**ENVIRONMENTAL IMPACT STUDY FILE - APPROVAL OF ENVIRONMENTAL TERMS (PURSUANT TO HY.A. NO. OIK. 170225/ 27.01.2014 (Government Gazette 135B')**

IMPLEMENTING BODY: **ANEMOS EVROU M.I.K.E.**

PROJECT: **130.2M W WIND POWER PLANT**

LOCATION: **AETOKORFI**

MUNICIPAL UNIT / MUNICIPALITY: **D.D PENTALOFOU, D.D PETROTON & D.D. KOMARON / D.E. TRIGONOU / D. ORESTIADOS**

REGIONAL UNIT: **EVROU**

REGION: **EASTERN MACEDONIA - THRACE**

PROJECT CATEGORY (Y.A 1958 F.E.K. 21B / 2012): **SUB-CATEGORY A1**

**The project has received a Producer Certificate from RAE (sub. no. VEV -2710/2021 – 10/5/2021), its amendment with the nos. 1104/ 2021-15 /12/21 and 566/2022-6/ 5/22 Decisions of the President**

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| | |
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**Thessaloniki, December 2022**

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# ENVIRONMENTAL IMPACT STUDY

## 1. INTRODUCTION

Wind Power Plant or Wind Station (W/P or W/S) is the facility that converts wind energy into useful mechanical or more commonly electrical energy. The main equipment of the W/P is the Wind Turbines (W/T). Wind Turbines -W/T- are used to convert wind energy into work and then into electricity. W/T consists of:

- the base part (tower),

- the carriage (or nacelle ) located at the top of the tower on which the generator and all auxiliary machinery are located

- the blade system (usually three);

W/Ts convert the kinetic energy of the wind into mechanical power. This mechanical power can be used for specific purposes (such as pumping water) or converted, which is the most common, through a generator into electricity.

Electrical energy with suitable mechanisms is transferred to the network and is available for consumption. Several W/Rs together in the same location constitute a wind power plant.

The implementing body of the project is **ANEMOS EVROU MONOPROSOPI I.K.E.**

**Institutional framework for the preparation of the present**

The basic legislation framework, which determines both the necessity and the specifications of the specific study, is the following:

- Law 998/79 "On the protection of forests and forest areas in general in the Country" (Government Gazette 289/A29-12-1979), as amended and in force.
- Law 1650/86 "For the protection of the environment" (Government Gazette 160/A), as amended and in force.
- Law 2244/7-10-94 (Government Gazette 168/A/94) on "Regulation of electricity generation issues from renewable energy sources and from conventional fuels and other provisions".
- Law 2742/99 "Spatial planning and sustainable development and other provisions" (Government Gazette 207/A/99).
- Law 3010/2002 (Government Gazette 91 A 25/4/2002) Harmonization of Law 1650/1986 with Directives 97/11 EU and 96/61 EU, demarcation process and regulations on watercourses and other provisions.
- Law 3017/02 "on the ratification of the Kyoto Protocol" (Official Gazette 117/A/30-05-02).
- Law 3028/02 "for the protection of Antiquities and Cultural Heritage in general" (Government Gazette 153/A/28-06-2002).
- Law 3199/03 (Government Gazette 280/A/9.12.2003) "Water protection and management - Harmonization with Directive 2000/60/EC of the European Parliament and Council of 23 October 2000", as amended by article 9 of Law 3481/1.8.06 (Government Gazette/162/A/2.8.06).
- Law 3378/2005 (Government Gazette 203/A/19-08-2005) "Ratification of the European Convention and the Protection of Archaeological Heritage (revised)".

- Law 3468/27-06-06 (Government Gazette 129/A/06) on "Electricity Production from Renewable Energy Sources and High Efficiency Cogeneration of Electricity and Heat and other provisions".
- Law 3851/2010 (Government Gazette 85/A/04.06.2010) on "acceleration of the development of Renewable Energy Sources to combat climate change and other provisions in matters of competence of the Ministry of Environment, Energy and Climate Change".
- Law 3852/2010 (Government Gazette 85/A/04-06-2010) "New Architecture of Self-Government and Decentralized Administration - Kallikratis Program".
- Law 3937/2011 (Government Gazette 60/A/31-03-2011) "Conservation of biodiversity and other provisions".
- Law 4014/2011 "On the environmental licensing of projects and activities, regulation of arbitrary in connection with the creation of an environmental balance and other provisions of the competence of the Ministry of Environment" (Government Gazette 209/A/21-09-2011), as amended and in force.
- Law 4629/2014 (Government Gazette A΄142/28-06-2014) "Spatial and urban planning reform - Sustainable development".
- Law 4447/2016 (Government Gazette A΄241/23-12-2016) "Spatial Planning - Sustainable Development and other provisions"
- Law 4685/2020 (Government Gazette A' 92/07-05-2020) "Modernization of environmental legislation, incorporation into Greek legislation of Directives 2018/844 and 2019/692 of the European Parliament and of the Council and other provisions.".
- KYA 33318/3028/11.12.98 (Government Gazette 1289 B/28.12.98) "Determining measures and procedures for the conservation of natural habitats (habitats), as well as wild fauna and flora", as amended and in force.
- KYA 3060 (FOR) 238/2002 (Government Gazette 512/B/25-04-02) which refers to measures to protect the public from the operation of devices emitting low-frequency electromagnetic fields.
- YA HP/11014/703/Φ104/2003 (Government Gazette – 332/B/20-03-2003) for the Preliminary Environmental Assessment and Evaluation (PEEA) and Environmental Conditions Approval (EPO) process
- KYA 49828/3-12-2008 (Government Gazette 2464/B/3-12-2008) "Approval of a Special Spatial Planning and Sustainable Development Framework (SDP) for renewable energy sources and its strategic environmental impact study", as amended and it is valid.
- KYA 37338/1807/2010 "Determining measures and procedures for the conservation of wild avifauna and their habitats , in compliance with Directive 79/409/EEC...", as amended and in force.
- KYA 36259/1757/E103/2010 (Government Gazette 1312/B/24-8-2010) "Measures, conditions and program for the alternative management of waste from excavations, constructions and demolitions (AEKK)".
- KYA U.P. 14122/549/E.103/2011 (Government Gazette 488 B'2011) Measures to improve the quality of the atmosphere, in compliance with the provisions of Directive 2008/50/EC "on ambient air quality and cleaner air for Europe » of the European Parliament and its Council.
- YA 1958/2012 (Government Gazette 21/B/13-1-2012) "Classification of public and private projects and activities into categories and subcategories in accordance with

Article 1 paragraph 4 of Law 4014/21.9.2011 (Government Gazette A'209/2011)" as amended and in force.

- Y.A. No. _ 15277/2012 "Specification of procedures for the integration into Decisions on the Approval of Environmental Terms or into the Standard Environmental Commitments of the intervention approval provided for by the provisions of the Forestry Legislation, for projects and activities of categories A and B of the ministerial decision no . 1958/2012 (Government Gazette 21/B/13.1.2012), in accordance with article 12 of Law 4014/2011.
- KYA 21398/2012 (Government Gazette 1470/B/2012) "Establishment and operation of a special website for the posting of environmental conditions approval decisions (EIA), decisions to renew or amend EIA, in accordance with article 19a of Law 4014/2011 ( Official Gazette A/209/2011).
- KYA Oik. 167563/EYPE/2013 (Government Gazette 964/B/2013) "Specification of the procedures and the more special criteria for environmental licensing of projects and activities of articles 3, 4, 5, 6 and 7 of Law 4014/2011, . .."
- YA co. 170225/2014 (Government Gazette 135/B/2014) "Specification of the contents of the environmental licensing files for projects and activities of category A" of the decision of the Minister of Environment, Energy and Climate Change with no . 1958/2012 (B΄21) as applicable, in accordance with article 11 of Law 4014/2011 (A΄209), as well as any other relevant details".
- The Decision of the Deputy Minister of PEKA (YA) 115973/6088/2014 (Government Gazette 2961/B/3- 11-2014) "Definition of supporting documents for the issuance of (A) intervention approval decision and (B) information act".
- YA 37674/27-7-16 (B' 2471) "Amendment and codification of YA 1958/2012 – Classification of public and private projects and activities in categories and subcategories in accordance with article 1 paragraph 4 of Law 4014/21.9.2011 (A' 209), as amended and in force".
- KYA 40238/2017 (Government Gazette 3759/B/25-10-2018) "Amendment of the joint ministerial decision no . Ministry of Education and Culture 107017/2006 "Assessment of the environmental effects of certain plans and programs, in compliance with the provisions of Directive 2001/42/EC on the assessment of the environmental effects of certain plans and programs of the European Parliament and Council of June 27, 2001".
- KYA 1915/2018 (Government Gazette 304/B/02-02-2018) "Amendment of no . 48963/2012 (B'2703) joint ministerial decision, no . 167563/2013(B' 964) joint ministerial decision and no . 170225/2014 (B' 135) of ministerial decision, which have been issued under the authority of Law 4014/2011 (A' 209), in compliance with Directive 2014/52/EU "amending Directive 2011/92/EU "on the assessment of the effects of certain public and private project plans on the environment" of the European Parliament and of the Council of 16 April 2014.
- YA co. 2307/2018 (Government Gazette 439B/14-02-2018) "Amendment of no. DIPA/ oik 37674/ 27-7-2016 Official Gazette: 2471/B/10-8-2016) decision of the Minister of Environment, Energy and Climate Change "Classification of public and private projects and activities into categories and subcategories, in accordance with article 1 paragraph 4 of Law 4014/21.09.2011 (A' 209)", regarding the classification of certain projects and activities of the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th and 12th Groups." .

- Official Gazette 5688/2018 (Government Gazette 988/B/21-03-2018) "Amendment of the appendices of Law 4014/2011 ('A 209) in accordance with Article 36A of this law, in compliance with Directive 2014/52/ EU "amending Directive 2011/92/EU on the assessment of the effects of certain public and private works projects on the environment of the European Parliament and of the Council of 16 April 2014".
- The Ministry of the Interior/DIPA/74463/4562/2020 (Government Gazette 3291/B/2020) "Amendment of No. DIPA/home 37674/27-7-2016 (B'2471) of the decision of the Minister of Environment, Energy and Climate Change "Classification of public and private projects and activities into categories and subcategories, in accordance with article 1 paragraph 4 of Law 4014/2011 (A' 209 )", regarding the classification of certain projects and activities of the 10th Group.
- No. _ MFA/DIPA/17185/1069, Official Gazette 8418/B΄/24-02-2022

The object of this study is the determination of the environmental impacts that will occur during the phase of its construction and operation and the assessment of these impacts in order to determine the appropriate measures to avoid or mitigate them.

The following chapters present the description of the project, the geographical location of the project and the current state of the environment. Then the expected effects from the activity in question and the measures to deal with the possible environmental effects are developed. The above are accompanied by maps, photos, plans , etc.

## 1.1 Title of project or activity

This Environmental Impact Study (EIA) concerns the project titled:

130,2 MW Wind Power Plant (ASPIE) at the location "AETOKORFI" with its accompanying works (road construction, external Medium Voltage 33kV network for the electrical interconnection of the ASPIE with the grid) in the Municipal Unit of Trigonos, of the Municipality Orestiada, of the Regional Unit of Evros, by the company with the name "ANEMOS EVROU MONOPROSOPI I.K.E." and d.t "ANEMOS EVROU M.I.K.E."

## 1.2 Type and size of the project or activity

The project concerns the installation of an electricity generation station using the inexhaustible and environmentally friendly wind energy within the framework of Law 2244/94 "Regulation of electricity generation issues from renewable energy sources and from conventional fuels and other provisions".

The Wind Station will operate as an independent power generation unit and will be connected to the electricity grid with all the necessary interconnection lines with the necessary protection, control, etc. facilities. The installed power and maximum production power of the station will be 130.2MW. According to law 2244/94, the entire generated energy will be channeled into the ADMIE network.

The Wind Power Plant at the Aetokorfi location will have a total nominal power of 130.2MW and will consist of twenty -one (21) wind turbines with a nominal power of 6,200kW each. W/Ts have been selected of indicative Vestas type V 162-6.2 MW , a sketch of which is shown below (Ch. 6.3.1.). All of the W/Ts are located in the Trigono Municipal Unit. For the implementation of the project, access works, internal road construction, shaping of squares, foundation of wind turbines, construction of control rooms and interconnection works of the wind power plant with the network are required.

**The project has received a Producer Certificate from RAE (sub. no. VEV - 2710/2021 – 10/5/2021), its amendment with the nos. 1104/ 2021-15 /12/21 and 566/2022-6/ 5/22 Decisions of the President.**

**Access**

Access to the Wind Park polygon area will be via existing roads.

Initially, it begins from the vertical axis Ardano – Ormenio of Egnatia Road. Then from the level junction in the community of Palli and through the municipal roads we head to the community of Pentalofos , where through the existing dirt roads there will be an approach to the installation site of the Wind Station.

It will be required to improve the existing dirt road that leads close to the construction sites of the wind turbines of the wind power plant, with a total length of 20,850.50m.

**Internal road construction**

The internal interconnection of the wind turbines will require the opening of a new forest road, with a total length of 1,235.40m. according to the instructions of the W/T supplier company, which will connect the positions of the wind turbines with the existing road, so that the traffic in the wind power plant area can be unhindered. All the aforementioned interventions and road construction projects are described in detail in the annex and illustrated in the attached plans and maps.

**Configuration of wind turbine erection sites**

The configuration of the construction sites of the W/Ts will be done with the aim of significantly reducing the required interventions, with innovative methods of transporting and assembling wind turbines, as described in detail in Paragraph 6.3.2 "Road Construction Projects" and in the attached topographical maps, in order to minimize the required interventions.

**Foundation of wind turbines**

The foundation of the W/Ts will be done according to the instructions of the supplier company of the W/Ts.

**Configuration of control cabin space**

The area for the construction of the control rooms will be prepared.

**Interface**

The connection of the W/S to the network is proposed to be made at the existing substation (S/S) of Orestiada.

The proposed 33 kV medium voltage underground line of the interconnection will have a total length of approximately 36.24 km. and will be built along existing roads.

Attached to the appendices is a topographical map with the proposed route of the medium voltage underground - plan number 299.5.1.7

An alternative for the grid connection is with the 33/150kV Voltage Elevation Substation in the route zone of the KYT NEAS SANTAS – ORESTIADAS transmission line with an underground medium voltage substation, with a total length of approximately 35.63 km.

Attached to the appendices is a topographical map with the proposed as well as the alternative route of the M.V. underground network. – plan number 299.5.1.3.

## 1.3 Geographical location and administrative affiliation of project or activity

### *1.3.1 Location*

The geographical location of the proposed project is in the Regional Unit of Evros. It is administratively under the Trigono Municipal Unit of the Municipality of Orestiada and the toponym of the specific area is " Aetokorfi ". The interconnection line of the project with the Transmission System passes through M.U. Triangle, and from M.U. Kyprinos and Orestiadas.

The nearest settlements are:

| **APPROXIMATE DISTANCE FROM THE NEAREST WIND TURBINE (in meters)** | | | |
|---|---|---|---|
| KOMARA | 2950 | ORMENIO | 11250 |
| THERAPEIO | 3510 | PLATI | 11510 |
| PENTALOPHOS | 3580 | ZONI | 11670 |
| MILIA | 4210 | KERAMOS | 12520 |
| KIPRINOS | 4298 | G. DOKSAPARA | 13200 |
| GALHNH | 4780 | DIKEA | 12780 |
| PETROTA | 6250 | KRIOS | 14520 |
| AMMOVOUNO | 8070 | ARZOS | 14850 |
| ELEA | 9610 | DILOFOS | 17532 |
| FILAKION | 9650 | CANADAS | 17980 |
| SPILEO | 9960 | RIZIA | 18650 |
| M. DOKSAPARA | 10620 | KASTANIES | 23160 |
| PTELEA | 10500 | MARASIA | 23284 |
| PALLI | 10520 | ORESTIADA | 29430 |

**Table 1**: Distances of wind power plant from settlements

The location was chosen after a thorough examination of the area in order to satisfy all the restrictions of the relevant legislation, not to affect the environment, the existing settlements and the general activities of the wider area.

Specifically, the proposed location is environmentally compatible with the planned activity, as:

- The location of the wind power plant is entirely outside the NATURA area GR1110008-SPA RIVERSIDE FOREST OF THE NORTHERN EVROS AND ARDA, as well as outside the SPP GR001 Riverside forest of the northern Evros and Arda . A percentage of 1.14% of the project accompanying the main and alternative interconnection (0.4km of 36.24km) is located within the NATURA area.
- The project has no negative environmental impact. It is an environmentally friendly renewable energy project from which there are no outflows (liquid, solid or gaseous waste, gaseous pollutants).
- On the contrary, the project will have significant positive environmental effects by reducing the emissions of pollutant gases & greenhouse gases to the environment,

contributing to the goals set by the Greek Government for the de- lignification of the area and the transition to a diversified sustainable mix of electricity production.

- It is a considerable distance from the nearest settlement ( Komara at a distance of about 2950 meters)
- There are no competing uses of the site

The geographic location of the project is listed in the image bellow (Figure 1).

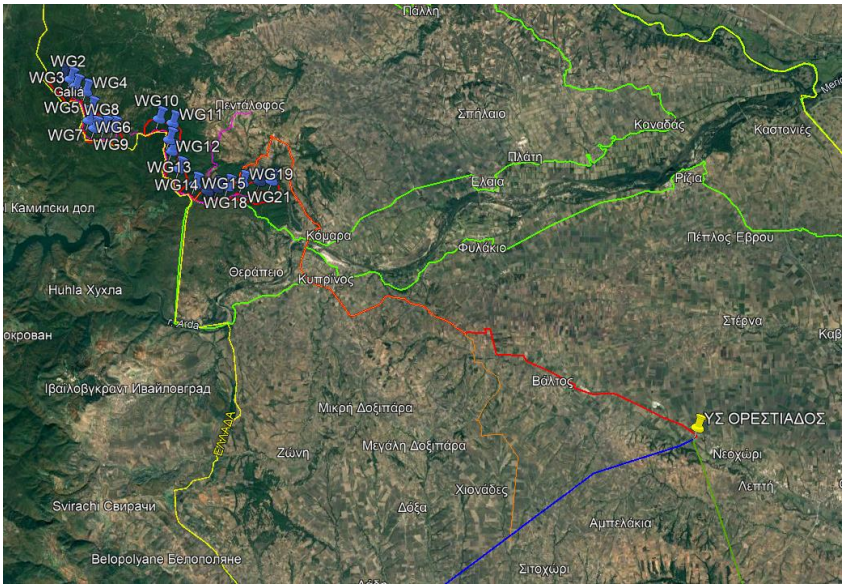


**Figure 1**: Excerpt of a general map of the area on Google Earth .

The specific location is on public land, as deduced from the initial data, and belongs to the category of forest land (Posted forest map of the local and municipal communities of the Municipalities of Alexandroupoli, Soufli , Didymoteicho, Orestiada and Samothraki with no . prot .: 2601/12-02-2021 ADA : 6Π0ΟΡΙΥ-0Β4) as well as on private lands. The ownership status of the lands that are not classified as forest will be investigated in the next stages of the licensing , before submitting an application for the issuance of an Installation Permit, as defined by the current legislative framework for the licensing of RES projects.

The project area is located far from settlements and is accessed via dirt roads.

### *1.3.2 Administrative affiliation of project or activity*

The project is located in the Region of Eastern Macedonia & Thrace, in the Regional Unit of Evros, in the Municipality of Orestiada, in the Municipal Unit of Trigonou in the SW. Petrotos, Pentalofos and Komaros.

### *1.3.3 Geographic coordinates of project or activity.*

The coordinates of the W/T, the vertices of the polygon and the control house in EGSA 87' and WGS 84 are shown in the tables below.

| ΑΝΕΜΟΣ ΕΒΡΟΥ Μ.Ι.Κ.Ε. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ΑΙΟΛΙΚΟΣ ΣΤΑΘΜΟΣ ΑΕΤΟΚΟΡΦΗ 130,2MW | | | | | | | | | |
| ΑΓ | Γεωγραφικές Συντεταγμένες | | | | | Υψόμετρο Εδάφους | Ύψος Πύργου | Διάμετρος Ρότορα | Ανώτατο ύψος ακραίου κινητού σημείου |
| Α/Α | ΕΓΣΑΧ | ΕΓΣΑΥ | WGSφ | WGSλ | Ενδεικτικός τύπος Α/Γ | (μ.) | (μ.) | (μ.) | (μ.) |
| 1 | 672923.77 | 4612566.34 | 41° 38' 55.0667" | 26° 04' 42.0521" | VESTAS V162 - 6,2MW | 507 | 149.00 | 162.00 | 737 |
| 2 | 673309.46 | 4612434.72 | 41° 38' 50.5001" | 26° 04' 58.5775" | VESTAS V162 - 6,2MW | 556 | 149.00 | 162.00 | 786 |
| 3 | 673583.52 | 4612132.85 | 41° 38' 40.5034" | 26° 05' 10.1018" | VESTAS V162 - 6,2MW | 582 | 149.00 | 162.00 | 812 |
| 4 | 674058.18 | 4611934.70 | 41° 38' 33.7096" | 26° 05' 30.3993" | VESTAS V162 - 6,2MW | 561 | 149.00 | 162.00 | 791 |
| 5 | 674341.34 | 4611171.68 | 41° 38' 08.7618" | 26° 05' 41.8304" | VESTAS V162 - 6,2MW | 534 | 149.00 | 162.00 | 764 |
| 6 | 674306.84 | 4610613.14 | 41° 37' 50.6901" | 26° 05' 39.7542" | VESTAS V162 - 6,2MW | 509 | 149.00 | 162.00 | 739 |
| 7 | 674593.71 | 4610278.50 | 41°37'39.61" | 26° 5'51.76" | VESTAS V162 - 6,2MW | 502 | 149.00 | 162.00 | 732 |
| 8 | 675001.61 | 4610355.04 | 41°37'41.77" | 26° 6'9.46" | VESTAS V162 - 6,2MW | 471 | 149.00 | 162.00 | 701 |
| 9 | 675424.80 | 4610351.17 | 41°37'41.31" | 26° 6'27.73" | VESTAS V162 - 6,2MW | 467 | 149.00 | 162.00 | 697 |
| 10 | 677456.89 | 4610944.39 | 41°37'58.91" | 26° 7'56.13" | VESTAS V162 - 6,2MW | 442 | 149.00 | 162.00 | 672 |
| 11 | 678087.96 | 4610800.12 | 41° 37' 53.7400" | 26° 08' 23.2607" | VESTAS V162 - 6,2MW | 446 | 149.00 | 162.00 | 676 |
| 12 | 678001.44 | 4610029.90 | 41°37'28.84" | 26° 8'18.67" | VESTAS V162 - 6,2MW | 395 | 149.00 | 162.00 | 625 |
| 13 | 678137.21 | 4609524.31 | 41° 37' 12.3601" | 26° 08' 24.0200" | VESTAS V162 - 6,2MW | 387 | 149.00 | 162.00 | 617 |
| 14 | 678530.36 | 4608743.56 | 41°36'46.73" | 26° 8'40.13" | VESTAS V162 - 6,2MW | 350 | 149.00 | 162.00 | 580 |
| 15 | 679311.00 | 4608091.21 | 41° 36' 24.9763" | 26° 09' 13.1613" | VESTAS V162 - 6,2MW | 359 | 149.00 | 162.00 | 589 |
| 16 | 679907.55 | 4607824.79 | 41° 36' 15.8601" | 26° 09' 38.6281" | VESTAS V162 - 6,2MW | 358 | 149.00 | 162.00 | 588 |
| 17 | 680337.08 | 4607986.71 | 41° 36' 20.7576" | 26° 09' 57.3468" | VESTAS V162 - 6,2MW | 344 | 149.00 | 162.00 | 574 |
| 18 | 680805.47 | 4608100.72 | 41° 36' 24.0599" | 26° 10' 17.6599" | VESTAS V162 - 6,2MW | 325 | 149.00 | 162.00 | 555 |
| 19 | 681449.56 | 4608331.81 | 41° 36' 31.0215" | 26° 10' 45.7189" | VESTAS V162 - 6,2MW | 290 | 149.00 | 162.00 | 520 |
| 20 | 682199.56 | 4608457.56 | 41° 36' 34.4807" | 26° 11' 18.2366" | VESTAS V162 - 6,2MW | 217 | 149.00 | 162.00 | 447 |
| 21 | 682742.53 | 4608528.25 | 41° 36' 36.3243" | 26° 11' 41.7564" | VESTAS V162 - 6,2MW | 150 | 149.00 | 162.00 | 380 |

| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Α ΣΕ ΕΓΣΑ 87 | | |
|---|---|---|
| ΚΟΡΥΦΗ | X | Y |
| A1 | 672400,82 | 4612726,74 |
| A2 | 672678,11 | 4613055,07 |
| A3 | 672999,17 | 4613108,12 |
| A4 | 673276,24 | 4612980,71 |
| A5 | 673625,71 | 4612881,04 |
| A6 | 673823,61 | 4612621,42 |
| A7 | 674009,20 | 4612476,38 |
| A8 | 674385,21 | 4612365,11 |
| A9 | 674597,96 | 4612007,98 |
| A10 | 674539,78 | 4611675,33 |
| A11 | 674160,36 | 4611537,10 |
| A12 | 673929,10 | 4611969,57 |
| A13 | 673590,31 | 4612006,75 |
| A14 | 673308,07 | 4611834,59 |
| A15 | 673175,43 | 4612040,80 |
| A16 | 672888,96 | 4612296,06 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 5.976,57μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 1.609.859,54τ.μ. | | |
| **ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Β ΣΕ ΕΓΣΑ 87** | | |
| ΚΟΡΥΦΗ | X | Y |
| B1 | 674121,40 | 4611510,86 |
| B2 | 674561,27 | 4611670,98 |
| B3 | 674860,53 | 4611343,85 |
| B4 | 674792,55 | 4610864,73 |
| B5 | 674834,07 | 4610758,90 |
| B6 | 675056,09 | 4610672,70 |
| B7 | 675283,80 | 4610836,07 |
| B8 | 675440,09 | 4610902,07 |
| B9 | 675758,95 | 4610805,68 |
| B10 | 675947,30 | 4610518,89 |
| B11 | 675960,49 | 4610243,42 |
| B12 | 675781,55 | 4610075,80 |
| B13 | 675491,62 | 4610188,84 |
| B14 | 675424,54 | 4610257,11 |
| B15 | 675181,88 | 4610278,74 |
| B16 | 674882,82 | 4610236,59 |
| B17 | 674583,41 | 4610168,25 |
| B18 | 674385,68 | 4610181,82 |
| B19 | 674341,01 | 4610246,28 |
| B20 | 674209,92 | 4610612,28 |
| B21 | 674145,03 | 4610809,41 |
| B22 | 674247,08 | 4611147,14 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 6.264,55μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 1.479.787,97τ.μ. | | |

| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Δ ΣΕ ΕΓΣΑ 87 | | |
|---|---|---|
| ΚΟΡΥΦΗ | X | Y |
| Δ1 | 678027,19 | 4608968,32 |
| Δ2 | 678644,72 | 4609271,48 |
| Δ3 | 678911,72 | 4609124,09 |
| Δ4 | 679065,88 | 4608810,48 |
| Δ5 | 679038,82 | 4608563,45 |
| Δ6 | 678764,08 | 4608247,30 |
| Δ7 | 678565,19 | 4608335,60 |
| Δ8 | 678431,22 | 4608734,38 |
| Δ9 | 678109,03 | 4608773,69 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 3.183,71μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 586.668,42τ.μ. | | |
| **ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Ε ΣΕ ΕΓΣΑ 87** | | |
| ΚΟΡΥΦΗ | X | Y |
| E1 | 678782,94 | 4608233,90 |
| E2 | 679068,07 | 4608580,29 |
| E3 | 679412,20 | 4608628,77 |
| E4 | 679651,53 | 4608519,28 |
| E5 | 679785,95 | 4608358,10 |
| E6 | 679946,56 | 4608369,72 |
| E7 | 680453,92 | 4608519,79 |
| E8 | 680982,81 | 4608617,04 |
| E9 | 681348,08 | 4608869,31 |
| E10 | 681761,24 | 4608781,33 |
| E11 | 682099,65 | 4608995,36 |
| E12 | 682412,05 | 4608961,60 |
| E13 | 682818,99 | 4609069,88 |
| E14 | 683188,23 | 4608845,36 |
| E15 | 683281,89 | 4608437,17 |
| E16 | 683001,78 | 4608046,59 |
| E17 | 682531,92 | 4608023,11 |
| E18 | 682242,45 | 4607912,24 |
| E19 | 681886,74 | 4608008,83 |
| E20 | 681755,42 | 4607918,57 |
| E21 | 681665,75 | 4607989,44 |
| E22 | 681351,43 | 4608082,09 |
| E23 | 680975,94 | 4608105,86 |
| E24 | 680551,98 | 4608009,75 |
| E25 | 680396,82 | 4607998,00 |
| E26 | 680205,23 | 4607867,64 |
| E27 | 680067,68 | 4607830,91 |
| E28 | 679935,82 | 4607767,18 |
| E29 | 679846,34 | 4607800,15 |
| E30 | 679662,91 | 4607824,03 |
| E31 | 679549,79 | 4607881,73 |
| E32 | 679403,08 | 4607925,20 |
| E33 | 679372,60 | 4607938,95 |
| E34 | 679249,84 | 4608021,51 |
| E35 | 679165,10 | 4608158,22 |
| E36 | 678898,31 | 4608076,81 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 10.444,63μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 3.119.797,92τ.μ. | | |

| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Γ ΣΕ ΕΓΣΑ 87 | | |
|---|---|---|
| ΚΟΡΥΦΗ | X | Y |
| Γ1 | 676994,86 | 4610646,26 |
| Γ2 | 676920,77 | 4611016,30 |
| Γ3 | 677107,19 | 4611349,05 |
| Γ4 | 677521,89 | 4611475,72 |
| Γ5 | 677866,49 | 4611299,49 |
| Γ6 | 678285,70 | 4611310,13 |
| Γ7 | 678579,72 | 4611039,66 |
| Γ8 | 678598,29 | 4610603,20 |
| Γ9 | 678414,80 | 4610361,50 |
| Γ10 | 678522,27 | 4609912,15 |
| Γ11 | 678638,55 | 4609293,84 |
| Γ12 | 678039,93 | 4608994,05 |
| Γ13 | 678024,53 | 4609344,54 |
| Γ14 | 678049,87 | 4609607,71 |
| Γ15 | 677994,83 | 4609861,02 |
| Γ16 | 677886,74 | 4610040,93 |
| Γ17 | 677959,81 | 4610408,92 |
| Γ18 | 678002,25 | 4610836,92 |
| Γ19 | 677937,59 | 4610904,24 |
| Γ20 | 677758,29 | 4610944,00 |
| Γ21 | 677546,73 | 4610870,51 |
| Γ22 | 677317,85 | 4610819,26 |
| Γ23 | 677181,87 | 4610656,53 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 7.923,73μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 1.755.791,11τ.μ. | | |

| ANEMOS EVROU M.I.K.E. | | |
|---|---|---|
| AETOKORFI WIND PLANT 130.2MW | | |
| COORDINATES OF HOUSING FIELDS IN EGSA 87 | | |
| AG | X | Y |
| 1 | 679404.43 | 4607960.07 |
| 2 | 679394.53 | 4607937.11 |
| 3 | 679417.48 | 4607927.21 |
| 4 | 679427.39 | 4607950.16 |
| FIELD AREA = 625.0 sq.m. | | |

**Table 2**: Wind power plant coordinates.

## 1.4 Classification of the project or activity

According to Y.A. No. : 1958 (Government Gazette 21B / 13.01.2012) "Classification of public and private projects and activities into categories and subcategories, in accordance with article 1 paragraph 4 of Law 4014 / 21.09.2011 (Government Gazette A'209 / 2011)", Y.A. 37674/2016 (Government Gazette 2471/B΄/10-8-2016), the No. MEE/DIPA/74463/4562 (Government Gazette B3291 – 6/8/2020) as well as MEE/DIPA/17185/1069 (Government Gazette B841/2022), MEE/DIPA/64712/4464/2022 (Government Gazette 3636/B/ 11-07-2022) the proposed projects are categorized as:

**For the main projects ( construction and mode Wind turbines Stations ):**

- In **10 th group** : Renewables sources energy
- With **serial number to the Tables 1** : Power generation from wind energy
- *Category* **A and Subcategory A 1** : Since the total nominal power of projects is equal to P=136.4 MW > 45MW

**For the new road that will be opened in order to build and interconnect the projects with the infrastructure network (accompanying project):**

- In the **1st group** : Land and air transport projects
- With **serial number in tables 11 (Group and category according to OMOE LKOD: AVI):** Forest road
- **Category B** : The whole

**For the interconnection projects with the existing El.En. transmission network (companion work):**

- The accompanying project of the underground medium voltage transmission line (MVT) is not environmentally classified in the tables of projects and activities of Ministerial Decision No. 37674/2016, as amended and in force, but is an integral part and infrastructure of the main activity (ASPIE).

**For the installation of a prefabricated control room (companion project):**

- The control rooms and the warehouse are not environmentally classified in the tables of projects and activities of Ministerial Decision no. 37674/2016, as amended and in force, but they are an integral part and infrastructure of the main activity (ASPIE).

According to the above analysis, the project as a whole is categorized in the higher ranking category of the main and accompanying projects. Therefore **, the project as a whole is classified in category A and subcategory A1 and follows the procedure of submitting an Environmental Impact Study** according to the provisions of KYA 170225/2014.

From a statistical point of view, wind energy and other RES are not an independent sector, but rather a sub-sector of sector 35. According to the NACE coding (but also STAKOD), Renewable Energy Sources (RES) are categorized under sub-sector 35.11 Electricity production of sector 35 "Supply of electricity, natural gas, steam and air conditioning".

According to K.Y.A. 3137/ 191/ Φ.15/12 (B' 1048), from where the following project table is for Electricity Production from wind turbine power plants with A/A 303e, the specific project having a power of 130.2MW > 700 kW , is classified as an **average degree of annoyance.**

| Α/Α | ΕΙΔΟΣ ΕΡΓΟΥ Ή ΔΡΑΣΤΗΡΙΟΤΗΤΑΣ | ΚΩΔΙΚΟΣ | ΒΑΘΜΟΣ ΟΧΛΗΣΗΣ | | | ΠΑΡΑΤΗΡΗΣΕΙΣ |
|---|---|---|---|---|---|---|
| | | | ΥΨΗΛΗ | ΜΕΣΗ | ΧΑΜΗΛΗ | |
| | ε. Σταθμοί ηλεκτροπαραγωγής από ανεμογεννήτριες | | | > 700 kW | > 20 kW<br>≤ 700 kW | Αποδιδόμενη ηλεκτρική ισχύς |

**Table 3:** Degree of annoyance of wind turbines.

### 1.5 Project or activity body

NAME : **ANEMOS EVROU MONOPROSOPI I.K.E.**
Address : Kifisias Avenue 280
Postal Code 152 32 Chalandri, Attica

### 1 .6 Environmental researcher of a project or activity

The Environmental Impact Study was conducted by the following degree holders 27 & 24, in collaboration with special partners (who sign the 2nd page of this study) of the company ESTIA CONSULTING & ENGINEERING SA, which has undertaken the environmental licensing of project.

