

CHAPTER 9 - ASSESSMENT AND EVALUATION OF ENVIRONMENTAL IMPACTS OF THE 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 (REMC).



OF THE COMPANY:

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## CHAPTER 9 - ASSESSMENT AND EVALUATION OF ENVIRONMENTAL IMPACTS

Environmental impact is defined as the change in environmental conditions or parameters (natural and human-made) in an area because of one or more activities. This change may be positive or negative (i.e., upgrading or degrading the quality of the environment), long or short term, permanent or Temporary, indirect, or direct.

Environmental Impact Assessment (EIA) is one of the basic tools of environmental planning. Its purpose is to assess the future adverse effects on the environment that may result from activities on the site, with a view to minimizing or redesigning them. It assesses and evaluates the potentially significant impacts that the project or activity may have on the environment through the use of natural resources, the emission of pollutants, the creation of disturbance and the disposal of waste. It shall also provide the data set and a description of the methods used to predict and assess the effects on the environment, with an indication of the reliability of the methods and an indication of any difficulties or lack of appropriate information encountered in gathering the necessary information.

This means that their impacts should be considered overall and not in isolation. Therefore, the impacts resulting from the construction and operation of the assessed wind power plant (WPP) relate to the totality of the main and associated projects.

The most important positive element of wind energy development and use is the reduction of anthropogenic impacts (because of air pollution) by replacing the combustion of conventional fuels for electricity generation, which has not yet been adequately assessed.

The main environmental parameters associated with the construction and operation of wind farms are the natural environment (flora and fauna), topography and landscape. Factors such as the size of the wind turbine, the type and size of the wind turbine, the size of the road works and the characteristics of the site (e.g. installation near environmentally sensitive areas) play an important role in determining the level of environmental impact.

### 9.1 Methodological requirements

This chapter assesses the potential environmental impacts that will be caused by the construction of the project during both the construction/installation and operation phases.

The assessment of the environmental parameters that are likely to be affected or changed by the construction and operation of the project (impact assessment) and

the identification of the identity of the impact for each of the changes identified, focuses on the following properties of the environmental impacts:

- Character of impacts (positive, negative, neutral) and type of impacts.
- Magnitude of impact (significant, moderate, weak). This characterization is related to the consideration of the above-mentioned environmental impact assessment and evaluation parameters.
- Duration of impacts (short-term, long-term). This refers to the duration over which impacts take place.
- Potential for recovery by natural means (reversible, partially reversible, irreversible). It relates to the potential for the environmental impacts caused to be reversed by natural processes.
- Possibility of being addressed by artificial means (manageable, partially manageable, not manageable). Relates to the potential to address the environmental impacts caused by the construction of appropriate technical works/applications (anti-pollution technologies, environmental restoration works, etc.).
- Geographical reference level for environmental impact assessment/evaluation (local, study area, wider region).
- Intensity, with reference to the magnitude of the change, and its comparison with the relevant limit values.
- Likelihood of occurrence.
- Complexity of effects, with reference to the mechanism of occurrence (direct or indirect impact, description of stages in the latter case), the components of the effect (to distinguish simple from complex effects), and the dependencies of intensity and magnitude on non-project factors, if any.
- Characteristic timescales (time horizon of occurrence of effects, duration, recurrence).
- Possibilities for prevention, avoidance, reversal, or minimization.
- Synergistic or cumulative effects with other impacts from the project itself or from other projects or activities developed or environmentally permitted in the area.

In general, wind energy projects aim to reduce anthropogenic impacts by replacing the combustion of conventional fuels for electricity generation. Most impacts occur during the construction phase but can be reduced by taking appropriate measures. Impacts during the construction phase will last if the wind farm is being built and will be limited to the area where the project is located.

It should also be noted that negative impacts are assessed in terms of whether they need to be addressed, but also in terms of the potential of the mechanism of occurrence of each impact in terms of prevention or subsequent reversal. In this way,

the most appropriate stage for taking the necessary action is explored. A diagnosis is made of the causes of each impact and whether measures to prevent one impact will have a positive effect on other impacts.

For the assessment - evaluation of the induced environmental impacts of the studied WPP, the following main determining parameters are considered and co-evaluated:

- ✓ Institutional framework for environmental protection, as specified by the adoption of measures for different environmental instruments.
- ✓ Characteristics of the area where the installation is located: Relates to the type and sensitivity - vulnerability of the environmental media that are subject to environmental pressures from the installation.
- ✓ Design of the technical-functional characteristics of the project: Refers to the type, size as well as the way of construction and operation of the project.
- ✓ Applicable measures for the prevention and mitigation of environmental impacts and environmental restoration.

Finally, for those environmental elements where no impacts are expected from the construction and/or operation of the project or activity as indicated by the information in the project description (Chapter 6), then only a simple statement that no impacts are expected is made and no development of the corresponding section is required.

**It is important to note that the analysis of synergistic - cumulative impacts in this chapter has been conducted regarding the entire synergistic impact study area as defined in Chapter 8.1.**

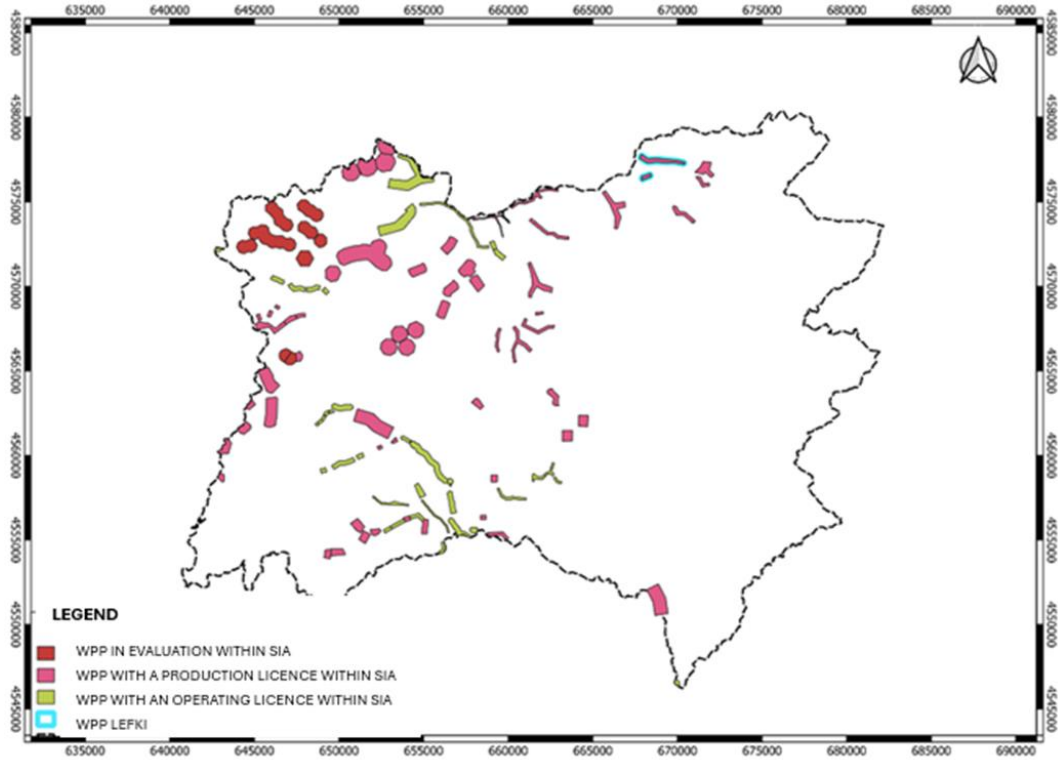
**Specifically, with regard to the protected areas under consideration, and in order to better address the synergistic impacts of the project under consideration, the Special Ecological Assessment **has been defined to consider the wider boundaries of the entire area enclosed within the main study area SPA GR1110010, but also the nearest Greek area SPA GR1130011, as this area contains almost all the already installed WPPs (operating license) of the wider area.****

Therefore, the area resulting from the merging of the boundaries of the above two areas is referred to as the '**Synergistic Impact Study Area**' (SIA).

Within the SIA, there are 14 WPPs (nine within the SIA and five partially within the SIA) licensed for operation with a total capacity of 314.6 MW, occupying a total area of 1,053.88 ha (total area of polygons within the SIA - of which five WPPs are partially **within the SIA**, they amount to 43 NPPs (including the one under study) in the



licensing phase under production (production license). The following map **shows the boundaries of the synergy study area** as defined in the SEA. Based on the above, the environmental impacts have also been extensively analyzed.



Map 1: Siting of wind farms within the synergistic impact study area (SIA)

**9.2 Impact on Climatic and Bioclimatic Characteristics**

In controlling the climate of a wider area, altitude, distance from the sea and the local conditions of a region play a role to some extent. Such conditions include, for example, large mountain ranges, prevailing local winds and other factors that shape the microclimate of a particular area.

Given the nature of the WPP and its associated projects, it follows that it will not result in any change in the climatic and bioclimatic characteristics of the area.

Sustainable development is related to efforts to reduce the consumption of non-renewable natural resources and is a global priority. Air pollution and greenhouse gas emissions resulting from the use of fossil non-renewable resources for energy production pose a major threat to the environment and sustainable development.

In particular, the production of electricity from wind turbines utilizes the wind potential of the region without emitting any air pollutants, unlike the process of generating energy by burning fossil fuels. A wind turbine therefore not only has no



impact on the climate, but also contributes to the reduction of pollutants that are responsible for significant climate and environmental changes on a global scale. A typical example is the greenhouse effect, which results in an increase in global warming and the occurrence of extreme weather events (floods, fires, hurricanes, etc.).

Long-term energy planning and the promotion of renewable energy projects (including the exploitation of wind potential through the construction and operation of wind farms) are the essential tools for mitigating the effects of climate change. The path towards a low greenhouse gas economy must involve all sectors of economic activity, both energy consumption and energy production.

According to the current National Energy and Climate Plan (NECP), the main target for 2030 is to achieve an overall reduction in greenhouse gas (GHG) emissions in our country of more than 40% compared to 1990, while compared to 2005, which is more comparable based on the level of the Greek economy and the relevant emissions at European level, the reduction target exceeds 55%.

Regarding the penetration of renewable energy sources (RES), the national target for their share in gross final energy consumption is set at a minimum of 35%.

In addition, targets are set for the share of RES in gross final consumption of electricity to be at least 60%, for the share of RES in heating and cooling to be at least 40% and for the share of RES in transport to be at least 14%, according to the relevant EU calculation methodology.

In addition to increasing energy security (by reducing a country's dependence on imports), the production of energy from renewable energy sources (RES) contributes to the reduction of pollutant emissions associated with conventional energy production (fossil fuels). Given that most forms of renewable energy, such as wind energy, do not produce greenhouse gases or other pollutants such as SO<sub>2</sub>, NO<sub>x</sub> or particulate matter, as there is no combustion process involved in energy production, they are expected and should form the basis of any long-term planning for sustainable development and energy production in particular.

Based on the energy mix of Greece, each kWh produced by wind energy avoids about 1 kg (0.85-1.06) of CO<sub>2</sub> in the atmosphere. It also reduces emissions of other harmful pollutants (such as particulate matter, nitrogen oxides, sulfur compounds, etc.). It offsets up to 8.3 kg of SO<sub>2</sub>, 1.7 kg of NO<sub>x</sub> and 0.7 kg of particulates.

A typical 1,000kW (1MW) wind turbine generates on average 3 million kWh per year in a good wind potential location in Greece, preventing the release of approximately 3,000 tons of carbon dioxide (CO<sub>2</sub>), which is equivalent to the amount of CO<sub>2</sub> absorbed annually by 4,000 hectares of forest or 200,000 trees.

Therefore, the project under consideration, neither during its construction nor during its operation, will have any negative impact on the climate of the surrounding area,

on the contrary, it will have a positive impact at local and national level, making the best use of the available wind potential of the region, contributing to the country's environmental objectives and international commitments, as well as to the principles of sustainable development.

### 9.2.1 Construction phase of the Project

The construction of the overall project, due to the nature of the works, cannot cause a change in the climatic and bioclimatic characteristics of the study area. Under no circumstances are construction activities expected to impact climatic parameters such as temperature, precipitation, hail, snowfall, or humidity in the project development area.

Construction equipment (cranes, trucks, graders, excavators, etc.) powered by diesel engines will be used for the foundation and installation of the wind turbines, maintenance of existing roads and trenching for the installation of power transmission cables at the ten wind turbine sites. The operation of these machines is expected to release a quantity of greenhouse gases and particulate matter (PM10, PM2.5) into the atmosphere due to the combustion of liquid fuels (diesel, petrol). Therefore, these operations will only cause some carbon dioxide emissions. These quantities of CO<sub>2</sub> will only be produced during the construction phase of the project, after which they will cease to be produced.

Therefore, any greenhouse gas impacts from the construction of the Project will be weakly negative - practically negligible, very weak, short term and fully reversible by the operation of the Project itself, mainly due to the minimal quantities of emissions that will be generated by a limited number of mechanical means in relation to the area of the Project site. However, compliance with current legislation on exhaust emissions from construction machinery and vehicles will be required.

#### **Synergistic / Cumulative effects:**

No synergistic impacts are anticipated with respect to temporary and limited weak air quality impacts during the construction phase as the projects are unlikely to be constructed all at the same time. The worst-case scenario is that there will be simultaneous greenhouse gas emissions from the vehicles used throughout the works, which however are expected to be extremely low firstly because the road network cannot support a load on the road traffic due to its nature, and secondly because the exhaust gases are from vehicles whose emissions do not exceed the limiting and legal thresholds as defined by Directive 2007/46/EK.

### 9.2.2 Project Operation Phase

Wind farms, by their very nature, have no negative impact on the climatic and bioclimatic characteristics of the area in which they are located. Wind turbines use a small fraction of the kinetic energy of the wind to produce energy without changing its intensity or direction. The operation of wind turbines does not generate heat, gases or other pollutants that could potentially alter the climatic and bioclimatic characteristics of the area in which they are installed. Consequently, during the operating phase of the wind turbine, it is not expected to have any impact on the climatic and bioclimatic characteristics of the area under consideration where the proposed WPP (10 W/Ts) will be installed.

As regards the production of greenhouse gases, not only will such gases not be produced, but on the contrary, the production of both greenhouse gases and other harmful pollutants in the atmosphere will be reduced because of the operation of the proposed projects.

It is therefore clear that the project in question is expected to have a significant positive impact on the climatic characteristics of the area, through its significant contribution to the country's energy mix, the decentralization of energy production and its contribution to a significant reduction in the production of greenhouse gases.

Regarding the underground electricity transmission network to be constructed to meet the interconnection needs of the Project, it is not expected to generate any air or other pollutants during its operation that could potentially alter the climatic and bioclimatic characteristics of the area. The heat generated by the medium and high voltage transmission lines is negligible, distributed over a wide area and does not affect the heat balance of the atmosphere, especially in the present case where the electricity transmission lines will be completely underground.

In conclusion, the impacts of the overall project during the operational phase on the climatic-bioclimatic characteristics of the wider study area will be positive of medium intensity, trans-regional, long-term, and permanent.

#### **Synergistic / Cumulative effects:**

The project is not associated with greenhouse gas emissions during operation. On the contrary, the operation of the project contributes to a reduction in greenhouse gas emissions compared to the do nothing alternative. In addition, in the worst-case scenario, where all licensed and approved projects in the study area would operate simultaneously, they would not have a negative impact, but a positive impact on the climate and bioclimatic characteristics of the study area.

Climatic and Bioclimatic Characteristics						
Impact Phase	Type	Possibility of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	/	/	/	NO	/	/
OPERATION	/	/	/	NO	/	POSITIVE
CESSATION OF OPERATION	/	/	/	NO	/	NEGATIVE

Table 1: Impact Assessment Table on climate and bioclimatic characteristics.

**Explanation of Contents of the Table:**

Impact occurrence phase: Refers to the different phases of the project's life cycle. **Construction:** construction of the project up to the issuing of the operating permit. **Operation:** The duration of project operation and **Cessation of operation:** Refers to the cessation of project operation and environmental restoration.

The remaining columns refer to the individual impacts and take the following values:

Column	Values			
Type	Direct	Indirect		
Possibility of Occurrence	/	LOW	MEDIUM	HIGH
Intensity	/	LOW	MEDIUM	HIGH
Synergistic action	YES	NO		
Reversibility	/	YES	NO	
Impact	/	POSITIVE	NEGATIVE	

/: No impact or negligible impact

Reversibility: refers to prevention, avoidance, reversal, minimization of impacts and is completed with / when there is no feasibility or reason to address and with 'YES' or 'NO' when: In the column 'Possibility of occurrence' and/or in the column 'Intensity' the assessment has concluded even a low probability of occurrence of impacts.

\*The explanation of the table also applies to the following impact assessment tables in this chapter.

**9.3 Impact on the morphology and characteristics of the landscape**

The impact on the morphological - landscape characteristics of the immediate and wider study area depends on the change in its visual value that may result from the construction and operation of the study project (WPP and its associated projects). The degree of change to a landscape depends in principle on its level of sensitivity - vulnerability, which is determined by the characteristics of each landscape and the level of intervention in it.

The project does not fall within any protected landscapes and there are no such areas in the wider landscape. In view of the above, it is concluded that the WPP site is not sited in areas where interesting landscape features have been identified.

### 9.3.1 Construction phase of the Project

#### Impact on soil morphology

In terms of geomorphology, the WPP area under consideration is characterized by steep slopes and the area is described as semi-mountainous. Most of the land is covered by forests, while there is sparse agricultural land, in the coastal area of the region.

During the construction of the Project, the changes in topography and soil morphology will be moderate and will result from the excavation works for the foundations of the W/Ts, the opening of the internal road network and the construction of the underground medium voltage transmission line.

However, these works are of minor scale and cannot cause erosion or significant changes in the topography of the land. All works on the wind farm site, except for the wind turbine platforms and internal roads, will be restored after completion of the works.

Excavation and backfilling will be conducted to create the internal access network for the project under consideration, the construction sites and the underground medium-voltage interconnection line, and the underground medium-voltage cables will be installed in trenches by removing vegetation and surface soil.

Earthworks will be limited to the occupation zone of the project and will be conducted under the supervision of the competent Forestry Department. A significant volume of the excavated material is expected to be used in the backfilling operations, which will result in an immediate reduction in the degree of landscape disturbance.

The final road construction and the axis of the HV and MV interconnectors will follow the slope of the existing ground, to ensure that as little earthworks as possible are carried out.

The ground disturbances on the installation sites and along the new branches and the route of the underground MV interconnector will be restored either by land restoration assessment or by natural means.

#### Impact on soil topology

The impact on the landscape **would be minor** as the construction of the project under consideration would be conducted in sections (zones) rather than simultaneously throughout the entire development. There will be little degradation of landscape aesthetics due to the increased mobility of material transport vehicles, the operation

of mobile construction sites during the construction of the accompanying underground interconnection works.

In addition, most of the sites where landscape changes are expected are located at a considerable distance from human activities (residential areas, workplaces, primary production activities, tourist facilities, etc.).

Good practice, proper project design and implementation of appropriate measures (elements discussed in Chapters 10 and 11) will reduce the impact on landscape features as construction works **will be low intensity, short term and localized**.

Impacts on morphology during the construction phase of the Project are considered to be low as they follow the technical characteristics of opening forest roads, which in turn facilitate access for fire engines, shepherds, and wildlife.

#### **Synergistic / Cumulative effects:**

Synergistic and cumulative impacts during the construction phase will not occur as it is unlikely **that all the neighboring wind farms with a production license will be built at the same time (the nearest projects are Pseftis, Ammoudes and Mavrodasos)**. On the contrary, the use of a common interconnection when all wind parks are realized with the nearest neighboring projects (Maurodasos, Petoumenon Arrianon) and the option to interconnect them **to already existing environmentally licensed wind parks** reduces the areas of intervention of the projects.

In conclusion, during the construction phase of the project the impacts on the morphology of the area are assessed **as medium scale, partially reversible and can be limited - after strict implementation of appropriate measures - to a low scale**.

In the case that all the projects under license and with a production license are built at the same time, the impact on morphological features will be related to the associated projects as there will be an intervention on the forest road. This will have a positive outcome as the improvement, intervention and use of the existing forest road will only occur once during the construction phase of the projects.

Overall, the landscape impacts during the construction phase of a wind farm could be described as medium-scale, partially reversible and can be reduced to low-scale - following the strict application of appropriate measures. After the end of the construction work of the project, a large percentage of the occupied surface will be restored, while the whole project will be restored after the end of operation.

### 9.3.2 Project Operation Phase

#### Impact on soil topology

During the operation phase, the changes in the landscape concern the visible parts of the works (W/Ts and roads), while during the operation phase no impact on the morphology of the landscape is expected.

The main impact of the project on the landscape results from the way in which the project is visually integrated into the natural environment. The degree of alteration of a landscape depends in principle on its degree of sensitivity and vulnerability. The more aesthetically interesting a landscape is, the more sensitive it is to alterations - interventions. The process of integrating a wind farm into the environment is based on the dynamic visual coupling of the wind turbines with the landscape features of the installation area.

These landscape elements can be characterized by:

- the flat topography of a lowland area
- the slightly undulating topography of a hilly area
- the steep topography of a ridge or mountain range
- the urban and suburban landscape of a town, village, or city
- the highly industrial and strictly regulated profile of an industrial zone
- combinations of the above.

Based on the above parameters, the desired visual link between the landscape and the wind farm can be achieved by applying aesthetic rules based on ensuring harmony in the relationships between lines and/or volumes. This is achieved through the use of techniques of integration, harmony, or counterpoint with the existing dominant features of the landscape, so that despite the intervention, the observer's eye is not disturbed or confused, and the aesthetic result is visually acceptable.

Due to the topography of Greece, the scale of wind farms is in most cases compatible with the scale of the landscape, which is dominated by large mountain ranges. In addition, modern wind turbines are characterized by a greater potential for visual acceptance than those of older technology, because:

a) they are slim and elegant in design, compared to the early models that were bulky or based on metal trusses,

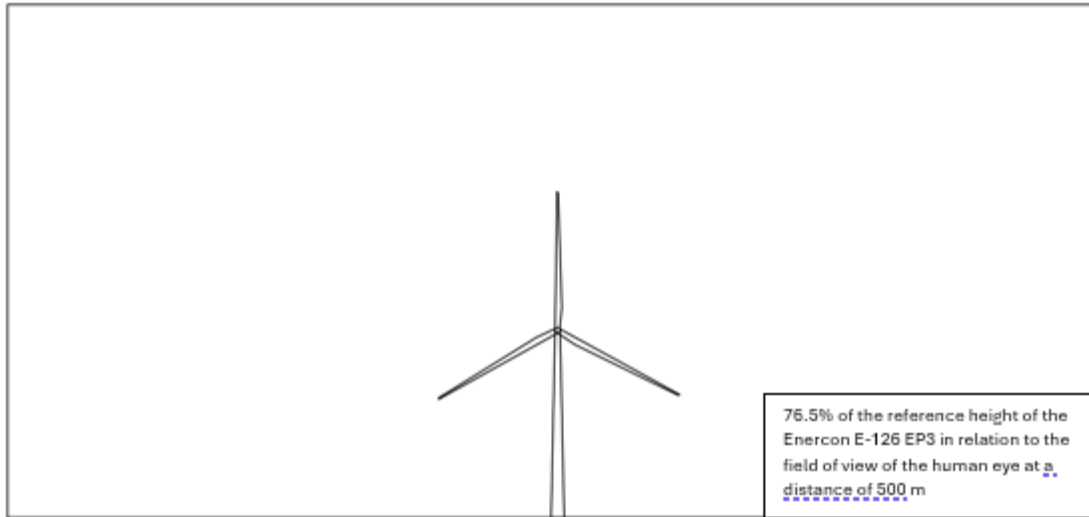
(b) the angular speed of rotation of their blades is lower, which creates a more pleasing visual effect; and

(c) they are placed at greater distances from each other, thus achieving sparser distributions compared to the denser groupings that earlier wind farms exhibited.

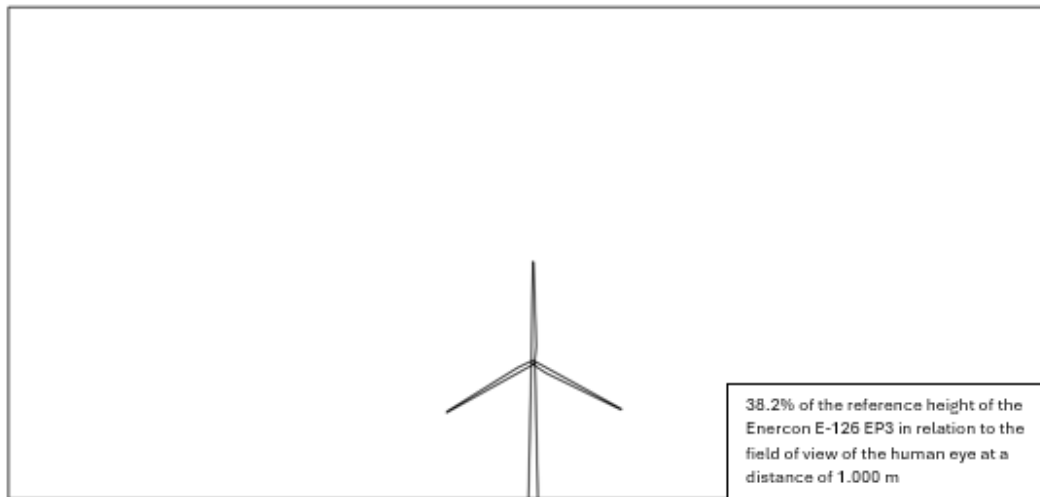


The sparse layout of the W/Ts in the project under study minimizes any visual change. The W/Ts are of a color that blends in with the landscape (usually light) and consist of three blades, which creates symmetry in the human eye and reduces visual disturbance, which is subjective anyway and not clearly defined by environmental legislation.

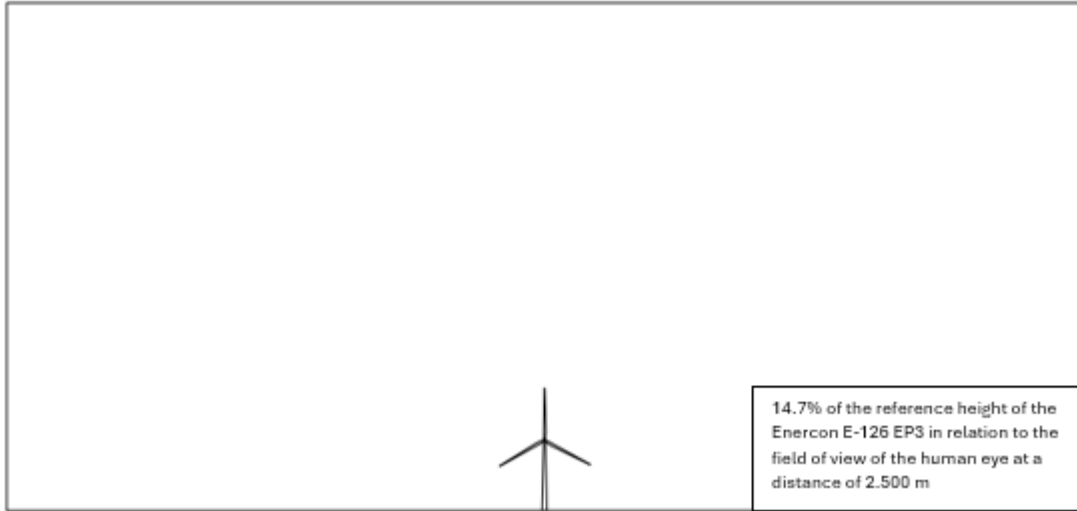
The following photographs illustrate the visual disturbance caused by W/Ts in relation to the field of vision of the human eye at distances of 500, 1.000, 2.500, 5.000, 7.500 and 10.000 m from the base of the W/Ts.



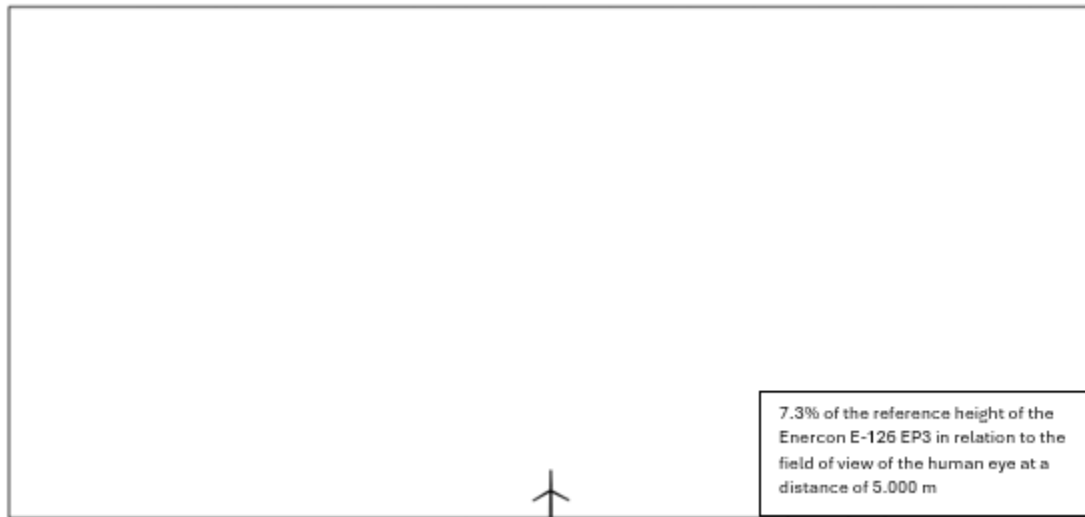
Picture 1: Visual disturbance at a distance of 500 m.



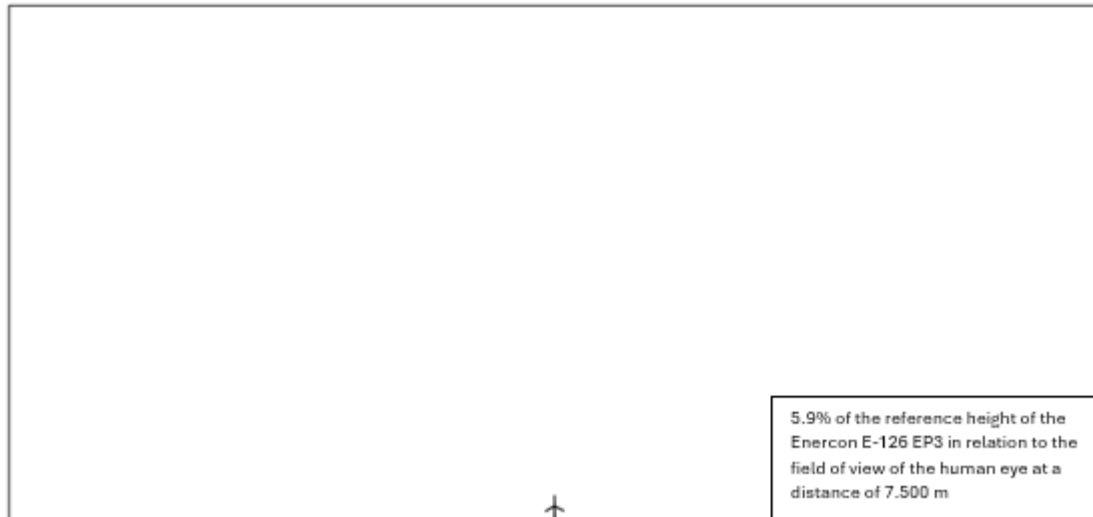
Picture 2: Visual disturbance at a distance of 1.000 m



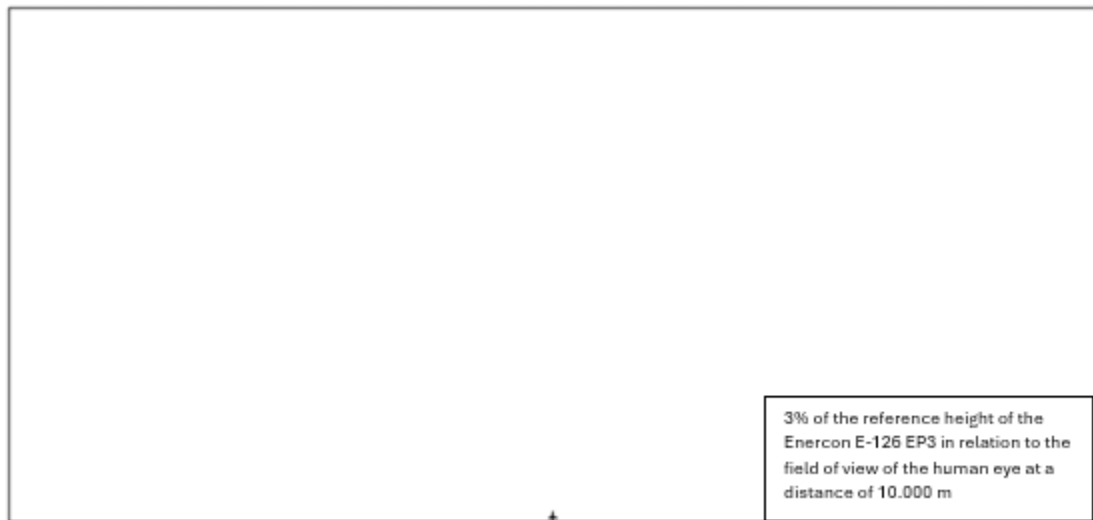
*Picture 3: Visual disturbance at a distance of 2.500 m*



*Picture 4: Visual disturbance at a distance of 5.000 m*



Picture 5: Visual disturbance at a distance of 7.500 m



Picture 6: Visual disturbance at a distance of 10.000 m

In the case of the project under study, the following can be noted:

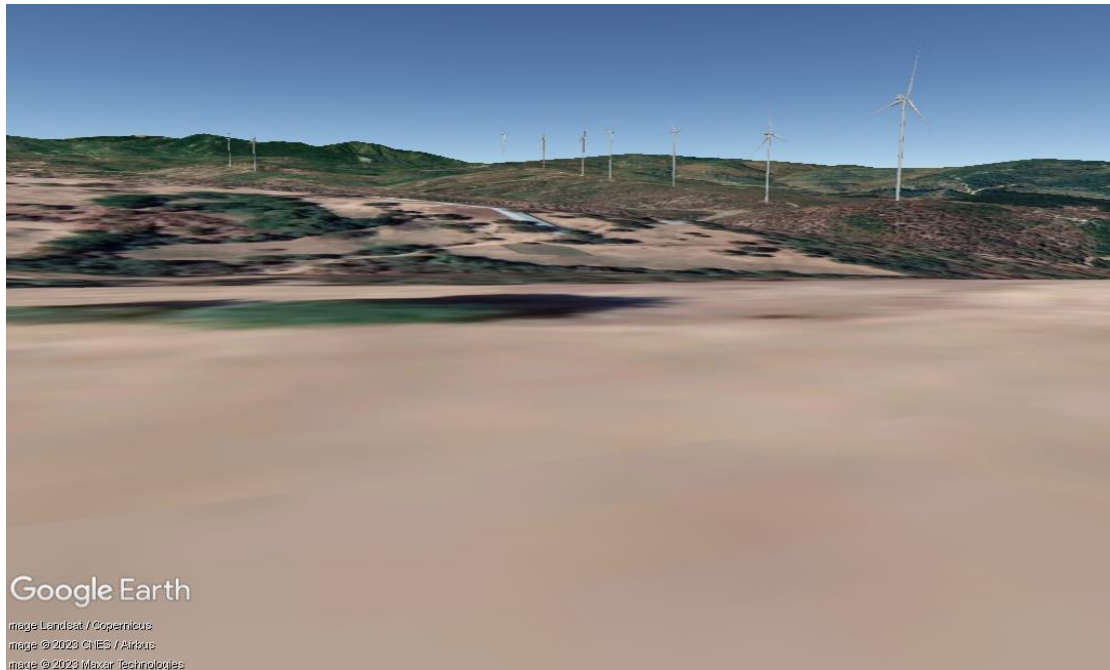
- The adoption of simple tubular towers, the three-blade propeller, and the coloring of the wind turbines with a color that blends in with the environment give a harmonious and elegant aesthetic effect to a wind farm and increase its visual acceptability.
- In the wind farm development area, the view from or towards a unique natural or cultural heritage monument is not altered.
- The distances and differences in height of the wind turbine installation sites from residential areas are such that they do not create problems of shading of residential or other public areas and the restrictions imposed by the General Spatial Planning Framework for Greece on RES are strictly adhered to.

