

HELLENiQ RENEWABLES

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SYNOPSIS OF THE ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR THE WIND FARM “XEFOTO”

PROJECT: WIND FARM “XEFOTO”

INSTALLED CAPACITY 148.8MW

**LOCATED IN THE MUNICIPALITY OF MIKI, REGIONAL UNIT OF
XANTHI, REGION OF EASTERN MACEDONIA & THRACE, GREECE**

MAY 2023

Contents

1	Non-technical summary.....	3
1.1	Brief description of the project's key elements – Position – Administrative affiliation	3
1.2	The project's distances	4
1.3	Significant environmental effects	5
1.4	Cross-border environmental impacts.....	8
1.5	Measures, actions and initiatives focused on environment protection.	12
1.5.1	Environmental Management.....	12
1.5.2	Monitoring programme	12
1.6	Positive impacts from the wind farm.....	14
1.7	The sustainable alternative options	15
1.8	Overview of the conclusions of Special Ecological study.....	16
2	Assessment AND EVALUATION of CROSS-BORDER Environmental Impacts.....	18
2.1	Cross-border Impacts morphological and topological features	18
2.2	Cross-border impacts in natural environment.....	18
2.2.1	Fauna - except avifauna.....	18
2.2.2	Avifauna.....	20
2.3	Cross-border impacts on air quality	20
2.4	Cross-border effects of noise	20
2.5	Cross-border Effects on: Climatic and bioclimatic characteristics, geological, tectonic and soil characteristics, natural environment (flora), man-made environment, Socio -economic effects, Technical infrastructures, Electromagnetic fields & Water	21

1 NON-TECHNICAL SUMMARY

1.1 Brief description of the project's key elements – Position – Administrative affiliation

The Environmental Impact Assessment (EIA) and the accompanying Special Ecological Assessment concern the construction and operation of a wind farm with a total installed capacity of 148.8 MW as well as the accompanying projects (external 33 kV medium voltage network, new substation and high voltage network for the wind farm's connection to IPTO's – Independent Power Transmission Operator – network).

The project is located in the sites "Xefoto, Samarano, Iskioma & Mesovouni" at the Municipal Unit of Satra belonging to the Municipality of Myki at the Regional Unit of Xanthi.

Briefly, the proposed project consists of the following:

- Configuration of 24 positions for the setup of the wind turbines.
- Construction and operation of 24 wind turbines of 6.2 MW each. The wind turbines will be connected electrically via autonomous 0.69kV/33kV inverters through an underground line of medium voltage which will be constructed along the roads used for getting access to the positions of the wind turbines. The inverters will be placed within the wind turbines spindle in compliance with the technical solutions provided by the final studies and with the regulations and instructions provided by IPTO in order to achieve operational and maintenance optimization.
- Configuration of two sites for the control buildings. Two control buildings, the primary and the secondary one, will be installed. The primary control building will be installed close to wind turbine 18 receiving the circuits from the secondary control building together with circuits from wind turbines 13 to 24. The secondary control building, placed close to wind turbine 7, will receive circuits from wind turbines 1 to 12 which will then be connected to the main control building.
- Underground 33 kV medium voltage network connecting the wind turbines with the control buildings and the existing substation "Iasmos". In order to connect the wind farm to the interconnected system, 32.4 km of underground medium voltage transmission lines will connect the wind turbines to the control buildings and 29.66 km of underground medium voltage transmission lines will connect the main control building to the substation "Iasmos".
- Road construction: They include improvements of existing ground roads as well as the construction of new roads at a total length of 14.884 m.

Based on the road construction study for the wind farm "Xefoto", a 14.884 m internal road network consisting of 27 branches will be constructed.

1.2 The project's distances

The project's area is located out of the statutory boundaries of settlements, approved urban plannings or other regulatory plannings.

It should be noted that there aren't any fixed settlements' boundaries within the Municipal Unit of Satres. In order to implement the inclusion to the landscape criteria of the Spatial Planning legislation, settlements a broad zone around residences was created.

The closest settlement to a wind turbine is *Kaloticho* located 632 m north of wind turbine 23, followed by the settlement *Gidotopos*, located more than 799 m east of wind turbine 15.

Echinos is located 13.5 km in the west (see the following map). Additionally, the closest settlement in Bulgaria is *Kousla*, located 780 m north of wind turbine 08.

The substation of "Iasmos" is located in the south of the wind farm's installation area, 16.3 km far from wind turbine 17 (according the calculation of the straight-line distance).

The project is fully located within the boundaries of the Special Protection Area "KOILADA KOMPSATOU" (code GR1130012 – SPA) of Natura 2000, and within the Important Bird Area (IBA) "Koilada Kompasou", GR009.

It should be noted however, that within Bulgarian territory and across the Greek borders lie the equivalent boundaries of the Special Area of Conservation (SAC) under the name "Rodopi – Iztochni" (code BG0001032), an area belonging to Natura 2000. Moreover, no intervention within the Bulgarian territory will apply.

The project is not situated within other protected areas of Law 3937/2011 (A'60).

The surrounding area of the wind farm is mainly within forestall areas. The total surface coverage falling into forestall areas is 276,827.9 m², while 81,677.1 m² are areas of different landform (considering the existing road surfaces which will be used for the roads and the positions of the project).

The broader area of the study belongs to the forest complex of Satres, supervised and managed by the Forest Authority of Xanthi.