NAME : **KONSTANTINIDIS DIMITRIOS**
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NAME : **SGEMBAS VASILIOS**
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## 2. NON – TECHNICAL SUMMARY

The project concerns the installation of an electricity production plant using unlimited and environmentally friendly wind energy in the framework of Law 2244/94 "Regulation of issues of electricity production from renewable energy sources and conventional fuels and other provisions".

The Wind Park will operate as an independent power generation unit and will be connected to the electricity grid with all the necessary interconnection lines with the necessary protection, control facilities etc. The installed capacity of the plant will be 130.2MW. In accordance with Law 2244/94, all the energy produced will be fed to the transmission system.

### 2.1 Brief description of the main elements of the project

The Wind Park in Aetokorfi location will have a total power of 130.2 MW and will include twenty-one (21) wind turbines (W/Ts) with nominal power 6.2 MW each. The Wind turbines selected are VESTAS V162-6.2MW.

All the wind turbines of the project are located at the Local community of Trigono, Municipality of Orestiada in the Regional Unity of Evros.

### 2.2 Project distances

The choice of the site was made after a thorough examination of the area in order to meet all the restrictions of the relevant legislation, not to affect the environment, the existing settlements, and the general activities of the wider area.

In particular, the proposed site is environmentally compatible with the planned activity, as:

- It is outside of all the protected areas defined by the legislation, except for a small part of the underground passage of the interconnection that passes through the existing bridge of Komara, the Special Protection Area called "PARATAMIO FOREST OF NORTH EVROS AND ARDAS" (code GR 1110008 - SPA)
- It is at a considerable distance from the nearest settlement of Komara at about 2.950m.
- There are no competing uses of the site.

This site is located on public land, as deduced from the original data, and belongs to the category of forest land. The project site is far from settlements and is accessed by a dirt road.

### 2.3 Significant environmental impacts that the project may cause

The proposed project:

✓ Will not alter the climatic and bioclimatic characteristics of the area.

✓ On the contrary, it will improve them because it will replace a percentage of energy from conventional power plants that emit air pollutants and pollute the environment with waste heat.

✓ Will reduce global warming by reducing the air pollutants that cause it

✓ Will not alter the morphological and landscape characteristics of the area

✓ Will not cause changes to the topography, nor to the relief characteristics of the land surface.

✓ Will not cause unstable ground conditions or changes in the geological arrangement of rocks.

✓ Will not cause disruption, displacement, compression and overburden of the surface soil layer.

✓ Will not cause destruction, overburdening, or alteration of any unique geological or natural feature.

✓ Will not cause an increase in wind or water erosion of the soil, on-site or off-site.

✓ Will not cause changes in the deposition or erosion of coastal sand or changes in the creation of silt, deposition or erosion that may alter the bed of a river or stream or the bottom of the sea or of any bay, cove or lake. There are no shorelines, rivers, streams, creeks, bays or lakes near the proposed site.

✓ Will not cause a risk of exposure of people or property to geological disasters such as earthquakes, soil or mud slides, subsidence or similar disasters.

✓ Will not alter the varieties or numbers of terrestrial fauna species from both construction activities and operation of the wind power plant.

✓ Would also not alter animal movements, introduce new species to an area, or impede migration.

✓ The potential disturbance of animal species during construction of the project is not a significant disturbance due to its small scale and short duration.

In conclusion, the type of works does not pose any risk to the deterioration of the natural environment and fauna species.

✓ Will not result in a change in the diversity of species or the number of any plant species (including trees, shrubs, etc.).

✓ Will not cause a reduction in the number of any unique rare or endangered plant species.

✓ Will not introduce new plant species or interfere with the natural regeneration of existing species.

✓ Will not reduce the area of any agricultural crop.

✓ Will not cause changes in biodiversity or the number of animal species.

✓ Will not cause a reduction in the number of unique rare or endangered animals.

✓ Will not introduce new animal species or impede the migration or movement of animals.

✓ Will not degrade the habitat of existing wildlife because of the proposed project.

✓ Will not interfere with livestock production

✓ Will not affect the avifauna of the area

✓ Will not cause obstruction of skyline views, nor will it result in the creation of an aesthetically unacceptable landscape accessible to public view.

✓ Will not cause an increase in noise levels in nearby settlements.

✓ Will not impact on the quality or quantity of existing recreational opportunities, instead it will improve them.

✓ Will not result in the alteration or destruction of an archaeological site.

✓ It is not expected to cause a change in the growth rate or population density of the area. On the contrary, it will have a positive impact on the living standards and economic

development of the local population, since it will provide employment, mainly during the construction of the works, but also a permanent inflow of resources from the operation of the project which can be used for the development of the local community.

✓ It does not affect the creation of additional housing and does not alter the structure of existing housing.

✓ It poses no risk of harm to human health, both to staff and residents of the wider area. All appropriate measures will be taken to protect operating staff against any accidents. The nature of the project does not pose any risks from production processes or from the storage of hazardous or toxic materials. There will be no storage of hazardous waste.

✓ There will be no negative impact on land use. Livestock power planting can continue to be carried out without problems, as can logging and other activities in the area.

✓ It is emphasized that the wind power plant area will not be fenced off, which will contribute to the continuation of livestock activities in the area during the operational phase of the project.

✓ There will be no adverse impacts on the Historic and Cultural Environment of the surrounding area from the operation of the proposed wind power plant. The project is not located within a designated archaeological zone and the area where the works are to be carried out is not part of an archaeological, cultural, and historical protection zone.

✓ It does not cause any negative impact on the social character of the area.

✓ It will enhance the developmental character of the area by creating employment opportunities for local communities.

✓ It will support the tourism sector for environmentally friendly and ecological tourism development.

✓ It will support the local municipalities with the revenue from the contribution fee they will receive from the operation of the project.

✓ It has a positive impact on the quality of life of the residents by replacing electricity generated by conventional fuels with clean electricity generated by harnessing the wind.

✓ In the context of environmental tourism and environmental education, it can be argued that wind energy enhances tourism, as it is a method that is not widely known and widespread and is an attraction for visitors with environmental and educational concerns.

✓ It contributes to local development both by increasing employment during project construction and operation, and by contributing to the economic and social regeneration of the area, generating significant resources for local development.

✓ Due to its nature, the proposed project is not expected to cause an increase or decrease in the population density of the settlements in the wider area, so that their social and economic conditions are not affected. The project would not cause changes to existing housing conditions. A temporary increase in the population of the settlements in the area may occur during construction of the project, which will be due to the workforce that will be employed. The personnel will be drawn either from within or outside the settlements in the area, at the discretion of the project contractor. During the operational phase of the wind power plant, (2-3) jobs will be created, which will be filled by local staff.

Based on the environmental impact assessment and evaluation, the following table has been prepared:

| Impact on | PS | LO | EI | II | IC | IT | IA | SA | CC | MM | IBM | IAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Climatological/ bioclimatic characteristics | C | M | NA | 0 | NA | NA | NA | N | N | NR | 0 | 0 |
| | O | H | E | M | I | P | I | N | N | NR | P | P |
| Morphological characteristics | C | M | L | L | NA | PE | NA | N | N | R | N | 0 |
| | O | 0 | L | L | NA | PE | NA | N | N | NR | 0 | 0 |
| Topological characteristics | C | M | L | L | NA | PE | NA | N | N | R | N | 0 |
| | O | H | L | M | NA | P | I | N | N | R | N | 0 |
| Geological/architectural/soil characteristics | C | M | L | L | NA | PE | NA | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | NA | N | N | NR | 0 | 0 |
| Flora, vegetation, habitats | C | M | L | L | NA | PE | R | N | N | R | N | 0 |
| | O | 0 | NA | 0 | NA | P | R | N | N | NR | 0 | 0 |
| Forests and woodlands | C | H | L | L | D | PE | I | N | N | R | N | 0 |
| | O | 0 | NA | 0 | K | P | PR | N | N | NR | 0 | 0 |
| Fauna | C | M | L | L | D | PE | PR | N | N | R | N | 0 |
| | O | 0 | NA | 0 | K | P | R | N | N | R | N | 0 |
| Bird fauna | C | M | L | L | D | PE | R | N | N | R | N | 0 |
| | O | L | L | L | D | P | PR | Y | Y | R | N | 0 |
| Spatial planning - Land use | C | L | L | L | NA | PE | NA | N | N | R | N | 0 |
| | O | L | L | 0 | NA | P | NA | N | N | NR | Θ | P |
| Structure/functions of the man-made environment | C | L | L | L | NA | PE | R | N | N | R | N | 0 |
| | O | L | L | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Cultural heritage | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Socio-economic environment | C | H | L | M | I | PE | R | N | N | NR | P | P |
| | O | H | R | M | NA | P | I | Y | N | NR | P | P |
| Technical infrastructure | C | H | L | L | D | PE | R | N | N | NR | 0 | 0 |
| | O | H | R | M | NA | P | I | N | N | NR | P | P |
| Correlation with anthropogenic environment Pressures on the environment | C | 0 | NA | 0 | D | K | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | K | K | R | N | N | NR | P | P |
| Air quality | C | H | L | M | D | PE | R | N | N | R | N | 0 |
| | O | H | L | L | I | P | I | N | N | NR | P | P |
| Noise/Vibration | C | H | L | M | D | PE | R | N | N | R | N | 0 |
| | O | H | L | L | D | P | I | N | N | NR | 0 | 0 |
| Electromagnetic fields | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Water | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Serious accidents due to natural disasters | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |

| | |
|---|---|
| Project Stage | (**PS**): **C** – Construction, **O** – Operation |
| Likelihood of Occurrence | (**LO**): **0** -Zero, **L** -Low, **M** -Medium, **H** – High |
| Extent of impact | (**EI**): **NA** – None, **L** – Local, **R** – Regional, **N** – National |
| Impact intensity | (**II**): **0** -Zero, **L** -Low, **M** -Medium, **H** – High |
| Impact complexity | (**IC**): **D** -Direct, **I** – Indirect, **NA** - None |
| Impact Timing | (**IT**):**PE**–Periodical, **R**–Repeatable, **P** –Permanent, **NA** -None |
| Impact assessment | (**IA**): **I** – Irreversible, **R** –Reversible, **PR**– Partially Reversible, **NA**-None |
| Synergistic action | (**SA**): **Y** -Yes, **N** - No |
| Cross-border character | (**CC**): **Y** -Yes, **N** - No |
| Mitigation measures | (**MM**) : **NR** – Not required, **R** – Required |
| Impact Before Measures | (**IBM**): **0** – Zero, **P** – Positive, **N** - Negative |
| Impact After Measures | (**IAM**) : **0** – Zero, **P** – Positive, **N** - Negative |

## 2.4 Measures, actions, initiatives in the design of the project for the protection of the environment

The proposed environmental conditions to be imposed in order to protect the environment during the construction and operation of the wind power plant are the following:

- Compliance with the fuel quality limits of the fuel used by the machinery during the construction of the project, as defined in the existing regulations.
- The exhausts of all machinery should be pointed upwards and not towards the ground
- Establish maximum speed limits on all earthen surfaces.
- Keep roadbeds and driveways clean and wet.
- Frequent sprinkling of areas (e.g., access zone and new road construction, construction sites, wind turbine plazas) to reduce the amount of dust and particulate matter emitted during the technical construction of the park.
- According to Greek legislation, all trucks transporting loose materials must be covered.
- All machinery and equipment used in construction should be in good condition and meet the manufacturer's specifications to minimise dust emissions.
- Minimize excavation, trench and embankment restoration, storm water drainage projects, etc.).
- On-ground interventions to take up as little surface area as possible. Limit excavations to those required for the construction of the projects under study (erection of wind turbines, construction of access roads).
- Restore vegetation where it has been removed by the works during the construction phase.
- Any excess excavated material will be deposited on the wind turbine plazas or in suitable areas.
- If any archaeological finds or traces are found during the construction of the project, the competent archaeological service will be notified immediately and will give its opinion. In this case, it should be under the provisions of Article 37, para. 1 of Law 3028/2000 "For the protection of Antiquities and Cultural Heritage in general", to immediately stop the work until the completion of the excavation and the decision, based on the Law, on their fate.
- To comply with the specifications for the correct operation of excavation machinery and the permissible acoustic power levels during their operation. It is also proposed, as a noise reduction measure, to use low-noise machinery, well maintained so as not to harm the acoustic environment of the study area.
- In accordance with Article 7, paragraph 3 of Law 4014, a separate Technical Environmental Study (TE.E.S.) must be submitted for special works, activities and facilities that will arise during the detailed design of the project.
- The collection, transport, storage, and general management of solid waste shall be carried out in accordance with the legislation in force and in compliance with the provisions of the Decisions of the following: common ministerial decision 29407/3508/2002, common ministerial decision 50910/2727/2003 for non-hazardous solid waste and common ministerial decision 13588/725, common ministerial decision 24944/1159 for hazardous solid waste, as applicable.

- The management of waste streams falling within the scope of Law 2939/01 (Government Gazette 179A') shall be carried out in accordance with the provisions of either this Law or the corresponding Decree issued in application of the same Law. In particular:
    1) The collected packaging (paper, metals, etc.) to be handed over to licensed companies for recovery, through approved alternative management systems in accordance with Law 2939/01.
    2) Waste lubricating oils to be collected and delivered through a duly licensed collector of this type of material to an approved alternative management system for further processing, with priority for regeneration. Management must be carried out in accordance with presidential resolution 82/2004
    3) The collection of electrical and electronic equipment for scrapping, at the end of its life cycle, to be managed in accordance with presidential resolution 117/2004.
    4) Any accumulators, used to meet the energy needs of the project in case of a power failure, to be managed at the end of their life in accordance with common ministerial decision 41624/2057/E103/2010.
- Household type waste will be placed in special waste bins and will be removed either by the collection crews of the Municipality of Orestiada or by a licensed solid waste collection / transport operator in order to be disposed of in an approved solid waste disposal site.
- The treatment and disposal of hazardous waste within the project site is prohibited. All hazardous and potentially hazardous waste to be stored in areas that meet the requirements of Chapter 2 of the Annex of the common ministerial decision 24944/1159/06 and disposed of in accordance with the requirements of common ministerial decision13588/725/2006, as amended.
- All hazardous waste temporarily stored at the facility must be handed over, under contract, to an operator/subcontractor, who must have a hazardous waste collection and transport license and a contract with the final recipient of the waste. The final environmental terms decision acceptance must allow the final consignee to receive such waste at his facility. The company must therefore have the environmental terms decision acceptance documents of the respective recipients and the other supporting documents at its disposal.
- For waste handed over to third parties, the relevant documents must be available to monitor the further management of the waste off-site. In the case of hazardous waste, the 'Identification form for the collection and transport of hazardous waste' must be duly completed in accordance with the provisions of common ministerial decision 24944/1159/06.
- Keep the records and registers of Article 20 of Law 4042/2012 and maintain them for as long as required. To be prepared and submitted in February, with the data for the previous year Annual Waste Producer's Report in the electronic system of article 42 of Law 4042/2012.
- Removal of solid waste, from the abandonment of bazaars, packaging materials, machinery parts and other special waste in suitable areas.
- Removal of solid excavation products not deemed suitable for filling of excavation spoils. The transport of waste to approved treatment facilities or to recovery and disposal sites shall be carried out by means of means of transport equipped with appropriate covers to prevent dispersion or spillage on the roads.

- Removal of minerals, residual materials, and waste from the site operation to areas appropriately designed for this purpose.
- During the operational phase of the project, the Wind Park personnel will be responsible for collecting the waste generated and transporting it to a suitable collection site of the nearest OTA to avoid the movement of garbage trucks in the area for a small volume of waste generation. The remaining waste, depending on its type, will be collected by appropriate bodies for further disposal in recycling and recovery facilities.
- At the substations of each wind turbine, if dry-type transformers are not used, there will be a collection chamber for the oils to avoid any deposit and/or discharge into the ground and thus into the underground aquifer. The chambers will be sealed and the oils will be collected by staff and will not be mixed with other liquids in special watertight containers.
- Fencing of transported bulky materials and, where appropriate, vehicles and machinery.
- Marking of the work area with appropriate signs to inform passing pedestrians and vehicles.
- Fire safety measures to be taken.
- The cleared areas of forest and woodland that will not be covered by operational facilities of the wind park should be restored with native flora and species that were already present in the area.
- Following the completion of the construction of the planned works, the disturbed areas will be restored.
- The wind power plant site shall be kept clean and the carcasses of dead animals likely to attract scavenging birds from greater distances shall be removed immediately.

**Measures for Fauna - Avifauna**

**Construction phase**

- The main measure proposed to minimise impacts on avifauna during the construction phase of the Wind Power plant is to organise and carry out the works at a time of year **EXCEPT the breeding season, which for most species lasts from mid-February to the end of April**. In this way, part of the birdlife and its normal activity in the project area is protected. In the event of removal and permanent abandonment of the species due to disturbance, no mitigation measures are available.
- It is proposed to conduct field work to locate and identify woodpecker nests prior to the commencement of construction activities. If nesting sites are identified in cavity-nesting trees in the construction zone, it is recommended that intervention in these areas be delayed until after chick development and wing development is complete, by which time they can be removed from the nests.
- The scheduling of works should ensure the shortest possible time in the work area to reduce the effects of noise and dust emissions.
- Vehicles should be driven at low speed within the areas and vehicle movements should be kept to a minimum.
- Lighting in the work area should ideally be limited to areas required for operations and safety. It should also be directed downwards in such a way as to minimize light spillage outside the work area.

**Operating phase**

During the operational phase of the Wind Park, several measures are proposed to minimize the possibility of bird and chiroptera strikes as follows:

- Sealing of doors and windows of the control cabinets.
- Keeping the Wind Power plant area clean and immediately removing dead animal carcasses which are likely to attract scavenging birds from greater distances.
- Developing a specific program to record expected mortality by implementing a specific protocol. It is proposed that the monitoring be carried out by a specialist. The recommendation is to have a special forestry officer of the organization, or the Forestry Department, or the Forestry Office, or an authorized person from the above (monitoring program). The project owner should arrange for the preparation of a two-year environmental monitoring plan during the operational phase of the project with the following characteristics:
    - Include annual field surveys to obtain the reference data, during which at least 40 days will be devoted to field work, distributed to cover the critical for the birds days of the year, to identify bird populations using the surveyed area during an annual cycle.
    - Vantage Point records shall have a minimum monitoring limit of 36 hours.
    - Migration surveys outside the breeding season should be carried out both during the day and at night. Nocturnal surveys shall also record nocturnal predators. Data recording specifications will be determined by the Ministry of Environment.
    - The report of the results will be submitted to the Department of Protected Areas of the Ministry of Environment and Natural Resources.
    - Permanent staff on the project site to be trained on the actions required in the event a dead or injured bird is detected. In case of detection of any injured bird, the relevant agencies will be informed immediately.
- Installation of a detection system (in each WT) of bird species, through appropriate algorithms and cameras, analysis of the flight path and timely reproduction of the appropriate sound pattern to repel the bird and avoid collision with the wings or the pylon of the wind turbine.
- The tracking systems should have the capability of stopping the rotation of the turbine in case a bird is not driven away by the sound signals.
- During the construction phase and for at least 2 years after the operation of the Wind Park, a monitoring program of the impacts on avifauna will be prepared and annual reports will be submitted to the site management unit and relevant agencies.
- Due to the inability to detect birds in dense fog and low cloud conditions that often prevail at the site, it is proposed to install thermal cameras in the detection and pause systems of the WTs as well.
- It is suggested that wings be painted with colors that repel bird attraction or can be detected in time. In Kalyarka, Bulgaria, at the SNWF park, painting the blade tips red had positive effects in reducing the incidence of strikes.
- Implementation of a training programme for the staff of the Wind Park by expert scientists and/or under the responsibility of the Site Management Unit on the actions required in case of detection of a dead or injured bird.
- No buoyant structures that allow birds to perch or congregate in any facility should be used at any facility.
- Undergrounding of power transmission cables should be located after very careful planning has been done.

➢ After construction work is completed, it is recommended that all unnecessary roads and encroachments be restored to limit access to the area, thereby reducing disturbance.

During the installation and operation of the wind power plant it is proposed to take and implement various necessary measures that will minimize or eliminate any potential impacts on the avifauna of the area.

➢ Resting or observation areas: no ponding structures that allow birds to perch or congregate on them should be used at the facility.

➢ Lighting at the wind power plant: Consider flashing lighting instead of steady lighting as less attractive to birds. This measure, with irregularly spaced lighting, is now used in almost all new technology wind turbines, such as the wind turbines in the wind power plant under construction.

➢ Undergrounding of cables: the connection to the grid to be made underground for the entire grid as well as the part falling within SPA.

➢ Removal of dead animals: Provision is made for the immediate removal of dead animals (dogs, sheep, goats, horses, cows, etc.) found within 500 m of the base of the wind turbines. These dead animals should be transported to safe places away from the wind power plant (for example to organised supplementary feeding areas), while remaining available for scavenging birds.

➢ Restoration of the surrounding area: Following the completion of construction activities, it is proposed that all unnecessary roads and encroachments be restored to limit access to the area, thereby limiting disturbance.

## 2.5 Benefits from project implementation

In accordance with the above, the project under study will not cause irreversible effects on the environment. Its implementation is considered important as it will contribute to:

➢ reduce dependence on conventional energy resources,

➢ reduce emissions of carbon dioxide and other greenhouse gases,

➢ achieve energy independence and security of energy supply at national level,

➢ the decentralisation of the energy system, enabling energy needs to be met at local and regional level, thus relieving infrastructure systems and reducing energy transport losses,

➢ the possibility of exploiting energy resources, covering a wide range of users' energy needs (e.g. solar energy for low temperature heat, wind energy for electricity generation),

➢ energy saving; and

➢ limiting the outflow of foreign exchange from the national economy in order to secure the required fuels, in particular oil.

➢ direct increase in local employment.

➢ creation of permanent resources in the local community from a contribution of 2% of gross revenues to be collected by local municipalities. The existence of this permanent revenue stream will create permanent growth opportunities in various sectors and therefore revitalize the local community.

➢ increasing the income of the residents of the municipality concerned through the reduction of electricity bills. For this purpose, a contributory fee of 1% of gross revenue will be allocated, which through the electricity provider will proportionally reduce the electricity consumption charge of the residents of the local municipalities, with priority to the municipal district concerned.

➢ affect the technical infrastructure of the area in a positive way, as this activity, together with all the ancillary activities (access roads, transmission lines, etc.) will contribute to the improvement of the local infrastructure.

In conclusion, the project is expected to have a positive impact on the socio-economic environment and the technical infrastructure of the area, as this activity, in combination with all the ancillary activities (access roads, transport lines, etc.) will contribute to the development of the area, to the improvement of local infrastructure and to the creation of development poles.

At the same time, the proposed project, apart from the economic dimension it has for the municipalities concerned through the contribution fees, will also contribute to the development of the wider area.

## 2.6 Viable alternatives considered

The siting of a wind power plant is mainly determined by the locations where wind potential occurs, i.e., by factors outside the possibility of human intervention. For this reason, the alternative siting of the project in question, i.e., the siting of the wind turbines in other locations, can be carried out under conditions of energy efficiency of the project.

The determination of the wind potential for the needs of a wind power plant is based on the analysis of measurement results from wind stations located at key points in the area under study, with the parallel use of meteorological mathematical models to predict the distribution of wind flow at a specific height above the given topographical relief and with the aim of a comparative assessment of neighboring areas.

In addition, for the siting of the wind power plant, elements such as the suitability of the area, the morphology of the site, the local slopes and foundation possibilities, as well as the safety of the residential areas were considered. It is also stated that there are no archaeological sites within the project area. The distance between the wind power plant and the nearest settlement, which is Komara, is more than 500 m, as defined by the Decree 25-4-89 (Government Gazette 293, no. 16-5-89) and exceeds 2 950 m. The selection of the wind turbine sites was based on criteria such as:

- The optimal wind potential of the region.
- The energy efficiency of wind turbines.
- The low atmospheric turbulence.
- The local terrain slope and the suitability of foundation within the
- The suitability of the ground.
- The minimum lateral distance between two consecutive turbines, i.e., more than two and a half rotor diameters (i.e., approximately 405 meters) when upwind, to minimize aerodynamic shading.
- The prevailing wind directions based on statistical analysis of wind data.

The above criteria led to the selection of the optimal location of the wind turbines, which contributes to the maximum utilization of the wind potential of the area and the maximum possible energy production. This location was chosen as the optimal result of the combination of many parameters and constraints required for the implementation of a Wind Power plant. These parameters and constraints are technical, economic, environmental, and social. Of decisive importance for the siting of such a project is the Wind Potential, which varies spatially, while an important parameter for the design of a wind power plant is the occurrence rate of winds from different directions. The optimum location for the placement and operation of wind turbines are the ridges where the highest

Wind Potential is found, and they should be placed in a specific arrangement so that there are no problems of shading during the operation of the turbines.

Considering all the above, it is estimated that the area under study, meets all the requirements defined by Greek legislation and is considered suitable for the siting of a wind power plant.

### *2.6.1 Alternative solutions for connection of the A/P & routing of the Medium Voltage network*

Alternatively, the connection to the grid could be made at a new 33/150kV step-up substation in the zone of the transmission line NEAS SANTAS - ORESTIADA substation with an underground medium voltage line, with a total length of approximately 35.63km.

### *2.6.2 Zero solution*

Apart from the above, an alternative to the installation of this wind power plant is the zero option, i.e., the continued use of conventional fuels for the production of electricity generated by the wind power plant.

However, the zero option will result in the pollution of the environment with significant amounts of air pollutants ($CO_2$, $SO_2$, CO, NOx, HC, Particulates) as shown in the table below.

| | | CO2 | SO2 | CO | NOx | HC | Particulates |
|---|---|---|---|---|---|---|---|
| EMISSIONS SAVED /YEAR | Tonnes/year | 285.60 | 5.21 | 0.06 | 0.40 | 0.02 | 0.27 |
| EMISSIONS SAVED / 20 YEARS | Tonnes/year | 5,712.00 | 104.16 | 1.21 | 8.06 | 0.34 | 5.38 |

**Table 4**: Emission of pollutants avoided by the operation of the wind power plant.

The above calculations were based on the average emission values to produce a final kWh of electricity in the Greek interconnected system of a conventional power plant.

As can be seen from the data in the table, the zero option would result in the pollution of the environment with more than 425,952 tonnes of carbon dioxide/year as well as the pollution with more than 8,885 tonnes of other hazardous pollutants such as sulphur dioxide, nitrogen oxides, carbon monoxide and particulate matter.

Additional, environmental impacts of the No Action Alternative would negate all the positive impacts of implementing the project under study which have been mentioned above and which are briefly: increased employment in the project area, revenue generation for the local community, reduction in fossil fuel consumption and, in general, the evolution of the local and wider community towards sustainability.

## 2.7 Summary of the conclusions of the Special Ecological Assessment Study (SEA)

Based on the assessment of the conservation status of the habitat types and species of flora, fauna and avifauna in the survey area and the general status of the natural environment in the NATURA 2000 network sites (GR1110008 - Riparian Forest of northern Evros and Ardas), it is concluded that the construction of the project:

- The study area includes 11 habitat types of Annexes I of Greek Government Decree No. 14849/853/E103/4.4.2008. The habitat types relevant to the wind park location are 91M0 Pannonian oak forests with Quercus cerris and/or Quercus petraea -, 934A : Greek Linen Forests -, 1020 : Agricultural crops - and Bare - barren - roads -. The habitat types relevant to the CIP of the underground interconnection cable are 91M0 : Pannonic oak forests with Quercus cerris and/or Quercus petraea -, 3280 : Mediterranean rivers with permanent flow of Paspalo - Agrostidion and dense vegetation in the form of a Salix and Populus alba curtain along their banks -, 3260 : Spring vegetation of Ranunculion fluitantis and Callitricho - Batrachion type -, 92C0 : Platanus orientalis and/or Liquidambar orientalis forests -, 1020 : Agricultural crops -, 934A : Greek Lily of the Valley forests -, G645 : Greek trans-Mediterranean wet grasslands -, 1050 : Bare barren land, roads - and 92A0 : Forests - galleries with Salix alba and Populus alba. The installation of the ESDP will be mostly in oak forest and will not affect priority habitat types and sites with protected flora species.
- The proposed Wind Park will NOT cause any delay in the progress towards the achievement of the conservation objectives of the SPA, the species of designation and the bird species protected by European and Greek legislation, as defined and the proposed measures will contribute satisfactorily to minimise the expected impacts.
- The implementation of the project will be subject to the condition that recording, record keeping, information to those responsible for the impacts on avifauna and the implementation of proposed methods to minimise the possibility of impact on the installations and on the blades and the pylon will be carried out.
- The expected mortality due to bird impacts on the wind turbines of the Wind Park is moderate to low. However, for species such as Black-backed Stork, Stork, Black Vulture, Vulture, and large raptors it is a significant impact due to the small population size and low breeding rate, with a corresponding significant impact on the overall population in the area. The project owner, by implementing all proposed measures, would minimize adverse impacts to these species.
- Synergistic effects with adjacent planned and existing Renewable Energy Projects (RES) create moderate impacts on migratory and migratory bird species, most of which are protected. Measures to protect and reduce impacts on predator and mammal (bat) species are considered necessary to achieve both the construction of RES projects and the conservation of avifauna and the role of the area. The siting of RES projects within a 10km radius does not exacerbate the barrier effect and does not have irreversible impacts on migratory passages.
- The habitat disruption is at small scale in the short term and very small in the long term, as the actual change of use is implemented over a very small area and outside of priority habitats.
- No changes are caused to vital parameters (e.g., nutrient balance, soil degradation from potential erosion dynamics of relationships between biotic and abiotic parameters) that determine ecological function and various ecosystem services in the study area.
- No interactions with predicted or expected natural changes in the study area are induced.
- The construction and operation of the project in one of the most isolated and in population and economic decline areas contributes to the positive impact on the socio-economic environment and the protection of the forest environment through the continuous presence of the wind park

## 2.8 Supervisory map

The image below shows a fragment of a satellite image ( Google Earth ) with the locations of the wind turbines, the proposed interconnection and the alternative route marked.

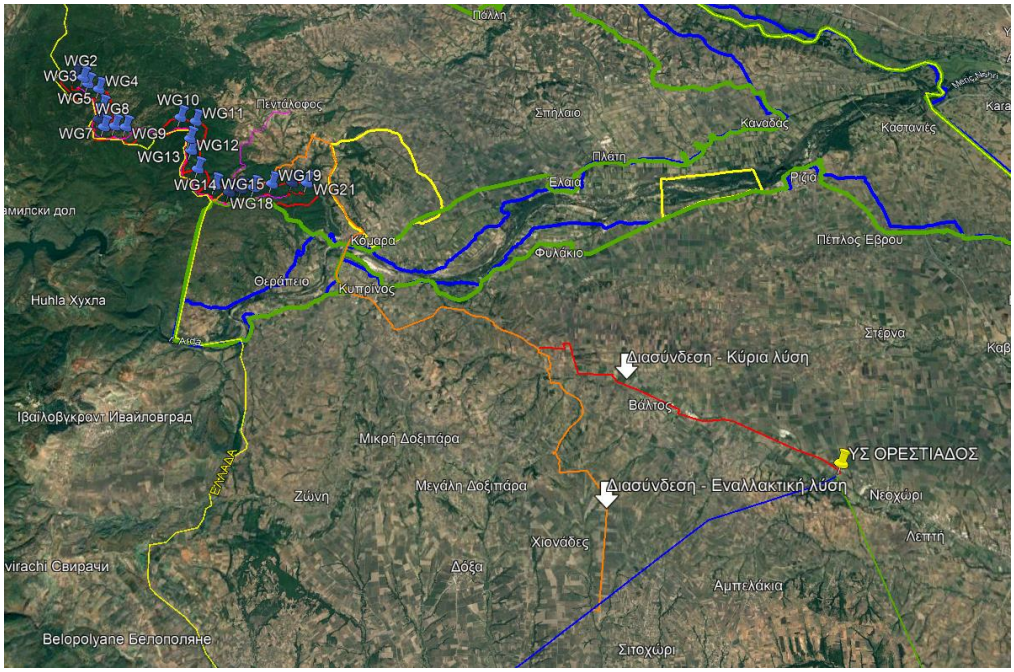



**Figure 2:** Excerpt of satellite imagery with the locations of the wind turbines, the proposed interface (red line) and the alternative interface (orange line) and the Natura areas .

## 2.9 Cross-border character of impact

Regarding the cross-border impacts of the project on the natural environment, it should be noted that the nearest protected area for avifauna is within the Greek territory, while on the border with Bulgaria there are protected areas included in the Natura 2000 network (BG0002106 and BG0001032), which were taken into account during the SEA and cannot be significantly affected either during the construction phase or during the operation phase of the project, as appropriate measures will be taken to protect the avifauna.

# 3. BRIEF DESCRIPTION OF THE PROJECT OR ACTIVITY

## 3.1 Basic data such as size, technologies, total equipment power, capacity, number of employees, population served, type and quantities of products produced.

A detailed description of the project can be found in chapter 6. In this paragraph, a brief description will be made with references where this is required in the appendices attached to this study.

The wind power plant will consist of twenty -one (21) wind turbines with a nominal power of 6.2 MW each one . W/Ts of indicative Vestas type have been selected (V 162-6.2 MW). The dimensions and main technical characteristics of the W/T are presented in the appendix. W/Ts are placed in such positions as to avoid aerodynamic shadowing and turbulence which would reduce their energy efficiency. The final positions of the W/Ts are shown on the maps in the annex. The W/Ts are connected to each other by a forest road so that access is possible for maintenance or inspection.

## 3.2 Basic elements of the construction and operation phases of the project or activity.

For the implementation of the specific project, small-scale infrastructure projects are required, which are briefly described below.

✓ Road construction projects . There is road access to the Wind Park polygon via an existing forest road. It will be necessary to improve and widen the existing road as well as coating with 3A to enable the transport of equipment to the area for a total length of approximately 20,850.50m. In addition, it will be necessary to open a new road to connect the W/Ts - internal road construction - with a total length of 1,235.40m.