- The paint on the wind turbines (pillar and rotor) is "absorbent" and there are no reflections of incident light.

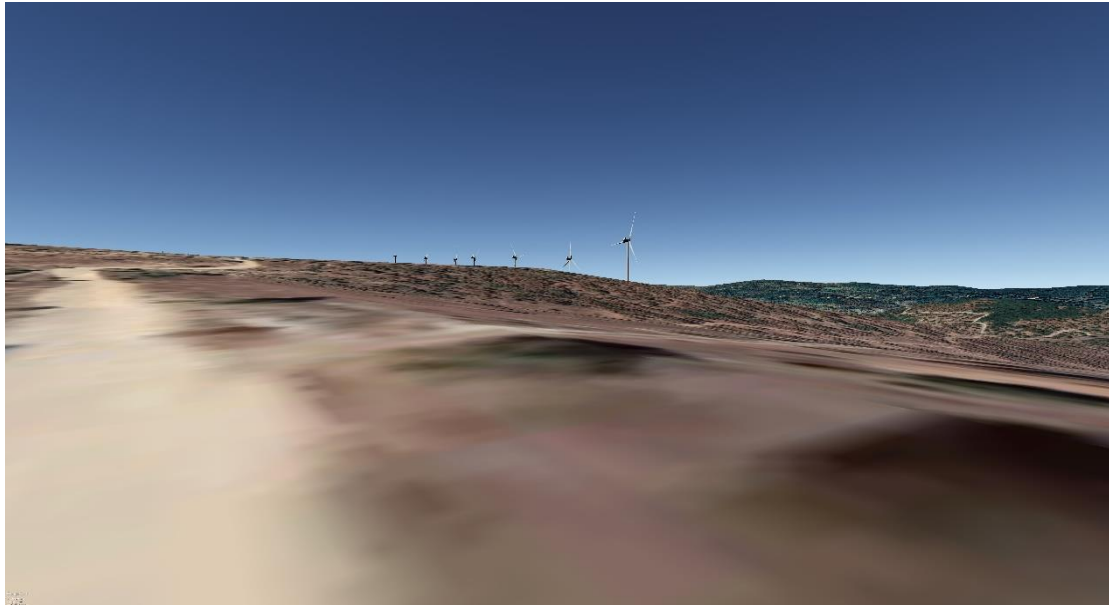
The aesthetic of a wind farm is a purely subjective factor, which depends, as relevant studies show, not so much on the image of the wind farm itself, but on the general image that the observer has formed of its use.

The attempt to quantify as objectively as possible the visual disturbance of a WPP has led to the establishment of rules under the General Spatial Planning for RES. It is further emphasized that the W/Ts are located **outside the exclusion zones of the area and meet the criteria for inclusion in the landscape.**

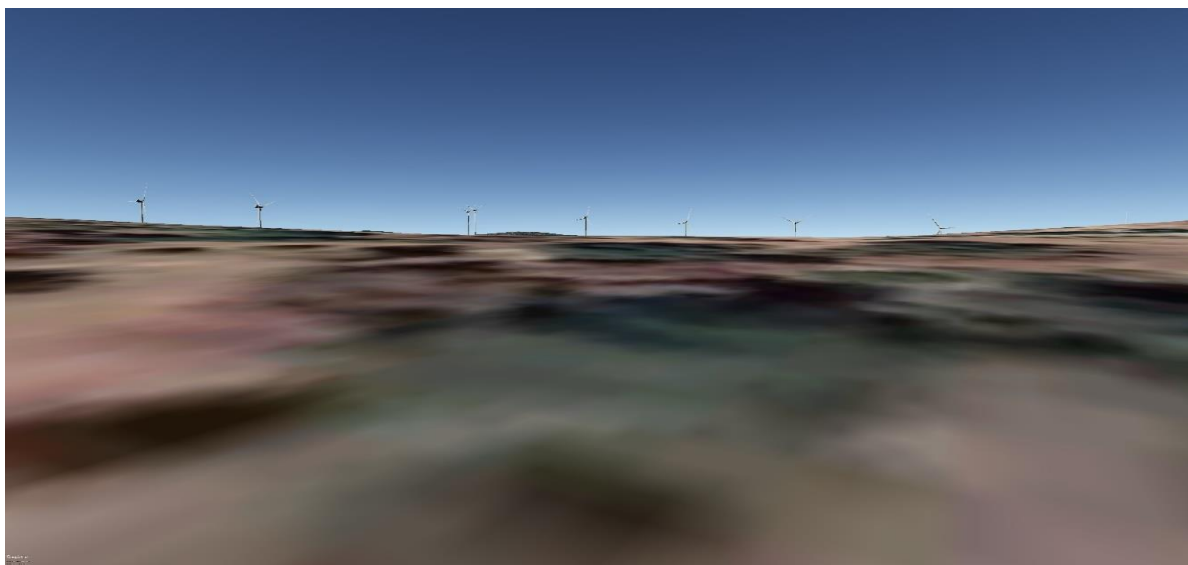
In any case, however, the project as such after the installation of the wind turbines will alter the landscape characteristics of the area to a minor extent and this is illustrated in detail in the following photorealistic illustration.



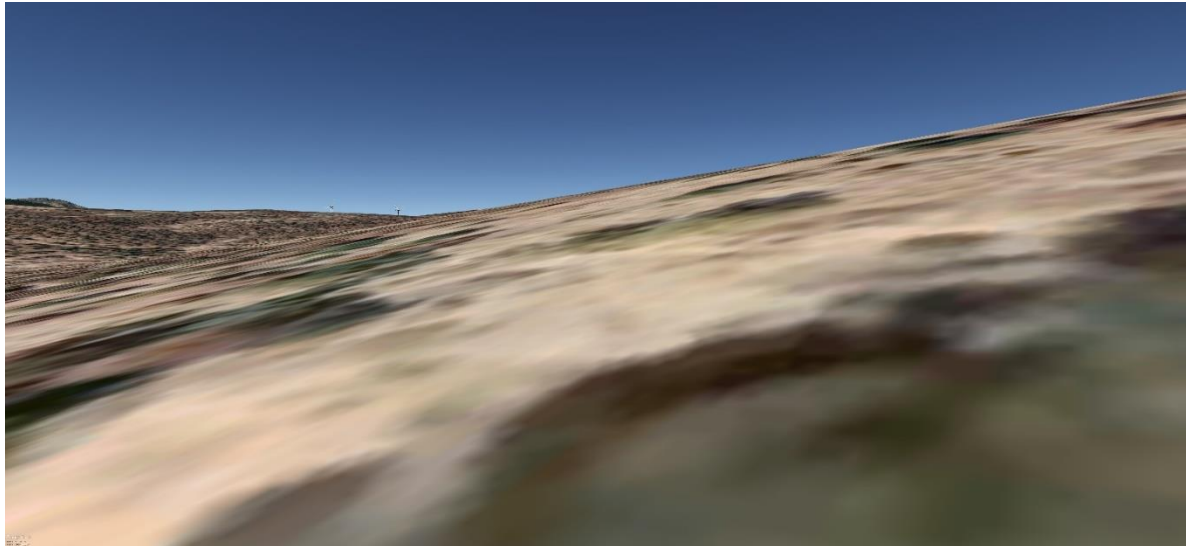
*Picture 7: View of the WPP from the archaeological site "Tekke Afroismenon nekron".*



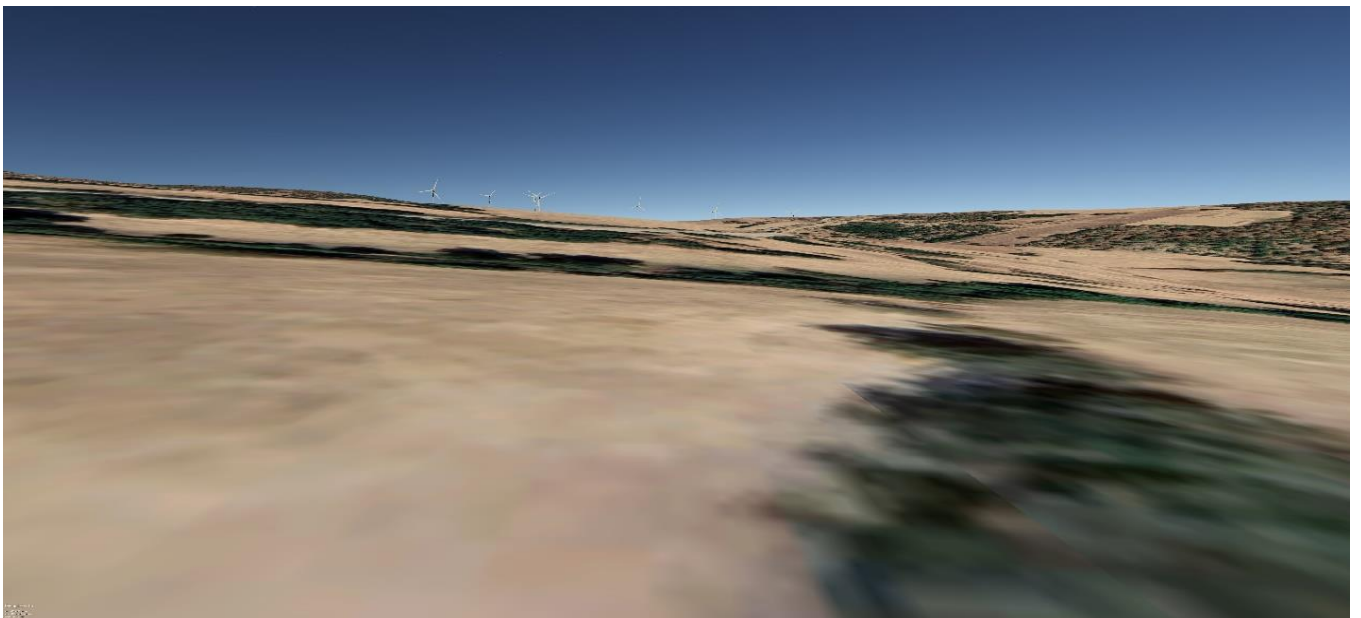
*Picture 8: View of the WPP from the archaeological site "Archaio Nekrotafeio" from the nearest point of the archaeological polygon site to the WPP.*



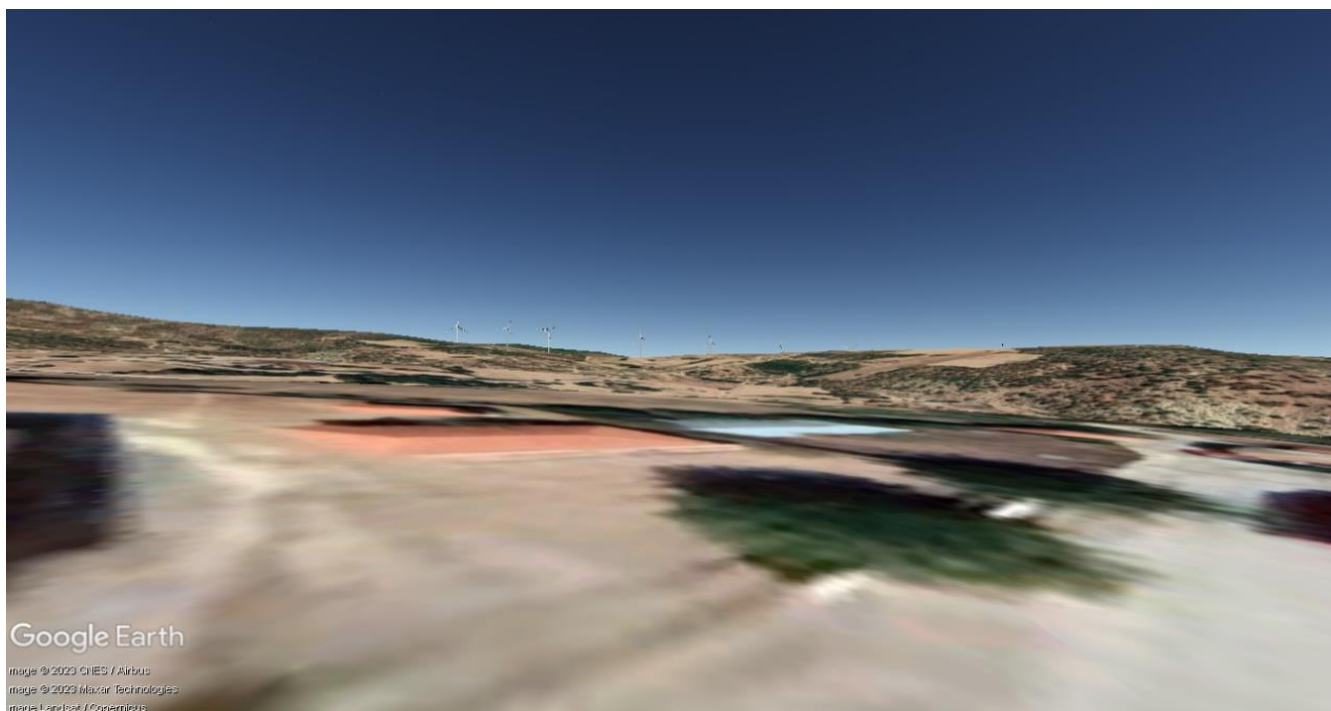
*Picture 9: View of the WPP from the archaeological site "10 Megalithika Mnimeia, Ammochrafa Mikrou Dereiou" from the nearest point of the archaeological polygon site to the WPP.*



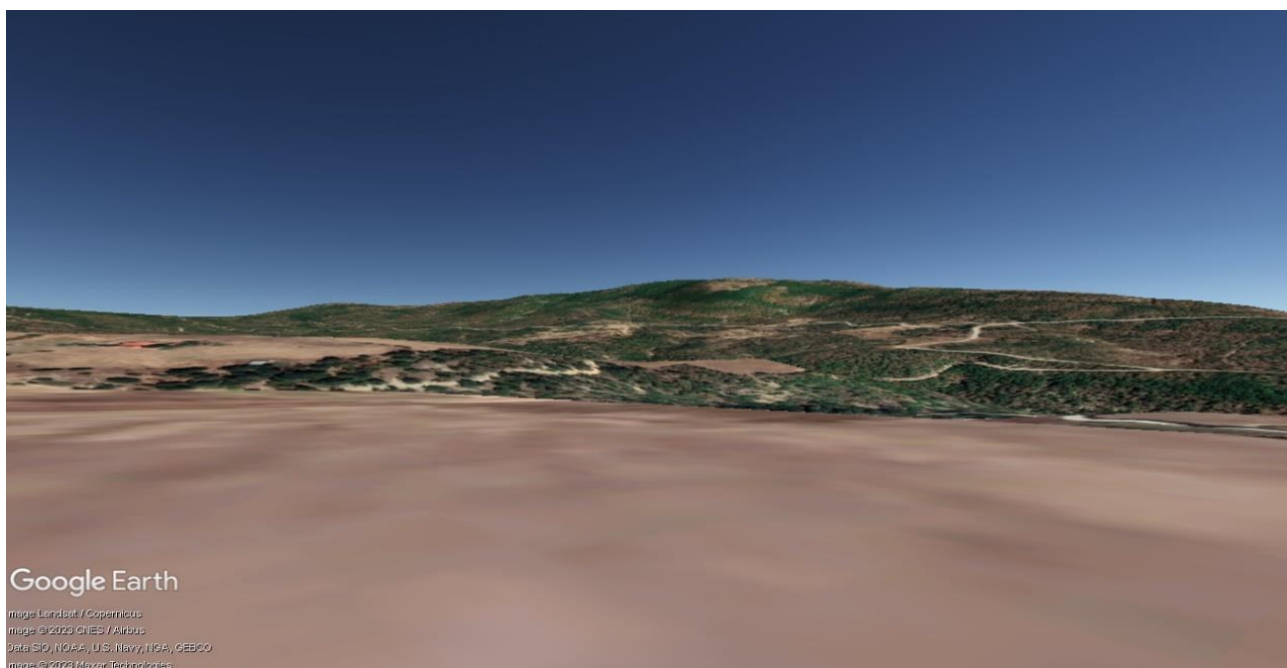
*Picture 10: View of the WPP from the archaeological site "10 Megalithika Mnimeia, Ammoxorafa Mikrou Dereiou" from a midway point of the archaeological site polygon.*



*Picture 11: View of the WPP from the archaeological site "Koum-Tarla"*

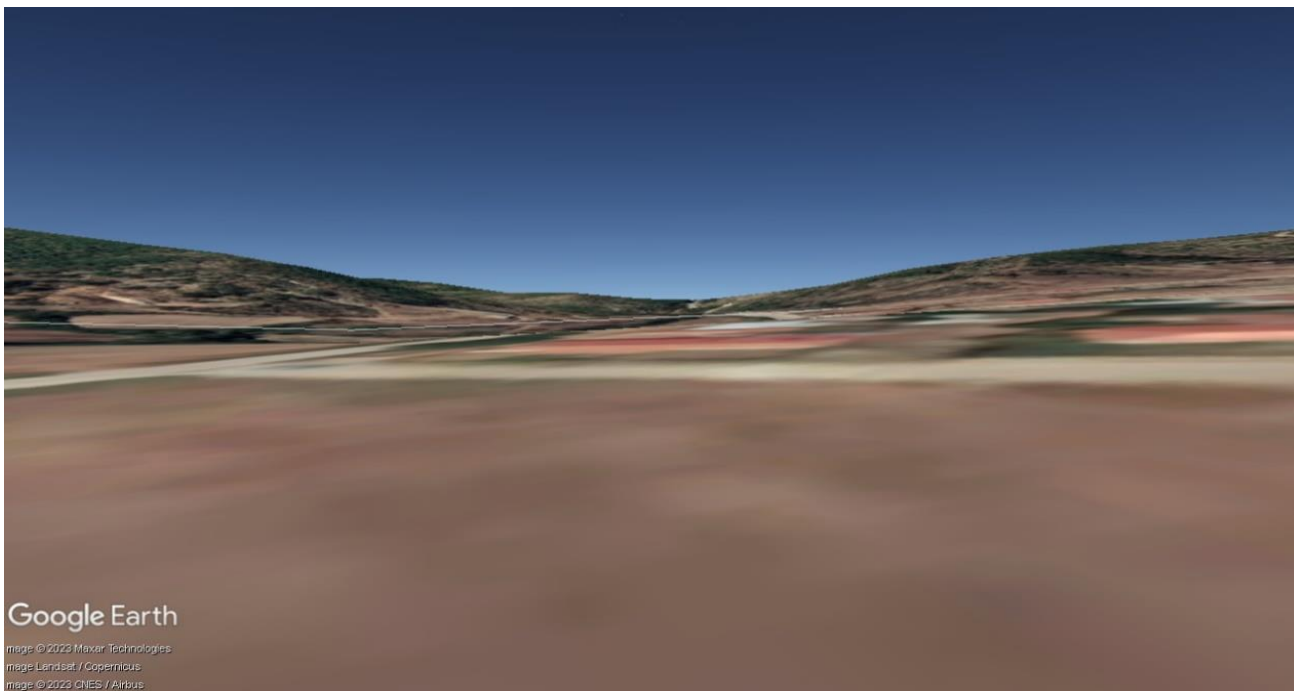


Picture 12: View of the WPP from the "Roussa" village.

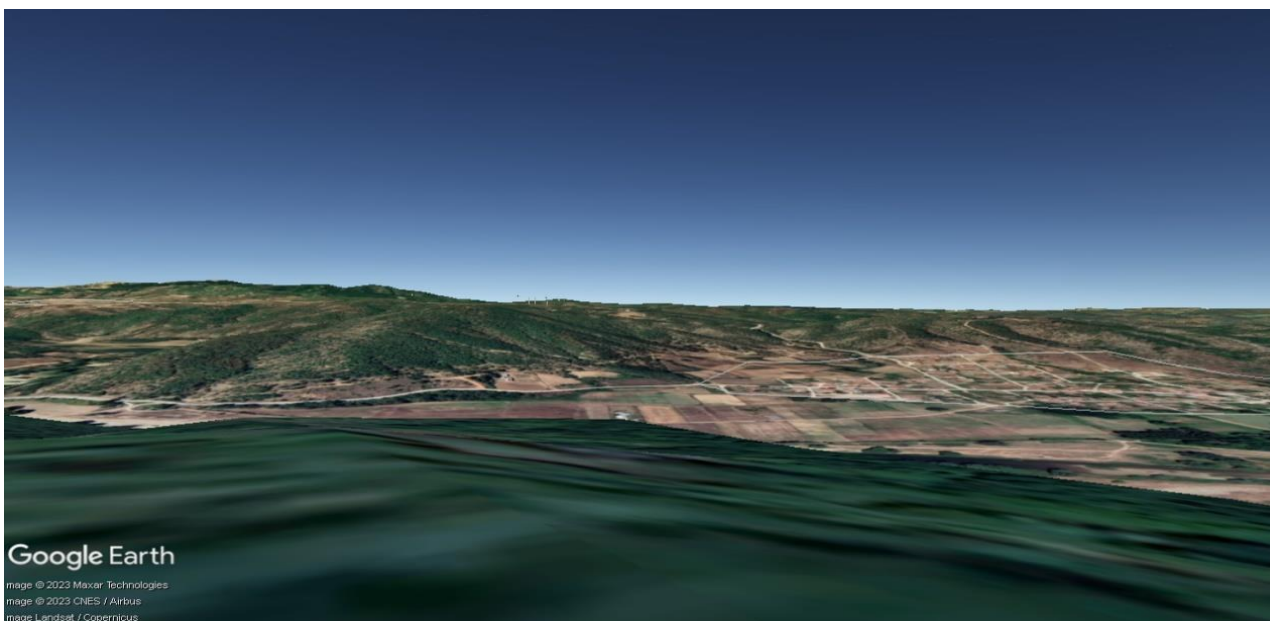


Picture 13: View of the WPP from the "Goniko" village. There is no visual disturbance.

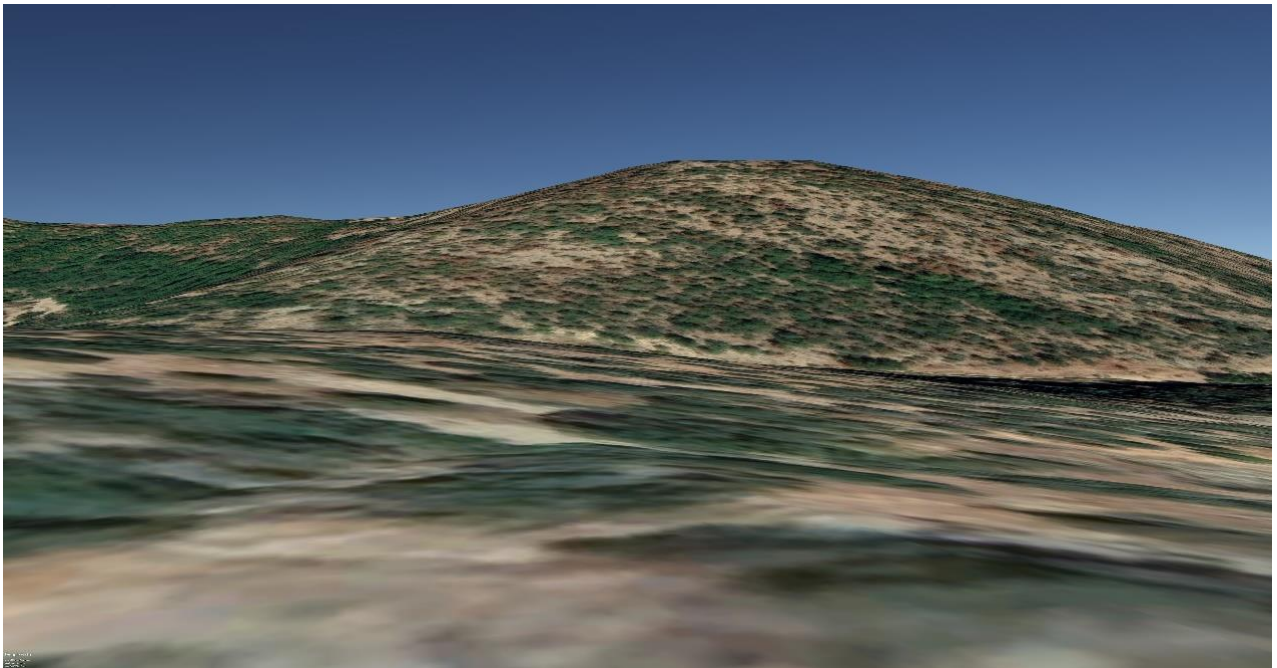




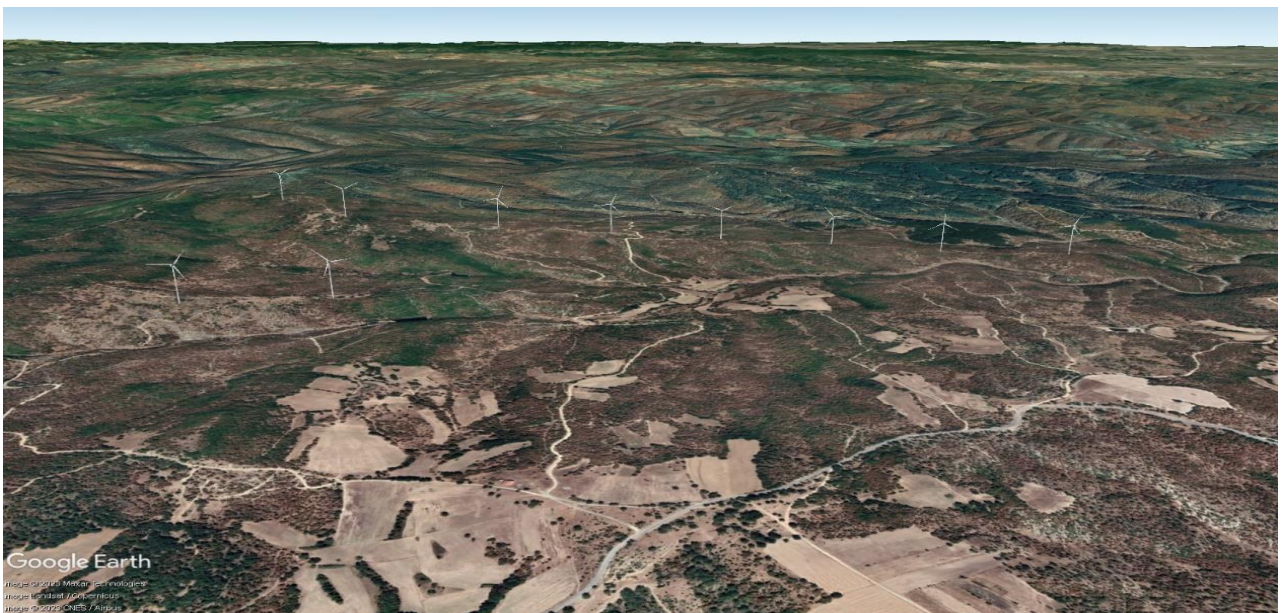
*Picture 14: View of the WPP from the "Goniko" village. There is no visual disturbance.*



*Picture 15: View of the WPP from the Wildlife Sanctuary "Poulia".*

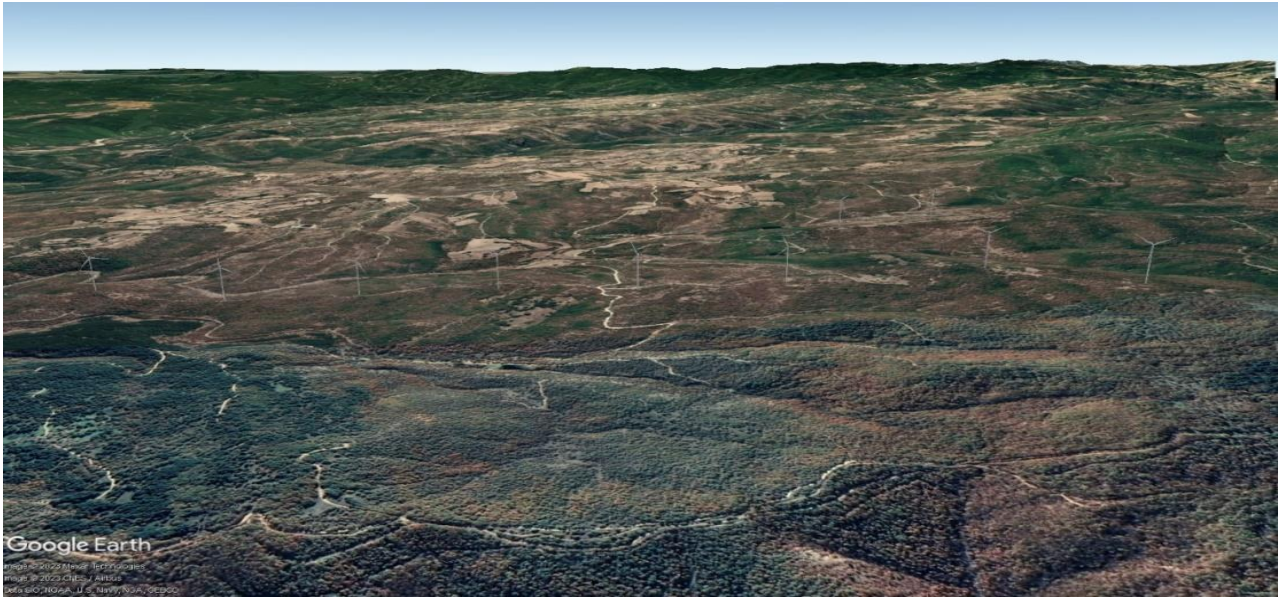


*Picture 16: View of the WPP from the archaeological site "Frouiakos Perivolos, Mesimler-Kale". - There is no visual disturbance.*

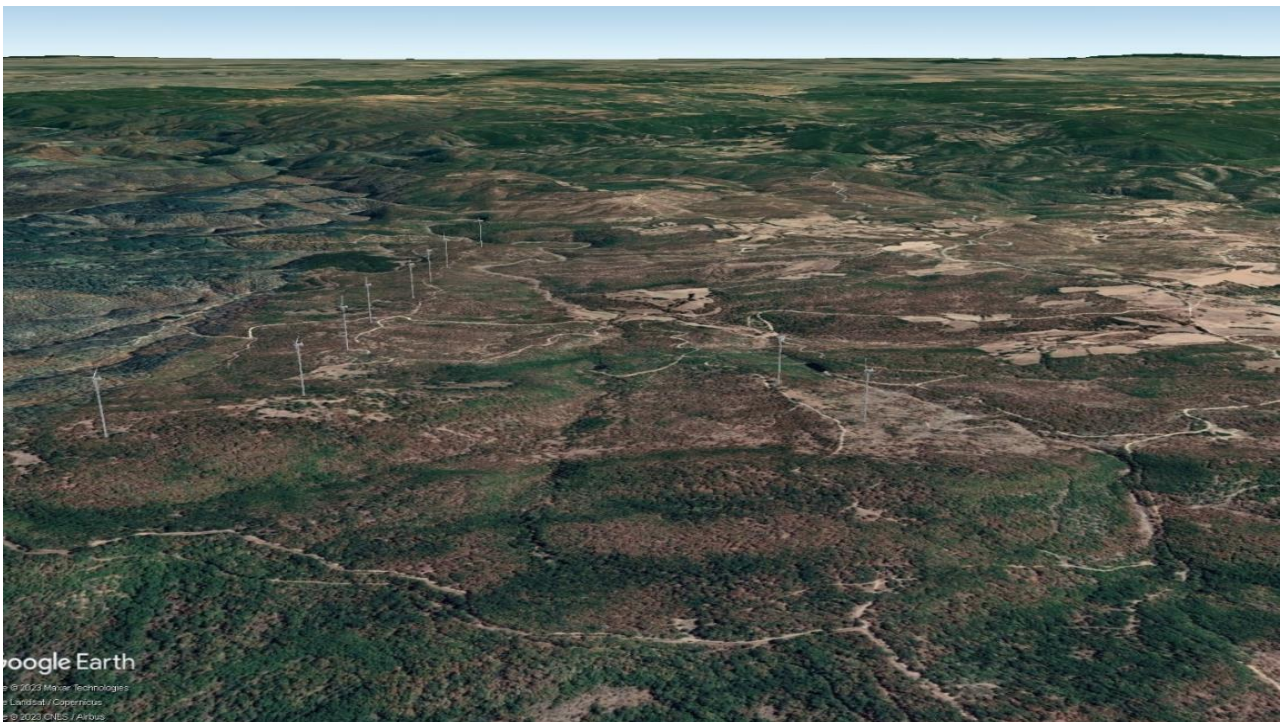


*Picture 17: Panoramic view of the WPP with shooting direction north.*

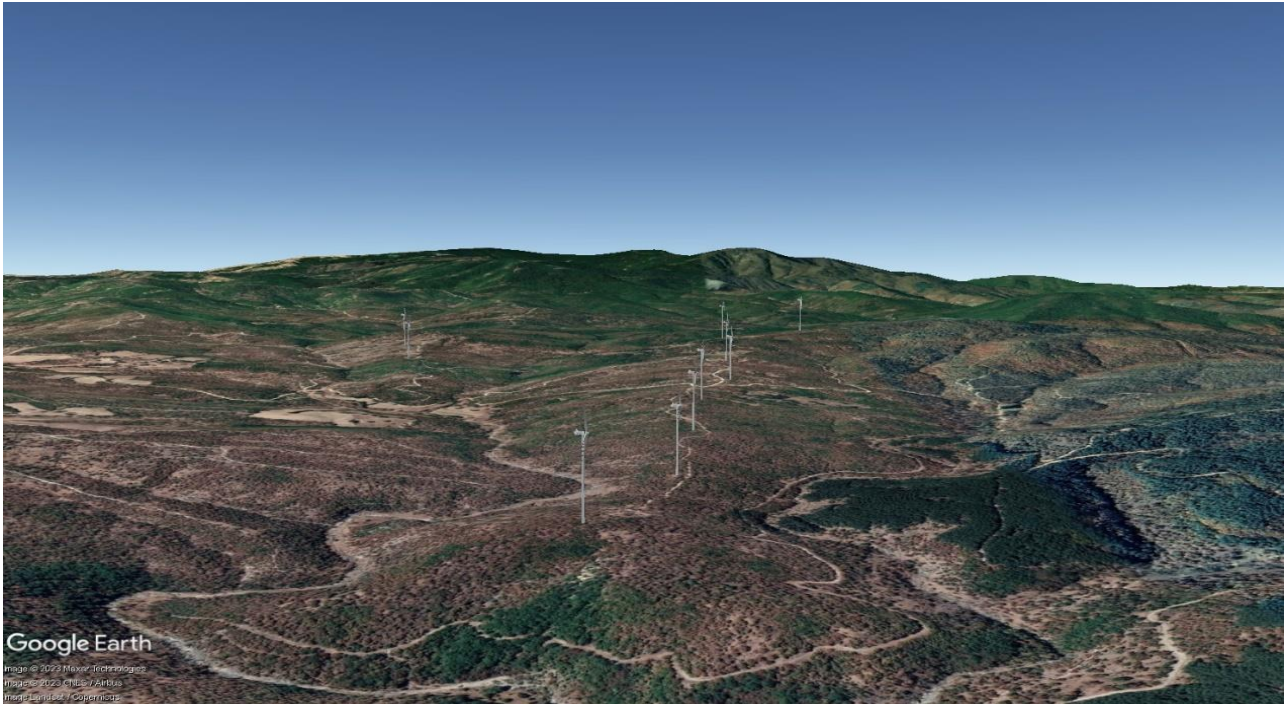




*Picture 18: Panoramic view of the WPP with shooting direction east.*



*Picture 19: Panoramic view of the WPP with shooting direction south.*



Picture 20: Panoramic view of the WPP with shooting direction west.

