

CHAPTER 2 – NON-TECHNICAL SUMMARY - ENVIRONMENTAL  
IMPACT STUDY OF THE WIND POWER PLANT WITH A NOMINAL  
CAPACITY OF 34,5MW AND ITS ACCOMPANYING WORKS AT THE  
SITE "LEFKI" MUNICIPALITY SOUFLIOU, MUNICIPAL UNIT OF  
ORFEA, IN THE REGIONAL UNIT OF EVROS, REGION OF EASTERN  
MACEDONIA AND THRACE (REMT)



OF THE COMPANY:

**EUROPEAN WIND FARMS GREECE ApS**

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## CHAPTER 2 - NON-TECHNICAL SUMMARY

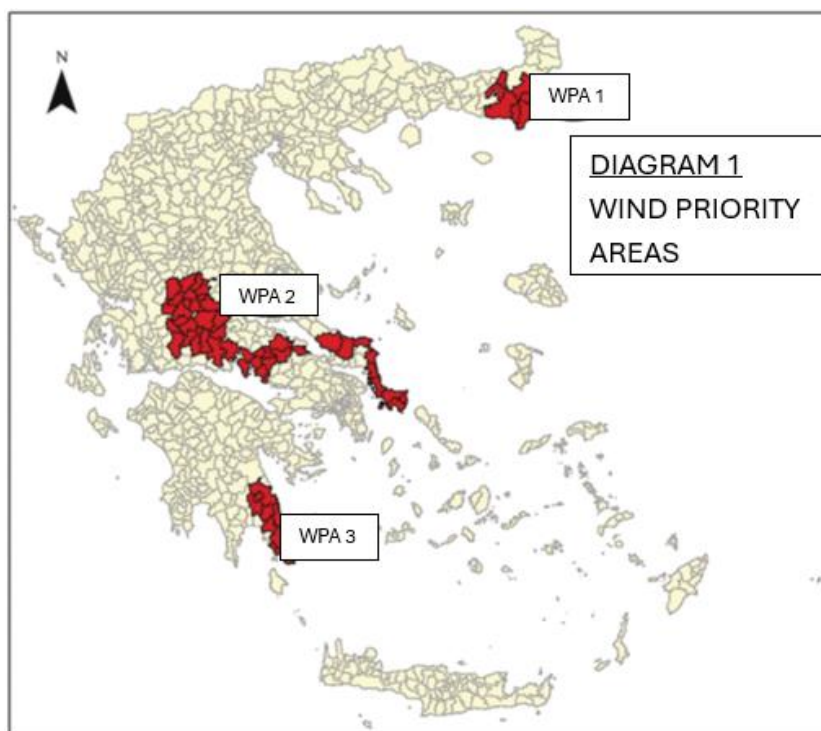
### 2.1 General information on the project under consideration

The present study deals with the environmental impacts resulting from the construction and operation of a Wind Power Plant at the location "Lefki" consisting of ten (10) wind turbines of indicative type V117-3,45MW, with a power of 3,45MW each. The Wind Power Plant in its entirety falls within the Municipal Unit of Orpheus, the Municipality of Soufli, the Prefecture of Evros and the Region of Eastern Macedonia and Thrace. The project under consideration has a **total power of 34,5MW**.

The area under study belongs to the Wind Priority Areas (WPA) according to Ministerial Decision 49828/2008 "Special Spatial Planning Framework for Renewable Energy Sources".

On the basis of the spatial plan, the wind turbines were examined according to Article 7 of the aforementioned Ministerial Decision (Special criteria for siting wind turbines on the mainland).

The operator of each project is the company European Wind Farms Greece ApS, which undertakes the entire management of the project.



Map 1 : Map of Wind Priority Areas (WPAs)

In summary, the project includes the following:

Main Project:

- ✓ Installation of a Wind Power Plant within a land area of total area: 659.927,55sq.m. consisting of ten (10) wind turbines, with a rotor diameter of 117m, with a power of 3,45MW each, i.e. a total power of 34,5MW.
- ✓ Configuration of ten (10) wind turbine construction squares with a total occupied area equal to 84,728.80 m<sup>2</sup>.
- ✓ Wind turbine foundations - construction of pylon bases with the excavation of ten foundations.
- ✓ Construction of an internal underground medium voltage network for the transmission of electricity generated by the wind turbines to the control house (docking station), with a total length of 5.550,19 m.
- ✓ Construction of a control house with an area of 31.50 m<sup>2</sup> on the site of wind turbine 5.
- ✓ Construction of 33kV underground transmission interconnection from the control house to the 33/150KV (Medium Voltage/High Voltage) elevation Patriarch Substation, total length 23.834,13m, of which 984.12m overlapped by the internal network.