✓ Configuration of W/Ts construction sites . A suitable flat space (square) with dimensions of 36.0m x 27.0m will be formed in each W/T construction site. for the assembly of the various parts of the W/T (tower, generator, subsystems, etc. ), space (square) dimensions 20.0m x 87.0m for depositing the blades, a space (square) measuring 19.0m x 61.5m for the deposition of the parts of the tower and a space (square) with dimensions of 10.0m x 125.0m for assembling the cranes. In W/T 1, 2 and 3, in order not to particularly affect the forest, there will be no square for depositing parts of the tower, but only a square for depositing a blade with dimensions of 5.0m x 87.0m

✓ W/T foundation . Excavation will be done for the foundation of each W/T. The excavation will be rectangular 27.0 × 25.5 meters and will be 3.0 meters deep. Inside the excavation, the base of each W/T will be concreted . After the construction of the W/T, the entire base will be filled with the excavated materials and the area will return to its original state. The only space occupied will be the surface of the W/T support tower with a diameter of approximately 5.5 meters.

✓ Excavation of cable trenches . It concerns the passage of power cables and weak currents, laying cables and grounding them. For the electrical connection of the W/T, an underground network will be constructed along the roads, from which the MV cables, low current cables and the grounding network will run. The cable routing trenches will be backfilled with the excavated materials and returned to their original condition.

✓ Wind power plant control center housing . The installation of three prefabricated houses - ISOBOX type - will be chosen, each measuring 2.6m wide and 8.0m to 10.0m long, in a specific location of the wind power plant.

✓ Internet connection. The connection of the W/S to the network is proposed to be made at the existing substation (S/S) of Orestiada. The proposed 33kV medium voltage underground line of the interconnection will have a total length of approximately 36.24km and will be built within the base of the existing roads.

## 3.3 Required quantities of raw materials, water and energy, expected quantities of waste, etc.

According to KYA 50910/2727/03 [83] "Measures and Conditions for Solid Waste Management. National and Regional Management Planning" and Annex IB "European Waste Catalog (ECW) (Decision 2001/118/EC)" only hazardous liquid waste according to Decision 2001/118 / e.k. ( EEL 47/2001), are the oils classified in category 13 WASTE OILS AND WASTE LIQUID FUELS, specifically in category 13 02 06 "synthetic engine, gearbox and lubrication oils" and 13 01 "waste hydraulic oils".

**During the construction phase** of the project, liquid waste may be generated from the discharge of mineral oils from the machines, which are considered dangerous for the environment and must necessarily be collected in special containers and removed from the work sites for recycling. It is also strictly forbidden to change oils and other similar work in the project area. In particular, it is suggested that the maintenance of the machines be carried out in organized workshops outside the area of the projects or at the approved construction site of the project, in which there must be a provision to avoid soil pollution, with a cement coating and a network to collect the leaks. In addition, in the event of an accident (e.g. breaking a gearbox or crankcase ) , the maintenance and repair should be carried out with full control and zero oil leakage into the environment. In case of leakage, the oils should be placed in suitable containers until they are collected by the appropriate bodies.

### *3.3.1. Liquid waste during construction*

Liquid personnel waste

Chemical toilets will be installed for the sanitary needs of the construction site staff. The production of domestic liquid waste by the staff, which needs management based on the average per capita consumption (100 l/ cap /d), is about 5 $m^3$/d.

Liquid construction waste

The garages must ensure the proper organization of the maintenance of their machines, so that the oil change and their regular maintenance are done in organized garage areas in the neighboring settlements and not within the project site.

Also, the washing of concrete machinery or asphalt processing machinery should be done at the facilities of their companies and not at the construction site of the project or freely in the countryside. In an emergency situation where maintenance must be done at the construction site, the oils, valves and other products of the mechanical parts of earthmoving and other machinery are shown in the table below with EKA codes (1301), (1302) and must be collected and disposed of appropriately, as provided by law.

| N/A | Description | EKA code | Space Temporary Storage | Estimated quantities |
|---|---|---|---|---|
| 1 | Waste hydraulic oils | 13 01 | Construction site | 500 lit |
| 2 | Waste engine gearbox and lubrication oils | 1302 06 | Construction site | 300 lit |

**Table 5:** Liquid construction waste

### *3.3.2. Municipal Solid Waste during construction*

For the collection of urban solid waste, appropriate bins will be placed on the construction site. Regarding municipal waste, the EKA codes of the waste to be produced are shown in the table below.

The maximum daily production of mixed MSW during the construction of the project (100% site occupancy) is estimated at a maximum of 60 people * 0.5 kg / person / day = 30 kg / peak day.

| N/A | Description | EKA code | Space Temporary Storage | Estimated quantities |
|---|---|---|---|---|
| **1** | Separately collected parts of household waste | 20 01 | suitable municipal waste bins at the construction site | 22 tn |
| **2** | Papers and cardboards | 20 01 01 | suitable municipal waste bins at the construction site | 4 tn |
| **3** | Glass | 20 01 02 | suitable municipal waste bins at the construction site | 0.5 tn |
| **4** | Biodegradable kitchen and residential waste | 20 01 08 | suitable municipal waste bins at the construction site | 3 tn |
| **5** | Wood | 20 01 38 | suitable municipal waste bins at the construction site | 5 tn |
| **6** | Plastic | 20 01 39 | suitable municipal waste bins at the construction site | 5 tn |
| **7** | Metals | 20 01 40 | suitable municipal waste bins at the construction site | 15 tn |

**Table 6:** Urban Solid Waste

### *3.3.3 Excavation, construction and demolition waste (AEKK)*

The solid waste that will be created by the works, with the completion of the works should be removed. The EKA codes of the solid waste that will be produced during the construction phase are listed in the table below.

| N/A | Description | EKA code | Space Temporary Storage | Estimated quantities |
|---|---|---|---|---|
| **1** | Construction and Demolition Waste (Includes Excavated Soil from Contaminated Sites) | 17 | Construction site | 0 tn |
| **2** | Concrete | 17 01 01 | Construction site | 0.5 tn |

**Table 7:** Excavation, construction and demolition waste

The project **during its operation** does not generate liquid waste. The liquids necessary for the maintenance of the wind turbines will be temporarily stored in suitable containers and then collected by a suitably licensed operator. They do not apply to W/T S/S oils, as they will be dry type. A special oil collection chamber will be built at the base of the S/S of the substation, in order to avoid any deposition or disposal of them on the ground and in the underground water bodies. The chambers will be waterproofed and the oils will be collected by an appropriately licensed operator.

The following table presents the codes according to EKA of the waste streams that are estimated to arise during the operation of the project, as well as the estimated quantities.

| WASTE | WASTE DESCRIPTION | EKA CODE | V162 | total | M.U. |
|---|---|---|---|---|---|
| **NON-HAZARDOUS WASTE** | | | **kgr / lt / pcs per W/T** | | |
| Plastic | plastic packaging | 15 01 02 | 5 | 165 | kg |
| Paper and cardboard | paper and cardboard packaging | 15 01 01 | 5 | 165 | kg |
| Electric/ electronic equipment | waste electrical and electronic equipment other than that referred to in items 200121, 200123 and 200135 | 20 01 36 | 0.5 (unscheduled tasks) | 16.5 | kg |
| **dangerous wastes** | | | **kgr / lt / pcs per W/T** | | |
| Used engine oils | non-chlorinated mineral-based hydraulic oils; | 13 01 10* | 10 (+ unscheduled tasks) | 330 | Lt |
| Contaminated empty containers | packaging containing residues of hazardous substances or contaminated by them | 15 01 10* | 2 (+ unscheduled tasks) | 66 | pc |
| Contaminated absorbent materials | absorbent materials, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated with hazardous substances | 15 02 02* | 10 (+ unscheduled tasks) | 330 | kg |
| Contaminated oil filters | oil filters | 16 01 07* | 3 | 99 | kg |
| Antifreezes | antifreeze fluids containing dangerous substances | 16 01 14* | 5lt/ year (for unplanned works) 400lt/5years (for planned works) | 165 | Lt |
| Used batteries | batteries containing mercury | 16 06 03* | 40kg/3 years | 440.0 | kg |
| Fluorescent lamps | fluorescent tubes and other waste containing mercury | 20 01 21* | 4pc/ year | 132 | pc |
| Empty aerosol containers | metal packaging containing a hazardous matrix of solid porous material (e.g. asbestos), including empty pressure receptacles | 15 01 11* | 1 kg / year | 33 | kg |
| Organic solvents | waste from paints and varnishes containing organic solvents or other hazardous substances | 08 01 11* | 1 kg / year | 33 | kg |
| Waste colors | waste from paints and varnishes containing organic solvents or other hazardous substances | 08 01 11* | 1.5lt more unscheduled tasks | 49.5 | Lt |
| Waste waterproofing materials | waste adhesives and sealants containing organic solvents or other hazardous substances | 08 04 09* | 1.5lt more unscheduled tasks | 49.5 | Lt |

**Table 8:** Codes according to EKA of the waste streams

### *3.3.4. Liquid waste during operation*

Liquid personnel waste

Chemical toilets will be installed for the sanitary needs of the maintenance staff. The production of domestic liquid waste by the staff, which needs management based on the average per capita consumption (100 l/ cap /d), is about 5 $m^3$/d.

### *3.3.5. Municipal Solid Waste during operation*

During the operation of the project, no urban solid waste streams will be produced.

# 4. OBJECTIVE AND FEASIBILITY OF IMPLEMENTING THE PROJECT OR ACTIVITY - WIDER ASSOCIATIONS

## 4.1 Objective and feasibility

Due to the significant environmental impacts of energy production using conventional fuels – oil, coal, uranium , etc. and the need for available energy to maintain today's standard of living, the production of electricity from Renewable Energy Sources and indeed with zero environmental impact is today a global priority. In combination with the significant benefits that the domestic production of renewable energy has for the national and local economy, the promotion of R.E.S. -Renewable Energy Sources- has become one of the most important national goals.

As part of this effort, the development of renewable energy production investments in Greece has begun. Part of these efforts is the construction of the proposed project.

### *4.1.1 Objective and feasibility of carrying out the considered project or activity.*

The importance and necessity of this project is great because wind power plants:

- Use an inexhaustible source of energy (wind energy) to produce electricity and help save conventional energy resources.
- Contribute to strengthening energy independence and security of energy supply at national level.
- Can be geographically dispersed and lead to the decentralization of the energy system - Decentralized Energy Production, (Distributed Power Generation)-, making it possible to cover energy needs at local and regional level, relieving infrastructure systems and reducing energy transmission losses, by producing energy at the point of consumption, decongest power lines and postpone investments in the electrical network.
- Are not affected by the fluctuations of the international economy and in particular the prices of conventional fuels.
- Investments create jobs at the local level and contribute to the decentralization of employment.
- Generate significant revenue for the local community by paying 3% of gross revenue to the local municipality under current legislation.
- Limit the rate of development of new central power plants of conventional technology.
- Promote the development of economic activities with a significant contribution to development and social goals.
- Constitute a social contribution of the producer and contribute to sustainable development, the quality of life and the protection of the environment.
- Are friendly to the environment and people and their utilization is generally accepted by the public.
- Reduce the production of gaseous emissions contributing to the protection of the environment.
- Advance the EU and Kyoto Protocol targets of reducing greenhouse gas emissions and of the penetration of RES in total electricity generation to 35% - or perhaps 45% with the latest developments - by 2030.

- Are the most environmentally friendly way to produce large-scale Renewable Energy because they occupy 50 times less land than Photovoltaic Stations for the same energy produced.

The aim of the project under study is to exploit the wind potential of the area, which is also an inexhaustible natural resource, in a way that contributes to the general reduction of pollution of the atmosphere, the subsoil and water resources due to the replacement of the energy produced by conventional power plants, but also saving fuel for the benefit of the national economy.

### *4.1.2 Developmental, environmental, social and other criteria that support the implementation of the project or activity.*

Following the aforementioned statements, the project under study is compatible with the environment. Its realization is considered important, as it will contribute to saving energy, limiting the outflow of foreign exchange from the national economy – for required fuel, mainly oil - but also to the protection of the environment by significantly reducing the production of gaseous emissions and the consumption of water and raw material. Its implementation will contribute to the country's effort to reduce greenhouse gas emissions, while it will have positive effects on the Greek energy balance, on increasing employment in the region and on local and regional development in general.

### *4.1.3 Benefits expected at local, regional or national level.*

The installation of the wind power plant, apart from the economic dimension it certainly has for the investors and for the municipalities of the region - through the reimbursing fees to them -, will also contribute to the development of the wider region, given the employment that will be created during the implementation stage of the project, as well as its subsequent operation.

Significant benefits for the local, regional and national economy result from the establishment and operation of the considered wind power plant, which are obviously related to the creation of jobs and the improvement of the socio-economic environment.

Specifically, the benefits from the operation of the project can be categorized, qualitatively and quantitatively, as follows:

1. Enhancing employment - creating jobs

It is worth noting that for every megawatt (MW) of installed wind energy capacity, 15 to 22 jobs are maintained during its construction, of which 0.5 -1 are permanent and concern the operation and management of the wind power plant at a global level (EWEA - Greenpeace 2002, Peristeris 2001).

At the local level, it is expected that 3-4 permanent jobs will be created for guarding and primary monitoring and another 5-6 permanent jobs for the maintenance of the station. Therefore, the creation of direct, indirect and secondary employment from the operation of the project is particularly important.

2. Strengthening local revenues and household electricity consumers

Each electricity producer from R.E.S. who is granted a production license after the entry into force of N.3468/2006, is charged, from the start of the commercial operation of

his station, with a special fee. This fee corresponds to a 3% percentage on the sales price of electricity to the competent System or Network Operator, before VAT.

The amounts corresponding to the special fee are withheld by the competent Administrator and are attributed as follows:

2.1) An amount of up to 1% on the pre-VAT sales price of electricity from RES is attributed to supply license holders who supply electricity to residential consumers of the first degree municipality in which the RES stations are installed, with the aim of crediting up to this total amount the electricity consumption bills of domestic consumers.

Beneficiaries of the credit of this paragraph are, by priority, household consumers within the administrative boundaries of the M.U. (former municipal or community apartment) in which the RES stations are installed and then the domestic consumers of the other municipal or community apartments. The credit is carried out in the settlement account of each beneficiary, in proportion to the energy consumed, provided that the above amount is not exceeded in total.

2.2) Rate amount of 0.3% on the -before VAT- sale price of electricity from R.E.S. attributed to the Special Fund for the Implementation of Regulatory and Environmental Plans (ETERPS).

2.3) 80% of the remaining amount is attributed to the municipality (first degree), within the administrative limits of which the R.E.S. stations are established, and by a percentage of 20% to the Municipality(s) of the first degree, through whose territory the line connecting the station to the System or the Network passes.

If the station is located within the administrative boundaries of more than one MUNICIPALITY, the amounts from the special fee are distributed among them, according to the power of the station's units installed in the area of each MUNICIPALITY.

Also, the amounts corresponding to the special fee are entered in a separate code of the revenue budget of the relevant MUNICIPALITY. first degree ("Revenues from renewable energy power plants") and are available compulsorily and exclusively, at a rate of 80%, for the execution of environmental actions of local development and social support projects, in areas within the boundaries of the M.U. (former municipal or community apartment) where the station is installed or the connecting line passes and in a percentage of 20%, in the rest of the region of the concerned MUNICIPALITY of the first degree.

Based on the aforementioned, each Municipality, each M.U. and each postal code as well as the citizens will have a direct benefit from the operation of the wind power plant.

Also, the annual revenue from the sale to the competent System or Network Operator of the generated energy is estimated at today's current prices at approximately €18,200,000.00 with a compensation price of €0.05/ kWh .
Therefore, the annual amount corresponding to the special fee amounts to €546,000.0, of which an amount up to €182,000.00 can be credited to the electricity consumption accounts of the Municipality's household consumers, while an amount of €309,400.00 can be allocated by the Municipality for the execution of environmental actions of local development and social support projects, in accordance with the aforementioned.

3. Strengthening of local, regional and national infrastructures

The construction of the road works strengthen the local road network in the area of each M.U. and of the Municipality and contribute to the more effective treatment of forest fires, given the forest character in the project area and contribute positively to forest protection measures at regional and national level. The current condition of the existing roads is problematic with insufficient maintenance. With the operation of the project, the

road network of the project will be regularly maintained, resulting in a significant benefit to the local community.

4. Reduction in air pollutant emissions, contribution to climate change

According to GREENPEACE's data ("Wind Power or Climate Change", 2nd Edition, April 2003), every kilowatt-hour of electricity produced by wind means one less kilowatt-hour that would have been produced in some other polluting way. On average, each kilowatt-hour produced by burning coal or oil releases into the atmosphere approximately one kilogram of carbon dioxide ($CO_2$), 4-20 grams of sulfur dioxide ($SO_2$), 1.5-15 grams of nitrogen oxides ($NO_x$), 0.3-5 grams of particulate matter (PM) and many more dangerous gaseous pollutants.

Therefore, given the annual net produced electricity of 350,000kWh of the particular station with an installed capacity of 130.2MW, the annual release into the atmosphere will be avoided:

- 285,600.00 tons of carbon dioxide ($CO_2$)
- 5,208.00 tons of sulfur dioxide ($SO_2$)
- 403.20 tons of nitrogen oxides ($NO_x$)
- 268.80 tons of particulate matter (PM)

It is worth noting that the specific wind turbine will produce in this specific location an average of approximately 15,181,818 kilowatt hours (kWh) per year and thus will prevent (according to a study by GREENPEACE), the release of 12,907 tons of carbon dioxide, which means they absorb annually 17,440 acres of forest or otherwise 1,090,000 trees.

## 4.2 Historical development of the project or activity

The project is developed by the company ANEMOS EVROU M.I.K.E. which is active in the area of Renewable Energy Sources. The aim of the company is the development and operation of the wind power plant at the location “Aetokorfi” in the Municipal Unit of Trigono of the Municipality of Orestiada of the Regional Unit of Evros. At first, site visits and analyses of wind data from existing weather station data were carried out, which showed promising wind potential. At a second stage, the company continued the development of the project at an intense pace. Specifically:

1. In collaboration with an ISO 17025 certified Wind Measurement Laboratory, installed measuring masts to assess the wind potential of the area. At the site of interest measurements are carried out at the levels of 30 meters from the ground, in conjunction with LIDAR . Measurements are in progress. The first data show that the wind potential is suitable for the installation and operation of a wind power plant.

2. The company has obtained a Producer Certificate from the RAE (sub. no. VEV - 2710/2021 – 10/5/2021), its amendment with the no . 1104/2021-15/12/21 and 566/2022-6/5/22 Decisions of the President.

3. The company is preparing to submit an application for Environmental Terms Approval.

After the issuance of all the required permits, the project will be implemented and put into operation, once the necessary Operating License has been obtained. The time horizon of the activity is 25 years, the same as the estimated lifetime of the wind power plant equipment.

## 4.3 Financial details of the project or activity

### *4.3.1 Total budget estimate.*

The main financial data of the investment are roughly given in the table below:

| | **Amounts in Euros** |
|---|---|
| Wind power plant implementation cost of 130.2 MW | About 156,240,000.00 |
| Annual operation and maintenance costs | About 1,750,000.00 |
| Annual revenue from energy and power sales (estimation based on energy produced and price determination by tender) | About 18,200,000.00 |

**Table 9**: Basic approximate financial data of the investment.

### *4.3.2 Assessment of individual approximate budget of the proposed measures and actions for the environment*

It is estimated that the budget for environmental actions will be of the order of 0.5%-1% of the project's revenues.

### *4.3.3 Method of financing*

The project is planned to be financed by equity and bank loan.

## 4.4 Association of the project with other projects

In the wider area of the wind power plant under study, at a distance of up to 5Km, there is no ASPIE with an Operating License or an Installation License or with an Environmental license. Within this distance there are two ASPIE, with a Producer Certificate, with the following information [1]:

Entity: **TERNA ENERGY ANONYMOUS INDUSTRIAL COMMERCIAL TECHNICAL COMPANY A E**

Application number: Γ-010266

Location: Mavri Petra

Municipality: Orestiada

Region: Evros

Power: 45.0MW

With Manufacturer's Certificate

| | | |
|---|---|---|
| 1 | 673578 | 4620070 |
| 2 | 672813 | 4619590 |
| 3 | 672203 | 4619245 |
| 4 | 672296 | 4618242 |
| 5 | 672030 | 4617930 |
| 6 | 672602 | 4617835 |
| 7 | 672988 | 4617701 |
| 8 | 673424 | 4617628 |
| 9 | 673825 | 4617601 |

W/T coordinate table in EGSA '87

and

[1] http://www.rae.gr/geo/

Entity: AEOLIKI **TRIGONOU IKE**
Application number: Γ-013017
Location: Pentalofos - Spileo
Municipality: Orestiada
Region: Evros
Power: 136.4MW
With Manufacturer's Certificate

| | | |
|---|---|---|
| 1 | 678147.74 | 4615687.87 |
| 2 | 679029.65 | 4615335.38 |
| 3 | 679439.12 | 4615796.29 |
| 4 | 679615.61 | 4616214.00 |
| 5 | 680148.86 | 4616374.98 |
| 6 | 681054.76 | 4616007.88 |
| 7 | 678969.21 | 4614534.01 |
| 8 | 679359.69 | 4613835.35 |
| 9 | 679345.76 | 4613058.61 |
| 10 | 684179.07 | 4611038.88 |
| 11 | 686062.58 | 4609329.04 |
| 12 | 686674.73 | 4609177.74 |
| 13 | 688950.03 | 4612264.05 |
| 14 | 689721.07 | 4612042.39 |
| 15 | 689534.77 | 4613240.77 |
| 16 | 690322.61 | 4613391.13 |
| 17 | 690853.29 | 4613368.89 |
| 18 | 689413.92 | 4615534.00 |
| 19 | 689650.74 | 4616344.36 |
| 20 | 690046.86 | 4616640.65 |
| 21 | 691359.61 | 4616391.93 |
| 22 | 691854.10 | 4616373.24 |

W/T coordinate table in EGSA '87

The positions of these stations are shown in the image below.

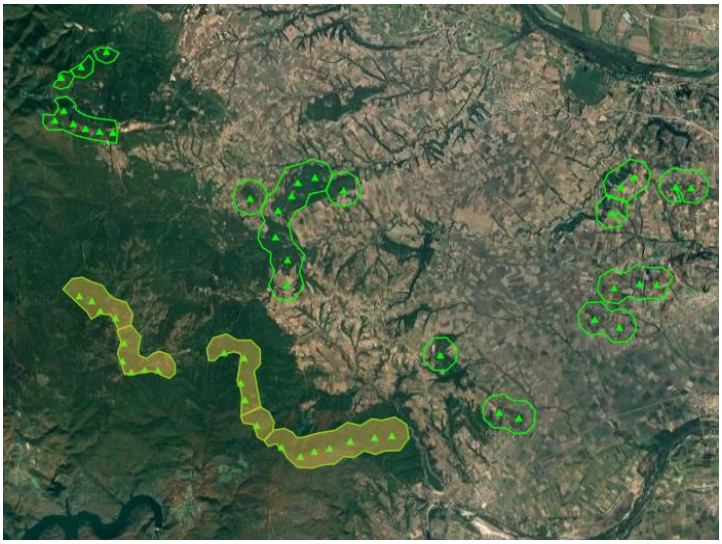


**Figure 3:** Location of wind power plant and the geographical footprint of applications for RES projects in the surrounding area.[2]

No other type of industrial facilities are located in the project area, so that the presence of the wind power plant in this location creates problems of interference or co-zoning with them. In the study area there are telecommunications facilities, but at a great distance from the nearest W/T.

[2] ***Source:*** *http://www.rae.gr/geo/*

# 5. COMPATIBILITY OF THE PROJECT OR ACTIVITY WITH STATUTORY SPATIAL AND URBAN PLANNING COMMITMENTS OF THE AREA

## 5.1 Location of the project or activity in terms of areas of the natural and man-made environment of the region, such as:

### *5.1.1 Established boundaries of settlements and approved town planning plans*

The location of the considered project is outside the boundaries of settlements and approved urban planning. The nearest settlements are:

| APPROXIMATE DISTANCE FROM THE NEAREST WIND TURBINE (in meters) | | | |
|---|---|---|---|
| KOMARA | 2950 | ORMENIO | 11250 |
| THERAPEIO | 3510 | PLATI | 11510 |
| PENTALOPHOS | 3580 | ZONI | 11670 |
| MILIA | 4210 | KERAMOS | 12520 |
| KIPRINOS | 4298 | G. DOKSAPARA | 13200 |
| GALHNH | 4780 | DIKEA | 12780 |
| PETROTA | 6250 | KRIOS | 14520 |
| AMMOVOUNO | 8070 | ARZOS | 14850 |
| ELEA | 9610 | DILOFOS | 17532 |
| FILAKION | 9650 | CANADAS | 17980 |
| SPILEO | 9960 | RIZIA | 18650 |
| M. DOKSAPARA | 10620 | KASTANIES | 23160 |
| PTELEA | 10500 | MARASIA | 23284 |
| PALLI | 10520 | ORESTIADA | 29430 |

**Table 10**: Distances of settlements from the nearest wind turbine.

### *5.1.2 Boundaries of the national system of protected areas of Law 3937/2011 (A'60)*

According to the Joint Ministerial Decision 3937/2011 the location of the proposed project **does not belong** to the NATURA 2000 network as shown in maps 4 and 5 . Specifically, the location of the W/T does not belong to any "Proposed Area of Community Interest ( PSCI )", nor to any " Special Protection Zone ( SPA )" of the avifauna according to law 3937/2011.

The project development area is in the immediate vicinity of Natura 2000 areas (85 m from ZEP - Yazovir Ivaylovgrad BG0002106 – W/T 9 and 39 m from ZEP - Riverside Forest of Northern Evros and Arda GR1110008 – W/T 17), while the accompanying projects (interconnection) run for a limited distance (about 400 m) through Natura 2000 area (ZEP - Riverside Forest of North Evros and Arda GR1110008). Therefore, it was considered appropriate to carry out a Special Ecological Assessment, which accompanies the submitted E.I.S.

| Α/Α | ΚΩΔΙΚΟΣ | ΚΑΤΗΓΟΡΙΑ | ΟΝΟΜΑΣΙΑ ΤΟΠΟΥ | ΟΝΟΜΑΣΙΑ ΤΟΠΟΥ | ΕΚΤΑΣΗ (ha) |
|---|---|---|---|---|---|
| | | | **1 ΒΟΡΕΙΑ ΕΛΛΑΔΑ** | | |
| | | | ***11 ΑΝΑΤΟΛΙΚΗ ΜΑΚΕΔΟΝΙΑ ΘΡΑΚΗ*** | | |
| | | | **ΕΒΡΟΣ** | | |
| 1 | GR1110002 | ΖΕΠ | DASOS DADIAS - SOUFLI | ΔΑΣΟΣ ΔΑΔΙΑΣ-ΣΟΥΦΛΙ | 41111,58 |
| 2 | GR1110003 | ΕΖΔ | TREIS VRYSES | ΤΡΕΙΣ ΒΡΥΣΕΣ | 9912,62 |
| 3 | GR1110004 | ΕΖΔ | FENGARI SAMOTHRAKIS, ANATOLIKES AKTES, VRACHONISSIDA ZOURAFA KAI THALASSIA ZONI | ΦΕΓΓΑΡΙ ΣΑΜΟΘΡΑΚΗΣ, ΑΝΑΤΟΛΙΚΕΣ ΑΚΤΕΣ, ΒΡΑΧΟΝΗΣΙΔΑ ΖΟΥΡΑΦΑ ΚΑΙ ΘΑΛΑΣΣΙΑ ΖΩΝΗ | 16437,741 |
| 4 | GR1110005 | ΕΖΔ | VOUNA EVROU | ΒΟΥΝΑ ΕΒΡΟΥ | 42372,5 |
| 5 | GR1110006 | ΖΕΠ | DELTA EVROU | ΔΕΛΤΑ ΕΒΡΟΥ | 12557,92 |
| 6 | GR1110007 | ΕΖΔ | DELTA EVROU KAI DYTIKOS VRACHIONAS | ΔΕΛΤΑ ΕΒΡΟΥ ΚΑΙ ΔΥΤΙΚΟΣ ΒΡΑΧΙΩΝΑΣ | 9857,56 |
| 7 | GR1110008 | ΖΕΠ | PARAPOTAMIO DASOS VOREIOU EVROU KAI ARDA | ΠΑΡΑΠΟΤΑΜΙΟ ΔΑΣΟΣ ΒΟΡΕΙΟΥ ΕΒΡΟΥ ΚΑΙ ΑΡΔΑ | 25931,73 |
| 8 | GR1110009 | ΖΕΠ | NOTIO DASIKO SYMPLEGMA EVROU | ΝΟΤΙΟ ΔΑΣΙΚΟ ΣΥΜΠΛΕΓΜΑ ΕΒΡΟΥ | 29275,36 |
| 9 | GR1110010 | ΖΕΠ | OREINOS EVROS - KOILADA DEREIOU | ΟΡΕΙΝΟΣ ΕΒΡΟΣ – ΚΟΙΛΑΔΑ ΔΕΡΕΙΟΥ | 48907,49 |
| 10 | GR1110011 | ΖΕΠ | KOILADA ERYTHROPOTAMOU: ASVESTADES, KOUFOVOUNO, VRYSIKA | ΚΟΙΛΑΔΑ ΕΡΥΘΡΟΠΟΤΑΜΟΥ: ΑΣΒΕΣΤΑΔΕΣ, ΚΟΥΦΟΒΟΥΝΟ, ΒΡΥΣΙΚΑ | 9587,12 |
| 11 | GR1110012 | ΖΕΠ | SAMOTHRAKI: OROS FENGARI KAI PARAKTIA ZONI | ΣΑΜΟΘΡΑΚΗ: ΟΡΟΣ ΦΕΓΓΑΡΙ ΚΑΙ ΠΑΡΑΚΤΙΑ ΖΩΝΗ | 21021,87 |
| | | | **ΞΑΝΘΗ** | | |
| 12 | GR1120003 | ΕΖΔ | OROS CHAINTOU - KOULA KAI GYRO KORYFES | ΟΡΟΣ ΧΑΪΝΤΟΥ-ΚΟΥΛΑ & ΓΥΡΩ ΚΟΡΥΦΕΣ | 3491,99 |
| 13 | GR1120004 | ΖΕΠ | STENA NESTOU | ΣΤΕΝΑ ΝΕΣΤΟΥ | 8752,99 |
| 14 | GR1120005 | ΕΖΔ | AISTHITIKO DASOS NESTOU | ΑΙΣΘΗΤΙΚΟ ΔΑΣΟΣ ΝΕΣΤΟΥ | 2335,86 |
| | | | **ΡΟΔΟΠΗ** | | |
| 15 | GR1130006 | ΕΖΔ | POTAMOS FILIOURIS | ΠΟΤΑΜΟΣ ΦΙΛΙΟΥΡΗΣ | 2058,44 |
| 16 | GR1130007 | ΕΖΔ | POTAMOS KOMPSATOS (ΝΕΑ ΚΟΙΤΗ) | ΠΟΤΑΜΟΣ ΚΟΜΨΑΤΟΣ (ΝΕΑ ΚΟΙΤΗ) | 423,65 |
| 17 | GR1130008 | ΕΖΔ | MARONEIA - SPILAION | ΜΑΡΩΝΕΙΑ-ΣΠΗΛΑΙΟ | 1,31 |
| 18 | GR1130009 | ΕΖΔ | LIMNES KAI LIMNOTHALASSES TIS THRAKIS - EVRYTERI PERIOCHI KAI PARAKTIA ZONI | ΛΙΜΝΕΣ & ΛΙΜΝΟΘΑΛΑΣΣΕΣ ΤΗΣ ΘΡΑΚΗΣ-ΕΥΡΥΤΕΡΗ ΠΕΡΙΟΧΗ ΚΑΙ ΠΑΡΑΚΤΙΑ ΖΩΝΗ | 29455,98 |
| 19 | GR1130010 | ΖΕΠ | LIMNES VISTONIS, ISMARIS - LIMNOTHALASSES PORTO LAGOS, ALYKI PTELEA, XIROLIMNI, KARATZA | ΛΙΜΝΕΣ ΒΙΣΤΩΝΙΣ, ΙΣΜΑΡΙΣ-ΛΙΜΝΟΘΑΛΑΣΣΕΣ ΠΟΡΤΟ ΛΑΓΟΣ, ΑΛΥΚΗ ΠΤΕΛΕΑ, ΞΗΡΟΛΙΜΝΗ, ΚΑΡΑΤΖΑ | 18217,14 |
| 20 | GR1130011 | ΖΕΠ | KOILADA FILIOURI | ΚΟΙΛΑΔΑ ΦΙΛΙΟΥΡΙ | 37565,9 |
| 21 | GR1130012 | ΖΕΠ | KOILADA KOMPSATOU | ΚΟΙΛΑΔΑ ΚΟΜΨΑΤΟΥ | 16600,86 |

**Table 11:** Details of the Natura Network in E.M.-Th.

| TABLE OF DISTANCES W/T FROM AREAS OF ENVIRONMENTAL INTEREST | | |
|---|---|---|
| **N/A** | protected area<br>( Greek Territory) | Distance from nearest W/T (m.) |
| **1** | NATURA spa | 39.08m from WT17 |
| **2** | PROTECTED AREAS FOR BIRDS (IBA) | 1807 m. from WT21 |
| **3** | WILDLIFE REFUGE | 13844 m. from WT21 |

**Table 12**: Table of distances from the areas of environmental interest- Distances from protected areas

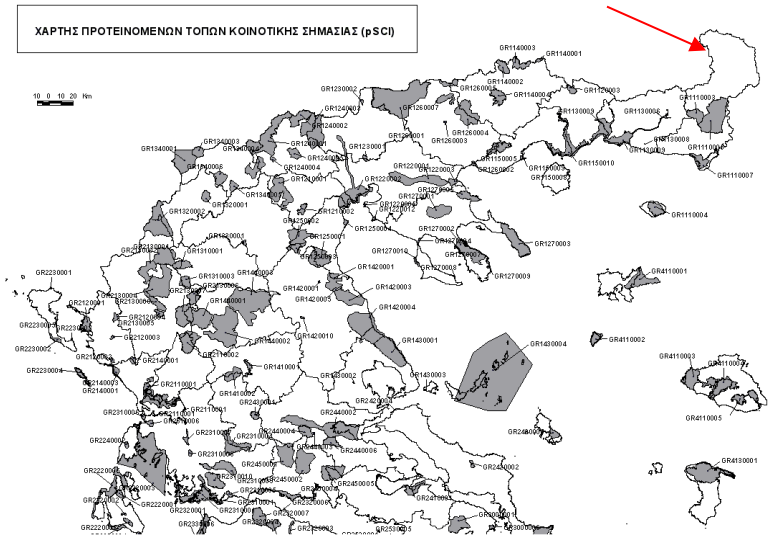



**Figure 4**: Map of Proposed Sites of Community Importance (Scale 1:2,200,000)

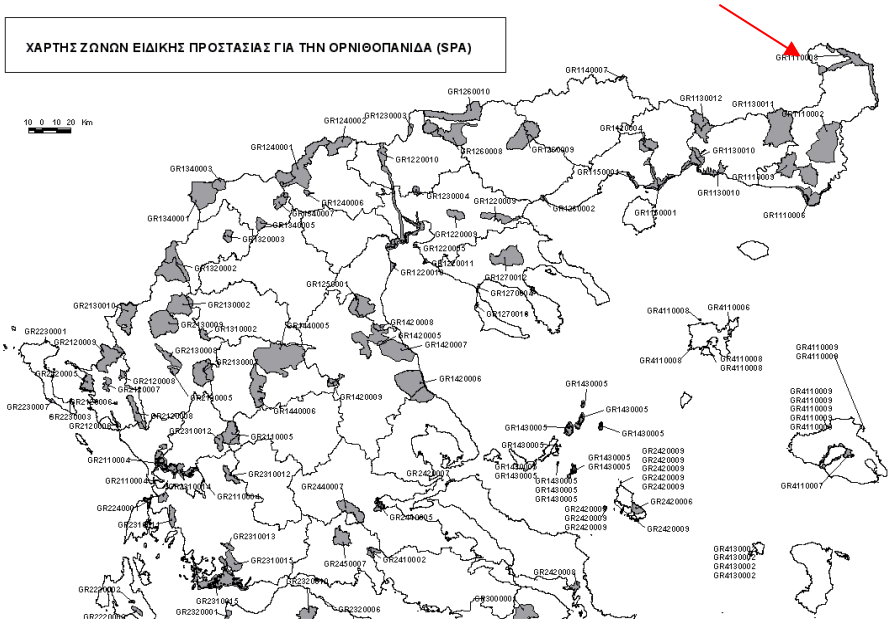



**Figure 5:** Map of Special Protection Zones for Bird Fauna (SPA) (Scale 1:2,200,000)

### *5.1.3 Forests, forest lands and reforested lands*

According to what is known, the area of the project belongs to the forest lands and is subject to the provisions of the forest legislation. For the R.U. of Evros there is a posted forest map of the local and municipal communities of the Municipalities of Alexandroupoli, Soufli , Didymoteicho, Orestiada and Samothraki with no . prot .: 2601/12-02-2021 (AD: 6ZP0OPIY-0B4), as well as on private lands. The ownership status of the lands that are not classified as forest will be investigated in the next stages of the licensing, before submitting an application for the issuance of an Installation laicense, as defined by the current legislative framework for the licensing of RES projects.