Based on the above photorealistic illustrations, it is confirmed that the changes in the landscape of the area are estimated to be of medium scale as the project's W/Ts will be partially visible from a long distance from most of the villages.

Moreover, the fact that **the undergrounding of the MV interconnection line will be carried out, significantly reduces the impact of the WPP on the landscape in combination with the choice of the environmentally licensed substation at "Patriarchis"** which will not have visual contact with the villages in the area as it is located at a distance of more than 9 km.

The project is also compatible with the criteria for the integration of wind installations in the landscape set by Annex IV of the Special Spatial Plan for RES (KYA 49828/2008 - Government Gazette 2464 B') and the relevant analysis is presented in **Annex II - Compatibility Sheet of this study.**

**In conclusion**, the impacts of the studied WPP in the location "Lefki" during its operation phase on the landscape and morphological characteristics of the area can be considered as **moderate negative, long-term and partially reversible.**

### **Accompanying projects**

#### **Roads**

In addition, the impacts of improving the existing roads relate to visual intrusion issues in the wider landscape of the area. However, the fact that both the existing roads are



in use and that there is limited visibility of these roads from settlements in the area minimizes the impact on the landscape and aesthetic environment.

The surface of the entire WPP road network will be unpaved and the traffic load will be minimal. The final shape of the roads will be as compatible as possible with the surrounding natural environment and therefore no paving is planned.

Therefore, the impact of the project's road construction on landscape and morphological features is considered neutral, as it does not introduce any new features into the landscape of the area, where an extensive network of forest roads has been identified.

### **Underground Transmission Line**

Regarding the underground transmission line, for the location "Lefki" it will have a length of 28.400,20 m (overlapping 984.12 m of interconnection) and will start at the nacelle of each wind turbine and will end at an existing substation named Patriarchis, as shown in the accompanying interconnection map attached to this study.

It is understood that the landscape and morphological impacts from the transmission grid on the site features are **weak, negative, and fully reversible**.

### **Conclusions**

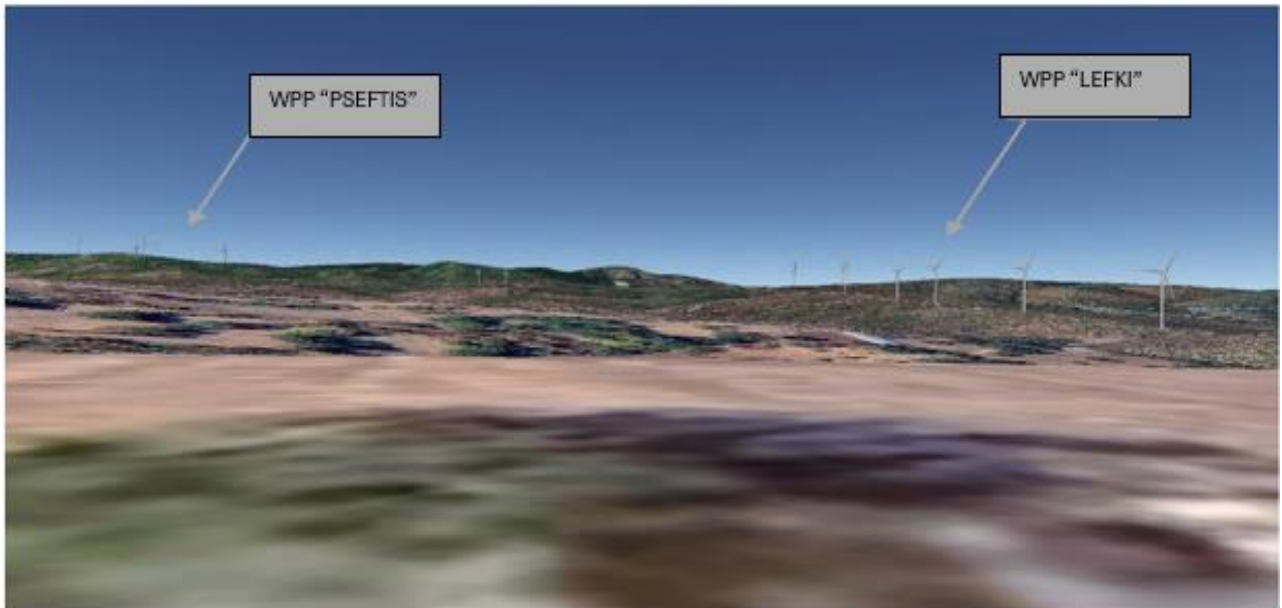
According to the above data, the impacts of wind farms on the morphological and landscape characteristics of the area will be negative but **fully reversible after the end of the lifetime of the investment** and will only concern the visual disturbance during the lifetime of the project and the temporary change in the aesthetics of the area. They can be classified as **moderate, short-term, localized and fully reversible**.

### **Synergistic impacts / Cumulative impacts:**

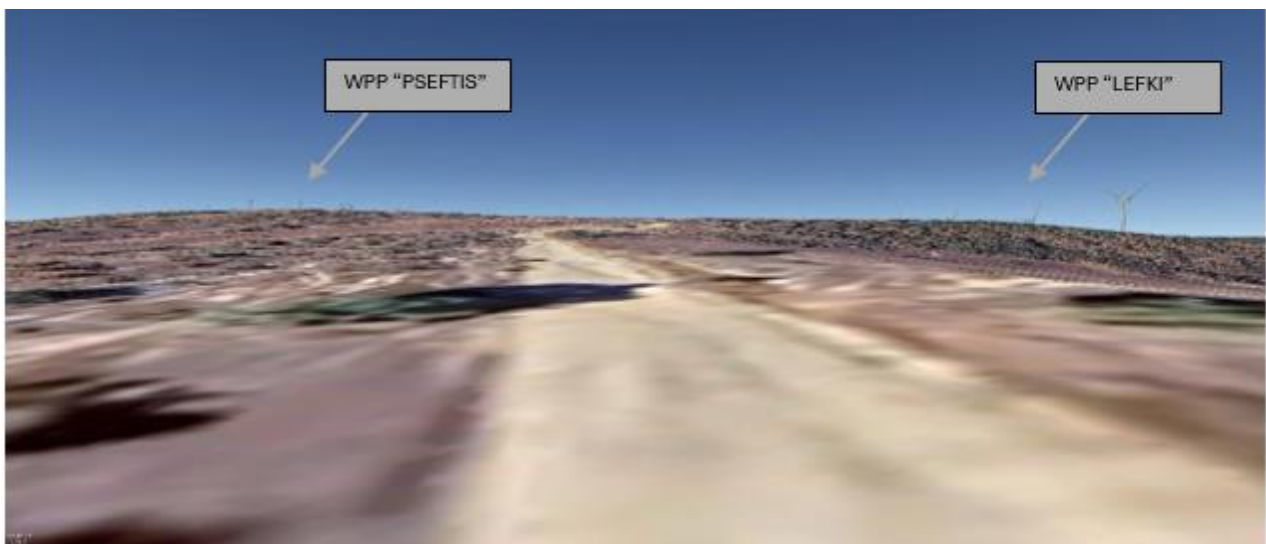
In the nearest area of the installation of the studied WPP and in the 10 km study area, WPPs with a production license and an operating license are identified. It is emphasized that in the context of the examination of the compatibility of the project with the Special Spatial Planning & Sustainable Development Framework for the Renewable Energy Sources (Ministerial Decision 49828/2008), the project was assessed in terms of its integration into the landscape, in synergy with the potentially nearest WPP (WPP in the location of Pseftis) and **was found to be compatible with the visual interference criteria of the above specific framework**.

The following images show the photorealistic representations of the W/Ts of both WPPs from different viewing angles to assess whether they are visible from the **nearest points of interest such as settlements and archaeological sites.**

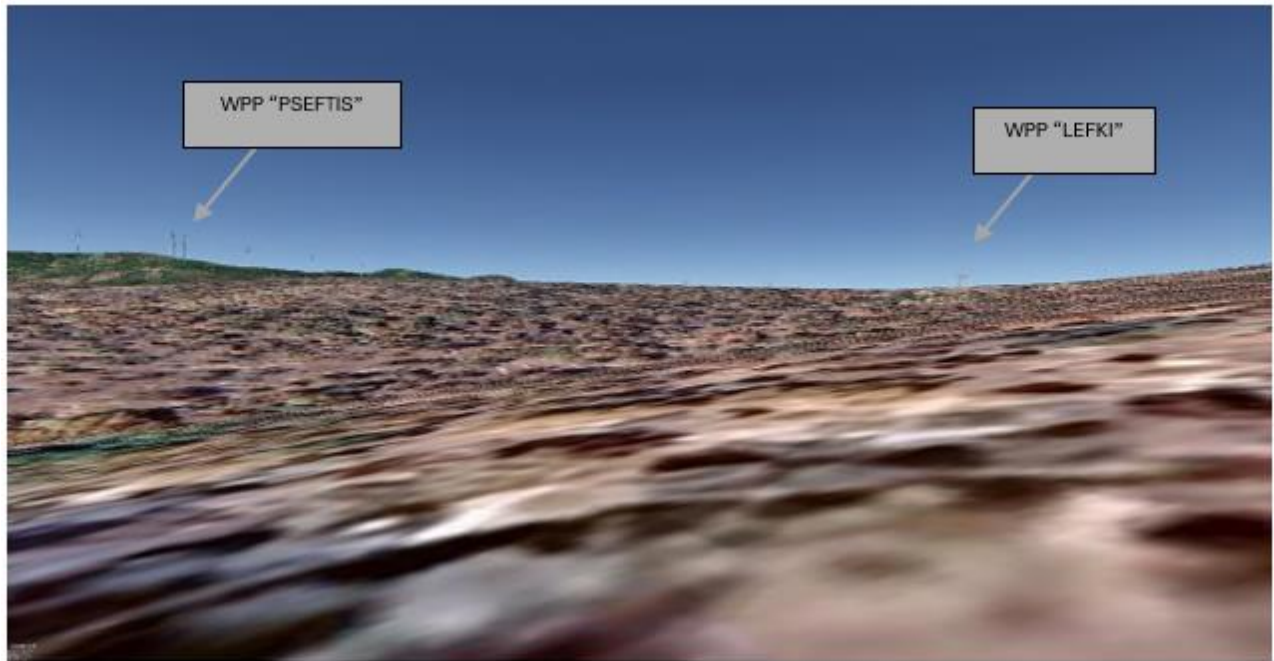
The shots from the points of interest towards the wind farm were taken from the average human height (1.70m). During the photorealistic imaging, the terrain was considered and not the visual obstacles (e.g. buildings, vegetation) in the study area, thus concluding that the visual disturbance depending on the viewing angle will be even weaker.



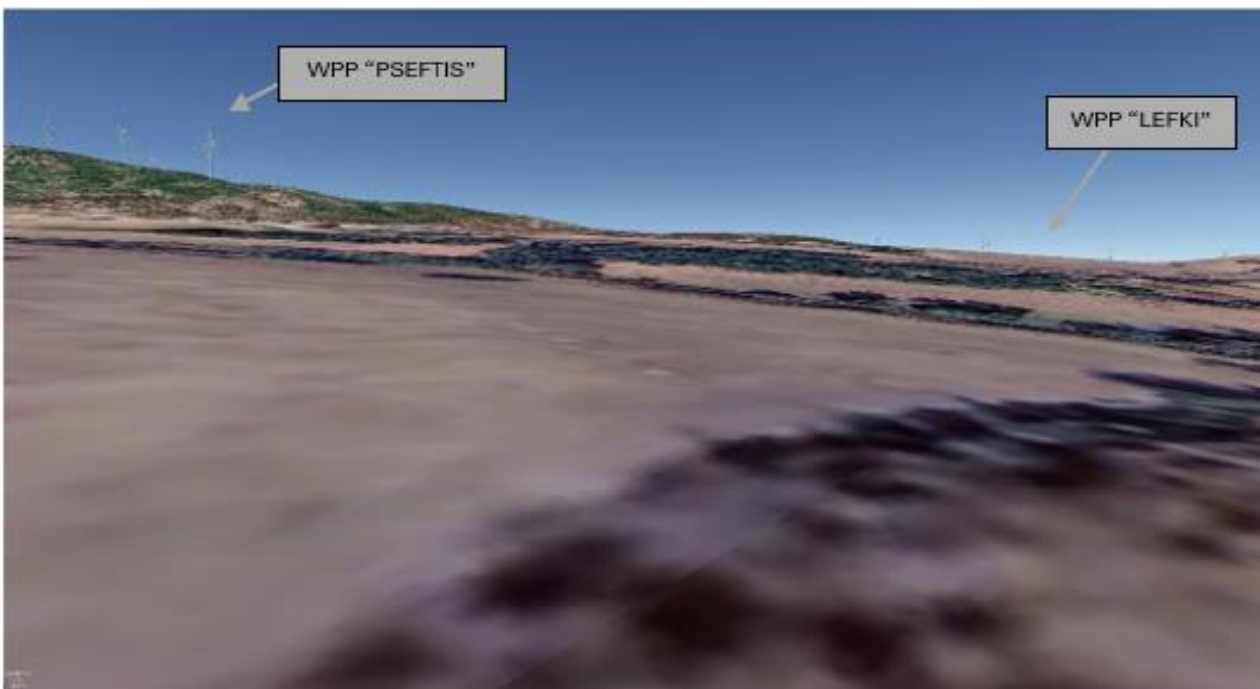
*Picture 21: View of the WPP from the archaeological site "Tekke Afiroismenon nekron".*



*Picture 22: View of the WPP from the archaeological site "Archaio Nekrotafeio" from the nearest point of the archaeological site polygon.*

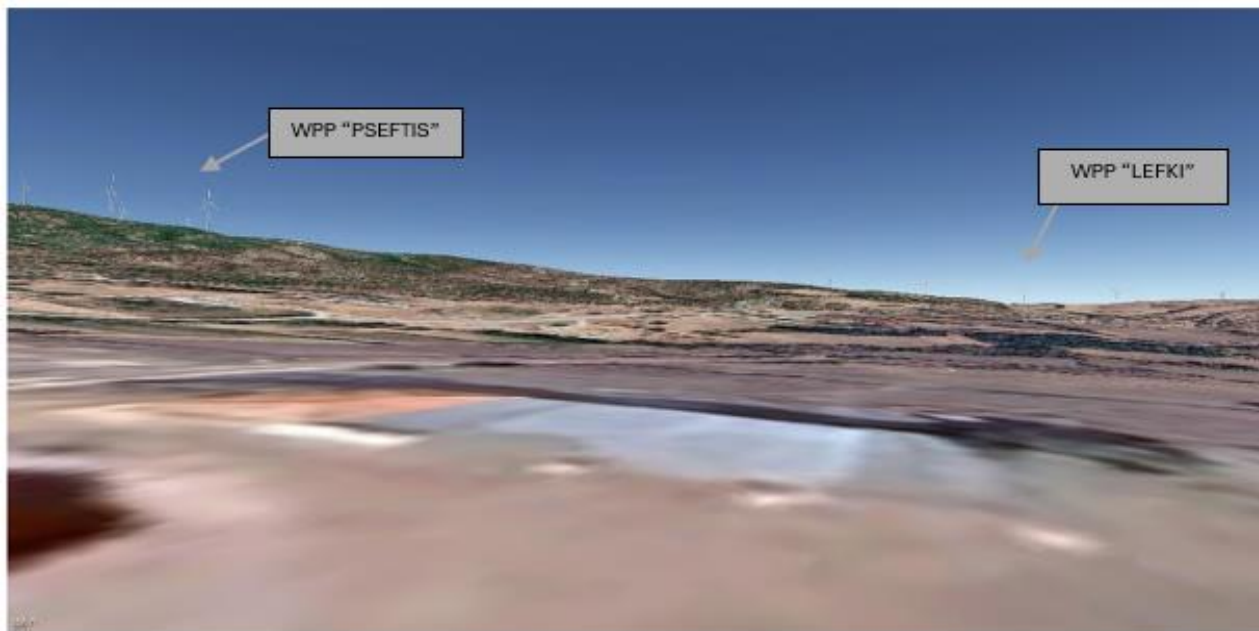


Picture 23: View of the WPP from the archaeological site "10 Megalithika Mnimeia, Ammochorafa Mikrou Dereiou" from the nearest point of the archaeological site's polygon to the WPP.

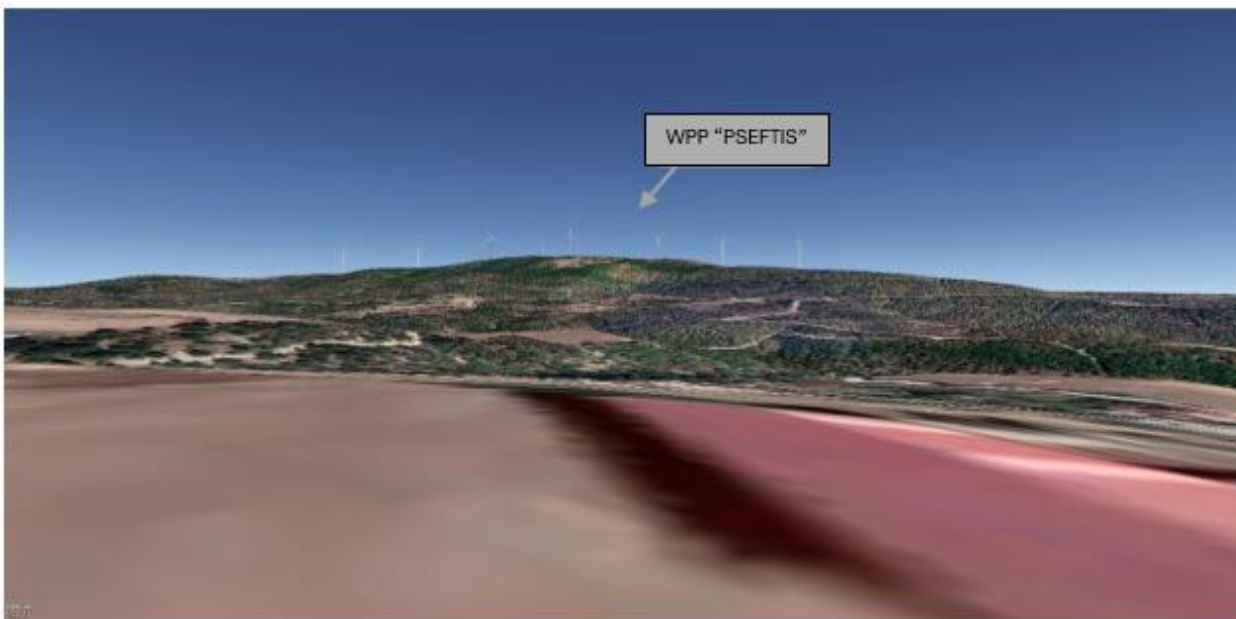


Picture 24: View of the WPP from the archaeological site "Koum-Tarla".

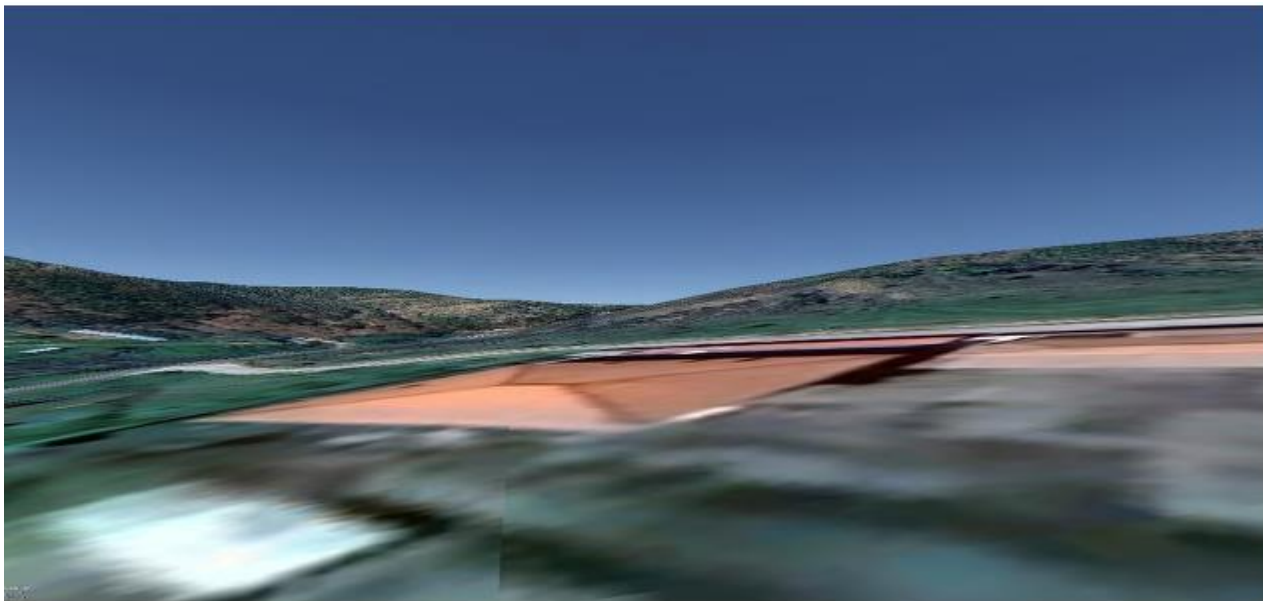




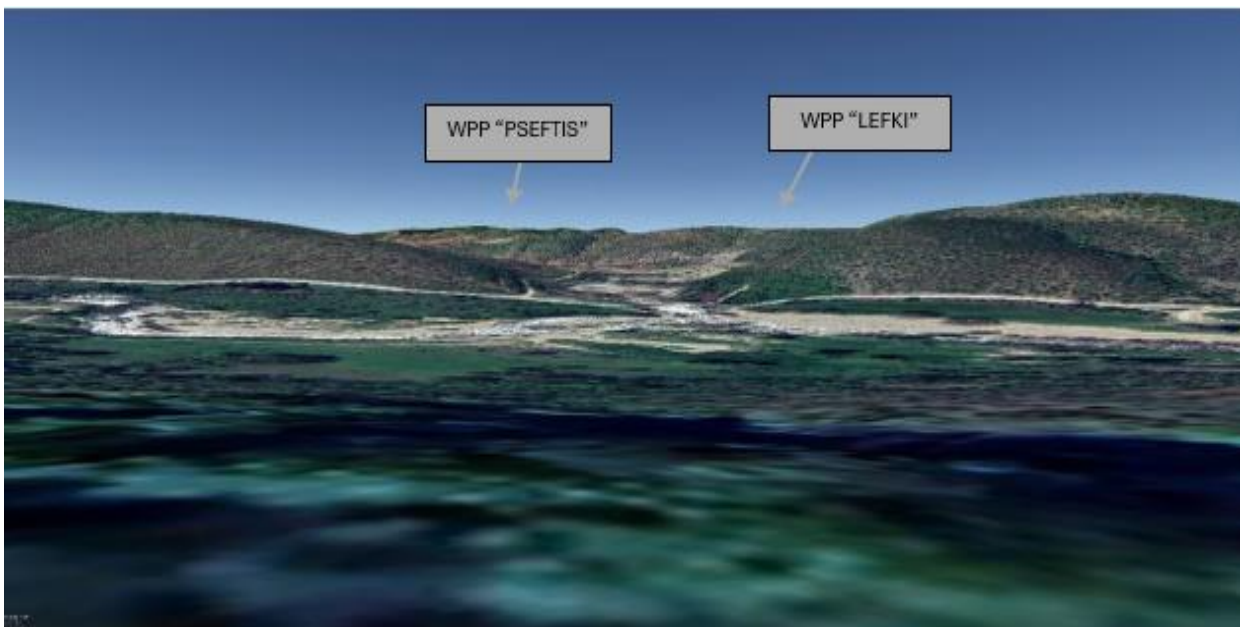
Picture 25: View of the WPP from the settlement "Roussas".



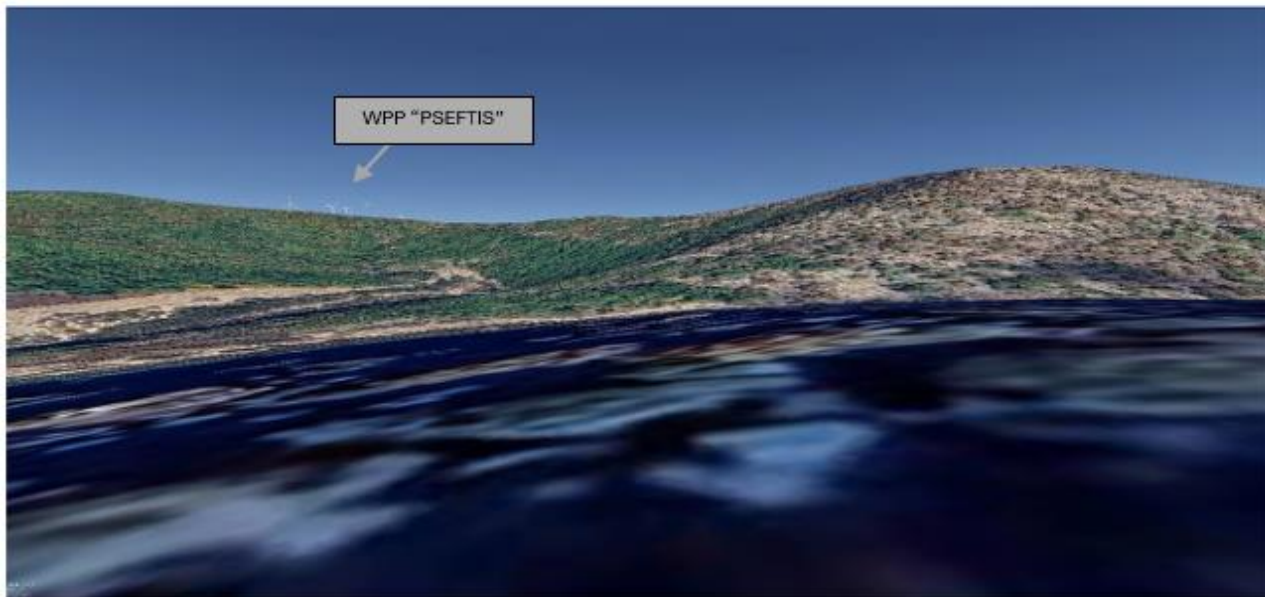
Picture 26: View of the WPP from the settlement "Goniko". There is visual disturbance only from the WPP at the location "Pseftis".



*Picture 27: View of the WPP from the settlement "Mikro Dereio". There is no visual disturbance.*



*Picture 28: View of the WPP from the Wildlife Sanctuary "Poulia".*

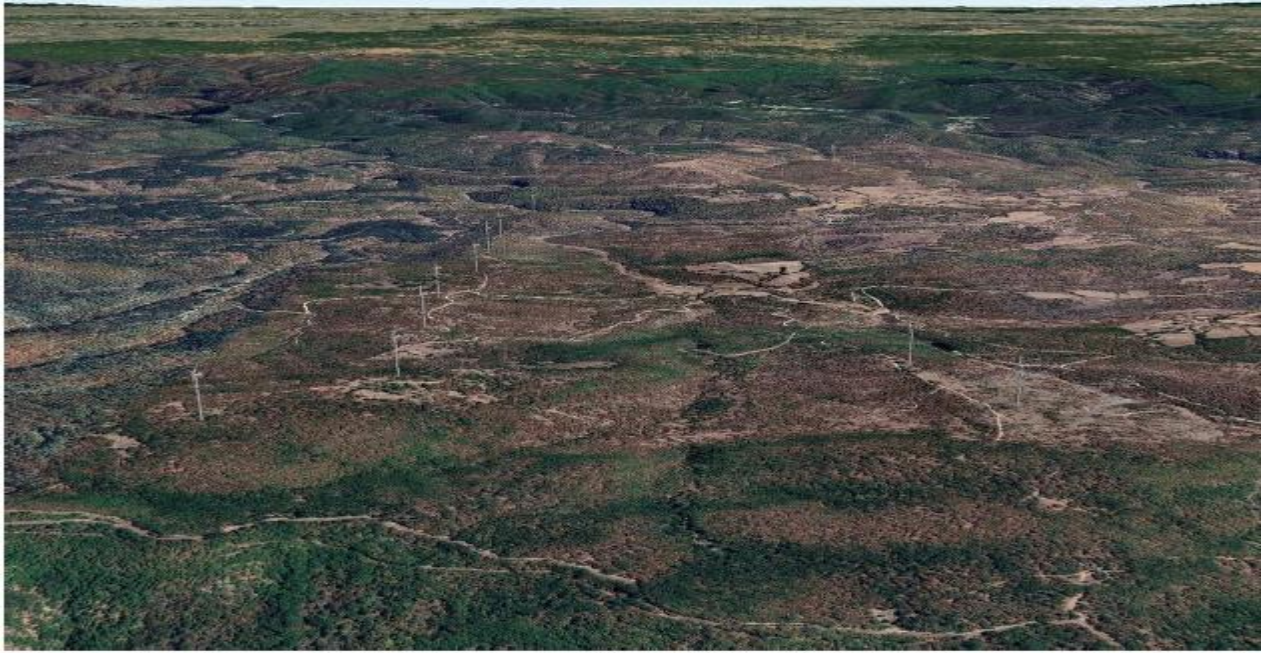


*Picture 29: View of the WPP from the archaeological site "Frouriakos Perivolos, Mesimler-Kale". - There is no visual disturbance.*

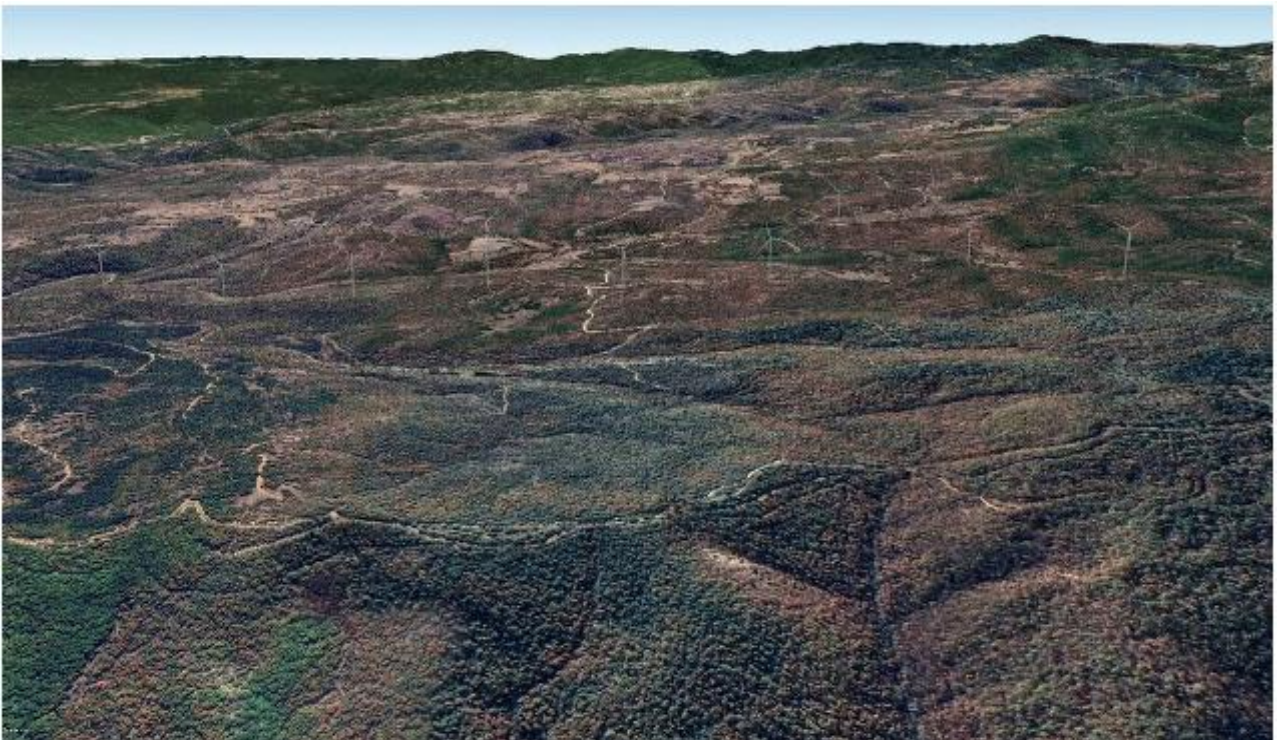


*Picture 30: Panoramic view of the WPP with shooting direction north.*



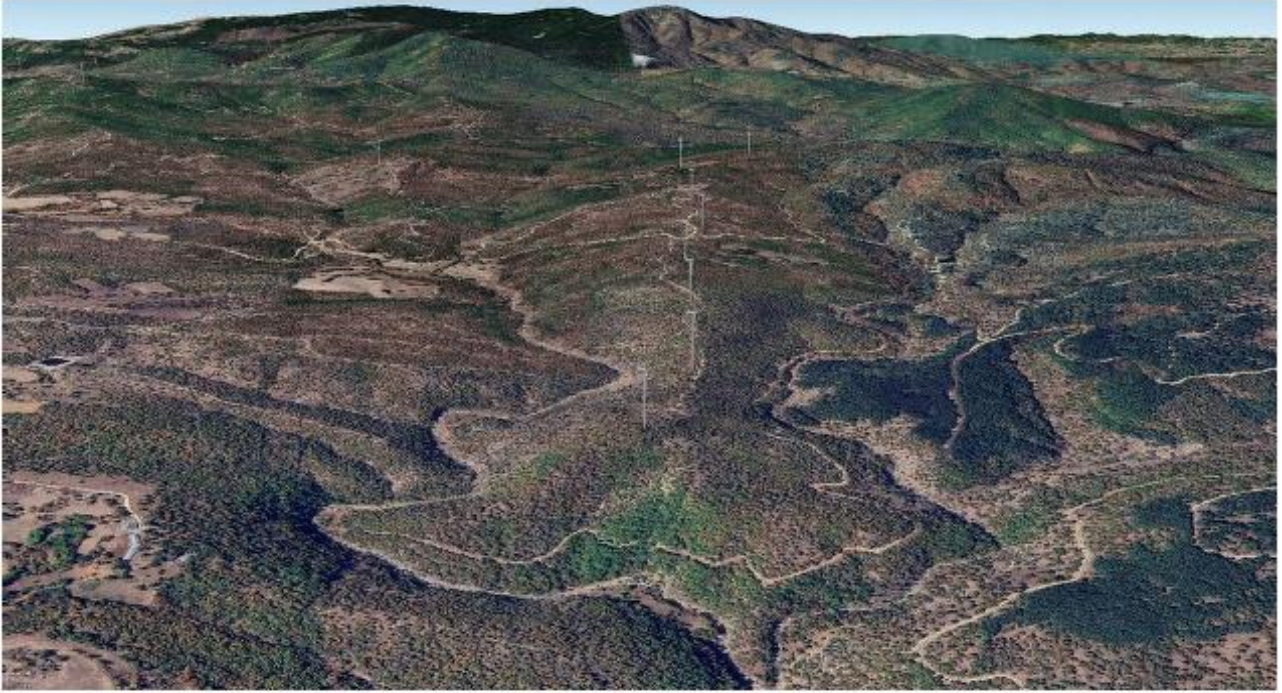


*Picture 31: Panoramic view of the WPP with shooting direction east.*



*Picture 32: Panoramic view of the WPP with shooting direction south.*





*Picture 33: Panoramic view of the WPP with shooting direction west.*

Considering all the above data, it is concluded that the project under consideration, together with the neighboring WPP at the "Pseftis" site, will not introduce a new element into the landscape of the area, as other W/Ts will already be visible from various points in the wider study area. The additional introduction of W/Ts into the landscape is difficult to assess as the aesthetic acceptability of W/Ts is subjective. However, it is considered that the small number of W/Ts to be installed in relation to the existing number and the satisfaction of the carrying capacity (compatibility issue) will not be significantly noticeable. Visually, it is considered that the Project's W/Ts, together with the adjacent WPP W/Ts at the "Pseftis" site, will not have a significant impact on the landscape.

The synergistic/cumulative effects on the landscape are expected to be of medium cumulative impact intensity because there are already constructed WPPs in operation in the project area. The impact of the photorealistic visualization with the neighboring WPP at the "Pseftis" site is considered to be of low intensity, as the geomorphology of the area is such that the WPPs of both projects will not be visible at the same time beyond a few viewpoints, and therefore the view of notable landscape features or monuments will not be obstructed.

