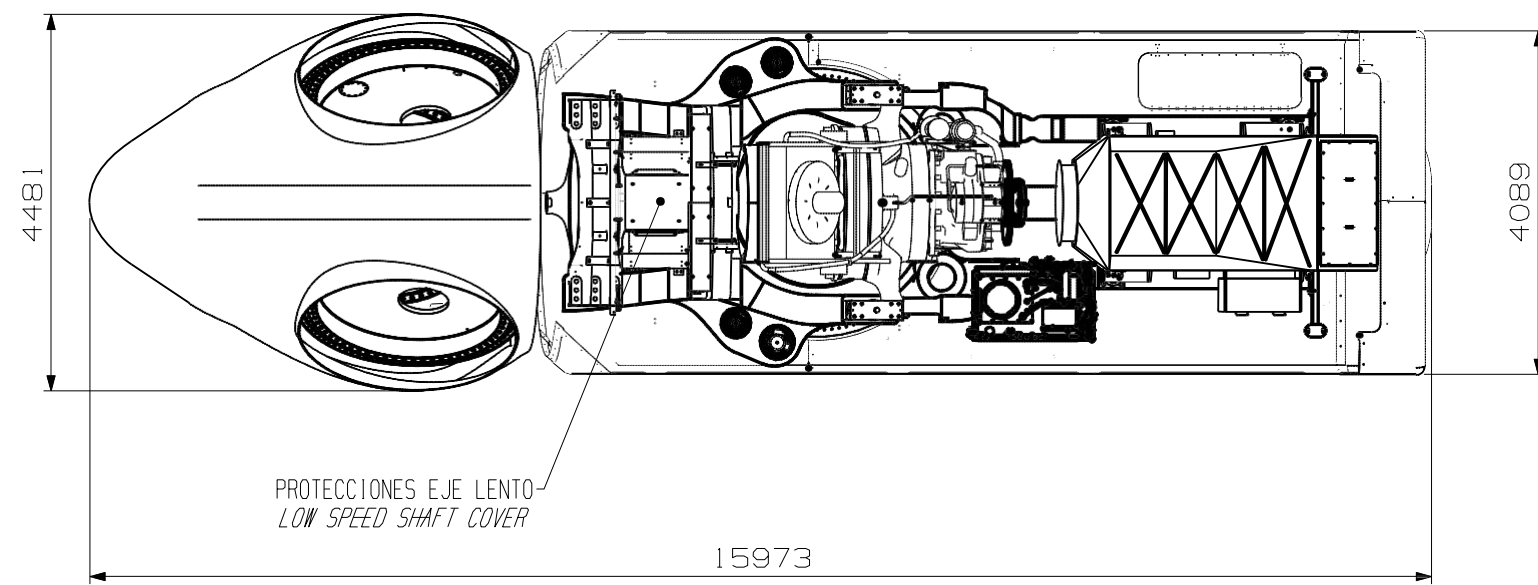
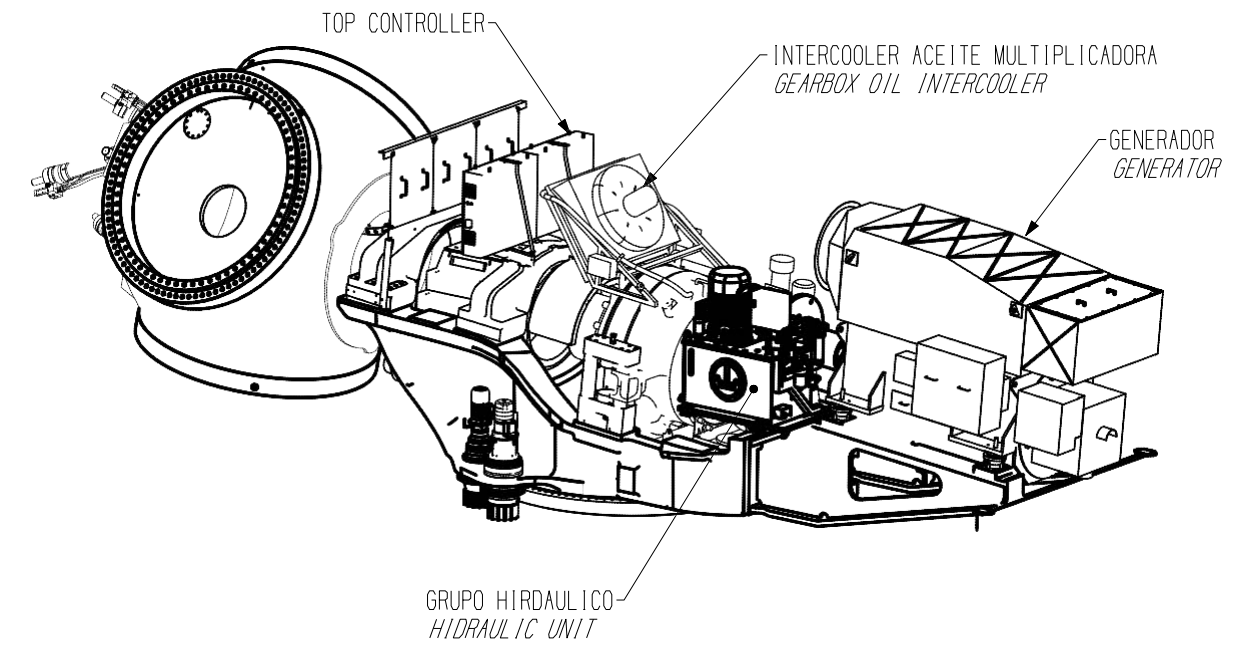
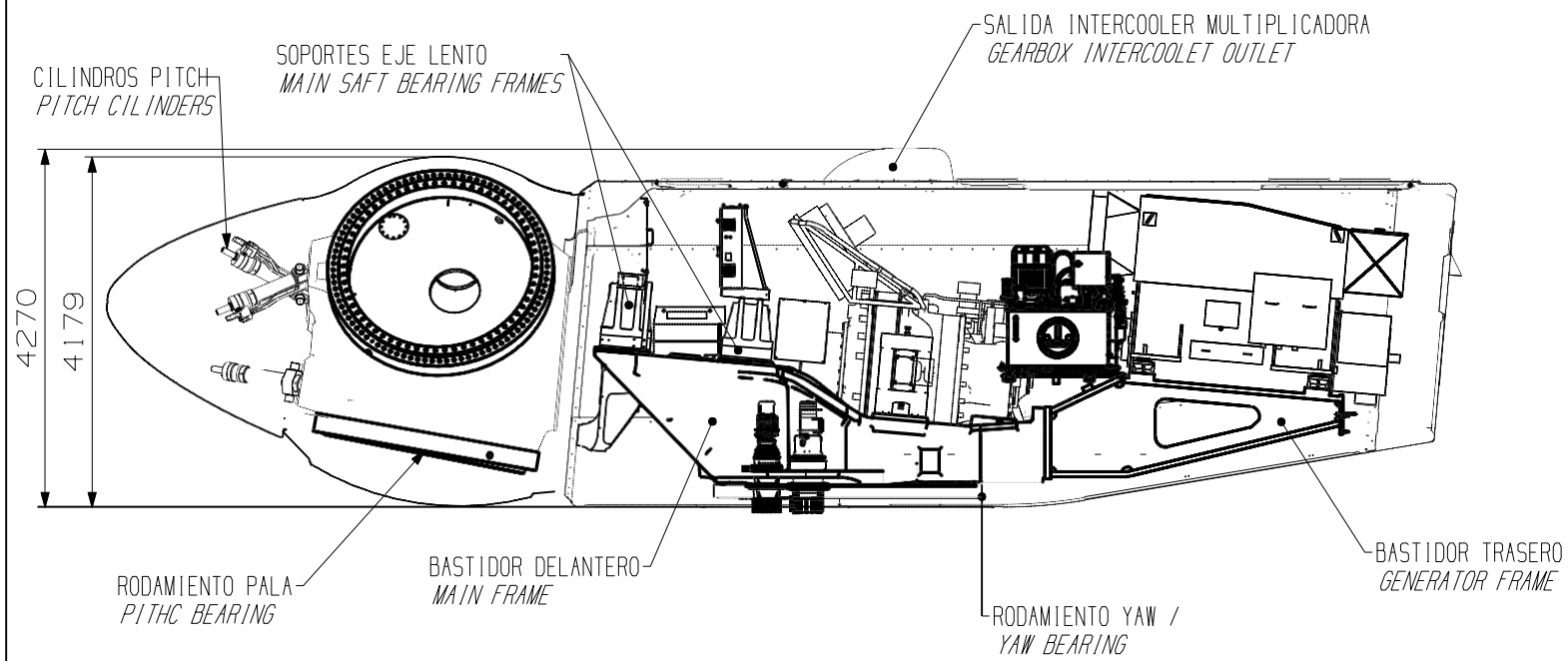


Figure N° 6 Rotor marking

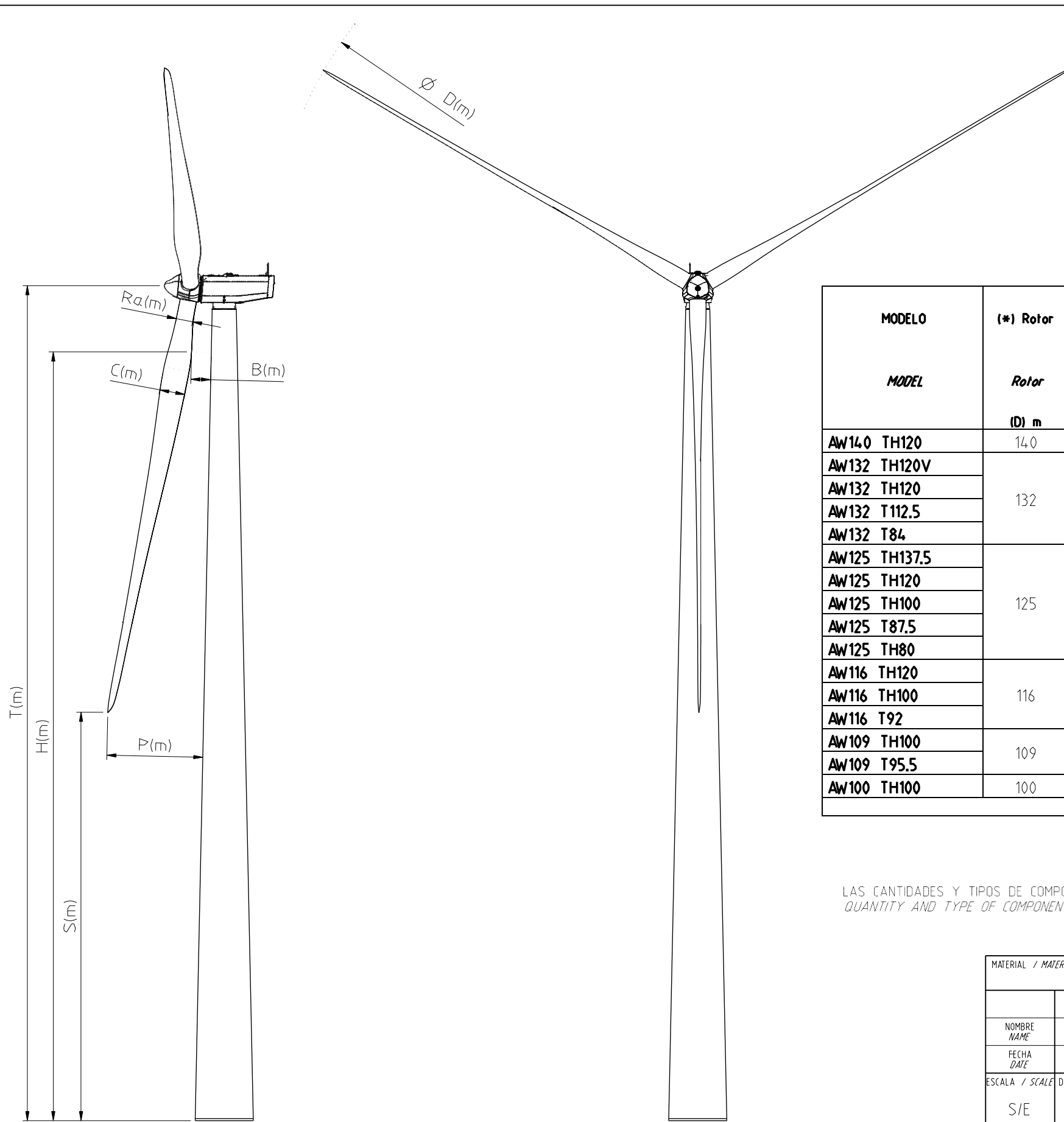


LAS CANTIDADES Y TIPOS DE COMPONENTES DE LAS IMAGENES MOSTRADAS PUEDEN VARIAR EN FUNCION DEL MODELO DE AEROGENERADOR / QUANTITY AND TYPE OF COMPONENTS MAY CHANGE DEPENDING ON WINDTURBINE MODEL

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	16-05-2017	16-05-2017			
FECHA / DATE	16-05-2017	16-05-2017			
ESCALA / SCALE	DENOMINACIÓN				
DISPOSICION EQUIPOS NACELLE AW3000					
NAME					
AW3000 NACELLE EQUIPMENT ARRANGEMENT					
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PLANO Nº / DRAWING Nº: DG200237
 REVISIÓN / REVIEW: E
 HOJA Nº / SHEET Nº: 1-1
 FORMATO / FORMAT: A3





MODELO <i>MODEL</i>	(*) Rotor <i>Rotor</i> (D) m	(*) Altura buje <i>Hub height</i> (T) m	(*) Pala-torre (Mínima distancia) <i>Blade-tower</i> (Minimum distance) (B) m	(*) Raíz de pala <i>Blade root</i> (Ra) m	(*) Cuerda pala máxima <i>Maximum blade chord</i> (C) m	(*) Pala-suelo (a mínima distancia pala-torre) <i>Blade-ground</i> (at minimum distance blade-tower) (H) m	(*) Punta pala-torre <i>Blade tip-tower</i> (P) m	(*) Punta pala-suelo <i>Blade tip-ground</i> (S) m
AW140 TH120	14.0	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	DESCRIPCIÓN 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	FECHA DATE	FECHA DATE	FECHA DATE	PLANO Nº / DRAWING Nº		
27-02-2018	27-02-2018	27-02-2018	27-02-2018	DG200274	REVISIÓN / REVIEW	
ESCALA / SCALE		DENOMINACIÓN				HOJA Nº / SHEET Nº
S/E		PL. GENERAL AEROGENERADOR AW3000				1-1
		NAME				FORMATO / FORMAT
		GENERAL ARRANGEMENT OF AW3000				A3
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Annex C.02.4

Schedule of Planned Preparations for Project Development

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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.

CHAPTER 03.



Environmental Baseline

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CHAPTER 03. Environmental Baseline

Index

1. INTRODUCTION 3
2. Update Reports and Environmental Baseline Amplification

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<p>Doc. N° CEEN-IA-2655-08/18</p>		<p>Date 15/08/2018</p> <p>Rev: A</p> <p>Page 3 of 5</p>

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).

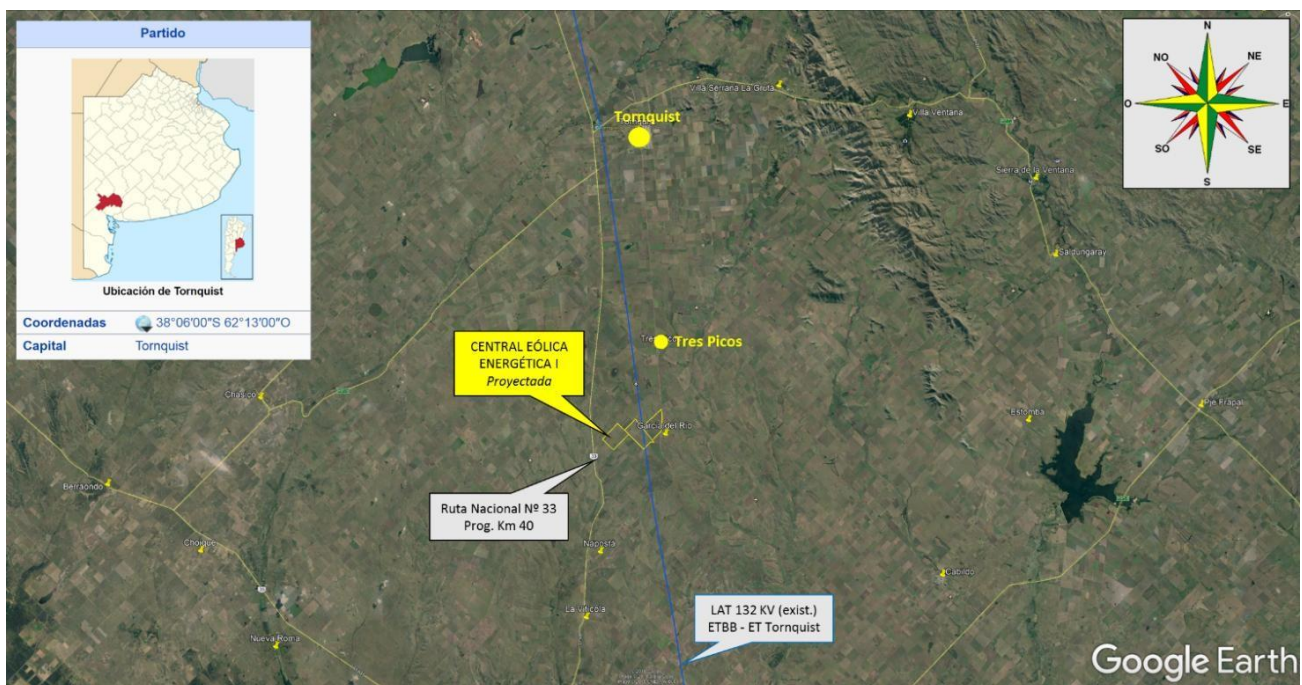




Figure N° 1 Google Image with the geographical location of the Project.



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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.

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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

Baseline Report: 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: Asteraceae, Oxidaceae, Malvaceae and from the Verbenaceae 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.

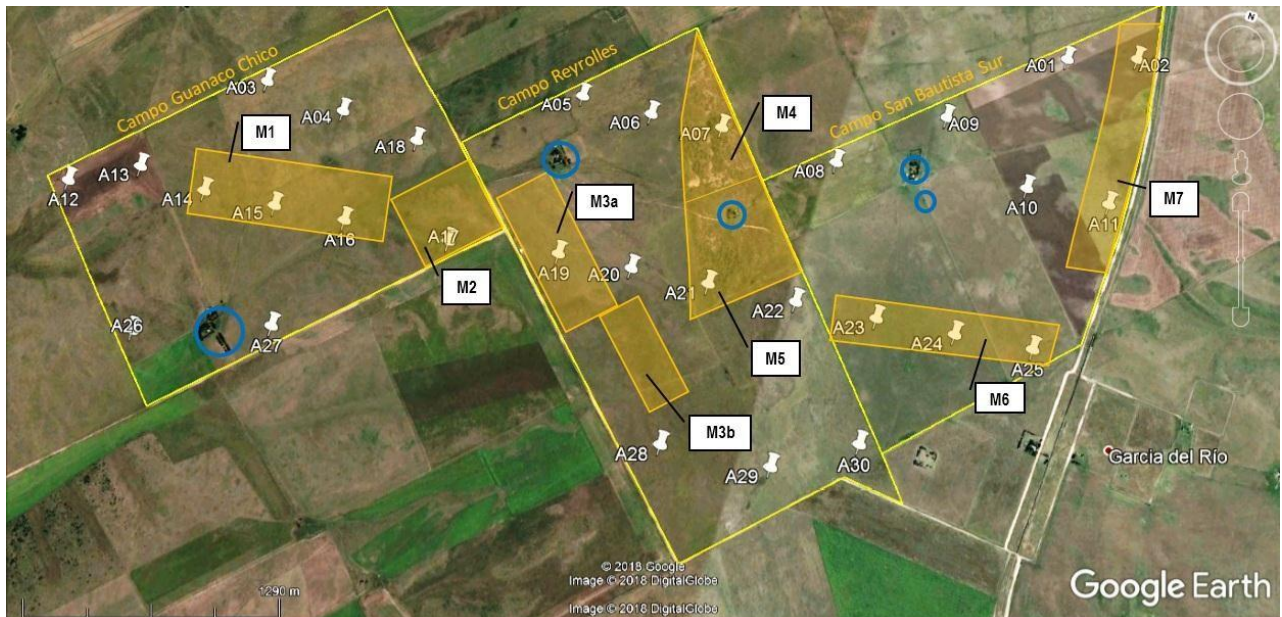


Figure 1- Image of the sector where the wind turbines of the Energetic Wind Center I Project will be located. The different lots are detailed: Campo Guanaco Chico, Reyrolles y San Bautista Sur (yellow-framed), location of the wind turbines (white), and sampling sites (M1 to M79). Blue circles point out 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*, *Panicum*, *Bromus*, *Melica* and *Bothriochloa*.
- Shrubs: presence of *Prosopidastrum angusticarpum*, *Discaria americana*, *Baccharis* spp., *Acanthoscyclus 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 Australes 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
<i>Acaena myriophylla</i>	0	0	0	0	0	0	1	native	VU	sub shrub	Rosaceae
<i>Adesmia incana</i>	0	0	0	0	1	0	0	native	VU	perennial herb	Fabaceae
<i>Amelichloa caudata</i>	1	50%	30%	20%	0	0	50%	native	IN:	perennial herb	Poaceae
<i>Anemone decapetala</i>	0	0	0	1	0	0	0	native	VU	perennial herb	Ranunculaceae
<i>Aphanes parodii</i>	0	1	1	1	0	0	1	native	NP	annual herb	Rosaceae
<i>Baccharis ulicina</i>	1	0	0	1	0	0	1	native	NP	sub shrub	Asteraceae
<i>Bipinnula pennicillata</i>	0	0	0	1	0	0	0	native	CR	perennial herb	Orchidaceae
<i>Bothriochloa barbinodis</i>	0	1	1	0	0	1	0	native	NP	perennial herb	Poaceae
<i>Bowlesia incana</i>	80%	1	0	1	1	0	1	native	NP	annual herb	Apiaceae
<i>Bromus cf aulethicus</i>	0	0	0	0	0	1	1	native	IN:	perennial herb	Poaceae
<i>Cardus thoermeri</i>	0	1	0	0	0	0	0	adventicia	_	perennial herb	Asteraceae
<i>Carex bonariensis</i>	1	0	0	1	0	0	0	native	VU	perennial herb	Cyperaceae
<i>Centaurea sp.</i>	1	0	0	0	0	1	1	adventicia	_	perennial herb	Asteraceae
<i>Centunculus minimus</i>	0	0	0	1	0	0	0	adventicia	_	annual herb	Primulaceae
<i>Chaptalia cf integerrima</i>	0	0	1	0	0	1	1	native	VU	perennial herb	Asteraceae
<i>Chevreulia sarmentosa</i>	1	1	1	1	0	0	0	native	NP	perennial herb	Asteraceae
<i>Cliococca selaginoides</i>	0	0	0	0	1	0	0	native	VU	perennial herb	Linaceae
<i>Conyza sp.</i>	1	1	0	0	0	0	0	native	SD	perennial herb	Asteraceae

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

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

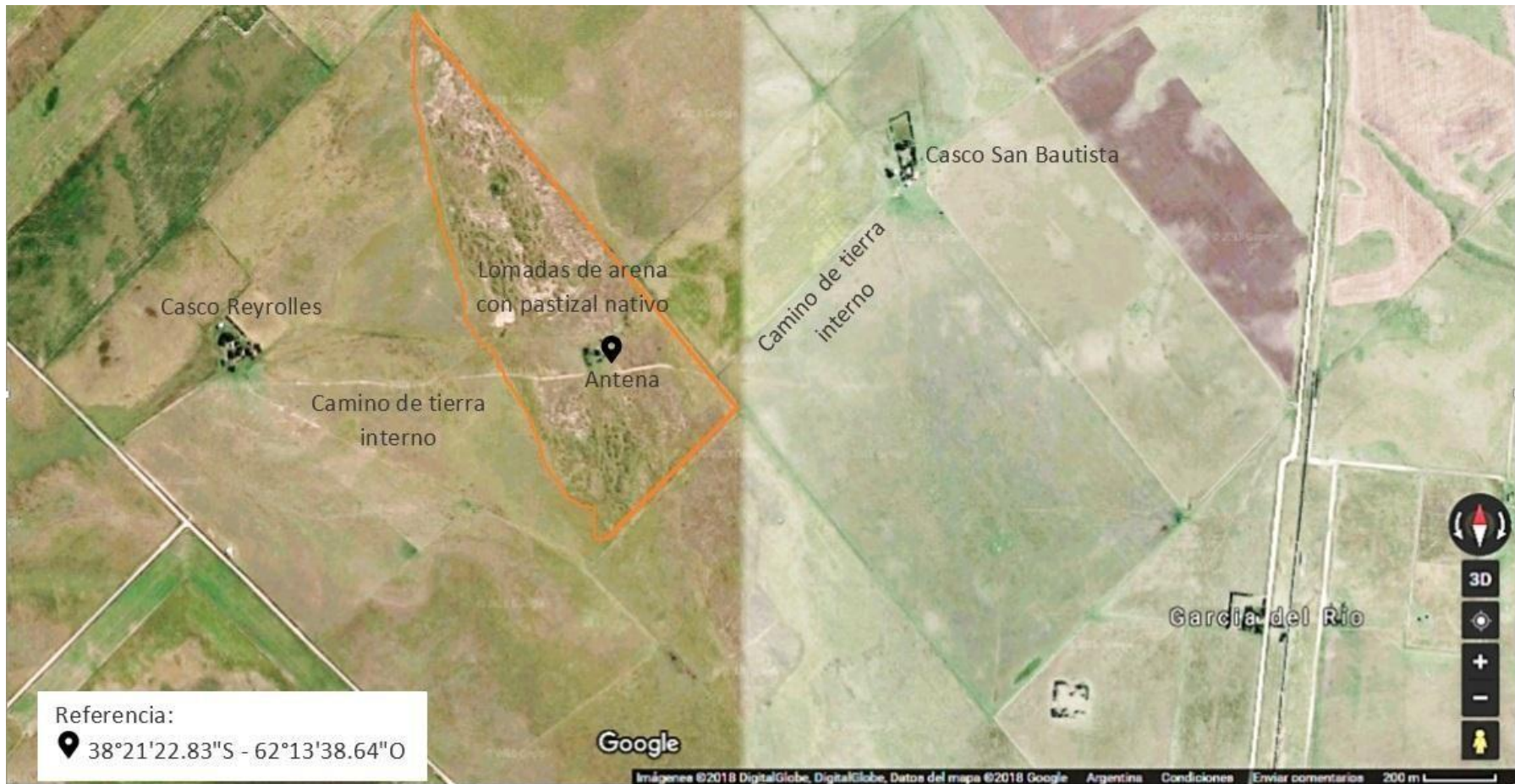




Figure 4- Guanaco Chico Field, sector M1, correspondent to cultivated field.



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 pencil 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 or threatened plants which grow in sites with future modification. (Rosselló-Graell 2002). In this case, it is recommended to do the assisted 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 majority 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).