Accompanying works:

- ✓ Construction of roads for access to the project site and internal road connections of the wind turbines of the "Lefki" wind farm, consisting of forest roads of category C with a total length of 5,708.98 m, of which 62.59 m are new roads and 5,646.39 m are improvements to existing roads.
- ✓ Construction of storm water drainage works.

## **2.2 Distances of the Project from Residential Areas, Protected Areas, and Infrastructure**

The proposed project concerns the construction and operation of a wind farm with a total capacity of 34.5MW which falls within the Municipal Unit of Orpheus, Municipality of Soufli, Regional Unit of Evros, Region of Eastern Macedonia and Thrace.

The project under consideration is located outside of the General Urban Plan, outside of the plan - residential area and established settlement boundaries. The closest settlements to the study area are:

	NAME OF RESIDENCE	POPULATION AT THE 2011 CENSUS	DISTANCE FROM THE FIRST WIND TURBINE (km)
1	ROUSSA	383	2,6
2	GONIKON	299	4,8
3	MIKRO DEREIO	88	5,2

*Table 1 : Distances of the nearest settlements to the nearest wind turbine of the wind farm*

In the area of the Municipality of Soufli, where the Wind Power Plant is located, no general urban plans have been established, nor have plans for the spatial and residential organization of the open city. The substation to which the project is to be connected is located in the Municipality of Arrianon, where there are no general planning and urban development plans. In the Regional Unit of Rodopi, where the Municipality of Arrianon is located, there is an area of Specially Regulated Urban Planning, which includes the substation in spatial unit 3 (mountainous area), as shown in the map extract. In the wider area, however, the General Plan of the Municipality of Alexandroupolis is being developed, which was initially approved by Government Gazette 9Δ/14-1-1988, then as amended by Government Gazette 844 Δ'/25-11-1999 and is now in stage B1 (02/2021) during which the spatial development model is being evaluated.

The site of the proposed Wind Power Plant falls within the Natura area called "Oreinos Evros - Koilada Dereiou", which is a Special Protection Area and has the code GR1110010. The site is located in the Evros Regional Unit, on the border with Bulgaria. It is also an important area for birds with the code GR003 and the name Forest of Dadia - Deriou - Aisymi. The area is located between the Dadia Forest National Park and the Filiouris valley at the western end of Evros Prefecture. It is mainly covered by oak and beech forests with small groups of pine trees and is crossed by the Diavolorema River. The central part and the north-east are dominated by partially forested areas with scattered old oak trees, mainly used by free grazing livestock. To the west of the station under examination is the Natura area - Special Protection Area 'Filiouris Valley' at a distance of more than 8 km (in a straight line).

It is also important to note that the study area of the station under consideration also falls within the protected area Byala Reka with the code "BG0002019". This protected area is classified as a Special Protection Area (SPA) and is located north of the plant at an average distance (straight line) of less than 500 m.

The traditional agricultural activities of the local inhabitants (e.g. nomadic livestock farming, small-scale agriculture) have played an important role in the conservation of the ecosystems, maintaining sparse oak forests in part of the area. The mature oak trees that remain are used for pruning, i.e. collecting branches with leaves for goats

to feed on in winter. The oak forests are also used for firewood production, while the beech forests and pine plantations are used for commercial timber.

The Important Bird Area of Greece **GR003** includes three different protection regimes:

- 1) The Special Protection Area with code **GR1110010** and name Oreinos Evros - Koilada Deriou (within which the station falls)
- 2) The Site of Community Importance, code **GR1110003** and name Treis Vryses, located approximately 17 km south of the Wind Power Plant
- 3) The Wildlife Sanctuary with code **K731** and name Kallithea - Treis Vryses of the Municipalities of Alexandroupolis, Orpheas, Soufli from which the nearest wind turbine is 12km away

According to the revised forest maps of Evros, the occupation zone of the project occupies mostly forested areas. Specifically, the wind turbine squares occupy areas classified as 'FF' and 'AF'<sup>1</sup> and are subject to the provisions of the forestry legislation. As regards the new roads to be built to access the wind turbines, they will mainly occupy forest land with the designation of 'FF' and 'AF' and a small part of other types of land (AA).