**Cessation of Operation**

After the wind farm has been decommissioned (a period of approximately 20 to 25 years), the wind turbines are dismantled, and the equipment is transported off-site to special areas for recycling/disposal. This obligation of the promoter is explicitly mentioned in the environmental conditions of each wind farm, as well as in the special spatial planning and sustainable development framework for renewable energy sources (Article 26).

Renewable Energy Sources (Article 26). Thus, when a wind farm is decommissioned, the only remaining interventions in the environment are the foundations of the wind turbines (most of which are restored), the underground electrical connection cables that remain buried in the ground, and the access roads. If a road is no longer considered necessary, it can be remediated using appropriate methods and returned to restoration. Therefore, any impact on landscape aesthetics is reversible after the end of the operation of the WPP under consideration.

In general, the impact on the landscape and morphology of an area resulting from the installation of a WPP during the construction phase is temporary and is located within the construction area of the project, which is usually in remote mountainous areas. The landscape impacts during the operation phase of the project are more significant due to the introduction of the project into the landscape of an area and the fact that the project is visible over long distances and over a wide horizon coverage. However, the impact of the operation of a WPP on the landscape and morphological characteristics of an area is extremely difficult to assess as it involves significant subjective parameters. Finally, the impact on the landscape during decommissioning is negligible, as restoration techniques and the correct removal of infrastructure can restore the landscape to its original state.

Morphology and characteristics of the landscape						
Impact Phase	Type	Possibility of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	MEDIUM	MEDIUM	YES	YES	/
OPERATION	DIRECT	MEDIUM	MEDIUM	YES	YES	/
CESSATION OF OPERATION	/	/	/	/	/	NEGATIVE

*Table 1: Impact Assessment Table about morphology and characteristics of the landscape*

**9.4 Impact on Geological, Tectonic and Soil Characteristics**

The expected impacts at the above intervention sites are related to the soil characteristics of these sites and not to the geotectonic characteristics. The construction works of the Project are not expected to have any impact on the tectonic characteristics of the immediate and wider study area, given the surface nature of the interventions (shallow excavation depths).

The overall impact on the soil characteristics of the intervention sites is only related to the construction phase, as the operational phase of the project does not involve any additional soil intervention.

The construction of the project includes:

- Widening of a new road with a length of 62.59 m and road improvements with a total length of 5,646.39 m for access to the "Lefki" site.
- Opening of underground channels for the transmission of medium voltage cables to connect the wind turbines to the substation.
- Excavations for the foundations of the wind turbine bases.
- Construction of the foundations for the wind turbines.

### **Project Construction Phase**

The geological, tectonic and soil changes that will occur are related to the activities that will take place during the construction of the project but will be minor and limited to the surrounding area.

The interventions for the placement of the WTs and the construction of the WPP, such as the landscaping of the wind turbine foundations, the construction of new internal roads and the improvement of existing roads to ensure access to the wind turbines, the interconnection of the wind turbines with the voltage step-up substation, have been described in detail in the description of the Project under consideration (Chapter 6) of this study. At a general level, the impacts of these interventions on the ground are characterized as mostly negative in nature, of varying magnitude (intensity) and duration, partially or fully manageable and localized in terms of their geographical scope, but without causing changes in the lower geological layers and tectonic characteristics of the study area.

The land will be restored to its previous condition and original height using most of the excavated soil. As the land where the wind turbines will be installed is rocky, it is not expected that extensive vegetation clearance will take place, except in specific areas, without causing soil erosion. Only the soil (and not the underlying geological layers and tectonics) will be temporarily affected during the construction phase by the presence of construction sites and machinery for the transport, assembly and installation of the wind turbines and the construction of ancillary works. This impact would be small, negative, short-term, and fully reversible.

Once the work on the foundations of the wind turbines, the construction of roads, etc., has been completed, it is planned to restore the area to its original state, and the changes that will take place will be limited to the foundations of the wind turbines. The latter will be paved with the products of the earthworks, so that the intervention



will be limited to the internal roads and the area where the wind turbines will be installed. This will also reduce the amount of waste generated and limit any further disturbance to the site.

The restoration of disturbed sites will therefore have the following main objectives:

- The restoration of the natural environment from the damage caused by the construction of the project and the harmonious integration of the road into the landscape.
- To protect the surface of the embankments from erosion, mainly because of rainwater, by removing various particles from the body of the embankment, the maximum percentage of which (around 75%) will normally take place in the first autumn and winter period following the end of the earthworks. The areas proposed for restoration are the embankment surfaces, which will be filled with vegetated soil.
- Restoration of vegetation removed during the excavation works.

Regarding the trenches for the transmission cables, it is planned that these surfaces will be partially covered with the material excavated during the excavation process and thus returned to their original level. The impact of the cable laying on the ground is expected to be extremely limited and localized, as the work will be light and of limited duration. They are also considered to be reversible, as the entire connection line is underground.

In addition, the WTGs can be installed in seismically active areas, since the design to withstand the normal stresses to which the blades and tower are subjected during operation is greater than the stresses normally encountered in the event of an earthquake. The entire plant can withstand large earthquakes without damage.

It can therefore be concluded that the impact on the topography and morphology of the area affected will be weak, negative, and short-term, and will not cause ground instability or changes in the geological configuration of the rocks, since no deep excavations will be carried out.

### **Project Operation Phase**

During the operational phase of the project, no impact on the soil, geological and tectonic characteristics of the immediate and wider study area is expected. The operation of the WPP Project is not associated with any additional ground disturbance. In addition, the operation of the project is not associated with the generation of hazardous liquid or solid wastes which, in the event of an accident, could be dispersed into the surface soil layers and cause changes in the composition and consistency of the surface soil mantle.

**Cessation Of Operation**

When dismantling a wind farm, the surface soil should be removed at the points where, according to the original design, cranes are to be installed and components and other materials are to be temporarily stored. The dismantling of the wind turbine sections, and the temporary storage of components and materials requires the creation of suitable flat surfaces. Earthworks grading will be undertaken, and the soil removed from the site surface will be stored for the purpose of re-surfacing. This area will be surface covered with gravel. At the end of the process the gravel placed will be removed. The soil will be decompacted and the soil will be replaced and reset to be like the original composition prior to any site intervention.

Therefore, the cessation of the project will have positive direct and indirect impacts as restoration interventions will be undertaken.

**Synergistic impacts / Cumulative impacts:**

As regards synergistic impacts during the construction phase, they are unlikely to occur as it is not feasible to build all the licensed stations at the same time. With regard to the case of simultaneous operation of the projects under licensing and with a producer's certificate in the study area, as well as the network of forest roads in the nearest area of the installation of the W/Ts, in the operation phase of the project, it is not expected to bring any synergistic impact on the geological, tectonic and soil characteristics of the nearest area of the project location, given that the WPP in its operation phase, as well as the accompanying projects, do not interact with the specific abiotic factors.

In addition, the use of the existing forest road shared by the power plant under consideration with the adjacent WPP "Pseftis" is an important positive synergistic effect, as it saves significant volumes of earthworks.

Geological, Tectonic and Soil Characteristics						
Impact Phase	Type	Possibility of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	MEDIUM	MEDIUM	YES	YES	/
OPERATION	/	/	/	NO	/	
CESSATION OF OPERATION	/	/	/	NO	/	

*Table 2 : Impact assessment table on geological, tectonic and soil characteristics.*

**9.5 Impacts on the Natural Environment**

**9.5.1 Construction phase of the Project**

*9.5.1.i Flora*

The occupation of the land in the area where the wind farms will be located is the most direct impact of the construction of the proposed WPP on the vegetation of the

Field Investigation Area (FIA). The area to be covered relates to the wind turbines foundations, improvements to existing roads and construction sites.

The impacts on vegetation are due to the construction phase of the project and in particular the removal of local plant species for the construction of the bases and wind turbines foundations. However, as already mentioned, the project site is occupied by oak trees, shrubs and areas of juniper and grassland. The direct impact of the construction of the wind farms will result from the occupation of part of the land in the areas where the technical works to serve the project are located, such as the zone of occupation of the internal roads and the cables and platforms of the wind turbines. The construction of these works will locally alter the natural state of the habitats on which they are built, as they will require the clearing and shaping of the land within the occupation zone.

The removal of vegetation will take place in the places where the W/Ts are to be located and the wind turbines foundations around them will be landscaped to accommodate the movement of the mechanical equipment that will work on their construction and maintenance.

The wind turbine site is located within areas of 'coniferous forests', 'natural pastures', 'sclerophyllic vegetation' and in an area of 'land used mainly for agriculture together with significant parts of vegetation'.

In general, the wider area is dominated by the above habitat types together with areas of "natural pasture" and "land used for agriculture together with significant parts of vegetation".

The removal of vegetation on these surfaces is negligible both in terms of the type of vegetation and in relation to the objective of the specific project. The WPP area under consideration falls within areas of oak and scrub and areas of juniper and grassland. The interconnection falls within the aforementioned areas as well as areas of beech, black pine and the existing substation falls within areas of grassland.

**No particularly important vegetation species are destroyed in either of the two cases examined.**

The interventions to be made on the surface will be minor and will soon be restored as the affected areas are backfilled and the native species of the area will re-cover the ground. Furthermore, the flora of the protected area and the other areas where the wind farms will be located are not expected to be exposed for a prolonged period to the air pollutants from the mechanical equipment and the dust to be generated by the construction processes that will take place on the site as these will be of limited duration and low concentration since all the necessary measures will be taken, such as wetting the surfaces to reduce the release of dust, maintenance of the equipment to be used etc.

However, vegetation can potentially be affected by the discharge or leaking of liquid toxic wastes such as oils and fuels from the site and construction machinery which will also affect the soil causing pollution of the soil and consequently the existing vegetation. For this reason, all necessary measures must be taken, and the necessary equipment must be available, e.g. adsorbents, to deal with possible spills that may occur. **Overall, the vegetation in the area under consideration is expected to be adversely affected to a moderate degree.**

However, these impacts can be identified as manageable and partially reversible assuming that **appropriate protection measures are taken, which are described in detail in Chapter 10.**

In terms of the time of occurrence, they are considered long-term locally as the lifetime of the project is long, but in the wider area they are considered short-term. **Therefore, minimal impacts on the flora of the area are expected to be caused locally during the construction phase of the project, since Annex I species of the Joint Ministerial Decision 14849/853/E103/4.4.2008 are not affected, as mentioned below.**

Thus, it is noted that the study area is not a Special Conservation Zone (S.C.Z.) and/or a Site of Community Importance (SCI) and for this reason **no habitat types of Annex I of Joint Ministerial Decision 14849/853/E103/4.4.2008 (Government Gazette B' 645) are recorded.**

Based on the above assessment, it is concluded that there is no substantial change in environmental impacts compared to those considered and assessed in the environmentally permitted project.

#### **Synergistic/Cumulative impacts**

Synergistic/ Cumulative impacts will not occur during the construction phase as it is unlikely that all the adjacent WPPs will be constructed at the same time.

In the scenario where only the proposed project under consideration is constructed and licensed in synergy with the existing WPPs in **the synergistic impacts study area** would be the limitation of areas that would be suitable for use by avian species, such as areas or sites suitable for nesting, roosting, cover, foraging, etc.

All the projects, or more accurately the most significant in terms of generating negative impacts, are usually located within the two polygons of the WPP, although associated projects, such as access roads, may extend for several kilometers off these.

However, the otherwise dense network of forest roads located within productive forests, the road network connecting mountain settlements, villages, etc., the road network serving other purposes, such as the network of rural roads, the network serving livestock needs, etc., which often already exist in areas where new WPPs are

being installed, cannot easily be distinguished in terms of the impact they cause in relation to those parts of the road network that are also used as access roads to WPPs.

*9.5.1.ii) Fauna - excluding avifauna.*

The impacts on fauna are due to the construction works of the wind farms, and particularly the groundworks, the required road improvements, the assembly of the electrical installations and the construction of the wind turbines. The characteristics of these works are not expected to disturb the habitats of reptiles, mammals, and amphibians for a long period of time.

**The interventions in the area where the wind turbines are to be installed will be punctual and cannot affect the local fauna to a significant extent.** However, the increased noise levels and human presence due to the works taking place at the site are likely to cause species to relocate and temporarily move from the site until the construction of the project under consideration is completed.

**In addition, it is noted that this area does not belong to the Natura 2000 network areas that are classified as SACs and/or SCIs and there is no record of species of Directive 92/43/EK in their Standard Data Forms.**

However, indicative sampling was carried out for the other fauna species of the area (except for the avifauna that is the protected object of the SPAs, and for which detailed records were made), and the presence of the species found is shown in the table below, with reference to their protection status.

THREATENED STATUS OF SPECIES OF FAUNA OBSERVED IN THE RESEARCH AREA						
Species (latin name)	Species (English name)	IUCN (EU) THREAT REGIME	Directive 92/43/EOK	Bern Convention	Bonn Convention	CITES
<b>Mammals</b>						
<b>Carnivora</b>						
<b>Canidae</b>						
<i>Vulpes vulpes</i>	Fox	LC				III
<b>Mustelidae</b>						
<i>Martes foina</i>	Beech marten	LC		III		III
<i>Meles meles</i>	Badger	LC		III		
<b>Felidae</b>						
<i>Felis silvestris</i>	Wildcat	LC	IV	II		II
<b>Lagomorpha</b>						
<b>Leporidae</b>						
<i>Lepus europaeus</i>	Rabbit	LC		III		
<b>Cetartiodactyla</b>						
<b>Suidae</b>						
<i>Sus scrofa</i>	Boar	LC				
<b>Cervidae</b>						
<i>Capreolus capreolus</i>	Roe deer	LC		III		
<b>Rodentia</b>						
<b>Sciuridae</b>						
<i>Sciurus vulgaris</i>	Squirrel	LC		III		
<b>Reptiles</b>						
<b>Squamata</b>						
<b>Sauria</b>						
<b>Lacertidae</b>						
<i>Lacerta viridis</i>	European green lizard	LC	IV	II		
<i>Podarcis muralis</i>	Common wall lizard	LC	IV	II		
<b>Anguillidae</b>						
<i>Pseudopus apodus</i>	European legless lizard	LC		II		
<b>Serpentes</b>						
<b>Psammophidae</b>						
<i>Malpolon insignitus</i>	Eastern Montpellier snake	LC		III		
<b>Testudines</b>						
<b>Testudinidae</b>						
<i>Testudo graeca</i>	Mediterranean spur-thighed tortoise	VU	II,IV	II		II
<i>Testudo hermanni</i>	Mediterranean tortoise	NT	II,IV	II		II
<b>Amphibians</b>						
<b>Anura</b>						
<b>Bufonidae</b>						
<i>Bufo viridis</i>	Green toad	LC	IV	II		

### Legend

#### IUCN Threat Status

EX: Extinct, EW: Extinct from their natural habitat, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Not Well Known, NE: Not Assessed

#### Directive 92/43/EOK

I belongs to Annex I of the Directive (types of natural habitats of Community interest whose conservation requires the designation of sites as Special Areas of Conservation)

II: included in Annex II to the Directive (animal and plant species of Community interest whose conservation requires the designation of Special Areas of Conservation)

III: included in Annex III to the Directive (criteria for the selection of sites that may be recognized as sites of Community interest and designated as Special Areas of Conservation)

IV: included in Annex IV to the Directive (animal and plant species of Community interest requiring strict protection)

V: included in Annex V to the Directive (animal and plant species of Community interest whose capture in the wild and exploitation may be subject to management measures)

**Berne Convention**

II: included in Annex II of the Treaty (fully protected species and their capture, possession and killing, damage or destruction of their breeding or resting places, disturbance during the breeding, dependence and hibernation period, destruction, collection or possession of their eggs and the possession or trade in these species, whether alive or dead, are prohibited)

III: belongs to Annex III of the Treaty (protected species and establishes periods of prohibition of hunting, temporarily or locally prohibits exploitation, and regulates the sale, possession, transport or offering for sale of these species, whether alive or dead)

**Bonn Convention**

I: included in Annex I to the Treaty (migratory species in danger of extinction)

II: included in Appendix II to the Treaty (migratory species benefiting from international cooperation on conservation and management measures)

**International Convention CITES**

I: included in Appendix I to the Convention (species threatened with extinction and affected or likely to be affected by trade)

II: included in Appendix II of the Convention (species which, although not currently threatened with extinction, may become threatened in the future if trade is not strictly regulated)

III: included in Appendix III to the Convention (species for which a Contracting State declares that they are subject, within the limits of its competence, to regulation aimed at preventing or restricting the exploitation of these species and requiring the cooperation of the other Contracting States)

About the mammals observed and recorded (Table 4) in the field research area, it is considered that the construction of the project under consideration will not cause significant or permanent disturbance or adverse impact to them.

The species recorded are species that are easily adapted to anthropogenic impacts, and it is certain that there will be no disruption to their activity or loss of habitat to such an extent that there will be an impact on their presence, the population they maintain in the area or the integrity of their habitats. These species are found in most parts of Greece and are species with large numbers, which is why they are not a priority species of the adjacent areas of the Special Conservation Areas (SCAs) of the Natura 2000 network and are not included in Annex II of Directive 92/43/EOK.

Regarding amphibians, one amphibian species was found in the study area, which is not classified as a threatened species, is listed as a species of Least Concern (LC) in the IUCN red list and is not an Annex II species of the Directive 92/43/EOK (it is a species listed in Annex IV to the Directive).

Regarding the reptiles in the study area, six species were recorded, of which only one species - the Mediterranean tortoise (*Testudo hermanni*) - is classified as vulnerable (VU) according to the Greek Red Book in Greece, while according to the IUCN at European level the species is classified as Near Threatened (NT).

The Mediterranean spur-thighed tortoise (*Testudo graeca*) is protected by Directive 92/43/EOK (Annex II and IV) and the Bern Convention (Annex II) and by the CITES Convention (Annex II). According to the Greek Red Data Book in Greece the species is not classified as threatened (LC: of reduced concern), while according to IUCN at



European level the species is classified as Vulnerable (VU). It is possible that during the construction process some casual loss of this species may occur, but this will not be significant in relation to other losses that the species faces from other anthropogenic activities (car traffic). Also, given that this area does not host significant populations of the species and that during construction the existing road network will be used, the fauna of the area will not be significantly affected by the construction of the project. Therefore, the impacts can **be minor, short term and partially reversible after the end of the works.**

#### 9.5.1.iii) Avifauna

During the construction phase of the WPP and due to the elevated noise level, increased human presence and the emission of dust and pollutants, bird species in the immediate vicinity of the project area will be forced to move to adjacent areas, which occupy a large area in the wider region and have similar habitat characteristics. At the end of the construction phase of the project, bird species will return to the W/T area.

**Impacts during the construction phase on avifauna will mainly result from:**

- ✚ **Immediate habitat loss**, which assesses the magnitude of the impact of direct habitat loss of important birds on these populations. No habitat loss is estimated to occur during the construction phase as the availability of similar habitat in the project area is high.
- ✚ **Disturbance and barriers to movement**, which is evaluated based on an assessment of the magnitude of the impact on populations living for at least some time (breeding, wintering, foraging area) in the installation area due to the potential displacement of some individuals.

*During the construction phase it is estimated that disturbance to the avifauna will be weak as*

- ✓ The intervention within the production license blocks will be less than their total area and only the areas within the blocks that will be used for the installation of each wind turbine (foundation of the turbine, infrastructure works) will be affected.
- ✓ The opening of access roads will not be particularly large due to the use of the existing road network in the wider area and will be limited to only the parts of the new openings to connect the existing network to the turbine sites.
- ✓ The broader area will not be fenced off; the disturbance will be of short duration and intensity and ultimately reversible after the works are completed.

#### Impact assessment of associated projects

Regarding the associated works, the works that are placed within the two polygons of the construction of the WPP, such as the control center that will be built on the site of the two polygons of the wind turbine installation, it is considered that no special mention is required since the important structure on the site is the wind turbine itself and any impacts reported in the literature relate to them.

The impacts that may be created on the environment by the accompanying works are caused by the wiring and power transmission lines, which may constitute obstacles to the movement and flight of various species of birdlife and may cause impacts. Based on studies in the international literature, accidents, and losses of individuals of avifauna species due to impacts on power lines have been recorded. Most of the incidents that have been documented concern cases of impacts on high-voltage cables or impacts on high-voltage cable pylons rather than on medium-voltage cables. At this wind farm it is proposed to connect the wind farm underground to the grid or, if this is not technically feasible, to connect it to existing power transmission lines running close to the wind farm under study. In any case, the underground connection is chosen for this wind farm as the undergrounding of the cables is always proposed as a measure to avoid impacts on the bird population and the environment in general.

Based on the above data, it is assessed that the cabling for the transmission of the generated electricity will not pose any risk to the avifauna of the installation site and its constituent species and will not harm the conservation objectives of the site and its integrity.

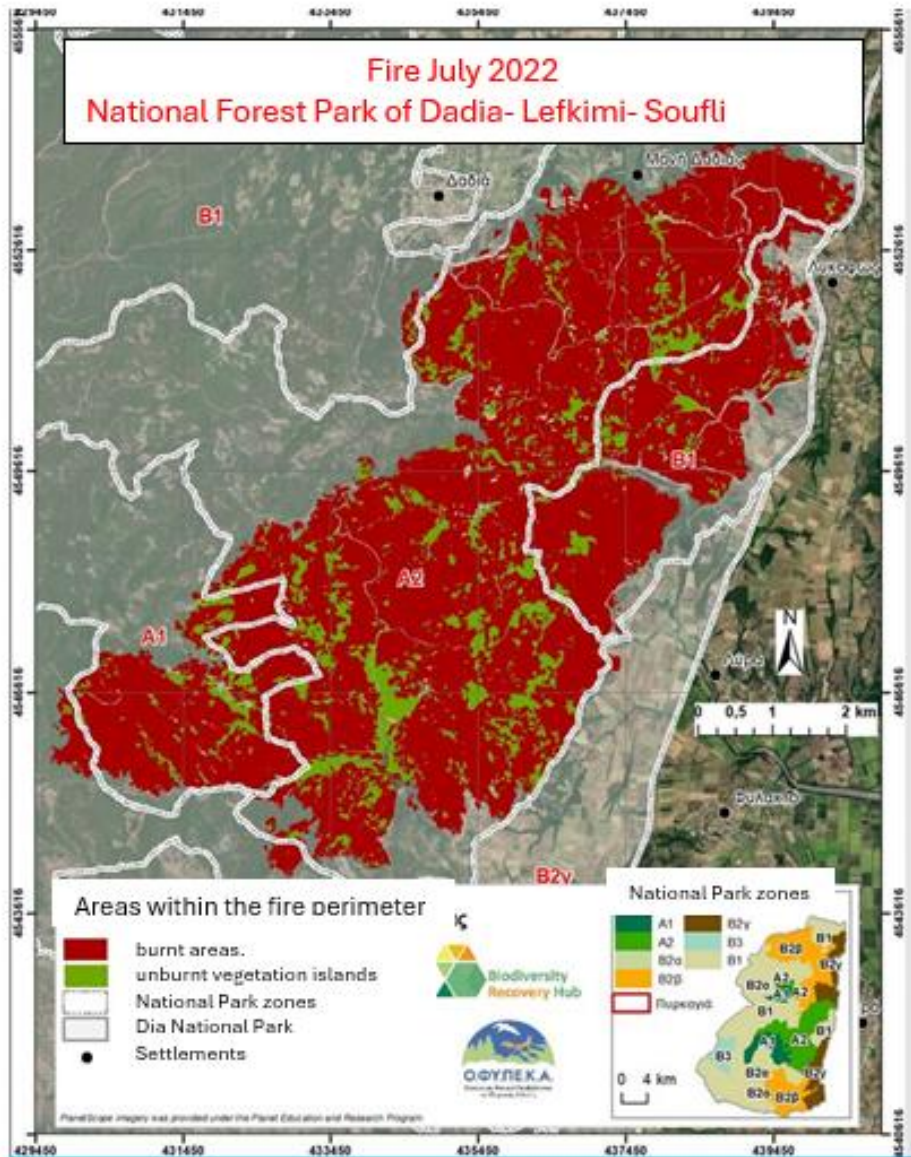
Regarding access roads, it is true that the existing road network in the area will be used, and very little internal road widening will be carried out to access the turbines, and very little improvements will be made to the existing road network, as it is a developed network mainly due to livestock farming (Map 109 of the SEA).

Therefore, the accessibility of the site will not be burdened by the installation of wind turbines and will not be less than in the pre-project situation. However, measures will subsequently be proposed for the new section of the widening however (although clearly limited in length) to prevent any additional burden from the movement of the public which includes any non-significant reason for working in the vicinity of the WPP.

#### Assessment of the impact of forest fires

The assessment of the 2022 fire season finds the Dardia National Park almost 4,600 ha less. During the Evros forest fire, part of the National Park burned despite a major firefighting operation by the fire brigade.

The most affected zones of the National Park were A2 with 2,636.7 ha burnt, while in the critical zone A1 with the highest density of Blackbird nesting sites, the fire affected 459 ha.



Map 2: Mapping of the forest fire in Dadia National Park in 2022 by Natural Environment and Climate Change Agency Greece (NECCA) (source: <https://necca.gov.gr/nea-anakoinoseis-deltia-typou/i-epexergasia-doryforikon-eikonon-poly-ypsilis-chorikis-analysis-3-met>)

The wildfire destroyed a large part of the GR1110002 SPA area named Dasos Dadias - Soufli, however, because it was mostly shingled, several trees were saved. Approximately, half of the hectares (2.250 ha) were burnt to the ground, while the remainder involved the vegetation lining the forest carpet, with the result that the trees were not affected. The destruction of the strict protection zone of the SPA amounts to 80%.

Based on the interview with iEidiseis (23-07-23) we conclude that, the damage assessment to the avifauna is expected to be significant, although the nest of the Golden Eagle within the burned area was not affected, the habitat of large raptors, has been radically changed. Breeding and cover sites have been stripped, and foraging

is also a problem as there is no assessment of the influence of the fire on other fauna in the area.

The proposed project is not expected to have any further impacts on the study area. During the construction phase, the continuous presence of manpower can contribute to case of a fire as they will be able to detect it immediately and inform the relevant authorities, while the accompanying works of the WPP, such as the opening and improvement of the forest road can help the fire brigade's work in accessing the forest.

It is important to mention the immeasurable ecological disaster that hit Alexandroupolis and Dadia in August 2023 with the burnt areas being of the total 93,500 ha of burnt area, approximately:

- 44,018 ha are forest areas (47%).
- 31,870 ha are scrubland (34%).
- 8,114 ha are agricultural land (9%).

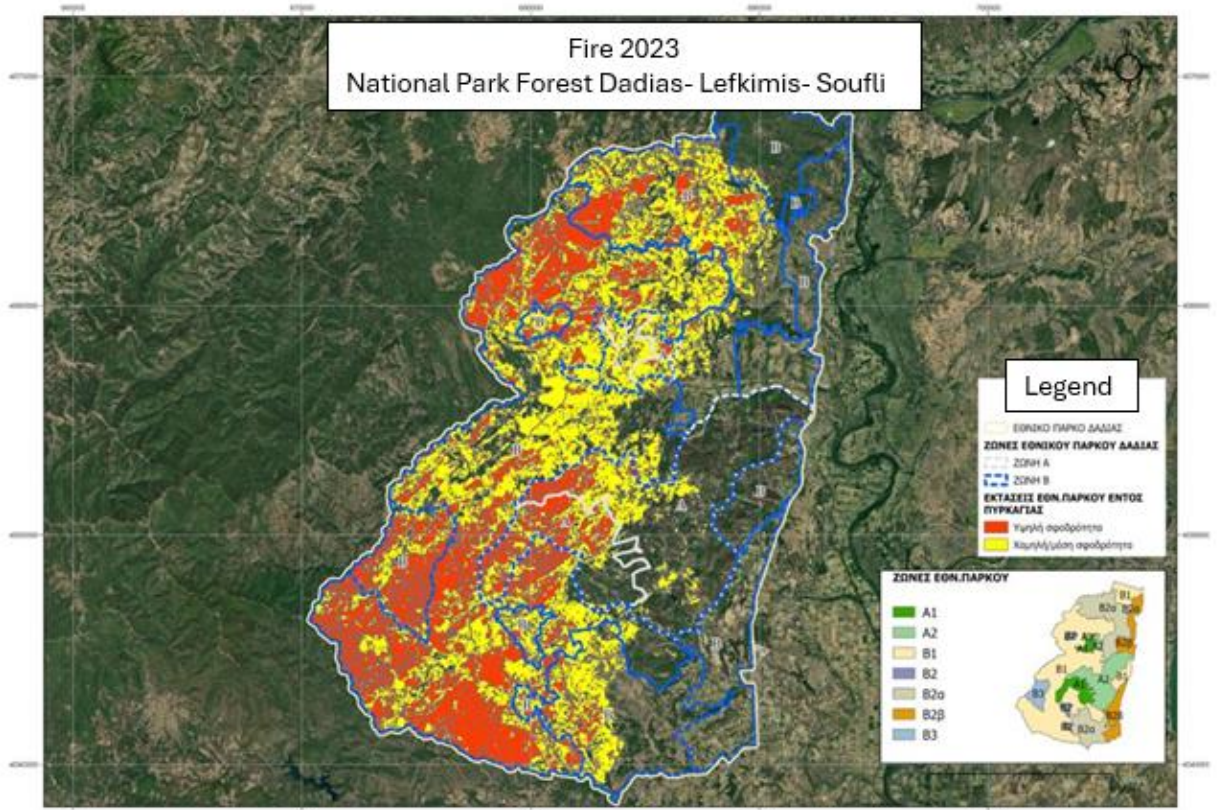
The Evros forest fire has been identified as the largest mega-fire in Greece in the last 21 years. The black pine forest that was destroyed was an important habitat for raptors, the good scenario is that they are gone, and the worst scenario is that they have burned. It will take 100 to 150 years to restore the unique forest of Dadia since the soil composition of the burnt area is expected to change, as silt and ash will settle with rain, while erosion and flooding will be a major problem and soil quality decline will be inevitable. Flood and erosion control measures are a necessity to minimize the impact.

The complete destruction of the Black Vulture, Egyptian Vulture and Vulture habitat will lead to a radical redistribution of the species, with the most plausible scenario being their migration to the more northerly forests of the Balkans, especially Bulgaria, which provide similar habitats. Due to the spatial distribution of these species and the large ranges they reach, it is considered almost certain that they will not be incorporated into the neighboring GR1130011 and GR1110010 SPAs, whose influence of the adjacent forest fire will be the temporary change in air quality due to smoke and soil quality due to ash. The overall estimates and the future condition of the affected area will have a significant negative impact on the Northern Lung of Greece such as the forests of Evros. A forest fire increases by 7 times the risk of flooding, by 4 times the risk of soil erosion and by 3 times the risk of landslides, all of which contribute to the advance of desertification and of course to a further acceleration of temperature increase. This is a vicious circle, the speed of which is constantly increasing.





Map 3: Burned areas from the fire in Evros (source: [https://www.meteo.gr/article\\_view.cfm?entryID=2907](https://www.meteo.gr/article_view.cfm?entryID=2907))



Map 4: Impact of the fire in the National Park Forest of Dadia - Lefkimi - Soufli (source: <https://necca.gov.gr/nea-anakoinoseis-deltia-typou/o-ofypeka-sti-sxeda-2-2/>)

Finally, it is noted that the project under consideration does not belong to any of the above-mentioned burnt areas and therefore does not affect it in terms of further disturbance.

### **Synergistic/Cumulative impacts**

**Disturbance, displacement, and barrier creation**: In the case of licensed all the under-licensed WPPs in constructive collaboration with the existing WPPs (worst case scenario) the impacts are related to the construction works of these and their accompanying infrastructure. The impact of the disturbance will last for a limited period; therefore, any potential impact will be ***short term, non-transient and reversible***.

Synergistic/Cumulative impacts during the construction phase if all adjacent licensed WPPs are licensed would be **moderate, short term and reversible**.

#### 9.5.2 Project Operation Phase

As seen from all the above exposures, the construction phase of the proposed WPP will have overall minor to moderate negative impacts, both direct and indirect, on the ecosystem, the ecosystem functions on the flora and fauna of the area. However, these impacts are expected to be local, not fragmenting priority habitats and habitats of vital importance for maintaining ecosystem cohesion, since they are short-term in character (for the duration of the construction of the WPP) and most of them are direct. Some of them are of a permanent nature, such as the construction of the wind turbines foundations. Finally, some of the impacts are manageable once the necessary measures have been taken.

##### 9.5.2.2.i) Flora

During the operational phase of a wind farm, no emissions of gases, liquid or solid waste are expected to have an adverse effect on the flora and fauna of the area.

Areas that have been altered during the restoration of the project will be restored to their original condition through horticultural interventions. The habitats of the area will not be adversely affected since, as mentioned above, it will be possible to recolonize the entire area affected in the immediate study areas and not occupied by technical works.

The area that will be restored at the completion of the construction of the project consists of areas with a total area of 1 829.50 m<sup>2</sup> and the area that will be kept free of vegetation consists of areas with a total area of 48 148.30 m<sup>2</sup>. However, after the project has ceased to operate, the remaining area will be restored.

Therefore, neutral impacts on flora and habitats are expected during the operational phase of the project.

**Synergistic / Cumulative effects**

**Best case scenario - Examination of the calculation of habitat loss (in ha), in case only the project under study, in synergy with the existing WPPs, within the considered synergistic impact study area, of the total number of WPPs (under production) is licensed.**

In case only the project under study is licensed in synergy with the existing WPPs, the flora and vegetation species will be deforested in the areas occupied by the project under study - **best case scenario**.

The following table illustrates the low percentages of acreage that may be affected by habitat loss in **the entire synergistic impact study area**.

Explanation of Corine land cover 2018 codes	Corine land cover 2018 codes	Area covered in the total synergy study area (ha)	Area of the habitat coverage of all the polygons of existing and under-licensed (in production) WPPs within the entire synergistic impact study area (ha)	Estimated percentage of area likely to be affected by habitat loss (% of each habitat of the total synergistic impact study area)
Discontinuous urban tissue	112	51,93	0,00	0,00
Industrial and commercial zones	121	109,29	20,82	19,05
Non-irrigated arable land	211	2017,77	0,00	0,00
Grasslands	231	195,32	0,00	0,00
Complex crops	242	375,62	0,00	0,00
Mainly agricultural land with significant natural vegetation	243	9950,51	24,56	0,25
Broad-leaved forest	311	23382,00	236,70	1,01
Coniferous forest	312	5979,37	83,57	1,40
Mixed forest	313	7500,77	0,08	0,00
Natural pastures	321	6895,16	406,39	5,89
Sclerophyllous vegetation	323	25088,50	140,70	0,56
Transitional wooded and bushy areas	324	2316,61	77,51	3,35
Beaches, dunes, sandy beaches	331	56,16	0,00	0,00
Areas of sparse vegetation	333	2407,08	121,09	5,03

*Table 3: Calculation of habitat loss (in ha), in case that out of the total number of licensed WPPs (under production), only the project under study, in synergy with the existing WPPs within the considered synergistic impact study area (best case scenario), receives a license.*



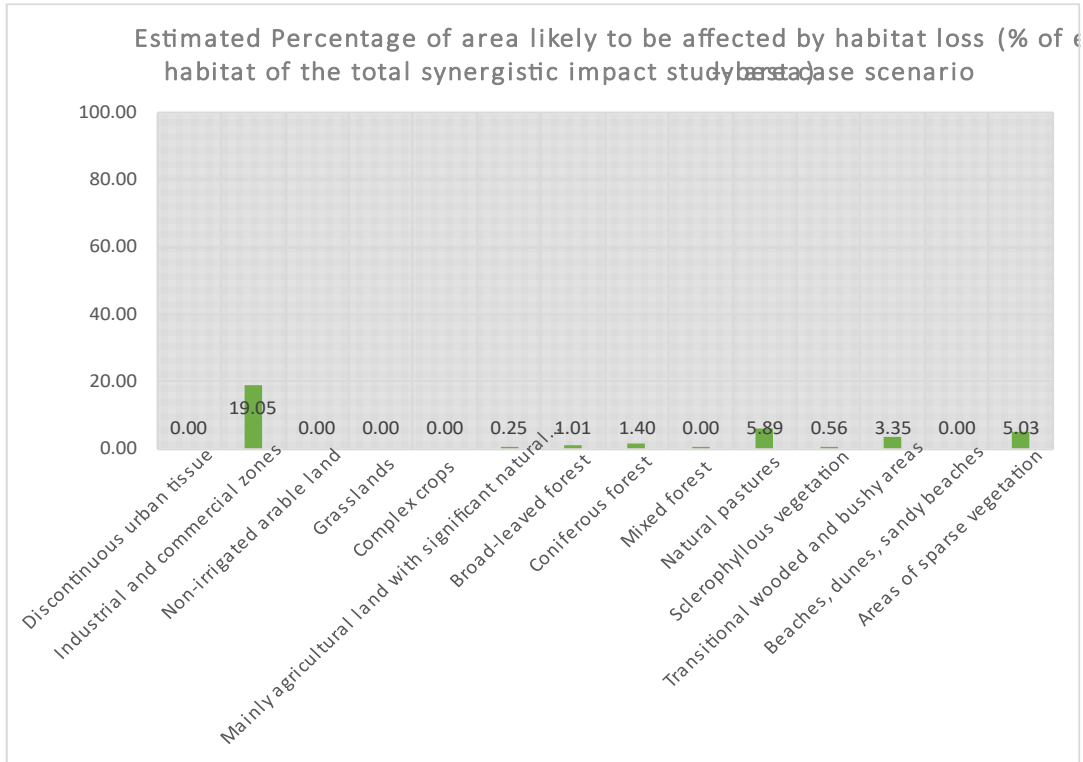


Figure 1: Graph showing the estimated percentages of area that may be affected by habitat loss (% of each habitat of the entire synergistic impact study area).