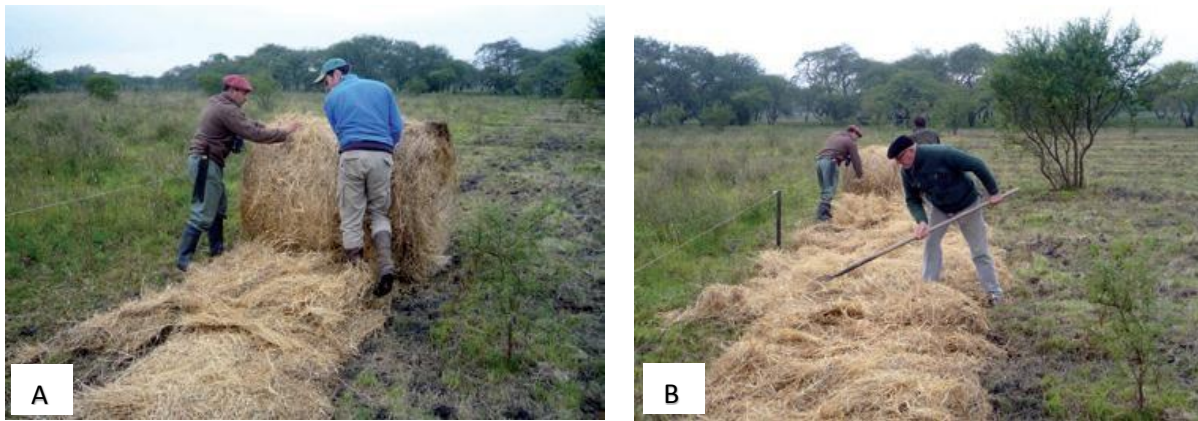


Figure 14- Recovering of degraded soil from rolls of native pastures cultivated in places with grassland of good quality. A- The rolls are dismantled on the ground to be treated. B- Then it is dispersed by hand to get a better distribution of the seeds. (Source: Casillo & Marino 2012).

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
<ul style="list-style-type: none"> Observe that the vegetable cover advances in areas that have been left with bare land. 	Immediately after the construction process.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> If translocation or replanting measures have been applied, check their implantation and installation. <u>are successful.</u> 	Months after the remediation action.

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PlanEAR. URL: <http://www.lista-planear.org/>

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 N° 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.

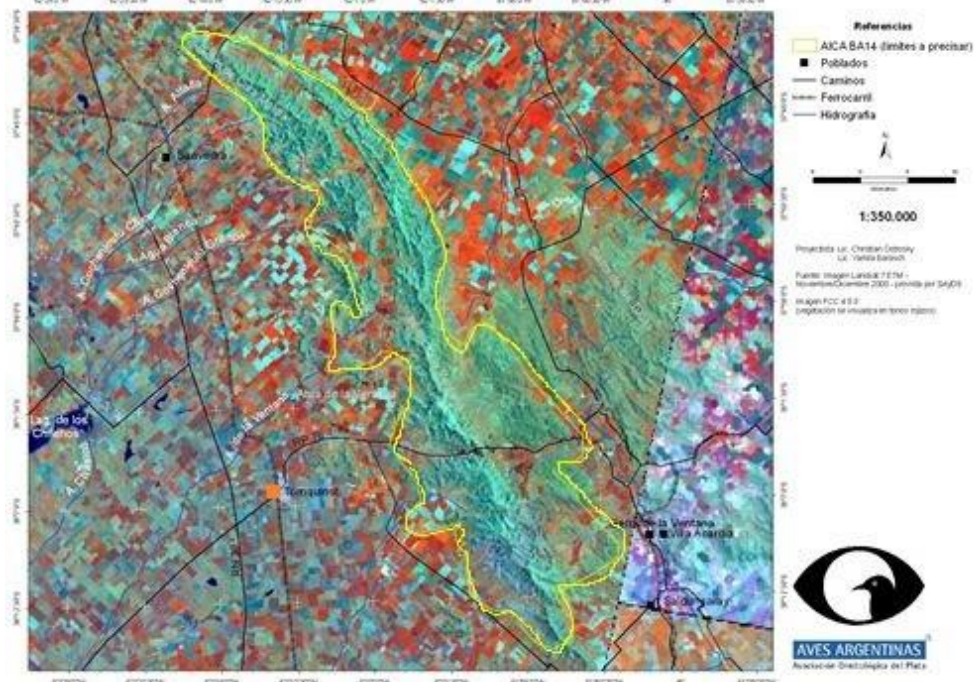


Figure 2. AICA BA14 Sierras Australes de Buenos Aires.

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

Pirincho	<i>Guira guira</i>	R	NA	LC
Lechuza de Campanario	<i>Tyto alba</i>	R	NA	LC
Lechucita Vizcachera	<i>Athene cunicularia</i>	R	NA	LC
Carpintero Campestre	<i>Colaptes campestris</i>	R	NA	LC
Bandurrita Común	<i>Upucerthia dumetaria</i>	Mp	NA	LC
Hornero	<i>Furnarius rufus</i>	R	NA	LC
Leñatero	<i>Anumbius annumbi</i>	R	NA	LC
Pico de Plata	<i>Hymenops perspicillatus</i>	Mp	NA	LC
Golondrina Ceja Blanca	<i>Tachycineta leucorrhoa</i>	Mp	NA	LC
Ratona Común	<i>Troglodytes aedon</i>	R	NA	LC
Calandria Grande	<i>Mimus saturninus</i>	R	NA	LC
Cachirla Común	<i>Anthus correndera</i>	Mp	NA	LC
Misto	<i>Sicalis luteola</i>	R	NA	LC
Chingolo	<i>Zonotrichia capensis</i>	R	NA	LC
Cachilo Ceja Amarilla	<i>Ammodramus humeralis</i>	R	NA	LC
Verdón	<i>Embernagra platensis</i>	R	NA	LC
Loica Común	<i>Sturnella loyca</i>	R	NA	LC
Cabecita Negra Común	<i>Carduellis magellanica</i>	R	NA	LC
Gorrión	<i>Passer domesticus**</i>	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	<i>Bartramia longicauda</i>	Mn	VU	LC
Loica Pampeana	<i>Sturnella defilippi</i>	Mp	AM	VU
Gavilán Planeador	<i>Circus buffoni</i>	R	VU	LC
Monjita Castaña	<i>Neoxolmis rubetra</i>	Mp	VU	LC
Espartillero Pampeano	<i>Asthenes hudsoni</i>	Mp	AM	VU
Tachurí Canela	<i>Polystictus pectoralis</i>	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 they 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 infrastructure 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 exploitation 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 alteration 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 pursued (Canevari y Vaccaro, 2007).

The Vizcacha (*Lagostomus maximus*) present in the site. It is abundant and without any problem of conservation mainly in the national range, but in the Buenos Aires Province has almost disappeared 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 Recommendations 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.

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

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Chapter 04

Specific Studies

Chapter 04 Specific Studies

Index

1. INTRODUCTION 3
2. Annex C.04 3

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Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date: 15/08/2018 Rev: A Page 3 of 3

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

1.	INTRODUCTION	3
2.	ESTIMATE ON THE AFFECTED SURFACE	4
2.1.	PREPARATORY STAGE OF THE SITE AND CONSTRUCTION	4
2.2.	OPERATIVE STAGE AND MAINTENANCE	5
3.	SERVICES	5

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)

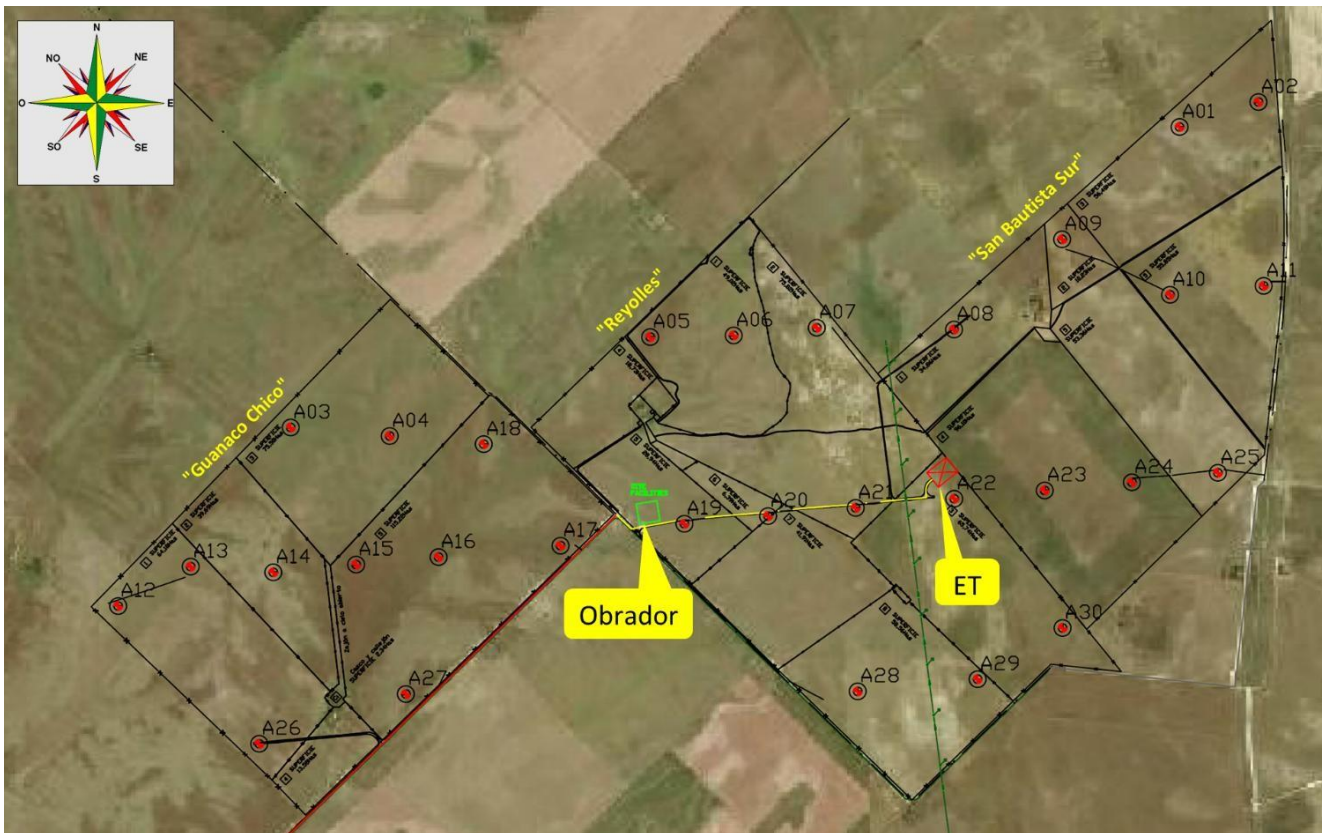




Figure N° 1 Google Image with the location of the facilities necessary for the project.

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<p>Doc. N° CEEN-IA-2655-08/18</p>	N° 2 Wind Energy Centre 1	<p>Date: 15/08/2018 Rev: A Page 4 of 5</p>

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.

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Doc. N° CEEN-IA-2655-08/18	N° 2 Wind Energy Centre 1	Date: 15/08/2018 Rev: A Page 5 of 5

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.

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<p>Doc. N° CEEN-IA-2655-08/18</p>		<p>Date: 15/08/2018 Rev: A</p>

Annex C.04.2

ANALYSIS OF NOISE EFFECTS PRODUCED BY WIND TURBINES

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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:

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, CO:

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

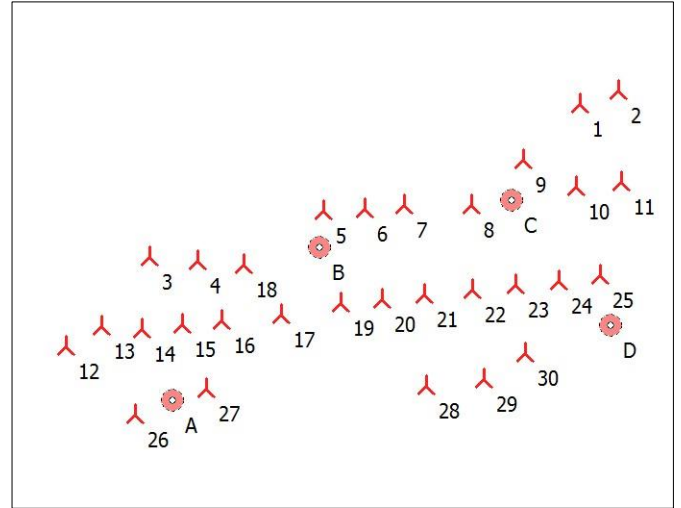
Deviation from "official" noise demands. Negative is more

restrictive, positive is less restrictive.:

0.0 dB(A)

WTGs

	Easting	Southing	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data		Wind speed [m/s]	LwA_ref [dB(A)]	Pure tones	
					Valid	Manufact.	Type-generator				Creator	Name				
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	5,754,771	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	566.681	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	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

No.	Name	Easting	Southing	Z [m]	Imission height [m]	Demands		Distance to noise demand [m]	Demands fulfilled ?	
						Noise [dB(A)]	Sound level From WTGs [dB(A)]		Noise	Yes
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	

Project:

20180525_AR_TresPicos_MAG_05

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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

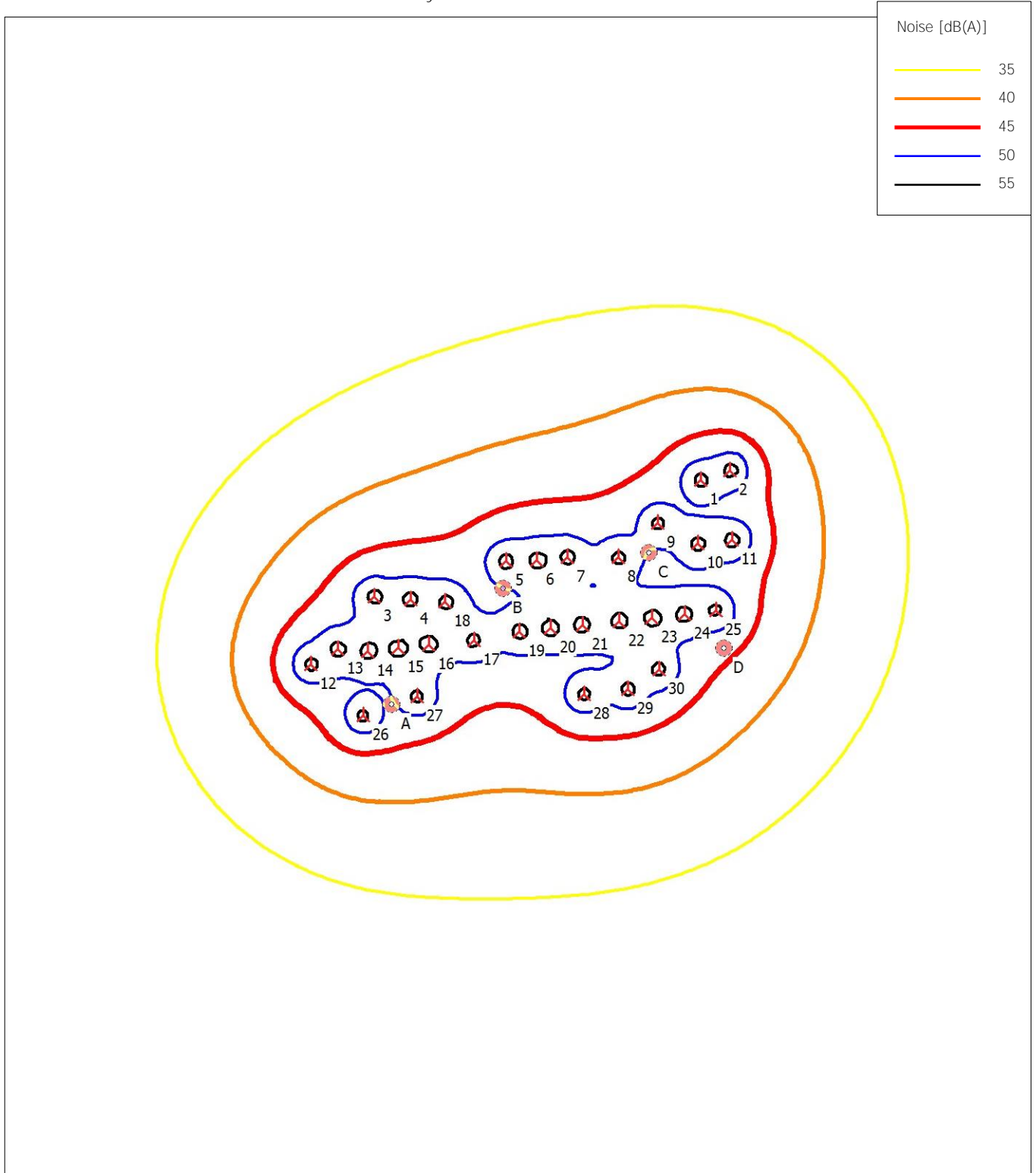
Calculation: 20180911_AR_Tres Picos_Noise study_R05-V11

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

DECIBEL - Map 8.8 m/s

Calculation: 20180911_AR_Tres Picos_Noise study_R05-V11





0 1 2 3 4 km

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

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Annex C.04.3

ANALYSIS OF SHADOW EFFECTS PRODUCED BY WIND TURBINES

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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.

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

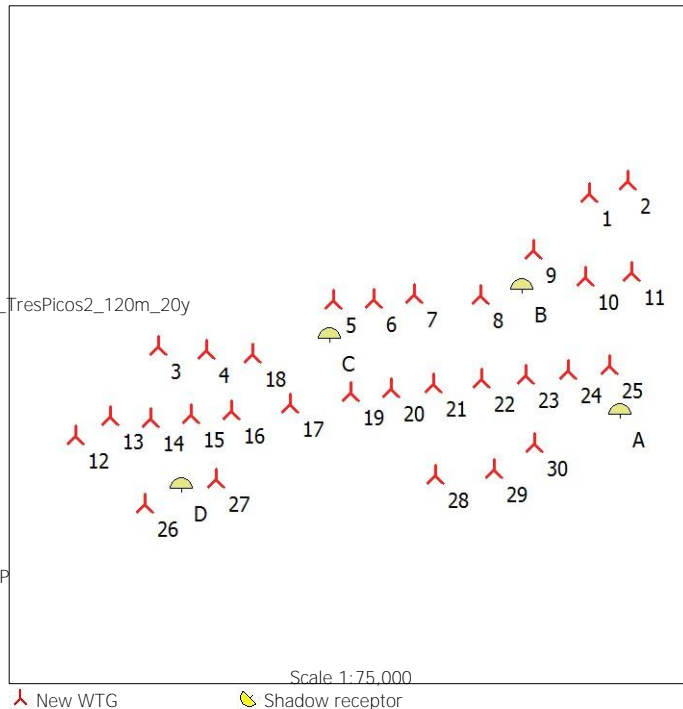
Operational hours are calculated from WTGs in calculation and wind distribution: WASP_TresPicos2_120m_20y

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				Noise data			
				Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	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

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

Shadow receptor-Input

No.	Easting	Southing	Z	Width	Height	Elevation	Degrees from	Slope of	Direction mode	Eye height
			[m]	[m]	[m]	a.g.l.	south cw	window		(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, expected values	
	Shadow hours per year	Shadow days per year	Max shadow hours per day	Shadow hours per year
	[h/year]	[days/year]	[h/day]	[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

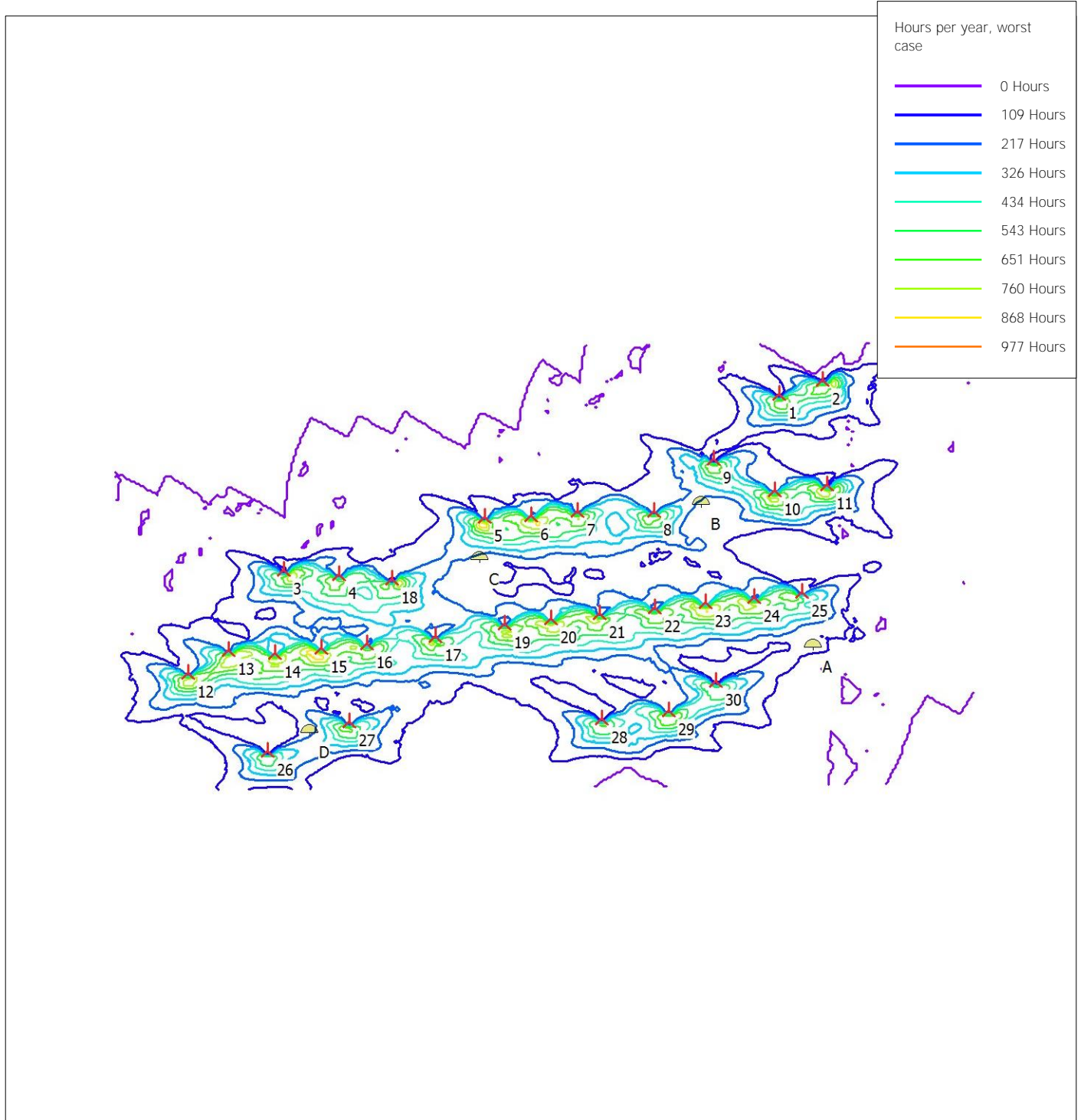
Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case	Expected
		[h/year]	[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.

SHADOW - Map

Calculation: 20180924_AR_Tres Picos_Noise R05-V11_Shadow



0 500 1000 1500 2000 m

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

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ANALYSIS OF LOW FREQUENCY FIELDS AND THE CORONA EFFECT

Index

1.	INTRODUCTION	3
2.	ANALYSIS FO CE, CM, RI AND RA OF ELECTRODUCTS IN 132 KV	4
2.1	ELECTRIC FIELD	4
2.2	MAGNETIC FIELD	5
2.3	RADIO INTERFERENCE AND AUDIBLE NOISE	6
2.3.1.	RADIO INTERFERENCE	7
2.3.2.	AUDIBLE ACOUSTIC NOISE	8
3.	ANALYSIS OF ELECTROMAGNETIC FIELDS OF LOW FREQUENCY IN THE WIND ENERGY PARK	9
3.1	ELECTRIC FIELD	10
3.2	MAGNETIC FIELD	10
4.	CONCLUSIONS	11
5.	BIBLIOGRAPHIC REFERENCIES	11

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date: 15/08/2018 Rev: A Page 3 of 12</p>

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.

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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 electromagnetic 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).

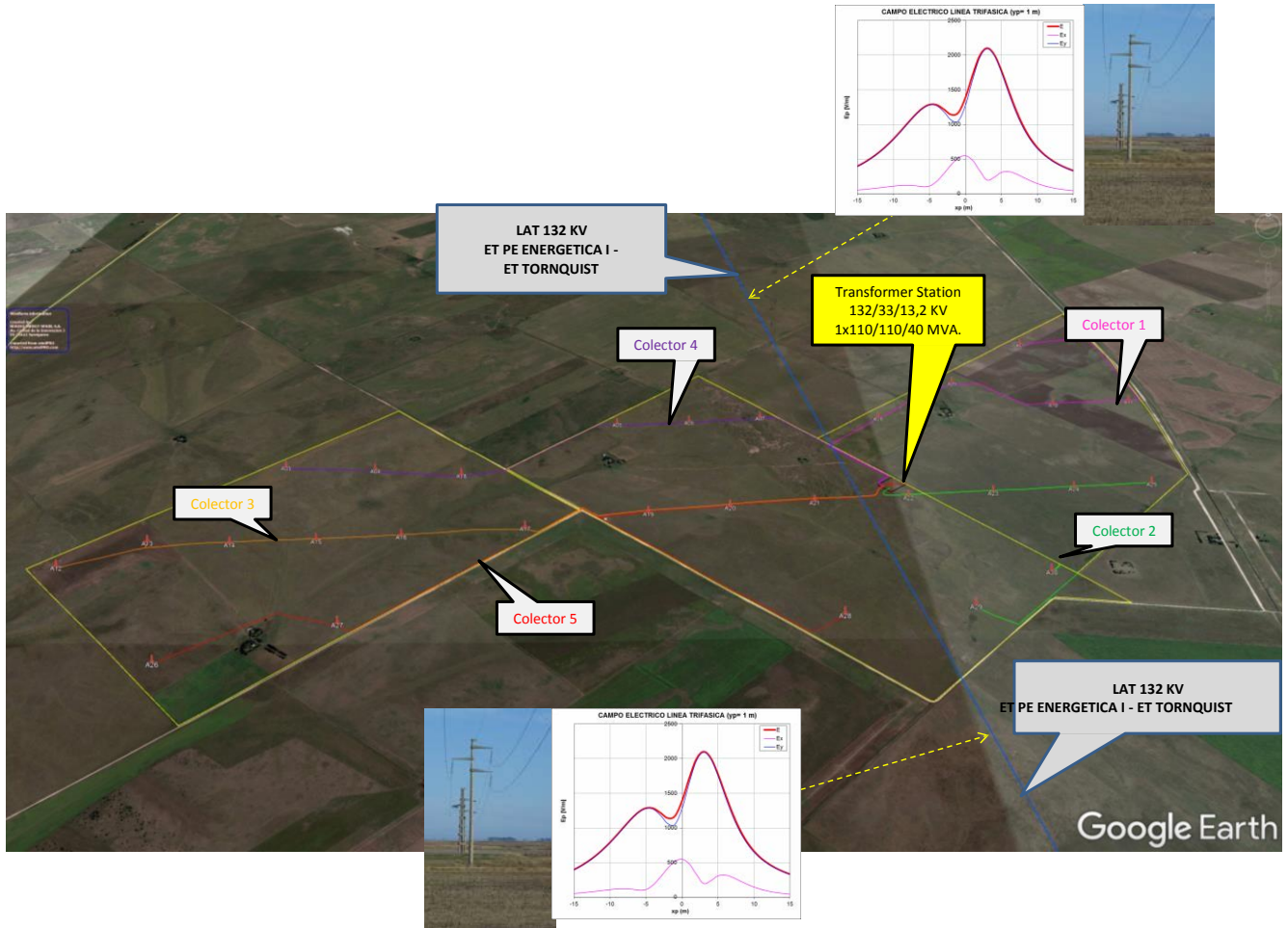


Figure N° 1

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.