The wind turbine installation sites are compatible with social infrastructure and utilities as they are not to be affected. The nearest airport is the "Demokritos" airport of Alexandroupolis, which is located southeast of the project area at a distance of 52 km. There are no social welfare facilities close to the study area, e.g. health care, education, sports facilities, urban infrastructure facilities (e.g. recycling, waste treatment, etc.), water supply facilities, livestock units, Integrated Tourism Development Areas and other Areas of Organised Development of Third Sector Production Activities, theme parks, tourist ports and other statutory or designated tourist areas (as identified within the Environmental Impact Assessment for each individual facility).

In conclusion, the proposed project is compatible with the approved boundaries of the settlements of the wider area where it is located since both the main activity (Wind Power Plant) and its associated facilities are located outside and at a satisfactory distance from these boundaries. The project is also located outside of approved Local Spatial Plans (General Urban Plan, Open City Spatial Settlement Plans) and outside of the Residential Control Zone and at a great distance from them.

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<sup>1</sup> FF: Forests and wooded areas on aerial photographs of older photographs or existing data / Forests and wooded areas on recent aerial photographs and on autopsies or on the land maps of Law 248/1976.

AF: Other form - coverage on aerial photographs of older photographs / Forests and wooded areas on aerial photographs of recent photographs and on autopsies or on the land maps of Law 248/1976.

### 2.3 Significant environmental impacts that may result from the implementation of the project.

The individual projects and infrastructures of the wind farm studied were designed to minimize and mitigate the impacts associated with the construction and subsequent operation of the project. The result of this approach, as documented in Chapter 9, was the integration of the project into the environment at the lowest environmental cost.

The following tables summarize the impacts that are considered to have a certain intensity and which, taken as a whole, relate to both the construction and operation phases of the project.

ENVIRONMENTAL PARAMETERS	DIRECT (D) / INDIRECT (I)	POSITIVE (P) / NEGATIVE (N)	SHORT-TERM (S) / LONG-TERM (L)	REVERSIBLE	TREATABLE	SHORT TERM / POSITIVE - NEGATIVE
CLIMATIC & BIOCLIMATIC CHARACTERISTICS	I	P	L			
MORPHOLOGICAL & LANDSCAPE FEATURES	D	N	L	PARTIALLY	PARTIALLY	P
GEOLOGICAL, TECTONIC & SOIL				PARTIALLY	PARTIALLY	
NATURAL ENVIRONMENT	D & I	N	L	PARTIALLY	PARTIALLY	N
ANTHROPOGENIC ENVIRONMENT						
SOCIO-ECONOMIC ENVIRONMENT	D & I	P	L			
TECHNICAL INFRASTRUCTURE						
ANTHROPOGENIC PRESSURES ON THE ENVIRONMENT	D	N	L	PARTIALLY	PARTIALLY	P
ATMOSPHERIC ENVIRONMENT - AIR QUALITY	I	P	S	PARTIALLY	PARTIALLY	P
ACOUSTIC ENVIRONMENT AND VIBRATIONS						
ELECTROMAGNETIC FIELDS						
WATER						

Table 2 : Environmental Impacts during the operational phase of the project

ENVIRONMENTAL PARAMETERS	DIRECT (D) / INDIRECT (I)	POSITIVE (P) / NEGATIVE (N)	SHORT-TERM (S) / LONG-TERM (L)	REVERSIBLE	TREATABLE	SHORT TERM / POSITIVE - NEGATIVE
CLIMATIC & BIOCLIMATIC CHARACTERISTICS						
MORPHOLOGICAL & LANDSCAPE FEATURES	D	N	S	PARTIALLY	PARTIALLY	P
GEOLOGICAL, TECTONIC & SOIL	D	N	S	PARTIALLY	PARTIALLY	
NATURAL ENVIRONMENT	D & I	N	S	PARTIALLY	PARTIALLY	N
ANTHROPOGENIC ENVIRONMENT						
SOCIO-ECONOMIC ENVIRONMENT	D	P	S			
TECHNICAL INFRASTRUCTURE	D	N	S	YES	PARTIALLY	
ANTHROPOGENIC PRESSURES ON THE ENVIRONMENT	D	N	S	PARTIALLY	PARTIALLY	P
ATMOSPHERIC ENVIRONMENT - AIR QUALITY	D	N	S	PARTIALLY	PARTIALLY	P
ACOUSTIC ENVIRONMENT AND VIBRATIONS	D	N	S	PARTIALLY	PARTIALLY	
ELECTROMAGNETIC FIELDS						
WATER	D	N	S	YES	PARTIALLY	

Table 3 : Environmental impacts during the construction phase of the project



## 2.4 Proposed measures and actions to protect the environment.

Some weak negative impacts, which are temporary and to a significant extent reversible, will occur during the construction works of the proposed Wind Power Plant and its accompanying technical works mainly due to the excavation works resulting in the removal of vegetation, the surface alteration of the soil and the geomorphology of the intervention sites as well as the emission of dust and possibly the difficulty for vehicles to pass through the construction sections along existing roads and roads.