As observed from the above graph, the estimated percentages of area that may be affected by habitat loss are low and are observed only in specific habitats such as industrial and commercial zones, natural pastures, sparse vegetation, transitional woodland and scrubland, coniferous forest, broadleaf forest, hardwood forest, land mainly used for agriculture together with significant parts of natural vegetation and mixed forest. Given that following the end of construction activities the land is expected to be restored to some extent by natural processes and that the project is located within habitats that are abundant throughout the synergistic impact study area, there will be minor impact on habitat degradation in the study area and the wider area.

**Worst case scenario - Consideration of habitat loss calculation in the event of approval of all the WPPs under permitting (permitting stage under production), in synergy with existing ones within the overall synergistic impact study area under consideration.**

In terms of habitat types, if all adjacent WPPs under licensing are licensed (**worst case scenario**), **impacts could rise to more onerous levels**. According to the following table, which is also included in the SEA, the contribution to habitat losses is calculated if the project under consideration were to operate in synergy with the adjacent licensed WPPs (existing and under production).

Explanation of Corine land cover 2018 codes	Corine land cover 2018 codes	Area covered in the total synergy study area (ha)	Area of the habitat coverage of all the polygons of existing and under-licensed (in production) WPPs within the entire synergistic impact study area (ha)	Estimated percentage of area likely to be affected by habitat loss (% of each habitat of the total synergistic impact study area)
Discontinuous urban tissue	112	51,93	-	-
Industrial and commercial zones	121	109,28	20,82	19,05
Non-irrigated arable land	211	2.017,53	129,37	6,41
Grasslands	231	195,31	-	-
Complex crops	242	375,58	-	-
Mainly agricultural land with significant natural vegetation	243	9.951,65	756,73	7,60
Broad-leaved forest	311	23.381,66	1134,45	4,85
Coniferous forest	312	5.978,11	311,83	5,22
Mixed forest	313	7.500,28	38,60	0,51
Natural pastures	321	6.898,75	730,47	10,59
Sclerophyllous vegetation	323	25.088,01	979,92	3,91
Transitional wooded and bushy areas	324	2.316,26	157,39	6,79
Beaches, dunes, sandy beaches	331	56,15	-	-
Areas of sparse vegetation	333	2407,08	592,30	24,61

Table 4: Calculation of habitat loss (in ha) if all of the proposed projects are approved licensing WPP (licensing stage under production), in synergy with the existing within the overall synergistic impact study area under consideration (worst case scenario)

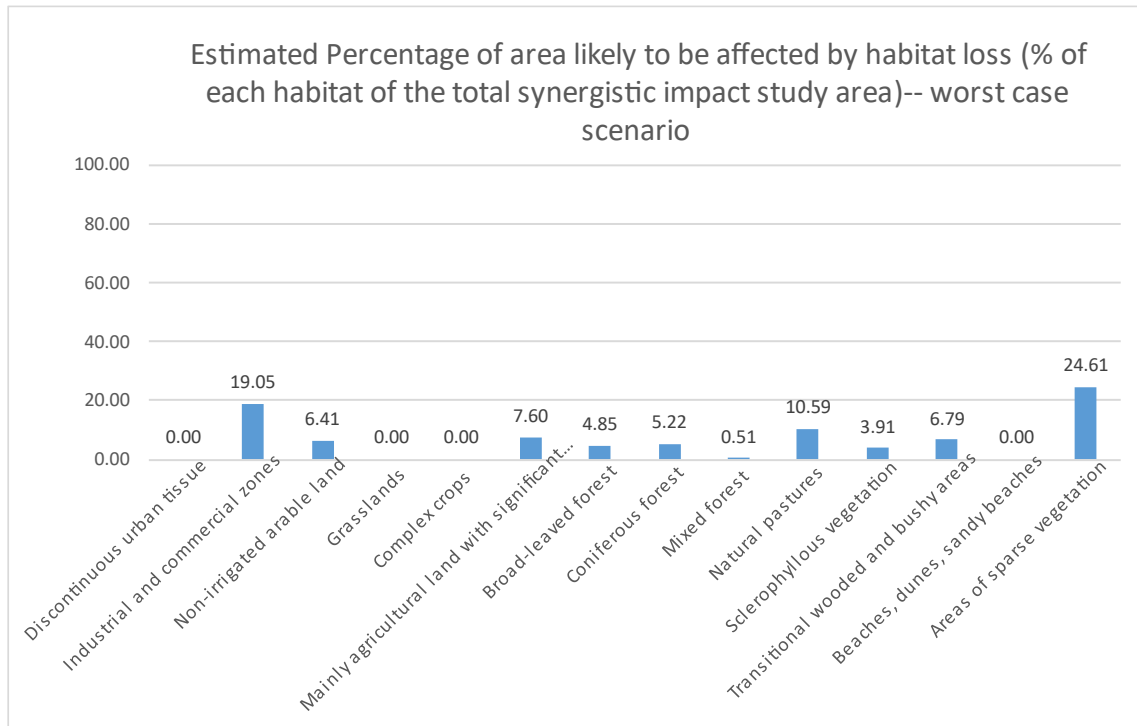


Figure 2: Graph showing estimated percentages of area that may be affected by habitat loss (% of each habitat of the total synergistic impact study area).

As observed from the above graph, the estimated percentages of areas that may be affected by habitat loss **are higher than in the previous best-case scenario**. Again, the percentages of area observed are only in specific habitats such as industrial and commercial zones, natural pastures, sparse vegetation, transitional woodland and scrubland, coniferous forest, broadleaf forest, hardwood forest, land used for agriculture together with significant parts of natural vegetation and mixed forest.

However, most of the habitats are abundant in the study area and the wider area and given that the WPP is sited within these habitats, the project would have minor impact on habitat loss/degradation in the study area and the wider area.

#### *9.5.2.ii) Fauna - except avifauna*

During the operational phase of the wind farm, the impacts on mammals, reptiles and amphibians will be due to the noise generated by the wind turbines and the lighting which, for reasons of flight safety, is likely to cause some fauna to move away from the wind farm site.

After reviewing the international literature and EU nature protection legislation, no significant impacts from the installation and operation of WPPs are found except for big mammals.

There are records of mammals such as badgers living near wind farms and showing effects on their physiology. However, in other studies such as Łopucki (2018) no adverse effect on the spatial distribution of the European curlew (*Cricetus cricetus*) within wind farms in Poland was observed. Łopucki, R., & Mróz, I. (2016) found no impact of wind energy projects on the diversity and abundance of small mammal species.

For larger mammals (*Canis lupus*) again according to Costa et al. in wind energy projects in Portugal they recorded displacement of wolf nest (den) sites up to 2.5 km. The authors also observed lower breeding rates during the first years of operation (2017).

Records for the fox (*Vulpes vulpes*) showed that the frequency of visiting internal wind power project sites decreased, possibly because of both less prey availability (hare) and reduced hearing ability during hunting.

Also, other animals such as deer and hares, from studies carried out, were observed to be staying away from the area of the WPP (especially in the early years of its operation) and there had been a reduction in habitat use of up to 700 m. For these species, which rely on their hearing to detect predators, this displacement may be due to their reduced ability to detect predators, especially where predator pressure is

high. Regarding reptiles and amphibians, the effects caused by wind turbines are very rare in published data.

Studies have shown that the operation of wind energy projects causes occasional mortality, resulting in long term displacement from areas with the highest concentration of wind turbines.

For example, the Greek tortoise (*Testudo graeca*) (classified as a vulnerable species under the IUCN Red List of Threatened Species) may be affected by habitat loss and fragmentation near access roads due to wind farm construction in southeastern Europe, particularly when wind farms are constructed in rocky or steppe habitats.

According to the study conducted by Thaker et al. 2018, indirect impacts may occur in cases where wind energy projects reduce the abundance of prey-seeking species in the reptile fauna, as indicated by the increase in reptile density and changes in their behavior, physiology, and morphology at a wind energy project in India.

Apart from the above data from international literature studies, the operation of the project under consideration in the study area is not expected to cause significant or permanent disturbance or adverse impact.

- ✚ The mammals observed in the study area are highly adaptable so even if a rearrangement of species has taken place during the construction phase, once the works are completed and the operational phase begins, the mammals will return to the now naturally restored habitats of the area.
- ✚ The reptiles (*testudo graeca* - gray turtle), Mediterranean tortoise (*testudo hermanni*) recorded in the study area will not be particularly affected as they are more at risk from other anthropogenic activities (motorways).
- ✚ The attraction of insects such as Lepidoptera (butterflies and moths) to the wind turbines may cause problems as they are food for bats and there is a possibility that they may be attracted to them. However, there is no evidence that wind energy projects pose a threat to insect populations.

During the operational phase, there is a possibility of relocation of mammals at short distances from the noise and light source locations, as these are disturbance factors for these animal populations, as mentioned above.

**However, the lack of fencing of the area of the considered WPP as well as the mitigation measures proposed in the SEA and mentioned in Chapter 10.4.1 peripherastically, cannot affect the fauna (mammals, reptiles) with phenomena of isolation or reduced mobility of species in the area. Only the removal of small mammals and reptiles is expected.**

In conclusion, it can be considered that the potential impacts on fauna during the operational phase of the project are **weak, short-term, and fully reversible.**



### 9.5.2.iii) Avifauna

#### Assessment of the impact on the main species

Based on the analysis of the field records provided in the attached SEA, it is considered that the construction and operation of this WPP, in theory, may have some impact on avifauna species that are sensitive to such structures and projects.

The following table presents the records of raptor species and species considered **"important" for the field research area**, the frequency with which these species were observed in the research and study area, and the months during which they were recorded. Note that the Table is derived from the daily and monthly field research logs.

Species of importance for the area are recorded in the table below as species observed in the field survey area that are either characterization or delimitation species of the main study area GR1110010 or the study IBA GR003 (within which the study project is located), either they are designation species of the nearest Greek SPA GR1130011 and the nearest IBA GR008, or they are species of interest (as selected in a previous section from the total number of protected areas under study) or they are included in Annex I of Directive 79/409/EOK, as encoded by Directive 2009/147/EK.

The field measurements show that 15 species listed in Annex I of Directive 2009/147/EK were identified in the area. Of these species, 12 are species of interest, while the species **Curruca cantillans**, **Curruca crassirostris**, **Curruca melanocephala**, **Oenanthe hispanica**, **Picus viridis** and **Strix aluco** were also observed, which, although they are not species of Annex I of the above Directive, are included in the table below, as they are species of interest (**species of characterization of the IBA under study**).

Thus, for the assessment of the impacts on birds, the following Table was prepared which presents the estimates of the sensitivity of avifauna to wind farms based on the EU guidelines and data (European Commission 2010). **Also presented is the assessment based on the observations and field records reported in the attached SEA.** The assessment is derived from the field data set and its analyses as presented in the section of the SEA "Analysis of records of important species (species listed in Table 30 of the SEA) - Impact risk assessment".

Species	total species recordings	Months (numerically 1= January etc.)
<i>Aegypius monachus</i>	16	7/2020, 8/2020, 9/2020, 3/2021, 4/2021, 6/2021
<i>Aquila chrysaetos</i>	2	4/2021, 5/2021
<i>Caprimulgus europaeus</i>	2	5/2021, 6/2021
<i>Ciconia nigra</i>	1	8/2020
<i>Circaetus gallicus</i>	9	7/2020, 8/2020, 9/2020, 4/2021
<i>Circus cyaneus</i>	1	11/2020
<i>Clanga pomarina</i>	2	8/2020, 4/2021
<i>Dryocopus martius</i>	1	2/2021
<i>Falco peregrinus</i>	2	11/2020
<i>Gyps fulvus</i>	14	7/2020, 8/2020, 10/2020, 3/2021, 4/2021
<i>Hieraaetus pennatus</i>	5	7/2020, 4/2021, 6/2021
<i>Lanius collurio</i>	6	7/2020, 8/2020, 6/2021
<i>Lullula arborea</i>	6	2/2021, 4/2021
<i>Leiopicus medius</i>	5	7/2020, 8/2020, 2/2021, 3/2021
<i>Pernis apivorus</i>	4	8/2020, 5/2021
<i>Curruca cantillans</i>	1	5/2021
<i>Curruca crassirostris</i>	2	4/2021, 6/2021
<i>Curruca melanocephala</i>	5	7/2020, 10/2020, 3/2021, 4/2021, 6/2021
<i>Oenanthe hispanica</i>	1	5/2021
<i>Picus viridis</i>	1	10/2020
<i>Strix aluco</i>	1	1/2021

Table 5: Important species of avifauna meeting the criteria for further analysis.

Species	number of individual crossings	individual crossings per hour of predator observation	transits within Zone A (outside the zone of direct effect)	transits within zone B	transits within zone C	transits within the zone of direct influence
<i>Aegypius monachus</i> *	24	0,148148148	11	9	3	
<i>Aquila chrysaetos</i>	2	0,012345679		1	1	
<i>Ciconia nigra</i>	6	0,037037037	6			
<i>Circaetus gallicus</i> *	14	0,086419753	3	5	2	
<i>Circus cyaneus</i>	1	0,006172839	1			
<i>Clanga pomarina</i>	2	0,012345679		2		
<i>Falco peregrinus</i> *	2	0,012345679			1	
<i>Gyps fulvus</i> *	20	0,123456790	4	12	2	
<i>Hieraaetus pennatus</i>	5	0,030864197		1	2	2
<i>Pernis apivorus</i> *	5	0,030864197		1		1

Table 6 : Data from the flight analysis of the important predators of the area

The graph below shows for the important species of raptors and other large birds observed in the area, the number of transits, the number of transits per hour of observation of raptors (and other large birds), as well as the number of recorded movements per impact zone A, B and C and the number of movements in the direct impact zone.

- ✚ **Zone A** covers 250 meters either side of the project development axis and within this area raptors may be adversely affected by the project because there is an increased potential for disturbance and collision.
- ✚ **Zone B** starts at 250 meters and extends up to 1000 meters from the project development axis, with avifauna being less affected within this zone than in Zone A.
- ✚ **Zone C** which starts from 1,000 meters and reaches up to 2,000 meters from the project development axis which in terms of risk and disturbance rating is even milder than that of Zone B, however it is assessed for large birds or raptors as their territories are large and may be affected by the project theoretically within it.

The Zone of Direct Effect was defined as the zone of 100 m radius from the installation site of each wind turbine, at a height of 30 to 150 m, which is the height at which the blades of the wind turbines rotate and is considered the zone of highest risk of impact for raptors.

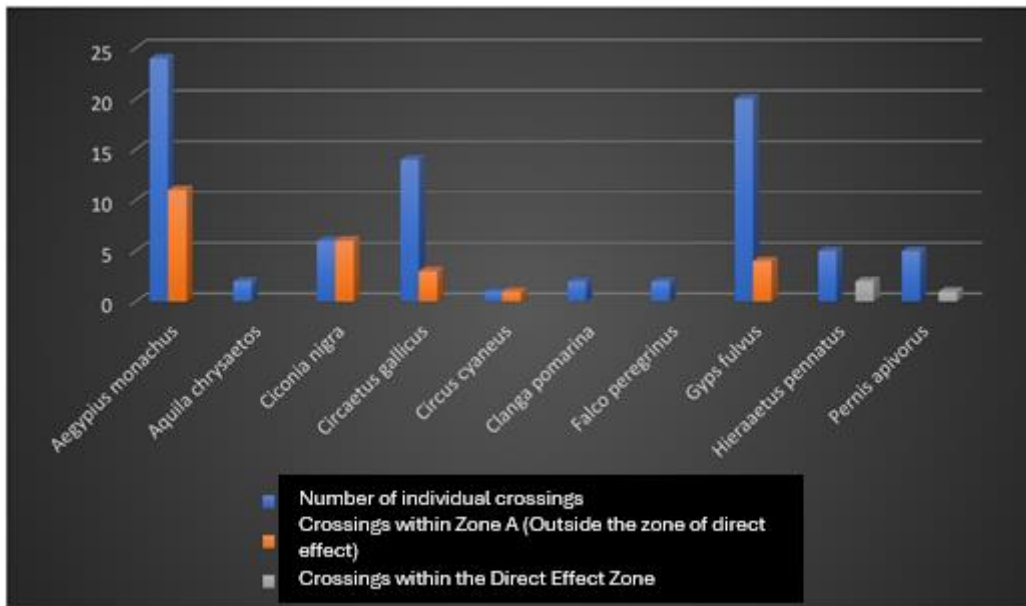


Figure 3: Total number of movements of important raptors and movements in Zone A and in the Direct Effect Zone of the WPP.

Even though the research and drafting study team of the SEA, due to the sensitivity of the wider neighboring area of the Forest of Dadia - Lefkimi - Soufli, extended the duration of the measurements, it was still not possible to calculate the probability of collision with the wind turbines to be installed for some predators due to their zero crossing of the zone of direct impact. This fact, although clearly indicating the very low probability of collision of the above predators with the wind turbines to be installed, does not in any way make the above probability zero.

**For the above reason, the study team's recording of the impact assessment for the WPPs under study is more rigorous than that which would result from an individual analysis of the field data.**

Therefore, the following table lists species that are included in the EU Guidance (European Commission 2010) and in addition the black vulture for which the EU does not provide guidance but is considered as an important species for the wider Eastern Thrace region, as well as other species listed in the EU Guidance as important species, based on the criteria they meet.

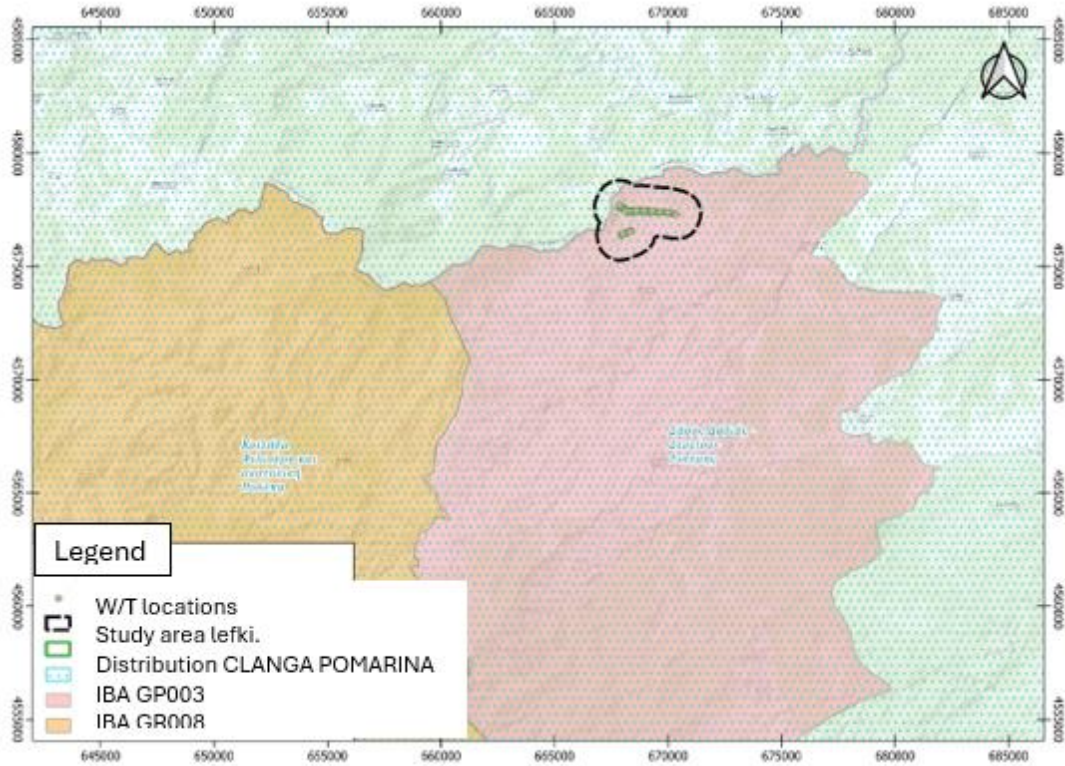
Species	EU characterization			Estimation in the studied WPP		
	Habitat loss	Collision	Creation of barrier	Habitat loss	Collision	Creation of barrier
<i>Aegypius monachus</i> (Cinereous Vulture)	-	-	-	O	XX	O
<i>Aquila chrysaetos</i> (Golden eagle)	X	XXX		O	O	O
<i>Ciconia nigra</i> (Black Stork)			O	O	O	O
<i>Circaetus gallicus</i> (Snake eagle)	X	XXX	X	O	X	O
<i>Circus cyaneus</i> (Hen Harrier)	XX	X	O	O	O	O
<i>Clanga pomarina</i> (Lesser Spotted Eagle)		XX		O	O	O
<i>Falco peregrinus</i> (Peregrine Falcon)	X	X	O	O	O	O
<i>Gyps fulvus</i> (vulture)	X	XXX	X	O	X	O
<i>Hieraetus pennatus</i> (Booted Eagle)	-	-	-	O	X	O



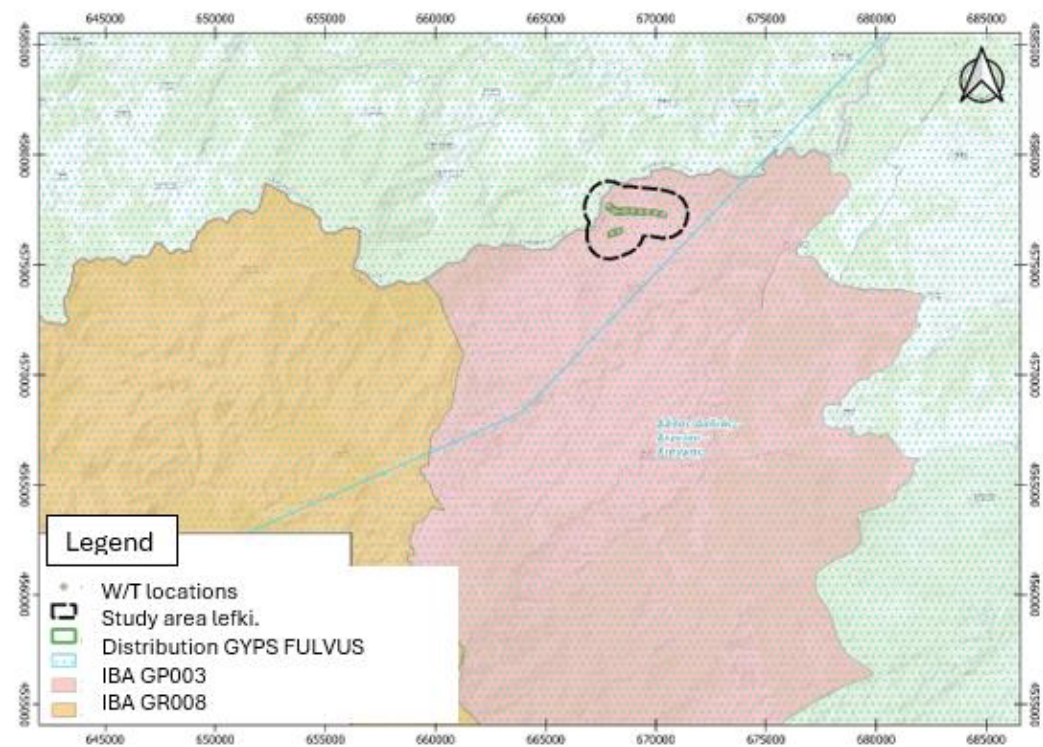
Species	EU characterization			Estimation in the studied WPP		
	Habitat loss	Collision	Creation of barrier	Habitat loss	Collision	Creation of barrier
<i>Pernis apivorus</i> (European Honey Buzzard)			O	O	X	O
<i>Caprimulgus europaeus</i> (Nightjar)	X	X			O	
<i>Dryocopus martius</i> (Black woodpecker)	-	-	-		O	
<i>Lanius collurio</i> (Red backed Shrike)	-	-	-		O	
<i>Lullula arborea</i> (Woodlark)	-	-	-		O	
<i>Leiopicus medius</i> (Middle Spotted Woodpecker)	-	-	-		O	
<i>Curruca crassirostris</i> (Eastern Orphean Warbler)	-	-	-		O	
<i>Curruca melanocephala</i> (Sardinian Warbler)	-	-	-		O	
<i>Curruca cantillans</i> (Subalpine Warbler)	-	-	-		O	
<i>Oenanthe hispanica</i> (Black eared Wheatear)	-	-	-		O	
<i>Picus viridis</i> (European Green Woodpecker)	-	-	-		O	
<i>Strix aluco</i> (Tawny Owl)	-	-	-		O	
Passeriformes		X	X	Recorded by case		

Legend: XXX = evidence of significant risk of impact, XX = evidence of risk of impact, X = possible risk of impact, O = low or no significant risk of impact, where there is a dash (-) the species is not mentioned in the EU Guide

Table 7: Assessment of impacts on avifauna recorded on the site, in relation to the EU designations and data (European Commission 2010) for those of the above.



Map 5: Mapping of important areas for birds and the distribution of Clanga Pomarina



Map 6: Mapping of important bird areas and distribution of Gyps Fulvus (Source: IUCN)

Impacts from collisions.

From the above table, it can be concluded that of the predator species - carnivores, the black vulture is considered to face a theoretical potential risk of impacts from impact as according to the SEA it was classified in the risk category "**indications of risk of impact**" which was carried out given the importance of the wider area for the species, the use of the area (foraging), its size, and the fact that this species, like most large scavenging birds, is a K-selection species in terms of its evolutionary growth strategies. It would be more correct to classify it in terms of collision impact in the milder category of "**potential collision risk**", as the estimated impact rates per year were not very high although they were calculated using the strictest possible criteria (accepting that all its recorded flights are flights indicating site use and not accidental passes through the site).

Regarding the species of snake eagle, booted eagle and Honey Buzzard, the chances of impact with wind turbines are infinitesimal. However, due to their presence in the area, the possibility of a collision cannot be excluded, therefore the study team preferred it to be classified in the category "**potential risk of impact**, while the correct classification would be in the milder category "**low or no significant risk of impact**".

Regarding the vulture, based on its flight characteristics, the field recordings in the study area did not reveal the possibility of impacting the wind turbines of the considered wind farm. However, the possibility of collision could again not be ruled out by the study team and the classification category is "**potential impact risk**", given the importance of the wider area for the species, the use of the area (foraging), its size, and the fact that this species, like most large - scavenging birds, is a K-selection species in terms of its evolutionary growth strategies.

Furthermore, as regards the other important predator-scavenging species, such as the golden eagle and the Lesser Spotted Eagle, **the probability of collision on the wind turbines of the project under study, based on the field records, is zero.**

However, given the importance of the wider area for these species, their low but real presence, even outside the Direct Effect Zone, their size, and the fact that these species, like the black vulture, are also K-selection species in terms of their evolutionary growth strategies, it is considered based on the SEA that there is always the possibility of a risk of collision. This possibility is real, especially if other factors act in combination in the area to increase the activity of the above species in the field research area, even if only for a limited period, for example the presence of a dead animal in the vicinity of the WPP site.

For the aforementioned reason, and in order to minimize the already low probability of risk to the above species from collision impacts (due to their passage through the area), additional measures are proposed in section 8 of the SEA to address the potential impacts, **the most important of which is the obligation of the project**

***promoter to install an optical system for the automated stopping of wind turbines in case of detection of a species of interest in the vicinity, in order to minimize the probability of collision.***

The other species of important predators such as the Peregrine Falcon and the Winter Petrel are classified in the same category and their total individual crossings are minimal. Although these species do not appear to be directly associated with the study area and with the project site, the fact that they make random crossings over the site cannot be excluded and therefore there is some possibility of collision for them as well, although this is small. For these reasons, the study team preferred to classify these species as **'low or no significant impact risk'**.

The same data applies in the case of the Black Stork, as the species was observed only once (six individual crossings) during the entire fieldwork with these crossings taking place at a remarkably high altitude (about 500 m).

Impacts from habitat loss.

Regarding the **impact of habitat loss** for most of the 46 species of interest, ***it is not considered to exist*** for the wind farm site, due to the very small area of project occupation and the high coverage of the respective habitats both within and outside the study area.

However, about the classification and delimitation of the main study area of the **GR1110010 SPA**, for which critical habitats for the study area have been presented (available on the website of the Ministry of Environment for 76 SPAs of the country <https://ypen.gov.gr/perivallon/viopoikilotita/diktyo-natura-2000/>), it is stated that the critical habitats of one of the three designation species (as there are no critical habitats, according to the above source, for the designation species of the blackbird, while the critical habitat of the crane eagle is located outside the two production license blocks of the project) **are within the two production license blocks of the project under study.**

With regard to the critical habitat of the demarcation species Ciconia nigra and Hieraaetus pennatus, these are located outside the two production license blocks, while for the demarcation species Circaetus gallicus and Aquila chrysaetos, with the percentages of critical habitat area covered being negligible, amounting to 0,13 % for Aquila chrysaetos (total area of critical habitat Aquila chrysaetos: 51. 929,86ha, area of critical habitat covered by the two production license blocks of the project under study: 65,99 ha) and **0,14 % for Circaetus gallicus (total area of critical habitat for Circaetus gallicus: 47 082 ha, area of critical habitat covered by the two production license blocks of the project under study: 65,99 ha).**

### Effects of barriers

Regarding the impact of barrier creation, the wind farm under study occupies a small area and therefore cannot cause a similar type of impact on the above species.

Also, given the proposal to install an automated wind turbine stopping system, each wind turbine will be stopped when birds of interest are passing through the area, further reducing the already minimal barrier area.

It is also important to note that this system can be set to operate without deterring birds but only by stopping each wind turbine, and the problems that may arise due to the topography can be overcome by the correct choice of the angle of camera placement, so that the case of a bird coming from a lower altitude than the level of the cameras is adequately covered. This proposed automated wind turbine stopping system has not been installed in all the wind farms in the region, where the passage of important birds of prey takes place without stopping the turbines. The above proposed system, will differentiate the wind farm under study from the rest of almost all the wind farms in the wider area and will minimize the possibility of collision of important species, which in any case does not turn out to be high, raising the bar of environmental protection high for the rest of the wind farms in the wider area as well (for a detailed description see [para 10.4.1]).

***No populations or significant group movements of migratory birds that could be affected by the presence of wind turbines were recorded from field measurements***, even though the wider study area is an important migratory corridor. Also, the topography of the area where the wind farms are to be installed as well as the morphology of the area does not create narrow passages that could direct species in transit from the site of the wind farm in question. ***Therefore, it is assessed that no potential impacts on migratory species can occur.***

**According to the above data, the following paragraph summarizes the impacts of the station on the avifauna:**

#### ***1) Impacts from collisions.***

**By species of avifauna and considering the data from the flight analysis of the important predators of the area, it is stated that:**

- **Black vulture:** the impact intensity is expected to be high for this species in the absence of mitigation measures.
- **Vulture:** impact intensity is expected to be moderate for this species in the absence of mitigation measures.
- **Snake Eagle & other eagle species:** the impact intensity for the Snake Eagle is expected to be moderate and for other eagle species low, in the absence of mitigation measures.



- **honey buzzard:** the intensity of the impact is expected to be moderate for the raptor species, in the absence of mitigation measures.
- **Black Stork:** impact intensity is expected to be low or not significant in the absence of mitigation measures.
- **Cranes:** the intensity of the impact is expected to be low, in the absence of mitigation measures.
- **Nocturnal species:** the intensity of the impact is expected to be low for Buffalo and negligible for other nocturnal species.
- **Migratory species:** impact intensity is expected to be negligible in the absence of mitigation measures.

### **2) Impacts from direct habitat loss (and change in habitat structure)**

As reported in the literature, the scale of direct loss or change in habitat structure due to the construction of a WPP (and associated infrastructure) is generally low (Rydell et al. 2012; Bright et al. 2009; Percival 2000). Specifically, the proposed WPP installation project under consideration at the "LEFKI" site is a project that will be installed within habitat types that are abundant in the area, as the availability of similar habitat to existing habitat in the region is high. **Therefore, the intensity of the impact on habitat types is expected to be low or negligible.**

### **3) Impact from discomfort-barriers**

In terms of the impact of the creation of barriers, the proposed WPP will not create any impacts as the EIA and the proposals/measures presented in the SEA foresee the cessation of the installation of the WPP during the breeding season of the birds. In addition, the high availability of similar habitat types in the area and the small size of the area of intervention exclude habitat fragmentation and habitat discontinuity. **Therefore, based on the above data, the passage of birds is not impeded and therefore it is not possible to cause a corresponding impact on the species in the area.**

### **Synergistic/ Cumulative effects**

The assessment and evaluation of the impacts on bird populations of the project in question considers the synergistic effects of **existing, approved, or planned projects**, as assessed in the interpretative guide for the management of Natura 2000 sites on the basis of Article 6 of Council Directive 92/43/EOK of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (EE L 206/22.07.1992).

A **synergistic impact study area** has been defined for the assessment of synergistic effects on avifauna in accordance with the Special Ecological Assessment (definition of synergistic impact study area para. 4.3.4).

An analysis of the synergistic effects was carried out in the case of the licensing of the project under consideration in synergy with the existing plants (operating license) - **(best case scenario)** and the case of the licensing of the project under consideration, the adjacent licensed WPPs with a production license in synergy with the existing ones **(worst case scenario)** was also analyzed.

The following paragraphs summarize the synergistic impacts from impacts, habitat loss and degradation, and disturbance, displacement, and barrier creation for both scenarios (worst-best scenario).

**A) Collisions:** With regard to impacts from collisions, according to the SEA the expected impact of the cumulative impact of loss of life due to impact, in the absence of mitigation measures, **will be of high importance mainly for scavenging large carnivores (black vulture and vulture)** as well as for the predators active in the SPA, the corresponding large other avian species such as storks, pelicans, swans, herons and to a lesser extent medium sized raptors.

Specifically, based on the calculations made in the Special Ecological Assessment (the calculations were based on the impact victim search program at 9 existing wind turbines in the Thrace region in 2009-2010), the estimated adjusted raptor mortality rate was calculated to be 0.152 and 0.173 for raptors and vultures respectively, per year and per wind turbine.

- ✚ In the case of licensing of the considered WPP in synergy with the existing ones (best case scenario), the mortality rates amounted to 25.99 and 29.58 for predators and vultures respectively.
- ✚ In the worst-case scenario, the estimated rates would increase to 62.47 and 71.10 for predators and vultures, respectively. The rates can be considered high and could potentially result in losses to the populations of the above species.