It should be noted that a forest map for the area under study has been published and uploaded on the website of the Greek Land Cadastral Office according to the document 1622/10-07-2017 of the Forest Directorate of Xanthi (ΑΔΑ: Ω2ΖΧΟΡ1Υ-3ΘΤ).

As far as social infrastructures, defined by the P.D. 59/2018, are concerned, there are no such infrastructures neither in the area under study nor on at least a 2 km radius from it both in the Greek and the Bulgarian territory.

The area under study is connected by road to Sminthi, the capital of the Municipality of Miki via the existing forest roads and the Provincial Road of Xanthi-Echinos-Potamochori heading west towards Echinos, then northwest (via the Provincial Road of Xanthi-Echinos) all the way to Sminthi and then north all the way to Xanthi.

Regarding designated archaeological sites, the closest site on Greek territory is more than 2.34 km southeast of the wind farm's area. This is the designated area of the Mount Papikio, determined as such by the Ministerial Decisions ΥΠΠΟ/ΑΡΧ/Β1/Φ37/15352/389 «*Characterization of Mount Papikio, section of Rodopi*» and ΥΠΠΟ/ΑΡΧ/Β1/Φ37/15352389 «*Characterization of Mount Papikio, section of Rodopi*.»

There exist also the stone bridges of Tsalapeteinos and Xiropotamos which are not characterized as archaeological sites and are far from the proposed wind farm, namely 1.86 km west of wind turbine 1 (Tsalapeteinos bridge) and 6.28 km west of wind turbine 4 (Xiropotamos bridge).

It should also be noted that within Bulgarian territory no archaeological site has been tracked on at least a 2 km radius from each wind turbine of the proposed wind farm.

1.3 Significant environmental effects

Renewable energy (RES) projects and particularly wind farms are environmentally friendly projects. Especially in Greece's case, such projects have a significant positive impact to its economy and environment:

- (i) They majorly contribute to the fulfillment of Kyoto Protocol requirements regarding the reduction of the greenhouse gas emissions, and to the Greece's (EU member) compliance towards the penetration of RES in the energy system (EU Directive 20158/2001). Any obstructionism in the promotion of renewable energy projects delays the environmental protection as well as damages national economy.
- (ii) The high dependence of Greece on oil turns the promotion of RES into a high priority. In this case it becomes obvious that financial growth and sustainable growth are co-related goals.
- (iii) Greece has one of the highest wind energy potentials in Europe. This means that in order to produce a given amount of energy, the number of wind turbines and accompanying projects required is lower compared to that in other countries.
- (iv) Greece's energy production relies majorly on coal (lignite) power stations which constitute a major danger for the health of people residing in many areas.

Since wind farms have zero solid, liquid and gas emissions, they do not pollute the area where they are located and they do not affect planet's climate negatively.

On the other hand, there is no doubt that likewise any project, regardless its size, wind farms have an impact on environment. Nevertheless, the degree and extent of such impact is so low that it should not negatively affect their development.

Based on the analysis of the Environmental Impact Assessment (EIA) chapters, one can briefly assess the expected environmental impacts by the construction and operation of this project.

Table: Overview table of environmental impacts of the project during construction phase

Environmental parameters	Possibility	Extent	Complexity	Time frame	Positive (P) / Negative (N)	Intensity	Prevention	Avoidance	Inversion	Minimization	Synergistic (S) or Cross-border (C) impact
Climate & bioclimate characteristics						O					
Morphological & topological characteristics	5	L	D	P & T	N	---	Non-reversible	Non-reversible	Partially	Partially	C
Geological & tectonic characteristics	5	L	D	T	N	--	Non-reversible	Non-reversible	Partially	Partially	
Natural environment - biodiversity	5	L	D & I	P & T	N	---	Partially	Partially	Partially	Partially	C & S
Human environment	3	L	D & I	T	N	-	Partially	Non-reversible	Totally	Partially	
Socio-economic environment	2	L	D	T	P	+	Partially	Non-reversible		Partially	
Infrastructure	3	L	D	T	N	-	Partially	Non-reversible	Totally	Partially	
Environmental impacts due to human activities	2	L	D	T	N	-	Partially	Non-reversible	Partially	Partially	
Atmosphere – Air quality	5	L	D	T	N	--	Non-reversible	Non-reversible	Totally	Partially	C
Acoustic environment	5	L	D	T	N	-	Partially	Non-reversible	Totally	Partially	C
Electromagnetic field	1	L	D	T		O		Non-reversible		Partially	
Water	2	L	D	T	N	-	Partially	Non-reversible	Totally	Partially	

APPENDIX

Possibility of appearance	«1» Unlikely up to «5» Certain
Έκταση	Local (L) Τοπικές, Regional (R), National (N)
Complexity	Direct (D), Indirect (I)
Time frame	Temporary (T), Permanent (P), Repetitive [R]
Prevention, Avoidance, Inversion, Minimization	Totally reversible, Partially reversible, Non-reversible
Environmental impact intensity:	++++ Highly positive, +++ Medium positive, ++ Low positive, +/O= Negligibly positive, O= Neutral, -/O = Negligibly negative, --: Low negative, --- Medium negative, ---- Highly negative

Table: Overview table of environmental impacts of the project during operation phase