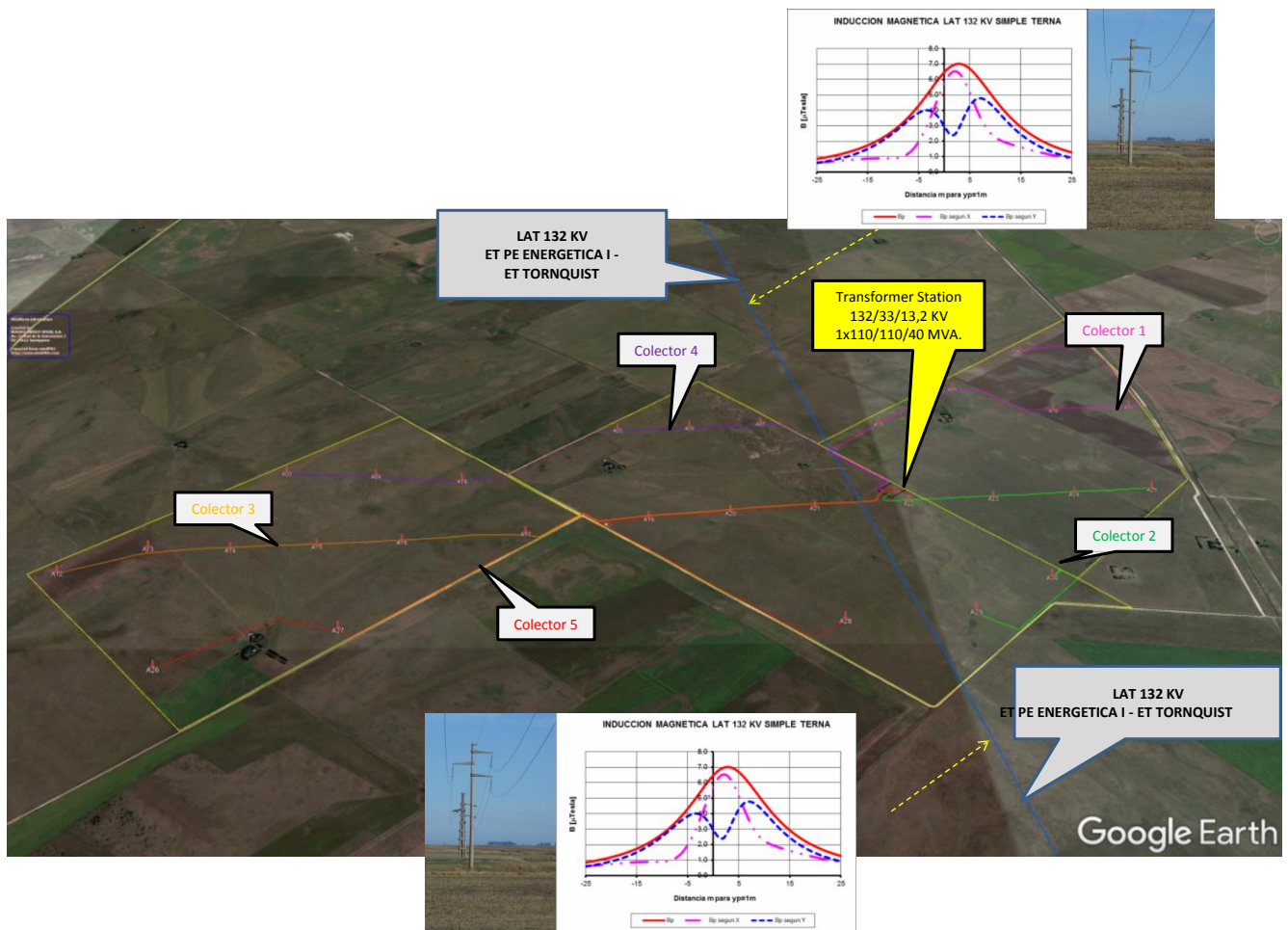




Figure N° 2

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

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date: 15/08/2018 Rev: A Page 7 of 12</p>

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.

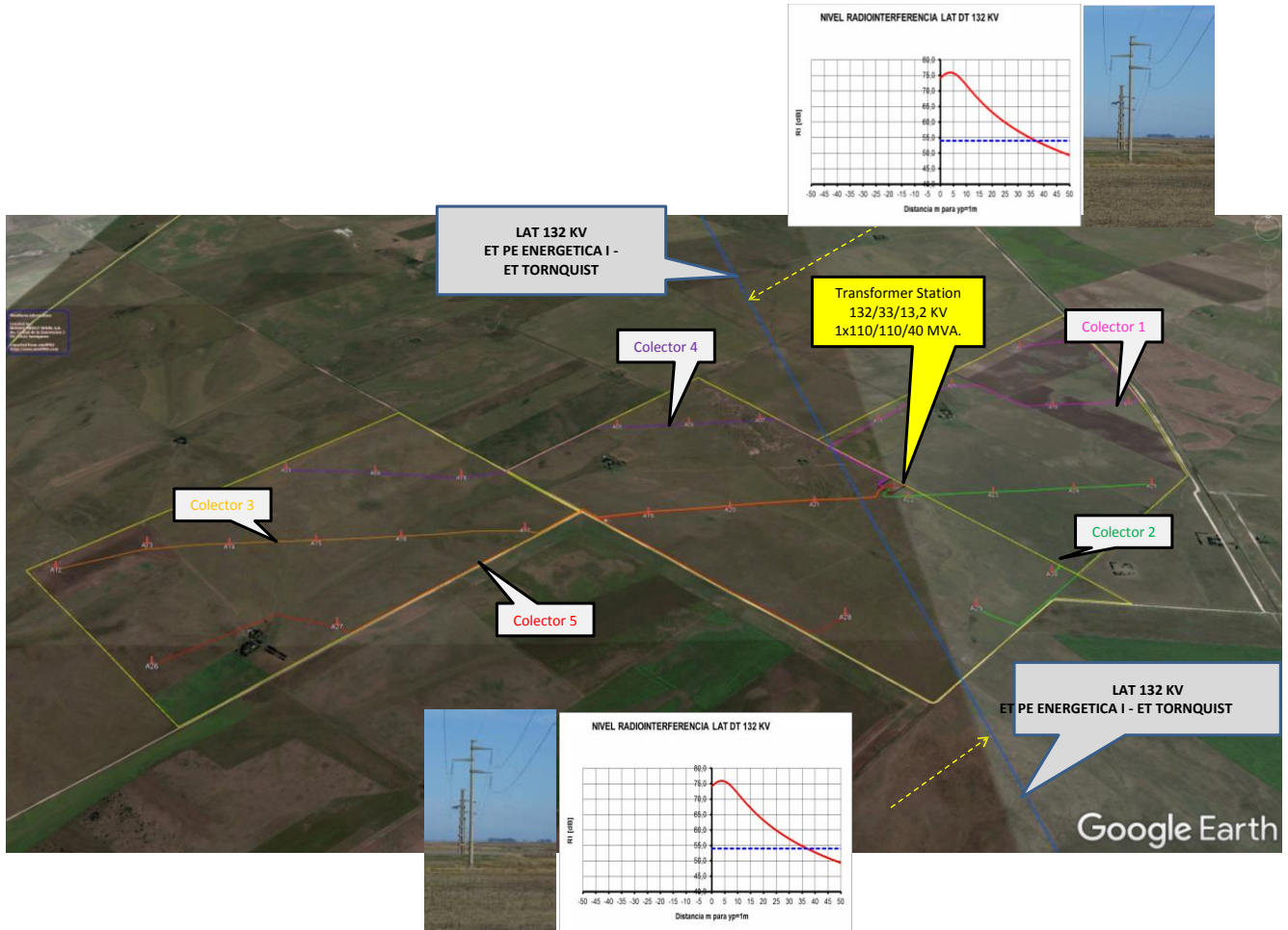


Figure N° 3

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.

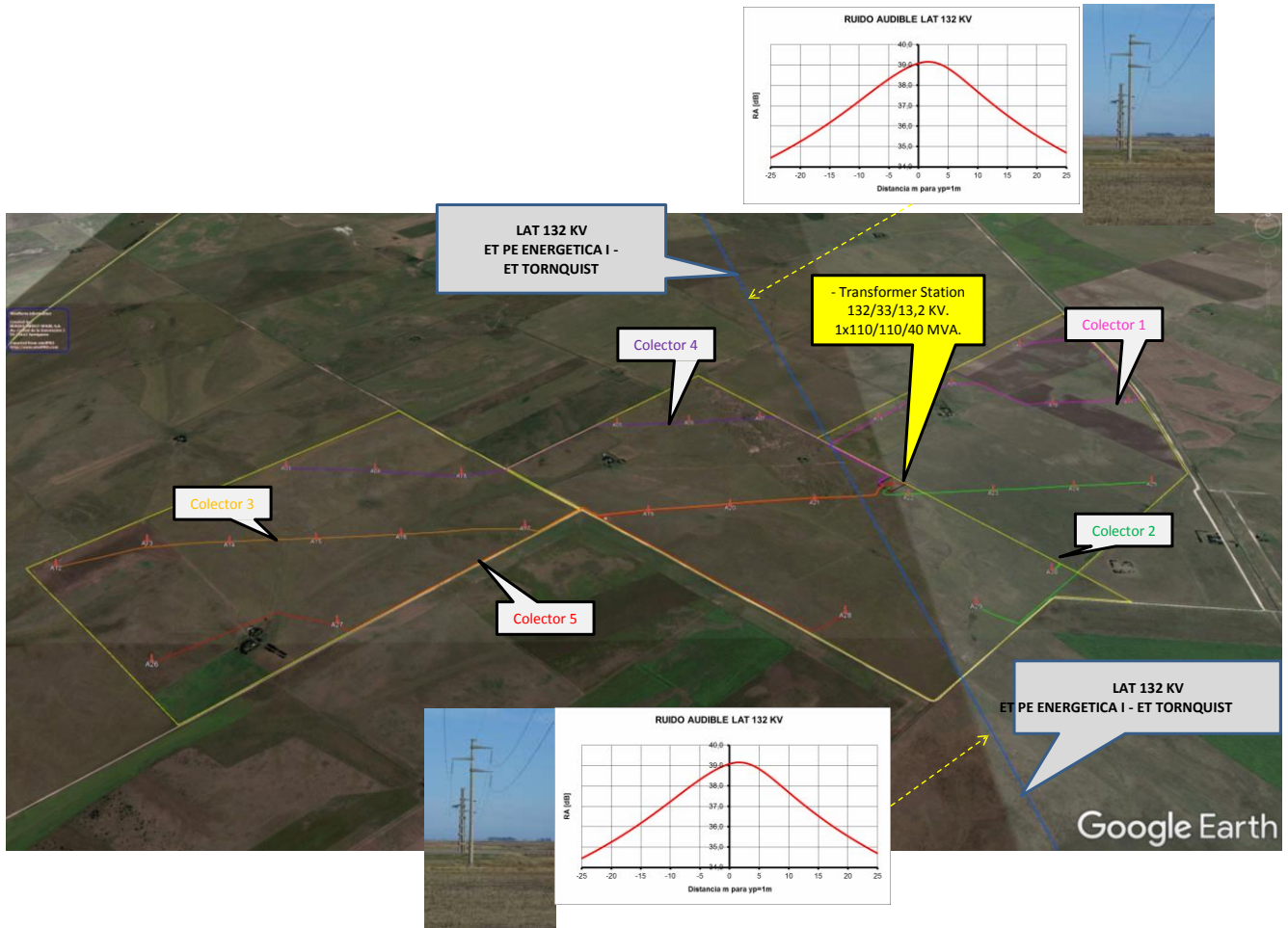


Figure N° 4

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.

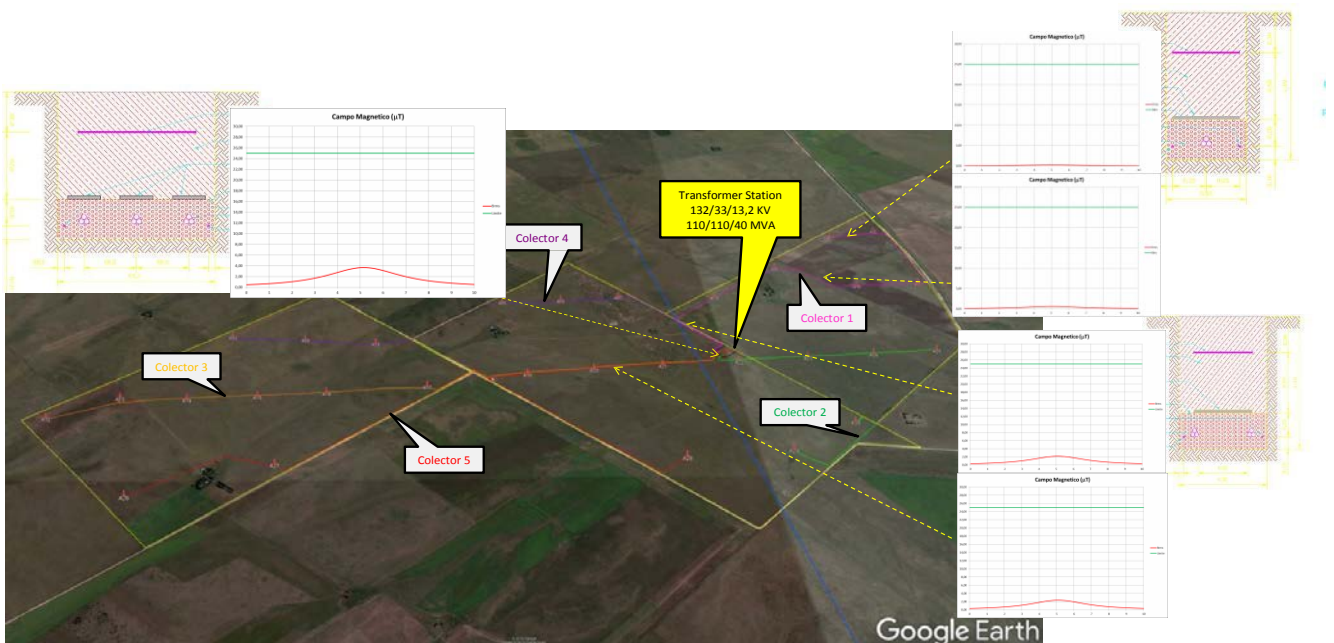




Figure N° 5

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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 μ T, quite under the limit of 25 μ T 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.

5. BIBLIOGRAPHIC REFERENCIES



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Annex C.04.5

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

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

Index

1.	INTRODUCTION.....	3
2.	CONTRIBUTION OF "CLEAN" ELECTRIC ENERGY PRODUCTION TO THE REGIONAL SYSTEM.....	3
3.	CONCLUSION	5

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								
	Residencial	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								
	Residencial	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.

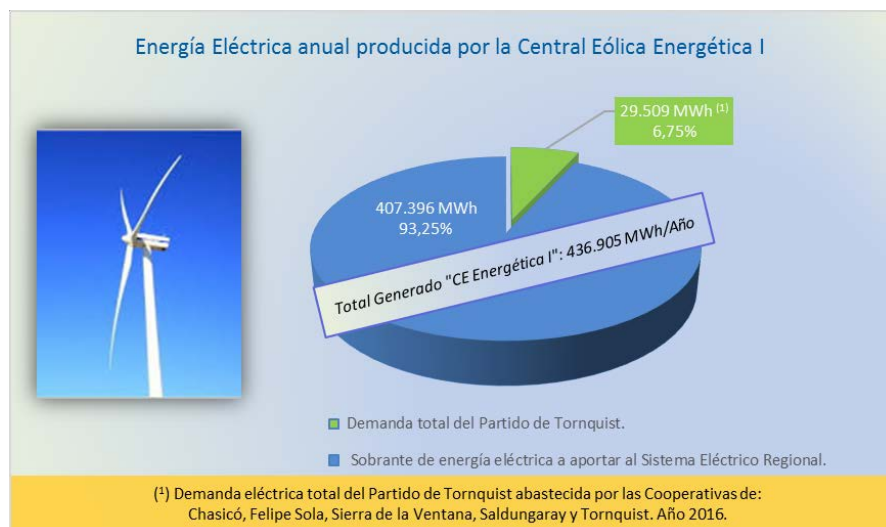




Figure N° 1 Effect of the Contribution of "Clean" Electric Energy in the Regional System

Annex C.04.6



Analysis of the Possible Contribution in Reduction of Emission Factors

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ANALYSIS OF THE POSSIBLE CONTRIBUTION IN REDUCTION OF EMISSION FACTORS

Index

1.	INTRODUCTION	3
2.	OBJECTIVE	3
3.	METHODOLOGY	3
3.1.	DATA USED FOR THE ESTIMATION	4
3.1.1.	Lower calorific value of the fuels	4
3.1.2.	Emission factors by fuel type	4
3.1.3.	Thermal generation and fuel consumption	4
4.	ANALYSIS OF THE POSSIBLE CONTRIBUTION IN REDUCTION OF EMISSION FACTORS	6

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Power Centre 1</p>	<p>Date: 15/08/2018 Rev: A Page 3 of 6</p>

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.

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<p>Doc. N° CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date: 15/08/2018 Rev: A Page 4 of 6</p>

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 Oil.	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 Oil.	21,25 (EPA)
Sub-bituminous 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 Oil. (tn)	Coal (tn)	Gas Oil.
2014	82,606	14,355,409	2,717,285	1,004,377	1,484,395

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Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date: 15/08/2018 Rev: A Page 5 of 6

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 Oil tn	Gas Oil 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 (NO_x), 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
NO _x	0.95
SO ₂	0.34
MP	0.03

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<p>Doc. N° CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date: 15/08/2018 Rev: A Page 6 of 6</p>

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

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<p>Doc. N° CEEN-IA-2655-08/18</p>		<p>Date: 15/08/2018 Rev: A Page 1 of 7</p>

Annex C.04.7



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

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<p>Doc. N° CEEN-IA-2655-08/18</p>		<p>Date: 15/08/2018 Rev: A Page 2 of 7</p>

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

Index

1.	OBJECTIVE.....	3
2.	INTRODUCTION.....	3
3.	METHODOLOGY.....	5
4.	DATA USED FOR THE ESTIMATION	5
4.1.	Lower calorific value of the fuels(LCV)	5
4.2.	Data of the Stations of Combined Cycle and conversion factors.....	6
4.3.	DATA ON THE CAPACITY OF METHANE TANKERS	6
5.	ESTIMATION OF EARNING OF METHANE TANKERS.....	6
6.	CONCLUSION	7

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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>Awareness Addendum N° 2</p>	<p>Date: 15/08/2018 Rev: A Page 3 of 7</p>

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 Cuatros, at 6Km approximately of Puerto Galván on the Northern 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 N° 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 Cycle, 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
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Doc. N° CEEN-IA-2655-08/18		Date: 15/08/2018 Rev: A Page 6 of 7

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 N° 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

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<p>Doc. N° CEEN-IA-2655-08/18</p>		<p>Date: 15/08/2018 Rev: A Page 7 of 7</p>

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.

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N° 2 Wind Power Centre 1</p>	
<p>Doc. N° CEEN-IA-2655-08/18</p>		<p>Date: 15/08/2018 Rev: A Page 1 of 44</p>

CHAPTER 05



ADDENDUM REPORT N°2

CHAPTER 05



ADDENDUM REPORT N°2

Index

1.	PRESENTATION	4
2.	ANTECEDENTS	4
3.	INTRODUCTION	5
4.	PUBLIC ENQUIRY DOCUMENTS	7
5.	DESCRIPTIVE MEMORY OF THE UPDATED PROJECT	7
5.1.	GENERAL ASPECTS RELATED TO THE UPDATED PROJECT	7
5.1.1.	Electric Energy Transport System	7
5.1.2.	Wind Farm	7
5.1.3.	Workroom	8
5.1.4.	Waste disposal and liquid effluent treatment	8
5.1.5.	Treatment of dangerous and/or chemical substances, others that will be stored in the site	
5.1.6.	Areas of lending materials	14
5.1.7.	Collection of aggregates	15
5.1.8.	Underground Water Resource Operation	15
6.	Evaluation Methodology on environmental impacts	16
7.	Information research	16
8.	Environmental Baseline	17
9.	Identification and Evaluation on environmental impact	17
9.1.	Identification of the stages of the Project	18
9.2.	Identification of the activities or actions of the Project	18
9.3.	Identification of the components of the Influential area	21
10.	Analysis of environmental impact related to the updated Project	21
10.1.	Environmental Impact related to the localization of components	23
10.1.1.	Soil use affectation and use of the space	23
10.2.	ENVIRONMENTAL IMPACT RELATED TO THE PRESENCE AND OPERATION OF WIND ENERGY TURBINES	25

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Power Centre 1	Date: 15/08/2018 Rev: A Page 3 of 44

10.2.1.	Analysis of Noise Effects produced by wind turbines	26
10.2.2.	Analysis of shadow effects (flickering) produced by wind turbines	28
10.2.3.	Affectation by Low Frequency Fields and the Corona Effect	30
10.2.4.	Affectation of flora and fauna	32
10.2.5.	Affectation of fauna	33
10.2.6.	Affectation of the landscape quality	34
10.2.7.	Affectation of aerial security	36
10.2.8.	Emission factors avoided to the atmosphere	37
10.2.9.	"Clean" electric energy production	38
10.2.10.	Wind Energy Turbine production on the earning of methane tankers	39
11.	Mitigation Actions and Environmental Management Plan	39
11.1.	Environmental Monitoring Program	41
12.	Conclusion	43
13.	Annex C.05	44

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	Study on Environmental Awareness Addendum N°	
<p>Doc. N° CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date: 15/08/2018 Rev: A Page 4 of 44</p>

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 N°: 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 <u>73 wind energy turbines</u> Trademark: Guodian United Power. Model: UP77-1500 KW. Rotor 77 meters Hub Height 80 meters Complementary:	Comprised by <u>31 wind energy turbines</u> Trademark: Siemens. Model: SWT 113-3,2 MW. Rotor 113 meters Hub Height 92.5 meters Complementary:	Comprised by <u>30 wind energy turbines</u> Trademark: Nordex-Acciona. Model: AW132/3300, TH120. Rotor 132 meters Hub Height 120 meters Complementary:

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	Study on Environmental Awareness Addendum N°	
<p>Doc. N° CEEN-IA-2655-08/18</p>	2 Wind Power Centre 1	<p>Date: 15/08/2018 Rev: A Page 5 of 44</p>

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	<p>1- Transformer Station (MT/AT)</p> <p>Level of Tension: 132/33/13,2 KV.</p> <p>Total Power Installed: 1x110/110/40 MVA.</p> <p>Length of access way to the ET: 1,585 Km (from neighborhood street).</p> <p>2- Opening of Overhead Power Line in High Voltage and bonding to ET (MT/AT)</p> <p>Level of Tension: 132 KV.</p> <p>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.</p> <p>Length of the installation hollow: 50 meters</p>
Wind Farm	<p>3- Total Power Installed: 99.75 MW.</p> <p>It will be conformed of 30 wind turbines Nordex-Acciona, model AW132/3300TH120 class IEC JIB and their complementary.</p> <p>Complementary:</p> <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> - Collector of Electrical Energy Network in 33 KV- - Earthing System. <p>System of Communication Network.</p>

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	<ul style="list-style-type: none"> ▪ 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 m². Noise level. 107,5 dB(A). 	<ul style="list-style-type: none"> ▪ 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 m². Noise level. 108,5 dB(A). Concrete and iron for foundation volume: 436 m³-33.2

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Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 7 of 44

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.

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Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 8 of 44

(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.

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p>	
<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 9 of 44</p>

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.







VERDE	AZUL	AMARILLO	NEGRO
			
Residuos Domésticos:	Residuos Reciclables y/o reutilizables:	Residuos Peligroso:	Residuos Peligroso:
Tela, papel, plásticos, cartones, residuos orgánicos, elementos de polietileno.	Papel y carton limpio y seco, plasticos (retazos de tuberías, cables), metales, maderas, cubiertas usadas, envases limpios.	Rostos de pintura, solventes, material sobrante y/o descartes de soldaduras.	Lubricantes, aceites, baterías, ácidos, trapos y estopas contaminados, materiales contaminados.
Almacenamiento transitorio:	Almacenamiento transitorio:	Almacenamiento transitorio:	Almacenamiento transitorio:
Bolsas en contenedores individuales con tapa. Deposito con tapas de material fácilmente lavable. Volqueta con lona impermeable.	Segregados en contenedores con tapa. Punto limpio o zona reciclable.	Tanques o depósitos estancos con tapa, y ficha de seguridad. Recintos de acopio.	Tanques o depósitos estancos con tapa, y ficha de seguridad. Recintos de acopio.
Transporte:	Transporte:	Transporte:	Transporte:
Servicio municipal y/o privados autorizados.	Recicladores intermediarios, contratistas, operadores.	Gestores autorizados	Gestores autorizados
Deposito final:	Deposito final:	Deposito final:	Deposito final:
Vertedero municipal	Reciclaje / Gestor autorizado	Gestores autorizados	Gestores autorizados

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

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p>	
<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 10 of 44</p>

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 recyclable 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:

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 11 of 44

- 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

 ICONO SRL <small>Tel: (0291) 4556484 - info@iconosrl.com.ar</small>	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 12 of 44

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

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p>	
<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 13 of 44</p>

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.

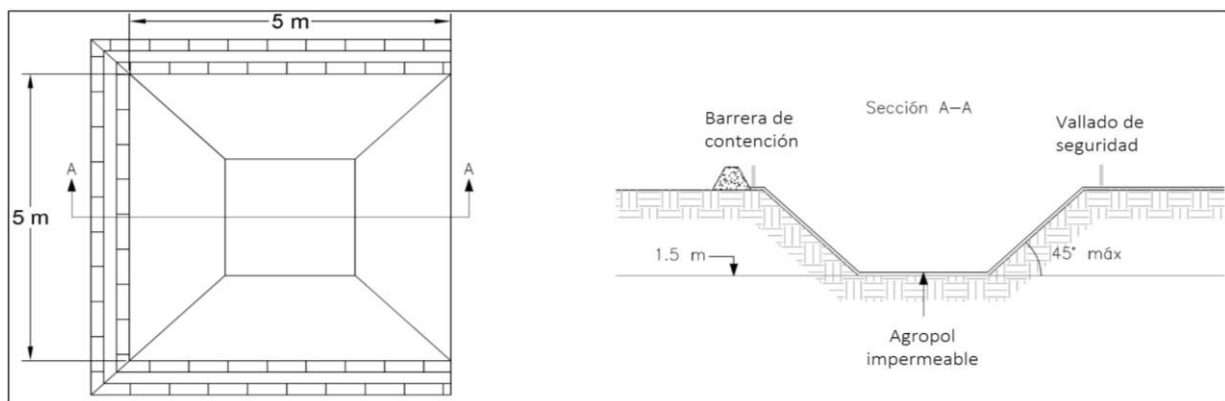




Figure N° 2 Sketch of the Decanting Pool.