However, by taking appropriate measures, any adverse impacts will be minimized and addressed. However, it is estimated that positive impacts will also result from the operation of the project.

The proposed measures aim, in order, to address the following environmental impacts:

- Prevention - Avoidance
- Reduction of intensity and extent
- Rehabilitation

The installation of the wind farm and the accompanying works are expected to cause some impacts and changes in the environment of the intervention sites. However, a number of measures are proposed to minimize the disturbance caused by the construction works of the project:

- ✚ Appropriate design of the road construction, considering the local topographical features, existing vegetation, and avoiding large volumes of excess excavated material, with maximum levelling of embankments and trenches.
- ✚ Plant road embankments with species appropriate to the area and in an appropriate manner.
- ✚ Collect, remove, and properly dispose of all types of construction waste, after separating recyclable materials, with subsequent disposal in recycling centers.
- ✚ Operate construction sites and transport vehicles during quiet hours to minimize acoustic disturbance to nearby settlements.

Provide for the appropriate sorting, temporary and final disposal of excavated materials resulting from earthworks, in accordance with applicable legislation.

In addition, throughout the construction of the entire project, care will be taken to minimize the removal of forest vegetation and to replace it with horticultural works, in accordance with the principles of sustainable development. The plant species selected for restoration will be in accordance with the local bioclimatic conditions and the needs of the fauna, in consultation with the relevant Forestry Department.

Particular attention will be paid to restoring the site to its original natural state, in order to minimize any disturbance to the landscape and topography. The same effort will be made during the excavation phase to limit it to the minimum technically necessary and to ensure the smooth and safe operation of construction crews and machinery.

During the construction of the project, the necessary measures will be taken to ensure that the developer:

- compliance with environmental requirements by the developer
- the ability to address and remedy environmentally undesirable situations caused by the developer's actions or omissions.

It is also noted that:

- The scope of the earthworks contract will include planting/restoration works and the obligation to maintain them where appropriate.
- The relevant archaeological authorities will be notified in writing on commencement of works.
- Systematic wetting of construction roads, materials, etc. will be used to reduce dust during the construction phase of the park.
- All waste materials (consumables, old machinery) will be removed from the project site and disposed of in accordance with applicable regulations.
- All forms of material burning will be prohibited in the project area.
- Special precautions will be taken to prevent any spillage of liquids (oils, etc.) onto the surface and ground water. Uncontrolled dumping of liquids on the ground will be strictly prohibited. Mineral oils used will be managed in accordance with the regulations in force.
- During the construction of the project, the smooth movement of vehicles to and from residential areas will be ensured.
- All areas suitable for vegetation will be planted. Planting will commence after the final surfaces have been formed.
- The developer will be required to:
  - The control and supervision of the construction of the external transmission network.

- Install the electromechanical equipment necessary to connect the project to the existing substation.
- Take emergency action if necessary.
- Ensure that the materials required for the construction of the project are sourced from legally operating quarries in the surrounding area.
- Care will be taken to ensure that the temporarily stored materials are not washed away by rainfall.

### **2.5 Benefits from the implementation of the project/activity**

The project under consideration aims at the construction and operation of a Renewable Energy Sources project and specifically a wind power plant for the production of wind energy, in compliance with the legislation in force, the exploitation of the wind potential of the region and the decoupling from conventional fuels that not only increase the price of electricity but also emit polluting and harmful substances into the environment.

Renewable energy sources are known as soft forms of energy because their use does not require any energy input (e.g. combustion), as they use a form of energy generated by natural processes. They have been used since ancient times to meet energy needs and, unlike fossil fuels, are inexhaustible. Renewable energy sources have a zero-energy footprint. The energy footprint is the amount of carbon dioxide (CO<sub>2</sub>) emitted into the atmosphere.