Environmental parameters	Possibility	Extent	Complexity	Time frame	Positive (P) / Negative (N)	Intensity	Prevention	Avoidance	Inversion	Minimization	Synergistic (S) or Cross-border (C) impact
Climate & bioclimate characteristics	5	N	I	P	P	O					
Morphological & topological characteristics	5	L	D	P	N	---	Non-reversible	Non-reversible	Partially	Partially	C
Geological & tectonic characteristics						O					
Natural environment - biodiversity	5	L	D & I	P	N	---	Partially	Partially	Partially	Partially	C & S
Human environment	3	L	D & I	P	N	-	Partially	Non-reversible	Partially	Partially	
Socio-economic environment	2	L	D & I	P	P	+					
Infrastructure						-					
Environmental impacts due to human activities	4	L	D	P	N	-	Non-reversible	Non-reversible	Partially	Partially	
Atmosphere – Air quality	5	N	D & I	P	N	--	Non-reversible	Non-reversible		Partially	
Acoustic environment						O					
Electromagnetic field						O					
Water						O					

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Possibility of appearance	«1» Unlikely up to «5» Certain
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Prevention, Avoidance, Inversion, Minimization	Totally reversible, Partially reversible, Non-reversible
Environmental impact intensity:	++++ Highly positive, +++ Medium positive, ++ Low positive, +/O= Negligibly positive, O= Neutral, -/O = Negligibly negative, -=: Low negative, -= Medium negative, -=- Highly negative

1.4 Cross-border environmental impacts

Impacts related to climate and bioclimatic features

No impact is expected during both the construction and the operation phase in terms of all climate parameters such as temperature, rainfall, hailstorm, snowfall and humidity in the broad area of the project and thus on a cross-border perspective.

Wind parks and their accompanying projects do not have negative impacts to the climate and to the bioclimatic features of the area in which they are located.

Regarding the production of greenhouse gases, it must be stressed that not only such gases will not be produced, but also it is expected that such gases will be reduced since projects like the present one contributes to the reduction of gas emissions related to the production of energy through conventional stations (fossil fuels).

Impacts to morphological and topological features

Firstly, it must be noted that all impacts to the relief and the morphology of the ground by the construction and operation of the project are constrained in Greece, since these are the result of the excavations for the foundations of the wind turbines, the trench for the sub terrain (underground) MV line, the installation of the control buildings and all interventions in order to provide accessibility to the site. These works are simple and do not result to any significant changes in terms of topography and relief features of the ground.

It should be commented that since the closest to the wind farm settlement (in the north) is "Kusla" (Kushla) in Bulgarian territory at a distance of 0.77 km from the nearest wind turbine (8), there appear cross-border impact to the topological characteristics (visual impact).

Any visual pollution caused by the size of the wind turbine is considered as highly important. The distance allows for the avoidance of shadow-related issues, while the wind turbines' paint (tower and runner) will be absorbent, therefore not allowing the generation of reflections by the falling light.

As far as the other 6 settlements at a distance of up to 10 km from the wind farm "XEFOTO" are concerned, there is just one wind turbine which is visible by the settlement of Ntzangmalovsna (by a part of it) and Gkorski Izvor. These two settlements are about 4 km away from the closest wind turbine resulting to a minor visual impact due to the size of the idol. Distance allows for the avoidance of shadow-related issues, while the wind turbines' paint (tower and runner) will be absorbent, therefore not allowing the generation of reflections by the falling light.

It must be noted that the project's wind turbines are visible in the direct area of study where no other settlements apart from the above small mountain settlements exist. It must also be noted that the sparse placement of the wind turbines attenuates the visual burden thus further minimizing estimated impacts.

Based on the above features and on in situ inspections from various viewing points, it can be concluded that the wind farm under study is not expected to cause a significant visual impact in the area. As a result, all cross-border impacts are considered as low.

Impacts related to geological, tectonic and territorial features

Impacts related to the geological, tectonic and territorial features of the area concern only the project's construction stage.

Such impacts are considered to be negative and vary in terms of size and duration. They are also partially or fully manageable and are limited to Greek territory. However, they do not intervene to the geological and tectonic features of the area under study and of any cross-border area.

According to the above, cross-border negative impacts related to the geological, tectonic and territorial features are not expected during the construction and operation of this project.

Impacts to the natural environment

The project uses wind energy, a clean energy. The operation of wind farms does not have negative environmental impacts for the air, the ground and the water. Additionally, no other conventional form of energy is used.

As far as the cross-border impacts to the environment are concerned, it must be noted that within Bulgarian territory and along Greek borders there exists a Special Area of Conservation (SAC) of Natura 2000 network under the name "Rodopi – Iztochni" (Code BG0001032). This protected area has been included in the Ecological study conducted by a team of specialists regarding the requirements for this project set by relevant legislation. Based on the assessments and the conclusions included in chapter 10 of EIA regarding species' populations in the areas of Natura 2000 SAC BG0001032 and SPA GR1130012, it can be concluded that, under the condition that all required measures are taken, the wind farm "Xefoto" is not expected to:

- Delay or stop any progress in achieving the goal of preserving Natura 2000 areas.
- Decrease or divide Natura 2000 habitats and affect the level of representation and conservation of their structure and functions.
- Decrease the species population size, affect the level of range conservation, divide them, affect the equilibrium among species and their isolation level.
- Cause changes in crucial issues (i.e. nutrients equilibrium, soil degradation due to corrosion, dynamics between biotic and abiotic parameters) which define the function of Natura 2000 areas.
- Interact/affect with foreseeing or expected natural changes in related Natura 2000 areas.

In conclusion, important negative impacts on a cross-border level regarding the natural environment are not expected to occur. Impacts on environment and more precisely on protected areas are located in Greek territory and are related to the project's construction phase.