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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 14 of 44

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).

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 15 of 44

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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 16 of 44

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 wind, 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).
- Resolution OPDS N° 2351/16 (2nd August, 2016). Corresponds to File N° 2145 - 9512/16.
- Notes, Declarations and documents associated to the Project (Town Hall of Tornquist, Ministry of Energy and Mining, ANAC, among others)

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 17 of 44

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

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 18 of 44

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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 19 of 44

- 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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 20 of 44

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 Water	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 04 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.



 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	Study on Environmental Awareness Addendum N°	
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 22 of 44



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
<ul style="list-style-type: none"> ▪ 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 m³. Total volume of concrete: 587 m³. Total quantity of iron: 62 tones. ▪ Mounting Platforms for the wind turbines. App Surface required: 2.200 m². 	<ul style="list-style-type: none"> ▪ 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 m³. Total volume of concrete: 436 m³. Total quantity of iron: 33,2 tones. ▪ Mounting Platforms for the wind turbines. App Surface required: 3.680 m².

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

Description	Addendum Project at EIA	Project Ad. N° 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%).

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 23 of 44

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 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

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 24 of 44

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
<ul style="list-style-type: none"> ▪ 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 m². Total Wind Farm: 310.000 m². 	<ul style="list-style-type: none"> ▪ 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 m². +37,2%. Total Wind Farm: 411.600 m². +32,8%. Color (blades, hub, trench, tower): RAL 7035 (light grey). Noise level. 108,5 dB(A). +0,9%.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 26 of 44

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 is 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, modulated 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(A), 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 N° 3).

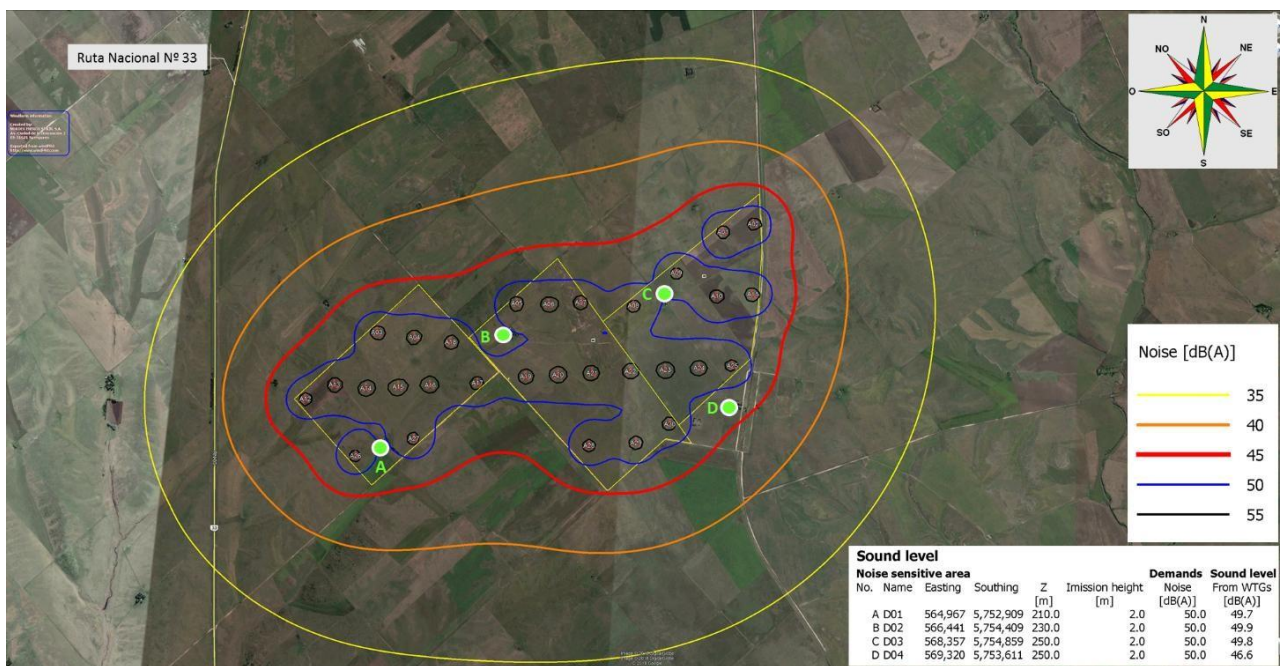




Figure N° 3 Map of noise emitted by the wind energy turbines of the Wind Energy Station.

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).

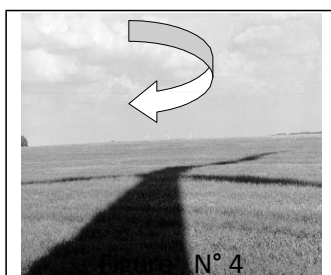
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<p>Doc. N° CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 28 of 44</p>

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 $Leq = 82 \text{ dB(A)}$.

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.



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).

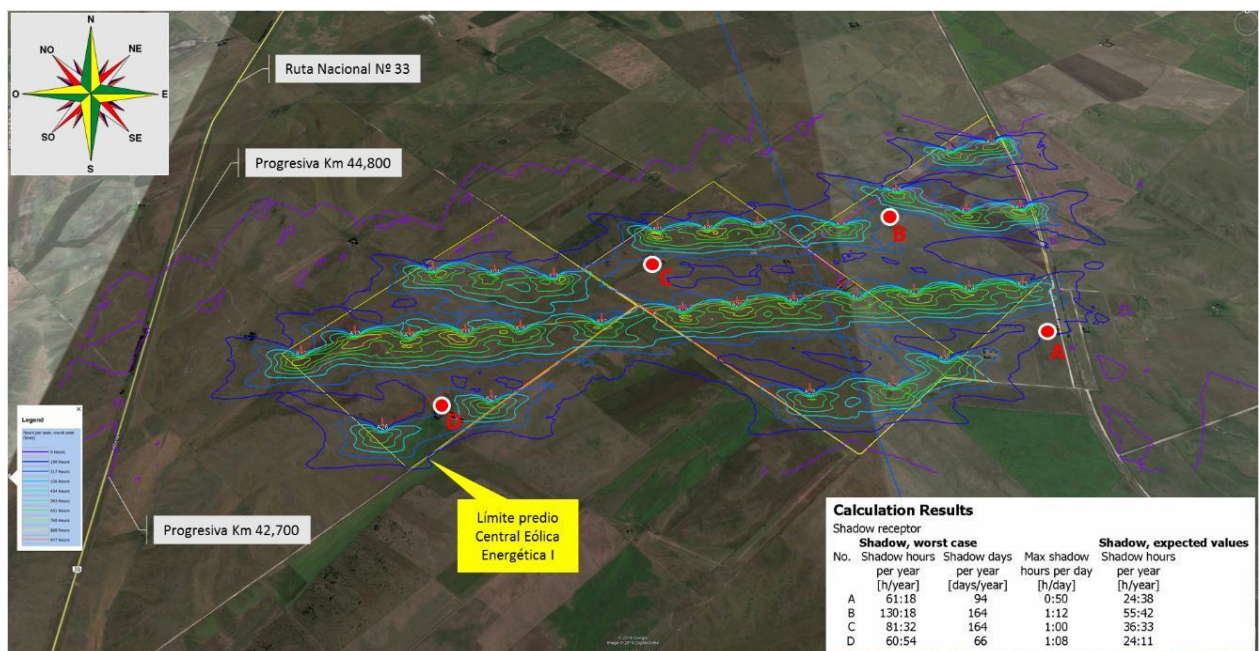




Figure N° 5 Map of shadows (flickering) emitted by the wind energy turbines of the Wind Energy Station. Source: Calculation software "WindPRO 3.2.712 by EMD International A/S, Noise.

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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 30 of 44

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.

 ICONO SRL <small>Tel: (0291) 4556484 - info@iconosrl.com.ar</small>	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 31 of 44

- 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 undertaken, 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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 32 of 44

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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 33 of 44

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.

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N° CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 34 of 44

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).

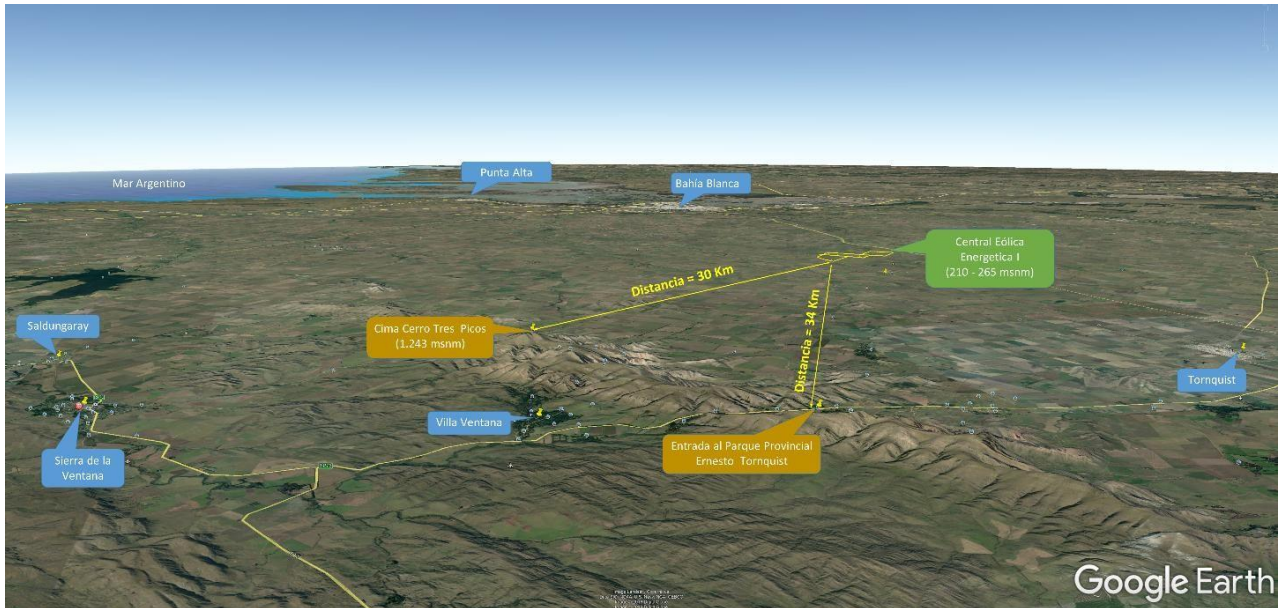
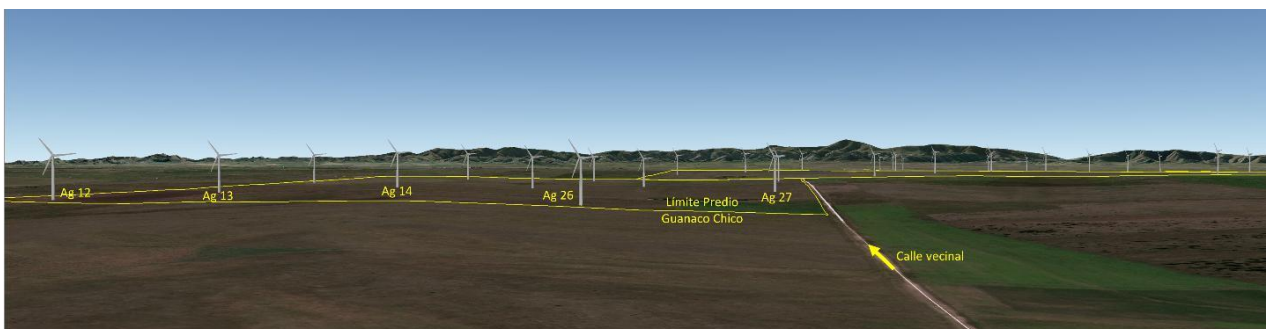


Figure N° 6 Google Image with the location of the Wind Energy Station projected, and the approximate distances to the summit of Cerro Tres Picos and to the entrance of the Part Ernesto Tornquist.

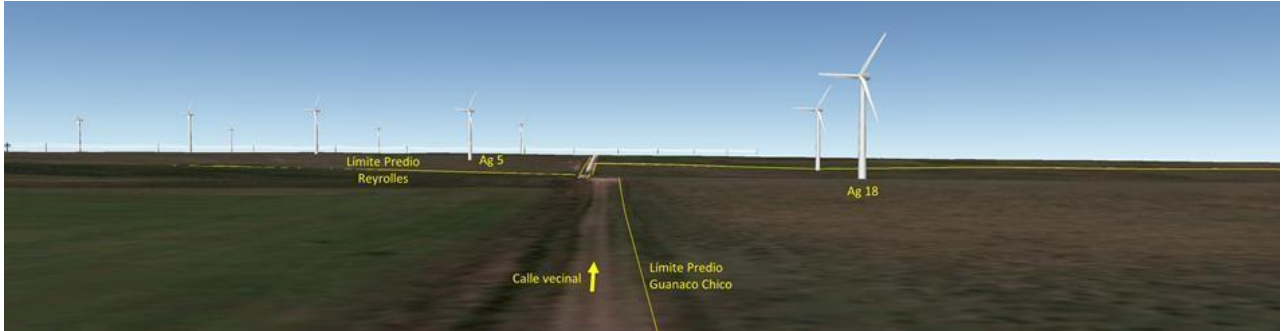
In figure N° 7 (A,B,C and D) there are some simulations with different views where the visual affectation that the wind turbine will produce to observers that may circulate by National Route N°33 and by the neighboring roads.



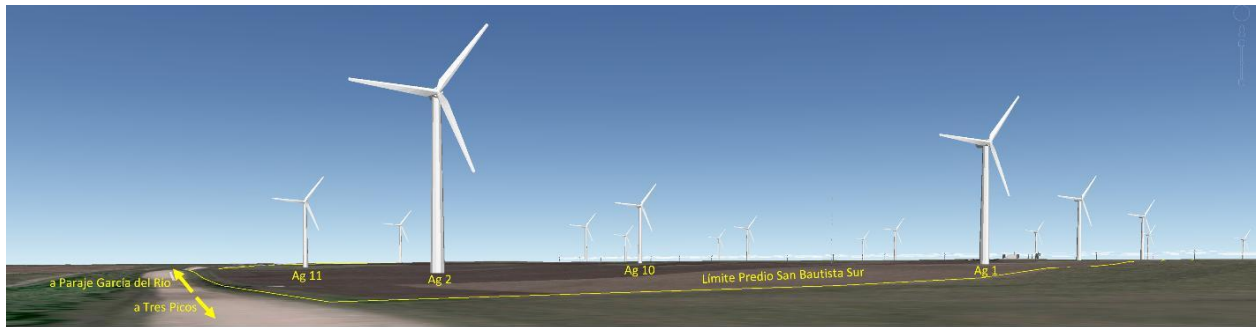
Figure N° 7 Image with a view of the wind turbines from: A) National Route N° 33



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)

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental Awareness Addendum N°</p>	
<p>Doc. N°: CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 37 of 44</p>

According to the Aeronautical Code of the Argentine Republic, there must be a study of prefeasibility of height before the Dirección de Tránsito Aéreo 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 it 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.

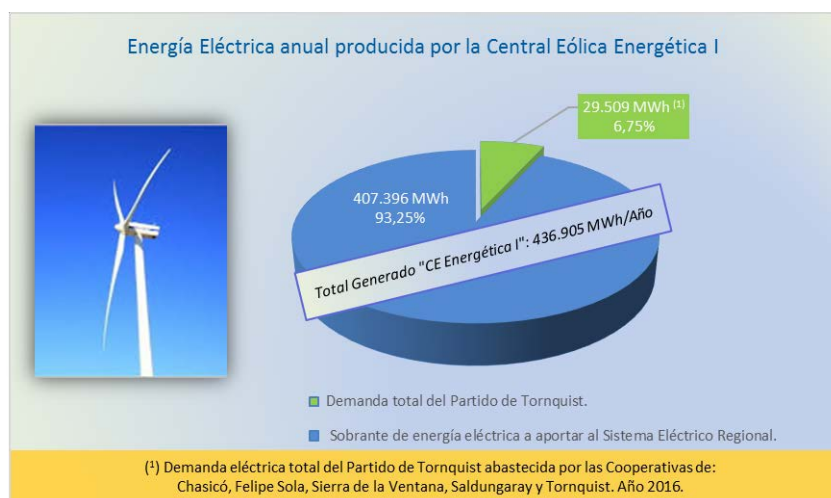




Figure N° 8 Effect of the Contribution of "Clean" Electric Energy in the Regional System

 ICONO SRL Tel: (0291) 4556484 - info@iconosrl.com.ar	Study on Environmental Awareness Addendum N°	 ENERGÉTICA ARGENTINA
Doc. N°: CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 39 of 44

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.

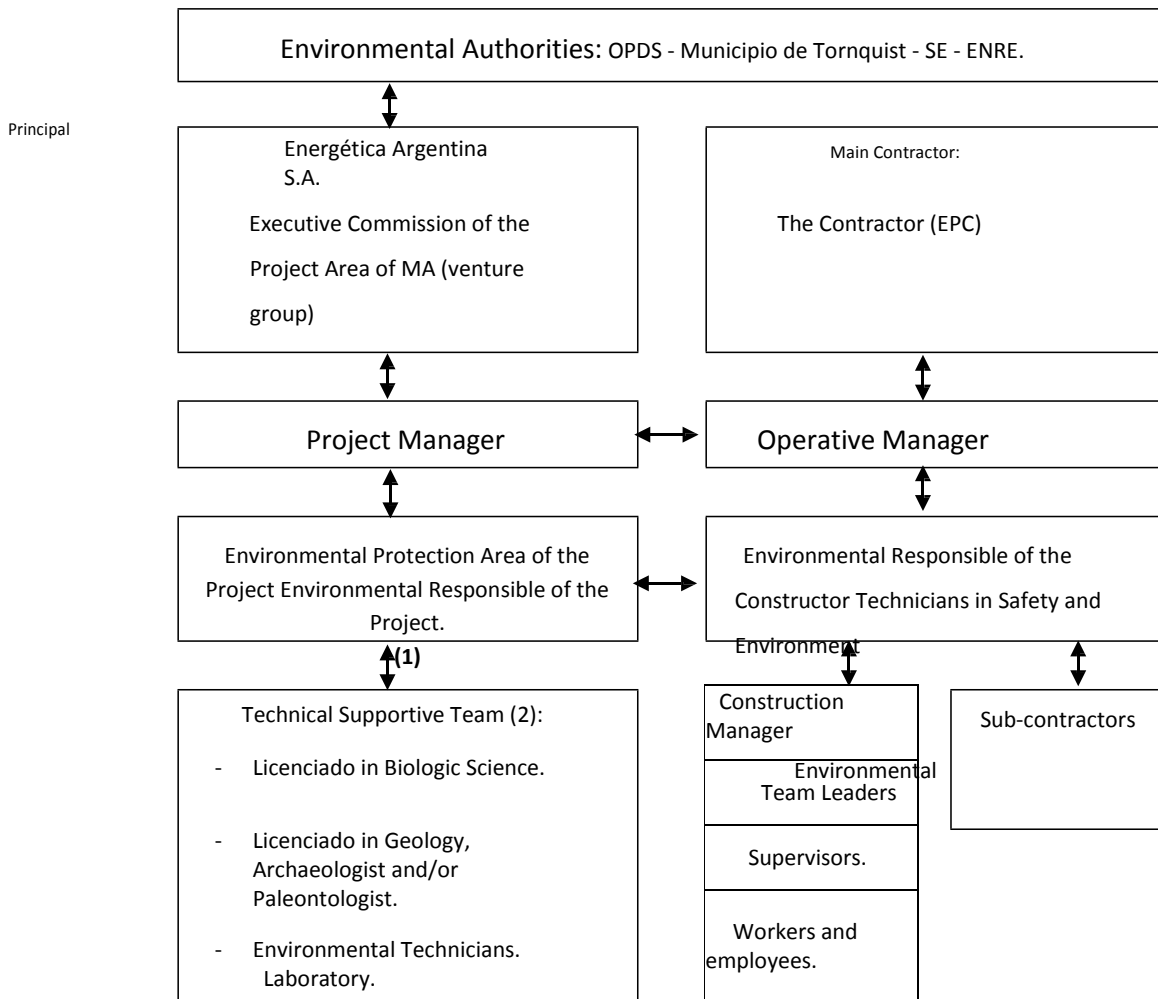
So, environmental protection measures required for the present study have already been investigated, which should be adapted as soon as the different activities are performed with all the modifications that may be needed.

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 N° 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.

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<p>Doc. N°: CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 41 of 44</p>

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.



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Doc. N°: CEEN-IA-2655-08/18	2 Wind Energy Station	Date: 15/08/2018 Rev: A Page 42 of 44

The sites where the measurements will be done and their frequency will be defined according to the requirements determined by the Ente Nacional Regulador de la Electricidad (ENRE), the Organismo 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 Noise IEC651-1987; 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) Beacons for the wind turbines.
- l) Treatment of Flora and Fauna (continuation of the preparation and construction 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.

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<p>Doc. N°: CEEN-IA-2655-08/18</p>	2 Wind Energy Station	<p>Date: 15/08/2018 Rev: A Page 43 of 44</p>

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.

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<p>Doc. N°: CEEN-IA-2655-08/18</p>	<p>2</p> <p>Wind Energy Station</p>	<p>Date: 15/08/2018 Rev: A Page 44 of 44</p>

13. Annex C.05

- C.05.1. Documents/Notes and Affidavits related to the Project
Dangerous and/or Chemical Substances, fuel, other substances that will be deposit in the site - HDS
- C.05.2. site - HDS

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<p>Doc. N°: CEEN-IA-2655-08/18</p>	<p>Wind Energy Centre 1 Buenos Aires Province</p>	<p>Date: 15/08/2018 Rev: A</p>

Annex C.05.1

DOCUMENTS/NOTES AND AFFIDAVITS RELATED TO THE PROJECT

- Tornquist Town Hall
1. 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. 14th September, 2018.
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.



*Tornquist Town Hall
Mayor.*

TORNQUIST, June 6th, 2016.-

Note N°: /16 -IM-

**TO THE PRESIDENT
OF THE WIND ENERGY PARK, I Ing.
GUILLERMO 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 III – Secc. Rural – Tla. 39 f – Ptda. 3.533; Circ. III – Secc. Rural – Pla. 566 B – Ptda. 14.852; and Circ. III – Secc. Rural – Pla. 569 – Ptda. 45.

It is informed that this authorization will be under condition of presenting all the documentation required by our Town Hall and that you must meet all the current National and Provincial regulations that may be necessary.

sincerely,

With no other matter to cover, yours

**Sergio Bordoni
Tornquist Town Hall
Mayor**

14th September, 2018.

Mr. Rubén Zaia
AES Renewable Energy
Director
S / D

B) 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 Assignment 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 an 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

Annex.

Evaluated location of the wind energy turbines. File sent by email, September 11th by Javier Valy from AES Company.



**Mayor Sergio
Bordononi**

ACTA DE AUDIENCIA PÚBLICA POR "PROYECTO DE PARQUE EÓLICO EN EL DISTRITO"

En la Ciudad de Tornquist, a los 14 días del mes de Diciembre de 2016, siendo las 18:00 horas en la Sala de Situaciones del palacio municipal, se reúnen con el objeto de realizar la Audiencia Pública convocada por el Municipio de Tornquist junto al Honorable Concejo Deliberante, donde la Empresa Energética Argentina S.A. presentará a los vecinos el proyecto detallado del Parque Eólico propuesto para ser construído, en inmediaciones de la localidad de Tres Picos y la estación García Del Río.

Se encuentran reunidas las siguientes autoridades: el titular de la Agencia de Desarrollo del Municipio de Tornquist, Dr. Gonzalo Iparraguirre; la Directora de Medio Ambiente del Municipio de Tornquist, Sra. Melisa Herrada; la concejal María Ofelia Skolak; el Presidente de la firma Energética Argentina S.A., Ing. Guillermo Coccoz, acompañado por la Directora y Gerente Técnica de Energética Argentina S.A., Ing. Agustina Peralta, el Gerente Comercial de Energética Argentina S.A., Ing. Alejandro Hunko, y el Gerente de Desarrollo, Sr. Agustín Marcenac; entidades educativas interesadas en la carrera de capacitación sobre energía sustentable, como así también ingenieros y referentes de Cooperativas Eléctricas de la zona y público en general.

Abre el acto de la Audiencia el Dr. Gonzalo Iparraguirre, quien tras saludar a los presentes, hace mención a la audiencia pública por el Proyecto de Parque Eólico en el Distrito", y agradece a las autoridades y a todo el público presente.

El Presidente de la empresa Energética Argentina S.A., Ing. Guillermo Coccoz toma la palabra y comienza su exposición mediante un power point, presentado el esquema asociativo de empresas que impulsan el proyecto y el equipo de trabajo que está llevando a cabo el proyecto, y que se encuentra presente en el Acto para evacuar cualquier duda que surgiera de la presentación. Asimismo describe los componentes del parque eólico y cómo se van integrando en el proceso de desarrollo del proyecto

Continúa presentando la situación energética actual en la Argentina, las características de la matriz energética del país y el impacto de las importaciones de gas en el déficit fiscal de la Argentina. En este contexto, propone a la Energía Eólica como parte de la solución a este problema tan importante, describiendo las ventajas de esta fuente renovable de generación de energía eléctrica, por encima de las fuentes convencionales que dominan la matriz energética actual del país. Asimismo se informa a la audiencia acerca del crecimiento de la energía eólica a nivel global durante los últimos 10 (diez) años; cuales son los países con mayor desarrollo en el mundo; y también en nuestra región.

Siguiendo con la presentación, el Ing. Guillermo Coccoz expone la evolución de la energía eólica en el tiempo, explica técnicamente cómo funcionan los

aerogeneradores que se instalarán en el proyecto, en función del recurso eólico de la zona donde se llevará a cabo. Luego explica la excelencia de este recurso en la Argentina en general, y en el distrito de Tornquist en particular.

El próximo tema a desarrollar en la presentación es el referido a los Antecedentes de la Energía Eólica en el país, cómo se llega a la nueva Ley de promoción de las Energías Renovables (Ley N° 27.191), y cuáles son sus principales características. El Ing. Guillermo Coccoz continúa explicando los mecanismos de selección de proyectos para la firma de contratos de abastecimiento de energía eléctrica a partir de fuentes renovables, en función de esta nueva ley, y cómo el Proyecto Eólico Energética I se encuadra en uno de estos mecanismos.

A partir de este momento, comienza a detallar las características particulares del Parque Eólico Energética I, desde su ubicación geográfica, hasta la excelencia del recurso eólico en el sitio, razones por las cuales se seleccionó para la instalación del proyecto. También se informa sobre las características de los aerogeneradores modernos, y como fue evolucionando la tecnología durante los 7 años de desarrollo que lleva el proyecto.

En este momento, se abre un espacio para las consultas de los asistentes a la audiencia, donde un representante de una cooperativa eléctrica de la zona da su opinión acerca del parque eólico y su importancia para el abastecimiento de energía del Partido de Tornquist.