However, the actual mortality within the whole of the '**synergistic impact study area**' may differ significantly (estimated to be much lower), as the above estimates on which they are based refer to a **wider geographical area with a significantly higher presence of scavenging and predator species**.

In conclusion, regarding the considered WPP, the contribution that the construction of the 10 W/Ts may have on the overall cumulative impact due to impact on energy infrastructure of the species of interest (with emphasis on scavenging large predators and other large species of interest, such as the black-backed stork) **is estimated to be initially high in the worst-case scenario**.

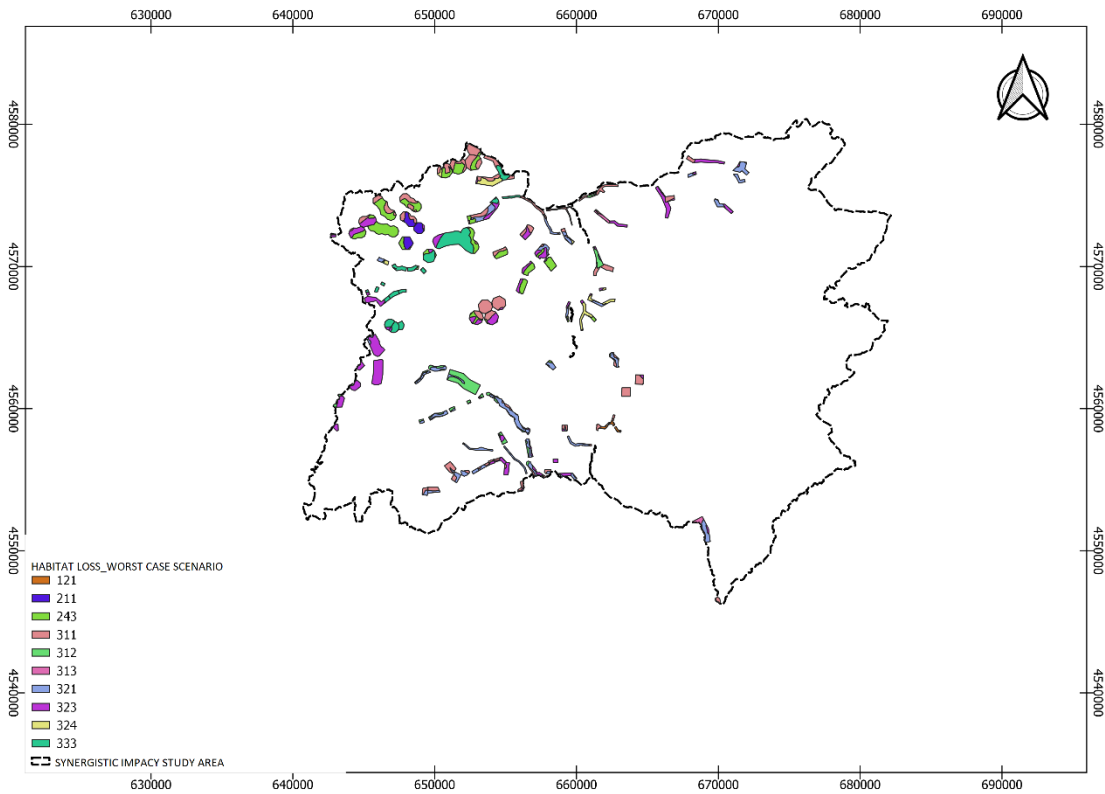
In the above, it should be taken into account that the installed wind farms in which the research was carried out from which the adjusted mortality rates for birds of prey

were derived (0.152 and 0.173 for raptors and vultures respectively) were located in a broader geographical area with a significantly higher presence of scavengers and raptor species, and were operated ***with almost no mitigation measures for potential negative impacts***, while a number of measures ***are proposed to avoid conflicts in the project under study, including 10.4.1 of Ch. 10.***

The contribution that the construction of the project under consideration may have on the total cumulative impact due to collision **on energy infrastructure after the implementation of the proposed mitigation measures is low in relation to the total existing and under-licensed energy infrastructure.**

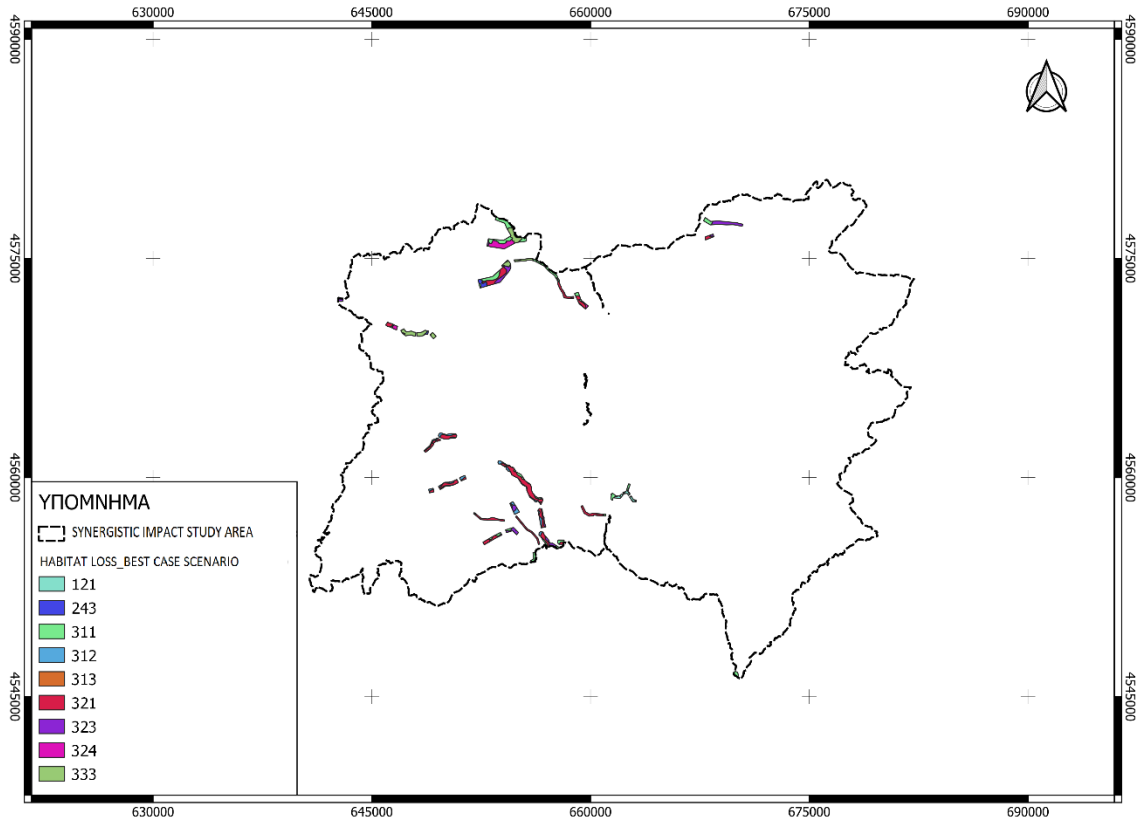
**B) Habitat loss and degradation:**

- ✚ **Worst case scenario.** In the case that all the WPPs are built and authorized. The contribution of direct habitat loss or degradation from the project under consideration, compared to the total coverage area of the Synergistic Impact Study Area (SIA) is recorded as significant. This is evidenced by the SEA table (see Table 26) in which significant rates of habitat loss (**worst-case scenario**) are recorded.



Map 6: Map of affected areas due to habitat loss within the entire study area of synergistic impacts in the case where all the WPPs under production and under evaluation are licensed in synergy with the existing ones (worst case scenario)

✚ **Best case scenario:** In the case that only the project under consideration is licensed in synergy with the existing WPP (WPP at Lefki) the impacts on habitats will be weak, long term and reversible as the rates of habitat loss are recorded as low (**see SEA table 27 - best case scenario**).



Map 7: Map of affected areas due to habitat loss within the entire synergistic impact study area in the case where only the WPP under consideration is licensed in synergy with the existing ones (best case scenario).

**C) Nuisance, displacement, and barrier creation:**

In the case of licensing all the adjacent (under licensing) WPPs in synergy with the existing WPPs (**worst case scenario**) the impacts are related to the operation of the WPPs and the use of the associated works (e.g. roads), which have been associated with displacement of species due to disturbance and avoidance efforts.

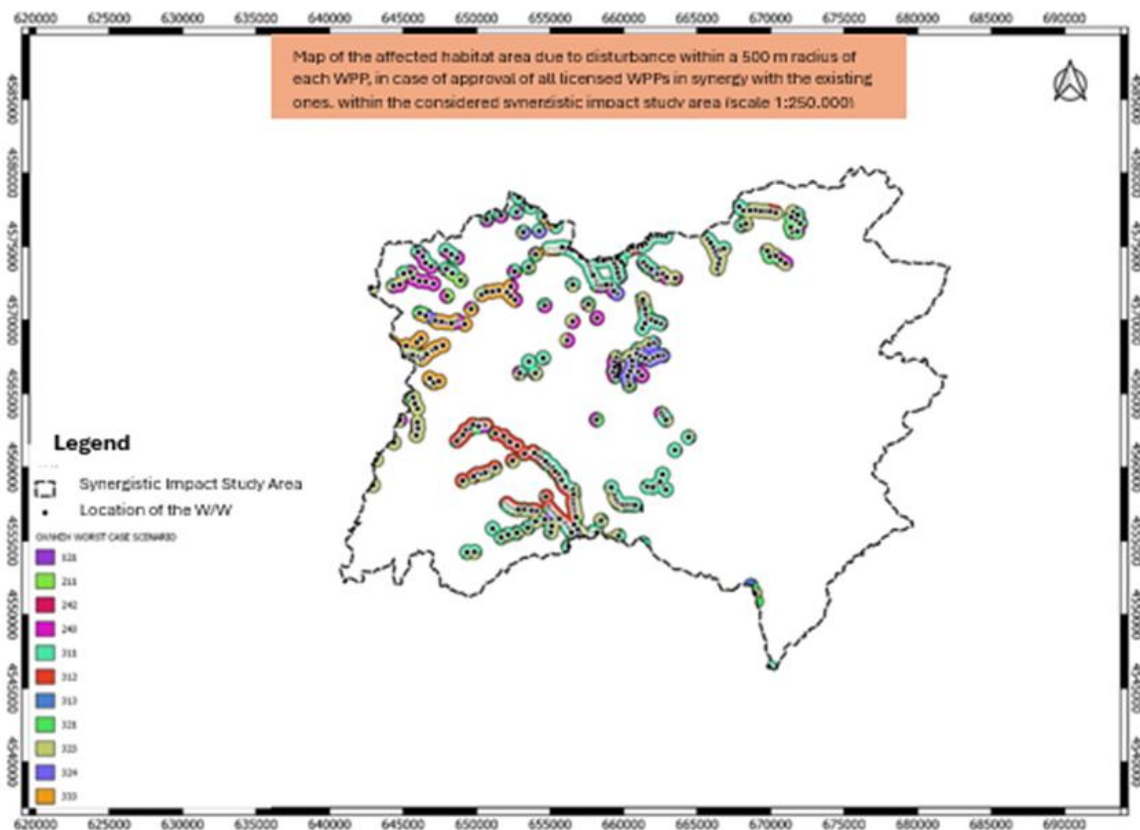
**Nuisance - displacement and barrier creation:**

The assessment of cumulative impacts due to displacement, either as an indirect effect of disturbance or for avoidance of the wind turbine and its associated works that may be encountered by bird species, was carried out on the assumption that total species activity is reduced by half within a 500 m radius of the wind turbine sites from the WPP. Based on this, the total area within which a reduction in the activity of species of interest by half is expected to occur was calculated, which was assumed to include

areas with scattered patches of necessary resources for avifauna, such as suitable nesting, cover, roosting, foraging, etc.

**A) Case of approval of all the WPPs under licensing (licensing stage under production), in synergy with the existing WPPs, within the considered synergistic study area (worst case scenario).**

As noted above, in any areas/locations of suitable habitat included within the above areas where impacts due to disturbance and displacement are expected to occur, **there will not be a complete cessation of activity of avian species, therefore there is no question of loss of all such habitat.**



Map 8: Map of the affected habitat area due to disturbance within a 500 m radius of each WPP, in case of approval of all licensed WPPs (licensing stage under production) in synergy with the existing ones, within the considered synergistic impact study area (worst case scenario)

Explanation of Corine land cover 2018 codes	Corine Land cover 2018 codes	Area covered in the total synergy study area (ha)	Estimated area of affected habitat for species of interest around the perimeter of all existing and pending permits W/T (500 m radius) within the total synergistic impact study area (ha)	Estimated percentage of area likely to be affected by disturbance (% of each habitat in the synergistic impact study area)
Discontinuous urban tissue	112	51,932	-	-
Industrial and commercial zones	121	109,29	36,015	32,95
Non-irrigated arable land	211	2017,7	158,806	7,87
Grasslands	231	195,3	0	0,00



Explanation of Corine land cover 2018 codes	Corine Land cover 2018 codes	Area covered in the total synergy study area (ha)	Estimated area of affected habitat for species of interest around the perimeter of all existing and pending permits W/T (500 m radius) within the total synergistic impact study area (ha)	Estimated percentage of area likely to be affected by disturbance (% of each habitat in the synergistic impact study area)
Complex crops	242	375,6	14,516	3,86
Mainly agricultural land with significant natural vegetation	243	9950,1	1320,69	13,27
Broad-leaved forest	311	23382,2	3551,28	15,19
Coniferous forest	312	5979,3	1254,7646	20,98
Mixed forest	313	7500,7	89,96	1,20
Natural pastures	321	6895,155	1885,2996	27,34
Sclerophyllous vegetation	323	25088,51	2969,2	11,83
Transitional wooded and bushy areas	324	2316,231	655,8861	28,32
Beaches, dunes, sandy beaches	331	56,15	-	-
Areas of sparse vegetation	333	2407,083	1280,48	53,20

Table 8 : Estimation of the affected area (in ha) of degradation due to nuisance within 500 m radius of each WPP, in case of licensing of all WPPs under licensing (licensing stage under production), in synergy with existing WPPs, within the considered synergist

The percentages of the areas calculated in the above table (see Table 28 of the SEA) refer to the case in which all the licensed WPPs will be licensed (licensing stage under production), in synergy with the existing WPPs (worst case scenario).

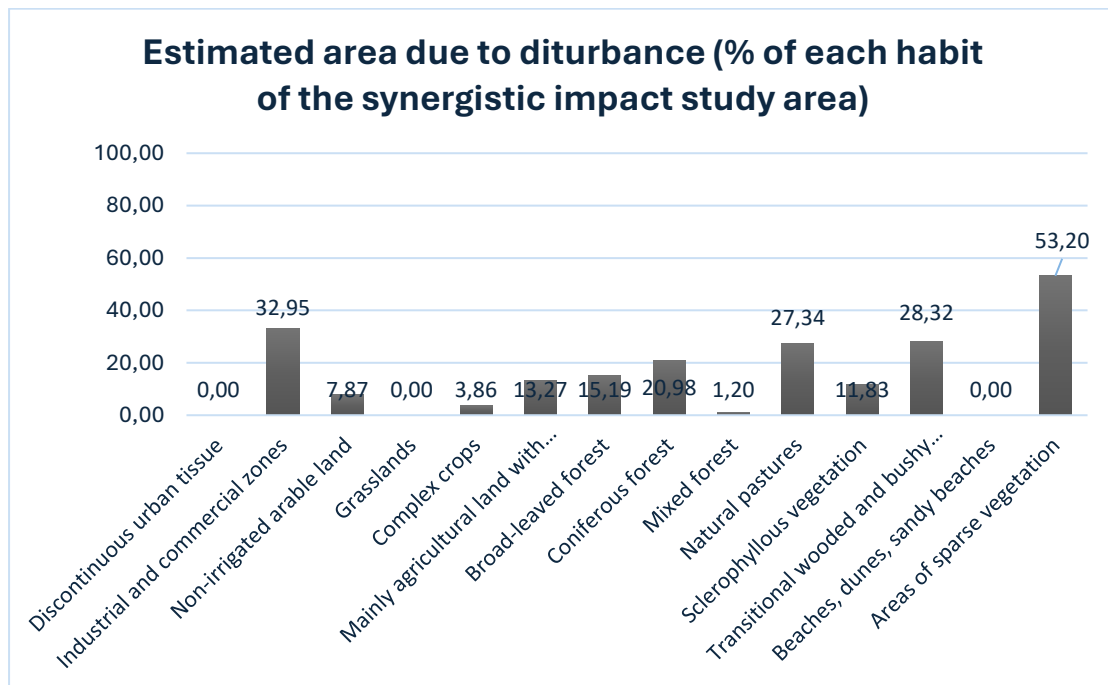


Figure 4: Estimated percentage of habitat area that may be affected (in ha) by disturbance (% of each habitat in the synergistic study area).

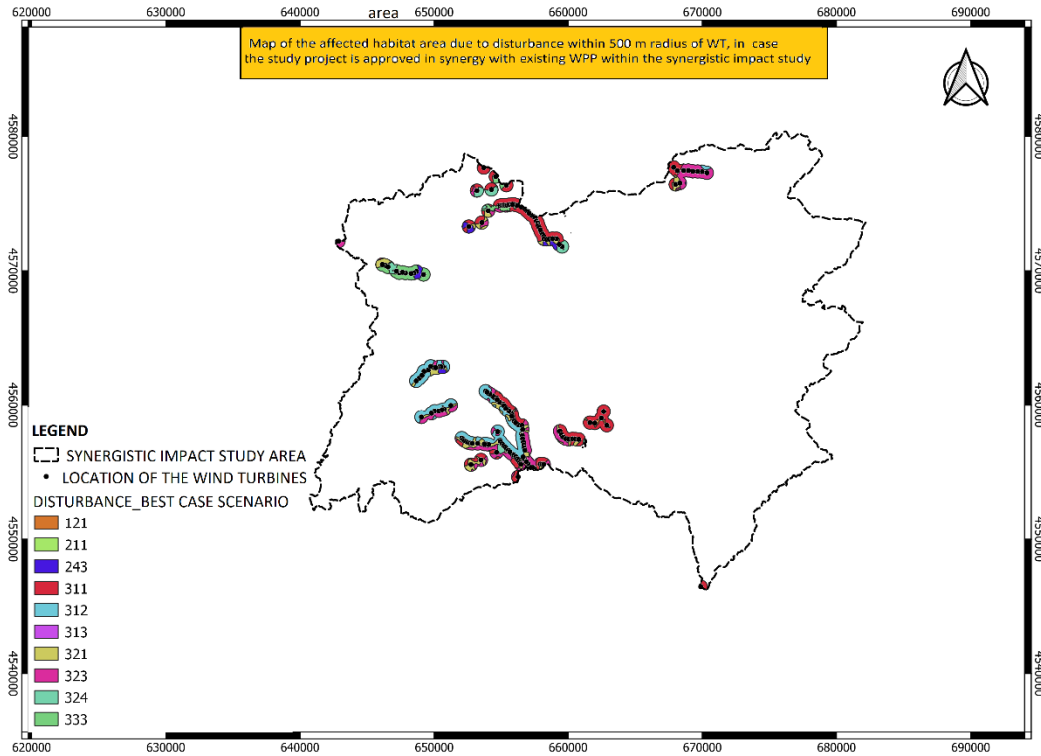
The graph and table above show high rates of habitat loss due to displacement relative to the total available suitable habitat within the Synergistic Impact Study Area (SIA). In descending order, they are sparsely vegetated land, natural grassland, industrial commercial zones, transitional woodland and scrubland, coniferous forest, broadleaf forest, hardwood forest, land used primarily for agriculture, mixed forest, composite crops, and non-irrigated arable land.

The species that are likely to experience minor impacts on the populations operating within the study area in the above scenario are large carnivorous raptors, as well as other large species of interest such as the black-backed stork.

**Results of synergistic effects on avifauna - worst case scenario.**

In the theoretical case that the above scenario comes true, although the synergistic effects are expected to be relatively high, the additive effect of the total of ten wind turbines of the project under study, based on the above analysis, is not expected to be to such an extent that it will negatively affect the protected objects of the protected areas concerned, their conservation status, conservation objectives, etc., given that **the total number of wind turbines proposed for the project under study will also help in the above direction, listed in relevant sections of the attached SEA.**

***B) Best case scenario for the approval of only the project under consideration, in synergy with the existing WPP, within the synergistic impact study area.***



Map 9: Map of affected area of habitats due to disturbance within a radius of 500 meters from each w/t, in the case of approval of only the existing WPPs in synergy with the existing ones, within the considered synergistic impact study area (best case scenario).

According to the following table, the estimated percentage of areas that could be affected by disturbance is lower than in the previous scenario (worst case scenario). However, here too there is a **reduction in the activity of bird species**, the activity of each species recorded through the field survey and their sensitivity to disturbance and displacement phenomena.

Explanation of Corine land cover 2018 codes	Corine land cover 2018 codes	Area covered in the total synergy study area (ha)	Estimated area of affected habitat of species of interest around the perimeter of the licensed WT of the project under study in synergy with the existing ones (500 m radius) (ha)	Estimated percentage of area likely to be affected by disturbance (% of each habitat in the synergistic impact study area)
Discontinuous urban tissue	112	51,932	-	-
Industrial and commercial zones	121	109,29	36,01	32,95
Non-irrigated arable land	211	2017,77	0,07	0,00
Grasslands	231	195,32	-	0,00
Complex crops	242	375,62	-	0,00
Mainly agricultural land with significant natural vegetation	243	9950,12	129,77	1,30
Broad-leaved forest	311	23382,2	1.397,17	5,98
Coniferous forest	312	5979,37	844	14,12

Explanation of Corine land cover 2018 codes	Corine land cover 2018 codes	Area covered in the total synergy study area (ha)	Estimated area of affected habitat of species of interest around the perimeter of the licensed WT of the project under study in synergy with the existing ones (500 m radius) (ha)	Estimated percentage of area likely to be affected by disturbance (% of each habitat in the synergistic impact study area)
Mixed forest	313	7500,76	0,25	0,00
Natural pastures	321	6895,15	987,785	14,33
Sclerophyllous vegetation	323	25088,51	853,26	3,40
Transitional wooded and bushy areas	324	2316,23	224,44	9,69
Beaches, dunes, sandy beaches	331	56,1		0,00
Areas of sparse vegetation	333	2407,083	381,12	15,83

Table 9 : Estimation of the affected area (in hectares) of nuisance degradation within a 500m radius of each WPP, if only the study project is approved, in synergy with existing WPPs, within the synergistic impact study area (best case scenario).

According to the SEA and documentation maps, the above table habitats are dominant, according to the database and land cover mapping (Corine land cover 2018) (see SEA Map 7), covering a total of more than 99% of the area of the synergistic impact study area.

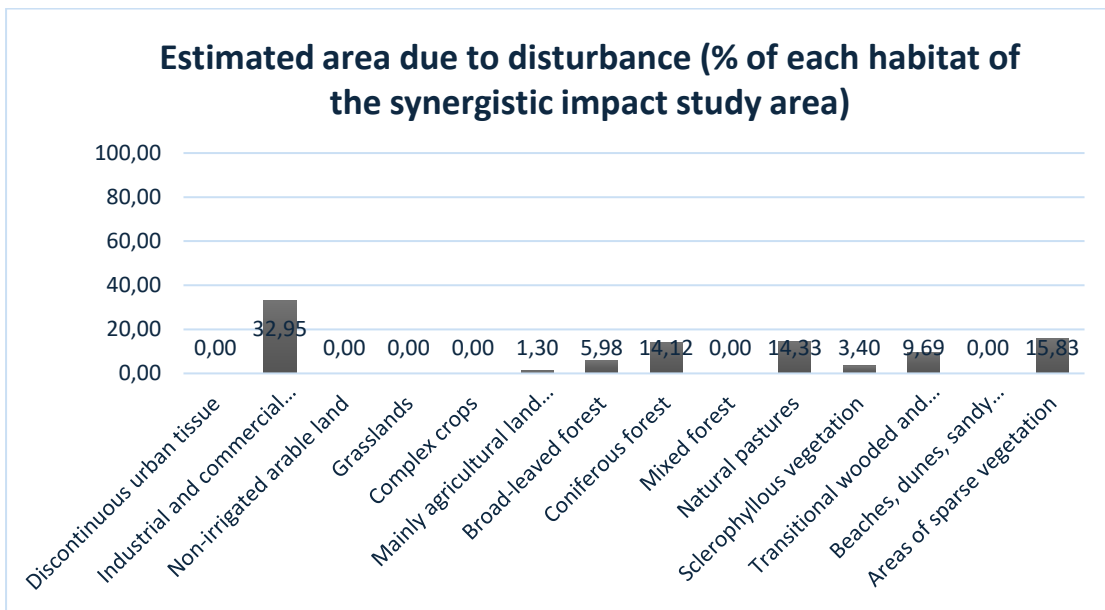


Figure 5: Description of the percentages of area that may be affected by disturbance (% of each habitat in the synergistic impact study area (best case scenario).

However, due to the fact that the project under study is located, as noted above, within habitats that are **abundant throughout (and outside of) the synergistic impact study area**, and due to the small contribution of this project to cumulative/co-occurring impacts (consisting of ten turbines), this project will have very little **impact on disturbance and displacement from important habitats for species of interest in the study area and the region more generally.**

**Synergistic impacts on avifauna - (best case scenario)**

Given all the above information, it can be concluded that *no significant synergistic impacts are expected to arise from the installation and operation of the study project in relation to the existing ones in the wider area (the nearest of which is located more than 9 km away).*

**Conservation objectives of the Natura 2000 site concerned parameters contributing to the conservation value of the site.**

By defining the conservation objectives for the bird species included in the Decision of the Ministers of Finance, Economy, Competitiveness and Shipping, and Environment, Energy and Climate Change (B' 1495), under reference 37338/1807/E.103/1.9.2010, in the Special Protection Areas (SPAs) of the national ecological network NATURA 2000, pursuant to paragraph b' of par. 3 of Article 21 of Law No. 1650/1986 (A' 160), a better assessment of the monitoring of the evolution of the protected object of the Natura site in question can be made.

The conservation objectives for the bird species referred to in par. 1 and 2 of Article 4 of Directive 2009/147/EK for all Special Protection Areas (SPAs) of the national ecological network NATURA 2000 of Greece were established by *the decision of the Deputy Minister of Environment and Energy No. ΥΠΕΝ/ΔΔΦΠΒ/50146/1786 (Government Gazette 3118/B'/10-05-2023).*

The decision includes the annex concerning the SPAs GR1110010, GR1130011 and GR1110002 (for SPA BG0002019 no Management Plan has been prepared), within or close to which **the study area is located, which set out the conservation objectives illustrated in the tables below.**

Conservation Objectives for the OREINOS EVROS - KOILADA DEREIOU SPA (GR1110010)							
<i>Species referred to in par. 1 and 4 of Article 4 of Joint Ministerial Decision 2 under No 37338/1807/E.103/01.09.2010</i>							
Code	Name	Type	Parameter	Unit of measurement of parameter	Target value	Specific target	Observations
A402	Accipiter brevipes	r	Population	pairs	Insufficient data	Insufficient data	
A223	Aegolius funereus	p	Population	pairs	Insufficient data	Insufficient data	
A079	Aegypius monachus	p	Population	pairs	Insufficient data	Insufficient data	
A229	Alcedo atthis	p	Population	pairs	Insufficient data	Insufficient data	
A255	Anthus campestris	r	Population	pairs	Insufficient data	Insufficient data	
A226	Apus apus	r	Population	pairs	Insufficient data	Insufficient data	
<b>A091</b>	<b>Aquila chrysaetos</b>	<b>p</b>	<b>Population</b>	pairs	<b>7</b>	<b>Reach</b>	
A404	Aquila heliaca	c	Population	individuals	Insufficient data	Insufficient data	



A028	Adrea cinarea	c	Population	individuals	Insufficient data	Insufficient data	
A215	Bubo bubo	p	Population	pairs	Insufficient data	Insufficient data	
A087	Buteo buteo	r	Population	pairs	Insufficient data	Insufficient data	
A403	Buteo rufinus	c	Population	individuals	Insufficient data	Insufficient data	
A243	Calandrella brachydactylla	r	Population	pairs	Insufficient data	Insufficient data	
A224	Caprimulgus europaeus	r	Population	pairs	Insufficient data	Insufficient data	
A031	Ciconia ciconia	c	Population	individuals	Insufficient data	Insufficient data	
<b>A030</b>	<b>Ciconia nigra</b>	<b>r</b>	<b>Population</b>	pairs	<b>6</b>	<b>Conservation</b>	<p>Given the general picture of the species in the Evros region and the existence of interests (forests and the permanent flow of rivers for feeding), the population is estimated to be larger than the recorded one. The ETA is defined as the number of 6 pairs which is the maximum historical estimate.</p>
<b>A080</b>	<b>Circaetus gallicus</b>	<b>r</b>	<b>Population</b>	pairs	<b>8</b>	<b>Conservation</b>	
A081	Circus aeruginosus	c	Population	individuals	Insufficient data	Insufficient data	
A082	Circus cyaneus	c	Population	individuals	Insufficient data	Insufficient data	
A083	Circus macrourus	c	Population	individuals	Insufficient data	Insufficient data	
A084	Circus pygargus	c	Population	individuals	Insufficient data	Insufficient data	
A859	Clanga clanga	c	Population	individuals	Insufficient data	Insufficient data	
<b>A858</b>	<b>Clanga Pomarina</b>	<b>r</b>	<b>Population</b>	pairs	<b>6</b>	<b>Reach</b>	
A231	Coracias garullus	r	Population	pairs	Insufficient data	Insufficient data	
A113	Coturnix coturnix	r	Population	pairs	Insufficient data	Insufficient data	
A212	Cuculus canorus	c	Population	individuals	Insufficient data	Insufficient data	
A212	Cuculus canorus	r	Population	pairs	Insufficient data	Insufficient data	
A738	Delichon urbicum (urbica)	r	Population	pairs	Insufficient data	Insufficient data	
A239	Dendrocopus leucotus	p	Population	pairs	Insufficient data	Insufficient data	
A429	Dendrocopus syriacus	p	Population	pairs	Insufficient data	Insufficient data	
A236	Dryocopus martius	p	Population	pairs	Insufficient data	Insufficient data	
A447	Emperiza caesia	r	Population	pairs	Insufficient data	Insufficient data	

A379	<i>Eperiza hortulana</i>	r	Population	pairs	Insufficient data	Insufficient data	
A098	<i>Falco columbarius</i>	c	Population	individuals	Insufficient data	Insufficient data	
A100	<i>Falco eleonora</i>	c	Population	individuals	Insufficient data	Insufficient data	
A095	<i>Falco naumanni</i>	c	Population	individuals	Insufficient data	Insufficient data	
A103	<i>Falco peregrinus</i>	p	Population	pairs	Insufficient data	Insufficient data	
A097	<i>Falco vespertinus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A321	<i>Ficedula albicollis</i>	c	Population	individuals	Insufficient data	Insufficient data	
A320	<i>Ficedula parva</i>	c	Population	individuals	Insufficient data	Insufficient data	
A442	<i>Ficedula semitorquata</i>	r	Population	pairs	Insufficient data	Insufficient data	
A078	<i>Gyps Fulvus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A078	<i>Gyps Fulvus</i>	w	Population	individuals	Insufficient data	Insufficient data	
A707	<i>Hieraetus fasciatus</i> ( <i>Aquila fasciata</i> )	c	Population	individuals	Insufficient data	Insufficient data	
A092	<i>Hieraetus pennatus</i> ( <i>Aquila pennata</i> )	r	Population	pairs	6	Reach	
A439	<i>Hippolais olivetorum</i>	r	Population	pairs	Insufficient data	Insufficient data	
A251	<i>Hirundo rustica</i>	r	Population	pairs	Insufficient data	Insufficient data	
A233	<i>Junx torquilla</i>	r	Population	pairs	Insufficient data	Insufficient data	
A338	<i>Lanius collurio</i>	c	Population	pairs	Insufficient data	Insufficient data	
A338	<i>Lanius collurio</i>	r	Population	pairs	Insufficient data	Insufficient data	
A339	<i>Lanius minor</i>	r	Population	pairs	Insufficient data	Insufficient data	
A433	<i>Lanius nubicus</i>	r	Population	pairs	Insufficient data	Insufficient data	
A868	<i>Leopieus medius</i>	p	Population	pairs	Insufficient data	Insufficient data	
A246	<i>Lullula arborea</i>	p	Population	pairs	Insufficient data	Insufficient data	
A242	<i>Melanorypha calandra</i>	r	Population	pairs	Insufficient data	Insufficient data	
A230	<i>Merops apiaster</i>	r	Population	pairs	Insufficient data	Insufficient data	
A073	<i>Milvus migrans</i>	c	Population	individuals	Insufficient data	Insufficient data	
A074	<i>Milvus milvus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A260	<i>Motacilla flava</i>	c	Population	individuals	Insufficient data	Insufficient data	
A260	<i>Motacilla flava</i>	r	Population	pairs	Insufficient data	Insufficient data	
<b>A077</b>	<b><i>Neophron percnopterus</i></b>	<b>r</b>	Population	pairs	<b>2</b>	<b>Reach</b>	

A533	Oenanthe pleschanka	r	Population	pairs	Insufficient data	Insufficient data	
A337	Oriolus oriolus	c	Population	individuals	Insufficient data	Insufficient data	
A337	Oriolus oriolus	r	Population	pairs	Insufficient data	Insufficient data	
A094	Pandion haliaetus	c	Population	individuals	Insufficient data	Insufficient data	
A355	Passer hispaniolensis	p	Population	pairs	Insufficient data	Insufficient data	
A072	Pernis apivorus	r	Population	pairs	Insufficient data	Insufficient data	
A234	Picus canus	p	Population	pairs	Insufficient data	Insufficient data	
A210	Streptopelia turtur	r	Population	pairs	Insufficient data	Insufficient data	
A210	Streptocella turtur	c	Population	individuals	Insufficient data	Insufficient data	
A307	Sylvia nisoria	r	Population	pairs	Insufficient data	Insufficient data	
A228	Tachymarphis melba	r	Population	pairs	Insufficient data	Insufficient data	
A282	Turdus torquatus	c	Population	individuals	Insufficient data	Insufficient data	
<b>Conservation objectives for the Koilada Filiouri SPA (GR1130011)</b>							
<i>Species referred to in par. 1 and 4 of Article 4 of Joint Ministerial Decision 2 under No 37338/1807/E.103/01.09.2010</i>							
Code	Name	Type	Parameter	Unit of measurement of parameter	Target Value	Specific target	Observations
A402	Accipiter brevipes	r	Population	pairs	Insufficient data	Insufficient data	
A079	Aegypius monachus	c	Population	individuals	Insufficient data	Insufficient data	
A229	Alcedo atthis	p	Population	pairs	Insufficient data	Insufficient data	
A255	Anthus campestris	r	Population	pairs	Insufficient data	Insufficient data	
A226	Apus apus	r	Population	pairs	Insufficient data	Insufficient data	
<b>A091</b>	<b>Aquila crhytaetos</b>	<b>p</b>	Population	pairs	<b>3</b>	<b>Reach</b>	
A404	Aquila heliaca	c	Population	individuals	Insufficient data	Insufficient data	
A215	Bubo bubo	p	Population	pairs	Insufficient data	Insufficient data	
<b>A087</b>	<b>Buteo buteo</b>	<b>r</b>	Population	pairs	<b>12</b>	<b>Conservation</b>	
<b>A403</b>	<b>Buteo rufinus</b>	<b>p</b>	Population	pairs	<b>1</b>	<b>Conservation</b>	
A224	Caprimulgus europaeus	r	Population	pairs	Insufficient data	Insufficient data	
A031	Ciconia ciconia	c	Population	individuals	Insufficient data	Insufficient data	
A030	Ciconia nigra	r	Population	pairs	Insufficient data	Insufficient data	