Impacts on human Environment

- Land use planning – Land use

Only 1-3% of a wind farm is occupied by wind turbines (tower's base) since their foundations are mainly underground. If one leaves out the territory required for road works, the rest of the area (up to 99% of total area) remains available for other uses (i.e. grazing). Therefore, the installation and operation of the project is not expected to cause changes to the existent human activities and land uses (cultivations and free-range farming). This applies to both local and cross-border level.

- Structure and operations of human environment

Such impacts are local, not cross-border, and they concern mainly recreation since works at the phase of construction affect parts of the area's hiking paths.

- Cultural heritage

There aren't any designated archaeological sites in the area so there aren't any expected impacts on monuments on both local and cross-border level during the construction and operation phase of this wind farm.

Socio-economic impacts

Socio-economic impacts related to the construction and operation phase of this project are mainly positive and apply to the broader area.

Impacts on technical infrastructure

There aren't any impacts on the area's technical infrastructure on both local and cross-border level during the construction and operation phase.

More precisely, during the construction phase there will be a temporary traffic charge on local level due to the circulation of vehicles and machines related to the construction site, to the transportation of the turbines and all needed equipment. This, however, applies to various parts of Greece. There will not be any negative impacts on water supply, sewerage and telecommunications networks.

Impacts on air quality

Wind farms' negative impacts on air are of low extent and concern only the construction phase.

A rise of gas emissions is expected to occur during the construction phase. However, such an impact:

- Is considered as a typical and expected one for projects of this kind.
- Can be significantly reduced by respecting Greek and EU regulations regarding machines and vehicles gas emissions at the construction site, by implementing all relevant good practices and by implementing all appropriate redressive measures during construction phase.
- Is confined to the works' area.
- Is temporary and will not cause serious irreversible air quality degradation in the works'

area.

Taking into account the size and nature of the project under study, it is estimated that there will be negative impacts on air during the construction phase but these will be of medium and local level, partially manageable by adopting all appropriate measures and directly reversible after the completion of construction works.

It is also estimated that there will be moderately positive and long-term impacts on air during the operation phase.

Overall, there will not be any substantial negative impacts on local and cross-border level. In the long-term impacts on air quality are considered to be positive.

Impacts by noise

Impacts on acoustic environment during construction phase are expected to be low. They concern mainly the works area, which is in Greek territory, and are considered partially reversible due to the adoption of prevention, redressive measures for noise reduction proposed by this study. The impacts are considered temporary and fully reversible after the end of the construction phase.

In the operation phase, according to the measured contours there will not be any noise impacts both for the closest settlement in Bulgarian territory (Kousla), situated 0.78 km away from wind turbine 8 and the closest settlement in Greek territory (Kaloticho), situated almost 0.63 km from wind turbine 73. This is due to the fact that according to estimations, the noise level is below 40 dB(A) which is less than 45 dB(A), the limit for every residential activity.

Therefore, the settlements of the area are not expected to suffer any effects from the turbines of the wind farm under study. The same applies on a cross-border level.

Impacts related to electromagnetic fields

No electromagnetic fields are expected to exist during the construction phase. At the operation phase, radiation (through medium voltage lines), is considered to be negligible and nonionizing. There will not be any negative impacts related to electromagnetic fields both on local and cross-border level.

Impacts on water

There is no impact on water on cross-border level, since the main project is not within or close to streams. Due to the location of the project on the ridge, there is no hydrological network in the project's area.

Any potential negative impact is limited down to possible leakage of liquid waste from the construction site. However, due to the implementation of prevention and response practices and to the appropriate use of machinery, these odds are minimized. In any case, these potential negative impacts refer to local and not cross-border level.

Impacts – Vulnerability in terms of risks of serious accidents or disasters

The implementation of wind turbines in an area constitutes a project not related to the emission

of chemical substances or radiation. There is no explosion danger because the operation of wind turbines does not rely on the use of inflammable or explosive materials. Additionally, the operation of a wind turbine does not rely on flammable fuel, active acids or other fuels nor does it comprise incineration procedures. These make the wind turbines' operation fully electrical and therefore a highly safe. The fact that wind turbines operate at ambient temperature eliminates accident risk related to direct contact with hot surface.

Overall, during the construction and operation phase of the wind farm and the associated projects in position "Xefoto" no important hazards for the environment are expected to appear. This is due to its small scale, to technological evolution and to all safety measures taken during works and operation. There is no danger for a serious accident or catastrophe resulting to possible negative impacts initially on local level and later on cross-border level.

1.5 Measures, actions and initiatives focused on environment protection.

1.5.1 Environmental Management

In the EIA as well as in the Special Ecological study which accompanies the EIA a number of preventive, redressive and compensatory measures for the protection of environment were included.

In order to better implement the proposed measures, it is suggested by the project's developer to implement an Environmental Management System (EMS) with the following targets:

- Implementation of environmental conditions included in the project's Environmental Terms Approval (ETA) and of all preventive, redressive and compensatory measures proposed in this study.
- Prevention and/or control of possible environmental impacts due to extraordinary events.
- Publication of the data, the actions taken to control impacts and the numbers constituting indexes of environmental performance in order for citizens, bodies and services to have access to them through internet and annual reports.
- Implementation and maintenance of the monitoring program proposed in this study.
- Effective environmental protection on the basis of the current legislation.

In order to secure both good design and effective implementation of the EMS, international standards and procedures (i.e. ISO 14001 and 14004) can be implemented. It is noted that the project's developer has incorporated ISO 14001 certificate in all operating projects.