Luego, el Director de la Escuela de Educación Secundaria Técnica N° 1 de Tornquist, Prof. Luis Quintana, consulta sobre si existe un proceso definido sobre la transferencia tecnológica para la instalación de industrias locales que puedan proveer de insumos y servicios a este tipo de proyectos. El Ing. Guillermo Coccoz explica que los suministradores de tecnología para proyectos eólicos ya han tomado contacto con potenciales suministradores locales, y que en la medida en que estos proyectos avancen en su desarrollo, se profundizarán estos vínculos, y proveedores locales prestarán sus servicios a los parques eólicos. También se explica que, por cuestiones de financiamiento de proyectos, es más difícil integrar localmente suministros, ya que la industria local no cuenta con experiencia en este tipo de tecnología.

Más adelante, luego de algunos intercambios de opiniones entre los asistentes y el equipo técnico del proyecto, el representante de una de las industrias más importantes del distrito se interesa en conocer las características técnicas de los sistemas de protecciones que se instalarán en la Subestación transformadora del parque. Interviene en este momento el Ing. Alejandro Hunko, quien informa que todos los equipamientos a utilizar en la Estación Transformadora están definidos por las especificaciones técnicas de TRANSBA (empresa transportista de la energía eléctrica de la provincia de Buenos Aires, y operadora de la red de Alta Tensión donde se conectará el parque eólico). También se explican las características de operación del parque eólico y su vínculo con el sistema



interconectado nacional.

El Ing. Guillermo Coccoz propone continuar con la presentación, informando que al final de la misma se abrirá otro espacio para responder a todas las consultas de los asistentes. Se continúa con la presentación describiendo las etapas de construcción del parque eólico, informando acerca de los tiempos necesarios, los recursos a utilizar, tanto económicos como humanos, y la necesidad de obtener mano de obra local para la obra.

El tema siguiente es el Estudio de Impacto Ambiental del Proyecto. Se profundiza en los medios analizados por el estudio, y se indican y describen los Impactos Positivos y Negativos de la Instalación del Parque Eólico Energética I en el lugar propuesto, para que los asistentes a la Audiencia Pública puedan dar sus opiniones con mayor conocimiento del impacto físico, biológico y medioambiental / cultural del proyecto.

Por último, dentro de la presentación del Ing. Guillermo Coccoz, se informa a la audiencia de la declaración del Proyecto Ambientalmente apto por parte de la OPDS (Organismo Provincial para el Desarrollo Sostenible de la Provincia de Buenos Aires), y se concluye explicando la importancia de instalar el parque eólico como fuente de generación de energía limpia, reemplazando la importación de barcos metaneros, alimentando de energía eléctrica a más de 220.000 hogares en el año, y reduciendo emisiones de CO2 por un volumen equivalente al que producen alrededor de 100.000 automóviles en un año.

Finalmente se pide a los asistentes sus opiniones y comentarios acerca de la instalación del parque eólico Energética I en el ámbito del distrito de Tornquist, recibiendo respuestas positivas sobre la iniciativa, y muestras de apoyo de los sectores de interés.


Siendo las 20.40 hs. del día de la fecha, habiendo expuesto la totalidad de los interesados y no habiéndose formulado observaciones por los participantes presentes en la audiencia, el Dr. Gonzalo Iparraguirre anuncia que se da por concluida la Audiencia pública, labrándose acta de la misma-----.




Dr. GONZALO IPARRAGUIRRE
SECRETARIO DE DESARROLLO
MUNICIPALIDAD DE TORNQUIST



MARIA OFELIA SKOLAK
PRESIDENTE BLOQUE
FRENTE PARA LA VICTORIA



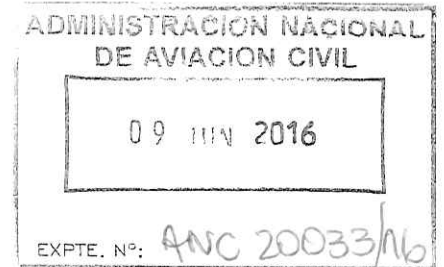
Lic. Melisa Soledad Herrada
Directora de Medio Ambiente
MUNICIPALIDAD DE TORNQUIST



Laura GARCIA.
Concejal
F.P.C. y S.

Buenos Aires, 8 de junio de 2016.

Señores
ADMINISTRACIÓN NACIONAL DE AVIACIÓN CIVIL
INFRAESTRUCTURA Y AERÓDROMOS
Mesa de Entradas



**Ref. Autorización en altura para
instalación de Parque Eólico**

De nuestra mayor consideración,

En mi carácter de Representante Legal de la compañía ENERGETICA ARGENTINA S.A., tengo el agrado de dirigirme a Uds. a fin de solicitar vuestra autorización en altura para el emplazamiento del Parque Eólico "ENERGÉTICA I", ubicado en el Partido de Tornquist, de la Provincia de Buenos Aires.

Para ello, fijamos nuestro domicilio para comunicaciones en Av. Corrientes 1174, piso 6°, de la Ciudad Autónoma de Buenos Aires.

El parque Eólico "ENERGÉTICA I" se instalará en tres inmuebles rurales (Nomenclatura Catastral: Circ. III – Secc. Rural – Tla. 39 f – Ptda. 3.533; Circ. VIII – Secc. Rural – Pla. 566 B – Ptda. 14.852; y Circ. VIII – Secc. Rural – Pla. 569 – Ptda. 45) ubicados en las inmediaciones del Paraje García del Río, del mencionado Distrito de Tornquist; y contará con un total de 31 (treinta y un) aerogeneradores.

Asimismo, adjuntamos a la presente la documentación que se detalla a continuación:

- Estatuto de la Sociedad certificado por Escribano Público.
- Formulario B – Solicitud Autorización en Altura Objetos Extensos.
- Planilla de Ubicación de Aerogeneradores, firmada por profesional competente.





Sin otro particular, aprovechamos la presente para saludarlo muy atentamente.

A handwritten signature in black ink, appearing to be "Inga. Agustina Peralta".

Inga. Agustina Peralta
Directora
ENERGÉTICA ARGENTINA S.A.





República Argentina - Poder Ejecutivo Nacional
2018 - Año del Centenario de la Reforma Universitaria

Nota

Número: NO-2018-04518441-APN-DDYME#MEM

CIUDAD DE BUENOS AIRES

Viernes 26 de Enero de 2018

Referencia: Notificación RESOL-2018-18-APN-SECEE#MEM - EXP-S01:0239839/2016 - Ingreso de la firma ENERGÉTICA ARG ENTINA SOCIEDAD ANÓNIMA como AGENTE GENERADOR del MEM para su Central Eólica Energética I

A: ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA (ESMERALDA 1394 Piso:4 Dpto:B - CABA),

Con Copia A:


De mi mayor consideración:

Por medio de la presente, se notifica la Resolución N° 18 (RESOL-2018-18-APN-SECEE#MEM) firmada por el Sr. Secretario de Energía Eléctrica de la Nación Ing. Alejandro Valerio SRUOGA a los 25 días del mes de Enero del año 2018.

Sin otro particular saluda atte.

Digitally signed by GESTION DOCUMENTAL ELECTRONICA - GDE
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ou=SECRETARIA DE MODERNIZACION ADMINISTRATIVA, serialNumber=CUIT 30715117564
Date: 2018.01.26 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

ESCOPIA
Ministerio de Energía y Minería
Dirección de Despacho
y Mesa de Entrada
Dr. Germán Oberli
DIRECTOR



República Argentina - Poder Ejecutivo Nacional
2018 - Año del Centenario de la Reforma Universitaria

Resolución

Número: RESOL-2018-18-APN-SECCE#MEM

CIUDAD DE BUENOS AIRES
Jueves 25 de Enero de 2018

Referencia: EXP-S01:0239839/2016 - Ingreso de la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA como AGENTE GENERADOR del MEM para su Central Eólica Energética I

VISTO el Expediente N° S01:0239839/2016 del Registro del MINISTERIO DE ENERGÍA Y MINERÍA, y

CONSIDERANDO:

Que la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA solicitó su habilitación como AGENTE GENERADOR del MERCADO ELÉCTRICO MAYORISTA (MEM) para su Central Eólica Energética I de CIEN MEGAVATIOS (100 MW) de potencia nominal, instalada en el Partido de Tornquist, Provincia de BUENOS AIRES, conectándose al SISTEMA ARGENTINO DE INTERCONEXIÓN (SADI) en barras de TREINTA Y TRES KILOVOLTIOS (33 kV) de la nueva Estación Transformadora 132/33 kV, vinculada a la Línea de Alta Tensión de CIENTO TREINTA Y DOS KILOVOLTIOS (132 kV) Bahía Blanca -Tornquist, jurisdicción de la EMPRESA DE TRANSPORTE DE ENERGÍA ELÉCTRICA POR DISTRIBUCIÓN TRONCAL DE LA PROVINCIA DE BUENOS AIRES SOCIEDAD ANÓNIMA (TRANSBA S.A.).

Que mediante Nota B-108130-1 de fecha 21 de julio de 2016 la COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA) informó que la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA cumple los requisitos exigidos en los Puntos 5.1 y 5.2 del Anexo 17 de Los Procedimientos para su ingreso y administración del MERCADO ELÉCTRICO MAYORISTA (MEM).

Que mediante Resolución N° 2.351 de fecha 02 de agosto de 2016, el Organismo Provincial para el Desarrollo Sostenible de la Provincia de Buenos Aires resolvió declarar ambientalmente apto el Proyecto de Obra denominado Parque Eólico Energética I.

Que la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA ha cumplido con las exigencias de la normativa vigente en cuanto al aporte de documentación societaria y comercial.

Que la solicitud de ingreso al MERCADO ELÉCTRICO MAYORISTA (MEM) de la Central Eólica Energética I se publicó en el Boletín Oficial de la República Argentina N° 33.486 de fecha 20 de octubre de 2016 sin haberse recibido objeciones que impidan el dictado de la presente.

Que la DIRECCIÓN NACIONAL DE REGULACIÓN DEL MERCADO ELÉCTRICO MAYORISTA de la SUBSECRETARÍA DE ENERGÍA TÉRMICA, TRANSPORTE Y DISTRIBUCIÓN DE ENERGÍA ELÉCTRICA de la SECRETARÍA DE ENERGÍA ELÉCTRICA del MINISTERIO DE ENERGÍA Y MINERÍA ha tomado la intervención de su competencia.

Que el Artículo 11 de la Resolución N° 6 de fecha 25 de enero de 2016 del MINISTERIO DE ENERGÍA Y MINERÍA, delegó en la SECRETARÍA DE ENERGÍA ELÉCTRICA las facultades asignadas a la ex SECRETARÍA DE ENERGÍA del ex MINISTERIO DE PLANIFICACIÓN FEDERAL, INVERSIÓN PÚBLICA Y SERVICIOS, según los Artículos 35, 36 y 37 de la Ley N° 24.065.

Que la DIRECCIÓN GENERAL DE ASUNTOS JURÍDICOS del MINISTERIO DE ENERGÍA Y MINERÍA ha tomado la intervención que le compete.

Que las facultades para el dictado del presente acto surgen de lo dispuesto por los Artículos 35 y 36 de la Ley N° 24.065 y por la Resolución N° 25 de fecha 16 de marzo de 2016 del MINISTERIO DE ENERGÍA Y MINERÍA.

Por ello,

EL SECRETARIO DE ENERGÍA ELÉCTRICA

RESUELVE:

ARTÍCULO 1º.- Autorízase el ingreso de la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA como AGENTE GENERADOR del MERCADO ELÉCTRICO MAYORISTA (MEM) para su Central Eólica Energética I de CIEN MEGAVATIOS (100 MW) de potencia nominal, instalada en el Partido de Tornquist, Provincia de BUENOS AIRES, conectándose al SISTEMA ARGENTINO DE INTERCONEXIÓN (SADI) en barras de TREINTA Y TRES KILOVOLTIOS (33 kV) de la nueva Estación Transformadora 132/33 kV, vinculada a la Línea de Alta Tensión de CIENTO TREINTA Y DOS KILOVOLTIOS (132 kV) Bahía Blanca -Tornquist, jurisdicción de la EMPRESA DE TRANSPORTE DE ENERGÍA ELÉCTRICA POR DISTRIBUCIÓN TRONCAL DE LA PROVINCIA DE BUENOS AIRES SOCIEDAD ANÓNIMA (TRANSBA S.A.).

ARTÍCULO 2º.- Instrúyase a la COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA) a efectos que los sobrecostos que se ocasionen a los demás agentes del MERCADO ELÉCTRICO MAYORISTA (MEM) y las penalidades que deban abonar los prestadores de la Función Técnica del Transporte (FTT) derivados de eventuales indisponibilidades con motivo del ingreso que este acto autoriza, sean cargadas a la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA, titular de la Central Eólica Energética I, en su vínculo con el SISTEMA ARGENTINO DE INTERCONEXIÓN (SADI) en barras de TREINTA Y TRES KILOVOLTIOS (33 kV) de la nueva Estación Transformadora 132/33 kV. A este efecto se faculta a la COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA) a efectuar los correspondientes cargos dentro de Período Estacional en que dichos sobrecostos o penalidades se produzcan.

ARTÍCULO 3º.- Notifíquese a la firma ENERGÉTICA ARGENTINA SOCIEDAD ANÓNIMA, a la COMPAÑÍA ADMINISTRADORA DEL MERCADO MAYORISTA ELÉCTRICO SOCIEDAD ANÓNIMA (CAMMESA), a la EMPRESA DE TRANSPORTE DE ENERGÍA ELÉCTRICA POR DISTRIBUCIÓN TRONCAL DE LA PROVINCIA DE BUENOS AIRES SOCIEDAD ANÓNIMA (TRANSBA S.A.) y al ENTE NACIONAL REGULADOR DE LA ELECTRICIDAD (ENRE), organismo descentralizado actuante en la órbita del MINISTERIO DE ENERGÍA Y MINERÍA.

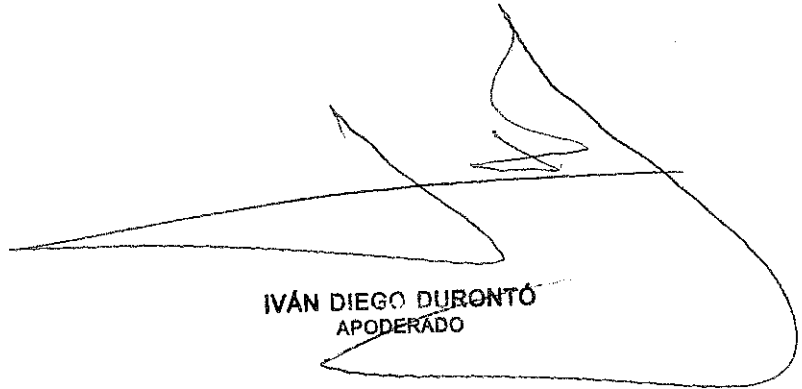
ARTÍCULO 4º.- Comuníquese, publíquese, dése a la Dirección Nacional del Registro Oficial y archívese.

SECRETARÍA
Ministerio de Energía y Minería
Dirección de Despacho
y Mesa de Entrada
Dr. Gerardo Oberti
DIRECTOR



Digitally signed by SRUOGA Alejandro Valerio
Date: 2018.01.25 18:03:14 ART
Location: Ciudad Autónoma de Buenos Aires

Alejandro Valerio Sruoga
Secretario
Secretaría de Energía Eléctrica
Ministerio de Energía y Minería

Por la presente, Iván Diego Durontó, con Documento Nacional de Identidad N° 23.471.261 y en mi carácter de apoderado de ENERGÉTICA ARGENTINA S.A., con domicilio legal en la calle Carlos Pellegrini 1023 piso 9, de la Ciudad Autónoma de Buenos Aires, declaro bajo juramento que los equipos afectados a la construcción y posterior operación del parque eólico no contienen ni contendrán policloruros de bifenilos (PCBs) y que no se almacenarán dichos productos en el sitio.



IVÁN DIEGO DURONTÓ
APODERADO

 Tel: (0291) 4556484 · info@iconosrl.com.ar	Study on Environmental Awareness Addendum N° 2	
Doc. Nº: CEEN-IA-2655-0 8.18	Wind Energy Station Energética I Buenos Aires Province	Date: 15/08/2018

ANEXOC.05.1

DOCUMENTS/NOTES AND AFFIDAVITS RELATED TO THE PROJECT

- Tornquist Town Hall
- I.
 - 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

TORNQUIST
Town Hall

Tornquist, 14th September, 2018

Mr. Rubén Zaia
AES Renewable Energy
Director
S L 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 Assignment 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** parami, Ruben Ignacio, Alfredo
Gonzalo. 11 sep

Buen día. Te comparto el layout definitivo para el parque Energética con las modificaciones requeridas para cumplir con las distancias de seguridad y requisitos del municipio de Tomquist y permitir el paso de la línea de evacuación de los proyectos de PCR.

Saludos,
Javier

“D” Javier Valy

Enviado el: viernes, 17 de agosto de 2018 19:15
Para: 'Gonzalo Iparraguirre' <g51j1ib@gmail.com>
Asunto: RE: Parque Eólico Energética - Layout 30 Aeross Acciona

layout Energética

11 Km.



Mayor Sergio
Bordonni

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.

Continuing with the presentation, engineer Guillermo Coccoz shows the evolution of wind energy in time, explaining technically how wind turbines

4...

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 renewable 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 audience, 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 N° 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 CO2 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.

///
"G..."
L.;

Dr. GONZALO IPARRAGUIRRE SECRETARY
DE DESARROLLO MUNICIPALIDAD DE TORONQUIST

MARIA OFELIA SKOLAK
PRESIDENTE BLOQUE
FRENTE PARA LA VICTORIA

Lic. Melisa Soledad Herrada
Directora de Medio Ambiente
MUNICIPALIDAD DE TORONQUIST

T...
Co-...

Buenos Aires, 8th June, 2016.

2) P-L1

Sirs

**ADMINISTRACIÓN NACIONAL DE AVIACIÓN CIVIL
INFRAESTRUCTURA YAERÓDROMOS**

Reception Office 1

1 - 9 June 2016

EXPTE. N°:

ANC 20033/16

Ref. Authorization in height for the
installation of the Wind Energy Park.

Dear Sirs,

As Legal Representative of the company ENERGETICA 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.





sincerely.

Yours

Inga.Agustina Peralta
Director
ENERGÉTICA ARGENTINA S.A.





República Argentina - Poder Ejecutivo Nacional
2018 - Año del Centenario de la Reforma 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 N° 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.

Digitally signed by GESTION DOCUMENTAL ELECTRONICA - GOE
DN:cn=GESTION DOCUMENTAL ELECTRONICA +GDE,c=AR, o=MINISTERIO DEMODERNIZACION,
ou::SECRETARIA DE MODERNIZACION ADMINISTRATIVA, serialNumber=CUIIT 30715117564
Date 2018.01.26 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



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 ENERGETICA ARGENTINA SOCIEDAD ANÓNIMA as AGENT GENERATOR
OR of the MEM for its Wind Energy Park Energética 1

WHEREAS Proceeding N° SOI :0239839/2016 of the Registry of the MINISTRY OF ENERGY AND MINING,
and

RESULTING:

That the company ENERGETICA 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 KILOVOLTS (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 ENERGETICA 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 N° 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 ENERGETICA ARGENTINA SOCIEDAD ANÓNIMA has fulfilled 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 N° 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 N° 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 N° 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 N° 24.065 and by the Resolution N° 25 with date 16th March, 2016 of the MINISTRY OF ENERGY AND MINING.

For that,

THE SECRETARY OF ELECTRIC ENERGY

RESOLVES:

ARTICLE 1°.- 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 OF INTERCONNECTION (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 KILOVOLTS (132 kV) Bahía Blanca -Tomquist, 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 (CMMESA) 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 (CMMESA) 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 (CMMESA), 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.

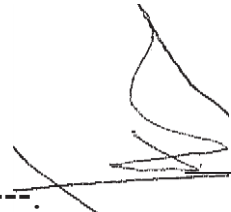
ARTICLE 4°.- For communication and publication, deliver to the Dirección Nacional del Registro Oficial and file it.


SECRETARIA
Ministerio de Energía y Minería
Dirección de Despacho
y Mesa de Entrada
Dr. Garbín Oberl
DIRECTOR

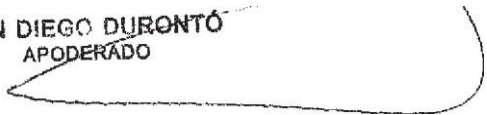
gt% d2 y1: eiaand:ro Valerio
Location Autonomous City of Buenos Aires



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 oath 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.





IVÁN DIEGO DURONTÓ
APODERADO



 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p align="center">Study on Environmental Awareness Addendum N° 2</p>	
<p>Doc. N°: CEEN-IA-2655-08/18</p>		<p>Date: 15/08/2018 Rev: A</p>

Annex C.05.2

**Dangerous and/or Chemical Substances, fuel, other substances that
will be stored in the site - Safety Data Sheet (HDS)**

 <p>Tel: (0291) 4556484 - info@iconosrl.com.ar</p>	<p>Study on Environmental</p>	
<p>Doc. Nº: CEEN-IA-2655-08/18</p>	<p>Awareness Addendum Nº 2</p>	<p>Date: 15/08/2018 Rev: A</p>

**Dangerous and/or Chemical Substances, fuel, other substances that
will be deposited in the site - Safety Data Sheet (HDS)**

1. INTRODUCTION

This Annex contains a preliminary list of the dangerous and/or chemical substances, fuels, among others, that will be stored in the site with their corresponding Safety Data Sheets (HDS).

Ítem Nº	Denomination
1	Daracem 19 NA.
2	Sica. Membrane sfáltica.
3	Sica.-1
4	Mira 313.
5	Separol wood.
6	Comon Petrol.
7	Shell V-Power Diesel.

Source: Energética Argentina S.A.

Note: Prior to the beginning of the construction and star-up stages of the wind Energy Station, it will be presented to the corresponding authorities the specific list of dangerous substances, their quantities and deposit sites, with their corresponding Safety Data Sheets (HDS).

W. R. GRACE
MATERIAL SAFETY DATA SHEET

Product Name: DaracemÆ 19
NA MSDS ID Number: D-06502

MSDS Date: 02

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DaracemÆ 19 NA
MSDS Number: D-06502
Cancelled MSDS Number: D-05965
MSDS Date: 02 26 2009
Chemical Family Name: Sodium salt of poly-naphthalene sulfonic acid
Product Use: Concrete Admixture
Chemical Formula: Mixture-NA
CAS # (Chemical Abstracts Service Number): Mixture-NA

Manufactured by:

W.R.Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

Grace Canada, Inc.
294 Clements Road West
Ajax, Ontario L1S 3C6

In Case of Emergency Call:

In USA: (617) 876-1400 In Canada: (905) 683-8561

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS#	Percent (max)
2-Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	036290 -7	-04 25-50
Sodium sulfate (solution)	007757	-82 1-10

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:

Caution!

Causes eye irritation.
Causes skin irritation.
May be harmful if ingested.
Causes digestive tract burns if ingested.

HMS Rating:

Health: 1
Flammability: 1
Reactivity: 0
Personal Protective Equipment: B (See Section 8)

Potential Health Effects:

Inhalation: Acute inhalation not expected to result in adverse effects.
If inhaled as a vapor or mist, causes irritation, sore throat, coughing and breathing difficulty.
Effects include: Tightness of chest, hypersensitive individuals may experience allergic respiratory reaction and wheezing.
Eye Contact: Eye contact causes irritation.
Skin Contact: Skin contact causes irritation.
May cause sensitization.
Hypersensitive individuals may develop an allergic reaction resulting in dermatitis, rash or hives.
Skin Absorption: Not expected to be harmful if absorbed through the skin.
Ingestion: Harmful if ingested.
If ingested, causes irritation to the linings of the mouth, esophagus and stomach.
Effects include: No other effects expected unless listed below.

W. R. GRACE
MATERIAL SAFETY DATA SHEET

Product Name: DaracemÆ 19
NA MSDS ID Number: D-06502

MSDS Date: 02

SECTION 4 - FIRST AID MEASURES:

Skin Contact: Wash with soap and water.

If discomfort or irritation persists, consult a physician.

Remove contaminated clothing and wash before reuse.

Eye Contact: Flush eyes with water for at least 15 minutes while holding eyelids open.

Get immediate medical attention.

Ingestion: Do not induce vomiting.

Never give anything by mouth to an unconscious person.

If discomfort or irritation persists, consult a physician.

Inhalation: If symptoms develop, get fresh air. If symptoms persist, consult a physician.

If breathing has stopped, give artificial respiration then oxygen if needed.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flash Point Method: Estimated

Lower Explosion Limit: Not Available

Upper Explosion Limit: Not Available

Auto-ignition Temperature: Not Available

NEPA Rating:

Health: 1

Flammability: 1

Reactivity: 0

Extinguishing Media: In case of fire, use water spray, dry chemical, Carbon dioxide or foam.

Special Fire Fighting Procedures:

Wear self-contained breathing apparatus and complete personal protective equipment when potential for exposure to vapors or products of combustion exist. Water may be used to cool containers to prevent pressure build-up and possible auto-ignition or explosion. Avoid breathing hazardous vapors or products of combustion, keep upwind. Isolate area and keep unnecessary people away. Prevent run-off from fire control or dilution from entering streams or drinking water supplies.

No special procedures specific to this product.

Unusual Fire and Explosion Hazards: None.

SECTION 6 - ACCIDENTAL RELEASE MEASURES:

Spills Leaks: Use proper personal protective equipment. Do not flush to sewer or allow to enter waterways. Keep unnecessary people away.

Contain and/or absorb spill with inert material (i.e. sand, vermiculite) then place in a suitable container. For large spills, dike area and pump waste material into closed containers for disposal or reclamation.

SECTION 7 - HANDLING AND STORAGE

Precautionary Measures: Avoid contact with eyes, skin and clothing.

Do not take internally.

Practice good personal hygiene to avoid ingestion.

Use only with adequate ventilation.

Wash clothing before reuse.

FOR PROFESSIONAL USE ONLY. KEEP OUT OF CHILDREN'S REACH.

W. R. GRACE
MATERIAL SAFETY DATA SHEET

Product Name: Daracem/AE 19
 NA MSDS ID Number: D-06502

MSDS Date: 02

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT

EXPOSURE GUIDELINES (US)

Ingredient	ACGIH TLV			OSHA PEL			Other
	TWA	STEL	Ceiling	TWA	STEL	Ceiling	
2-Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	-	-	-	-	-	-	-
Sodium sulfate (solution)	-	-	-	-	-	-	-

*Contains formaldehyde below 0.1% threshold. Product is capable of releasing formaldehyde under certain conditions. Exposure during typical application is expected to be insignificant. Exposure to formaldehyde vapor is a potential concern if product is applied under confined space conditions. Consult appropriate exposure guidelines for formaldehyde. (OSHA: 0.75 ppm-TWA, 2.0 ppm - STEL, ACGIH 0.3 ppm Ceiling)

EXPOSURE GUIDELINES (CANADA)

Employers should consult local Provincial regulatory limits for exposure guidelines which may vary locally.

Engineering Controls:

Not generally required.

Personal Protective Equipment:

Respiratory Protection: Respiratory protection is not normally required. However, a chemical cartridge respirator with organic vapor cartridge and a pre filter for dusts/mists is required at or above the applicable exposure limits (Consult above Exposure Guidelines). If no limits exist, use an approved respirator whenever a vapor or mist is generated or if respiratory irritation occurs. Supplied air respirator (SCBA) is required at exposure levels above the capabilities of a chemical cartridge respirator.