The development of the project under study and wind energy projects in general contributes to the objectives of the European Union for increasing the penetration of Renewable Energy Sources and to the objectives of the Greek government for the decarbonization of electricity production. Wind Power Plants (WPP) do not occupy a large area and are able to share land with sectors such as agriculture and livestock making wind energy space efficient. Wind turbines are a form of energy generation with minimal maintenance requirements and reliability of operation.

At the local level, the realization of the project under study will lead to the creation of jobs during the construction phase and during the operation phase. According to a measurement by the association of power generators (report HWEA), jobs are created in the areas of maintenance, operation in wind turbine suppliers and in the areas of construction of the project's foundations. During the operation of the project, jobs are created to monitor and supervise the operation of the wind turbine on a continuous basis.

The project under consideration and wind projects in general strengthen the economy of local communities. According to Article 7 of Law 3851/2010, as in force, it is stipulated that the 1.7% is attributed at a rate of 80% to the local authorities. A' degree, within the administrative boundaries of which the RES plants are installed and 20% to the local authority or local authorities A', through the territorial area of which the line connecting the plant to the System or the Grid passes. If the stations are installed within the administrative boundaries of more than one local authority, 1% shall be attributed to the licensees supplying electricity to the household consumers of the first-degree local authority in which the RES stations are installed and shall be refunded through the electricity bills of the household consumers. The amount of 0,3 % is paid to the green pay (green pay.gr).

Furthermore, benefits accrue to the local community from the construction of utility projects as a compensatory measure from the installation and operation of the Wind Power Plant as well as sponsorships that serve local needs. The project under study, when implemented, will promote a form of alternative tourism of an educational nature with a visit to the site of the Wind Power Plant. Therefore, a wind energy project not only does not have a negative impact on the environment but also contributes to its restoration and to the achievement of the national objectives of the country by avoiding the emission of pollutants into the atmosphere.

## 2.6 Alternatives

The selection of the location for the installation of all ten (10) wind turbines and the accompanying works was made after a thorough examination of the area in order to satisfy initially the data for high potential and subsequently the restrictions provided in the relevant legislation for the protection of the environment, the existing settlements, and the general activities of the wider area.

The question for the selection of the position in relation to the above parameters and the more general parameters was:

- I. The highest possible wind potential in the area.
- II. Access roads to ensure the ability to transport the wind turbine sections with the least possible disruption to the existing network and the least possible widening of the road network within and outside the ten (10) wind turbine sites.
- III. The distances from neighboring settlements shall be above the limit that allows them to blend into the landscape and minimize visual disturbance.
- IV. Land uses shall not prohibit the project boundary.

- V. Projects should, as far as possible, be located outside protected areas or archaeological sites and at a sufficient distance from them to ensure compatibility.
- VI. Wind turbines should be sited in a position suitable for connection to the transmission grid.
- VII. The configuration and technical characteristics of the terrain shall be suitable for the construction and development of the project.
- VIII. The area shall be relatively sufficient for the development of the project.
- IX. Cause the least possible visual disturbance.
- X. Compatibility with the provisions of the legislation in force and, in particular, the provisions of Ministerial Decision 49828/2008 "Special Framework for Spatial Planning and Sustainable Development for Renewable Energy Sources and its Strategic Environmental Impact Study".
- XI. The electrical connection shall have as little energy loss as possible.

Interconnection projects are subject to constraints depending on the nature of the project. However, there are technical and non-technical constraints associated with the relevant system operator.

The above constraints also apply to the project access road network, considering the topography of the area.

For the layout of the internal access roads to the wind turbines within the wind farm site, the final proposed layout has the least environmental impact and the lowest gradients.

The final solution chosen best meets the conditions and constraints required for such projects.

**Specifically:**

- 1) The wind potential at the proposed site is satisfactory. The site is located in a Wind Priority Area (WPA). This ensures maximum electricity generation.
- 2) The location and number of wind turbines make maximum use of the available wind potential in the area where they are installed.
- 3) The network of rural and country roads in the proposed area is satisfactory and there is no need to build many kilometers of new roads.
- 4) It complies with distance restrictions from settlements.
- 5) It does not interfere with existing land use and does not require future land use changes.

- 6) The location of the wind turbines is outside of designated archaeological sites.
- 7) The connection of the project to the existing road network does not require extensive works and infrastructure.
- 8) The technical design of the project makes the best use of available technology to achieve maximum project efficiency at the lowest feasible environmental cost and with the least visual and acoustic disturbance.

Based on the above, the selected project design, as formulated from the consideration of the various scenarios analyzed in Chapter 7 of this study, meets the data for optimal project efficiency with a focus on minimizing environmental impacts.