1.5.2 Monitoring programme

The following paragraphs include the proposed parameters of the monitoring program.

1. Flora

Implementation of the ETA conditions and of the instructions given by the Directorate of forests and acquisition of the necessary licenses.

- Monitoring of flora changes
- Overview of the cleanliness of works' area and removal of garbage in order to avoid the cause of fire.

2. Avifauna and bats

As suggested in Special Ecological study during the wind farm's operation it is recommended to monitor and keep a record of the wind farm's operation by specialized personnel operating as a source of continuous observation and basic information. These personnel should include specialized scientists verifying the accuracy of forecasts, possible diversifications in the use of land by significant avifauna species due to random or unforeseeable factors (i.e. a fire in the area which will cause open spaces) differentiating the level of use by the different species, the effectiveness of the suggested measures and the impacts during construction and operation phase. The avifauna monitoring program may be accompanied by a similar bats program (adjusted to the time of day and the year when these mammals are active).

It is suggested that monitoring and recording of the impacts should have at least a 4-year duration and should take place during the preparatory, the construction phase as well as during the first two years of the project. Furthermore, it should include the following:

- Regular recordings (every 15 days, 2 times per month) at the crucial periods and every 20 days (3 times every 2 months) the rest of time, focused on the collision danger and the nest tracking in the area.
- Recording of the data referring to the use of the project's area and recording of the flights of major species in the project's area and their interaction with wind turbines.
- Data visualization on a map in order to assess the situation.
- Control and recording of the death expectancy at a document available for inspection by authorities.
- In situ training of the employers in order to be capable of providing aid to injured birds and notifying the quickest possible the authorities.
- In situ training of the employers in order to be capable of scanning the wind turbines area for dead birds and correctly implement the standard procedures.
- Evaluation of the situation based on gathered information.

Based on the above program, it will be possible to evaluate the project's performance course and to assess whether it is necessary to take additional measures or proceed to modifications in order to minimize any possible impacts.

3. Water resource - ground

In order to protect the water condition, the EIA includes a method of hazardous waste management in accordance with the law.

In order to avoid any alteration on the surface runoff, operating personnel should conduct regular visual checks to all technical works performed by civil engineers so as to track changes. This checking includes the construction phase as well as all works aimed at improving the road sections used for the transportation of equipment to the wind farm. Special attention is required where road network meets streams.

4. Landscape

The wind turbines' smooth integration to the landscape is ensured during the wind farm's planning, positioning and construction phase. There is, therefore no need for additional monitoring actions, except for the systematic maintenance of their metallic parts in order to avoid corrosive phenomena.

5. Sound environment

The use of new, certified wind turbines ensures the protection of sound environment. There is, therefore, no need for additional monitoring actions, except for the management of construction and maintenance works in relation to the equipment used; these have to be certified as far as the operation noise levels are concerned.

1.6 Positive impacts from the wind farm

Based on the above, the project is expected to have benefits both at its construction and operation phase on local and regional level. These are:

- Job creation mainly during the project's construction phase
- Capital inflows in the area for the implementation of the project. This will lead to the local market's growth due to the increased need for supplies and personnel's accommodation.
- Development of new infrastructure (i.e. access roads) and compensatory measures (i.e. donations) to local communities.

Finally, according to Greek law 3468/2006 as amended, there will be repayments to consumers and the concerned local authorities through reciprocal fees derived from the project's operation.

On national level, expected benefits concern:

- The improvement of the supply/demand balance and reinforcement of the internal energy market,
- The implementation of Greece's commitment for higher penetration of RES in the electrical system,
- The use of local dynamic for energy supply assurance and the decrease of dependence from imported energy and fuels and

- The smoother operation of the electrical energy market that would be highly beneficial for consumers.

1.7 The sustainable alternative options

Alternative options were examined as far as the positioning and the number of wind turbines are concerned. More analytically:

Alternative positions

Close to the wind farm's selected area, two alternative sites south to the selected one, were examined.

Scenario 1 faces proximity issues with two nesting places of the Egyptian vulture (Asproparis in Greek) which have been traced and recorded in the European programme LIFE "Urgent Actions to strengthen the Balkan Population of the Egyptian Vulture and Secure Its Flyway "- LIFE16 NAT/BG/000874. More precisely, the south polygon of Scenario 1 did not meet the criteria of a 5 km minimum distance from Egyptian vulture nesting place.

Regarding Scenario 2:

It became apparent that both the polygons and the positions of the wind turbines are situated to a significant percentage within the protection zone (Zone of Nature Protection) where among other land uses, the installation of wind parks is prohibited.

Alternatives regarding size and scale

The alternative that was examined focused on positioning of 31 smaller wind turbines (4,8MW) in an extended area and within bigger polygons in comparison to the ones included in this study.

In this scenario, the final access solution was also assessed. However, since the extended topographical positions are the same, access is guaranteed as in the chosen solution which is the best one.

The differentiation in this scenario refers to the necessity of opening additional access roads to the wind turbines positions and of configuring more wind turbines platforms. In this case, the positioning of the wind park remains the same but with more wind turbines as does access to the area but with more roads needed within the polygons.

This scenario was rejected in order to improve positioning through the limitation of the coverage area and the number of wind turbines.

Alternatives regarding planning

As far as the project's electrical connection alternatives are concerned, it must be noted that "Iasmos" substation is available in the area.