A NIOSH approved respirator for Formaldehyde vapor is required whenever exposures exceed regulatory limits. For additional information, refer to US OSHA Regulations 29 CFR 1910.° 134.

Skin Protection: Rubber or other impervious gloves should be worn to prevent skin contact.

Eye Protection: At minimum, safety glasses with side shields should be worn where exposure to excessive dust or spray is likely.

Work Hygienic Practices: Use good personal hygiene practices.

None beyond those noted above.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance Odor:	Clear dark brown liquid with slight mothball (naphthalene) odor.
Odor Threshold: (ppm)	Not Determined
pH:	7.0-11.5
Vapor Pressure: (Mm Hg)	Equal to Water
Vapor Density: (Air = 1)	Equal to Water
Solubility In Water:	Complete
Specific Gravity: (Water = 1)	1.1 - 1.3
Evaporation Rate: (Butyl Acetate = 1)	~ = Water
Boiling Point:	>212°F/100°C
Viscosity:	Unknown
Bulk Density: (Pounds/Cubic Foot)(Pcf)	Not Applicable
% Volatiles (gr/L): (70°F) (21°C)	~60% (As Water)

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability:	Stable
Conditions To Avoid:	None known for this product.
Hazardous Polymerization:	Will not polymerize.
Hazardous Decomposition Products:	None known for this product.

W. R. GRACE
MATERIAL SAFETY DATA SHEET

Product Name: Daracem/AE 19
NA MSDS ID Number: D-06502

MSDS Date: 02

National Volatile Organic Compound Emission Standards For Architectural Coatings:

Volatile Organic Content: (gr/L) 0

WHMIS Classification(s): D2 B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR). This MSDS contains all the information required by the CPR.

State Regulatory Information:

California Proposition 65: WARNING! This product contains a substance known to the state of California to cause cancer, birth defects or other reproductive harm.

Massachusetts Hazardous Substance List(Identification threshold 0.0001%(1ppm)):

<u>Chemical Name</u>	<u>CAS#</u>	<u>Wt %</u>
Formaldehyde	000050 -00	05

New Jersey Hazardous Substance List(Identification threshold (0.1%)):

<u>Chemical Name</u>	<u>CAS #</u>	<u>Wt %</u>
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Pennsylvania Hazardous Substance List(Identification threshold 0.01%):

<u>Chemical Name</u>	<u>CAS#</u>	<u>Wt %</u>
Formaldehyde	000050 -00	05
	-0	

CHEMICAL INVENTORY STATUS:

All chemicals in this product are listed or exempt from listing in the following countries:

US	CANADA		EUROPE	AUSTRALIA	JAPAN	KOREA	PHILIPPINES
TSCA	DSL	NDSL	EINECS/ELINCS	AICS	ENCS	ECL	PICCS
Yes	Yes	No	Yes	Yes	Not Determined	Yes	Yes

SECTION 16 - OTHER INFORMATION

Non-Hazardous Ingredient Disclosure:

<u>Chemical Name</u>	<u>CAS Number</u>
Water	007732-18-5

Prepared by: EH&S Department
Approved by: EH&S Department
Approved Date: 02/26/2009

Disclaimer:

"The data included herein are presented in accordance with various environment, health and safety regulations. It is the responsibility of a recipient of the data to remain currently informed on chemical hazard information, to design and update its own program and to comply with all national, federal, state and local laws and regulations applicable to safety, occupational health, right-to-know and environmental protection."

HOJA DE DATOS DE SEGURIDAD

HDS. Nro. 41.29



Fecha: 24 / 04 / 01

Compañía: Sika Argentina S.A.I.C.
Juan B. Alberdi 5250 – Caseros – Bs. As.

Teléfono: (011) 4734-3500

Producto: MEMBRANA ASFÁLTICA 35 kg c/aluminio

Hoja 1 / 3

Teléfono de Emergencia para casos de ingestión: (01) 4658-7777 / (01) 4654-6648 Hospital Posadas

1.1 Caracterización química: Formulación a base de asfaltos, cargas minerales, aditivos, con films intermedios de polietileno y una lámina externa de aluminio.

1.2 Estado: Sólido

1.3 Color: Negro

1.4 Olor: -

2. DATOS FISICOS Y DE SEGURIDAD

2.1 Cambio de estado:

2.2 Densidad:

N.A.

2.3 Presión de vapor:

N.A.

2.4 Viscosidad:

N.A.

2.5 Solubilidad en agua:

Insoluble

2.6 pH:

N.A.

2.7 Punto de inflamación:

> 200 °C

2.8 Temperatura de ignición:

N.A.

2.9 Límites de explosión:

Inferior: -

Superior: -

2.10 Descomposición térmica:

N.A.

2.11 Productos de descomposición peligrosos: -

2.12 Reacciones peligrosas:

Ninguna si se manipula correctamente

2.13 Información adicional: -

6. MEDIDAS EN CASO DE FUEGO O ACCIDENTE

6.1 Luego de pérdidas o derrames: Remover mecánicamente y desechar según 5.5.
Quitar pequeños residuos con pequeñas cantidades de aguarrás.

6.2 Medios de extinción: Adecuados: Espuma, CO₂, polvo seco, agua

No usar: -

6.3 Primeros Auxilios: Quitar inmediatamente la ropa contaminada. Lavar la piel contaminada con abundante agua y jabón.
En caso de contacto con los ojos, enjuagar inmediatamente bajo chorro de agua por 15 minutos con los párpados abiertos. Consultar al oculista.
En caso de ingestión o inhalación de vapores, llevar al accidentado al aire fresco y procurar ayuda médica.

6.4 Información adicional:

7. INFORMACION SOBRE TOXICIDAD

Con un manipuleo normal no se conocen daños a la salud.

8. INFORMACION SOBRE EFECTOS ECOLOGICOS

El producto es ligeramente perjudicial para el medio ambiente acuático.
No arrojar a cursos de agua ni sobre la tierra.

9. INFORMACION ADICIONAL

Esta información corresponde solo al producto en sí y no incluye las medidas de precaución que se deben considerar al colocar el producto, sobre todo en lo que respecta al manipuleo de sopletes o calentadores necesarios para su aplicación.

La información contenida en esta Hoja de Seguridad corresponde a nuestros conocimientos en el momento de su publicación. Se excluye toda garantía. Serán aplicadas nuestras vigentes Condiciones Generales de Venta y Suministro. Se ruega consultar la versión última y actualizada de las Hojas Técnicas de Productos previamente a cualquier uso.

Hoja de Datos de Seguridad de Materiales

Sika®-1



Versión 1.0

Número de HDS: 100000014484

Fecha de revisión: 2016.09.22

SECCIÓN 1. IDENTIFICACIÓN DE LA SUSTANCIA QUÍMICA PELIGROSA O MEZCLA Y DEL PROVEEDOR O FABRICANTE

Nombre del producto : Sika®-1
 Código del producto : 100000014484
 Tipo de producto : líquido
Uso recomendado del producto químico y restricciones de uso
 Uso del producto : Únicamente para uso profesional.

Informaciones sobre el fabricante o el proveedor

Compañía : Sika Argentina S.A.I.C.
 Juan Bautista Alberdi 5250
 1678 Caseros/Buenos Aires
 Argentina
 Teléfono : 011-4734-3500
 Fax : 011-4734-3555
 Dirección del correo de electrónico : failache.nestor@ar.sika.com
 Teléfono de emergencia : Hospital Posadas +54 11 4658 7777

SECCIÓN 2. IDENTIFICACIÓN DE LOS PELIGROS

Clasificación GHS

Irritación cutáneas : Categoría 3

Sensibilización cutánea : Categoría 1

Elementos de etiqueta GHS

Pictogramas de peligro :



Palabra de advertencia : Atención

Indicaciones de peligro : H316 Provoca una leve irritación cutánea.
 H317 Puede provocar una reacción cutánea alérgica.

Consejos de prudencia : **Prevención:**
 P261 Evitar respirar polvos/ humos/ gases/ nieblas/ vapores/ aerosoles.

Hoja de Datos de Seguridad de Materiales

Sika®-1



Versión 1.0

Número de HDS: 100000014484

Fecha de revisión: 2016.09.22

Provoca una leve irritación cutánea.
Puede provocar una reacción cutánea alérgica.

Notas para el médico : Trate sintomáticamente.

SECCIÓN 5. MEDIDAS CONTRA INCENDIOS

Medios de extinción adecuados : Use medidas de extinción que sean apropiadas a las circunstancias locales y de sus alrededores.

Productos de combustión peligrosos : No se conocen productos de combustión peligrosos

Métodos específicos de extinción : Procedimiento estándar para incendios químicos.

Equipo de protección especial para los bomberos : En caso de incendio, utilice un equipo respiratorio autónomo.

SECCIÓN 6. MEDIDAS QUE DEBEN TOMARSE EN CASO DE DERRAME ACCIDENTAL O FUGA ACCIDENTAL

Métodos y materiales de contención y limpieza : Limpie con material absorbente (por ejemplo tela, vellón).
Guarde en contenedores apropiados y cerrados para su eliminación.

SECCIÓN 7. MANEJO Y ALMACENAMIENTO

Sugerencias para la protección contra incendios y explosiones : Medidas normales preventivas para la protección contra incendios.

Consejos para una manipulación segura : Evitar todo contacto con los ojos, la piel o la ropa.
Ver sección 8 para el equipo de protección personal.
Cuando se manejen productos químicos, siga las medidas estándar de higiene.

Condiciones para el almacenaje seguro : Conserve el envase herméticamente cerrado en un lugar seco y bien ventilado.
Almacenar en conformidad con la reglamentación local.

SECCIÓN 8. CONTROLES DE EXPOSICIÓN/PROTECCIÓN PERSONAL

Componentes con parámetros de control en el área de trabajo

No contiene sustancias con valores límite de exposición laboral.

Protección personal

Protección respiratoria : Utilice protección respiratoria a menos que exista una ventilación de escape adecuada o que la evaluación de la exposición indique que el nivel de exposición está dentro de las pautas recomendadas.

Hoja de Datos de Seguridad de Materiales

Sika®-1



Versión 1.0

Número de HDS: 100000014484

Fecha de revisión: 2016.09.22

Presión de vapor	: 23 hPa (23 hPa)
Densidad relativa de vapor	: Sin datos disponibles
Densidad	: aprox. 1,05 g/cm ³
Solubilidad	
Hidrosolubilidad	: Sin datos disponibles
Solubilidad en otros disolventes	: Sin datos disponibles
Coefficiente de partición: (n-octanol/agua)	: Sin datos disponibles
Temperatura de auto-inflamación	: Sin datos disponibles
Temperatura de descomposición	: Sin datos disponibles
Viscosidad	
Viscosidad, dinámica	: Sin datos disponibles
Viscosidad, cinemática	: > 20,5 mm ² /s
Propiedades explosivas	: Sin datos disponibles
Peso molecular	: Sin datos disponibles

SECCIÓN 10. ESTABILIDAD Y REACTIVIDAD

Reactividad	: No se conoce ninguna reacción peligrosa bajo condiciones de uso normal.
Estabilidad química	: El producto es químicamente estable.
Posibilidad de reacciones peligrosas	: Estable bajo las condiciones de almacenamiento recomendadas.
Condiciones a evitar	: Sin datos disponibles
Materiales incompatibles	: Sin datos disponibles

No se descompone si se almacena y aplica como se indica.

SECCIÓN 11. INFORMACIÓN TOXICOLÓGICA

Toxicidad aguda

Sin datos disponibles

Corrosión/irritación cutáneas

Provoca una leve irritación cutánea.

Hoja de Datos de Seguridad de Materiales

Sika®-1



Versión 1.0

Número de HDS: 100000014484

Fecha de revisión: 2016.09.22

duos.

Envases contaminados : Vacíe el contenido restante.
Eliminar como producto no usado.
No reutilice los recipientes vacíos.

SECCIÓN 14. INFORMACIÓN RELATIVA AL TRANSPORTE

Regulaciones internacionales

IATA-DGR

Mercancías sin peligro

Código-IMDG

Mercancías sin peligro

Transporte a granel de acuerdo con el Anexo II de MARPOL 73/78 y el Código IBC

No aplicable para el producto tal y como se proveyó.

NCh 2190/382

Mercancías sin peligro

SECCIÓN 15. INFORMACIÓN REGLAMENTARIA

Reglamentación medioambiental, seguridad y salud específica para la sustancia o mezcla

Convención Internacional sobre las Armas Químicas : 2,2',2"-nitrilotrietanol
(CWC) Programas sobre los Productos Químicos Tóxicos y los Precursores (Louisiana Administrative Code, Title 33, Part V Section 10101 et. seq.)

Control de precursores y sustancias químicas esenciales para la elaboración de estupefacientes. : No aplicable

SECCIÓN 16. OTRA INFORMACIÓN INCLUIDAS LAS RELATIVAS A LA PREPARACIÓN Y ACTUALIZACIÓN DE LAS HOJAS DE DATOS DE SEGURIDAD

La información contenida en esta ficha de datos de seguridad corresponde a nuestro nivel de conocimiento en el momento de su publicación. Quedan excluidas todas las garantías. Se aplicarán nuestras condiciones generales de venta en vigor. Por favor, consulte la Hoja de Datos del Producto antes de su uso y procesamiento.

FICHA DE INTERVENCIÓN PARA EMERGENCIAS

Aditivo multifuncional plastificante
Reductor de agua de Mediorango

MIRA 313

MERCANCÍA NO PELIGROSA PARA SU TRANSPORTE

Expedidor: W.R. GRACE ARGENTINA S.A.
Primera Junta 570,
(B1878IPL) Quilmes, Buenos Aires, Argentina
T: +54 11 4229 5303

Número de Riesgo: No Peligroso
Número de ONU: No Peligroso
Clase y División: No Peligroso
Grupo de Embalaje: No Peligroso

Tel. de Emergencias: **0810 999 6091**

Estado Físico: Líquido marrón. Incompatible con Agentes oxidantes fuertes (clase 5.1), ácidos y bases (clase 8).

EPP: Use equipos de protección respiratoria, de protección ocular y dérmica, y guantes de butilo.

RIESGOS

Incendio	<ul style="list-style-type: none"> • NO INFLAMABLE, no enciende por si mismo, pero se puede descomponer al calentarse y producir vapores corrosivos y/o tóxicos. • Las fugas resultantes del control del incendio o la dilución con agua, pueden causar contaminación.
Salud	<ul style="list-style-type: none"> • IRRITANTE; puede causar irritación si se inhala, se ingiere o en contacto con la piel.
Medio Ambiente	<ul style="list-style-type: none"> • Todo manejo debe regirse por las leyes locales. • El material es estable. No obstante, evitese flamas abiertas y altas temperaturas. • Densidad: 1,2 g/cm³

EN CASO DE ACCIDENTE

Derrames	<ul style="list-style-type: none"> • Utilizar los elementos de protección personal adecuados. • Detener la fuga, en caso de poder hacerlo sin riesgo. No tocar ni caminar sobre el material derramado. • Recoger el producto utilizando arena, vermiculita, tierra o material absorbente inerte y limpiar o lavar completamente la zona contaminada. • No poner agua directamente al derrame o fuente de la fuga. Evitar que flujos de agua entren en contacto con el material derramado.
Incendio	<ul style="list-style-type: none"> • Utilizar polvo químico seco, espuma, arena o CO₂. Utilizar el producto acorde a los materiales de los alrededores. NO USAR chorros de agua directos. • Mover los contenedores del área de fuego si lo puede hacer sin ningún riesgo. • Hacer un dique de contención para el agua que controla el fuego para su desecho posterior; no desparramar el material.
Contaminación Ambiental	<ul style="list-style-type: none"> • Este material puede ser un desecho peligroso. • Cumplir con la legislación que establece el método de eliminación. • SOLICITAR LA ASISTENCIA DE UN ESPECIALISTA.
Primeros Auxilios	<ul style="list-style-type: none"> • Llamar a los servicios médicos de emergencia. • Mover a la víctima al aire libre. Aplicar respiración artificial si la víctima no respira. • Quitar y aislar la ropa y el calzado contaminados. • Mantener a la víctima en reposo y con temperatura corporal normal. • En caso de contacto con la sustancia, enjuagar inmediatamente la piel o los ojos con agua corriente y jabón por lo menos durante 20 minutos. • Asegurar que el personal médico tenga conocimiento de los materiales involucrados, y tomar las precauciones para protegerse a sí mismos.
Información p/ el médico	<ul style="list-style-type: none"> • Si hay pérdida de conciencia, se debe administrar oxígeno. • Trasladar al paciente a una atmosfera no contaminada, mantener al paciente abrigado y tranquilo.

LLAMAR A LOS SERVICIOS DE EMERGENCIA

Esta Ficha de Intervención a Emergencias está destinada a los Servicios de Emergencias que actúen durante las mismas. La información sobre riesgos y medidas a tomar en caso de accidente que se consignan para cada producto están elaboradas en base a la clasificación genérica del mismo (número de riesgo y número ONU). Por lo tanto, los valores típicos de las propiedades físicas incluidas en esta información se consignan con el único propósito del manejo de emergencias y no deben interpretarse como especificaciones técnicas, de calidad, ni límites absolutos de los parámetros para las distintas partidas de producto.

TELÉFONOS DE EMERGENCIAS

BOMBEROS: 100

POLICÍA: 101 / 911

DEFENSA CIVIL: 103

EMERGENCIAS MÉDICAS: 107

Hoja Técnica de Seguridad del Material

Separol® Madera



Versión 1.0

Número SDS: 100000015754

Fecha de revisión: 2017.03.14

SECCIÓN 1. IDENTIFICACIÓN DEL PRODUCTO Y DE LA COMPAÑÍA

Nombre del producto : Separol® Madera

Código del producto : 100000015754

Tipo de producto : líquido

Uso recomendado del producto químico y restricciones de uso

Uso del producto : Reservado exclusivamente a usuarios profesionales.

Informaciones sobre el fabricante o el proveedor

Compañía : Sika Argentina S.A.I.C.
Juan Bautista Alberdi 5250
1678 Caseros/Buenos Aires
Argentina

Teléfono : 011-4734-3500

Telefax : 011-4734-3555

E-mail de contacto : failache.nestor@ar.sika.com

Teléfono de emergencia : Hospital Posadas 011-4658-7777

SECCIÓN 2. IDENTIFICACIÓN DE LOS PELIGROS

Clasificación SGA

No es una sustancia o mezcla peligrosa.

Elementos de etiquetado GHS

No es una sustancia o mezcla peligrosa.

Otros peligros que no dan lugar a la clasificación

Ninguna conocida.

SECCIÓN 3. COMPOSICIÓN/INFORMACIÓN SOBRE LOS COMPONENTES

Sustancia / Mezcla : Mezcla

Componentes peligrosos

No contiene ingredientes peligrosos

SECCIÓN 4. PRIMEROS AUXILIOS

Recomendaciones generales : Sin peligros que requieran medidas especiales de primeros auxilios.

Si es inhalado : Trasládese a un espacio abierto.

En caso de contacto con la : Quítese inmediatamente la ropa y zapatos contaminados.

Hoja Técnica de Seguridad del Material

Separol® Madera



Versión 1.0

Número SDS: 100000015754

Fecha de revisión: 2017.03.14

piel	Eliminar lavando con jabón y mucha agua.
En caso de contacto con los ojos	: Lavarse abundantemente los ojos con agua como medida de precaución. Retirar las lentillas. Manténgase el ojo bien abierto mientras se lava.
Por ingestión	: Lavar la boca con agua y después beber agua abundante. No dar leche ni bebidas alcohólicas. Nunca debe administrarse nada por la boca a una persona inconsciente.
Principales síntomas y efectos, agudos y retardados	: No se conocen efectos significativos o riesgos. Vea la Sección 11 para obtener información detallada sobre la salud y los síntomas.
Notas para el médico	: Tratar sintomáticamente.

SECCIÓN 5. MEDIDAS DE LUCHA CONTRA INCENDIOS

Medios de extinción apropiados	: Usar medidas de extinción que sean apropiadas a las circunstancias del local y a sus alrededores.
Productos de combustión peligrosos	: No se conocen productos de combustión peligrosos
Métodos específicos de extinción	: Procedimiento estándar para fuegos químicos.
Equipo de protección especial para el personal de lucha contra incendios	: En caso de fuego, protéjase con un equipo respiratorio autónomo.

SECCIÓN 6. MEDIDAS EN CASO DE VERTIDO ACCIDENTAL

Precauciones relativas al medio ambiente	: No se requieren precauciones especiales medioambientales.
Métodos y material de contención y de limpieza	: Limpiar con material absorbente (por ejemplo tela, vellón). Guardar en contenedores apropiados y cerrados para su eliminación.

SECCIÓN 7. MANIPULACIÓN Y ALMACENAMIENTO

Indicaciones para la protección contra incendio y explosión	: Disposiciones normales de protección preventivas de incendio.
Consejos para una manipulación segura	: Equipo de protección individual, ver sección 8. No se requiere consejo de manipulación especial. Cuando se manejen productos químicos, siga las medidas estándar de higiene.
Condiciones para el almace-	: Conservar el envase herméticamente cerrado en un lugar



- naje seguro : seco y bien ventilado.
Almacenar de acuerdo con la reglamentación local.
- Materias que deben evitarse : No hay restricciones especiales para el almacenamiento con otros productos.

SECCIÓN 8. CONTROLES DE EXPOSICIÓN/ PROTECCIÓN INDIVIDUAL

Componentes con valores límite ambientales de exposición profesional.

No contiene sustancias con valores límites de exposición profesional.

Protección personal

- Protección respiratoria : Utilice protección respiratoria a menos que exista una ventilación de escape adecuada o a menos que la evaluación de la exposición indique que el nivel de exposición está dentro de las pautas recomendadas.
La clase de filtro para el respirador debe ser adecuado para la concentración máxima prevista del contaminante (gas/vapor/aerosol/particulados) que puede presentarse al manejar el producto. Si se excede esta concentración, se debe utilizar un aparato respiratorio autónomo.
- Protección de las manos : Guantes químico-resistentes e impermeables que cumplan con estándares aprobados deben ser utilizados cuando se manejen productos químicos y la evaluación del riesgo indica que es necesario.
- Protección de los ojos : Equipo de protección ocular que cumpla con estándares aprobados debe ser utilizado cuando la evaluación del riesgo indica que es necesario.
- Protección de la piel y del cuerpo : Elegir la protección para el cuerpo según sus características, la concentración y la cantidad de sustancias peligrosas, y el lugar específico de trabajo.
- Medidas de higiene : No comer ni beber durante su utilización.
No fumar durante su utilización.

SECCIÓN 9. PROPIEDADES FÍSICAS Y QUÍMICAS

- Aspecto : líquido
- Color : Sin datos disponibles
- Olor : característico
- Umbral olfativo : Sin datos disponibles
- pH : Sin datos disponibles
- Punto/intervalo de fusión /
Punto de congelación : Sin datos disponibles

Hoja Técnica de Seguridad del Material

Separol® Madera



Versión 1.0

Número SDS: 100000015754

Fecha de revisión: 2017.03.14

Punto /intervalo de ebullición	: Sin datos disponibles
Punto de inflamación	: > 150 °C (> 302 °F) Método: (Sistema de) Copa Cerrada Seta
Tasa de evaporación	: Sin datos disponibles
Inflamabilidad	: Sin datos disponibles
Límite superior de explosividad	: Sin datos disponibles
Límites inferior de explosividad	: Sin datos disponibles
Presión de vapor	: Sin datos disponibles
Densidad relativa del vapor	: Sin datos disponibles
Densidad	: aprox. 0,87 g/cm ³ (20 °C (68 °F) ())
Solubilidad(es)	
Solubilidad en agua	: Sin datos disponibles
Solubilidad en otros disolventes	: Sin datos disponibles
Coefficiente de reparto n-octanol/agua	: Sin datos disponibles
Temperatura de auto-inflamación	: Sin datos disponibles
Temperatura de descomposición	: Sin datos disponibles
Viscosidad	
Viscosidad, dinámica	: Sin datos disponibles
Viscosidad, cinemática	: > 20,5 mm ² /s (40 °C)
Propiedades explosivas	: Sin datos disponibles
Peso molecular	: Sin datos disponibles

SECCIÓN 10. ESTABILIDAD Y REACTIVIDAD

Reactividad	: No se conoce reacciones peligrosas bajo condiciones de uso normales.
Estabilidad química	: El producto es químicamente estable.
Posibilidad de reacciones peligrosas	: Sin peligros a mencionar especialmente.



Condiciones que deben evitarse : Sin datos disponibles

Materiales incompatibles : Sin datos disponibles

No se descompone si se almacena y aplica como se indica.

SECCIÓN 11. INFORMACIÓN TOXICOLÓGICA

Toxicidad aguda

Sin datos disponibles

Corrosión o irritación cutáneas

No está clasificado en base a la información disponible.

Lesiones o irritación ocular graves

No está clasificado en base a la información disponible.

Sensibilización respiratoria o cutánea

Sensibilización cutánea: No está clasificado en base a la información disponible.

Sensibilización respiratoria: No está clasificado en base a la información disponible.

Mutagenicidad en células germinales

No está clasificado en base a la información disponible.

Carcinogenicidad

No está clasificado en base a la información disponible.

Toxicidad para la reproducción

No está clasificado en base a la información disponible.

Toxicidad específica en determinados órganos (stot) - exposición única

No está clasificado en base a la información disponible.

Toxicidad específica en determinados órganos (stot) - exposiciones repetidas

No está clasificado en base a la información disponible.

Toxicidad por aspiración

No está clasificado en base a la información disponible.

SECCIÓN 12. INFORMACIÓN ECOLÓGICA

Ecotoxicidad

Sin datos disponibles

Persistencia y degradabilidad

Sin datos disponibles

Potencial de bioacumulación

Sin datos disponibles

Movilidad en el suelo

Sin datos disponibles

Otros efectos adversos

Producto:

Hoja Técnica de Seguridad del Material

Separol® Madera



Versión 1.0

Número SDS: 100000015754

Fecha de revisión: 2017.03.14

Información ecológica complementaria : No existe ningún dato disponible para ese producto.

SECCIÓN 13. CONSIDERACIONES RELATIVAS A LA ELIMINACIÓN

Métodos de eliminación.

Envases contaminados : Los contenedores vacíos deben ser llevados a un sitio de manejo aprobado para desechos, para el reciclado o eliminación.

SECCIÓN 14. INFORMACIÓN RELATIVA AL TRANSPORTE

Regulaciones internacionales

IATA-DGR

Mercancía no peligrosa

Código-IMDG

Mercancía no peligrosa

Transporte a granel con arreglo al anexo II del Convenio Marpol 73/78 y del Código IBC

No aplicable al producto suministrado.

NCh 2190/382

Mercancía no peligrosa

SECCIÓN 15. INFORMACIÓN REGLAMENTARIA

Reglamentación y legislación en materia de seguridad, salud y medio ambiente específicas para la sustancia o la mezcla

Registro de Sustancias y Agentes Cancerígenos. : No aplicable

Convención Internacional sobre las Armas Químicas (CWC) Programas sobre los Productos Químicos Tóxicos y los Precursores (Louisiana Administrative Code, Title 33, Part V Section 10101 et. seq.) : No aplicable

Control de precursores y sustancias químicas esenciales para la elaboración de estupefacientes. : No aplicable

SECCIÓN 16. OTRA INFORMACIÓN

La información contenida en esta ficha de datos de seguridad corresponde a nuestro nivel de conocimiento en el momento de su publicación. Quedan excluidas todas las garantías. Se aplicarán nuestras condiciones generales de venta en vigor. Por favor, consulte la Hoja de Datos del Producto antes de su uso y procesamiento.