### *5.1.4 Social infrastructure facilities, utilities, etc.*

No new shared infrastructure/utility facilities are known near the project.

### *5.1.5 Sites of archaeological interest*

According to the following published information of Ministerial Decisions, in the area of the Municipality of Oestiada Mykis and at **a distance of six (6) km** from the location of the wind power plant there are the following sites[3] of archaeological interest. All are at significant distances from the location of the project and are not affected by it, as can be seen in the following chapters of the study.

| EXPLANATORY BOARD OF POINTS OF CULTURAL AND HISTORICAL INTEREST | | | | |
|---|---|---|---|---|
| N/A | Name of Monument | GAZETTE | Type of Monument | Distance from nearest W/T (m.) |
| 1 | Mikri Doxipara - Zone, Plutos Kyprinou | YYPO/GDAPC/ARCH/A1/Φ43/21634/911 & Gazette: 58/AAP/2011-04-06 & YYPO/GDAPC/ ARCH/A1/Φ43/53573/2466 Gazette: 169/AAP/2011-06-27 | Land Archaeological Site | 10,064 m. from AG21 |
| 2 | Mikri Doxipara - Zone, Ploutos Kyprinou, Zone A | YYPO/GDAPC/ARCH/A1/Φ43/21634/911 & Gazette: 58/AAP/2011-04-06 & YYPO/GDAPC/ARCH/A1/Φ43/53573/2466 Gazette: 169/AAP/2011-06-27 | Protection Zone A | 10,709 m. from AG21 |
| 3 | Mikri Doxipara - Zone, Ploutos Kyprinou, Zone B | YPPO/GDAPC/ARCH/A1/Φ43/21634/911 & Gazette: 58/AAP/2011-04-06 & YPPO/GDAPC/ARCH/A1/Φ43/53573/2466 Gazette: 169/AAP/2011-06-28 | Protection Zone B | 10,064 m. from AG21 |
| 4 | Forestry Building, Orestiada, Evros, property of the Ministry of Agriculture | HY YPPO/DILAP/C/3246/3328 Official Gazette: 56/B/1991-02-14 | Newer Monument | 30,827 m. from AG21 |

**Table 13:** Distances of the nearest archaeological monuments

[3] http://listedmonuments.culture.gr/search_declarations.php


**Figure 6:** Archaeological sites[3]. The location of the project is marked with a red arrow.

## 5.2 Applicable zoning and urban planning regulations in the area of the project or activity

The Special Framework for Spatial Planning and Sustainable Development for Renewable Energy Sources is in force, without having been modified (Government Gazette 2464/B/03-12-2008) : "Approval of a special spatial planning and sustainable development framework for renewable energy sources and its strategic environmental impact study".

In this EIA, the project's compatibility with the Spatial Framework for RES is examined and verified - chapter 5.3.

### *5.2.1 Provisions and directions of the General, the Special and the relevant Regional Framework for Spatial Planning and Sustainable Development .*

In 2018, the Regional Spatial Framework of the Region of Eastern Macedonia and Thrace was revised with Decision : No. MINISTRY/DCHORS/68605/1092 (Government Gazette 248/AAP/2018).

Key points in the review are the following, as set out in the Framework:

1. "The directions of the development pattern are defined as follows:

• Reconstruction of the primary sector, with a reduction in dependence on subsidies, an increase in competitiveness and extroversion and the interconnection with the secondary sector in order to produce and market products with increased added value. Promoting polyculture in agriculture, increasing employment and productivity in animal husbandry and further exploitation of comparative advantages in fisheries.

- Sustainable exploitation of the mineral wealth, with reconstruction and optimization of the extraction methods of the main sector of the Region, that of marble, and parallel improvement of efficiency at the level of protection and restoration of the environment and the landscape. The mining activities that appear as future production potential are supported on the condition of environmentally compatible conditions but also as long as they are in agreement with the development profile of the area.

- Reconstruction of the secondary sector - transformation into an important industrial hub, with the recognition of branches of interconnection with the primary sector, regional specialization and export character.

- Utilization of energy resources and potential, with a shift to integrated interventions that will maximize the benefits of energy sources, infrastructures and networks, exploiting potential synergies at all levels and with the Region's active integration into international energy networks. Geothermal energy, natural gas and biomass are used in particular to produce electricity in addition to covering heating needs.

- Development of transit trade, with strengthening of commercial infrastructure (Alexandroupoli and Kavala ports, Alexandroupoli - Ormenio axis , utilization of Egnatia Road and vertical axes). Development of the extroversion of the primary and secondary sectors and interconnection with wider markets.

- Development of tourism with a shift to quality, with an increase in the general tourist product in combination with a shift to quality and thematically diversified tourism, stimulation of the existing tourist flow from Eastern and South-Eastern Europe and Turkey, the promotion of special forms of soft and alternative tourism and the revival of domestic tourism and social tourism. The creation of a single tourist identity is promoted with reference to the endogenous potential and the natural, cultural, economic and social particularities of each spatial unit. The promotion of classic tourism implies its upgrading to a product with quality characteristics and its inclusion in a multi - centered and multi-thematic network. A critical parameter is the development of "green" tourism, with protection and sustainable management of the environment.

- Introduction of innovation at all levels as a condition for absorbing the maximum percentage of available resources, activating latent productive potential and turning to endogenous development with networking and mutual feeding between sectors.

- Improving the quality of life, by containing the population and upgrading infrastructure, public spaces, housing stock and services provided in large urban centers."

2. "Alexandroupolis is defined as the Primary National Pole and gateway of international and interregional reach, both in relation to Turkey and Bulgaria and the Eastern Balkans and the Black Sea countries, as well as to the Mediterranean and international sea flows. Orestiada and Didymoteicho are defined as Primary Regional Poles and together constitute an "operational - development duopoly".

3. "Basic strategic directions for the mountainous area are the highlighting of the unique identity of each region, the utilization of its productive potential in the direction of sustainable management of natural resources and eco -development and the improvement of the accessibility of the settlements. The development of livestock management plans for the development of livestock power planting, as well as forest management plans for the rational development of logging, is promoted. The certification of characteristic products such as oriental tobacco (" basmas ") is also sought to ensure the sustainability of crops in mountainous

areas. The development of special - alternative mild form tourism is promoted, as a priority within the existing settlements or forest villages, both for reasons of sustainability of tourist investments, and to strengthen the sustainability of the settlements. Incentives are sought for the construction of guesthouses and the restoration - reuse of existing valuable buildings, especially in traditional and abandoned settlements. For the interconnection of alternative tourism and the natural environment, the creation of environmental education and training centers is promoted as well as the strengthening of information centers, with the introduction of new - innovative techniques, in selected settlements, which are the main gateways to the areas of interest".

4. « Power grid. The completion of all the development projects of the 400kV basic system is promoted to ensure satisfactory voltage levels, even in cases of disturbances and to improve the capacity to receive and transfer the power produced by the RES units. The necessary projects to upgrade the high voltage network are being completed, with the most important being the planned projects in the area of Kavala, Nea Santa and Evros, while a new YT-400kV Greece-Bulgaria interconnection line, Nea Santa - Maritsa , is being promoted . The strengthening of the transmission networks is also considered necessary in relation to the reception of the loads produced by RES. »

### *5.2.2 Statutory status, according to approved plans (regulatory, general urban planning, zoning, ZOE, SCHOAP, demarcation of settlements or other plans for determining land use and building).*

The project area seems to be outside the plan and neither GIS nor ZOE has been statutory. An opinion will be obtained from the competent Construction Service of the Evros R.U.

### *5.2.3 Special management plans (ESDA, PESDA, water management plans, etc. ).*

On Monday, November 28, 2016, the Regional Council of Eastern Macedonia and Thrace approved the "Regional Solid Waste Management Plan of Eastern Macedonia and Thrace (PESDA AMTH)", in accordance with the provisions of Law 4042/2012 as amended and in force, approving with the no . 218/2016 decision of (A.D.A.: 78NS7LB-ETE) the relevant study entitled "UPDATING OF THE REGIONAL SOLID WASTE MANAGEMENT PLAN OF THE REGION OF EASTERN MACEDONIA AND THRACE (PESDA AMTH) 2016".

Subsequently, on Wednesday, December 21, 2016, the Joint Ministerial Decision (JD) with reference no. of the approval decision of the Regional Waste Management Plan (PESDA) of the Region of Eastern Macedonia - Thrace".

The project is harmonized with the approved PESDA plan. A certified manager will be used for the minimal waste from its operation (spare parts, etc.).

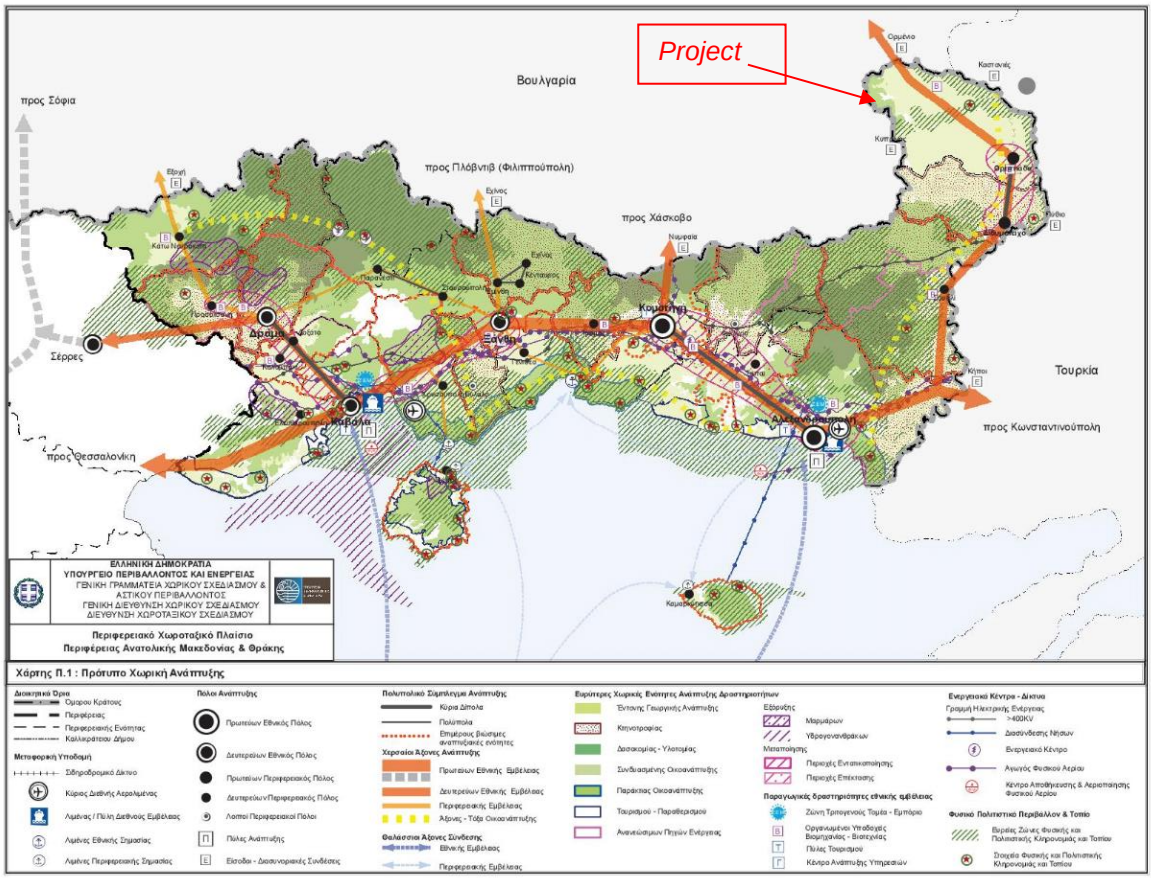



**Figure 7**: Model of Spatial Development of the E.M.-Th.

5.2.3.1 Approval of the 1st Revision of the River Basin Management Plan of the Thrace Watershed (watershed 12 "Thrace")

The 1st Revision of the River Basin Management Plan of the Water Division of Thrace was made with Decision No. E.G.: house 900 (Government Gazette 4680B – 29/12/2017).

The project is located within the Water Division of Thrace, in the LAP of Evros ( EL 1210).

LAP Evros (EL1210)

The Evros River Basin, with a total area of 53,000 km $^2$ occupies part of the eastern Balkan Peninsula and is shared between Bulgaria, Turkey and Greece. To the north and west the basin develops on Bulgarian territory, to the southeast mainly on Turkish territory and to the southwest on Greek territory. The river Evros forms the national border between Greece - Bulgaria and Greece - Turkey. The total length of the river is 528 km , of which 310 km belong to Bulgaria, while 208 km define the borders of Greece with Bulgaria and Turkey. The river basin is divided between the three states it crosses as follows:

- 35,085 km $^2$ (66.2%) belong to Bulgaria,
- 14,575 km $^2$ (27.5%) belong to Turkey, and
- 3,340 km $^2$ (6.3%) belong to Greece.

The Evros LAP (EL1210) includes the above-mentioned part of the wider Evros river basin which is located in Greek territory as well as some smaller watercourses in the southwest of the Evros basin (Loutrou, Irinis, Arapis). The LAP also includes sub -

watersheds of two more cross-border rivers, tributaries of the Evros river: the Arda river , in the area of Orestiada, and the Erythropotamos river in the Didymoteicho region. Greece shares both of these tributaries with Bulgaria.

According to the no. 900 (Government Gazette 4680B – 29/12/2017) Decision of the National Water Commission on the subject: "Approval of the 1st Revision of the River Basin Management Plan of the Thrace Water Division and the corresponding Strategic Environmental Impact Study", the project falls under the Underground Water Systems:

YYS Orestiada (EL12BT010) within which the main projects and the majority of accompanying projects are located,

b) HYS Soufli - Didymoteicho System (EL12BT150) within which part of the project's underground interconnection network is located .

The Groundwater Systems in question are in good chemical, qualitative and quantitative condition.

The pressures on the Evros LAP as a whole come from Wastewater Treatment Facilities (WTPs), industrial units, the discharge of sewage networks into a natural receiver and from large Livestock units.

The SPAs in which the project is located are all associated with protected areas according to the list of protected areas as follows:

The fissured YYS of Evros is associated with the following protected areas, according to the list of protected areas:

- SPA GR1110002 ( Dadia Forest - Soufli)
- SCI GR1110005 (Evros Mountains)
- SPA GR1110011 (Erythropotamos Valley, Asvestades, Koufovouno, Vrysika).

In accordance with the environmental objectives of the 1st Revision of the Water Division of Thrace (EL 12) approved by the 1st Revision of the SDLP, the following applies to the 199 surface water bodies:

• For 4 YS the goal is to maintain the high ecological status.

• For 129 YS the goal is to maintain good ecological status.

• For 12 YS and ITYS/TYS the goal is to achieve good ecological status / potential. This group includes the ITYS/TYS in which a monitoring station operated during the period 2013-2015. The existence of monitoring and classification data of said ITIS/TYS offers a reference base from which to assess the impact on the status of ITIS/TYS of the remedial/mitigation measures to be taken within the framework of the main measures of the FD and of the implementation of the "Prague approach" will be easier. It is therefore expected that a better monitoring of the situation will allow the recognition of the achievement of the maximum possible improvement of the bodies after the restoration measures have been taken – thus the simultaneous determination of the good ecological potential.

• For 22 ITYS/TYS the goal is to determine the ecological potential by 2021 and to take measures (if necessary) to achieve good ecological potential by 2027. This group includes the ITYS/TYS in which no monitoring station was operational during the previous period and therefore there is no basis of reference for the assessment of the improvement that will possibly be brought about by the implementation of the restoration / mitigation measures. Therefore, for these ITYS/TYS, the priority is the determination of the good ecological potential until 2021 and its achievement in the next management period. For the current management period, as is obvious, the specific ITYS/TYS are included in an exemption regime.

• For 181 YS the goal is to maintain good chemical condition.

• For 9 YS the goal is to determine the chemical status by 2021 and take measures (if needed) to achieve good chemical status by 2027.

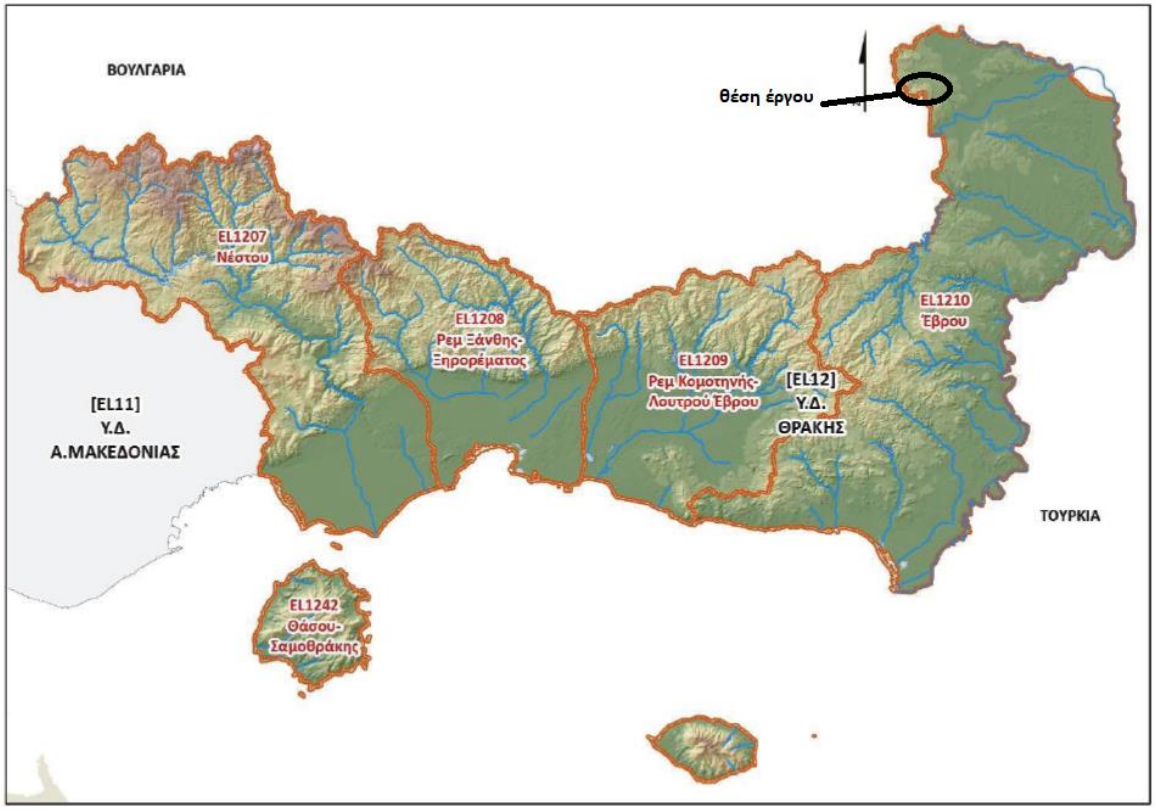
• For small elements of surface water, which are not identified as surface water bodies, they are protected by the written provisions on environmental protection as they apply today and the required measures and restrictions are taken, in order to achieve the objectives of the Directive for the water bodies in which they are directly or indirectly linked.

In accordance with the environmental objectives of the 1st Revision of the Water Division of Thrace (EL 12) approved by the 1st Revision of the EMP, the following applies to the 18 underground water bodies:

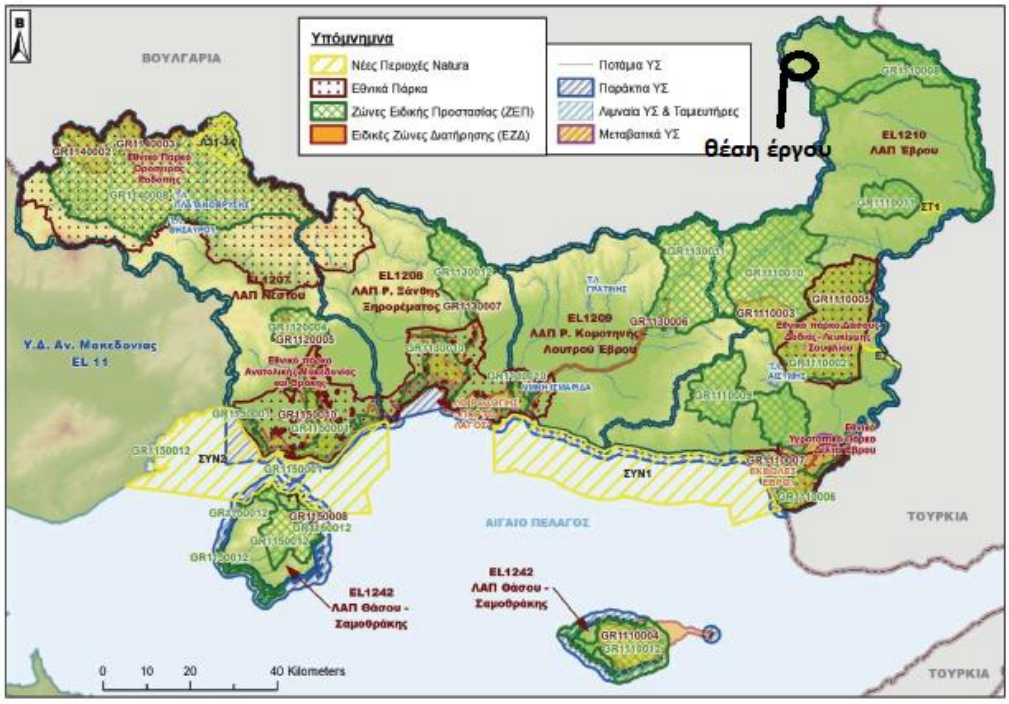
• For 18 YYS the goal is to maintain the good quantitative situation.
• There is no SIS with the aim of achieving a good quantitative status by 2027.
• For 14 YSS the goal is to maintain good chemical status.
• For 4 YSS the goal is to achieve good chemical status whenever physical conditions allow after 2027.

The Project Operator must take the necessary measures so that, from its construction and operation, it is ensured that the achievement of the above environmental objectives is not disturbed.

The project is fully harmonized with the Watershed Management Plan. Wind power plants do not use surface or underground water resources. They also do not produce liquid waste. The measures of the plan do not concern the specific project. The sites of the W/T are located outside the protected areas of the 1st Revision of the Management Plan. The location of the project and the design of the roads help in zero change of surface water flow, zero generation of transported materials and zero risk of landslides.



*Χάρτης 9: Περιοχές προστασίας οικοτόπων ή ειδών που περιλαμβάνονται στο ΜΠΠ στο ΥΔ Θράκης (EL12)*




*Χάρτης 14: Ποιοτική (Χημική) κατάσταση ΥΥΣ του ΥΔ Θράκης (EL12)*

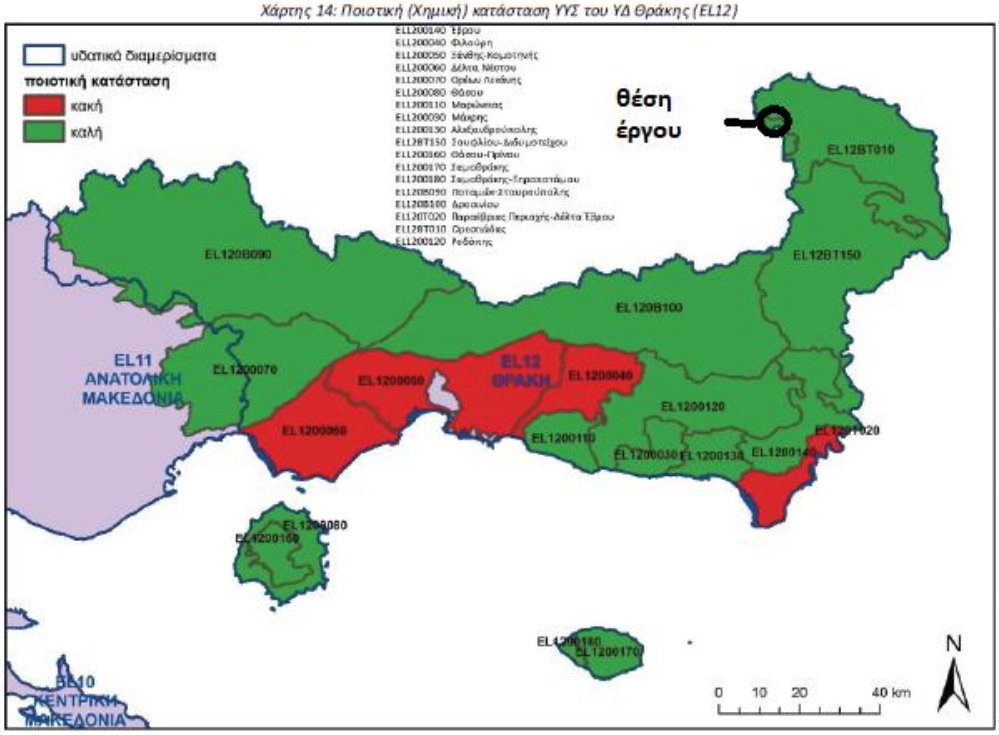
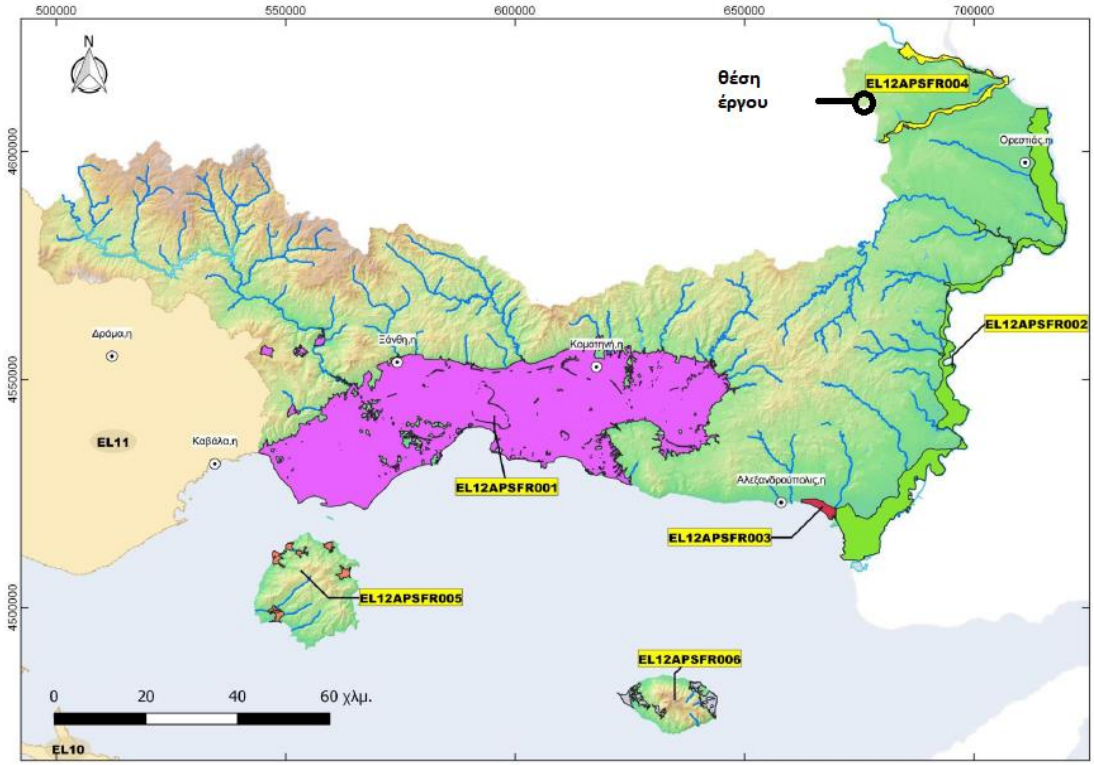



**Figure 8( a,b,c ):** a. Project location and surface water bodies, b. Location of the project and protection areas of the Ministry of Thrace, c. Location of the project and quality status of underground water systems.

5.2.3.2 Approval of the Flood Risk Management Plan for River Basins of the Water Division of Thrace (EL 12) – Official Gazette B2639 – 5/7/2018, 1st Revision 2019.

According to the 1st Revision of the Preliminary Flood Risk Assessment ( 2019), the W/T locations are outside the Potentially High Flood Risk Zones. The nearest Zone, but at a significant distance of more than 3km, is EL 12 APSFR 004 - Northern Evros and Arda areas .
A small part of the underground interconnection network passes through this Zone.
In any case, the project is subject to the terms and limitations of the Program of Measures of the relevant SDCPs, as well as the terms of the corresponding Strategic Environmental Impact Studies concerning the whole of the Water Divisions with the aim of mitigating the effects in the areas where a potential risk of flooding has been identified, as reflected in the Potentially High Flood Risk Zones, Flood Risk Maps and Flood Risk Maps.




*Εικόνα 7-13: Υδατικό Διαμέρισμα Θράκης (EL12)*

**Figure 9:** Location of the project outside the potentially high flood risk zones.

*5.2.4 Organized receptors of activities such as business parks, organized receptors of manufacturing and business activities, quarry zones, areas of integrated tourism development, areas of organized aquaculture development, etc.*

In the area of the project, there are no organized receptors of activities such as business parks, organized receptors of manufacturing and business activities, quarry zones, areas of integrated tourism development, areas of organized aquaculture development, etc.

## 5.3 Project Compatibility with the Special Spatial Planning & Sustainable Development Framework for RES.

The examination of the compatibility of the project with the EPHSAA is listed in a separate issue in the Appendix.

### *5.3.1 Project compatibility with the zoning restrictions of paragraph 1 of article 13 of Law 4685/2020*

It is noted that the project is compatible with the restrictions of article 13 of N4685/2020.

In the modification request requested by the company from RAE, the distance restrictions between the wind turbines were taken into account (indicative for Vestas V 162-6.2 MW ) of the project (>2.5 D and <5D), as well as the distance restrictions of the wind turbines of the project from the boundaries of the polygon (<3.5D).

Based on these constraints, the polygons were constrained as shown in the image below (Figure 10).

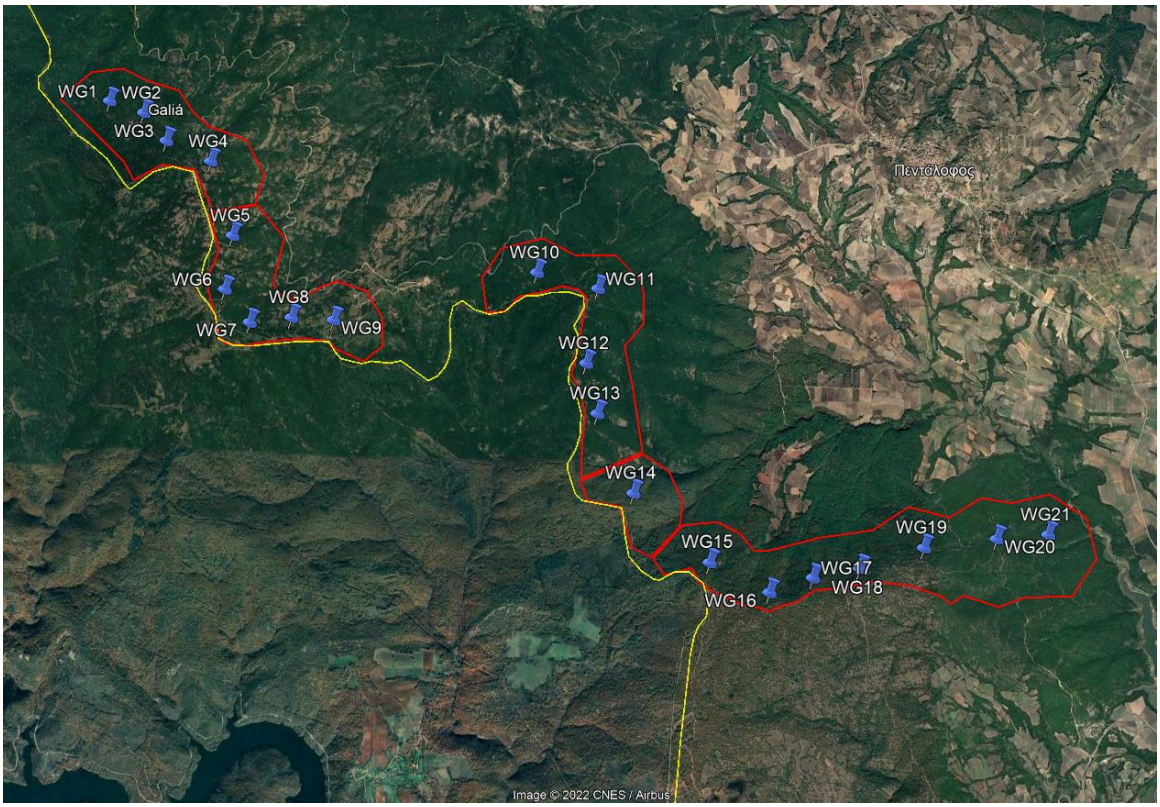



**Figure 10:** Satisfaction of distance restrictions of article 13 N4685/2020.

Specifically:

- The limitation of a minimum distance of 2.5 D (405 m) between wind turbines.
- The maximum distance limitation of 5 D (810 m) between wind turbines.
- Limiting the maximum distance of wind turbines to 3.5 D (567 m) from the boundaries of the polygon.