The medium voltage network's routing was decided upon the need to reduce as much as possible distance to the the new substation. The alternative study included the routing of the external MV network from wind turbine 14 to the east towards Tsalapetinos settlement, from there to Satrai settlement and towards the south to Amaxades settlement. From that point and up to the substation "Iasmos" the routing goes east along the Xanthi-Iasmos road. In both cases, routing goes along the existent forest, rural and regional road infrastructure.

This alternative was rejected because it requires longer interventions and more maneuvers compared to the chosen scenario.

Alternatives regarding technology

Due to the satisfactory wind potential, the area is suitable only for the development of wind farms. The wind turbines were selected in accordance with the standards suggested by the supplier.

Alternatives regarding the production process

No alternatives regarding the production process were examined since the project concerns primary exploitation of the area's wind dynamic and production of clean energy.

The wind turbines are made of prefabricated parts that are assembled in situ according to the constructor's guidelines and in a special order. The assembling procedure is technically appropriate and cannot be altered.

All accompanying interventions like the platforms and roadworks comply with specific standards in order to ensure safe transportation of the wind turbines' parts and the needed space for their assembly. The medium-voltage network is designed in compliance with IPTO's (Independent Power Transmission Operator) standards.

Therefore, no alternatives regarding the production process were examined.

1.8 Overview of the conclusions of Special Ecological study

The project is located within the protected area of Natura 2000 network (SPA GR1130012, and within IBA GR009. Additionally, it sits side by side with the Bulgarian protected area of Natura 2000 SAC BG0001032, while it is in a distance of more than 18 km from the second closer SPA GR1130010, whose subject of protection is avifauna (SPA and IBA) and the types of habitats of Index I of Directive 92/43/EEC as well the flora and fauna species of Index II of the above Directive (SAC).

After reviewing bibliography and analyzing field observation data obtained from November 2021 to October 2022, all necessary recordings and assessments were made in order to have the special ecological evaluation of the project in relation to the neighboring protected areas. Based on these **and on the presupposition that all measures against possible impacts mentioned in the Special Ecological study will be undertaken (in the mentioned grouped priority)**, it is considered that the project:

- Is not expected to delay or cease the progress of achieving the goals of preserving the Natura 2000 areas concerned.
- Is not expected to minimize the extent or fragment the types of habitats of Natura 2000 areas or to affect the representativeness and preservation level of their structure and functions.
- Is not expected to minimize the population's size of the species or to affect the level of preservation of their habitats or to fragment them or to affect the equilibrium among species or to affect their isolation level.
- Is not expected to cause any changes to crucial parameters (i.e. nutrients balance, soil degradation from possible corrosion, relationship between biotic and abiotic factors) which define the way the related Natura 2000 areas function.
- Is not expected to have interactions with anticipated or foreseen natural changes in the related Natura 2000 areas.

The accompanying works of this wind farm are not going to have negative impacts neither on the installation area nor on the species living there due to the undergrounding of the electrical cables used for the transmission of generated current. The new road for the installation of the wind farms is relatively short in length and will not have negative impacts on the Natura 2000 area and on all protected species due to the proper positioning of wind turbines (and to the suggestions included in this study).

The synergetic project's impacts with other similar, under licensing projects in the area, **will not be important under the condition that all measures against possible impacts mentioned in the present Special Ecological study, will be implemented.**

2 ASSESSMENT AND EVALUATION OF CROSS-BORDER ENVIRONMENTAL IMPACTS

2.1 Cross-border Impacts morphological and topological features

As can be seen from the design of the project, all interventions will be carried out within the Greek Territory. Moreover, due to the morphology of the area and the location of the interventions, only a limited view of small areas of the interventions for the construction of the wind farm will be visible from Bulgaria and the nearest settlement within the Bulgarian territory (Kushla). Consequently, the cross-border effects during the construction phase on the morphological and topographic features in the territory of the neighboring state of Bulgaria are judged to be negligible.

During the operating phase:

- "Kushla" is the closest settlement to the Wind Farm under consideration and eighteen (18) W/Ts are visible. The settlement is 0.78 km away from the nearest wind turbine (W/T 8), which causes the highest visual burden. The distance is such that no shading problem is created, while the paint of the wind turbines (tower and rotor) will be "absorbent" and consequently no reflections of the incident light will be created.
- Of the remaining six (6) settlements that are located up to 10 km from "XEFOTO" Wind Farm, only one (1) W/T will be visible from the settlements of "Dzangmalovsma" (in part of the settlement) and "Gorski Izvor"; these settlements are approximately 4 km from the nearest W/T and therefore any visual burden is particularly small due to their size. The distance is such that no shading problem is created, while the paint of the wind turbines (tower and rotor) will be "absorbent" and consequently no reflections of the incident light will be created.

It should also be noted that the sparse, in terms of the distance between them, placement of the W/Ts, limits the visual nuisance to a minimum, significantly limiting the estimated effects on the territory of the neighboring state of Bulgaria.

As regards the supporting works of "XEFOTO" Wind Farm, these will all be carried out within the Greek territory and due to the morphology of the area and the area being implemented, it is not possible to view them from the nearest settlements within the Bulgarian territory and therefore no effects are expected.

2.2 Cross-border impacts in natural environment

2.2.1 Fauna - except avifauna

The Special Ecological Study that accompanies the Environmental Impact Assessment has examined in addition to the areas of the Natura network that belong to the Greek territory and the area adjacent to the Wind Farm, which is also part of the Natura 2000 network with the code BG0001032 and the name "Rodopi - Iztochni", which is designated as a Special Area of Conservation (SAC). Thus, the Study Area of the Special Ecological study was defined as the wider installation area of "XEFOTO" Wind Farm with the description and the characteristics mentioned concerning all the protected characteristics of GR1130012 and IBA GR009 areas, while the protected characteristics of

the nearest GR11300010 and of the neighboring Bulgarian SAC BG0001032 were also taken into account.