ACST



NAFTA NORMAL
FICHA DE DATOS DE SEGURIDAD
 Versión: 1 – Marzo de 2018

SECCIÓN I - IDENTIFICACIÓN DEL PRODUCTO Y DE LA COMPAÑÍA

Nombre del producto: **NAFTA NORMAL**
 Código Interno: -
 Uso previsto: Combustible.

PAN AMERICAN ENERGY LLC, Sucursal Argentina

Av. Leandro N. Alem 1180 (C1001AAT) Ciudad Autónoma de Buenos Aires, Argentina
 Teléfonos para consultas técnicas: LUBRICANTES 0800-888-8088
 COMBUSTIBLES 0800-555-3776 / 0800-666-3776

Teléfono para emergencias (24 horas): **0-800-222-2933 (En Argentina)**
+54 11 5199 1409 (Fuera de Argentina)

SECCIÓN II – IDENTIFICACIÓN DE LOS PELIGROS

CLASIFICACIÓN (acorde al Sistema Globalmente Armonizado)

PICTOGRAMA



Líquidos inflamables (Categoría 2)
 Irritación cutánea (Categoría 2) – Irritación ocular (Categoría 2A)
 Mutagenicidad (Categoría 1B) - Carcinogenicidad (Categoría 1B)
 Toxicidad para la reproducción (Categoría 2)
 Toxicidad específica en determinados órganos – única exposición (Categoría 3)
 Peligro por aspiración (Categoría 1)
 Peligro para el medio ambiente acuático – peligro agudo (Categoría 2)
 Peligro para el medio ambiente acuático – peligro a largo plazo (Categoría 2)

PALABRA DE ADVERTENCIA

PELIGRO

INDICACIONES DE PELIGRO

H225 - Líquido y vapores muy inflamables.
 H304 - Puede ser mortal en caso de ingestión y penetración en las vías respiratorias.
 H315 - Provoca irritación cutánea.
 H319 - Provoca irritación ocular grave.
 H336 - Puede provocar somnolencia o vértigo.
 H340 - Puede provocar defectos genéticos.
 H350 - Puede provocar cáncer.
 H361 - Susceptible de perjudicar la fertilidad o dañar al feto.
 H401 + H411 - Tóxico para los organismos acuáticos, con efectos nocivos duraderos.

CONSEJOS DE PRUDENCIA

P210 - Mantener alejado del calor, superficies calientes, chispas, llamas al descubierto y otras fuentes de ignición. No fumar.
 P273 - No dispersar en el medio ambiente.
 P280 - Usar guantes, ropa y equipo de protección para los ojos y la cara.
 P301 + P310 + P331 - EN CASO DE INGESTIÓN: Llamar inmediatamente a un CENTRO DE TOXICOLOGÍA/médico. NO provocar el vómito.

Versión: 1 Fecha de Emisión: Marzo de 2018
 Reemplaza a: -
 Elaborado por: CIQUIME Revisado por: PAN AMERICAN ENERGY LLC, Sucursal Argentina

P303 + P361 + P353 - EN CASO DE CONTACTO CON LA PIEL (o el pelo): Quitar inmediatamente toda la ropa contaminada. Enjuagar la piel con agua o ducharse.

P304 + P340 - EN CASO DE INHALACIÓN: Transportar a la persona al aire libre y mantenerla en una posición que le facilite la respiración.

P305 + P351 + P338 - EN CASO DE CONTACTO CON LOS OJOS: Enjuagar con agua cuidadosamente durante varios minutos. Quitar las lentes de contacto cuando estén presentes y pueda hacerse con facilidad. Proseguir con el lavado.

P370 + P378 - En caso de incendio: Utilizar niebla de agua, espuma, polvo químico seco o dióxido de carbono (CO₂) para la extinción.

P403 + P235 - Almacenar en un lugar bien ventilado. Mantener fresco.

P501 - Eliminar el contenido/ recipiente conforme a la reglamentación nacional/ internacional.

INFORMACIÓN ADICIONAL

Ninguno.

SECCIÓN III - COMPOSICIÓN / INFORMACIÓN DE LOS COMPONENTES

SUSTANCIA

No aplica.

MEZCLA

COMPONENTES EN LA MEZCLA	N° CAS	% PESO	CLASIFICACIÓN
Gasolina	86290-81-5	99,8	Flam. Liquid 1; Skin Irrit 2; Carc. 1B; Muta. 1B; Repr. 2; STOT Single Exp. 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2
Benceno	71-43-2	< 2,5	Flam. Liq. 2; Carc. 1A; Muta. 1B; STOT RE 1; Asp. Tox. 1; Eye Irrit. 2; Skin Irrit. 2; Aquatic Acute 2

SECCIÓN IV - PRIMEROS AUXILIOS

MEDIDAS GENERALES:	Evite la exposición al producto, tomando las medidas de protección adecuadas. Consulte al médico, llevando la ficha de seguridad.
CONTACTO CON LOS OJOS:	Enjuague inmediatamente los ojos con agua durante al menos 15 minutos, y mantenga abiertos los párpados para garantizar que se aclara todo el ojo y los tejidos del párpado. Enjuagar los ojos en cuestión de segundos es esencial para lograr la máxima eficacia. Si tiene lentes de contacto, quíteselas después de los primeros 5 minutos y luego continúe enjuagándose los ojos. Consultar al médico.
CONTACTO CON LA PIEL:	Lávese inmediatamente después del contacto con abundante agua y jabón, durante al menos 15 minutos. Quítese la ropa contaminada y lávela antes de reusar.
INHALACIÓN:	Traslade a la víctima y procúrele aire limpio. Manténgala en calma. Si no respira, suminístrele respiración artificial. Llame al médico.
INGESTIÓN:	NO INDUZCA EL VÓMITO. Enjuague la boca con agua. Nunca suministre nada oralmente a una persona inconsciente. Llame al médico. Si el vómito ocurre espontáneamente, coloque a la víctima de costado para reducir el riesgo de aspiración.
SÍNTOMAS:	Inhalación: irritante de la nariz, garganta y pulmones. Puede causar depresión al sistema nervioso central. Contacto con la piel: Irritante para la piel. La inyección a alta presión bajo la piel puede causar daños graves. Contacto con los ojos: Puede ser irritante para los ojos. Ingestión: Si es ingerido, puede ser aspirado causando daño al pulmón.

NOTA PARA EL MÉDICO:

Si se ingiere, el material puede ser aspirado por los pulmones y causar neumonía química. Tratar adecuadamente. Proveer tratamiento sintomático. Para más información, consulte a un Centro de Intoxicaciones. La exposición prolongada y repetida al benceno puede causar lesiones graves a los órganos formadores de sangre y se asocia con anemia y al desarrollo posterior de leucemia mieloide aguda.

SECCIÓN V - MEDIDAS DE LUCHA CONTRA INCENDIOS

MEDIOS DE EXTINCIÓN APROPIADOS:

Utilizar polvo químico seco, espuma, arena o CO₂. Utilizar el producto acorde a los materiales de los alrededores. NO USAR chorros de agua directos.

PELIGROS ESPECÍFICOS:

El recipiente sometido al calor puede explotar inesperadamente y proyectar fragmentos peligrosos.
Los vapores son más pesados que el aire y se pueden esparcir por el suelo. En caso de incendio puede desprender humos y gases irritantes y/o tóxicos, como monóxido de carbono y otras sustancias derivadas de la combustión incompleta.

EQUIPAMIENTO ESPECIAL DE PROTECCIÓN PARA BOMBEROS:

Utilice equipo autónomo de respiración. La ropa de protección estructural de bomberos provee protección limitada en situaciones de incendio ÚNICAMENTE; puede no ser efectiva en situaciones de derrames.
En derrames importantes use ropa protectora contra los productos químicos, la cual esté específicamente recomendada por el fabricante. Esta puede proporcionar poca o ninguna protección térmica.

MEDIDAS ESPECIALES DE LUCHA CONTRA INCENDIOS:

Rocíe con agua los recipientes para mantenerlos fríos. Enfríe los contenedores con chorros de agua hasta mucho después de que el fuego se haya extinguido. Combata el incendio desde una distancia máxima o utilice soportes fijos para mangueras o reguladores.
Prevenga que el agua utilizada para el control de incendios o la dilución ingrese a cursos de agua, drenajes o manantiales.
Retírese inmediatamente si sale un sonido creciente de los mecanismos de seguridad de las ventilaciones, o si el tanque se empieza a decolorar. SIEMPRE manténgase alejado de tanques envueltos en fuego.
El producto caliente puede ocasionar erupciones violentas al entrar en contacto con el agua, pudiendo proyectarse material caliente y provocar serias quemaduras.

SECCIÓN VI - MEDIDAS EN CASO DE DERRAME ACCIDENTAL

PRECAUCIONES Y PROCEDIMIENTOS DE EMERGENCIA:

Eliminar todas las fuentes de ignición (no fumar, no usar bengalas, chispas o llamas en el área de peligro). Detenga la fuga si puede hacerlo sin riesgo. Todos los equipos usados para manipular el producto debe estar conectado a tierra. No toque ni camine sobre el material derramado. Se puede utilizar espuma para reducir la emisión de vapores. No permitir la reutilización del producto derramado.

PRECAUCIONES DEL MEDIO AMBIENTE:

Contener el líquido con un dique o barrera. Prevenir la entrada hacia vías navegables, alcantarillas, sótanos o áreas confinadas no controladas.

CONTENCIÓN Y LIMPIEZA:

Recoger el producto utilizando arena, vermiculita, tierra o material absorbente inerte y limpiar o lavar completamente la zona contaminada. Disponer el agua y el residuo recogido en envases señalizados para su eliminación como residuo químico.

SECCIÓN VII - MANIPULACIÓN Y ALMACENAMIENTO

PRECAUCIONES PARA LA MANIPULACIÓN SEGURA:

Prohibido comer, beber o fumar durante su manipulación. Evitar contacto con ojos, piel y ropa. Lavarse los brazos, manos, y uñas después de manejar este producto. Facilitar el acceso a duchas de seguridad y

lavaojos de emergencias.
Utilizar equipamiento y ropa que evite la acumulación de cargas electrostáticas. Controlar y evitar la formación de atmósferas explosivas.

CONDICIONES DE
ALMACENAMIENTO
SEGURO:

Almacenar en un área limpia, seca y bien ventilada. Proteger del sol. No fume, sude o haga cualquier trabajo que pueda producir llamas o chispas en el área de almacenamiento. Manténgase lejos de oxidantes fuertes.

Mantener alejado de Agentes oxidantes fuertes, ácidos y bases, halógenos.

Material de empaque apropiado: el suministrado por el fabricante.

Código NFPA: **1 3 0**

SECCIÓN VIII – CONTROLES DE EXPOSICIÓN Y PROTECCIÓN PERSONAL

PARÁMETROS DE CONTROL:	CMP (Res. MTESS 295/03):	300 ppm; Gasolina 0,5 ppm; Benceno
	CMP-CPT (Res. MTESS 295/03):	500 ppm; Gasolina
	CMP-C (Res. MTESS 295/03):	N/D
	REL-TWA:	0,1 ppm, Benceno
	REL-STEL:	1 ppm, Benceno
	TLV-TWA (ACGIH):	300 ppm; Gasolina 0,5 ppm; Benceno
	TLV-STEL (ACGIH):	500 ppm; Gasolina 2,5 ppm; Benceno
	PEL (OSHA 29 CFR 1910.1000):	1 ppm, Benceno
	IDLH (NIOSH):	500 ppm, Benceno
	MEDIDAS DE PROTECCIÓN:	Mantener ventilado el lugar de trabajo. La ventilación normal para operaciones habituales de manufacturas es generalmente adecuada. Campanas locales deben ser usadas durante operaciones que produzcan o liberen grandes cantidades de producto. En áreas bajas o confinadas debe proveerse ventilación mecánica. Disponer de duchas y estaciones lavaojos.
PROTECCIÓN RESPIRATORIA:	En los casos necesarios, utilizar protección respiratoria para vapores orgánicos (A). Debe prestarse especial atención a los niveles de oxígeno presentes en el aire. Si ocurren grandes liberaciones, utilizar equipo de respiración autónomo (SCBA).	
PROTECCIÓN DÉRMICA:	Al manipular este producto se deben usar guantes protectores impermeables de nitrilo (que cumplan con las normas IRAM 3607-3608-3609 y EN 374), ropa de trabajo y zapatos de seguridad resistentes a productos químicos.	
PROTECCIÓN OCULAR:	Se deben usar gafas de seguridad, a prueba de salpicaduras de productos químicos (que cumplan con la EN 166).	

SECCIÓN IX – PROPIEDADES FÍSICAS Y QUÍMICAS

FORMA Y APARIENCIA:	Líquido claro.
OLOR:	Aromático.
UMBRAL DE OLOR:	N/D
COLOR:	Levemente amarillento.
pH:	N/D
PUNTO DE FUSIÓN:	N/D
PUNTO DE EBULLICIÓN:	25°C a 215°C (77°F a 419°F)

PUNTO DE INFLAMACIÓN:	-40°C (-40°F) [ASTM D56]
TASA DE EVAPORACIÓN:	> 10 (Acetato de n-butilo = 1)
TEMP. DE AUTOIGNICIÓN:	440°C (824°F)
TEMP. DE DESCOMPOSICIÓN:	N/D
INFLAMABILIDAD:	El producto es inflamable.
INTERVALO DE EXPLOSIVIDAD:	1,0 % - 7,0%
PRESIÓN DE VAPOR (38°C):	455 mmHg (60,5 kPa)
DENSIDAD VAPOR (AIRE=1):	3
DENSIDAD (15°C):	0,72 g/cm ³
SOLUBILIDAD EN AGUA (20°C):	Insignificante en agua.
CONSTANTE DE HENRY (20°C):	N/D
COEF. DE REPARTO (logK _{o/w}):	N/D
VISCOSIDAD (cSt a 20°C):	0,9
Log K _{oc} :	N/D
PROPIEDADES EXPLOSIVAS:	No explosivo. De acuerdo con la columna 2 del Anexo VII del REACH, este estudio no es necesario porque: en la molécula no hay grupos químicos asociados a propiedades explosivas.
PROPIEDADES COMBURENTES:	De acuerdo con la columna 2 del Anexo VII del REACH, este estudio no es necesario porque: la sustancia, por su estructura química, no puede reaccionar de forma exotérmica con materias combustibles.
OTROS DATOS:	Ninguna.

SECCIÓN X – ESTABILIDAD Y REACTIVIDAD

REACTIVIDAD:	No se espera que se produzcan reacciones o descomposiciones del producto en condiciones normales de almacenamiento. No contiene peróxidos orgánicos. No es corrosivo para los metales. No reacciona con el agua.
ESTABILIDAD QUÍMICA:	El producto es químicamente estable y no requiere estabilizantes.
REACCIONES PELIGROSAS:	No se espera polimerización peligrosa.
CONDICIONES A EVITAR:	Descargas estáticas, calor y presión. Evitar el contacto con superficies calientes (mayores a 80 °C)
PRODUCTOS PELIGROSOS DE DESCOMPOSICIÓN:	En caso de calentamiento puede desprender vapores irritantes y tóxicos. En caso de incendio, ver la Sección 5.
MATERIALES INCOMPATIBLES:	Agentes oxidantes fuertes, ácidos y bases, halógenos.

SECCIÓN XI – INFORMACIÓN TOXICOLÓGICA

VÍAS DE EXPOSICIÓN:	Inhalatoria, contacto dérmico y ocular.
EFFECTOS AGUDOS:	Inhalación: irritante de la nariz, garganta y pulmones. Puede causar depresión al sistema nervioso central. Contacto con la piel: Irritante para la piel. La inyección a alta presión bajo la piel puede causar daños graves.

	Contacto con los ojos: Puede ser irritante para los ojos. Ingestión: Si es ingerido, puede ser aspirado causando daño al pulmón.
CARCINOGENICIDAD, MUTAGENICIDAD Y OTROS EFECTOS:	Se identifican componentes de este producto a niveles mayores o iguales que 0,1%, que presentan características de carcinógenos humanos probables, posibles o confirmados por la IARC (Agencia Internacional de Investigaciones sobre Carcinógenos).
DATOS EN ANIMALES:	ETA-DL50 oral (rata, calc.): > 5000 mg/kg ETA-DL50 der (conejo, calc.): 2051 mg/kg ETA-CL50 inh. (rata, 4hs., calc.): > 5 mg/l Irritación dérmica (conejo, estim.): irritante Irritación ocular (conejo, estim.): irritante Sensibilidad cutánea (cobayo, estim.): no sensibilizante Sensibilidad respiratoria (cobayo, estim.): no sensibilizante

SECCIÓN XII – INFORMACIÓN ECOTOXICOLÓGICA


ECOTOXICIDAD:	ETA-CE50 (O. mykiss, calc., 48 h): 8,1 mg/l ETA-CE50 (D. magna, calc., 48 h): 4,6 mg/l ETA-CE50 (P. subcapitata, calc., 48 h): 3,2 mg/l ETA-CE50 (T. pyriformis, calc., 48 h): 15,3 mg/l ETA-CSEO (D. rerio, calc., 14 d): 0,2 mg/l ETA-CSEO (D. magna, calc., 14 d): 0,2 mg/l
PERSISTENCIA Y DEGRADABILIDAD:	BIODEGRADABILIDAD (estimado): 75% en 28 días - fácilmente biodegradable. PNEC (agua): N/D PNEC (mar): N/D PNEC-STP: N/D Esta sustancia/mezcla no cumple los criterios PBT del anexo XIII del reglamento REACH. Esta sustancia/mezcla no cumple los criterios mPmB del anexo XIII del reglamento REACH.
BIOACUMULACIÓN:	Log Ko/w: N/D BIOACUMULACIÓN EN PECES – BCF (OCDE 305): 10 a 2500. Tiene el potencial de bioacumularse, sin embargo el metabolismo sobre las propiedades físicas pueden reducir la bioconcentración o limitar la biodisponibilidad.
MOVILIDAD:	LogKoc: N/D CONSTANTE DE HENRY (20°C): N/D
AOX, CONTENIDO DE METALES:	No contiene halógenos orgánicos ni metales.

SECCIÓN XIII – CONSIDERACIONES PARA DESECHO


Tanto el sobrante de producto como los envases vacíos deberán ser eliminarse según la legislación vigente en materia de Protección del Medio ambiente y en particular de Residuos Peligrosos (Ley Nacional N° 24.051 y sus reglamentaciones). Deberá clasificar el residuo y disponer del mismo mediante una empresa autorizada.

Aviso de contenedor vacío (donde sea aplicable): Los contenedores vacíos pueden contener residuos y ser por tanto peligrosos. No intente rellenar o limpiar contenedores sin poseer las instrucciones apropiadas. Los tambores vacíos se deben purgar, drenar completamente y almacenarse seguros hasta que se reacondicionen o eliminen adecuadamente. Los contenedores vacíos deben reciclarse, recuperarse o eliminarse a través de contratistas debidamente calificados o autorizados y en concordancia con las regulaciones oficiales. NO PRESURICE, NI CORTE, SUELDE CON METALES DUROS NI BLANDOS O CON SOLDADURA FUERTE, NI BARRENE, RECTIFIQUE O EXPONGA ESOS CONTENEDORES A CALOR, LLAMA, CHISPAS, ELECTRICIDAD ESTÁTICA O A OTRAS FUENTES DE IGNICIÓN PUES PODRÍAN EXPLOTAR Y CAUSAR DAÑOS O LA MUERTE


SECCIÓN XIV – INFORMACIÓN PARA EL TRANSPORTE**TRANSPORTE TERRESTRE**

Nombre Apropriado para el Transporte:	GASOLINA	
N° UN/ID:	1203	
Clase de Peligro:	3	
Grupo de Embalaje:	II	
Código de Riesgo:	3	
Cantidad limitada y exceptuada:	ADR: 1L / E2	R.195/97: 333 Kg

TRANSPORTE AÉREO (ICAO/IATA)

Nombre Apropriado para Embarque:	GASOLINA	
N° UN/ID:	1203	
Clase de Peligro:	3	
Grupo de Embalaje:	II	
Instrucciones para aviones de pasajeros y carga:	Y341, 1L / 353, 5L	
Instrucciones para aviones de carga:	364, 60L	
CRE:	3H	

TRANSPORTE MARÍTIMO (IMO)**Transporte en embalajes de acuerdo al Código IMDG**

Nombre Apropriado para Embarque:	GASOLINA	
UN/ID N°:	1203	
Clase de Peligro:	3	
Grupo de Embalaje:	II	
EMS:	F-E; S-E	
Estiba y manipulación:	Categoría E	
Segregación:	-	
Contaminante Marino:	SI (naphtha)	
Nombre para la documentación de transporte:	UN1203; GASOLINE; Class 3; PG II; MARINE POLLUTANT; Flash point -40°C (-40°F) c.c.	

SECCIÓN XV – REGULACIÓN DE USO

Reglamentación y legislación en materia de seguridad, salud y medio ambiente específicas para la sustancia o la mezcla:

Sin peligro para la capa de ozono (1005/2009/CE).

Contenidos orgánicos volátiles de los compuestos (COV) (1999/13/EC): N/D

Ficha de Datos de Seguridad conforme a la Resolución 801/2015 de la Superintendencia de Riesgos del Trabajo, MTESS, y a la Norma IRAM 41400: 2013 – Formato de Ficha de Datos de Seguridad según el SGA.

Resolución 295/2003 Ministerio de Trabajo, Empleo y Seguridad Social, República Argentina – Controles de exposición ambiental.

Resolución 310/2003 Superintendencia de Riesgos del Trabajo, Ministerio de Trabajo, Empleo y Seguridad Social, República Argentina – Agentes cancerígenos.

Ley Nacional N° 24.051 y sus reglamentaciones, República Argentina – Ley de residuos peligrosos.

Resolución 195/97 Secretaría de Obras Públicas y Transporte, República Argentina – Reglamento General para el Transporte de Mercancías Peligrosas por Carretera.

Acuerdo europeo sobre Transporte Internacional de Mercancías peligrosas por carretera (ADR 2015).

Reglamento relativo al Transporte Internacional de Mercancías Peligrosas por Ferrocarril (RID 2015).

Código Marítimo Internacional de Mercancías Peligrosas (Enmienda 38-16), IMO.
 Código IBC/MARPOL, IMO, Resolución MEPC 64/23/Add.1.
 Regulaciones de la Asociación de Transporte Aéreo Internacional (IATA 56 ed., 2015) relativas al transporte de mercancías peligrosas por vía aérea.
 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: no aplicable.	REL: Límite de Exposición Recomendada.
N/D: sin información disponible.	PEL: Límite de Exposición Permitido.
CAS: Servicio de Resúmenes Químicos	INSHT: Instituto Nacional de Seguridad e Higiene en el Trabajo.
IARC: Agencia Internacional para la Investigación del Cáncer	ETA: estimación de la toxicidad aguda.
ACGIH: American Conference of Governmental Industrial Hygienists.	DL ₅₀ : Dosis Letal Media.
TLV: Valor Límite Umbral	CL ₅₀ : Concentración Letal Media.
TWA: Media Ponderada en el tiempo	CE ₅₀ : Concentración Efectiva Media.
STEL: Límite de Exposición de Corta Duración	CI ₅₀ : Concentración Inhibitoria Media.
	: Cambios respecto a la revisión anterior.

La clasificación se ha efectuado en base a análogos químicos y a información del producto.
 SECCIÓN 2: clasificación por analogía con otros productos, y en base a datos del producto.
 SECCIÓN 9: datos del producto.
 Inflamabilidad: conforme a datos de ensayos.
 SECCIÓN 11 y 12: analogía con otros productos.
 Toxicidad aguda: método de cálculo de estimación de toxicidad aguda.

Esta información solamente se refiere al producto mencionado en la Sección I y no será válida para otro(s) producto(s) ni para cualquier proceso. Esta ficha de datos de seguridad proporciona información de salud y seguridad. La información es, según nuestro mejor conocimiento y entendimiento, correcta y completa y se facilita de buena fe, pero sin otorgar garantía alguna. El producto debe ser usado en aplicaciones consistentes con nuestra bibliografía del producto. Los individuos que manejen este producto, deben ser informados de las precauciones de seguridad recomendadas y deben tener acceso a esta información. Para cualquier otro uso, se debe evaluar la exposición de forma tal que se puedan implementar prácticas apropiadas de manipulación y programas de entrenamiento para asegurar operaciones seguras en el lugar de trabajo. En todos los casos será responsabilidad propia del usuario que esta información sea apropiada y completa para la utilización especial de este producto.

Versión:	1	Fecha de Emisión:	Marzo de 2018
Reemplaza a:			
Elaborado por:	CIQUIME	Revisado por:	PAN AMERICAN ENERGY LLC, Sucursal Argentina

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name : Shell V-Power Diesel

Product Code: 002C0251

Information about the manufacturer or provider

Manufacturer/Provider: **Shell CAPSA**

Av. Presidente R.S. Peña 788

Buenos Aires-C1035 AAP

Argentina

Telephone : 0810 999 7435

Telefax :

Emergency Telephone: +54 11 4962 6/ 2247

; Centro de Toxicología Hospital Ricardo Gutiérrez – Ciudad Autónoma de Bs. As.

Recommended use of the chemical product and use restrictions

Recommended use: Fuel for diesel motors

Restrictions of use:

This product must not be used in applications different to those recommended in section 1 without following first the providers' recommendations.

This product will not be used as dissolvent or cleaning product; or for lighting flames; or skin cleaner.

SECTION 2. HAZARD IDENTIFICATION

Flammable liquids : Category 3 **SGA Classification**

Inhalation danger : Category 1

Acute Toxicity (inhalation) Category 4

Skin irritation Category 2

Carcinogenicity : Category 2

Specific toxicity in determined organs –
(blood, Thymus, Liver) repeated
expositions

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date
10

Chronic Acute Toxicity: Category 2 Chronic

Aquatic Toxicity : Category 2

Tagged elements GHS

Danger Pictogram

:



Warning:

Danger

Danger Indications:

PHYSICAL DANGERS:

H226 Flammable liquids and vapors.

HEALTH RISKS:

H304 Can be lethal in case of ingestion and penetration through respiratory tracks.

H332 Noxious in case of inhalation.

H315 Skin rash

H373 It may produce damage in the organs (blood, liver, thymus) under permanent or repeated exposure

H351 Suspected carcinogenic.

ENVIRONMENTAL DANGERS

H401 Toxic for aquatic organisms

H411 Toxic for aquatic organisms, with permanent noxious effects.

Safety Advice:

Prevention:

P210 Keep aside from heat, hot surfaces, sparks, open fires and any other source of ignition. No smoking.

P260 Do not inhale powder/ smoke/ gas/ haze/ vapors/ air mist.

P273 Avoid liberation in the environment.

P280 Take protection gloves/ clothes/ goggles/ masks.

Intervention:

P301+ P310 IN CASE OF INGESTION: Communicate immediately with a TOXIC CONTROL CENTER or a physician.

P331 Do not induce vomiting.

Other dangers not classified.

Can be flammable in surfaces with temperatures over auto ignition.

Accumulated vapor in the top of deposits or containers can be flammable and explode at temperatures over auto ignition, when vapor concentration is in a range of flammability.