## 6. DETAILED DESCRIPTION OF PROJECT OR ACTIVITY DESIGN

The wind power plant at Aetokorfi , with a power of **130.2 MW ,** will consist of **twenty -one (21)** wind turbines of indicative type Vestas V 162 , with a nominal power of **6.2 MW each**. The installation of the W/P is planned to take place in the location of **Aetokorfi** , the **Municipal Unit of Trigonou,** the **Municipality of Orestiada** , the **Regional Unit of Evros**, as shown in the topographical diagrams of the annex.

### 6.1 Detailed description of the project or activity, with reference to all the main technical and geometric elements.

The production of electricity from the proposed installation is based on the movement - rotation of the blades and its conversion into electricity. The collectors produce direct current at their output which is converted into alternating current through the inverters and finally injected into the network.

Specifically, for the implementation of the station, twenty will be installed (21) Vestas wind turbines , type V 162 , of nominal power 6.2MW .

The coordinates of the W/T, the vertices of the polygon and the control hut in EGSA 87 are shown in the table below.

| ΑΝΕΜΟΣ ΕΒΡΟΥ Μ.Ι.Κ.Ε. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ΑΙΟΛΙΚΟΣ ΣΤΑΘΜΟΣ ΑΕΤΟΚΟΡΦΗ 130,2MW | | | | | | | | | |
| ΑΓ | Γεωγραφικές Συντεταγμένες | | | | | Υψόμετρο Εδάφους | Ύψος Πύργου | Διάμετρος Ρότορα | Ανώτατο ύψος ακραίου κινητού σημείου |
| Α/Α | ΕΓΣΑΧ | ΕΓΣΑΥ | WGSφ | WGSλ | Ενδεικτικός τύπος Α/Γ | (μ.) | (μ.) | (μ.) | (μ.) |
| 1 | 672923.77 | 4612566.34 | 41° 38' 55.0667" | 26° 04' 42.0521" | VESTAS V162 - 6,2MW | 507 | 149.00 | 162.00 | 737 |
| 2 | 673309.46 | 4612434.72 | 41° 38' 50.5001" | 26° 04' 58.5775" | VESTAS V162 - 6,2MW | 556 | 149.00 | 162.00 | 786 |
| 3 | 673583.52 | 4612132.85 | 41° 38' 40.5034" | 26° 05' 10.1018" | VESTAS V162 - 6,2MW | 582 | 149.00 | 162.00 | 812 |
| 4 | 674058.18 | 4611934.70 | 41° 38' 33.7096" | 26° 05' 30.3993" | VESTAS V162 - 6,2MW | 561 | 149.00 | 162.00 | 791 |
| 5 | 674341.34 | 4611171.68 | 41° 38' 08.7618" | 26° 05' 41.8304" | VESTAS V162 - 6,2MW | 534 | 149.00 | 162.00 | 764 |
| 6 | 674306.84 | 4610613.14 | 41° 37' 50.6901" | 26° 05' 39.7542" | VESTAS V162 - 6,2MW | 509 | 149.00 | 162.00 | 739 |
| 7 | 674593.71 | 4610278.50 | 41°37'39.61" | 26° 5'51.76" | VESTAS V162 - 6,2MW | 502 | 149.00 | 162.00 | 732 |
| 8 | 675001.61 | 4610355.04 | 41°37'41.77" | 26° 6'9.46" | VESTAS V162 - 6,2MW | 471 | 149.00 | 162.00 | 701 |
| 9 | 675424.80 | 4610351.17 | 41°37'41.31" | 26° 6'27.73" | VESTAS V162 - 6,2MW | 467 | 149.00 | 162.00 | 697 |
| 10 | 677456.89 | 4610944.39 | 41°37'58.91" | 26° 7'56.13" | VESTAS V162 - 6,2MW | 442 | 149.00 | 162.00 | 672 |
| 11 | 678087.96 | 4610800.12 | 41° 37' 53.7400" | 26° 08' 23.2607" | VESTAS V162 - 6,2MW | 446 | 149.00 | 162.00 | 676 |
| 12 | 678001.44 | 4610029.90 | 41°37'28.84" | 26° 8'18.67" | VESTAS V162 - 6,2MW | 395 | 149.00 | 162.00 | 625 |
| 13 | 678137.21 | 4609524.31 | 41° 37' 12.3601" | 26° 08' 24.0200" | VESTAS V162 - 6,2MW | 387 | 149.00 | 162.00 | 617 |
| 14 | 678530.36 | 4608743.56 | 41°36'46.73" | 26° 8'40.13" | VESTAS V162 - 6,2MW | 350 | 149.00 | 162.00 | 580 |
| 15 | 679311.00 | 4608091.21 | 41° 36' 24.9763" | 26° 09' 13.1613" | VESTAS V162 - 6,2MW | 359 | 149.00 | 162.00 | 589 |
| 16 | 679907.55 | 4607824.79 | 41° 36' 15.8601" | 26° 09' 38.6281" | VESTAS V162 - 6,2MW | 358 | 149.00 | 162.00 | 588 |
| 17 | 680337.08 | 4607986.71 | 41° 36' 20.7576" | 26° 09' 57.3468" | VESTAS V162 - 6,2MW | 344 | 149.00 | 162.00 | 574 |
| 18 | 680805.47 | 4608100.72 | 41° 36' 24.0599" | 26° 10' 17.6599" | VESTAS V162 - 6,2MW | 325 | 149.00 | 162.00 | 555 |
| 19 | 681449.56 | 4608331.81 | 41° 36' 31.0215" | 26° 10' 45.7189" | VESTAS V162 - 6,2MW | 290 | 149.00 | 162.00 | 520 |
| 20 | 682199.56 | 4608457.56 | 41° 36' 34.4807" | 26° 11' 18.2366" | VESTAS V162 - 6,2MW | 217 | 149.00 | 162.00 | 447 |
| 21 | 682742.53 | 4608528.25 | 41° 36' 36.3243" | 26° 11' 41.7564" | VESTAS V162 - 6,2MW | 150 | 149.00 | 162.00 | 380 |

| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Α ΣΕ ΕΓΣΑ 87 | | |
|---|---|---|
| ΚΟΡΥΦΗ | X | Y |
| A1 | 672400,82 | 4612726,74 |
| A2 | 672678,11 | 4613055,07 |
| A3 | 672999,17 | 4613108,12 |
| A4 | 673276,24 | 4612980,71 |
| A5 | 673625,71 | 4612881,04 |
| A6 | 673823,61 | 4612621,42 |
| A7 | 674009,20 | 4612476,38 |
| A8 | 674385,21 | 4612365,11 |
| A9 | 674597,96 | 4612007,98 |
| A10 | 674539,78 | 4611675,33 |
| A11 | 674160,36 | 4611537,10 |
| A12 | 673929,10 | 4611969,57 |
| A13 | 673590,31 | 4612006,75 |
| A14 | 673308,07 | 4611834,59 |
| A15 | 673175,43 | 4612040,80 |
| A16 | 672888,96 | 4612296,06 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 5.976,57μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 1.609.859,54τ.μ. | | |
| **ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Β ΣΕ ΕΓΣΑ 87** | | |
| ΚΟΡΥΦΗ | X | Y |
| B1 | 674121,40 | 4611510,86 |
| B2 | 674561,27 | 4611670,98 |
| B3 | 674860,53 | 4611343,85 |
| B4 | 674792,55 | 4610864,73 |
| B5 | 674834,07 | 4610758,90 |
| B6 | 675056,09 | 4610672,70 |
| B7 | 675283,80 | 4610836,07 |
| B8 | 675440,09 | 4610902,07 |
| B9 | 675758,95 | 4610805,68 |
| B10 | 675947,30 | 4610518,89 |
| B11 | 675960,49 | 4610243,42 |
| B12 | 675781,55 | 4610075,80 |
| B13 | 675491,62 | 4610188,84 |
| B14 | 675424,54 | 4610257,11 |
| B15 | 675181,88 | 4610278,74 |
| B16 | 674882,82 | 4610236,59 |
| B17 | 674583,41 | 4610168,25 |
| B18 | 674385,68 | 4610181,82 |
| B19 | 674341,01 | 4610246,28 |
| B20 | 674209,92 | 4610612,28 |
| B21 | 674145,03 | 4610809,41 |
| B22 | 674247,08 | 4611147,14 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 6.264,55μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 1.479.787,97τ.μ. | | |

| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Γ ΣΕ ΕΓΣΑ 87 | | |
|---|---|---|
| ΚΟΡΥΦΗ | X | Y |
| Γ1 | 676994,86 | 4610646,26 |
| Γ2 | 676920,77 | 4611016,30 |
| Γ3 | 677107,19 | 4611349,05 |
| Γ4 | 677521,89 | 4611475,72 |
| Γ5 | 677866,49 | 4611299,49 |
| Γ6 | 678285,70 | 4611310,13 |
| Γ7 | 678579,72 | 4611039,66 |
| Γ8 | 678598,29 | 4610603,20 |
| Γ9 | 678414,80 | 4610361,50 |
| Γ10 | 678522,27 | 4609912,15 |
| Γ11 | 678638,55 | 4609293,84 |
| Γ12 | 678039,93 | 4608994,05 |
| Γ13 | 678024,53 | 4609344,54 |
| Γ14 | 678049,87 | 4609607,71 |
| Γ15 | 677994,83 | 4609861,02 |
| Γ16 | 677886,74 | 4610040,93 |
| Γ17 | 677959,81 | 4610408,92 |
| Γ18 | 678002,25 | 4610836,92 |
| Γ19 | 677937,59 | 4610904,24 |
| Γ20 | 677758,29 | 4610944,00 |
| Γ21 | 677546,73 | 4610870,51 |
| Γ22 | 677317,85 | 4610819,26 |
| Γ23 | 677181,87 | 4610656,53 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 7.923,73μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 1.755.791,11τ.μ. | | |

| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Δ ΣΕ ΕΓΣΑ 87 | | |
|---|---|---|
| ΚΟΡΥΦΗ | X | Y |
| Δ1 | 678027,19 | 4608968,32 |
| Δ2 | 678644,72 | 4609271,48 |
| Δ3 | 678911,72 | 4609124,09 |
| Δ4 | 679065,88 | 4608810,48 |
| Δ5 | 679038,82 | 4608563,45 |
| Δ6 | 678764,08 | 4608247,30 |
| Δ7 | 678565,19 | 4608335,60 |
| Δ8 | 678431,22 | 4608734,38 |
| Δ9 | 678109,03 | 4608773,69 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 3.183,71μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 586.668,42τ.μ. | | |
| **ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΚΟΡΥΦΩΝ ΠΟΛΥΓΩΝΟΥ Ε ΣΕ ΕΓΣΑ 87** | | |
| ΚΟΡΥΦΗ | X | Y |
| E1 | 678782,94 | 4608233,90 |
| E2 | 679068,07 | 4608580,29 |
| E3 | 679412,20 | 4608628,77 |
| E4 | 679651,53 | 4608519,28 |
| E5 | 679785,95 | 4608358,10 |
| E6 | 679946,56 | 4608369,72 |
| E7 | 680453,92 | 4608519,79 |
| E8 | 680982,81 | 4608617,04 |
| E9 | 681348,08 | 4608869,31 |
| E10 | 681761,24 | 4608781,33 |
| E11 | 682099,65 | 4608995,36 |
| E12 | 682412,05 | 4608961,60 |
| E13 | 682818,99 | 4609069,88 |
| E14 | 683188,23 | 4608845,36 |
| E15 | 683281,89 | 4608437,17 |
| E16 | 683001,78 | 4608046,59 |
| E17 | 682531,92 | 4608023,11 |
| E18 | 682242,45 | 4607912,24 |
| E19 | 681886,74 | 4608008,83 |
| E20 | 681755,42 | 4607918,57 |
| E21 | 681665,75 | 4607989,44 |
| E22 | 681351,43 | 4608082,09 |
| E23 | 680975,94 | 4608105,86 |
| E24 | 680551,98 | 4608009,75 |
| E25 | 680396,82 | 4607998,00 |
| E26 | 680205,23 | 4607867,64 |
| E27 | 680067,68 | 4607830,91 |
| E28 | 679935,82 | 4607767,18 |
| E29 | 679846,34 | 4607800,15 |
| E30 | 679662,91 | 4607824,03 |
| E31 | 679549,79 | 4607881,73 |
| E32 | 679403,08 | 4607925,20 |
| E33 | 679372,60 | 4607938,95 |
| E34 | 679249,84 | 4608021,51 |
| E35 | 679165,10 | 4608158,22 |
| E36 | 678898,31 | 4608076,81 |
| ΠΕΡΙΜΕΤΡΟΣ ΠΟΛΥΓΩΝΟΥ Π = 10.444,63μ. | | |
| ΕΜΒΑΔΟΝ ΠΟΛΥΓΩΝΟΥ Ε = 3.119.797,92τ.μ. | | |

| ANEMOS EVROU M.I.K.E. | | |
|---|---|---|
| AETOKORFI WIND POWER PLANT 130.2MW | | |
| COORDINATES OF HOUSING CONTROL ROOMS IN EGSA 87 | | |
| AG | X | Y |
| 1 | 679404.43 | 4607960.07 |
| 2 | 679394.53 | 4607937.11 |
| 3 | 679417.48 | 4607927.21 |
| 4 | 679427.39 | 4607950.16 |
| FIELD AREA = 625.0 sq.m. | | |

**Table 14:** Wind power plant coordinates.

The basic infrastructure projects as well as the accompanying projects for the construction and operation of the proposed ASPIE, include:

1. Access roads and internal roads along the Wind Power plant with a width of 5.0 meters.

2. Placement of three (3) prefabricated houses - ISOBOX type - of the operational control center of ASPIE in a strategic position.

3. Excavations for the underground routing of the L.V. cabling. and M.V. 33 kV , interconnecting the W/Ts with each other and with the Control Station as well as cabling of weak currents within the forest roads under construction.

4. W/T foundations measuring 27.0 m × 25.5 m. and 3.0 m depth

5. Construction of a square for W.T. erection measuring 27m.X36m

6. Space configuration (square) of dimensions 20.0m x 87.0m for the deposition of the blades and space (square) of dimensions 19.0m x 61.5m for the deposition of the tower sections. In W/T 1, 2 and 3, in order not to particularly affect the forest, there will be no square for depositing parts of the tower, but only a square for depositing a blade with dimensions of 5.0m x 87.0m

7. Elevating crane shaft, 125m long and 10m wide for each W/T (within the approach road of the W/T, where possible).

8. Installation of twenty-one (21) W/Ts of indicative type Vestas V 162-6.2 MW horizontal axis, with their accompanying facilities (S/S, control cabins) in array (a/a 1-21).

9. Assembly of the metal pillars and propellers on site as well as installation of the other electromechanical equipment.

10. Interconnection works of the W/P with the existing substation of Orestiada with an exclusive underground line of medium voltage 33 kV , with a total length of 36.24 km.

## 6.2 Accuracy of topographic coordinate studies

The functional classification of the road is Category AVI (Tertiary road – Forest road).

The cartographic background used is the .dtm model . of GYS.

The resulting digital model is of the order of the accuracy of the GIS map 1:5000 as well as the georeference of the map to the trigonometric points of the GIS.

The collection - recording of the characteristic topographic data (trigonometric points, axes of existing roads, PPC networks, characteristic points of the ground) were done with a GPS GNSS geodetic receiver and their rendering through the IntelliCAD operating program .

The process and drafting of the corresponding diagrams (horizontography, mecotomy, cross-sections) was done according to the study specifications through the Anadelta Tessera design operating program.

The accuracy of the coordinates of the positions of the W/T, the control building, the improvements of the existing road construction, the routing of the M.V. network, as well as all other accompanying projects presented in the EIA and in all the attached annexes depends on the accuracy – quality of the cartographic data of the GIS map as well as the dtm terrain model of the Army Geographical Service, determined at 5.0 meters.

## 6.3 Detailed description of main, auxiliary and supporting/accompanying facilities and projects/activities.

### *6.3.1 Technical characteristics W/T indicative type Vestas V162-6.2MW*

The complete technical characteristics of the W/T can be found in the appendix. A brief description of the mechanical equipment of an W/T as well as some technical characteristics of the equipment of the indicative Vestas V162-6.2MW W/T follows, being:

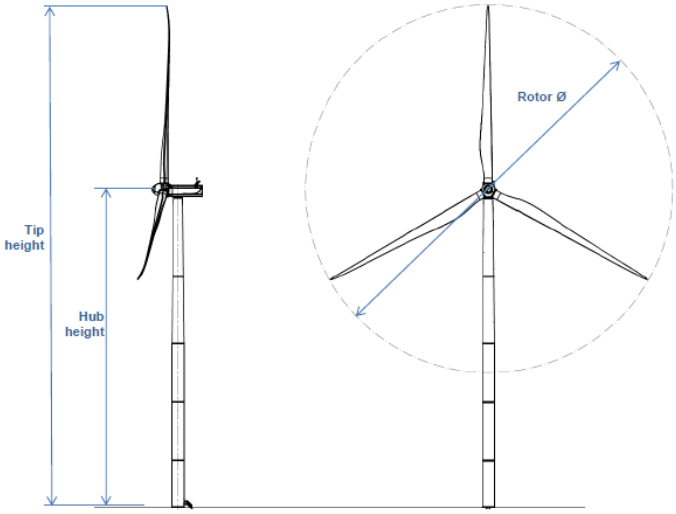
- rotor, which consists of a rotation axis and 3 blades having a diameter of 162m
- axis of rotation, which supports the blades which are 81m long, made of fiberglass
- blade, consisting of two different aerodynamic sections which are joined to the axis of rotation with special devices (bearings), so that the blades are adapted at any moment to the particularities of the wind, thus achieving maximum aerodynamic effect and, by extension, maximum energy production or even stopping rotation in extreme wind conditions.

The transfer of the torque due to the wind to the electricity generator is done through a gearbox. The W/T starts rotating when the wind speed exceeds 3m/s and is interrupted for wind speeds greater than 25m/s. The generator is placed together with all the electromechanical components of the W/T on the nacelle. The whole arrangement rests on a 149m high pillar.

For the operational needs of the project, one (1) control center will be constructed at a strategic point of the area, in order to control the operation of the wind turbines and measure the energy produced. Each W/T will be connected to a substation that will include a low voltage (LV) to medium voltage (MV) step-up transformer and through an underground MV line the generated energy will be transferred to a central electrical panel, which will be located in the control center.

For the implementation of the project, small-scale earthworks are required for the foundation of the W/T towers.

Elevation Drawing




**POWER REGULATION** — Pitch regulated with variable speed

**OPERATING DATA**

| | |
|---|---|
| Rated power | 6,200kW |
| Cut-in wind speed | 3m/s |
| Cut-out wind speed* | 25m/s |
| Wind class | IEC S |

Standard operating temperature range from -20°C to +45°C
*High Wind Operation available as standard

**SOUND POWER**

| | |
|---|---|
| Maximum | 104.8dB(A)* |

*Sound Optimised Modes available dependent on site and country

**ROTOR**

| | |
|---|---|
| Rotor diameter | 162m |
| Swept area | 20,612m² |
| Aerodynamic brake | full blade feathering with 3 pitch cylinders |

**ELECTRICAL**

| | |
|---|---|
| Frequency | 50/60Hz |
| Converter | full scale |

**GEARBOX**

| | |
|---|---|
| Type | two planetary stages |

**TOWER**

| | |
|---|---|
| Hub height | 119m (IEC S/DIBt S)<br>125m (IEC S)<br>166m (IEC S/DIBt S)<br>169m (DIBt S) |

**TURBINE OPTIONS**

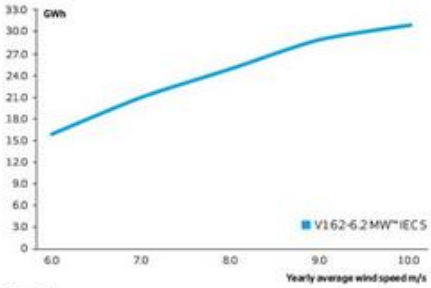
- Condition Monitoring System
- Oil Debris Monitoring System
- Service Personnel Lift
- Low Temperature Operation to -30°C
- Vestas Ice Detection™
- Vestas Anti-Icing System™
- Vestas Shadow Flicker Control System
- Aviation Lights
- Aviation Markings
- Fire Suppression System
- Vestas Bat Protection System
- Lightning Detection System
- Power Optimised Modes

**SUSTAINABILITY**

| | |
|---|---|
| Carbon Footprint | 6.1g $CO_2$e/kWh |
| Return on energy break-even | 6 months |
| Lifetime return on energy | 39 times |
| Recyclability rate | 88% |

Configuration: HH=166m, Vavg=8.5m/s, k=2.48. Depending on site-specific conditions. Metrics are based on a preliminary stream-lined analysis. An externally-verified Lifecycle Assessment will be made publicly available on vestas.com once finalised.

**ANNUAL ENERGY PRODUCTION**




Assumptions
One wind turbine, 100% availability, 0% losses, k factor = 2.
Standard air density = 1.225, wind speed at hub height

**Figure 11:** W/T sketch and general characteristics of indicative model Vestas V162-6.2MW

*6.3.2 Road construction projects*

For the access to the installation site of the project and for the transport of the required equipment, road construction projects with a total length of 22,085.91m will be carried out, of which 1,235.40m concern new openings and 20,850.50m concern the improvement of existing roads.

It should be noted that the road construction study based on the innovative method of transporting blades with lifting and rotating blade vehicles, " bladelifter ", in order to avoid excessive widening of the roads at the bends. Using this method, special vehicles (bladelifter) transport the blades at an angle as shown in the image below.

**Figure 12**: Transport of blades using a " bladelifter " vehicle

With this method, the length of the transfer vehicles is significantly reduced. As shown in the image below, transporting the blades in the conventional way would require a vehicle, with a total length of approximately 65.00m, while the "bladelifter" method reduces the length of the vehicle to 30.00m. Moreover, there is a significant reduction in the horizontal turning radius from R=60m to R=30m. In this way, the best possible use is made of the topography of the area and of the existing roads, resulting in avoiding both extensive excavations/embankments, as well as variations in the layout of the existing roads. The opening of new auxiliary roads to change the direction of vehicles - U-turns - is significantly reduced. At the same time and as the blade is raised in turns, required interventions at turns are minimized.

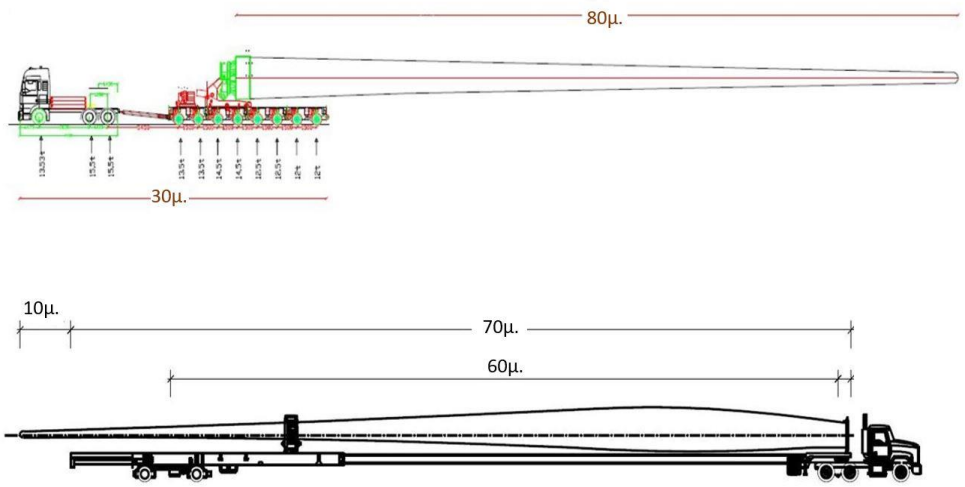



**Figure 13**: Comparison of transfer vehicles.

In order to quantify the benefit of this method, a calculation was made of the expansions required to transport the blade in the conventional way, for an indicative section of forest road construction,n with a total length of 1800m. Figure 15 shows the graphical placement of the vehicle as well as the calculation of the surrounding of the required widenings in green.

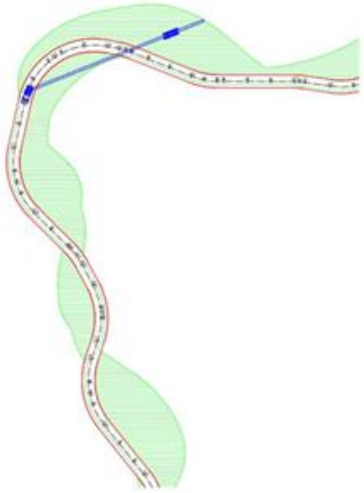


**Figure 14**: Calculation of trajectories using the Anadelta Tessera program.

In the indicative section under study of a forest road, with a total length of 1800m, when transporting the blade with a **blade-lifter** , the required area of the deck is 10,078.00 **sq.m.** On the contrary, when transporting the wings with a **conventional truck** as shown in the picture above, **an additional 20,429.00 square meters would be required** . In other words, there is a saving of **67% of the surfaces with interference.**

In addition, with the use of the **blade-lifter** , the best possible utilization of the topography of the area is achieved, resulting in a significant reduction of excavations/ embankments . In the above example, making a conservative estimate of the average slopes of the slopes at 30 degrees, we calculate:

- By employing a **blade-lifter** , an average of **4,069 square meters is required** of excavations/ embankments for forming the deck.
- By employing a **conventional truck , 37,291 square meters** would be required of excavations/ embankments .

In this way, the saving of earthworks achieved is of the order of **89%**.

| **COMPARISON OF BLADE TRANSPORT METHODS** | | |
|---|---|---|
| Wind Power plant Road Construction Study | | |
| INTERVENTION | CONVENTIONAL AREA (sq.m.) | SURFACE WITH BLADE LIFTER (sq.m.) |
| Widening Turns | 30,507 | 10,078 |
| Deviation (sq.m.) | 20,429.00 | |
| Deviation ( acres) | 2.042 | |

A total of seventeen (17) sections of roads were studied with forest road specifications of category C.

The following table shows in detail the roads proposed for opening & improvement, their classification, their type, their length and the beginning and end of the route:

| **IMPROVEMENT OF EXISTING AND OPENING OF NEW FOREST ROADS** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **N/A** | **Characterization / category** | **Observations** | **Length** | **Start of Engraving** | | **End of Engraving** | |
| | | | | **X** | **Y** | **X** | **Y** |
| **1** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 1" | 6,152.86 | 681683.42 | 4612153.58 | 679426.17 | 4607916.41 |
| **2** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 2" | 49.84 | 681056.40 | 4612018.49 | 681031.94 | 4612061.92 |
| **3** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 3" | 1 . 960.16 | 679860.15 | 4607816.95 | 678418.54 | 4608729.26 |
| **4** | Forest road / C′ | ACCESS IMPROVEMENT "ROUTE 4" | 3 . 141.00 | 678482.65 | 4608737.11 | 677503.62 | 4610933.15 |
| **5** | Forest road / C′ | IMPROVEMENT OF ACCESS ''ROAD 5'' | 2 . 962.63 | 677443.79 | 4610939.19 | 675049.34 | 4610349.45 |
| **6** | Forest road / C′ | ACCESS IMPROVEMENT "ROUTE 6" | 1 . 198.72 | 675366.90 | 4610282.11 | 674282.29 | 4610524.26 |
| **7** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 7" | 764.95 | 674317.15 | 4610621.69 | 674347.23 | 4611160.45 |
| **8** | Forest road / C′ | ACCESS IMPROVEMENT "ROUTE 8" | 1,269.44 | 674301.62 | 4611198.32 | 673594.43 | 4612129.36 |
| **9** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 9 " | 2,666.30 | 679732.35 | 4607802.91 | 682152.91 | 4608360.27 |
| **10** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 10 " | 150.12 | 673299.16 | 4612443.50 | 673151.98 | 4612467.36 |
| **11** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 11 " | 409.88 | 673594.14 | 4612138.41 | 673350.60 | 4612409.80 |
| **12** | Forest road / C′ | ACCESS IMPROVEMENT "ROAD 12 " | 40.23 | 673229.65 | 4612497.94 | 673218.63 | 4612459.25 |
| **13** | Forest road / C′ | ACCESS IMPROVEMENT ' '13 ROAD '' | 40.03 | 682602.26 | 4608484.30 | 682573.76 | 4608512.41 |
| **14** | Forest road / C′ | ACCESS IMPROVEMENT ' '14 STREET '' | 44,36 | 679482.27 | 4607939.06 | 679494.97 | 4607898.44 |
| **total** | | | **20,850.50** | | | | |
| **N/A** | | **Observations** | **Length** | **X** | **Y** | **X** | **Y** |
| **1** | Forest road / C′ | "BRANCH 1" STREET | 556.17 | 682172.99 | 4608431.71 | 682603.71 | 4608547.78 |
| **2** | Forest road / C′ | "BRANCH 2 " STREET | 211.09 | 673187.61 | 4612463.17 | 673330.38 | 4612320.89 |
| **3** | Forest road / C′ | "BRANCH 3 " STREET | 468.15 | 673298.27 | 4612339.02 | 672941.43 | 4612521.68 |
| **total** | | | **1,235.40** | | | | |

**Table 15**: Improvement of existing and opening of new road construction.

**Improvement of Existing Road Construction**

The transport of the blades and parts of the W/T, the access of the necessary for the installation of the W/T cranes as well as the transport of the rest of the necessary equipment for the operation of the wind power plant make it necessary to improve the existing access road. The improvement of the existing road will be done in accordance with the road construction specifications defined by the supplier and installer of the wind turbines in order to ensure safe transportation and installation.

**Access to the installation polygon of the proposed ASPIE**

Access to the Wind Park polygon area will be via existing roads. Starting from the vertical axis Ardano – Ormenio of Egnatia Road, then from the level junction in the community of Palli and through the municipal roads, by heading to the community of Pentalofos , through the existing dirt roads there will be access to the installation site of the Wind Station.

- The existing road to be improved is a dirt road, approximately 3.0-4.0 meters wide with a south-west, east and north-west direction from all the W/Ts of the Wind Station. Below is a satellite image excerpt of the existing access roads.

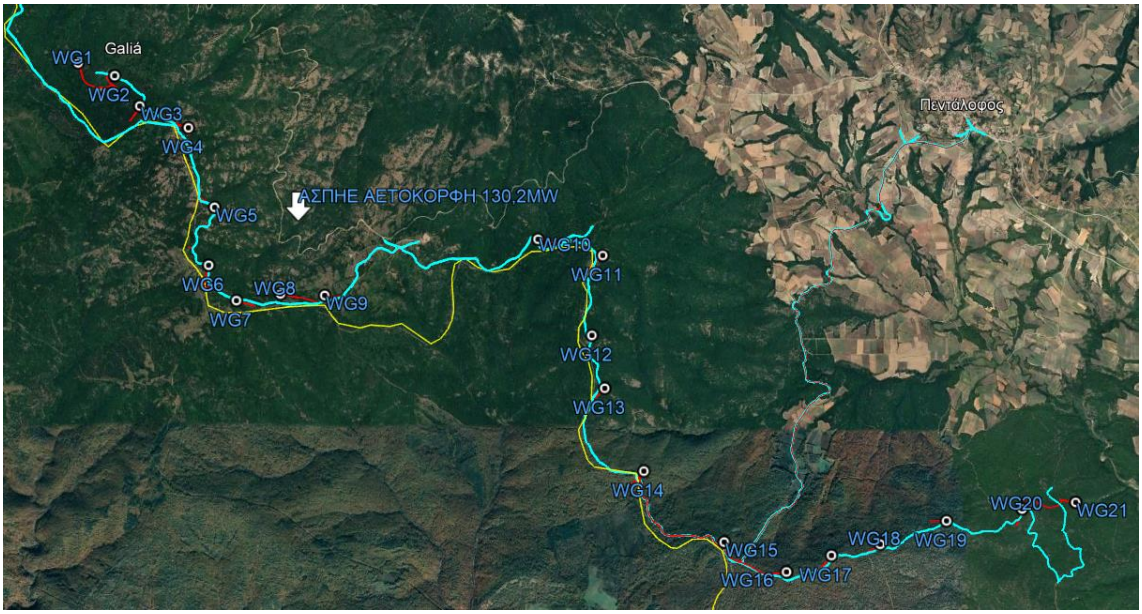



**Figure 15**: Fragment of a satellite image (in blue the existing roads and in red the new roads under construction)

Suggested roads

A/A 1: ACCESS IMPROVEMENT "ROAD 1"

This is the main approach road to the wind power plant. It starts south of the community of Pentalofos at an altitude of 242.00m with a south-west direction and ends near the control room at an altitude of 360.00m.

The longitudinal maximum positive slope is +15.922% and -17.286% the negative. The total length of the road is 6,152.86m.

A/A 2: ACCESS IMPROVEMENT "ROAD 2"

This is the road diversing the course of the Wind Station vehicles. It starts from intersection 51 of the access road under improvement (ACCESS IMPROVEMENT "ROAD 1") at an altitude of 220.01m in a north-west direction.

The longitudinal maximum positive gradient is +5.987%. The total length of the road is 49.84m.

A/A 3: ACCESS IMPROVEMENT "ROAD 3"

This is the access road that starts from the square of W/T 16 at an altitude of 358.00m in a north-west direction. It passes through the crane erection square of W/T 15 and ends between intersections 6 and 7 of access road 4 at an altitude of 357.38m.

The longitudinal maximum positive slope is +8.985% and -10.932% the negative. The total length of the road is 1,960.16 m.

A/A 4: ACCESS IMPROVEMENT "ROUTE 4"

This is the access road that starts from the square of W/T14 at an altitude of 350.00m in a north-west direction. It passes through the crane erection square of W/T 13, through the square of W/T 12 and the crane erection square of W/T 11 and ends at the square of W/T10 at an altitude of 442,00m.

The longitudinal maximum positive slope is +12.735% and -9.638% the negative. The total length of the road is 3,141.00m.

A/A 5: ACCESS IMPROVEMENT "ROUTE 5"

This is the access road that starts from the square of the wind turbine W/T10 at an altitude of 442.0m in a south-west direction. It passes through the crane erection square of W/T 9 and ends at the square of W/T 8 at an altitude of 471.00m.