The emphasis in the examination of the neighboring Bulgarian SAC BG0001032 was given to those species of other fauna that due to the distances they can travel during their daily movements (but also the very short distance of the installation area under project study from the boundaries of the above SAC), may be affected by the project under study. The species of the rest of the fauna of the above SAC, which were chosen to be examined, consist of 12 species of chiroptera (*Barbastellus barbastellus* , *Mioniopterus schreibersii* , *Myotis Bechsteinii* , *Myotis blythii* , *Myotis capaccinii* , *Myotis emarginatus* , *Myotis myotis* , *Rhinolophus blasii* , *Rhinolophus Euryale* , *Rhinolophus ferrumequinum* , *Rhinolophus hipposideros* , *Rhinolophus mehelyi*), due to the distances they can travel during their movements to meet their daily needs, five species of mammals (excluding chiroptera) (*Canis lupus* , *Ursus arctos* , *Myomimus roachi* , *Spermophilus citellus* , *Vormela peregusna*) and three species of reptiles (*Testudo graeca* , *Testudo hermanni* , *Elaphe sauromates*), which are either species with a large endemic area (e.g. *Canis lupus* , *Ursus arctos*), or may be affected by the project under study due to the proximity of its installation area to the boundaries of the specific SAC.

As for the chiroptera, they have a recorded presence in locations greater than 10 km from the boundaries of the Production License (RAE) polygons of the project, with a shorter distance being recorded for the *Rhinolophus* species *hipposideros* (13 km), and although according to the IUCN red list the species is classified as threatened (NT: Endangered), according to the Bulgarian Red Book it is not classified as threatened, since as mentioned above, the species (together with *Rhinolophus ferrumequinum*) is the most abundant in the country (273 locations).

Finally, for the final assessment of the impacts, a field survey was carried out within the framework of the Special Ecological Study, which also included field recordings which, of course, were carried out within the Greek territory.

From the field survey and according to the Special Ecological Study, the presence of seven types of chiroptera was established, belonging to the Annex II of Directive 92/43/EEC (*Barbastella barbastellus*, *Myotis capaccinii*, *Myotis Myotis*, *Mioniopterus schreibersii*, *Rhinolophus euryale* , *Rhinolophus hipposideros* , *Rhinolophus ferrum-equinum*) while the species of *Eptesicus serotinus*, *Hypsugo savii*, *Alcathoi 's myotid* , *Myotis daubentonii*, large night bat, *Nyctalus leisleri*, *Nyctalus noctula*, *Pipistrellus kuhlii*, *Pipistrellus nathusii*, *Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*, *Plecotus auritus*, Mediterranean eared bat , *pardalon bat*, belong to the corresponding Appendix IV.

Of all the other recorded mammals (except chiroptera), none belong to Annex II of the above mentioned Directive, while the wild cat is a species of Annex IV and the wolf is a species of Annex V of the Directive. Out of all the species of reptiles, two turtle species (Greek turtle and Mediterranean turtle / *Testudo Graeca* and *Testudo hermanni* Gmelin) are species of Annex II of the Directive, while in total the species of Greek turtle, Mediterranean turtle, *prasinosaurus* (*Lacerta viridis*) , Common wall lizard (*Podarcis muralis*), *Ochia* (*Vipera ammodytes*) and *Astrapofido* are species of the Annex IV of the Directive. The water snake does not belong to any of the above Appendices. Regarding amphibians, only the species *Bufo viridis* was observed during the field survey (green toad), which belongs to Annex IV of the above Directive. At this point it is worth noting that throughout the field

survey, the presence of horses was recorded in the installation area of the Wind Farm under study. Even though they are regarded as wild horses, they were actually abandoned in the wider area decades ago by their owners, who used them for agricultural and livestock work, managed to survive and reproduce in the natural environment, now maintaining natural populations in the wider area.

As regards the cross-border impacts from the construction of the Wind Farm under study on the other species of fauna (except avifauna), these are included in the above mentioned as it is not possible to separate between the Greek and Bulgarian territory for species that have the ability to move and that of course do not know geographical borders.

2.2.2 Avifauna

As already mentioned, the Natura 2000 network area with the code BG0001032 and the name "Rodopi - Iztochni" is classified as a Special Area of Conservation (SAC) and not a Specially Protected Area (SPA) and therefore doesn't include avifauna in its scope of protection. However, due to the proximity of the territory of the state of Bulgaria and the specific Natura network area to the Wind Farm under consideration, as well as the distances that the bird species found in the project area can travel to cover the daily needs, these species may also use areas within the territory of Bulgaria. However, as it follows from the design of the project, all the interventions will be carried out within the Greek territory, any impacts during the construction phase mainly concern the Greek territory and no significant impacts (of a cross-border nature) are expected in the neighboring country.

During the operation phase, as can be seen from the design of the project, all the interventions will be carried out within the Greek territory, therefore any impacts during the operational phase of the Wind Farm mainly concerns the Greek territory and no significant impacts (of cross-border nature) are expected in the neighboring country.

2.3 Cross-border impacts on air quality

During the construction phase, cross-border impacts on the atmospheric environment are expected that also affect the territory of the state of Bulgaria, but the intensity of these is expected to be significantly lower than that expected in the Greek territory due to the above mentioned and specifically they are judged to be negative of negligible intensity.