This material is static storage.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date
10

Including with the correct the connection and earthing, this material can storage electrostatic charge.

If enough charge is accumulated, an electrostatic discharge and ignition of mixture air-vapor flammables may be caused.

This product if for use, exclusively in closed systems.

SECTION 3. COMPOSITION/INFORMATION OF COMPONENTS

Chemical nature: Complex combination of hydrocarbons produced by the distillation of crude oil. Hydrocarbon composed with a number of carbons mainly inside the interval C9 to C20 and a boiling interval of 163° C to 357 °C.
May have additives with < 0.1% v/v each.
May contain cetane substance (etilo hexil nitrate) with <0,2% v/v.

May contain methyl and ethylic esters from lipidic sources.

May contain oils disintegrated catalytically in which may be present polycyclic aromatic compounds, mainly species of 3 rings but some of 4 or 6 rings.

Dangerous Components

Chemical Name	No. CAS	Classificatio n	Concentration (%)
fuels, for diesel motors.	68334-30-5	Flam. Liq.3; H226 Asp. Tox.1; H304 Acute Tox.4; H332 Skin Irrit.2; H315 Carc.2; H351 STOT RE2; H373 Aquatic Acute2; H401 Aquatic Chronic2; H411	<= 100

It may be used colors or signs to indicate the fiscal state and prevent frauds. For explanation of abbreviations see section 16

Others

Contain:

Chemical Name	Classification Number	Concentration (%)
Cumene	98-82-8, 202-704-5	>= 0 - <= 0,5
Naftalene	91-20-3, 202-049-5	>= 0 - <= 0,5

SECTION 4. FIRST AIDS

If inhaled: Call local emergency number or the facility number.

Take to fresh air. Take appropriate breathing protection to rescue the victim. If the victim suffers from breathing difficulty o chest pain, is dizzy,

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

- not conscious, or vomits, give oxygen to 100% with a mask or practice RCP accordingly and transport him/her to the nearest medical center.
- In case of skin contact. : Take off contaminated clothes. Wash the skin immediately with plenty of water during 15 minutes, following a wash with water and soap. If there is reddening, swelling, pain and/or blistering, take to nearest medical center.
If there is high pressure equipment, may produce injection under skin. If there is a wound for high pressure, the individual must be taken immediately to hospital. Do not wait for symptoms to be developed
Ask for medical help even if there are no apparent wounds.
- In case of eye contact. : Rinse eyes immediately with plenty of water.
Take contact lens out, if possible. Continue rinsing.
Take to nearest medical center for supplementary treatment.
- By ingestion : Call local emergency number or the facility number. If swallowed, do not induce vomit: take to nearest medical center for treatment. If there is spontaneous vomit, keep head at hip level to prevent aspiration.
- If after the following 6 hours any of these appear signs or symptoms, go nearest medical center: more than 38.3°C of temperature, low breathing, chest congestion, cough or continuous whistles.
- Main symptoms and effect : If the material penetrates the lungs, the signs and symptoms may include cough, whistlings, difficulty to breathe chest congestion, breathlessness, and/or fever.
Breathing symptoms may delay during several hours after exposure.
Signs and symptoms of skin rash may include burning, reddening, or swelling.
- Rescuer protection : When giving first aids, be sure to use the personal protection equipment appropriate according to the incident, lesion and the surroundings.

Notes for the physician: Give symptomatic treatment.

SECTION 5. FIREFIGHTING SAFETY MEASURES

- Proper firefighting means : Foam, sprayed water or in form of mist. Can be used dry chemical powder, carbon dioxide, sand or earth only for small fires.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

- Non proper firefighting means : Do not use water directly over the products under combustion, this may provoke a vapor blast and spread the fire. It must be avoided the simultaneous use of foam and water over the same surface, because the water destroys the foam.
- Specific Dangers in firefighting. : Dangerous combustion products may contain: A complex mixture of solid particles (in suspension) and liquids, or gases (smoke)
Sulfur oxide.
Organic and inorganic components not identified.
If there is incomplete combustion, carbon monoxide can be originated.
It will float, may burn again over the water surface. Even a lower temperatures of the flame point vapors may originate.
Product vapor is heavier than air and spreads through the ground, being source of a possible ignition at a distance of origin.
- Specific extinguishing methods : Use extinguishing measures that are appropriate to the place and its surroundings.
Clear up the fire area of all not emergence personnel.

Keep the nearest deposits cold spraying them with water. If possible, get the containers out of the risk zone.
If the fire does not extinguish the next action is immediate evacuation.
Keep residual material in the affected places to prevent spills in the drainage networks., trenches and waterways.
- Especial Protection Equipment for firefighting personnel : A special protection equipment must be used, with chemical resistant gloves; it is recommended the use of chemical resistant clothes. An autonomous breathing equipment must be used in case to be closed to the fire in confined spaces. Proper clothes must be chosen according to norms (e.g. in Europe: EN469).

SECTION 6. MEASURES IN CASE OF ACCIDENTAL SPILLAGE

- Personal warning, protection equipment and emergency procedures : Do not inhale smoke or vapor.
Do not manipulate electric equipment.
Insulate the leakages, without personal risks, if possible.
Remove all possible sources of ignition in the surrounding area and evacuate the employees. Try to disperse the gas or direct its flow to a safety place using, for example nebulizers.
Take preventive measures against electrostatic discharges.
Ensure the electric continuity through union and connection to earth of all the equipment. Control

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date
10

the area with fuel gas meters.

Warning related to the environment

: Take measures to minimize effects in underground waters. Keep residual material in the affected places to prevent spills in the drainage networks., trenches and waterways. Prevent spreading or filtering into drainages, canals or rivers through the use of sand, earth or other barriers.

Cleaning and contention methods and materials

: For small liquid spills (<1 barrel), through mechanical means take to a sealable and tagged container for its recuperation or safe disposal. Leave the liquids to evaporate or be absorbed by absorbent material and eliminate safely. Evacuate the polluted soil and eliminate safely.
For big liquid spills (>1 barrel), through mechanical means like a vacuum tanker truck to a rescue storage for recuperation or safe disposal. Do not flush to eliminate waste. Retain as polluted waste. Leave the liquids to evaporate or be absorbed by absorbent material and eliminate safely. Evacuate the polluted soil and eliminate safely.
Prevent spreading or filtering into drainages, canals or rivers through the use of sand, earth or other barriers.

Respect all local and international current legislation Leave out all unnecessary personnel.
Air completely the polluted zone.

Additional Advice: In Chapter 8 of this Safety Sheet you will find

a guide for the selection of personal protection equipment. Report to authorities if there is or may be possible to be any exposure to the public in general or the environment. In Chapter 13 of the Safety Sheet you will find a guide for the spilled material disposal. Local authorities must be informed if important spills cannot be contained. Spills into the sea must be attended through an Emergency Plan as required in Annex 1 of the Regulation 26 of MARPOL.

SECTION 7. MANIPULATION AND STORAGE

General warning: Avoid breathing the material or contact with it.

Use only well-aired areas. Wash well after its handling. See Chapter 8 of this Material Safety Sheet for advice on equipment selection for self-protection.
Use the information in this file as entrance data in

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

a risk evaluation of local circumstances with the aim of determining appropriate controls for the handling, storage and safe disposal of this material.

Leave contaminated clothes to dry in a well-aired place before washing.

Prevent spills.

Use local ventilation for aspiration if there is risk of vapor, mist or spray inhalation.

Never inhale by mouth.

Leather articles, including shoes, cannot be depolluted and should be destroyed to avoid reusing it.

Maintenance and supply activities - Avoid vapor inhalation and skin contact.

Safe manipulation advice : Ensure that all local regulations are met with respect the handling and storage.
Avoid vapor inhalation and/or fogging. Avoid prolonged or repeated skin contact. Do not eat or drink anything when use it.
Extinguish flames. No smoking. Discard ignition sources.
Avoid sparkles.
Earth all equipment.
Discard any piece of cloth that may be contaminated to avoid fires.
Use local ventilation for aspiration if there is risk of vapor, mist or spray inhalation.

Product vapor is heavier than air and spreads through the ground, being source of a possible ignition at a distance of origin.

Avoid eye contact: Strong oxidant agents:

Transfer of product: Avoid splashes in the filling. Once the deposit is full.
wait 2 minutes before opening the lids or gates (for deposits like tanker trucks) Once the deposit is full, wait 30 minutes before opening lids or gates (for deposits of big capacity)
Keep containers closed when not used. Transfer product contamination may provoke vapor ignition of hydrocarbons in the upper part of the deposits that have previously contained gasoline. This vapor may explode if there is a source of ignition. Partially full containers present a greater risk than the ones completely full; thus a special care is required when handling, transferring or sampling them. Including with the correct the connection and earthing, this material can storage electrostatic charge. If enough charge is accumulated, an electrostatic discharge and ignition of mixture air-vapor flammables may be caused.
Be cautious with operations handling that may originate additional dangers caused by

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

accumulation of static charges. They may include bombing (especially turbulent flows), mixture, filtering, water jet, cleaning and filling of tanks and containers, sampling, transference, measurement, vacuum truck operations and mechanic movements. Such activities may result in static discharge, for example sparkle formation. Restrict speed in the piping system during the bombing to avoid the generation of electrostatic discharge (≤ 1 m/s until the filling capacity is reached at the double in its diameter, then ≤ 7 m/s). Avoid water jet. Do not use compressed air for filling, discharge or manipulation operations.

Storage

Others Storage in barrels and small containers:

Barrels/drums can be piled up to 3 meter-height.

Use identified containers in an adequate form and with closings.

Storage in deposit:

Tanks must be specially designed for the product.

Storage deposit in bulk must be surrounded by a contention wall.

Keep deposits far from heat and ignition sources. They must be stored in a well-aired area, surrounded by a dike (terrace), far reached from the sunlight, ignition and other heat sources.

Deposit vapors must not be freed into the atmosphere.

Product loss must be controlled during storage, through the adequate treatment of vapor.

Vapor is heavier than air. Care with the accumulation in confined spaces.

Keep the containers hermetically sealed in a fresh well-aired place.

Keep in cool place.

During bombing there might be electrostatic charge.

Electrostatic discharge may provoke fire. To reduce risks, ensure that there is electric continuity through the earthing connection of all the equipment.

Vapors present in the head of the container might be in the limit of flammability point and so be flammable.

See section 15 for additional information about specific regulations for the packaging and storage of this product.

For contention in case of spills, keep the protection area with a low-permeability floor.

Avoid water entry.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Packaging material: Proper material: For containers or coatings of containers, use stainless steel. Aluminum can be used as well in applications of no risk of fire. They are examples of adequate materials: polyestylene of high density (HDPE) and Viton (FKM), whose compatibility goes well with this product. For container coating, use epoxi solidified paint with amine adduct. For obstructions and joints, use: graphite, PTFE(teflon), viton A, viton B.
Non Proper material: Some synthetic materials may be inadequate for containers or container coating depending the specification material and previous use. Materials to avoid: natural rubber (NR), nitrile rubber (NBR), Ethylene-Propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene. Nevertheless some materials may be useful for gloves.

Specific uses: See additional references that safety manipulation practices offer for liquids considered static storage tanks:
Petro American Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents, Protection against ignitions caused by stray currents, static currents and lightening) or norm NFPA 77 of the American Association of Fire Protection (Recommended Practices on Static Electricity).
60079-32-1 Electrostatic risks, guidelines. Ensure that all local regulations are met with respect the handling and storage.

SECTION 8. EXPOSURE CONTROL/INDIVIDUAL PROTECTION

Environmental Limit Value Components of professional exposure.

Components	No. CAS	Value type (Form of exposure)	Control Parameters/ Permissible	Base
Cumene	98-82-8	CMP	50 ppm	AR OEL
	Others Irritation, Central Nervous System			
Naftalene	91-20-3	CMP	10 ppm	AR OEL
	Others A4- Non assigned as carcinogenic in human being: agents that might be carcinogenic in human beings but cannot be evaluated in a conclusive way. Studies in vitro or in animals do not indicate enough carcinogenicity to classify the agent in any of the categories, Notation "Dermal exposure", Irritation, eye , blood.			
		CMP - CPT	15 ppm	AR OEL

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Biologic limits of professional exposure	Others: A4- Non assigned as carcinogenic in human beings: agents that might be carcinogenic in human beings but cannot be evaluated in a conclusive way. Studies in vitro or in animals do not indicate enough carcinogenicity to classify the agent in any of the categories, Notation "Dermal exposure", Irritation, eye , blood.
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No biologic limit assigned.

No biologic limit assigned.

Control Methods

It is possible that it is required the concentration of substances in the breathing zone of the workers or in the place of work to confirm there is fulfillment of the limit regulation of professional exposure (OEL) and with the correct suitability. For some substances biologic monitoring may be needed.

The suitable person must apply validated methods of exposure measures and a credited laboratory must analyze the samplings.

Sources of recommended air measurement methods. There may be other national methods.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/>

Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>

L'Institut National de Recherche et de Sécurité, (INRS), France <http://www.inrs.fr/accueil>

Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances <http://www.hse.gov.uk/>

Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. <http://www.dguv.de/inhalt/index.jsp>

Engineering Measures: Protection level and types of control needed

will vary depending on the potential conditions of exposure.

Select controls based on risk value of local circumstances.

Measures are related to:

Use sealing systems

Water cannons are suggested for water jet in fires and water in bulk systems.

Adequate air circulation, controlling concentrations suspended in the air under limits of exposure, avoiding explosions.

Local airing of the place.

Eye water rinsing and showers in case of emergency.

General Information:

Keep to personal hygiene norms, as washing your hands after handling materials.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date
10

before eating, drinking or smoking. Wash regularly you work clothes and protection equipment to clean the contaminant products. Discard contaminated clothes and shoes that might not be well-cleaned. Keep good-cleaning habits in the facilities.

Define procedures for safe handling and control maintenance. Teach and instruct workers about the risks and control measures relevant for the normal activities associated to this product.

Ensure to select, try and maintain equipment properly, example personal protection equipment, local airing. Turn systems off before opening or maintaining equipment. Keep drainages sealed until evacuation for subsequent recycling.

Do no ingest. In case of swallowing look for medical assistance immediately.

Personal Protection

Breathing protection: If engineering control does not keep a good level of air to protect workers' health,

select a breathing protection equipment for specific use conditions that keep to current legislation.

Verify breathing protection equipment providers

When air filtering respirators are not adequate (e.g. high concentration in air, oxygen deficiency risk, confined spaces) use autonomous breathing apparatus.

When air filtering protection are adequate, choose a combination of mask and filter.

Select an adequate filter for the combination of gases and organic vapors [Boiling point type A/type P >65 °C (149 °F)].

Hand Protection

Observation: When there can be hand contact with the product, use gloves, according to accepted norms, (for example, EN374 in Europe and F739 in USA.) produced with these materials When there is constant or frequent exposure Nitrile Rubber. For protection against splash/ unforeseen contact, Neoprene PVC gloves may be adequate. In case of constant contact, it is recommended the use of gloves with permeability for more than 240 minutes, preferable for > 480 minutes if there are appropriate gloves. For short-term protection or splash we recommend the same, but we acknowledge that may

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

not be gloves with this level of protection and in this case it may be acceptable a type of glove with a lower permeability. The thickness of the gloves may not be a good way to predict the resistance of a chemical, since this depends on the exact composition of the glove material. Suitability and durability of gloves depend on its use, e.g frequency and duration of contact, chemical resistance, skill. Ask advice from providers. Contaminated gloves must be changed. Personal hygiene is a key element for special hand care. Gloves must be used only with clean hands. After using gloves, hands should be washed up and dried. It is advisable to use a neutral hand cream.

Eye protection If the material is managed in a way that might spatter in the eyes, it is recommended to use eye protection. If a local risk evaluation considers it appropriate, it may not be necessary to use goggles to protect from chemical spatters.

Skin and body protection : Chemical resistant gloves/ long sleeve gloves, boots, and apron (when there is risk of spattering)

Protection measures: Individual Protection equipment (EPI) must satisfy the national norms recommended. Verify breathing protection equipment providers

Hygiene Measures: Keep to good personal hygiene measures, like washing your hands after handling materials and before eating, drinking or smoking. Wash regularly you work clothes and protection equipment to clean the contaminant products. Discard contaminated clothes and shoes that might not be well-cleaned. Keep good-cleaning habits in the facilities.
Define procedures for safe handling and control maintenance. Teach and instruct workers about the risks and control measures relevant for the normal activities associated to this product.
Ensure to select, try and maintain equipment properly, example personal protection equipment, local airing. Turn systems off before opening or maintaining equipment. Keep drainages sealed until evacuation for subsequent recycling.
Do no ingest. In case of swallowing look for medical assistance immediately.
If there is constant or frequent skin exposure to

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

a substance, it is advisable to use gloves according to EM374 and apply the skin protection program.

Environmental Exposure Controls

General Recommendation: Vapor aspiration systems must be designed observing local regulations on emission limits of volatile substances.
Diminish emissions to the environment. There must be an environmental evaluation to guarantee the compliance to local regulations related to the environment.
In section 6 there is more information about measures in case of an accidental release.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES.

Aspect: Liquid

Color. : No tint

Odor with odor

Odor threshold: No data

pH: not applicable

Fusion point/ freezing point : No data

Boiling Point/ interval 170 - 390 °C / 338 - 734 °F
Method: No

specification 55 - 75 °C / 131 - 167 °F

Method: No specification

Evaporation ratio: not available not applicable

Superior limit of explosion : 6 %(V)

Highest limit of explosion : 1 %(V)

Vapor pressure <= 0,6 kPa (50,0 °C / 122,0 °F) Method: No specification

<= 0,4 kPa (38,0 °C / 100,4 °F)
Method: No specification

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Relative vapor density : No data

Relative density No data

Density 820 - 860 kg/m³ (15,0 °C / 59,0 °F) Method: No specification

Solubility

Solubility in water: No data

Solubility in other
dissolvent : No data

Coefficient of sharing n-
octane/water : log Pow: approx. 2 - 15

Temperature of auto
inflammation : >220 °C/428 °F

Temperature of
decomposition : No data

Viscosity

Viscosity, dynamics: No data

Viscosity, cinematics: 2 - 4,5 mm²/s (40 °C / 104 °F)
Method: No specification

Explosive properties: Classification code: Not classified. Oxidizing

properties: not applicable

Conductibility: Low conductivity: < 100 pS/m, the conductivity of this material makes it a static storage. A liquid is considered a nonconductor if its conductivity is less than 100 pS/m and semiconductor if its conductivity is less than 10000 pS/m., Whether it is a liquid nonconductor or semiconductor, warning is the same. Several factors like liquid temperature, the presence of pollutants and antistatic additive products may influence enormously in the liquid conductivity.

SECTION 10. Stability and reactivity

Reactivity : The product does not contain other threaten of reactivity different from the ones enumerated below:

Chemical stability: Stable under normal conditions.

Possible reactions: There is no possible dangerous reaction when handling and storage.

Conditions to avoid : Avoid heat, sparkles, open fires and other sources of ignition.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Under certain circumstances the product might be flammable due to static electricity.

Incompatible materials: Strong oxidant agents:

Dangerous decomposing products : During storage, it is probable the formation of dangerous products in decomposition.

Thermal composition depends on the conditions. When the material experiences combustion or thermal degradation it will release a mixture of solids, liquids and gases taken through the air, including carbon monoxide, carbon dioxide, sulfur oxides and organic components not identified.

SECTION 11. TOXICOLOGIC INFORMATION

Criteria for valuation: The information given is based on the product information, knowledge of its components and the toxicity of similar products.
Unless indicated contrary, the data presented represent the product totally and not its individual components.

Information about possible ways of exposure. : Skin and eye contact are the primary ways of exposure although there can also be inhalation or occasional ingestion.

Acute toxicity

Product:

Oral Acute Toxicity: DL50 (rat): > 5.000 mg/kg
Observation: Low toxicity:

Acute inhalation toxicity : LC50 (rat): > 1 - <=5 mg/l
Time of exposure: 4 h
Observation: Noxious if inhaled

Skin Acute Toxicity : DL 50 (rabbit): > 2.000 mg/kg
Observation: Low toxicity:

Corrosion or skin irritation Product:

Observation: Skin irritation.

Sever lesions or eye irritation

Product:

Observation: Lightly irritant

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Breathing or skin sensibilization

Product:

Observation: Not predicted

Mutagenicity in germinal cells

Product:

Genotoxicity "in vivo": Observation: Positive in studies of mutagenesis "in vitro" but negative "in vivo"

Carcinogenicity

Product:

Observation: Limited evidence in carcinogenic effects.
Repeated skin contact has provoked irritation and skin cancer in animals.

Material.	GHS/CLP Carcinogenicity Classification
fuels, for diesel motors.	Carcinogenicity Category 2
Cumene	Not classified
Naftalene	Carcinogenicity Category 2

Material	Other carcinogenicity classification
Cumene	IARC Group 2B: Possibly in humans
Naftalene	IARC Group 2B: Possibly in humans

Toxicity for reproduction

Product:

Effects on fertility:

Observation: Not expected Not expected

Specific toxicity in determined organs (stot)- unique exposure

Product:

Observation: Not classified.

Specific toxicity in determined organs (stot)- repeated exposure Product:

Target organs: blood, Thymus, Liver

Observation: May provoke damage in organs after prolonged or repeated.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Aspiration toxicity

Product:

Aspiration into the lungs when swallowing or vomiting may provoke chemical pneumonia which can be fatal

Other data Product:

Observation: There may be other classifications by other authorities in different regulation frames

SECTION 12. ECOLOGIC INFORMATION

Criteria for valuation: The information emitted is based on knowledge of the components and in the eco toxicity of similar products. Fuels are elaborated generally mixing up several currents of refinery. Eco toxicological studies have been made with different currents of hydrocarbons, but with no additives. Unless indicated contrary, the data presented represent the product totally and not its individual components.

Eco toxicity

Product:

Toxicity for fish (Acute toxicity)	:	Observation: Expected to be. LL/EL/IL50 > 1 <= 10 mg/l
Toxicity for crustaceans (Acute toxicity)	:	Observation: Expected to be. LL/EL/IL50 > 1 <= 10 mg/l
Toxicity for algae and aquatic plants (Acute toxicity)	:	Observation: Expected to be. LL/EL/IL50 > 1 <= 10 mg/l
Toxicity for fish (Acute toxicity)	:	Observation: No data
Toxicity for crustaceans (Toxicity chronic)	:	Observation: No data
Toxicity for microorganisms (Acute Toxicity)	:	Observation: Not Expected to be. LL/EL/IL50 >100 mg/l

Persistence and degradability Product:

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

Biodegradability: Observation: Easily biodegradable.

Potential of bioaccumulation Product:

Bioaccumulation: Observation: Contains constituents with potential for bio accumulate

Coefficient of sharing n-octane/water : log Pow: approx. 2 - 15

Mobility of the soil

Product:

Mobility: Observation: It evaporates partially in water or soil surfaces, but along a day a significant proportion stays.
If the product seeps into the soil, one or more constituents may be transported and pollute underground waters.
Great volume of the product may seep into the soil and pollute underground waters.
Floats in water

Other adverse effects

Product:

Complement ecologic information : The coating formed in the water may affect oxygen transference and harm organisms.

SECTION 13. CONSIDERATIONS RELATED TO THE ELIMINATION

Elimination Methods.

Waste: Recovery or recycling if it is possible.

Send barrels/drums to a recovery center or scrap dealer. It is responsibility of the waste producer to determine the toxicity and the physical properties of the material produced to determine the classification of waste and the elimination methods in conformity to current regulations.

Drain containers completely. Do not dispatch drainages or water waste into the environment.

Once empty, air the place free from sparkles and fire. Do not purge the water in the bottom of the deposit on the floor.

Waste may cause blast risks. Do not drill, cut or weld dirty barrels. This will do contamination into the soil and the water layers.

Waste originated by spills or tank cleaning must be eliminated according to current legislation, preferably in a collector or dealer contractor. Competence and capacity of the collector or dealer contractor

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date

10

must be determined previously.

Polluted containers: Waste may cause blast risks if they are heated over the flammatory point. Do not drill, cut or weld dirty barrels/drums.
Do not contaminate the soil, water or the environment with waste disposal.
Keep to current legislation for the recovery of waste.
Eliminate according current legislation, using services of a known provider. Competence and capacity of the collector or dealer contractor must be checked previously.

Local legislation

Observation: Elimination must be done according to regional, federal and local laws and current regulations.

Local regulations might be stricter due to regional or national requirement and they must be observed.

SECTION 14. INFORMATION RELATED TO TRANSPORT.

International Regulations

ADR

ONU Number : 1202
Official Designation of transport by the United Nations : DIESEL FUEL
Class: 3
Packing group: III
Tags: 3
Number of identification of danger: : 30
Dangerous for environment: Yes

IATA-DGR

No. UN/ID : UN 1202.
Official Designation of transport by the United Nations : DIESEL FUEL
Class: 3
Packing group: III
Tags: 3

IMDG-Code

ONU Number : UN 1202.
Official Designation of transport by the United Nations : DIESEL FUEL
Class: 3
Packing group: III
Tags: 3
Marine Pollutant: Yes

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date
10

Bulk transport with arrangement to Annex II of the Convenio Marpool 73/78 and the IBC Code.

Category of Contamination : not applicable
Type of shipping: not applicable
Product Name not applicable
Especial Warning: not applicable

Particular warning for users

Observation: Especial Warning: See Chapter 7 Manipulation and storage, to know the warnings that users must consider or respect in relation to transport.

Additional Information: MARPOL norms are applied to bulk transport.
Mar.

SECTION 15. REGULATION INFORMATION

Regulation and legislation in relation to safety, health and environment specific for the substance or mixture

The regulation information is not extensive. Other regulations may be applied to this material

SECTION 16. OTHER INFORMATION

Complete text of the Declarations-H

H226	Flammable liquids and vapors.	
H304	Might be lethal in case of	and penetration in respiratory
injection	tract	
H315	Causes skin rash	
H332	Noxious in case of inhalation.	
H351	Suspected carcinogenic.	
H373	May cause harm in organs.	under constant exposure or
	repeated.	
H401	Toxic for aquatic organisms	cos.
H411	Toxic for aquatic organisms	cos, with noxious permanent effects

Complete text of other abbreviations.

Acute Tox.	Acute toxicity
Aquatic Acute	Aquatic Chronic Asp.
Tox.	Inhalation danger:
Carc.	Carcinogenicity:
Flam. Liq.	Flammable liquids
Skin Irrit.	Skin irritation
Specific toxicity in determined organs (stot)-	unique exposure

References of the main : Abbreviations and acronyms that are used in this document
abbreviations used in this can be searched for in reference publications (scientific
Safety Sheet dictionaries) or in web sites.

SAFETY DATA SHEET

Shell V-Power Diesel

Version 4.0

Review date 10/17/2017

Publishing date
10

Others

Advice related to
formation

: It must be imparted to workers enough information and
practice formation

OTHER INFORMATION This product if for use, exclusively in closed systems.

A vertical bar (|) in the left side indicates a modification with
respect to the previous version.

| **Due to the conversion of this product into the classification
and tag system of GHS there has been a significant change in
respect to the nature of the information presented in chapter
2.**

The information contained in this document is based in our present knowledge and is our
intention to describe the product only in relation to health, safety and environment. So, it will
not be interpreted as guarantee of any specific property of the product. Consequently, it
corresponds to the user under his exclusive responsibility, decide if this information is
appropriate and useful.