The longitudinal maximum positive slope is +13.027% and -12.992% the negative. The total length of the road is 2,962.63m.

A/A 6: ACCESS IMPROVEMENT "ROUTE 6"

This is the access road that starts from the intersection D48 of the access road under improvement (ACCESS IMPROVEMENT "ROAD 5") at an altitude of 470.497m in a west and north direction. It passes through the square of W/T 7 at an altitude of 502m and ends at the crane erection square of W/T 6 at an altitude of 509.36m.

The longitudinal maximum positive slope is +12.153% and -6.519% the negative. The total length of the road is 1,198.72m.

A/A 7: ACCESS IMPROVEMENT "ROAD 7"

This is the access road that starts from the square of the W/T 6 at an altitude of 509.00m in a northerly direction and ends at the square of W/T 5 at an altitude of 534.00m.

The longitudinal maximum positive slope is +12.139% and -6.797% the negative. The total length of the road is 764.95m.

A/A 8: ACCESS IMPROVEMENT "ROUTE 8"

This is the access road that starts from the square of W/T 5 at an altitude of 534.00m in a north-west direction, it passes through the crane erection square of W/T 4 and ends at the square of W/T 3 at an altitude of 582.00m.

The longitudinal maximum positive slope is +11.775% and -8.420% the negative. The total length of the road is 1,269.44m.

A/A 9: ACCESS IMPROVEMENT "ROAD 9"

This is the access road that starts from section D3 of the access road under improvement (ACCESS IMPROVEMENT "ROAD 3") at an altitude of 359.33m in an east and north direction. It passes through the crane erection squares of W/T 16, W/T 17 and W/T 18, from the square of W/T 19 and ends at the crane erection square of W/T 20 in altitude 222,685m.

The longitudinal maximum positive slope is +4.059% and -12.342% the negative. The total length of the road is 2,666.30m.

A/A 10: ACCESS IMPROVEMENT "ROAD 10"

This is the access road that starts from the square of W/T 2 at an altitude of 556.00m in a westerly direction and ends at a point at an altitude of 546.02m.

The longitudinal maximum negative slope is -7.553%. The total length of the road is 150.12m.

A/A 11: ACCESS IMPROVEMENT "ROAD 11"

This is the access road that starts from the square of W/T 3 at an altitude of 582.00m with a north-west direction and ends at the square of the wind turbine W/T 2 at an altitude of 556.00m.

The longitudinal maximum negative slope is -9.320%. The total length of the road is 409.88m.

A/A 12: ACCESS IMPROVEMENT "ROAD 12"

It is a gradient change ramp starting from point 673229.65, 4612497.94 at an altitude of 549.31m in a south-west direction and ends at a point between intersections 2 and A'3 of the access road under improvement (ACCESS IMPROVEMENT "ROAD 10") at an altitude of 550.98m.

The longitudinal positive slope is +4.142%. The total length of the road is 40.23m.

A/A 13: ACCESS IMPROVEMENT "ROAD 13"

It is a gradient change ramp starting from point 682602.26, 4608484.30 at an altitude of 155,773m in a north-west direction and ends at a point between intersections 5 and A'16 of the road under construction (OPEN ROAD "BRANCH 1") at an altitude of 155.63m.

The longitudinal negative slope is -0.359%. The total length of the road is 40.03m.

A/A 14: ACCESS IMPROVEMENT "ROAD 14"

This is the access road that starts from a point between the intersections A96 and 458 of the access road under improvement (ACCESS IMPROVEMENT "ROAD 1") at an altitude of 356.76m in a south-eastern direction and ends at intersection 31 of the access road under improvement (ACCESS IMPROVEMENT "ROAD 3") at an altitude of 385.31m.

The longitudinal positive slope is +3.501%. The total length of the road is 44.36m.

The following technical works will be carried out on the specific road sections:

- Improvement of the quality of the road by restoration of the road surface and coating of crushed material 3A with a road width of 5.0 m. ( underlay 0.1m thick - P.T.P. (O)-150).
- Digging a trench along the entire length of the road for water flow and project safety.
- Construction of small technicals, where necessary for the safe operation of the road, which will be studied in the submission of the road construction study.

Attached to annex 16.5 is a plan (plan: 299.5.1.6_1&2 "Topographic map of the project and accompanying projects", cl. 1 : 5,000) in which all sections of the forest road under improvement are mapped.

**Opening of a new forest road**

The new road construction includes the access road - approach of the W/T within the polygon of the wind power plant. This is a new opening of forest roads, with a total length of 1,235.40 m.

Suggested routes:

A/A 1: "BRANCH 1" STREET

This is the opening of a new forest approach road to W/T 21 of the Wind Station.

The opening of the new section has a total length of 556.17m, starting from the square of W/T 20 at an altitude of 217.00m in an easterly direction and ends at the crane erection square of W/T 21 at an altitude of 150.00m.

The longitudinal maximum negative slope is -12.047%.

A/A 2: "BRANCH 2" STREET

This is the opening of a new forest approach road to wind turbine W/T 1 of the Wind Station and is crossed in reverse .

The opening of the new section has a total length of 211.09m, starting from the A2 section of the access road under improvement (ACCESS IMPROVEMENT "ROAD 10") at an altitude of 548.27m in a south-east direction and ends at a point at an altitude of 538.40m.

The longitudinal maximum positive slope is +11.556% and -10.602% the negative.

A/A 3: "BRANCH 3" STREET

This is the opening of a new forest approach road to W/T 1 of the Wind Power plant.

The opening of the new section has a total length of 468.15m. It starts from cross-section 4 of the road under opening ("BRANCH 3" ROAD OPENING) at an altitude of 541.081m with a west and north direction and ends at the square of the wind turbine W/T 1 at an altitude of 507.00m.

The longitudinal maximum negative slope is 12.002%.

The roads will be constructed as a C' category forest road according to the following geometric data and the standard cross-section that follows. In detail, the geometric elements of the new road construction are:

- road width 5m
- maximum longitudinal slope 12% - ( under conditions 14%) with vertical adjustment radius R = 300m
- minimum horizontal radius R = 30m.
- incline alignment 0.5% (ambiclinic)
- triangular trench 1.2m wide and 0.4m deep.
- construction of small techniques, where necessary for the safe operation of the road,

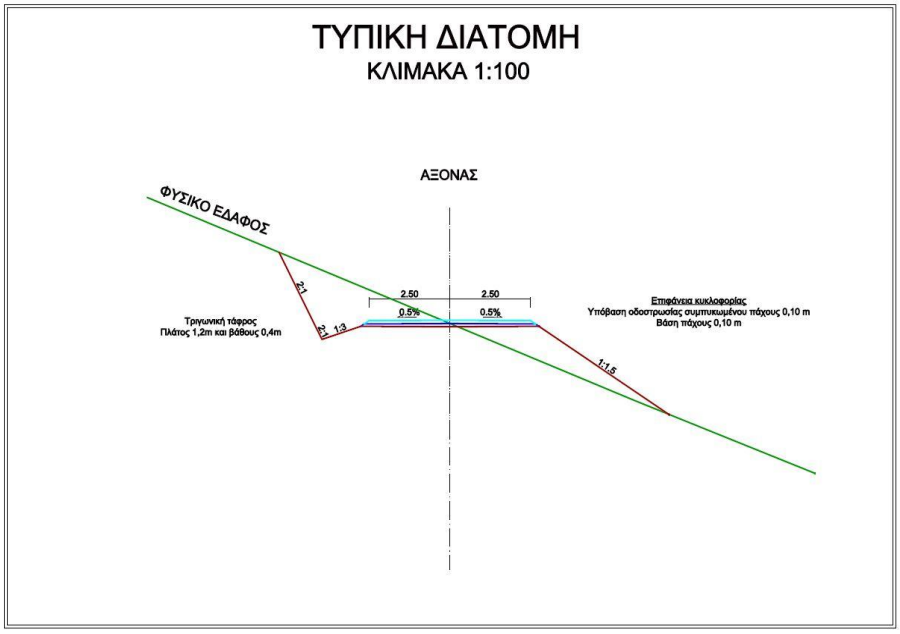



**Figure 16** : Typical Section **.**

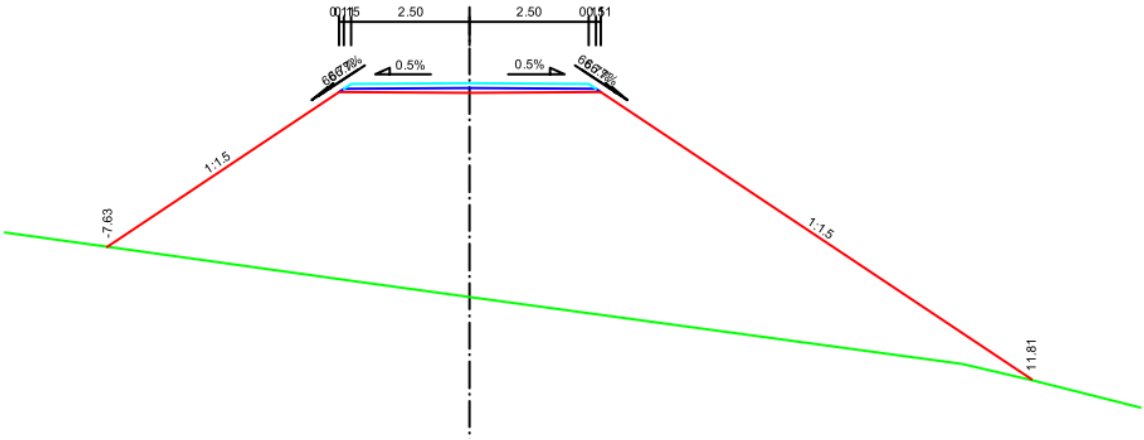



**Figure 16**: Adverse Section with embankment.

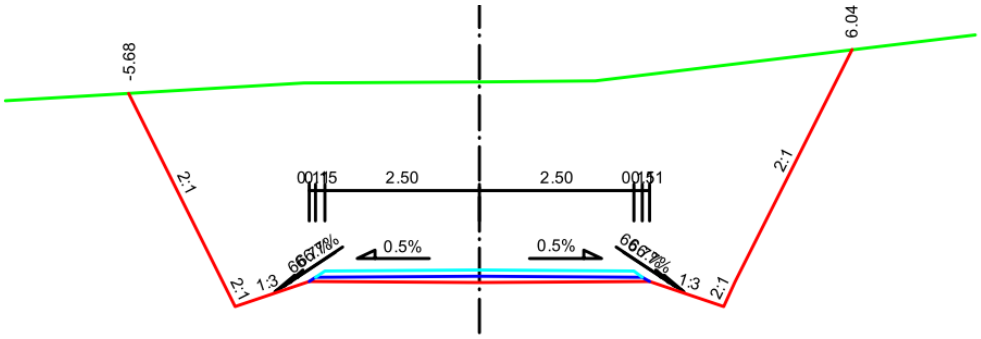



**Figure 17**: Adverse Cross-section with trench.

Attached to annex 16.5 is a plan (plan: 299.5.1.6_1&2 "Topographical project and accompanying projects", cl. 1 : 5,000) which shows the internal forest road construction of the ASPIE under construction.

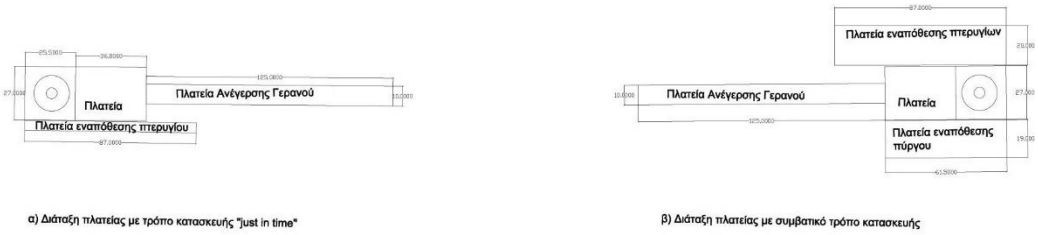
*6.3.3 Construction of wind turbine sites*

A suitable flat area (square) with dimensions of 36.0m x 27.0m will be created for the assembly of the various parts of the W/T (tower, generator, subsystems, etc.) and a space (square) measuring 10.0m x 125.0m for the assembly of the crane in all W/Ts.

The configuration of the construction sites of W/T 1, 2 and 3 will be based on the assembly method “just in time” and by employing a telescopic crane. The construction method “just in time” involves assembly of the wind turbine parts upon their arrival at the project site. Therefore, it is not necessary to form a storage square for the towers, except storage square of a blade measuring 5.0m x 87.0m.

For the remaining 18 W/Ts, an additional space (square) with dimensions of 20.0m x 87.0m will be formed for depositing the blades and a space (square) measuring 19.0m x 61.5m for the deposition of the tower sections.

Below is a comparison of the square required by the conventional construction method (with blade and tower storage square) and the square with the " just in time" construction method.




The total area required in the case of a square layout “ just in time " is 3,372.63 $m^2$ , while in the case of the layout of the square with a conventional construction method, the surface required is 5,874.73 $m^2$ , **i.e. 2,502.1 $m^2$ /W/T are saved, or a total of 7,506.3 $m^2$.**

Consequently, the **works required for the formation** of the construction sites are:

- excavation in rocky ground for the construction of the desired square measuring 27m x 36m;

- construction of compacted embankment with possible configuration of terraces in case loose soils are revealed for the construction of the desired square;
- coating of the final surface with inert materials type 3A and where it is required to form the subgrade of the final surface with a minimum slope of 0.2%;
- construction of a 125.0m long crane shaft and 10.0 m wide (within the approach road of the W/T, where possible);
- construction of the crane installation area for the erection of the wind turbines (within the square) measuring 21.0m x 27.0m at 0% slope with a compacted pavement base layer at 100% dry bulk density in the modified Proctor test;
- formation of a storage square of a wing measuring 5.0m x 87.0m for W/Ts 1, 2 and 3 that will be manufactured with the assembly method “just in time” and employing a telescopic crane;
- for the remaining 18 W/Ts, an additional space (square) of dimensions 20.0m x 87.0m will be created for depositing the blades and a space (square) measuring 19.0m x 61.5m for the deposition of the tower sections.

Finally, it is noted that all the squares are located along the opened and existing roads with the aim of further reducing interventions.

*6.3.4 Wind turbine foundation works*

The foundation works of the wind turbines will be done according to the instructions of the supplier company of the wind turbines. The works required for the foundation of the wind turbines are:

- excavation in rocky ground for the construction of the desired square 27.0m x 25.5m and 3m deep
- coating and compaction with type 3A aggregates at the base of the foundations
- concreting the base of the wind turbine with cleaning concrete type C30/37
- installation of metal wind turbine base
- supply, forming and installation of reinforcement
- concreting with concrete type C30/37 and C50/60

*6.3.5 Site configuration and control room installation works*

The works required for the configuration of the space for the installation of the control rooms are:

- excavation in rocky ground for the construction of the cabin
- coating the final surface with inert materials type 3A
- access configuration
- placement of control cabins
- installation of fencing

The installation of three prefabricated ISOBOX -type cabins will be chosen , each measuring 2.6m wide and 8.0m to 10.0m long, in a specific location of the wind power plant. The cabins will include the following spaces:

- ✓ Medium voltage panel space.
- ✓ Office to monitor and control the operation of the park & WC

- ✓ Storage space

*6.3.6 Installation works of medium voltage and weak current cables* .

The work required for the internal wiring of medium/low voltage and weak currents is:

- excavation along the road under construction at a width of 0.6 m and 1.2m deep
- coating with clay material
- installation of cables, marking mesh and plates
- coating with excavation materials and 3A

It is also noted that a complete control, supervision and measurement (SCADA) system will be installed in the park. The system consists of a central PC, peripheral units and special software.

Finally, W/Ts are protected from the fall of lightning with special anti-lightning systems they are equiped with.

*6. 3.7 Wind turbine construction projects*

The following lifting machinery will be required for the erection of the W/Ts:

- A 600 ton crane.
- A 120 ton crane.
- A construction site utility crane.

*6.3.8 Grid connection works*

For the safe injection of power from a Wind Power plant, a method is usually chosen depending on:

- ✓ The power of the park and any other neighboring parks.
- ✓ The distance from existing S/S and existing H.V. lines.
- ✓ The robustness of the network at the connection point.

The connection of the W/S to the network is proposed to be made at the existing substation (S/S) of Orestiada. The proposed 33kV medium voltage underground line of the interconnection will have a total length of approximately 36.24km and will be built within the base of the existing roads.

Attached to the appendices is a map - topographical with the proposed routing of the medium voltage network - (plan 299.5.1.7: Interconnection Network Map).

Alternatively, the connection to the grid could be made in a new 33/150 kV Voltage Raising Substation in the route zone of the KYT NEAS SANTAS – ORESTIADAS Substation transmission line, with an underground medium voltage substation, having a total length of approximately 35.63km.

Attached to the appendices is a topographical map with the alternative route of the M.V. underground line - (of plan 299.5.1.3 : Alternative Network Interconnection Map).

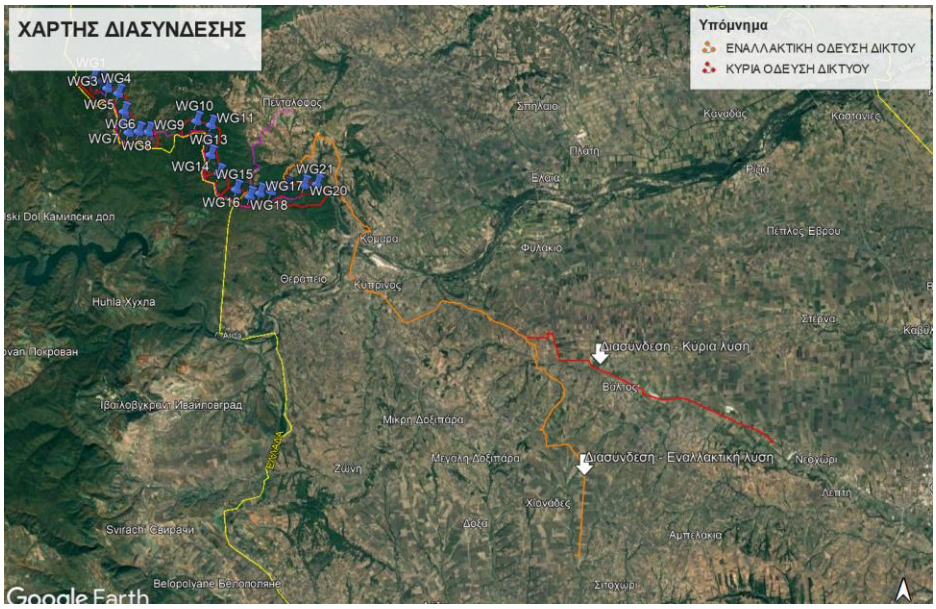



**Figure 18**: Google image earth -connection to the grid

*6.3.9 Benefits of applying innovative methods of building and transporting W/Ts*

As extensively analyzed in paragraphs **6.3.2** and **6.3.3** , the project was studied based on modern methods of transportation (bladelifter) and erection of wind turbines (just in time method). The use of these methods aims to minimize the required interventions during the opening/optimization of the project's access roads and during the configuration of the wind turbine erection squares. The following table summarizes the benefits of these methods as roughly calculated in the previous paragraphs.

| CURRENT BENEFITS OF INNOVATIVE METHODS OF TRANSPORTING AND ERECTING WIND TURBINES | | |
|---|---|---|
| **Road Construction Study and Layout of Wind Power plant Squares** | | |
| **INTERVENTION** | CONVENTIONAL METHODS | INNOVATIVE METHODS |
| **Access Road Construction and Internal Road Construction of Wind Power plant** | **321,362.03** | **106,049.47** |
| **Configuration of Squares** | **5,874.73** | **3,372.63** |
| **Total** | **327,236.76** | **109,422.1** |
| **Benefit (sq.m.)** | **217,814.66** | |
| **Benefit (acres)** | **21.781** | |

**Table 16**: Cumulative benefits from the use of innovative methods of transporting and erecting wind turbines.

**Summarizing and taking into account the total number of intervention surfaces (refers to the occupation of the entire project with excavations and embankments), as it resulted from the measurement of the project surfaces - see plan 299.5.1.8 - which is 26.352 acres, a very significant saving of 21.781 acres by employing new transportation and construction methods can be achieved. In percentage terms, this benefit mounts to 67% of the interventions performed.**

## *6.3.10 Overall project earthwork pre -measurement table*

| ΘΕΜΕΛΙΩΣΗ / ΔΙΑΜΟΡΦΩΣΗ ΠΛΑΤΕΙΩΝ ΑΓ VESTAS V162 - 6,2MW | | | | |
|---|---|---|---|---|
| **ΑΝΕΜΟΓΕΝΝΗΤΡΙΑ** | **ΕΡΓΑΣΙΕΣ** | **Η** | **ΕΚΣΚΑΦΗ** | **ΕΠΙΧΩΜΑ** |
| ΑΓ1 | ΘΕΜΕΛΙΩΣΗ | 504,00 | 4272,86 | 944,48 |
| | ΠΛΑΤΕΙΑ | 507,00 | 1044,57 | 635,25 |
| | | **Σύνολο** | **5317,43** | **1579,73** |
| | | **Ισοζύγιο** | **3737,70** | |
| ΑΓ2 | ΘΕΜΕΛΙΩΣΗ | 553,00 | 2201,21 | 944,48 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΟΥ | 556,00 | 234,75 | 307,00 |
| | ΠΛΑΤΕΙΑ | 556,00 | 1182,22 | 6,70 |
| | | **Σύνολο** | **3618,18** | **1258,18** |
| | | **Ισοζύγιο** | **2360,00** | |
| ΑΓ3 | ΘΕΜΕΛΙΩΣΗ | 579,00 | 2614,31 | 954,37 |
| | ΠΛΑΤΕΙΑ | 582,00 | 2563,64 | 0,00 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΟΥ | 582,00 | 3038,94 | 240,00 |
| | | **Σύνολο** | **8216,89** | **1194,37** |
| | | **Ισοζύγιο** | **7022,52** | |
| ΑΓ4 | ΘΕΜΕΛΙΩΣΗ | 558,00 | 3489,41 | 944,48 |
| | ΠΛΑΤΕΙΑ | 561,00 | 2003,59 | 97,48 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ & ΠΤΕΡΥΓΙΩΝ | 561,00 | 109,61 | 8422,15 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ | 561,00 | 3681,74 | 0,00 |
| | | **Σύνολο** | **9284,35** | **9464,11** |
| | | **Ισοζύγιο** | **-179,76** | |
| ΑΓ5 | ΘΕΜΕΛΙΩΣΗ | 531,00 | 1621,23 | 949,68 |
| | ΠΛΑΤΕΙΑ | 534,00 | 2285,63 | 143,43 |
| | Βελτίωση Πρόσβασης ΄΄ΟΔΟΣ | 534,00 | 7245,10 | 442,47 |
| | Βελτίωση Πρόσβασης ΄΄ΟΔΟΣ | 534,00 | 0,00 | 11000,89 |
| | | **Σύνολο** | **11151,96** | **12536,47** |
| | | **Ισοζύγιο** | **-1384,51** | |
| ΑΓ6 | ΘΕΜΕΛΙΩΣΗ | 506,00 | 2903,93 | 944,48 |
| | ΠΛΑΤΕΙΑ | 509,00 | 859,67 | 1404,61 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 509,00 | 0,00 | 8257,09 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 509,00 | 3790,28 | 2862,52 |
| | | **Σύνολο** | **7553,88** | **13468,70** |
| | | **Ισοζύγιο** | **-5914,82** | |
| ΑΓ7 | ΘΕΜΕΛΙΩΣΗ | 499,00 | 5720,22 | 944,48 |
| | ΠΛΑΤΕΙΑ | 502,00 | 3450,74 | 55,13 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 502,00 | 2329,31 | 4691,46 |
| | | **Σύνολο** | **11500,27** | **5691,07** |
| | | **Ισοζύγιο** | **5809,20** | |
| ΑΓ8 | ΘΕΜΕΛΙΩΣΗ | 468,00 | 5250,28 | 944,48 |
| | ΠΛΑΤΕΙΑ | 471,00 | 2585,54 | 0,49 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 471,00 | 178,83 | 1707,57 |
| | | **Σύνολο** | **8014,65** | **2652,54** |
| | | **Ισοζύγιο** | **5362,11** | |
| ΑΓ9 | ΘΕΜΕΛΙΩΣΗ | 464,00 | 2924,39 | 944,48 |
| | ΠΛΑΤΕΙΑ | 467,00 | 742,59 | 0,00 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 467,00 | 27,05 | 521,84 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 467,00 | 751,10 | 969,50 |
| | | **Σύνολο** | **4445,13** | **2435,82** |
| | | **Ισοζύγιο** | **2009,31** | |
| ΑΓ10 | ΘΕΜΕΛΙΩΣΗ | 439,00 | 1429,58 | 959,36 |
| | ΠΛΑΤΕΙΑ | 442,00 | 1188,03 | 1514,47 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 442,00 | 2042,60 | 1034,80 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 442,00 | 5571,81 | 28,45 |
| | | **Σύνολο** | **10232,02** | **3537,08** |
| | | **Ισοζύγιο** | **6694,94** | |
| ΑΓ11 | ΘΕΜΕΛΙΩΣΗ | 443,00 | 2526,11 | 944,48 |
| | ΠΛΑΤΕΙΑ | 446,00 | 1501,50 | 352,78 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 446,00 | 5227,31 | 0,00 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 446,00 | 791,44 | 6750,42 |
| | | **Σύνολο** | **10046,36** | **8047,68** |
| | | **Ισοζύγιο** | **1998,68** | |

| | | | | |
|---|---|---|---|---|
| ΑΓ12 | ΘΕΜΕΛΙΩΣΗ | 392,00 | 3327,60 | 944,48 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 395,00 | 217,59 | 2355,87 |
| | ΠΛΑΤΕΙΑ | 395,00 | 3160,10 | 0,00 |
| | **Σύνολο** | | **6705,29** | **3300,35** |
| | **Ισοζύγιο** | | **3404,94** | |
| ΑΓ13 | ΘΕΜΕΛΙΩΣΗ | 384,00 | 1759,30 | 1012,53 |
| | ΠΛΑΤΕΙΑ | 387,00 | 1675,88 | 834,20 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 387,00 | 2938,30 | 5089,43 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 387,00 | 2580,11 | 2286,79 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ | 387,00 | 1701,41 | 201,95 |
| | **Σύνολο** | | **10655,00** | **9424,90** |
| | **Ισοζύγιο** | | **1230,10** | |
| ΑΓ14 | ΘΕΜΕΛΙΩΣΗ | 347,00 | 1629,37 | 944,48 |
| | ΠΛΑΤΕΙΑ | 350,00 | 2258,42 | 12,70 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 350,00 | 1333,20 | 1666,36 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 350,00 | 2307,50 | 2224,05 |
| | **Σύνολο** | | **7528,49** | **4847,59** |
| | **Ισοζύγιο** | | **2680,90** | |
| ΑΓ15 | ΘΕΜΕΛΙΩΣΗ | 356,00 | 1652,80 | 961,80 |
| | ΠΛΑΤΕΙΑ | 359,00 | 2516,59 | 611,25 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 359,00 | 3095,30 | 1324,30 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 359,00 | 849,74 | 10286,81 |
| | **Σύνολο** | | **8114,43** | **13184,16** |
| | **Ισοζύγιο** | | **-5069,73** | |
| ΑΓ16 | ΘΕΜΕΛΙΩΣΗ | 355,00 | 2616,45 | 944,48 |
| | ΠΛΑΤΕΙΑ | 358,00 | 332,71 | 121,32 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 358,00 | 535,00 | 305,45 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 358,00 | 0,00 | 3060,58 |
| | **Σύνολο** | | **3484,16** | **4431,83** |
| | **Ισοζύγιο** | | **-947,67** | |
| ΑΓ17 | ΘΕΜΕΛΙΩΣΗ | 341,00 | 2450,62 | 944,48 |
| | ΠΛΑΤΕΙΑ | 344,00 | 976,77 | 0,00 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 344,00 | 110,00 | 1794,07 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 344,00 | 62,56 | 2691,30 |
| | **Σύνολο** | | **3599,95** | **5429,85** |
| | **Ισοζύγιο** | | **-1829,90** | |
| ΑΓ18 | ΘΕΜΕΛΙΩΣΗ | 322,00 | 1912,54 | 983,77 |
| | ΠΛΑΤΕΙΑ | 325,00 | 2248,10 | 37,18 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 325,00 | 2133,69 | 1466,45 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 325,00 | 79,70 | 5513,75 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ | 325,00 | 1667,36 | 521,20 |
| | **Σύνολο** | | **8041,39** | **8522,35** |
| | **Ισοζύγιο** | | **-480,96** | |
| ΑΓ19 | ΘΕΜΕΛΙΩΣΗ | 287,00 | 2144,17 | 944,48 |
| | ΠΛΑΤΕΙΑ | 290,00 | 506,72 | 131,60 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 290,00 | 1437,60 | 159,66 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 290,00 | 2,20 | 3662,98 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ | 290,00 | 620,60 | 250,38 |
| | **Σύνολο** | | **4711,29** | **5149,10** |
| | **Ισοζύγιο** | | **-437,81** | |

| | | | | |
|---|---|---|---|---|
| ΑΓ20 | ΘΕΜΕΛΙΩΣΗ | 214,00 | 1958,49 | 1061,58 |
| | ΠΛΑΤΕΙΑ | 217,00 | 1287,58 | 37,80 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ & ΠΥΡΓΟΥ | 217,00 | 3234,30 | 3109,23 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ | 217,00 | 2678,27 | 561,70 |
| | | **Σύνολο** | **9158,64** | **4770,31** |
| | | **Ισοζύγιο** | **4388,33** | |
| ΑΓ21 | ΘΕΜΕΛΙΩΣΗ | 147,00 | 2095,02 | 944,48 |
| | ΠΛΑΤΕΙΑ | 150,00 | 496,53 | 17,70 |
| | ΠΛΑΤΕΙΑ ΕΝΑΠΟΘΕΣΗΣ ΠΥΡΓΟΥ | 150,00 | 1,20 | 1617,12 |
| | ΠΛΑΤΕΙΑ ΑΝΕΓΕΡΓΗΣ ΓΕΡΑΝΟΥ & ΕΝΑΠΟΘΕΣΗΣ ΠΤΕΡΥΓΙΩΝ | 150,00 | 1933,69 | 697,43 |
| | | **Σύνολο** | **4526,44** | **3276,73** |
| | | **Ισοζύγιο** | **1249,71** | |
| **Γενικό Σύνολο ΑΓ** | | | **155906,20** | **124202,92** |
| **Ισοζύγιο** | | | **31703,28** | |

| **ΟΔΟΠΟΙΙΑ** | | | | |
|---|---|---|---|---|
| **ΕΣΩΤΕΡΙΚΗ** | | **ΜΗΚΟΣ** | **ΕΚΣΚΑΦΗ** | **ΕΠΙΧΩΜΑ** |
| ΚΛΑΔΟΣ 1 | | 556,17 | 1058,33 | 1718,42 |
| ΚΛΑΔΟΣ 2 | | 211,09 | 718,43 | 206,19 |
| ΚΛΑΔΟΣ 3 | | 468,15 | 2040,71 | 2508,98 |
| **Σύνολο** | | **1235,40** | **3817,47** | **4433,59** |
| **Ισοζύγιο** | | | **-616,12** | |
| **ΠΡΟΣΒΑΣΗ** | | **ΜΗΚΟΣ** | **ΕΚΣΚΑΦΗ** | **ΕΠΙΧΩΜΑ** |
| ΟΔΟΣ 1 | | 6152,86 | 22409,34 | 15665,76 |
| ΟΔΟΣ 2 | | 49,84 | 545,06 | 0,00 |
| ΟΔΟΣ 3 | | 1960,16 | 5261,33 | 3645,33 |
| ΟΔΟΣ 4 | | 3141,00 | 21374,02 | 9213,97 |
| ΟΔΟΣ 5 | | 2962,63 | 6463,10 | 5235,82 |
| ΟΔΟΣ 6 | | 1198,72 | 3288,42 | 7873,08 |
| ΟΔΟΣ 7 | | 764,95 | 1824,06 | 1926,26 |
| ΟΔΟΣ 8 | | 1269,44 | 3601,19 | 3983,72 |
| ΟΔΟΣ 9 | | 2666,30 | 4869,58 | 1800,68 |
| ΟΔΟΣ 10 | | 150,12 | 260,08 | 116,51 |
| ΟΔΟΣ 11 | | 409,88 | 3302,04 | 2418,99 |
| ΟΔΟΣ 12 | | 40,23 | 932,67 | 148,56 |
| ΟΔΟΣ 13 | | 40,03 | 377,76 | 295,74 |
| ΟΔΟΣ 14 | | 44,36 | 216,95 | 0,00 |
| **Σύνολο** | | **20850,50** | **74725,60** | **52324,42** |
| **Ισοζύγιο** | | | **22401,18** | |
| **κό Σύνολο Οδοποιίας** | | | **78543,07** | **56758,01** |
| **Ισοζύγιο** | | | **21785,06** | |

| **ΟΙΚΙΣΚΟΣ ΕΛΕΓΧΟΥ** | | | | |
|---|---|---|---|---|
| Οικίσκος Ελέγχου | | 25μ.Χ25μ. | 34,4 | 518,05 |
| **Γενικό Σύνολο Ο.Ε.** | | | **34,40** | **518,05** |

| | | | | |
|---|---|---|---|---|
| | | **Άθροισμα** | **234483,67** | **181478,98** |
| | | **Ισοζύγιο** | **53004,69** | |

**Table 17**: Overall table of earthworks pre -measurements.

In total, 234483.67 square meters will be required for the construction needs of the project of general excavations and 181478.98 sq.m embankments. From the leftovers of the excavation products, paving material will be created ( ubgrade).

The project, according to the pre -measurement, has a positive soil balance, so the needs for embankments will be covered by excavations. In the event that the construction of an embankment is required without a corresponding available volume of soil, or the soils are deemed unsuitable for the construction of embankments, they will be sought from licensed quarries.

### *6.3.11 Intervention Surface*

The interventions that will be carried out during the construction of the considered project by branch of road construction, opening-improvement, W/T foundation - squares, and the site for the installation of control cabins, and regarding the total area occupied by the project (excavations- embankments), are presented in the following table:

| PREMEASUREMENT OF INTERVENTION SURFACES | |
|---|---|
| **Sets of Interference Surfaces** | |
| Wind Power plant Access Road | 92211.67 |
| Wind Station Internal Road Construction | 13837.80 |
| Wind Turbines Erection Square | 153473.24 |
| Control Cabin | 4000.00 |
| **Total (sq.m.)** | **263522.71** |
| **Total (acres)** | **26.352** |

**Table 18**: Measurement of intervention surfaces.

A map is attached to annex 16.8 (drawing: 299.5.1.8 Map of Intervention Surfaces : 1: 10 000 and detailed Measurement Table of Intervention Surfaces).