A080	<b>Circaetus gallicus</b>	r	Population	pairs	<b>8</b>	<b>Conservation</b>	
A081	Circus aeruginosus	c	Population	individuals	Insufficient data	Insufficient data	
A082	Circus cyaneus	c	Population	individuals	Insufficient data	Insufficient data	
A083	Circus macrourus	c	Population	individuals	Insufficient data	Insufficient data	
A084	Circus pygargus	c	Population	individuals	Insufficient data	Insufficient data	
A858	Clanga clanga	c	Population	pairs	Insufficient data	Insufficient data	
<b>A858</b>	<b>Clandga pomarina</b>	<b>r</b>	Population	pairs	<b>2</b>	<b>Reach</b>	
A231	Coracias garrulus	r	Population	pairs	Insufficient data	Insufficient data	
A738	Delichon urbicum (urbica)	c	Population	individuals	Insufficient data	Insufficient data	
A738	Delichon urbicum (urbica)	r	Population	pairs	Insufficient data	Insufficient data	
A429	Dendrocopus syriacus	p	Population	pairs	Insufficient data	Insufficient data	
A236	Dryocopus martius	P	Population	pairs	Insufficient data	Insufficient data	
A379	Emperiza hotulana	r	population	pairs	Insufficient data	Insufficient data	
A100	Falco eleonora	c	Population	individuals	Insufficient data	Insufficient data	
A095	Falco naumanni	c	Population	individuals	Insufficient data	Insufficient data	
A103	Falco peregrinus	p	Population	pairs	Insufficient data	Insufficient data	
A321	Ficedula albicollis	c	Population	individuals	Insufficient data	Insufficient data	
A320	Ficedula parva	c	Population	individuals	Insufficient data	Insufficient data	
A442	Ficedula semitorquata	r	Population	pairs	Insufficient data	Insufficient data	
<b>A076</b>	<b>Gypeatus barbatus</b>	<b>p</b>	Population	<b>pairs</b>	<b>1</b>	<b>Reach</b>	<b>The species has suffered a great historical decline both locally and nationally. In this case, the population of the species in the SPA before the extinction was calculated as ORP. It is assumed that if anthropogenic threats (poison baits) are eliminated, there is suitable habitat and food for the SPA species. The target in an annual SPA is to increase to at least 1 pair of the species.</b>
<b>A078</b>	<b>Gyps fulvus</b>	<b>p</b>	Population	<b>individuals</b>	<b>15</b>	<b>Conservation</b>	<b>Due to the species' biology and social lifestyle the</b>

							conservation goal will be the minimum population of individuals to establish a colony. As 10% to 50% of the individuals in a colony are likely to nest, the target at the SPA level will be an increase to 15 adults of the species.
A092	<b>Hieraetus pennatus (Aquila pennata)</b>	r	Population	pairs	8	Reach	
A439	Hippolais olivetorum	r	Population	pairs	Insufficient data	Insufficient data	
A251	Hirundo rustica	c	Population	individuals	Insufficient data	Insufficient data	
A251	Hirundo rustica	r	Population	pairs	Insufficient data	Insufficient data	
A338	Lanius collurio	r	Population	pairs	Insufficient data	Insufficient data	
A339	Lanius minor	r	Population	pairs	Insufficient data	Insufficient data	
A868	Leopieus medius	p	Population	pairs	Insufficient data	Insufficient data	
A246	Lullula arborea	p	Population	pairs	Insufficient data	Insufficient data	
A230	Merops apiaster	r	Population	pairs	Insufficient data	Insufficient data	
A260	Motacilla flava	r	Population	pairs	Insufficient data	Insufficient data	
A077	<b>Neophron percnopterus</b>	r	Population	pairs	2	Reach	
A337	Oriulus Oriulus	r	Population	pairs	Insufficient data	Insufficient data	
A072	Pernis apivorus	r	Population	pairs	Insufficient data	Insufficient data	
A210	Streptopella turtur	r	Population	pairs	Insufficient data	Insufficient data	
A307	Sylvia nisoria	r	Population	pairs	Insufficient data	Insufficient data	
<b>Conservation Objectives for the SPA Dadias forest - Soufli (GR111002)</b>							
<i>Species referred to in par. 1 and 4 of Article 4 of Joint Ministerial Decision 2 under No 37338/1807/E.103/01.09.2010</i>							
Code	Name	Type	Parameter	Unit of measurement of parameter	Target value	Specific target	Observations
A402	Accipiter brevipes	r	Population	pairs	6	Reach	
A168	Acitis hypoleucos	c	Population	individuals	Insufficient data	Insufficient data	
A079	Aegyptius monachus	r	Population growth rate	pairs per year	0.7	Reach	The trend of the species at local (and therefore national) level is medium and long-term positive, the conservation objective is to maintain the growth



							rate (0.7 pairs/year) until the population finally stabilizes and the carrying capacity of the SPA is reached.
A247	<i>Alauda arvensis</i>	r	Population	pairs	Insufficient data	Insufficient data	
A229	<i>Alcedo atthis</i>	p	Population	pairs	Insufficient data	Insufficient data	
A053	<i>Anas platyrhynchos</i>	r	Population	individuals	Insufficient data	Insufficient data	
A255	<i>Anthus campestris</i>	r	Population	pairs	Insufficient data	Insufficient data	
A226	<i>Apus Apus</i>	r	Population	pairs	Insufficient data	Insufficient data	
A091	<i>Aquila chrysaetos</i>	p	Population	pairs	Insufficient data	Insufficient data	
A404	<i>Aquila heliaca</i>	w	Population	individuals	Insufficient data	Insufficient data	
<b>A215</b>	<b>Bubo bubo</b>	<b>p</b>	Population	pairs	<b>5</b>	<b>Reach</b>	
<b>A087</b>	<b>Buteo buteo</b>		Population	pairs	<b>128</b>	<b>Reach</b>	
<b>A403</b>	<b>Buteo rufinus</b>	<b>r</b>	Population	pairs	<b>3</b>	<b>Reach</b>	
A243	<i>Calandrella brachydactylla</i>	c	Population	individuals	Insufficient data	Insufficient data	
A224	<i>Caprimulgus europaeus</i>	r	Population	pairs	Insufficient data	Insufficient data	
A031	<i>Ciconia ciconia</i>	r	Population	individuals	27	Reach	
<b>A030</b>	<b>Ciconia nigra</b>	<b>r</b>	Population	<b>pairs</b>	<b>32</b>	<b>Conservation</b>	
A080	<i>Circaetus gallicus</i>	r	Population	pairs	41	Reach	
A081	<i>Circus aeruginosus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A082	<i>Circus cyaneus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A083	<i>Circus macrourus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A084	<i>Circus pygargus</i>	c	Population	individuals	Insufficient data	Insufficient data	
A859	<i>Clanga clanga</i>	w	Population	individuals	4	Conservation	
<b>A858</b>	<b>Clanga Pomarina</b>	<b>r</b>	Population	<b>pairs</b>	<b>22</b>	<b>Reach</b>	
A231	<i>Coracias garullus</i>	r	Population	pairs	Insufficient data	Insufficient data	
A113	<i>Coturnix coturnix</i>	r	Population	pairs	Insufficient data	Insufficient data	

A738	Delichon urbicum (urbica)	r	Population	pairs	Insufficient data	Insufficient data	
A239	Dendrocopus leucotus	p	Population	pairs	Insufficient data	Insufficient data	
A429	Dendrocopus syriacus	p	Population	pairs	Insufficient data	Insufficient data	
A236	Dryocopus martius	p	Population	pairs	Insufficient data	Insufficient data	
A026	Egretta garzetta	c	Population	individuals	Insufficient data	Insufficient data	
A447	Emperiza caezia	r	Population	pairs	Insufficient data	Insufficient data	
A379	Emperiza Hortulana	r	Population	pairs	Insufficient data	Insufficient data	
A101	Falco biarmicus	p	Population	pairs	1	Reach	
A098	Falco columbarius	c	Population	individuals	Insufficient data	Insufficient data	
A100	Falco eleonora	c	Population	individuals	Insufficient data	Insufficient data	
A095	Falco naumanni		Population	individuals	Insufficient data	Insufficient data	
A103	Falco peregrinus	p	Population	pairs	3	Reach	
A099	Falco subbuteo		Population	pairs	11	Insufficient data	
A097	Falco vespertinus	c	Population	individuals	Insufficient data	Insufficient data	
A321	Ficedula albicollis	c	Population	individuals	Insufficient data	Insufficient data	
A320	Ficedula parva	c	Population	individuals	Insufficient data	Insufficient data	
A442	Ficedula semitorquata	r	Population	pairs	Insufficient data	Insufficient data	
A125	Fulica atra	r	Population	pairs	6	Reach	
<b>A076</b>	<b>Gypaetus barbatus</b>		Population	pairs	<b>1</b>	<b>Reach</b>	
A078	Gyps fulvus	c	Population	individuals	115	Conservation	
A078	Gyps fulvus	p	Population	pairs	11	Insufficient data	
A075	Haliaeetus albicilla	w	Population	individuals	Insufficient data	Insufficient data	
A707	Hierraaetus fasciatus (Aquila fasciata)	r	Population	-	Insufficient data	Reach	
A092	Hierraaetus pennatus (Aquila pennata)	r	Population	pairs	24	Insufficient data	
A439	Hippolais olivetorum	r	Population	pairs	Insufficient data	Insufficient data	

A251	Hirundo rustica	r	Population	pairs	Insufficient data	Insufficient data	
A233	Junx torquilla	r	Population	pairs	Insufficient data	Insufficient data	
A338	Lanius collurio	r	Population	pairs	Insufficient data	Insufficient data	
A339	Lanius minor	r	Population	pairs	Insufficient data	Insufficient data	
A433	Lanius nubicus	r	Population	pairs	Insufficient data	Insufficient data	
A868	Leopiepus medius	p	Population	pairs	Insufficient data	Insufficient data	
A246	<i>Lullula arborea</i>	p	Population	pairs	Insufficient data	Insufficient data	
A242	Melanorypha calandra	r	Population	pairs	Insufficient data	Insufficient data	
A230	Merops apiaster	r	Population	pairs	Insufficient data	Insufficient data	
A875	Microcarbo pygmaeus	c	Population	individuals	Insufficient data	Insufficient data	
A073	Milvus migrans	r	Population	pairs	2	Reach	
A073	Milvus migrans	w	Population	individuals	Insufficient data	Insufficient data	
A074	Milvus milvus	c	Population	individuals	Insufficient data	Insufficient data	
A260	Motacilla flava	r	Population	pairs	Insufficient data	Insufficient data	
A077	Neophron percnopterus	r	Population	pairs	12	Reach	
A077	Neophron percnopterus	c	Population	individuals	Insufficient data	Insufficient data	
A023	Nycticorax nycticorax	c	Population	pairs	Insufficient data	Insufficient data	
A337	Oriolus oriolus	r	Population	pairs	Insufficient data	Insufficient data	
A094	Pandion halliaetus	c	Population	individuals	Insufficient data	Insufficient data	
A355	Passer hispaniolensis	r	Population	pairs	Insufficient data	Insufficient data	
A072	Pemis apivorus	r	Population	pairs	28	Insufficient data	
A391	Phalacrocorax carbo sinensis	c	Population	individuals	Insufficient data	Insufficient data	
A234	Picus Canus	p	Population	pairs	Insufficient data	Insufficient data	
A249	Riparia riparia	r	Population	pairs	Insufficient data	Insufficient data	
A210	Streptopella turtur	r	Population	pairs	Insufficient data	Insufficient data	
A307	Sylvia nisoria	r	Population	pairs	Insufficient data	Insufficient data	
A228	Tachymarptis melba	r	Population	pairs	Insufficient data	Insufficient data	
A282	Turdus torquatus	c	Population	individuals	Insufficient data	Insufficient data	
A142	Vanellus vanellus	w	Population	individuals	Insufficient data	Insufficient data	

Table 10 : Conservation objectives for the Natura sites "Forest of Dadia - Soufli", "Oreinos Evros – Koilada Dereiou", and "Koilada Filiouri".

**In conclusion, the above tables show that for most species there is insufficient data and therefore it is not possible to set the relevant targets. The conclusions on the conservation objectives and impact assessment of the station under consideration are discussed in section 10.4.1 (Chapter 10).**

#### Impact assessment of associated projects

Regarding the associated works of this WPP project, it is estimated that they will not cause any negative impact on the site and the integrity of the area or on the species living there, due to the proposed undergrounding of the cabling for the transmission of the electricity generated.

Concerning the drilling for the installation of the wind turbines, it will be of noticeably short length and will also not cause any negative impact on the Natura 2000 site and its protected objects, due to the correct placement (and the relevant proposals herein).

The effects of the project synergistically with other projects in the vicinity of the site (projects under permitting) would be minor given that **the mitigation measures for potential impacts identified in the attached SEA would be implemented.**

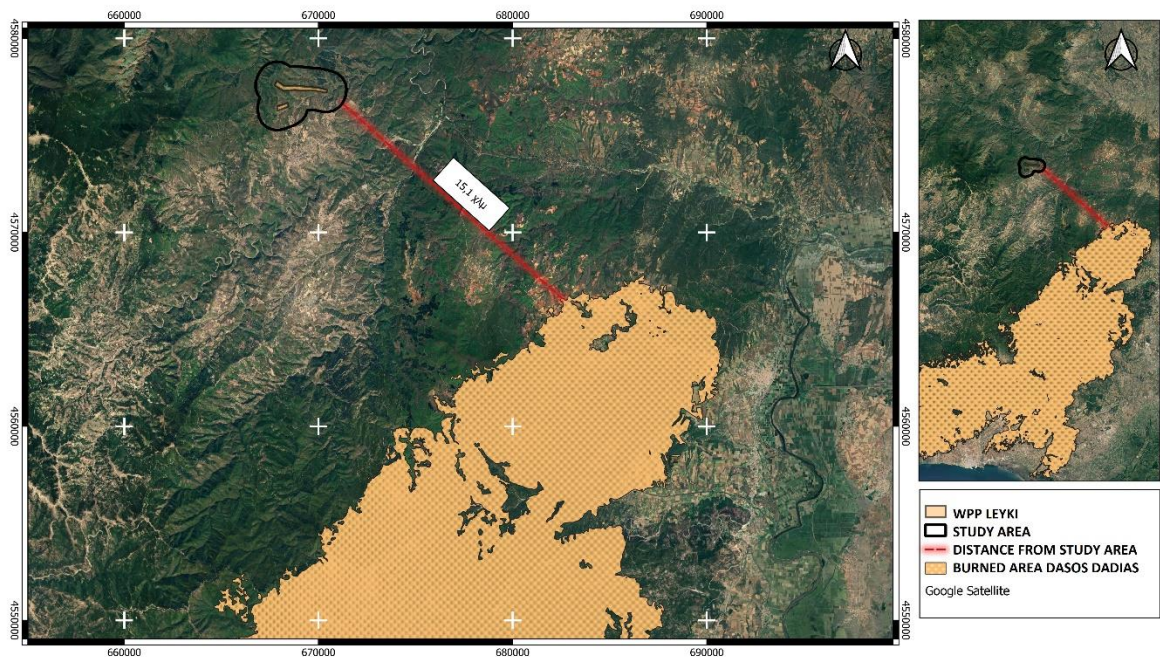
#### Forest fire impact assessment

The nature of the WPP project is not expected to create favorable conditions for forest fires during the operational phase. The project has no emissions of flammable materials, nor is it expected to experience emissions of pollutants or hazardous materials in general during its lifetime. The expected maintenance of the project as well as the occasional measurements that will be conducted will make a positive contribution as there will be a human presence that in case of fire or strange mobility will inform the competent authorities immediately. The access of the crews will ensure that the forest road is cleared so that it is also accessible for fire trucks in case of emergency. The sustainability of the project and its protection by the company is not only about the project itself but also about the surrounding area, which is a forest area of great ecological value. In addition to the use of renewable energy sources to optimize the quality of life of all organisms on the planet and to reduce to zero the negative effects of the use of fuels used so far, it is important to preserve the natural environment in its entirety, as it constitutes the natural lungs of the earth but also houses the unique biodiversity that is essential for the life cycle of every organism. The harmonization of renewable energy projects with the environment is a successful bet as the development of technology has made it possible for projects to be fully

compatible with the natural environment. It is also worth mentioning that the wind turbines have installed a fire detection system for fire safety which is mounted on the nacelle of each wind turbine and with appropriate, advanced technology and high-resolution IR Panoramic cameras so that it can detect fire (even small-scale, when it is in an early stage) with a range of up to 5 km.

In the case where the forest area has been classified as reforestation due to fire damage, the project promoter, in cooperation with the competent Forestry Department, will carry out the necessary protection and restoration measures, such as reforestation, flood and erosion control works, The necessary measurements to be carried out in the study area of the WPP during the operational phase of the project may be combined with the preparation of a report on the evolution of the area and the progress of natural or technical reforestation, always in full consultation and cooperation with the competent Forestry Department.

Finally, it is pointed out that the project under consideration does not belong to the burned areas, but it is located at a very long distance, around 15.01 km in a straight line, while various geomorphological elements are also included. The project will not affect the habitats of the Dadia Forest area. Therefore, the event of the fire is not required to be considered in the impact assessment of the study.



Map 10: Distance of the project under consideration from the burned areas of the Dadia Forest

Impact on the well-being of populations

As a company fully aware of the state of the forests of Evros and because we consider the biodiversity of the area where we are planning our projects important, we would like to express our views and intentions for our future participation in actions that aim



to indirectly benefit the conservation of endangered scavenger species and the rest of the avifauna of the region.

Our projects may be aimed at establishing energy independence and addressing the ecological problems of the planet by solving the problem of non-renewable fossil fuel reserves, but this does not mean that fighting local ecological problems is not our priority. Based on the overall environmental value of each project study area and its future conservation to benefit a cleaner planet through the installation of the project, we can contribute to actions that will ensure the survival and reproduction of these species in their range.

For example, as we know, based on the National Action Plan for the Egyptian Vulture in Greece, the abandonment of traditional farming practices and legislation imposing strict sanitary and veterinary rules is one of the decisive factors that have led to the reduction of the available food for the Egyptian Vulture, and not only for that species. Therefore, providing "secure food" to Egyptian Vultures through the establishment of a network of raptor feeding sites is essential and this is what we intend to work on.

Our aim is therefore to contribute to efforts to ensure that there is stable food for both breeding pairs and wandering individuals so that they can colonize abandoned territories.

Thus, one of the measures considered is the provision of supplementary food in artificial feeding stations, so-called "feeders", which have been recognized as a good management tool for maintaining populations of all vulture species including the Egyptian vulture. It has been found that these supplementary feeding programs usually provide carcasses, in fixed locations and in areas with insufficient food, aim to support scavenger predator populations by increasing their reproductive capacity thus ensuring a high survival rate in their juveniles and reducing the risk of poisoning of the species, while helping to maintain large concentrations. However, it should be noted that there is a risk that the use of these feeders will be minimal due to the unsuitable location, the reduced food supply and the inadequate protection of wildlife in neighboring areas, while it should be stressed that the Egyptian vulture is very sensitive to disturbance during its breeding period, which requires strict planning of various activities (road construction, recreational activities, military exercises, forestry work, etc.).

From the above and since the vulture species are in a critical situation, it becomes necessary to assess and design a strategy for the enhancement of the natural population in the country using the method of captive breeding. Since the natural recovery of the wild population of these birds is extremely difficult due to the low number of individuals left in Greece, as well as the strong presence of specific threats

that are difficult to eradicate (poisoned baits, etc.), early planning and preparation for action to strengthen the natural population will bring about a halt to the population decline through the creation of safe breeding areas with a reduced risk of poisoning and increased food availability.

An integrated population model has shown that population enhancement with captive-bred individuals would reduce the probability of extinction by 2049 from 48% to < 1% if 12 or more birds were released each year for 30 years. The model and a feasibility study suggest that a 4% improvement in wild survival combined with releasing 9 birds annually for 20 years or 6 birds annually for 30 years would result in a stable population while releases continue. Thus, an optimal goal is to release at least 9 individuals per year on average. However, to achieve this goal, a set of actions must be implemented to increase the size of the captive breeding pool and the success of captive breeding pairs of scavengers to ensure the above required number of birds per year.

Trial releases have shown that the delayed release method is the most successful approach leading to higher survival of released individuals compared to the survival of wild juveniles during the first 6 months. Therefore, delayed release can be applied as the main method to enhance the population of scavenging species and the Egyptian vulture population.

Thus, considering the above, our company intends to cooperate with all relevant bodies (Ministry of Environment, Natural Environment & Climate Change Agency (N.E.C.C.A.), Forestry Services, etc.) by contributing to direct actions to increase the reproductive rate of vultures (e.g. (e.g. captive breeding, participation in feasibility studies for reintroduction programs, creation of feeders, etc.) which will indirectly benefit the conservation and increase of this species and serve the conservation objectives of the critical bird fauna, as established in the legislation.

## **9.6 Impact on the human-made environment**

### **9.6.1 Spatial planning - Land use**

The siting of the wind power plant will be carried out in an isolated mountainous area and specifically in a Wind Priority Area, as according to the Special Spatial Framework for Renewable Energy Sources, these areas have comparative advantages for the installation of wind power plants (such as the existence of exploitable wind potential, increased demand for the installation of wind turbines, etc.). The wind farm under study is developed at a sufficient distance from settlements and anthropogenic activities.

The Wind Power Plant under consideration falls within areas of sclerophyllic vegetation, broadleaf forests and land used for agriculture together with significant parts of vegetation.

The land use of the study area and the wider area will not change as the area where the Wind Power Plant will be constructed is small in relation to the available undeveloped land in the wider area.

For the part of the land that will be affected during the construction phase, **a specific landscape restoration** and reforestation study will be conducted after the end of the works, under the guidance of the relevant Forestry Department, and therefore the study area will not undergo any change in land use.

It is important to note that the proposed wind turbine sites are located outside the exclusion areas and incompatibility zones, according to **Article 6 of the Special Spatial Planning & Sustainable Development Framework for the Renewable Energy Sources**

**Synergistic / Cumulative Impacts**

Table 27 of the SEA presents the calculation of habitat loss in the case of construction **of only the approved project** at the "Lefki" site **in the synergistic impact study area (best case scenario)**. The calculated percentages of estimated habitat loss are small, therefore the impact of the project under consideration on habitats and therefore on land use will be minimal and there will be no permanent change in land use (see Table 27 of the SEA).

To better assess the impacts of the simultaneous approval of all wind farms within the considered synergistic impact study area (worst case scenario), a calculation of habitat loss has been carried out in the SEA (Table 26 of the SEA). The rates of habitat loss will, as is normal, be higher than the rates of habitat loss in the case of construction of the project under consideration alone **(best case scenario)**. **Therefore, the impacts can be considered as more obvious.**

Regarding the Synergistic / Cumulative Impacts of the project under consideration in terms of land-use planning, these do not arise, as the compatibility issue is carried out only for the wind farm under consideration, while for the other projects under approval (near the project under consideration "Pseftis" and "Maurodasos") it will be carried out in separate issues as required.

Spatial Planning - Land Use						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	LOW	LOW	NO	/	/
OPERATION	INDIRECT	MEDIUM	MEDIUM	YES	YES	YES
CESSATION OF OPERATION	/	/	/	NO	/	/

Table 2: Conservation objectives for the Natura sites "Forest of Dadia - Soufli", "Oreinos Evros – Koilada Dereiou", and "Koilada Filiouri".

9.6.2 Structure and functions of the anthropogenic environment

The wind turbines will be installed at a great distance from the nearest settlement and from anthropogenic activities and as has been thoroughly analyzed in Chapter 5 of this study, generally the distances defined by the Ministerial Decision 49828/08 (Government Gazette 2464B'/03.12.2008), which approved **the Special Spatial Planning & Sustainable Development Framework for the Renewable Energy Sources in Annex II, Table Δ, from residential activities, are met.**

The construction and operation of the project under consideration is not expected to alter the main characteristics of the settlements of the wider area (Goniko and Roussas and Mikro Dereio). There is no risk of fragmentation of the urban fabric, nor any tendency to deteriorate. No settlements, of any category, are identified within 500 m from the location of the Wind Power Plant under consideration, nor are there any traditional settlements or other types of organised housing in the immediate study area of the project.

**Therefore, the implementation of the project is not expected to result in any change in the residential environment of the area.**

In addition, according to the Noise Propagation Study prepared for the Wind Power Plant, the noise levels will not exceed the 45 dB limit in any settlement or point of interest (see centers of archaeological site declarations).

Specifically, the noise generated by the wind turbines, which reach the nearest settlements of Roussas, Goniko and Mikro Dereio, is below the maximum permitted level, as shown in the table below.

Points of interest	Nearest wind turbine	Distance (m)	Noise level (dB(A)) Produced by the proposed Wind Power Plant at "Lefki"
Settlement - Roussa	wind turbine 9	2.469 m	22,4
Settlement - Goniko	wind turbine 9	4.671 m	13,3
Settlement - Mikro Dereio	wind turbine 1	5.213 m	12,2

Table 3: Evaluation table for the noise level for the "Lefki" site.

**Synergistic impacts / Cumulative impacts:**

In addition to the examination of the noise level for the Wind Power Plant under consideration at the location "Lefki" in relation to the settlements, a calculation of the noise level **from the cumulative operation of all three Wind Power Plants at the locations "Lefki", "Mavrodasos" and "Pseftis"** was conducted. It is noted that the

other Wind Power Plant at the location "Ammoudes" is not calculated synergistically as it appears that it does not meet, as it stands, the compatibility criteria of the Ministerial Decision 49828/2008 and therefore cannot be calculated.

Thus, the noise level towards the nearest settlements of Roussas, Goniko and Mikro Dereio is again below the maximum permissible limit and is reflected in the following table (Table 5.3, Noise Study).

Points of interest	Nearest wind turbine	Distance (m)	Noise level (dB(A))	
			Produced by the proposed Wind Power Plant at "Lefki"	Produced by the cumulative operation of three (3) Wind Power Plants
Settlement - Roussa	wind turbine 9	2.469 m	22,4	39,42
Settlement - Goniko	wind turbine 9	4.671 m	13,3	38,28
Settlement - Mikro Dereio	wind turbine 1	5.213 m	12,2	30,36

Table 4: Distances of settlements from wind turbines (measured from the closest point to the turbines) and noise level with wind speed 10 m/s. (\*The cumulative operation of three (3) wind turbines includes the Wind Power Plants at the locations "Lefki", "Mavrodasos" and "Psetis").

The conclusions of the assessment of the project's impacts on the structure and functions of the anthropogenic environment are summarised in the following table.

Structure and functions of the anthropogenic environment						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	LOW	LOW	NO	/	/
OPERATION	/	/	/	NO	/	/
CESSATION OF OPERATION	/	/	/	NO	/	/

Table 5: Structure and functions of the anthropogenic environment

### 9.6.3 Cultural heritage

In the study area of the two polygons of the Wind Power Plant there are two archaeological sites named "10 Megalithic monuments (Dolmen)" which is located 1.6km from the nearest wind turbine (wind turbine 10) and the archaeological site "Koum-Tarla" which is located at a distance of 2.4Km from the wind turbine 10 of the project under consideration.

The Wind Power Plant under consideration in relation to the archaeological sites has been considered in the Compatibility Document in Appendix II and is compatible. Therefore, no impacts to historic sites or other sites of historical and cultural interest are anticipated during the operation and construction phase of the Wind Power Plant.

### Synergistic impacts / Cumulative impacts



Regarding archaeological sites, no cumulative impacts of the project in relation to other projects are identified. According to the photorealistic illustration carried out for the project under consideration and for the nearest Wind Power Plant (Wind Power Plant in the location of Pseftis), it is noted that the archaeological sites "10 megalithic monuments" will not be affected, "Archaio Nekrotafeio", "Kum – Tarla", "Tekkes aforoismenon nekron", "Frouriakos perivolos", "Mesimler – Kale". However, the wind turbines of the Lefki and Psefti Wind Power Stations will be partially visible. Therefore, Synergistic impacts / Cumulative impacts in terms of archaeological sites will be of low intensity. The assessment conclusions are summarised in the following table.

Cultural Heritage						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	LOW	LOW	NO	YES	/
OPERATION	/	/	/	NO	/	/
CESSATION OF OPERATION	/	/	/	NO	/	/

Table 6: Impact assessment table for cultural heritage

## 9.7 Socio-economic impacts

### 9.7.1 Demographic situation

The construction and operation of the Wind Power Plant will not affect the demographic situation of the Municipality of Soufli.

### 9.7.2 Productive structure of the local economy

During the construction phase of the project, temporary jobs will be created as local labour will be recruited for the infrastructure works.

These actions will bring significant help to the local economy of the region. The increase in local income and local employment through the implementation of the project will lead to the retention of the local population and at the same time the development of the living standards of the region.

During the operation phase of the project, there will be personnel responsible for monitoring the proper functioning of the system (wind turbines, step-up substations, metering system and systems installed by HEDNO (Hellenic Electricity Distribution Network Operator), for the immediate disconnection or reconnection of the wind farms to the grid in case of emergency, as well as for the maintenance of all equipment. The staff employed during the operation of the project need not have any specialization but must have a basic technical understanding.

Finally, with the direct financial benefit gained by Local Authorities, according to Law 3468/06 (Government Gazette 129A/27.06.2006), as amended by Law 3851/10

(Government Gazette 85A'/04.06.2010) and Law 4555 /2018 (Government Gazette 133 A'/19.07.2018) will be supported towards the development of other activities and the promotion of infrastructure projects, such as sewerage network, internal road works, cultural and tourism upgrading projects, in order to further increase jobs and improve per capita income.

Positive effects on the economy are therefore expected from the creation of new jobs and on the local economy in general (indirect impact).

Social - Economic Environment						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	/	/	/	NO	/	POSITIVE
OPERATION	INDIRECT	MEDIUM	LOW	NO	/	POSITIVE
CESSATION OF OPERATION	/	/	/	NO	/	

Table 7: Assessment of impacts on the Socio-Economic Environment.

**9.8 Impact on technical infrastructure**

**9.8.1 Impact on road network**

During the construction and operation phases of the project, the technical infrastructure networks of the area are not expected to be affected, only the local road network. During the construction of the project, there will be an increase in road traffic in the area due to the movement of vehicles, construction machinery, transport of wind turbines and other equipment. At the same time, all necessary safety measures (road markings, etc.) will be taken to ensure traffic safety.

During the operational phase of the project, there will be no impact on road traffic in the area, as the movement of vehicles due to the repair of damage to the wind turbines or emergency situations will be almost negligible.

**9.8.2 Impact on the water supply network**

During the construction phase of the project as already calculated and analyzed in the relevant section of Chapter 6, approximately 21 m3/day will be required for construction. Water requirements will be met by tankers (water trucks). There will therefore be no changes to the water supply network in the wider area.

**9.8.3 Effects on the sewerage system**

During the construction phase of the project, chemical toilets will be installed for staff use.

It will not be possible to connect the works to the city's sewerage network, so there will be no change to the existing state of the sewerage network, which is located a long distance from the turbine sites.

During the operational phase of the project, since it will not be possible to connect to the sewerage network, it is planned to construct a system of cesspits (septic tanks and absorption or chemical toilets) in accordance with the existing urban planning regulations.

**9.8.4 Impact on energy resources**

During the construction phase of the two projects there will be no change in energy resources other than the connection of the transmission network through the proposed substation.

During the operation phase of the two proposed Wind Power Plants, the available wind potential will be exploited and therefore electricity generation will take place helping to meet the country's environmental objectives and international obligations.

**9.8.5 Impact on the telecommunications network**

No impacts to the telecommunications network are anticipated during the construction phase, and during the operational phase. The change will be to connect the two projects via fiber optic cables, which will be installed within the medium voltage cable laying channels.

The only infrastructure expected to be changed to support the main project is the road network (e.g. through the new road widening/improvements) and the electricity transmission network (through the "Patriarchs" Step up Substation and the additional medium and high voltage network to be constructed).

As has been mentioned in Section 9.3, there are significant benefits from improving/expanding the aforementioned infrastructure such as improving accessibility for residents engaged in activities, improving accessibility for grazing, improving accessibility for the relevant Forestry Services, improving accessibility for emergency response such as fire suppression and upgrading electricity transmission infrastructure.

No likelihood of adverse cumulative/synergistic effects is indicated by the proposed project design with other projects under permitting. Even if the adjacent Wind Power Plants (Wind Power Plants at the "Pseftis" and "Mavrodasos" sites) are licensed, a common external road network will be used to access the proposed Wind Power Plant with the neighboring Wind Power Plants under licensing (Mavrodasos and Pseftis).

**Social - Economic Environment**

Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	LOW	LOW	YES	/	/
OPERATION	/	/	/	NO	/	/
CESSATION OF OPERATION	/	/	/	NO	/	/

Table 8: Assessment of impacts on the socio-economic environment

**9.9 Correlation with anthropogenic pressures on the environment**

The proposed interventions to be made by the project under consideration (roads, squares, etc.) will not increase existing anthropogenic pressures. The minor pressures that will occur will have a specific timeframe (different impact in each phase: construction, operation, cessation of operation and rehabilitation). However, with the use of appropriate preventive measures, medium-scale impacts can be reduced to low-scale impacts.

The construction of the plant under study is not expected to cause any additional environmental impact either during construction or operation.

**Synergistic / Cumulative impacts**

The isolation of the study area to date has resulted in the main land use and human activities in general in the area remaining traditional - extensive (agriculture, livestock farming), so that no significant problems or pressures on the environment have arisen. Overgrazing and illegal logging in some cases create pressures on the area concerned. Cumulative impacts on the environment may result from a number of projects and activities with similar impacts, which interact with each other, on the ecological integrity of the Natura site.

The potential for significant cumulative/synergistic effects from the proposed project design with other projects of a similar nature relates to the operational phase of the project. However, as analyzed in the supporting Special Ecological Assessment of Special Protection Area GR1110010, the possibility of moderately significant synergistic/cumulative effects is apparent if all of the adjacent Wind Power Plants are licensed in conjunction with the existing ones in the study area (refer to paragraphs 9.5.1 and 9.5.2).

**However, it is estimated that the contribution of the Wind Power Generation Plants under consideration is expected to be low after mitigation measures are implemented.**

Social - Economic Environment						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	LOW	LOW	YES	YES	/
OPERATION	DIRECT	MEDIUM	MEDIUM	YES	YES	/

CESSATION OF OPERATION	DIRECT	/	/	NO	/	/
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*Table 9: Assessment table for anthropogenic pressures on the environment*

**9.10 Impact on air quality**

**9.10.1 Construction phase of the Project**

Negative impacts on air quality are limited during the construction phase of wind farms.

During construction, air pollution impacts will include the following:

- Dust from the movement of vehicles - lorries, machinery, the handling and processing of materials and earthworks during the construction of access roads, internal road construction, the shaping of the turbine support surfaces and the excavation of the ground for the underground connection of the turbines to the substation.
- Exhaust gases from the movement of lorries and construction machinery around the site.
- Emissions from the transport of construction materials and wind turbines to and from the site.

These emissions are expected to increase in the project area due to the operation of construction sites, earthmoving, excavation, and material stockpiling. These factors will be exacerbated by wind drift of dust particles. These impacts will be localized and, with appropriate measures, can be considered negative and negligible. Their duration is related to the construction period of the project, as the construction period of the project is estimated to be short and the number of vehicles and machinery involved in its construction is estimated to be small.

**9.10.2 Project Operation Phase**

During the operational phase of the project, no negative impacts on air quality are expected as the project does not emit any gaseous pollutant. It also does not emit dust particles (respirable and nonrepairable) and odors. Furthermore, wind turbines do not cause thermal pollution of the atmosphere, as they do not emit hot gases or use atmospheric air to cool their parts and circuits. The exploitation of wind power does not involve any chemical, physical or biological process of any kind, which may result in the generation and release of any gaseous pollutants into the environment as final or intermediate products. On the contrary, the project under study is expected to have a positive effect on the general state of the atmospheric environment, as its operation will contribute to an increase in electricity generation through renewable, environmentally friendly energy sources. The amount of electricity produced by the wind power plant under study will contribute positively to the country's energy deficit by developing energy production from renewable resources and meeting part of the annual energy demand.



Finally, any impacts from vehicle movements for maintenance or repair works are considered negligible. Considering the size and nature of the project under study, it is estimated that the impacts during the operational phase of the project under study on the atmospheric environment will be **moderately positive and long term.**

**Synergistic /cumulative effects**

Regarding synergistic effects, there is no likelihood of significant cumulative synergistic effects of the proposed project design with other projects of a similar or different nature.