2.4 Cross-border effects of noise

As it follows from the design of the project, all the interventions will be carried out within the Greek territory. The distance (0.78 km) from the nearest Bulgarian settlement of " Kushla " is in correspondence with the nearest Greek settlement of "Kaloticho" (distance 0.63 km), while the rest of the settlements are at considerably longer distances. Therefore, as mentioned above, in the case of the settlements within the Greek territory, the distance from the work area is sufficient for the non-appearance of effects on it.

Therefore, during the construction phase, cross-border impacts are expected in terms of the acoustic environment that also affect the territory of Bulgaria, but the intensity of these is expected to be

significantly lower than expected in the Greek territory due to the above mentioned and specifically they are judged to be negative but of negligible intensity.

During the operating phase, for the nearest settlement in the Bulgarian territory (Kushla, Zlatograd) which is approximately 0.78 km from the closest W/T (W/T 8) and based on the above results, it follows that there are no expected impacts from noise, since -according to the assessment carried out- noise level is below 40dB(A) for the entire area of Kushla settlement (Figure 1). Furthermore, no noise effects are expected from the supporting works of the Wind Farm based on the above-mentioned comments.

2.5 Cross-border Effects on: Climatic and bioclimatic characteristics, geological, tectonic and soil characteristics, natural environment (flora), man-made environment, Socio -economic effects, Technical infrastructures, Electromagnetic fields & Water

As can be seen from the design of the project, all interventions will take place within the Greek territory. Based on what is mentioned in the assessment, no cross-border effects are expected during the construction and operation phase of the wind farm in any climatic parameters and also in relation to the emission of greenhouse gases

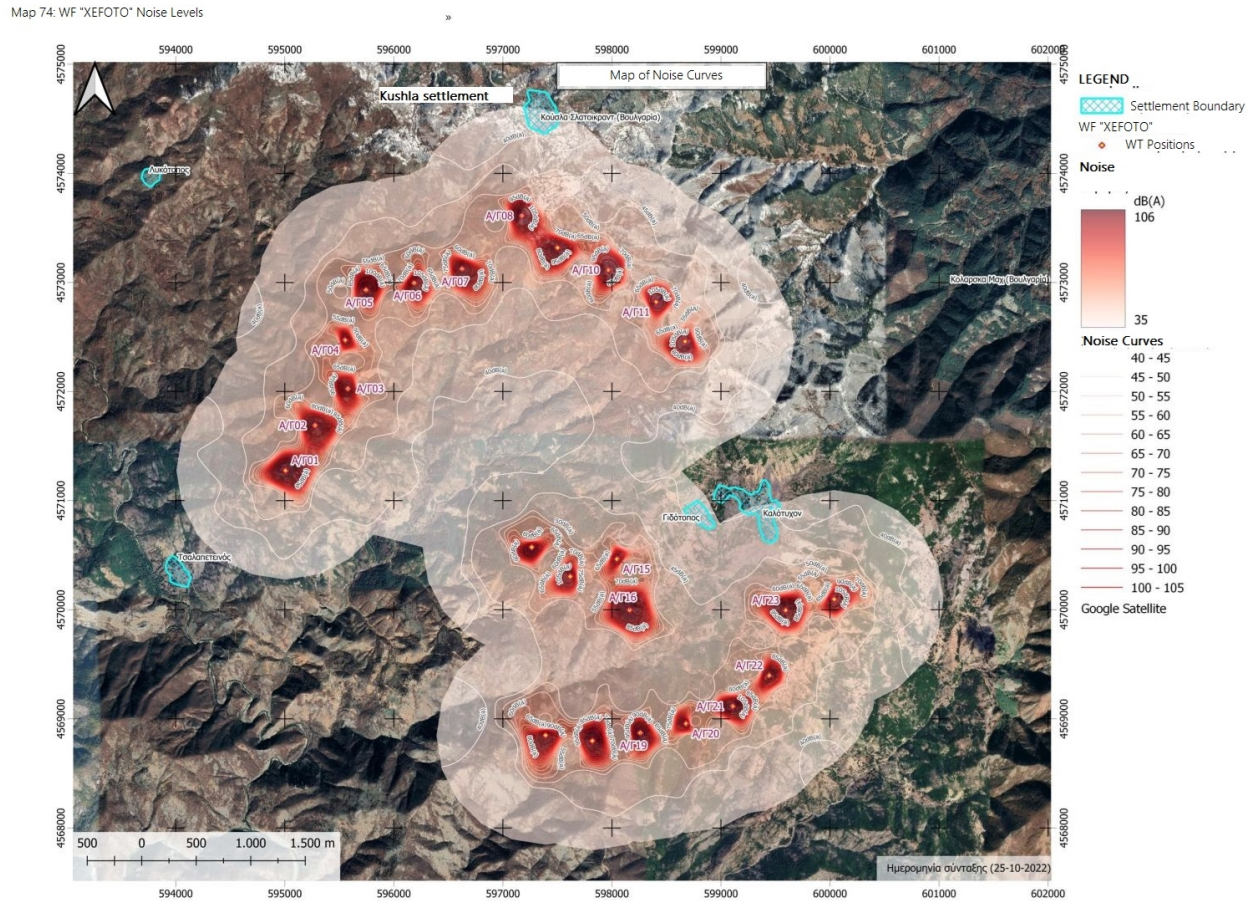


Figure 1. Noise Level Curves of WF "XEFOTO"