It is worth noting that:

- Excavations and embankments will be the minimum possible and in fact will be carried out in such a way that there is no significant excess of excavation products (almost zero backfill -embankment balance)
- With the appropriate planning and protection of the slopes in the places where small embankments or trenches will be observed, landslides and dangerous changes of any kind will be avoided.
- In the event that trees need to be cut, the work will be carried out with a view to minimizing interventions and protecting the forest ecosystem and the subsoil.
- The topography and relief of the ground are used to minimize the impact on the geomorphology in combination with the efficient operation of the W/P. Appropriate adaptation of the shaft to the topography of the area minimizes the size of the interventions in the morphology.
- The slopes will be lined with topsoil. The clothing of the slopes (mainly the embankments) with vegetable earth is intended to ensure infrastructure for plantings but also conditions for natural re-vegetation to improve the integration of the technical works into the natural environment. The topsoil will normally come from the removal products of the surface layers of the soil material in the work area. From the above surface excavation products, suitable materials with vegetative factors for the growth of vegetation will be selected. Plant soil is not placed on the slopes of the trenches formed in semi-rocky to rocky soil, as they favor natural re-vegetation on the same soil material.

## 6.4 Construction Phase

The technical works planned to be done during the construction phase of the project include:

- ✓ Road construction works

- ✓ Configuration of W/T construction sites
- ✓ W/T foundation – Pillar bases
- ✓ Excavation of transit trenches, power cables and weak currents, laying cables and burying them
- ✓ Wind power plant indoor IT installation
- ✓ Wind power plant control center building facilities
- ✓ Construction of W/T
- ✓ Connection works to the medium voltage grid

It is noted that for the foundation of the W/Ts, as well as for the improvement or opening of roads in the case of rocky terrain, there is a possibility of controlled use of explosives. It is noted that if explosives are used, their use will be done by specialized crew, it will be controlled and with all necessary safety measures taken, as detailed in the relevant standards and instructions.

**We point out that:**

**For special works, activities and facilities that will arise during the detailed planning of the project, a separate Technical Environmental Study (TE.PE.M.) will be submitted, in accordance with Article 7, paragraph 3 of Law 4014.**

**Indicatively, TEPEM will assess the Environmental Impacts for works, activities and facilities such as: construction site, warehouses , use of explosives, specialized technical measures, etc.**

### *6.4.1 Schedule of works - stages of construction*

The projected work schedule and construction stages is presented in the table below.

| | **Investment schedule** | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| **1** | **Licensing Procedures** | **X** | **X** | **X** | **X** | **X** |
| 1.1 | Production license | X | X | | | |
| 1.2 | Opinions from agencies | | X | | | |
| 1.3 | Terms of connection to the network | | X | | | |
| 1.4 | Environmental terms approval | | X | X | | |
| 1.5 | Binding Connection Terms | | | X | | |
| 1.6 | Participation in a tender process for an Operational Support Contract | | | X | | |
| 1.7 | Installation license | | | X | | |
| 1.8 | Connection Agreement | | | X | | |
| 1.9 | Operational Support Agreement | | | X | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **2** | **Offers Orders – Contracts with Suppliers** | | | | **X** | |
| **3** | **Construction works** | | | | **X** | |
| 3.1 | Road construction works | | | | X | |
| 3.2 | Earthworks | | | | X | |
| 3.3 | Layout of squares - W/T foundation | | | | X | |
| 3.4 | Control cabin | | | | X | |
| 3.5 | Transport & placement of W/T | | | | | X |
| 3.6 | Electrical works | | | | | X |
| 3.7 | Construction of connection network and H/S | | | | | X |
| **4** | **Operating period** | | | | | **X** |
| 4.1 | Trial period | | | | | **X** |
| 4.2 | Project receipt | | | | | **X** |

**Table 19**: Construction work-stage schedule.

### *6.4.2 Individual technical projects of the main project*

The main project is the electricity generation units, the wind turbines of ASPIE. For their installation and operation, necessary individual technical works are required, which are their accompanying works.

The individual technical works for the ASPIE installation, which have been analyzed in previous parts of the chapter, are the following:

- Access roads and internal roads along the Wind Power plant with a deck width of 5.0 meters
- Space configuration for a control center of dimensions 25.0m x 25.0m where three prefabricated cabins - ISOBOX type - will be installed, each measuring 2.6m wide and 8.0m to 10.0m long
- Excavations for the underground routing of the H.V. cabling and M.V. 33 kV, interconnecting the W/Ts with each other and with the Control Station as well as low current cabling within the forest roads under construction
- W/T foundations measuring 25m x 27m and 3.0 m depth
- Layout of the square construction area W/T
- Interconnection works of the W/P with the new 33/150kV Voltage Raising Substation with an exclusive underground medium voltage line with a total length of 36.24 km.

Heavy vehicles and lifting equipment will be used during the transport and erection of the W/T parts. The compaction of the embankments will be done with great care.

The foundation excavations will be carried out based on the current legislation and the specifications of the W/T manufacturer. An effort will be made to carry out excavation work exclusively by mechanical means.

**Use of explosives**

The use of explosives during the works will be applied in the event that excavation using mechanical means is not possible or it is environmentally better to use them (shorter period of disturbance and noise). In the event that during the work the use of explosives is necessary, this will be done by taking all the necessary measures defined by the legislation and the environmental licensing of the project. Explosives will be procured from legal explosives factories and used by specialized personnel.

All factors affecting blasting (ground morphology, type and quality of explosives, geology, wind direction and speed, weather conditions, hole geometry, etc.) will be calculated to enable greater exploitation of the energy of the explosive material for the production of useful project and limit environmental impacts.

All necessary measures will be taken to:

- reduce noise
- reduce dust emissions
- ground vibrations are minimized
- increase the breaking of the material into suitable fractions.

It should be noted that forest roads have already been opened in the same area by the forestry service using explosives, as shown in the following photo, which concerns the existing forest road from the Echinou-Synoron asphalt to the northwest of the project.


**Figure 19**: Use of explosives at the project site to open a forest road by the competent agency.

After each W/T foundation is completed, the foundations and channels will be backfilled . The necessary actions will be taken, according to the instructions of the forestry services, so that the intervention surface is restored.

*6.4.3 Support facilities of the construction*

For the construction of the project, it will be necessary to set up a construction site, as well as to utilize loan rooms - storage rooms .

**Construction site**

Construction site measuring 50X50 meters will be created in a suitable location in the project area. The construction site will be fenced and guarded throughout the works. Staff facilities, offices and auxiliary spaces will be placed inside the construction site.

The following necessary environmental practices will be applied at the site:

- Wetting to reduce dust emissions
- Wastewater disposal
- Containment of fluid leaks
- Storage and management of waste (oils, etc.)
- Collection of concrete mixer washing water
- Reuse of excavated materials
- Sanitary facilities (Chemical toilets to cover hygiene needs)

Furthermore, an overall construction site noise management plan will be drawn up, which will include protective measures to deal with noise in accordance with all the environmental conditions.

After the completion of the works, there will be removal of all waste and full restoration of the site. All excess unsuitable trenching products and excess backfill will be safely disposed of in designated disposal areas. Below is an indicative plan of the construction site that will be formed.

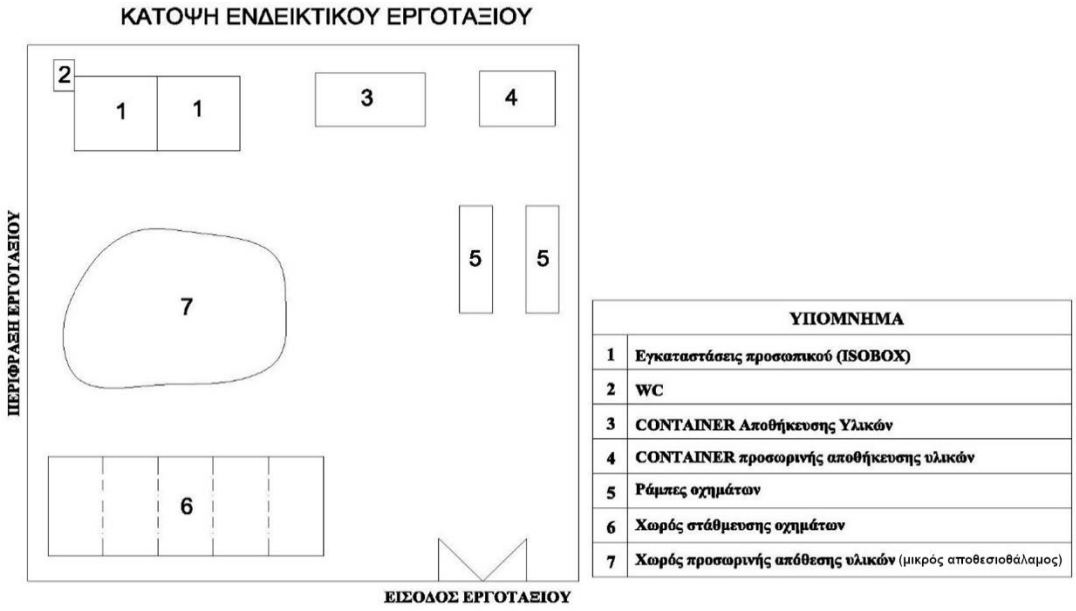



**Figure 20**: Indicative site plan.

### Storage rooms

During the construction of the infrastructure works, it will be necessary to set up temporary warehouses . The locations of the warehouses will be selected based on the criteria of the slope of the ground (flat surfaces) and the vegetation of the area (areas without vegetation). After the end of the works, there will be restoration and stabilization of the warehouses' soils . Depending on the nature of the soil, restoration will be done by the method of planting or sowing the local native flora.

The supply of necessary aggregate materials will be made from legally existing aggregate quarries in the area or legal natural loan chambers after approval by the competent services.

**Crushing Unit – Crusher**

During the construction of the infrastructure works, and if deemed necessary, a unit for crushing and depositing aggregates will be installed. The installation of the unit will be done in a suitable area of the works. During the operation of the unit, all necessary measures are taken to limit noise and minimize dust emissions. The products of the fracturing plant will be used as backfill of excavations or transferred to temporary storage chambers .

### *6.4.4 Necessary construction materials*

During the construction of the accompanying works, raw materials for earthworks (sand, gravel 3A), materials for the foundation of the equipment, cables, water and energy will be used. The W/Ts will be transported disassembled to the project site, where they will be founded and assembled .

The necessary raw materials will be transported to the project area with suitable trucks from companies based in the area as well as from legally operating quarries. Also, the resulting excavation products will be used for the construction of embankments.

For the foundation of W/T and control houses, concrete, steel reinforcement , etc. will be required , which will be purchased on a priority basis from local suppliers.

Cables will also be obtained from suitable electrical equipment suppliers.

The necessary water for the construction of the project (road construction and concreting works ) will be transported by water tankers.

The energy that will be needed for the construction of the projects will be produced by diesel generators or by construction machinery.

### *6.4.5 Liquid waste discharges with assessment of quantitative and qualitative characteristics*

During the construction phase of the project, liquid waste may be generated from the discharge of mineral oils from the machines, which are considered dangerous for the environment and must necessarily be collected in special containers and removed from the work execution sites for recycling. It is also strictly forbidden to change oils and other similar work in the project area. In particular, it is suggested that the maintenance of the machines be carried out in organized workshops outside the area of the projects or at the approved construction site of the project, in which there must be a provision to avoid soil pollution, with a cement coating and a network to collect the leaks. In addition, in the event of an accident (e.g. breaking a gearbox or crankcase ) , the maintenance and repair should be carried out with full control and zero oil leakage into the environment. In case of leakage, the oils should be placed in suitable containers until they are collected by the appropriate agencies.

The project during its operation does not generate liquid waste. The liquids necessary for the maintenance of the wind turbines will be transported outside the wind power plant by qualified personnel who will perform the maintenance, in order to process

them in accordance with the applicable provisions and regulations. These liquids refer to transformer oils, as long as dry type MS is not used. Special oil collection chambers will be built at the base of the transformers, in order to avoid any deposition or disposal of them on the ground and, by extension, in the underground water table. The chambers will be waterproofed and the oils will be collected by the staff, without mixing with other liquids.

According to KYA 50910/2727/03 [83] "Measures and Conditions for Solid Waste Management. National and Regional Management Planning" and Annex IB "European Waste Catalog (ECW) (Decision 2001/118/EC)" the produced oils are classified in category 13 WASTE OILS AND WASTE LIQUID FUELS, specifically in category 13 02 06 "synthetic engine, gearbox and lubrication oils", which are classified as potentially hazardous waste according to Decision 2001/118 / n.c. ( EEL 47/2001).

The liquid waste also includes the sewage that will result from the personnel employed by the wind power plant, the quality of which is that of municipal sewage. The staff of the wind power plant will be 1-2 people and they will be employed daily for a few hours.

### *6.4.6 Surplus or waste materials or solid waste to be produced*

During the construction phase of the project, an additional cause of environmental burden is the generation of waste and debris both from the site personnel and from the operation of the site and from the construction work of the projects. Waste generated by site workers, packaging materials, used machine parts or parts, and excavation products will constitute the waste generated during construction of the project.

The exact amounts of workers' personal waste cannot be estimated at this stage, since they depend on various factors and much more on the correct or non-functioning of the construction site. The subcontractor will collect the waste, which will be separated into recyclables and food waste. These , in cooperation with the local authorities, will be deposited in areas suitable for them (e.g. collection of waste and feed residues in plastic bags and transfer to special waste collection and recycling bins).

As far as packaging materials are concerned, used pieces as well as machinery spare parts will be forwarded by the subcontractor for recycling.

Both the maintenance of the facilities and their maintenance in a state of uninterrupted operation, as well as the restoration of the development sites of the construction site after the end of the works, is deemed necessary and ensures the restoration of the landscape. The subcontractor is responsible for all these works.

Inert residues according to the European Waste List are classified in category 17 WASTE FROM CONSTRUCTION AND DEMOLITION and in particular in category 17 05 03 "soils and stones other than those mentioned in point 17 05 03 (where 17 05 03: soils and stones containing (hazardous substances). These aggregates in this case will be used to shape the surrounding area, while the final excess of these will be transferred by a licensed collection and transport operator to the Collective System for Alternative Management (SSED) of Excavation, Construction and Demolition Waste (AEKK) **"Aggregate Recycling North of Greece SA"** .

### *6.4.7 Emissions of pollutants into the air from the construction of the project or activity*

The effects on the atmospheric environment are limited, as mentioned in a previous chapter, to the construction phase of the project and concern the gaseous pollutants that

will be produced by the construction machinery, as products of oil combustion, and the production of dust, as a product of excavation.

The amount of gaseous pollutants is considered negligible given the limited operating time of the machines. Regarding the avoidance of dust generation, it is recommended to wet the excavated soil and moisten the movement corridors of the machines as well as observe and apply the Road Traffic Code in terms of dust protection measures.

Regarding the avoidance of dust generation, from the movement of construction workers vehicles, it is recommended:

- Wetting of the excavated soil and moistening of the movement corridors of the machines.
- Establishment of maximum speed limits on all dirt surfaces.
- The exhausts of all machines should point upwards and not towards the ground.
- Rests and walkways should be kept clean and moist.

More general site management measures to control dust include:

- According to Greek Legislation, all trucks transporting loose materials must be covered.
- Wetting during movements and deposits of sand and gravel as well as washing the wheels of all vehicles leaving the work area to reduce the dust emitted. Vehicles leaving the work area must be clean.
- All machinery and equipment used in construction should be in good condition and meet the manufacturer's specifications to minimize dust emissions.
- For the volume of the excavations and until it is used for the needs of the embankments , the necessary measures will be taken such as wetting the embankments and covering the volume of the embankments , so that the embankments are not dispersed and dust is created.

### *6.4.8 Noise and vibration emissions from the construction work of the project or activity*

The proposed project does not cause vibrations and any form of radiation. Impacts on the environment will occur from the noise of the machinery during the construction of the project. It is pointed out that all the work will be carried out far from residential areas and therefore no disturbances are expected for the residents of the settlements in the wider area. However, it is recommended that the specifications of the correct operation of the machines be respected, that machines with reduced noise pollution, well maintained and that the permitted acoustic power levels are respected according to the K.Y.A. 37393/2028/2003.

In addition to the above K.Y.A. there are legislative regulations on sound protection of the environment during the use of jackhammers and other noisy machines. In the event of the use of such machines, the manufacturer is obliged to apply the applicable legislative regulations for the protection of the environment from noise during the construction of the project (Ministerial Decisions 56206/1613 Official Gazette 570/B/9-9-86, 69001/1921 Official Gazette 751/B/18-10-88 and A5/2375 Official Gazette 689/B18).

### *6.4.9 Emissions of electromagnetic radiation, with reference to the power and frequencies of the emissions*

The construction phase of ASPIE is not related to emissions of electromagnetic radiation.

### *6.4.10 Life Cycle*

Regarding the life cycle of the project, like all technical projects it consists of the acquisition of raw materials, the pre-construction phase, construction, use and the end of the critical life. Based on life cycle analysis and in terms of CO2 emissions, a RES plant emits over its lifetime 1/100 of the CO2 emitted during the corresponding period and for the same amount of energy produced by a conventional power plant.

## 6.5 Operation Phase

### *6.5.1 Detailed description of the operation and management of the project*

The operation of the wind power plant will be almost uninterrupted (98% expected availability) and the production power will be injected into the PPC network. For the reliable and continuous production of electricity, it is necessary to monitor the operation of the park by experienced and properly trained personnel, who will perform operation monitoring, routine maintenance and repair of faults. For the above reason, three people will be employed, an engineer (responsible for the operation and maintenance of the park) and two craftsmen, properly trained by the construction company.

The park will have the possibility of two-way communication with the ADMIE energy control center. For this purpose, an appropriate supervisory control system will be installed, with which indications, markings and proportional operational parameters of the park will be sent to the ADMIE energy control center on a 24-hour basis. The information that will be sent by the park is the following:

- ✓ Instantaneous delivered active power of the park (MW).
- ✓ Instantaneous absorbed reactive power of the park ( MVAr ).
- ✓ Voltage on the balance M.T. of the park ( kV ).
- ✓ Maximum power generation capacity (MW) that the park can deliver based on conditions.
- ✓ Status of the park's 33 kV circuit breakers and disconnectors.

The maintenance program shall be performed periodically at regular intervals and in accordance with the manufacturer's instructions. It is distinguished in the maintenance of the mechanical parts of the W/T that bear the greatest fatigue and possibility of failure and damage and in the maintenance of the electrical parts.

### *6.5.2 Inputs of materials, energy and water*

ASPIE do not require special consumption of materials, energy and water.

**Energy**

The operation of the Power Station requires the supply of low-power electricity that will be covered by the existing distribution network. In order to cover its energy needs in the event of a power cut, it will be possible to connect an external manual backup generator pair.

**Fuel**

No fuel is required for the operation of the Power Station. Fuel consumption will be required for the movement of vehicles for the attendance of the personnel at the ASPIE site, as well as for the operation of machines, mainly for maintenance or for backup power generating pairs - H/Z.

**Water supply**

The operation of the Power Station does not require the use of water. Quantities of water are required during the phases of construction of the Station and restoration of the site after its operation. The quantities of water required to cover the needs of the project's operational staff will be provided with common tanks which will be paid for by water vehicles. The quantities of water (how much, hygiene) will depend on the total number of personnel that will be employed during the construction of the project.

### *6.5.3 Liquid waste discharges with assessment of quantitative and qualitative characteristics*

The project during its operation does not generate liquid waste. The fluids produced by the M/S will be transported outside the station by qualified personnel who will perform the maintenance, in order to process them in accordance with the applicable provisions and regulations. These liquids refer to transformer oils, as long as dry type MS is not used. Special oil collection chambers will be built at the base of the transformers, in order to avoid any deposition or disposal of them on the ground and, by extension, in the underground water table. The chambers will be waterproofed and the oils will be collected by the staff, without mixing with other liquids.

### *6.5.4 Solid waste discharges with assessment of quantitative and qualitative characteristics*

The solid waste from the operation of the WWTPs is small and concerns waste from the operating staff and mainly spare parts from the maintenance of the equipment, which are managed as hazardous waste. The following table presents the codes according to EKA of the waste streams that are estimated to arise during the operation of the project, as well as the estimated quantities.

| WASTE | WASTE DESCRIPTION | EKA CODE | V162 | total | M.U. |
|---|---|---|---|---|---|
| **NON-HAZARDOUS WASTES** | | | **kgr / lt / pcs per W/T** | | |
| Plastic | plastic packaging | 15 01 02 | 5 | 165 | kg |
| Paper and cardboard | paper and cardboard packaging | 15 01 01 | 5 | 165 | kg |
| Electric/ electronic equipment | waste electrical and electronic equipment other than that referred to in items 200121, 200123 and 200135 | 20 01 36 | 0.5 (unscheduled tasks) | 16.5 | kg |
| **HAZARDOUES WASTES** | | | **kgr / lt / pcs per W/T** | | |
| Used engine oils | non-chlorinated mineral-based hydraulic oils; | 13 01 10* | 10 (+ unscheduled tasks) | 330 | Lt |
| Contaminated empty containers | packaging containing residues of hazardous substances or contaminated by them | 15 01 10* | 2 (+ unscheduled tasks) | 66 | pc |
| Contaminated absorbent materials | absorbent materials, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated with hazardous substances | 15 02 02* | 10 (+ unscheduled tasks) | 330 | kg |
| Contaminated oil filters | oil filters | 16 01 07* | 3 | 99 | kg |
| Antifreezes | antifreeze fluids containing dangerous substances | 16 01 14* | 5lt/ year (for unplanned works) 400lt/5years (for planned works) | 165 | Lt |
| Used batteries | batteries containing mercury | 16 06 03* | 40kg/3 years | 440.0 | kg |
| Fluorescent lamps | fluorescent tubes and other waste containing mercury | 20 01 21* | 4pc/ year | 132 | pc |
| Empty aerosol containers | metal packaging containing a hazardous matrix of solid porous material (e.g. asbestos), including empty pressure receptacles | 15 01 11* | 1 kg / year | 33 | kg |
| Organic solvents | waste from paints and varnishes containing organic solvents or other hazardous substances | 08 01 11* | 1 kg / year | 33 | kg |
| Waste colors | waste from paints and varnishes containing organic solvents or other hazardous substances | 08 01 11* | 1.5lt more unscheduled tasks | 49.5 | Lt |
| Waste waterproofing materials | waste adhesives and sealants containing organic solvents or other hazardous substances | 08 04 09* | 1.5lt more unscheduled tasks | 49.5 | Lt |

Solid waste will be managed according to the applicable legislation and contracts will be signed with certified companies for their collection and management.

The aim of solid waste management is to protect water, air, soil, fauna and flora, as well as human health.

The applicable legislation for solid waste management is noted below:

- Law 2939/2001 - "Packaging and alternative management of packaging and other products - Establishment of EOEDSAP and other provisions".
- Presidential Decree 115 – Official Gazette 80/05.03.2004, management of batteries and accumulators
- Presidential Decree 115 - Gazette 82/05.03.2004 "Measures, conditions and program for the alternative management of electrical and electronic equipment waste".
- KYA 13588/725/2006 - Official Gazette 383/B'/28.3.2006 "Measures and conditions for the management of hazardous waste"
- KYA 24944/1159/2006 - Official Gazette 791/30.06.2006 "Approval of General

Technical Specifications for the management of hazardous waste"
- KYA 8668/2007 - Official Gazette 287 B "Approval of the National Hazardous Waste Management Plan, in accordance with article 5 of no . 13588/725 KYA".

### *6.5.5 Emissions of pollutants and GHG into the air from the operation of the project*

The operation of ASPIE is not related to gaseous pollutant emissions. The only gaseous pollutants come from the movement of vehicles on the project site by personnel for operation monitoring and routine or emergency maintenance of equipment. It goes without saying that vehicle emissions are minimal.

Also, the operation of ASPIE is in no way related to the production of Greenhouse gases. The production and emission of greenhouse gases is related to other activities and not to the conversion of wind energy into electricity.

The operation of the ASPIE not only does not produce gaseous pollutants and greenhouse gases, but on the contrary, the operation of the ASPIE produces clean energy that replaces the energy that would be produced by conventional fuels. The production of a corresponding amount of energy from conventional fuels would result in the emission of significant amounts of pollutants ($CO_2$ , $SO_2$ , CO, $NO_x$ , HC, Particles) as shown in the table below (Table 4, section 2.6.2).

| | | CO2 | SO2 | CO | NOx | HC | σωματίδια |
|---|---|---|---|---|---|---|---|
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / ΕΤΟΣ | Τόνοι/έτος | 285,600.00 | 5,208.00 | 60.48 | 403.20 | 16.80 | 268.80 |
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / 20 ΕΤΗ | Τόνοι | 5,712,000.00 | 104,160.00 | 1,209.60 | 8,064.00 | 336.00 | 5,376.00 |

The above calculations were made based on the average values of emitted pollutants for the production of a final kWh of electricity in the Greek interconnected system of a conventional power plant.

As can be seen from the data in the table, the zero solution will result in the pollution of the environment with over 285,600 tons of carbon dioxide / year as well as the pollution of about 6,000 tons of other dangerous pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide carbon and particles.

### *6.5.6 Noise and vibration emissions from the operation of the project*

The noise emissions from the operation of the project are presented in paragraph 9.11 of the study. The operation of the project does not cause vibrations.

### *6.5.7 Emissions of electromagnetic radiation*

The creation of electromagnetic interference problems refers on the one hand to problems caused by the wind turbines due to their location in relation to already existing television or radio stations and on the other hand to possible electromagnetic emissions from them.

Propagation of broadcasts on TV and/or radio frequencies (mainly FM broadcast frequencies) is affected by obstacles intervening between transmitter and receiver. The main problem with wind turbines comes from the moving blades which can cause signal fluctuations due to reflections. This was much more pronounced in the first generation of

wind turbines that had metal blades. With today's W/Ts whose blades are synthetic, interference effects have been eliminated. W/Ts according to EWEA (European Wind Energy Association) cause interference in telecommunications, due to the blades that sometimes scatter the signal as they rotate. In the study area, as it was found, there are telecommunications facilities, but at a significant distance - about 600m. from the nearest W/T. These are not expected to be affected by the construction and operation of the proposed project. In terms of emitted radiation, the only subsystems that could be considered to "emit" low-level electromagnetic radiation are the generator and the medium voltage transformer. The electromagnetic field of the generator is extremely weak and is limited to a very short distance around its shell which is placed above the ground. The radiation of these devices is less than that of the PPC cables on the wooden poles that bring the electric power to the houses.

In this case, the generator is placed at a height of 149m from the ground, while the medium voltage transformer is placed in an enclosure of specially formed steel sheet and for this reason there is no real issue of exposure to electromagnetic radiation even at the base of the wind turbine.

## 6.6 Shutdown - recovery

### *6.6.1 Downtime Estimate*

Estimated downtime is 25 years.

### *6.6.2 Method of final disposal of equipment*

When wind turbines are decommissioned, most of them (over 90% by mass) can be recycled, thus constituting a sustainable form of energy production throughout its life cycle. The removal of the equipment (wings, mechanical parts, pylon) will be done by specialized crews, such as those used for their installation, while the removal for recycling will be done from the already formed access roads of the project.

### *6.6.3 Land restoration*

Because the support tower is removed, any obvious change in the environment ceases, the field of vision returns absolutely to the state before the installation of the park, and the construction square is already a grassy area for livestock utilization since the operation of the station.

## 6.7 Emergency conditions and risks to the environment

The project does not involve emissions of chemicals or radiation. Also, the risk of explosion does not exist because the operation of a Wind Power plant does not require the use of flammable or explosive materials. The operation of A/Ps is extremely safe, because it is purely electric and does not require flammable fuels or reactive acids or other caustics. Due to the fact that W/Ts operate at ambient temperature, there is no risk of accident from contact with hot surfaces of the installation.

The proposed project does not involve risks of abnormal situations during construction, as long as the existing safety regulations regarding the operation of

construction sites are observed. In order to reduce any costs of repairing damage from lightning strikes and to protect the A/P from any kind of surges, appropriate lightning protection elements will be connected to the panels. Also on the spindle of the wind turbine there will be a lightning rod, which will be connected to the generator and the wind turbine panel. The conductor that will connect all of the above will end up in the foundation ground.

There are no risks from the construction and operation of this project in case of abnormal situations, nor are abnormal situations caused by the construction and operation of the project.

The implementation of the project under study will contribute to meeting the country's commitments towards the European Union regarding greenhouse gas emissions, while it will have positive effects on the Greek energy balance, on increasing employment in the region and on local and regional development in general. The above positive effects from the implementation of the project make it beneficial for society as a whole and the Greek Economy.

## 6.8 Delineation of Streams

Not required for the construction of the project, as no interventions will be made in streams, neither for the main project nor for its accompaniments .

# 7. ALTERNATIVE SOLUTIONS

## 7.1 Presentation of the viable alternatives considered

The location of a wind power plant is mainly determined by the places where the wind potential appears, i.e. by factors beyond the possibility of human intervention. For this reason, the alternative location of the specific project, i.e. the location of the machines in other positions, can be done under conditions of energy efficiency of the project.

The determination of the wind potential, for the construction needs of a wind power plant, is done by analyzing the results of measurements from wind stations located in key points of the studied area, while simultaneously using meteorological mathematical models to predict the distribution of the wind flow, at a specific height above the given topographic relief and with the aim of the comparative assessment of the neighboring areas.

In addition, factors such as site suitability , site morphology, local slopes and foundation possibilities, as well as the safety of residential areas to minimize acoustic and visual disturbance were taken into account for the siting of the wind power plant . It is also mentioned that there are no archaeological or military sites within the project area. The distances of the W/T of the A/P from the nearest settlement, which is Komara , are greater than 500m, as defined by PD/25-4-89 (Government Gazette 293 sq.D '/16-5-89) and exceed at 2950m. Regarding the selection of the positions of the wind turbines, it was based on criteria such as:

- The optimal wind potential of the area.
- The energy efficiency of wind turbines.
- The low atmospheric turbulence.
- The local slope of the soil and the suitability of the foundation within the soil.
- The minimum lateral distance between two consecutive wind turbines, i.e. a distance greater than two and a half rotor diameters (ie approximately 405 meters) when they are positioned upwind , to minimize the effect of aerodynamic shadowing.
- The prevailing wind directions based on the statistical analysis of wind data.

The above criteria led to the selection of the optimal location of the wind turbines, which contributes to the maximum utilization of the wind potential of the area and to the maximum possible energy production. The specific location was chosen as an optimal result of the combination of many parameters and constraints required for the implementation of a Wind Park. These parameters and constraints are technical, economic, environmental and social. Of decisive importance for the siting of such a project is the Wind Power that varies spatially, while an important parameter for the design of a wind power plant is the percentage of occurrence of winds from the various directions. The best position for the placement and operation of the wind turbines are the ridges where the highest wind potential is found and which should be placed in a specific arrangement so that there are no shading problems during the operation of the wind turbines.

Taking into account all the above, it is estimated that the area under study meets all the conditions defined by the Greek Legislation and is considered suitable for the siting of a wind power plant.

### *7.1.1 Alternative solutions for connecting the A/P and routing of the M.T. network.*

In this section you consider an alternative solution for the accompanying projects of the station.

The connection of the A/S to the network is proposed to be made at the existing substation (Y/S) of Orestiada. The proposed 33kV medium voltage underground line of the interconnection will have a total length of approximately 36.24km. and will be built within the base of the existing roads.

Attached to the appendices is a map - topographical with the proposed routing of the medium voltage network - (plan 299.5.1.7: Interconnection Network Map)

Alternatively, the connection to the grid could be made in a new 33/150 kV Voltage Raising Substation in the route zone of the KYT NEAS SANTAS – ORESTIADAS Substation transmission line with an underground medium voltage substation , with a total length of approximately 35.63km . (see alternative interface map below).

Attached to the appendices is a topographical map with the proposed as well as the alternative route of the M.T. underground network. - (of plan 299.5.1.3 : Alternative Interconnection Map)

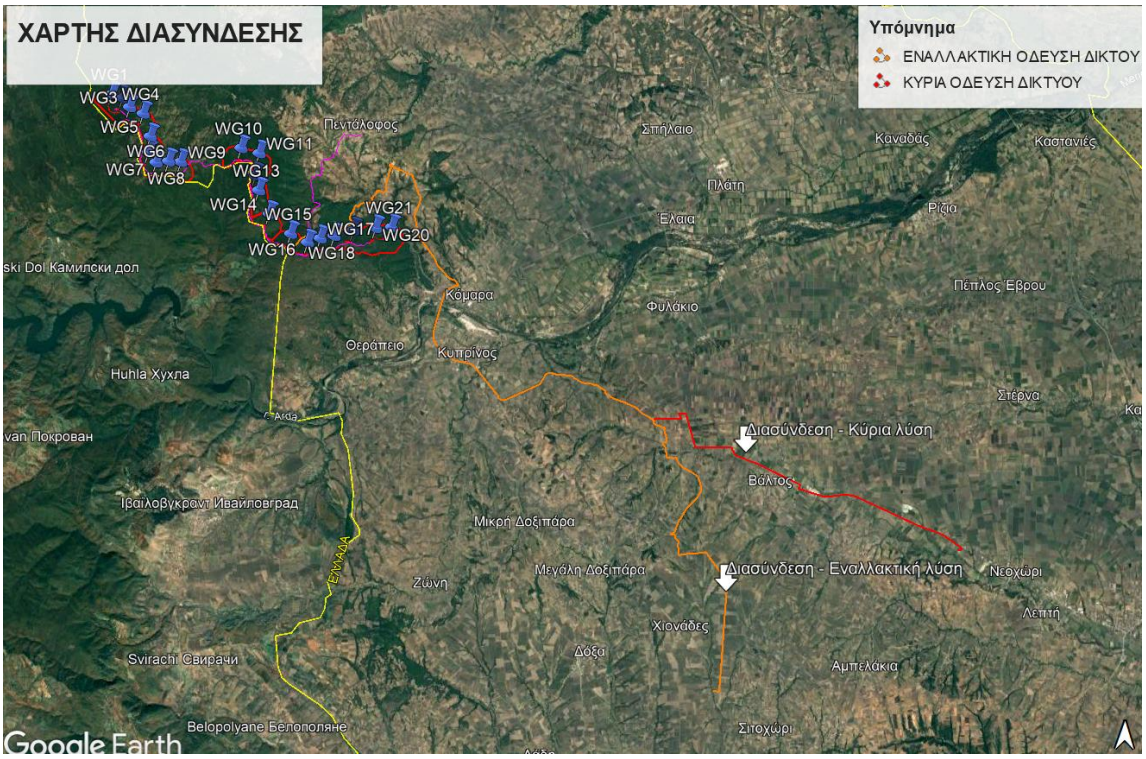



**Figure 21**: ASPIE alternative interface map

**Initial project design**

During the initial design of the project and the first Producer Certificate issued by RAE, the project consisted of Vestas indicative type 8W/T V 155/3.3 MW (impeller diameter 155m, hub height 105m) and had a total power of 26.4 MW . Along the way, appropriate modifications were made to make the project its current form and to be more efficient and sustainable and have a lower environmental impact.