During the construction phase there is no issue of cumulative/synergistic impacts as the simultaneous construction of all the adjacent Wind Power Plants under licensing is unlikely to take place. Even in the case of simultaneous operation of the licensed adjacent Wind Power Plants, no air pollutants would be emitted but instead the installation of the projects would reduce air pollutants in the study area.

The wind power plants produce electricity by using renewable energy sources such as the wind potential of the Rhodope and Evros region, replacing polluting sources such as lignite and oil, etc. The contribution of these projects is considered important in addressing global environmental phenomena such as global warming and climate change, etc.

The conclusions of the air quality impact assessment are summarized in the following table.

Social - Economic Environment						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	MEDIUM	MEDIUM	YES	YES	/
OPERATION	/	/	/	NO	/	/
CESSATION OF OPERATION	/	/	/	NO	/	/

*Table 10: Air quality assessment table*

**9.11 Effects from Noise or Vibration**

In general, wind turbines are quiet machines, which do not cause noise pollution or disturbance to residents of the surrounding area. The sound level at a distance of 40 meters from a wind turbine is 50- 60 dB(A), which is equivalent to the volume of a conversation (European Commission, 1999). At a distance of 200 meters, the noise level drops to 44 dB(A), downwind of the wind turbine, for a wind speed of 8 m/s. The aerodynamic noise generated by the rotating blades of the machine is incredibly low and in no way comparable to the noise level of corresponding conventional power plants. Technological studies conducted by educational institutions and organizations (National Technical University of Athens, Centre for Renewable Energy Sources,

Danish Ministry of Energy, etc.) show that the noise level of an average modern wind turbine does not exceed 45,3 dB within a radius of 150 m.

Thus, this section provides a summary of the noise and vibration impacts. The data analyzed below during the construction and operation of the proposed Wind Power Plant has been extracted from the Special Noise Study, attached as an Appendix to the Environmental Impact Assessment, together with literature data.

9.11.1 Construction phase of the Project

The first and main source of noise during the construction of a Wind Power Plant is the machinery used at the construction site (excavation or soil loosening machinery, loading of excavated materials, spreading and compaction of materials, etc.) and the second source is the noise from the traffic of heavy vehicles transporting excavated materials to the site disposal areas. Noise from vehicles is also likely to affect areas away from the site as vehicles use the local road network to reach their destination.

However, the disturbance caused by heavy vehicles and machinery on site will be short-lived and reversible as vehicles will only use the local road network during construction.

Those who will be affected by the noise generated will be the project workers. The duration of the disturbance will also be transient here as it will only apply during the construction of the proposed Wind Turbine Generating Station. If necessary, for the safety of the workers, earplugs will be provided to them at the responsibility of the company constructing the works. More information regarding the noise section is presented in the attached Annex to the Environmental Impact Assessment.

At this stage it is not possible to record the operating data of the site (types of machinery, actual operating times, etc.), so the assessment of noise impacts will be approximate.

We consider a mobile construction site of 12-hour operation with the following composition:

- 1 excavator
- 1 loader
- 1 leveler
- Trucks
- 1 road roller

The results of the prediction of the noise level  $Leq(12)$  for a receiver located at distances of 15 to 400 m from the source are presented in the following table :

Receiver distance (m)	15	30	50	100	200	400
<b>Leq(12) dBa (rural area)</b>	81	75	71	65	59	53
<b>Leq(12) dBa (urban area)</b>	84	78	74	68	62	56

*Table 11: Noise level measurements for a receiver located at distances of 15 to 400 m.*

The noise caused by the operation of vehicles and machines used for the foundation and construction of the wind turbines and the road construction project will not exceed 50 dB(A) (at a distance of more than 500m), as defined by the relevant legislation for the urban environment (Π.Δ. 1180/1981). More specifically, according to Article 2, par. 5 of Π.Δ. 1180/81, the maximum permissible level of noise emitted by installations - activities is determined, which is measured at the boundary of the land on which the installation - activity is located.

<b>α/α</b>	<b>REGION</b>	<b>MAXIMUM LIMIT NOISE IN dB(A)</b>
<b>1</b>	Established Industrial Areas - Quarry Areas	70
<b>2</b>	Areas where the industrial element predominates	65
<b>3</b>	Areas where the industrial and urban elements are equally dominant	55
<b>4</b>	Areas where the urban element is dominant	50

*Table 12: Maximum permissible noise limit from installations*

Any impacts from the operation of the sites are localized and can be significantly reduced by taking appropriate remedial measures, as proposed in the relevant section of this chapter 10 to minimize impacts on the acoustic environment.

Indicative examples are:

- Locating construction sites as far as possible from settlements and human-made activities.
- The use of construction machinery and site vehicles with strict noise emission standards.
- Application of the most stringent regulations, both Greek and EU.
- Selective routing of heavy vehicles.

Finally, any impacts on the acoustic environment are considered fully reversible, as they last as long as the construction phase of the project.

From the above data, it can be concluded that the acoustic disturbance of the project will be negligible, as indicated by the acoustic map of the attached Special Noise Study, since the nearest settlement (Roussa settlement) is 2.6 km from the nearest wind turbine.

The same applies to the construction of medium-voltage transmission lines. Finally, appropriate measures will be taken to ensure that vehicles transporting all the necessary equipment for the project (foundations, cables, etc.) pass as little as possible through sensitive areas (residential areas, settlements) so that acoustic disturbance is kept to a minimum and to zero during quiet hours.

Another characteristic of noise during the construction of such projects is its variation over time. Construction sites usually operate from 7 a.m. to 3 p.m. and therefore there is no problem in the afternoon, evening, and night hours. Usually, unless there is a need to expedite work, no work is performed at a wind farm construction site on weekends.

In conclusion, the assessment of the impact of the construction of the projects (main and associated works) could be considered as medium scale, in the light of the fact that no noise emissions can be identified in the existing situation - i.e. this is semi-mountainous land that is not host to technical works or facilities and is surrounded by small settlements. However, with the implementation of the above mitigation and/or other precautionary measures, the impacts are estimated to be of low magnitude.

### **Synergistic effects**

During the construction phase of the project there will be no possibility of cumulative/synergistic effects as it is not feasible to build all the projects at the same time. Therefore, impacts on the acoustic environment of the project area would be negligible, short-term, and fully reversible.

#### 9.11.2 Project Operation Phase

Wind turbines are machines that do not cause noise disturbance in the surrounding area. The noise generated during the operation of a wind turbine is the aerodynamic noise generated by the rotating blades of the machine, which is quite low compared to the noise levels of other power plants. In addition, the mechanical noise caused by the operation of the bearings and the generator has been reduced thanks to modern technologies.

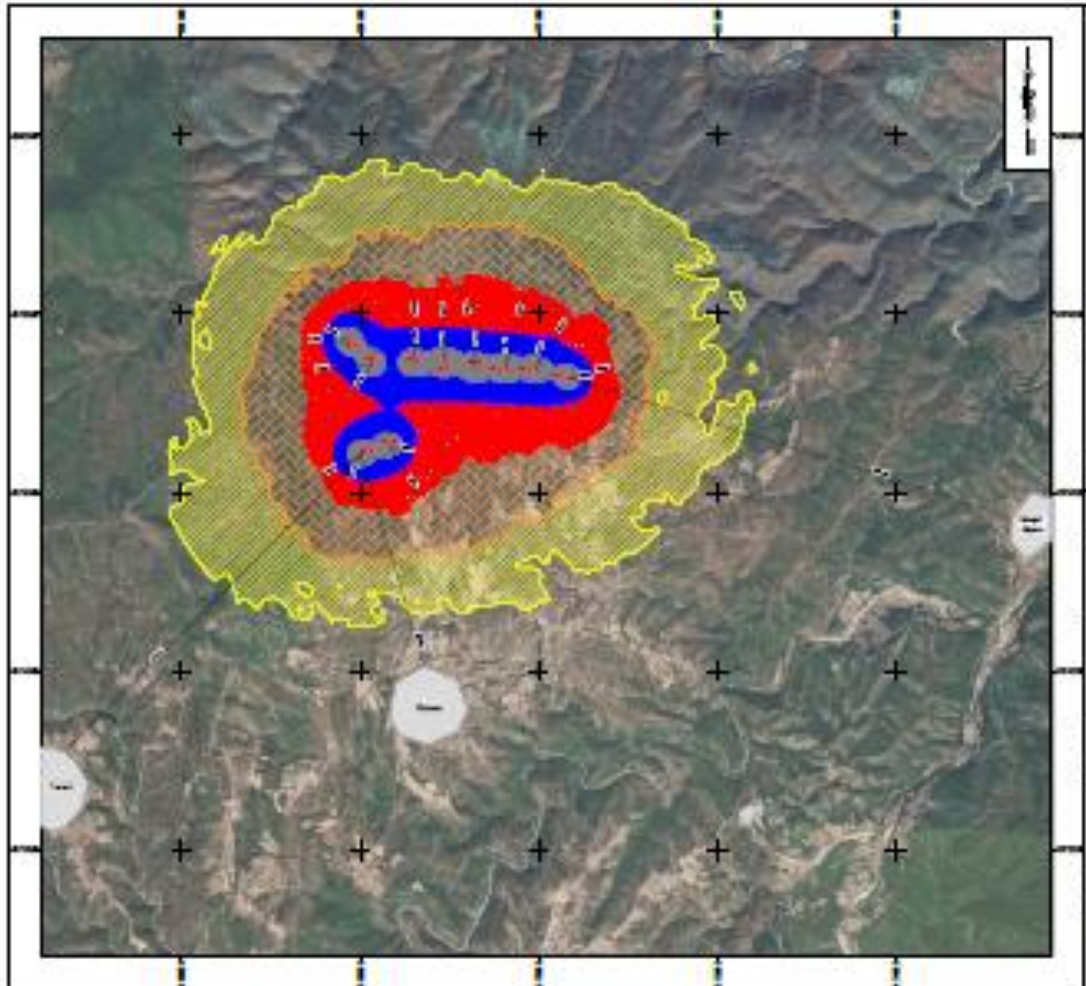
The aerodynamic noise produced by wind turbines is only noticeable at low wind speeds. When the wind speed exceeds 8 m/s, the aerodynamic noise of the wind turbines is more than compensated for.

The wind turbines to be installed in the wind farm under study are state-of-the-art and have all the necessary quality and operational certificates (IEC 61400, IEC WT 01 IEC, ISO 2813, etc.). Specifically, the wind turbines to be used will be Vestas type V117, with a rated power of 3.45 MW, a rotor diameter of 117 m and a hub height of 91.5 m.

The logarithmic law of sound transmission was used to estimate the noise generated by the wind farm in question, and therefore by the 10 turbines, and to draw the isothermal curves. This was done using the specialized WindPro software from the Danish company EMD International A/S. The calculations are based on the approved standard ISO 9613-2, which is a widely used standard for predicting noise levels.

The main parameters of the model were the locations of the wind turbines, the dimensions of the wind turbines and, in particular, the hub height and the noise emission at the source ( $LW_{ref}$ ) at a given wind speed.

Following the analysis described in the attached Special Noise Study, isothermal curves were obtained, as shown in the map below:



*Map 11: Equilibrium curves in relation to the nearest settlements for the Wind Power Plant at Lefki*

The above leads to the following conclusions:

- The equal-noisiness contours that exceed the maximum permissible noise limit of 45dB(A), as set in the Special Spatial Plan for Renewable Energy Sources and in the P.D. 1180/81 (Government Gazette 293/A/6-10-1981), extend to radii of less than 910m from the centers of the wind turbines.
- The nearest settlements to the wind farm are Roussas, Goniko and Mikro Dereio where the noise generated by the wind turbines is below the maximum permissible limit.



- The noise generated by the turbines at less than 200 m (equal-noisiness contour 1), an area within which no point of interest is located, is the same as that heard during a normal conversation.

Points of interest	Nearest Wind Turbine	Distance(m)	Noise level (dB(A)) <i>Production from the operation of the Wind Farm "Lefki"</i>
Settlement - Roussa	Wind Turbine 9	2.469 m	22,4
Settlement - Goniko	Wind Turbine 9	4.671 m	13,3
Settlement - Mikro Dereio	Wind Turbine 1	5.213 m	12,2

Table 13: Noise generated at the nearest points of interest.

Equal-noisiness Contours	Wind Turbine	Minimum Distance(m)	Generated Noise
Equal-noisiness Contours 1	Wind Turbine 1-10	0-200	55-62
Equal-noisiness Contours 2	Wind Turbine 1	262	50-55
	Wind Turbine 2	364	
	Wind Turbine 3	393	
	Wind Turbine 4	410	
	Wind Turbine 5	380	
	Wind Turbine 6	386	
	Wind Turbine 7	331	
	Wind Turbine 8	288	
	Wind Turbine 9	287	
	Wind Turbine 10	287	
Equal-noisiness Contours 3	Wind Turbine 1	500	45-50
	Wind Turbine 2	720	
	Wind Turbine 3	853	
	Wind Turbine 4	910	
	Wind Turbine 5	830	
	Wind Turbine 6	828	
	Wind Turbine 7	774	
	Wind Turbine 8	510	
	Wind Turbine 9	500	
	Wind Turbine 10	653	

Table 14: Distances of equal-noisiness contours from A/C and noise generated by the operation of the ASPHE at the "Lefki" site.

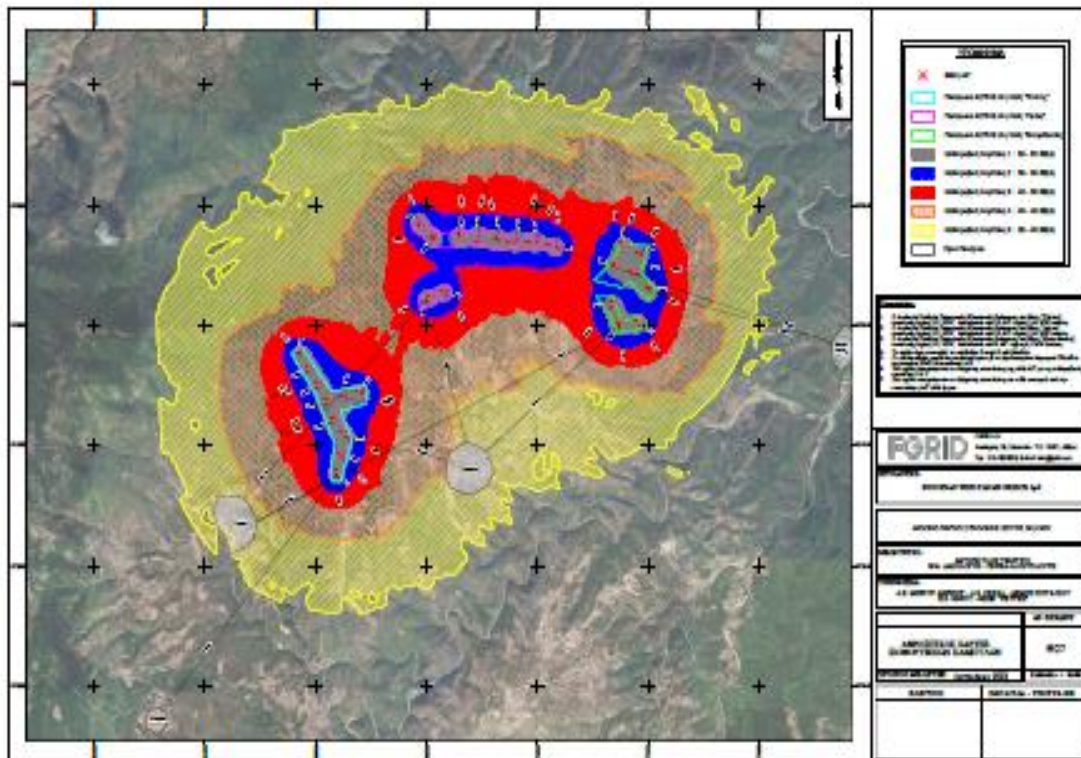
According to the limits of the Special Spatial Framework for RES and the limits defined by the PD 1180/81, it is concluded that although the worst-case scenario for the implementation of the study was considered, the installation of the Wind Power Plant with a total capacity of 34.5MW will not create any acoustic impact on the surrounding area as the noise levels produced are expected to be negligible. During the operational phase of the project, there is no risk of exposure of people to high noise levels. It

should be recalled that the normal sound noise level in a quiet room without any human activity exceeds 60dB(A), a value that occurs only in the narrow core of each Wind Turbine individually.

**Synergistic/cumulative effects**

In addition to the examination of the noise level for the wind power plant under consideration at the "Lefki" site, a calculation of the noise level from **the cumulative operation of the other two neighboring wind power plants at the sites, "Maurodassos" and "Pseftis"**, was also conducted. It should be noted that the other wind power plant at the "AMMOUDES" site is not calculated as it does not appear to meet the zoning criteria as it stands.

According to the cumulative study, the equal-noisiness contours that **exceed the maximum permissible noise limit of 45dB(A)** extend to radii of less than 1.008m from the centers of the wind turbines. The noise generated by the wind turbines at less than 200m (equal-noisiness contour 1), an area within which no point of interest is located and is identical to that heard during a normal conversation. The following maps and tables show the results of the cumulative study of the three Wind Power Plants to illustrate the above.



Map 12: Map of equal-noisiness contours for the cumulative function of the three projects "Lefki", "Pseftis" and "Mavrodassos".

Equal-noisiness Contours	Wind Turbine	Minimum Distance (m)	Generated Noise
Equal-noisiness Contours 1	Wind Turbine 1-10	0-200	55-62
Equal-noisiness Contours 2	Wind Turbine 1	302	50-55
	Wind Turbine 2	388	
	Wind Turbine 3	411	
	Wind Turbine 4	424	
	Wind Turbine 5	390	
	Wind Turbine 6	397	
	Wind Turbine 7	340	
	Wind Turbine 8	295	
	Wind Turbine 9	300	
	Wind Turbine 10	300	
Equal-noisiness Contours 3	Wind Turbine 1	775	45-50
	Wind Turbine 2	799	
	Wind Turbine 3	963	
	Wind Turbine 4	977	
	Wind Turbine 5	893	
	Wind Turbine 6	870	
	Wind Turbine 7	821	
	Wind Turbine 8	531	
	Wind Turbine 9	614	
	Wind Turbine 10	736	

Table 15: Distances of equal-noisiness contours from Wind Turbines and noise generated by the cumulative operation of three (3) Wind Power Plants at the locations "Lefki", "Mavrodasos" and "Pseftis".

Points of interest	Nearest Wind Turbine	Distance(m)	Noise level (dB(A)) Generated by the cumulative operation of three (3) Wind Power Plants*.
Settlement - Roussa	Wind Turbine 9	2.469 m	39.42
Settlement - Goniko	Wind Turbine 9	4.671 m	38.28
Settlement - Mikro Dereio	Wind Turbine 1	5.213 m	30.36

Table 16: Distances of settlements from Wind Turbines (measured from the closest point to the wind turbines) and noise level with a wind speed of 10 m/s.

Noise						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	DIRECT	MEDIUM	MEDIUM	NO	/	/
OPERATION	/	/	/	NO	/	/
CESSATION OF OPERATION	/	/	/	NO	/	/

Table 17: Impact assessment table for Noise

**9.12 Effects Related to Electromagnetic Fields**

No electric and magnetic fields are expected to be generated during the construction phase and therefore no impacts of any kind will occur.

During the operational phase at the proposed Wind Power Plants, the parts of the facility that will emit low-level electromagnetic radiation are the generator and the transformer which is located within the generator. The electromagnetic field generated by the generator will be at low levels and will be confined to the engine shell, which is located 91.5 meters above the ground.

Regarding the power transmission and interconnection works of the project, it is noted that the Medium Voltage (MV) connection lines will be underground as they will be placed within channels that will follow the route of the wind farm internal roads. In addition, the interconnection of the Wind Farm with the power transmission grid will be conducted through underground 33kV medium voltage lines that will start from the shaft of each wind turbine and end at the proposed substation. Therefore, there will be no electromagnetic field emissions during any of the above power transmission and interconnection operations of the proposed Wind Power Plant.

From the above it is concluded that there will be no increase in the level of electromagnetic radiation from the installation and operation of the proposed Wind Power Plant.

**Synergistic/ cumulative effects**

In the case of simultaneous construction of all Wind Power Plants in the study area, no effect on electromagnetic fields is expected. During the corresponding simultaneous operation of all Wind Power Plants in the study area (with a license and/or a producer's certificate), there will be no correlations with electromagnetic fields.

Electromagnetic Fields						
Project phase	Type	Probability of occurrence	Intensity	Synergistic action	Reversibility	Impact
CONSTRUCTION	/	/	/	NO	/	/
OPERATION	/	LOW	LOW	YES	YES	/
CESSATION OF OPERATION	/	/	/	NO	/	/

*Table 18: Impact Assessment Table for Electromagnetic Fields*

**9.13 Impact on water**

During both the construction phase and during operation of the project, no disturbance to the hydrologic condition of the immediate and wider study area is anticipated due to the mild nature of the project.

### 9.13.1 Construction phase of the Project

With respect to surface water, no major modification to the water balance of the area is expected since the excavation and other operations will take place outside the aquifer, and therefore will not affect groundwater. During the construction of the Wind Power Plant and associated works, special attention will be paid to possible spills of small quantities of liquid waste from the construction site to be established in the project area, which are mineral oils from the maintenance of vehicles and machinery, oil, or petrol from the movement of vehicles, liquid waste from the washing of concrete vehicles and domestic wastewater from the site personnel.

No changes in surface water movement would occur, nor would the current situation change in terms of the rate of water runoff or soil leaching. No works (e.g., major earthworks) are also envisaged which could affect the course of flood waters or indirectly create risks of exposing people or property to flood damage.

### 9.13.2 Project Operation Phase

During the operation of the wind plant, no activity capable of affecting water flow is anticipated. The liquid waste generated during the operation of the wind farm is only in the oils from the maintenance of the wind turbines and municipal wastewater from the personal cleaning of the staff. No negative impacts are expected from surface runoff of water on roads. The proposed technical drainage works (tubular culverts - box culverts) are intended both to divert rainwater at road intersections and to drain the drainage ditches (pressurized drainage ditches) to ensure good hydraulic function of the road.

The operation of Wind Power Plant does not involve any production process wastewater, nor does it pose any risk of thermal pollution of neighboring surface or groundwater receptors, as no cooling water is used. Any impacts from liquid waste can only result from accidental oil spills from damage or during maintenance of the wind turbines. All circuits of the generators are closed so that they are immediately shut down in case of a fault, without any oil leakage. As for the liquid waste resulting from the scheduled replacement of the oils of these devices, their management will be conducted in accordance with the provisions of the applicable environmental legislation by qualified technicians of the manufacturer. The solid waste expected during the operational phase is minimal and will be of an urban type, generated by the staff and will be collected in special metal bins placed in suitable locations inside the installation site of the wind power plant.

In conclusion, as there are no major water courses in the project area, the proposed works cannot de facto lead to a reduction in the amount of water available to the public and will not affect existing water intakes.

**Synergistic/ cumulative effects**

**No likelihood of significant synergistic/ cumulative effects is apparent from the proposed project design with other projects of a similar or different nature.**

No impact is anticipated during the construction phase as the adjacent licensed Wind Power Plants are unlikely to be constructed at the same time. During the operation phase, if all the licensed Wind Power Plants under production permit are licensed, there is no possibility of a reduction in the quality and quantity of surface and groundwater in the surrounding area.

Water						
Project phase	Type	Potential for occurrence	Intensity	Synergistic action	Reversibility	Effect
CONSTRUCTION	/	/	/	NO	/	/
OPERATION	/	/	/	NO	/	/
CLOSURE OF OPERATION	/	/	/	NO	/	/

*Table 19: Table for the assessment of impacts on water*

**9.14 Impacts from project vulnerability and the occurrence of accidents**

The vulnerability of the project and its associated projects is very low due to the nature and characteristics of the project. The likelihood of a major accident is also considered to be incredibly low and there is no possibility of a domino accident. No hazardous materials (fuels or toxic substances) or waste will be present in the project. Its construction and operation are designed to be completely safe.

This safety will be ensured by

- The distances between the wind turbines, which comply with current legislation.
- The construction of an underground connection to the 33 kV medium voltage grid.
- The foundation of the wind turbines is on reinforced concrete bases.
- The assembly of the individual parts of the wind turbines in accordance with international standards and the manufacturer's instructions.
- Installation of an operational monitoring system.
- Regular maintenance by specialized technicians.
- Implementation of Approval of Environmental Terms (AET).
- Fire protection and fire detection system within a radius of 5 km.

In any case, the safety of the project and its environment is of paramount importance to the company.

The project under study is not subject to the provisions of the KYA 172085/2016 (Government Gazette 354/B/2016) for the "Determination of measures and conditions for dealing with the risks of major accidents in installations or units due to



the presence of dangerous substances, in compliance with the provisions of Directive 2003/105/EK "amending Council Directive 96/82/EK on the control of major-accident hazards involving dangerous substances" of the European Parliament and of the Council of 16 December 2003.

This chapter analyses the impacts arising from the vulnerability of the project to natural disaster or major accident hazards.

**Vulnerability** refers to the characteristics and conditions of a community, system or asset that make it susceptible to the harmful effects of the hazard. **Vulnerability is the degree of loss of a given asset or group of assets at risk as a result of the occurrence of a natural phenomenon of comparable magnitude.**

The project under study is not subject to the provisions of the KYA 172085/2016 (Government Gazette 354/B/2016) for the "Determination of measures and conditions for dealing with the risks of major accidents in establishments or units, due to the presence of dangerous substances, in compliance with the provisions of Directive 2003/105/EK "amending Council Directive 96/82/EK on the control of major-accident hazards involving dangerous substances" of the European Parliament and of the Council of 16 December 2003.

The methodology followed includes the identification of the sources of risk, the nature of the risk to the project and the environment, the likelihood of the risk occurring and its impact on the project and the natural and man-made environment.

A quantitative assessment of the significance of each risk is then carried out using the following evaluation criteria:

**Probability - Frequency of occurrence**

<b>High Probability</b>	<b>3</b>
<b>Moderate Probability</b>	<b>2</b>
<b>Low Probability</b>	<b>1</b>

*Table 120: Probability – Frequency of Occurance*

**Project vulnerability**

<b>High</b>	<b>3</b>
<b>Moderate</b>	<b>2</b>
<b>Low</b>	<b>1</b>

*Table 121: Project vulnerability*

**Severity - Size of Risk Impact**

<b>Big Scale</b>	<b>3</b>
<b>Moderate Scale</b>	<b>2</b>
<b>Short Scale</b>	<b>1</b>

Table 122: Severity – Size of Risk Impact

**The sum of all the criteria is the overall threat score and they are ranked accordingly as high, moderate and low importance.**

A score equal to or greater than 8 is considered a serious threat of high importance and immediate action should be taken to address it.

For a score of 5 to 7 it is considered a threat of moderate importance and requires action and controls in the near future.

Finally, a score of 3 to 5 is considered a low threat and no immediate measures and actions are required.

First, scenarios that could potentially cause serious impacts on the project and the natural environment of the area are identified.

The potential risks that the project may face are:

- Flooding
- Earthquakes
- Forest fires
- Forest fires
- Pollution from an accidental event

The following is a detailed presentation of the impacts of the above risks.

**Floods**

The most serious and dangerous type of flood is flash flooding. They usually occur with little or no warning and last for a very short period of time. They result from a sudden and rapid rise in water levels, accompanied by high velocities. They occur particularly in hilly or mountainous areas with steep slopes. The surface runoff they cause is very significant for the duration of the flood and poses a serious threat to the structural integrity of buildings and infrastructure. Important factors in this type of flooding are the intensity and duration of rainfall, the morphology and slope of the terrain in the area and the prevailing surface conditions. **The station site is located outside the potentially high flood risk zone.** It is a section of land with moderate and gentle slopes. It is also important to note that no watercourses are found in the project under study, but small half-gorges have been identified in the vicinity of the project.

Based on paragraph 2 of Article 1 of Law 4258/2014 (Government Gazette A94/14.4.2014), half-grains are defined as "the receptors of surface water runoff, with a watercourse catchment area of less than or equal to 1.0sq.mm. when located outside

the boundaries of a residential area, or less than or equal to 0.50sq.mm. for those within the boundaries of a residential area".

According to paragraph 6.8 and paragraph 8.14, the delimitation of a watercourse is not an issue, as this is a matter of ensuring unimpeded surface water flow and environmental protection of the watercourse, which is not the case in the study area.

### **Earthquakes**

An earthquake is a phenomenon that usually occurs without clear warning, cannot be prevented and, despite its short duration, can cause major material damage to human infrastructure. The impact that an earthquake is likely to have on the area and thus on the project depends on its intensity and on the susceptibility of the natural environment in the area concerned.

The area where the project is to be located is a low seismic risk area, so the chances of a catastrophic earthquake occurring are negligible. Due to the low vulnerability of the site to earthquakes the potential damage in the event of a major earthquake is expected to be very low without significant impact on the environment.

### **Forest Fires**

Forest fires are a large-scale natural phenomenon which belongs to the category of natural disasters and can have catastrophic consequences.

The causes of fires could be classified into the following cases:

#### **A) Natural causes**

This category includes fires caused by lightning, and volcanoes.

Natural fires are few in number and do not exceed 3%.

#### **B) Negligent arson**

This category includes fires caused by the dumping of cigarettes, burning of rubbish and dry grass, lighting fires in forests, engine sparks, etc. Negligent arson is the main cause of forest fires, with a confirmed percentage of more than 50% of cases.

#### **C) Arson with intent**

This is the most devastating cause of forest fires. It accounts for about 30 % of forest fires.

#### **D) Unknown causes**

They make up the remaining 17 % and are those causes that cannot be logically explained or proven.

Human activities very often cause fires to break out, reducing the resilience of the ecosystem and thus reducing its ability to regenerate and sustain itself.

In a fire, the wind and its speed play a decisive role in determining the extent of its spread. The effects that are likely to result from the occurrence of a fire are:

- Fragmentation of the ecosystem of the area where the fire took place
- Degrading air quality and causing health effects
- Negatively affects the surrounding areas

The vulnerability of the project to fire is low, since as mentioned in paragraph 8.14 of Chapter 8 the nature of the WPP project is not expected to create favorable conditions for forest fires during its operational phase. The project will not generate hazardous emissions of gaseous pollutants due to the absence of flammable materials during the construction phase and during the operation phase. The maintenance of the project and the occasional measurements that will be carried out will help to prevent accidents. There will be a presence of staff where, in the event of fire or strange activity being observed, the competent authorities will be informed, and the forest road will be cleared to make it accessible to fire engines in case of emergency.

#### **Explosion challenge**

An explosion hazard is not likely to occur as no flammable substances will be used during either the construction or operation phase of the project.

#### **Leakage of Hazardous Liquids into the ground or groundwater of the site.**

Sources of risk that could cause spills are almost non-existent since the project will manage the liquid waste appropriately during operation.

During the construction phase, special attention will be paid to possible spills of small quantities of liquid waste from the construction site that will be installed on the project site, which are mineral oils from the maintenance of vehicles and machinery, oil or fuel from the movement of vehicles, liquid waste from the washing of concrete vehicles and domestic wastewater from site personnel.

During the operational phase of the project as already mentioned in paragraph 9.13, any impacts from liquid waste can only arise from accidental oil spillage from damage or during maintenance of the W/Ts. All the circuits of the gensets are closed so that they are immediately shut down in case of failure, without any oil leakage. As for the liquid waste resulting from the scheduled replacement of the oils of these devices, their management will be carried out in accordance with the provisions of the applicable environmental legislation by qualified technicians of the manufacturer.

Measures to deal with accidental leakage of hazardous liquid waste during the construction and operation phase are detailed in paragraph 10.12.

It is important to note that according to paragraph 6.8 there are no watercourses for which delineation is required, only streams in the vicinity of the project.

HAZARD-THREAT	PROBABILITY-FREQUENCY OF OCCURRENCE	VULNERABILITY OF THE PROJECT	SEVERITY-MAGNITUDE OF IMPACT ON THE ENVIRONMENT	OVERALL RISK ASSESSMENT	MAGNITUDE OF THREAT	JUSTIFICATION
<b>NATURAL DISASTERS</b>						
Floods	1	1	2	4	Low	The project is exempt from creeks and other types of runoffs as there are no watercourses but only streams. Therefore there is no need for a watercourse delineation as documented in detail in paragraph 6.8.
Earthquakes	1	1	1	3	Low	<p>According to the Greek Seismic Regulation (EAK 2000) as amended by the decisions of the Minister of Environment and Urban Development Δ17a/67/1/ΦN275/03 (Government Gazette 781/B/16-6-03) and Δ17a/115/9/ΦN275/03 (Government Gazette 1154/B/12-8-03), the area is included in the seismic risk zone I.</p> <p>The earthquake detected in the area of the project took place in 1983, with a magnitude of 4.3 on the Richter scale, at a depth of 30 km south-east of the affected</p>

						WPP. The following map shows the WPP under consideration and the nearest earthquake to the study area.
<b>Fires</b>	1	1	3	5	Low	The project is not particularly at risk of fires, as it is located in an area with sparse vegetation. Moreover, all fire protection and fire safety measures have been taken during the design of the project.
<b>MAJOR ACCIDENTS</b>						
<b>Pollution from leakage of hazardous liquids (mineral oils from maintenance or accidental leakage of oils due to damage or during maintenance of wind turbines</b>	2	1	1	4	Low	<p>The project does not produce liquid waste.</p> <p>During the construction phase, oil or fuel from the maintenance of vehicles and machinery, or gasoline from the movement of vehicles may be generated. During the operation phase, oil may only be generated by accidental oil spillage due to damage or during maintenance of the W/T.</p> <p><b>The vulnerability of the project from such leakage is considered negligible given that all necessary preventive measures have been</b></p>



						<b>taken in paragraph 10.12.</b>
<b>Explosion - Fire</b>	1	3	3	7	Low	<p>Causing a fire - explosion. A fire may be caused during the operating phase by electrical or mechanical faults involving friction or high heat release which may lead to a fire in the wind turbine's nacelle.</p> <p>These types of fires are usually of short duration and are not easy to extinguish due to their location. If the fire develops, the hot parts may fall and lead to localized fires in the wider area of the projects (with possible extension and causing a major accident, with or without vegetation).</p> <p>Volatile substances (resins) will be used in the maintenance of the W/Ts, in particular when lubricating them, which may ignite with the increase in temperature. In this case it is almost impossible to cause a major accident, provided that large quantities of chemicals are not kept in a place for maintenance or repair.</p>

						<p><b>The vulnerability of the activity is considered to be moderate as all preventive measures have been taken in the design of the activity in order to minimise the possibility of such events occurring.</b></p>
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**9.15 Project impacts on climate and project vulnerability to climate change, project vulnerability and adaptation (climate resilience).**

In this section, an analysis of the project's vulnerability to climate change is presented. An assessment of the adaptation of renewable energy projects to climate change should consist of two phases, the pre-assessment and the detailed analysis. During the pre-control, the vulnerability analysis of the project to climate change is carried out. **From the vulnerability analysis it is decided whether the detailed analysis is required or not.**

If it is required, the detailed analysis shall include the risk analysis of each significant source of risk identified in the vulnerability analysis. The risk analysis shall assess each source of risk, which now constitutes the inherent risk, in terms of its level of significance. For significant intrinsic risks it is required **to consider climate change adaptation measures that reduce each significant intrinsic risk to an acceptable level of residual risk.**

Therefore, integration of climate vulnerability assessment and risk analysis will take place from the beginning of the development process, as this will ensure the widest possible range of options for selecting the best adaptation technics.

A detailed presentation of the expected change in climate parameters can be found in the National Information Web Node on Climate Change Adaptation (<https://adaptivegreecehub.gr>) developed under the LIFE-IP AdaptInGR project ([www.adaptivegreece.gr](http://www.adaptivegreece.gr)). The data from the Node has been used for the analysis methodology in the Project Evaluation Framework.

**The climate resilience assessment of the project is detailed in the paragraph 5.2.1**