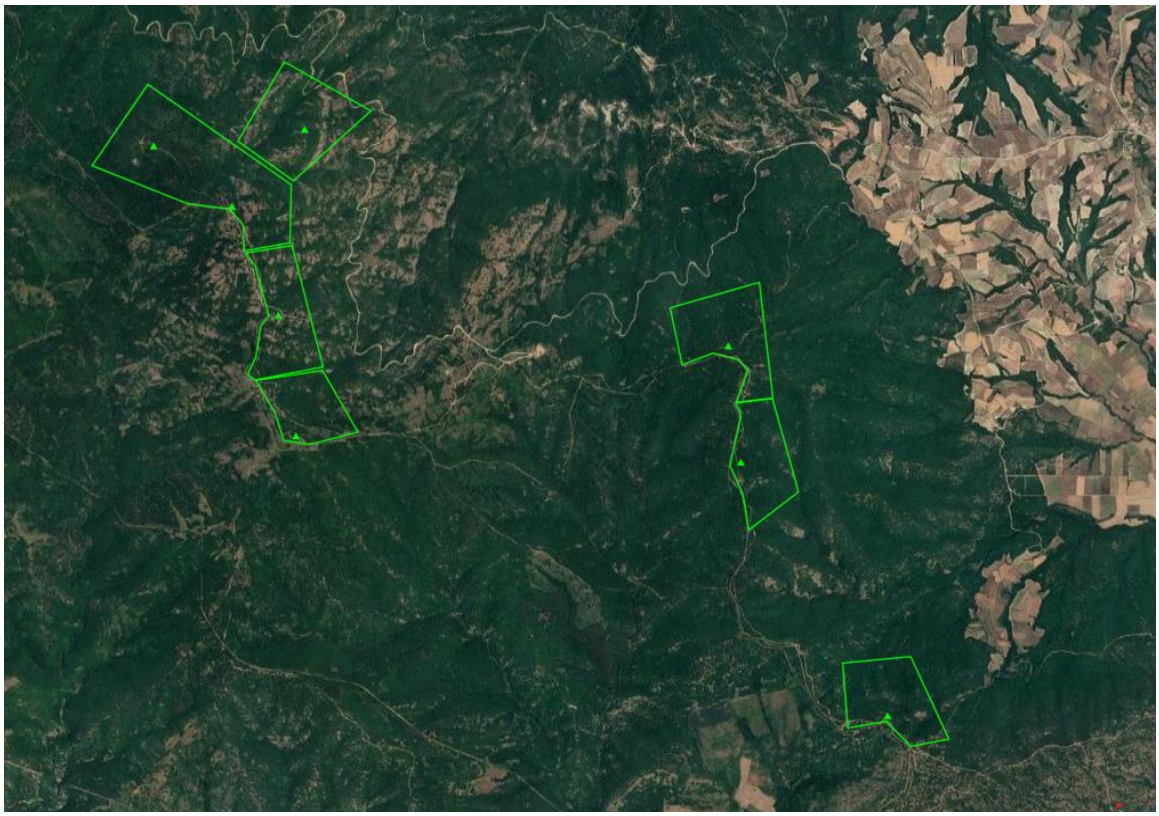


**Figure 22**: Initial design of the project – initial Producer Certificate.

| **WIND PARK ANEMOS EVROU I.K.E.** | | | |
|---|---|---|---|
| AETOKORFI WIND PLANT 26.4MW | | | |
| COORDINATES OF WIND TURBINES IN EGSA 87 | | | |
| AG | X | Y | H |
| 1 | 673309.92 | 4612440.50 | 556 |
| 2 | 674488.05 | 4612596.47 | 422 |
| 3 | 673937.67 | 4611988.73 | 562 |
| 4 | 674316.72 | 4611162.64 | 540 |
| 5 | 674478.41 | 4610237.20 | 532 |
| 6 | 677843.62 | 4611012.28 | 444 |
| 7 | 677963.81 | 4610119.33 | 410 |
| 8 | 679161.29 | 4608197.47 | 359 |

| COORDINATES OF VERTICES OF POLYGON K IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| K1 | 674395.07 | 4612157.77 |
| K2 | 674396.09 | 4611711.18 |
| K3 | 674037.85 | 4611641.21 |
| K4 | 674027.38 | 4611837.74 |
| K5 | 673916.87 | 4611960.10 |
| K6 | 673584.91 | 4611994.10 |
| K7 | 672833.06 | 4612268.37 |
| K8 | 673253.55 | 4612903.35 |
| AREA OF POLYGON E = 890766.724 sq.m. | | |
| PERIMETER OF POLYGON Π = 4432.327 m. | | |

| COORDINATES OF VERTICES OF POLYGON L IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| L1 | 674317.34 | 4613102.92 |
| L2 | 675003.92 | 4612743.06 |
| L3 | 674411.48 | 4612189.21 |
| L4 | 673969.79 | 4612482.76 |
| AREA OF POLYGON E = 484701.980 sq.m. | | |
| PERIMETER OF POLYGON Π = 2827.435 m. | | |

| COORDINATES OF VERTICES OF POLYGON M IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| M1 | 674052.05 | 4611625.49 |
| M2 | 674412.09 | 4611692.25 |
| M3 | 674677.91 | 4610763.02 |
| M4 | 674146.72 | 4610649.95 |
| M5 | 674089.31 | 4610692.32 |
| M6 | 674150.13 | 4610827.51 |
| M7 | 674182.13 | 4611065.32 |
| M8 | 674245.58 | 4611143.87 |
| M9 | 674128.06 | 4611525.25 |
| AREA OF POLYGON E = 379787.931 sq.m. | | |
| PERIMETER OF POLYGON Π = 2961.162 m. | | |

| COORDINATES OF VERTICES OF POLYGON N IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| N1 | 674154.70 | 4610646.41 |
| N2 | 674307.63 | 4610403.66 |
| N3 | 674384.72 | 4610188.90 |
| N4 | 674595.02 | 4610166.02 |
| N5 | 674963.33 | 4610267.11 |
| N6 | 674673.72 | 4610736.20 |
| AREA OF POLYGON E =283869.484 sq.m. | | |
| PERIMETER OF POLYGON Π = 2186.582 m. | | |

| COORDINATES OF VERTICES OF POLYGON X IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| X1 | 678203.45 | 4610611.29 |
| X2 | 677919.71 | 4610570.72 |
| X3 | 678004.50 | 4610820.53 |
| X4 | 677925.72 | 4610900.00 |
| X5 | 677726.07 | 4610943.79 |
| X6 | 677486.95 | 4610848.44 |
| X7 | 677382.45 | 4611283.91 |
| X8 | 678074.92 | 4611497.52 |
| AREA OF POLYGON E = 412320.160 sq.m. | | |
| PERIMETER OF POLYGON Π = 3192.153 m. | | |

| COORDINATES OF VERTICES OF POLYGON O IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| O1 | 678040.47 | 4609589.57 |
| O2 | 678422.03 | 4609892.68 |
| O3 | 678199.94 | 4610605.74 |
| O4 | 677916.01 | 4610565.14 |
| O5 | 677957.02 | 4610463.87 |
| O6 | 677879.90 | 4610078.55 |
| O7 | 677987.87 | 4609861.61 |
| AREA OF POLYGON E = 337823.105 sq.m. | | |
| PERIMETER OF POLYGON P =2542.585 m. | | |

| COORDINATES OF VERTICES OF POLYGON P IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| P1 | 678800.44 | 4608584.08 |
| P2 | 679331.48 | 4608647.88 |
| P3 | 679645.50 | 4608020.11 |
| P4 | 679349.64 | 4607956.84 |
| P5 | 679151.02 | 4608144.52 |
| P6 | 678853.41 | 4608085.82 |
| AREA OF POLYGON E = 373317.042 sq.m. | | |
| PERIMETER OF POLYGON Π = 2617.022 m. | | |

**Table 20**: Coordinates of the wind power plant during its initial design.

**Project modification with the amendment decision number 1104/2021-15/12/21**

During the second planning of the project and the number 1104/2021-15/12/2021 amendment issued by RAE, the project consisted of 12 W/T indicative type Vestas V 120/2.2 MW (impeller diameter 120m, hub height 137m) and had a total power of 26.4 MW . This modification was made in order to use smaller wind turbines in order to reduce the operations required for their transport and erection. Along the way, the appropriate transportation and construction methods were sought, so that the project could take its current form and be more efficient and sustainable and have a lower environmental impact.

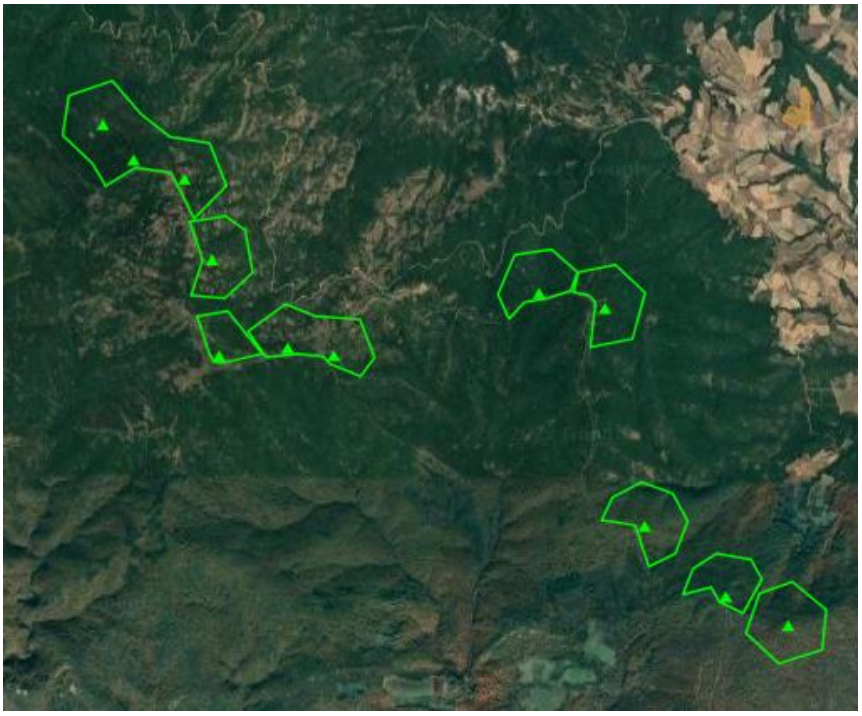


**Figure 23**: First amendment of the project design – RAE amendment number 1104/2021-15/12/2021.

| ΑΝΕΜΟΣ ΕΒΡΟΥ Ι.Κ.Ε. | | | |
|---|---|---|---|
| ΑΙΟΛΙΚΟΣ ΣΤΑΘΜΟΣ ΑΕΤΟΚΟΡΦΗ 26,4MW | | | |
| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΑΝΕΜΟΓΕΝΝΗΤΡΙΩΝ ΣΕ ΕΓΣΑ 87 | | | |
| ΑΓ | X | Y | H |
| 1 | 673270.09 | 4612434.05 | 554 |
| 2 | 673569.66 | 4612099.98 | 586 |
| 3 | 674058.18 | 4611934.70 | 562 |
| 4 | 674341.34 | 4611171.68 | 534 |
| 5 | 674433.84 | 4610264.05 | 533 |
| 6 | 675082.85 | 4610346.88 | 475 |
| 7 | 675515.06 | 4610293.56 | 465 |
| 8 | 677461.25 | 4610932.09 | 441 |
| 9 | 678087.96 | 4610800.12 | 448 |
| 10 | 678523.62 | 4608738.61 | 350 |
| 11 | 679311.00 | 4608091.21 | 358 |
| 12 | 679907.82 | 4607825.10 | 355 |

| ΑΝΕΜΟΣ ΕΒΡΟΥ Ι.Κ.Ε. | | | |
|---|---|---|---|
| ΑΙΟΛΙΚΟΣ ΣΤΑΘΜΟΣ ΑΕΤΟΚΟΡΦΗ 26,4MW | | | |
| ΣΥΝΤΕΤΑΓΜΕΝΕΣ ΑΝΕΜΟΓΕΝΝΗΤΡΙΩΝ ΣΕ WGS 84 | | | |
| ΑΓ | Φ | Λ | H |
| 1 | 41 38'50''49886 | 26 04'56''84356 | 554 |
| 2 | 41 38'39''43867 | 26 05'09''43631 | 586 |
| 3 | 41 38'33''69941 | 26 05'30''36706 | 562 |
| 4 | 41 38'08''75159 | 26 05'41''79813 | 534 |
| 5 | 41 37'39''26780 | 26 05'44''84052 | 533 |
| 6 | 41 37'41''43965 | 26 06'12''95755 | 475 |
| 7 | 41 37'39''36974 | 26 06'31''56782 | 465 |
| 8 | 41 37'58''50924 | 26 07'56''30156 | 441 |
| 9 | 41 37'53''72981 | 26 08'23''22833 | 448 |
| 10 | 41 36'46''57962 | 26 08'39''83014 | 350 |
| 11 | 41 36'24''96621 | 26 09'13''12907 | 358 |
| 12 | 41 36'15''85969 | 26 09'38''60783 | 355 |

| COORDINATES OF VERTICES OF POLYGON A IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| A'1 | 672888.96 | 4612296.06 |
| A'2 | 673175.43 | 4612040.80 |
| A3 | 673308.07 | 4611834.59 |
| A4 | 673590.31 | 4612006.75 |
| A5 | 673929.10 | 4611969.57 |
| A6 | 674160.36 | 4611537.10 |
| A7 | 674456.19 | 4611860.44 |
| A8 | 674289.70 | 4612260.83 |
| A9 | 673912.70 | 4612313.12 |
| A10 | 673626.66 | 4612516.09 |
| A11 | 673352.65 | 4612833.96 |
| A12 | 672938.16 | 4612677.73 |
| AREA OF POLYGON E = 891653.8746 sq.m. | | |
| PERIMETER OF POLYGON W = 4641.4097m. | | |

| COORDINATES OF VERTICES OF POLYGON B IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| B1 | 674121.40 | 4611510.86 |
| B 2 | 674247.08 | 4611147.14 |
| B3 | 674145.03 | 4610809.41 |
| B4 | 674471.38 | 4610789.15 |
| B5 | 674731.23 | 4611037.11 |
| B6 | 674651.41 | 4611436.24 |
| B7 | 674456.09 | 4611565.31 |
| AREA OF POLYGON E = 341310.3149 sq.m. | | |
| PERIMETER OF POLYGON Π = 2404.0286 m. | | |

| COORDINATES OF VERTICES OF POLYGON C IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| C1 | 674209.92 | 4610612.28 |
| C2 | 674341.01 | 4610246.28 |
| C3 | 674385.68 | 4610181.82 |
| C4 | 674486.15 | 4610174.96 |
| C5 | 674841.37 | 4610268.26 |
| C6 | 674503.47 | 4610667.59 |
| AREA OF POLYGON E = 183487.1397 sq.m. | | |
| PERIMETER OF POLYGON Π = 1756.9916 m. | | |

| COORDINATES OF VERTICES OF POLYGON D IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| D1 | 674697.70 | 4610475.18 |
| D2 | 674881.50 | 4610244.65 |
| D3 | 675181.88 | 4610278.74 |
| D4 | 675424.54 | 4610257.11 |
| D5 | 675491.62 | 4610188.84 |
| D6 | 675781.55 | 4610075.80 |
| D7 | 675910.53 | 4610256.43 |
| D8 | 675755.65 | 4610616.65 |

| COORDINATES OF VERTICES OF POLYGON Z IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| Z1 | 677790.49 | 4610933.97 |
| Z2 | 677937.59 | 4610904.24 |
| Z3 | 678002.25 | 4610836.92 |
| Z4 | 677959.81 | 4610408.92 |
| Z5 | 678363.25 | 4610501.27 |
| Z6 | 678469.00 | 4610939.37 |
| Z7 | 678183.67 | 4611195.81 |
| Z8 | 677831.96 | 4611115.52 |
| AREA OF POLYGON E = 328738.5687 sq.m. | | |
| PERIMETER OF POLYGON W = 2468.6875m. | | |

| COORDINATES OF VERTICES OF A POLYGON 87 | | |
|---|---|---|
| peak | X | Y |
| H1 | 678109.03 | 4608773.69 |
| H2 | 678431.22 | 4608734.38 |
| H3 | 678565.19 | 4608335.60 |
| H4 | 678824.91 | 4608468.84 |
| H5 | 678930.00 | 4608776.01 |
| H6 | 678784.50 | 4609042.77 |
| H7 | 678479.34 | 4609143.81 |
| H8 | 678208.55 | 4608986.18 |
| AREA OF POLYGON E = 357416.8135 sq.m. | | |
| PERIMETER OF POLYGON W = 2535.0905m. | | |

| COORDINATES OF VERTICES OF POLYGON TH IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| T1 | 678898.31 | 4608076.81 |
| T2 | 679165.10 | 4608158.22 |
| Th3 | 679200.38 | 4608102.15 |
| T4 | 679249.84 | 4608021.51 |
| Th5 | 679483.11 | 4607918.33 |
| Th6 | 679652.53 | 4608253.77 |
| Th7 | 679537.88 | 4608432.98 |
| Th8 | 679205.53 | 4608483.73 |
| Th9 | 678989.43 | 4608331.48 |
| AREA OF POLYGON E = 251822.8475 sq.m. | | |
| PERIMETER OF POLYGON Π = 2154.4152 m. | | |

| COORDINATES OF VERTICES OF POLYGON I IN EGA 87 | | |
|---|---|---|
| peak | X | Y |
| I1 | 679510.86 | 4607734.08 |
| I2 | 679831.74 | 4607445.71 |
| I3 | 680238.58 | 4607594.45 |
| I4 | 680272.02 | 4607973.17 |
| I5 | 679936.59 | 4608230.89 |
| I6 | 679625.74 | 4608114.82 |
| AREA OF POLYGON E = 413351.9522 sq.m. | | |
| PERIMETER OF POLYGON Π = 2397.3017 m. | | |

| | | | |
|---|---|---|---|
| D9 | 675344.24 | 4610639.94 | |
| D10 | 675047.33 | 4610751.52 | |
| AREA OF POLYGON E = 462592.5281 sq.m. | | | |
| PERIMETER OF POLYGON Π = 3036.6286 m. | | | |
| **COORDINATES OF VERTICES OF POLYGON E IN EGA 87** | | | |
| peak | X | Y | |
| E1 | 677181.87 | 4610656.53 | |
| E2 | 677317.85 | 4610819.26 | |
| E3 | 677546.73 | 4610870.51 | |
| E4 | 677758.29 | 4610944.00 | |
| E5 | 677822.12 | 4611117.33 | |
| E6 | 677567.98 | 4611327.07 | |
| E7 | 677220.52 | 4611267.09 | |
| E8 | 677068.18 | 4610893.94 | |
| AREA OF POLYGON E = 286320.8935 sq.m. | | | |
| PERIMETER OF POLYGON Π = 2203.6750 m. | | | |

**Table 21**: Wind power plant coordinates during the first modification of the design.

## Zero solution

In addition to the above, an alternative solution in relation to the installation of the particular wind power plant is only the zero solution, i.e. the continuation of using conventional fuels for the production of the electricity that will be produced by the wind power plant.

However, the zero solution will result in the contamination of the environment with significant amounts of gaseous pollutants ($CO_2$ , $SO_2$ , CO, $NO_x$ , HC, Particles) as shown in the table below.

The above calculations were made based on the average values of emitted pollutants for the production of a final kWh of electricity in the Greek interconnected system of a conventional power plant.

| | | CO2 | SO2 | CO | NOx | HC | σωματίδια |
|---|---|---|---|---|---|---|---|
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / ΕΤΟΣ | Τόνοι/έτος | 285.600,00 | 5.208,00 | 60,48 | 403,20 | 16,80 | 268,80 |
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / 20 ΕΤΗ | Τόνοι | 5.712.000,00 | 104.160,00 | 1.209,60 | 8.064,00 | 336,00 | 5.376,00 |

**Table 22**: Emission of pollutants avoided by the operation of the wind power plant.

As can be seen from the data in the table, the zero solution will result in the pollution of the environment with over 285,600 tons of carbon dioxide / year as well as the pollution of about 6,000 tons of other dangerous pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide carbon and particles.

In addition to the negative environmental effects of the zero solution, this will negate all the positive effects of the implementation of the project under study which have been mentioned in paragraph 3 and which are epigrammatic: the increase in employment in the project area, the generation of income for the local society, the reduction of fossil fuel consumption and in general the development of local and wider society towards sustainability .

## 7.2 Evaluation and justification of the final choice in relation to the effects on the natural and anthropogenic environment

The need to protect the environment, as well as the management of environmental natural resources, is becoming more and more perceived, to the extent that the environment is constantly receiving the consequences (positive and negative) of the modern development model, which, of course, in turn affects the human-environment relations . Knowledge of the state of the environment and its development trends is a necessary condition in the effort to protect and rationally manage it. An assessment of the development trends of the various parameters of the environment is then attempted in comparison to the null solution, i.e. the possible development of the environment without the intervention under consideration (wind power plant).

Regarding the evolution of the climatic characteristics of the project area, these are not expected to be affected and changed, as the project does not include interventions that could affect such characteristics.

As for the morphological characteristics of the area, these depend on the hydrogeological and climatic conditions, as well as on the geotechnical characteristics of the rocks. In the study area the rocks that structure it are generally assessed as stable and as the area is characterized by vegetation their corrosion is generally prevented. However, the developed hydrographic network and the prevailing climatic conditions contribute to soil erosion and the area tends to be characterized as an area with medium erosion potential. According to the above, no significant changes in the morphological characteristics of the soil of the study area due to natural causes are expected, nor are activities planned in the area that would cause changes in this morphology.

As far as the atmospheric environment is concerned, the existing activities in the wider area contribute to the unfavorable evolution of the quality of the atmosphere, which is constantly being degraded by the emission of pollutants and particles. The proposed project will help to reduce this burden.

The water environment of the wider study area concerns the streams and springs of the area and no change in their quality is expected from the implementation of the proposed project.

As far as the living environment is concerned, no substantial change is expected, as the factors that regulate the ecological balance of the area are not expected to change.

As far as the evolution of the built environment is concerned, the potential state of this depends on the elements concerning the evolution of the social and economic environment and the building. In the study area, a shrinking trend of small settlements is observed, which the municipalities are trying to reverse. In general, no significant changes are expected in the residential environment.

In conclusion, the operation of the Wind Park will positively influence the development of the environment in the area by reducing the existing environmental impacts. With reference to the zero solution, no significant advantage is expected to arise from the non-implementation of the Wind Park since, as already mentioned, its implementation is not expected to negatively affect the anthropogenic activities in the wider area, nor the natural development of the area.

# 8. EXISTING STATE OF THE ENVIRONMENT

## 8.1 Study area

First of all, it is noted that in order to define the study area, the following characteristics should be taken into account:

• project categorization according to environmental legislation and

• type of project depending on whether it is a linear project or a point- area project .

The proposed project is, on the one hand, linear, from the access roads and the routing of the medium voltage network, but at the same time, point-wise due to the W/T wind turbines, while according to Y.A. ΙΠΕΝ/DIPA/17185/1069/2022 (Government Gazette 841/B` 24.2.2022) "Amendment and codification of the ministerial decision under the information DIPA/ok.37674/27-7-2016 "Amendment and codification of the ministerial decision 1958/2012 - Classification of public and private projects and activities into categories and subcategories in accordance with par. 4 of article 1 of Law 4014/21.9.2011 (A΄ 209), as amended and valid" (B΄ 2471)", is classified in subcategory A1 (see subsection 1.4 hereof).

Therefore according to Y.A. A.P. 170225/2014 the minimum radius of the study area:

• for linear projects of subcategory A1, it is set at 1,000m. from their axis for areas outside settlement or city plan boundaries and

• for spot and area projects 2,000m . from the boundaries of the field or the occupied space for areas outside the boundaries of settlements or city planning.

In the present study, 2,000 m was taken into account as a minimum study radius. from the W/T points and the 1,000m on either side of the axis of the linear works of access roads and interconnection (figure 26). Regarding protected areas, the whole project is located outside protected areas ( Natura 2000, Wildlife Refuge, Important Bird Area, etc.)

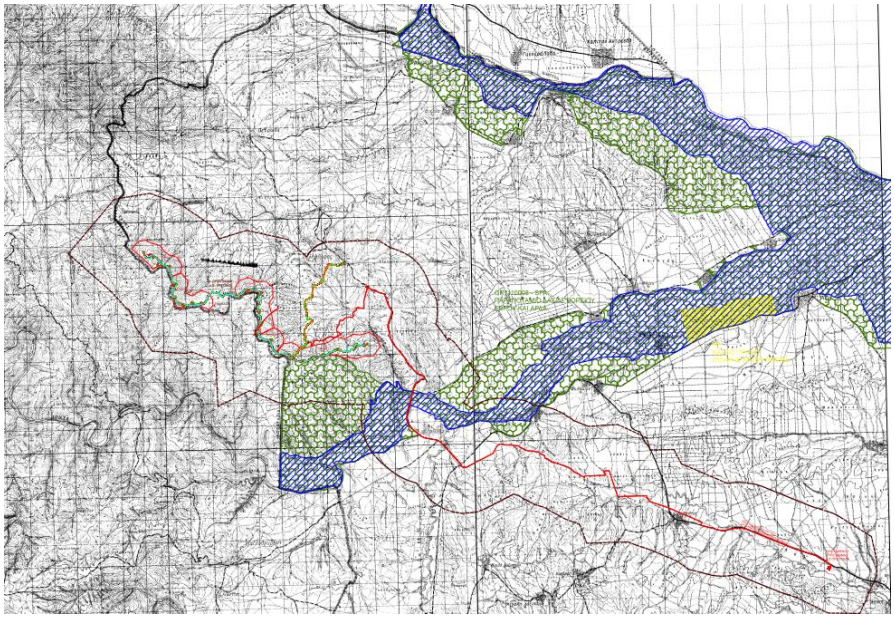


**Figure 24:** Map of the study area (excluding a small section of the underground passageway of the interconnection that passes through the existing Komaron bridge, the Special Protection Zone named " NORTHERN EBROS RIVERSIDE FOREST AND ARDAS" (code GR 1110008 - SPA and area for birds with name "NORTH EBROS RIVER FOREST AND ARDAS" (code GR 001 – IBA )

### *8.1.1 Development of the project in whole or in part within a Natura 2000 network area*

As already mentioned, the project under study is located entirely outside the boundaries of the Natura 2000 Network areas . Ivaylovgrad BG0002106 – W/T 9 and 39 m from ZEP - Riparian Forest of Northern Evros and Arda GR1110008 – W/T 17), while its accompanying projects (interconnection) run for a limited distance (about 400 m) Natura 2000 area (ZEP - Riverside Forest of North Evros and Arda GR1110008). Therefore, it was considered appropriate to carry out a Special Ecological Assessment, which accompanies the submitted M.P.E. The distances of the nearest W/Ts to the Natura 2000 areas are:

| TABLE OF W/T DISTANCES FROM AREAS OF ENVIRONMENTAL INTEREST | | |
|---|---|---|
| N/A | protected area<br>( Greek Territory) | Distance from nearest W/T<br>(m) |
| 1 | NATURA spa | 39.08m from WT17 |
| 2 | PROTECTED AREAS FOR BIRDS (IBA) | 1807 m. from WT21 |
| 3 | WILDLIFE REFUGE | 13844 m. from WT21 |

**Table 23**: Distances from other areas of the Natura 2000 network

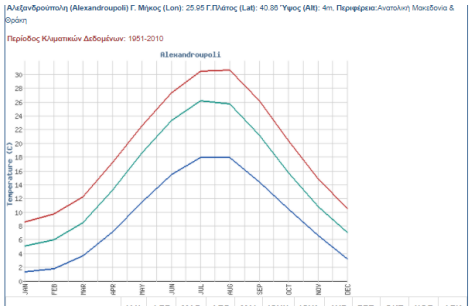
### *8.1.2 Locating downstream of wetland protected area activity*

A wetland protected area is located downstream of the activity . More information is listed in subchapter 8.5.2 "Areas of the national system of protected areas" herein.

## 8.2 Climatic and bioclimatic characteristics

The following diagrams [4]and tables show the climatological and bioclimatic characteristics of the area, as given by the nearest recording station of EMY Alexandroupolis, which is approximately 85 km from the wind power plant installation site.

I. TEMPERATURE

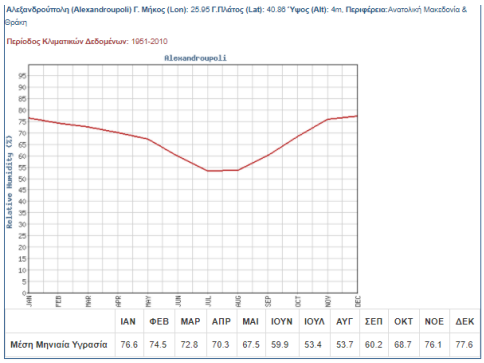



| | ΙΑΝ | ΦΕΒ | ΜΑΡ | ΑΠΡ | ΜΑΙ | ΙΟΥΝ | ΙΟΥΛ | ΑΥΓ | ΣΕΠ | ΟΚΤ | ΝΟΕ | ΔΕΚ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ελάχιστη Μηνιαία Θερμοκρασία | 1.4 | 1.8 | 3.7 | 7.2 | 11.5 | 15.5 | 18.0 | 18.0 | 14.4 | 10.5 | 6.7 | 3.3 |
| Μέση Μηνιαία Θερμοκρασία | 5.1 | 6.0 | 8.5 | 13.3 | 18.6 | 23.4 | 26.2 | 25.8 | 21.2 | 15.8 | 10.9 | 7.1 |
| Μέγιστη Μηνιαία Θερμοκρασία | 8.6 | 9.8 | 12.3 | 17.3 | 22.6 | 27.4 | 30.5 | 30.7 | 26.2 | 20.4 | 14.9 | 10.6 |

**Figure 25:** Long-term temperature data for Alexandroupoli

[4] ***EMY source:*** ***http://www.hnms.gr/emy/el/climatology/climatology_city?perifereia=East%20Macedonia%20and%20Thrace&poli=Kavala_Chryssoupoli***

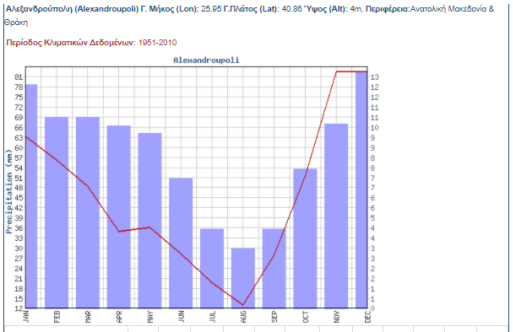
## II. MOISTURE




| | ΙΑΝ | ΦΕΒ | ΜΑΡ | ΑΠΡ | ΜΑΙ | ΙΟΥΝ | ΙΟΥΛ | ΑΥΓ | ΣΕΠ | ΟΚΤ | ΝΟΕ | ΔΕΚ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Μέση Μηνιαία Υγρασία | 76.6 | 74.5 | 72.8 | 70.3 | 67.5 | 59.9 | 53.4 | 53.7 | 60.2 | 68.7 | 76.1 | 77.6 |

**Figure 26:** Long-term humidity data for Alexandroupoli

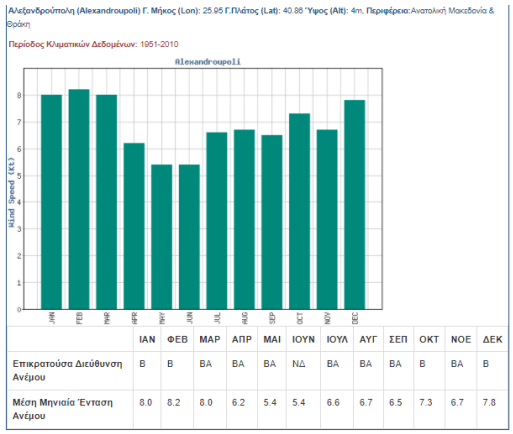
## III. RAINFALL




| | ΙΑΝ | ΦΕΒ | ΜΑΡ | ΑΠΡ | ΜΑΙ | ΙΟΥΝ | ΙΟΥΛ | ΑΥΓ | ΣΕΠ | ΟΚΤ | ΝΟΕ | ΔΕΚ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Μέσο Μηνιαίο Ύψος Υετού | 63.3 | 56.3 | 48.6 | 35.1 | 36.2 | 28.3 | 19.8 | 13.1 | 27.9 | 51.5 | 82.7 | 82.7 |
| Μέσος Μηνιαίος Αριθμός Ημερών Υετού | 12.4 | 10.6 | 10.6 | 10.1 | 9.7 | 7.2 | 4.4 | 3.3 | 4.4 | 7.7 | 10.2 | 13.1 |

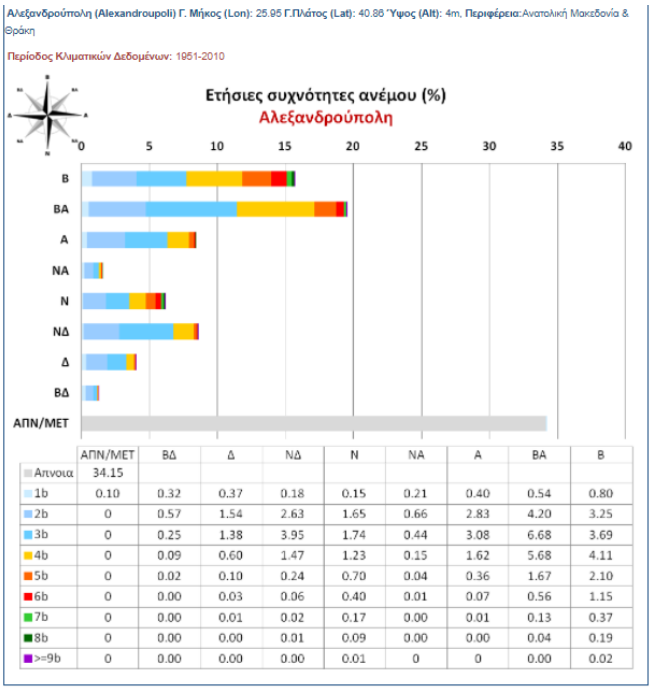
**Figure 27:** Long-term rainfall data for Alexandroupolis

## IV. WIND INTENSITY & DIRECTION



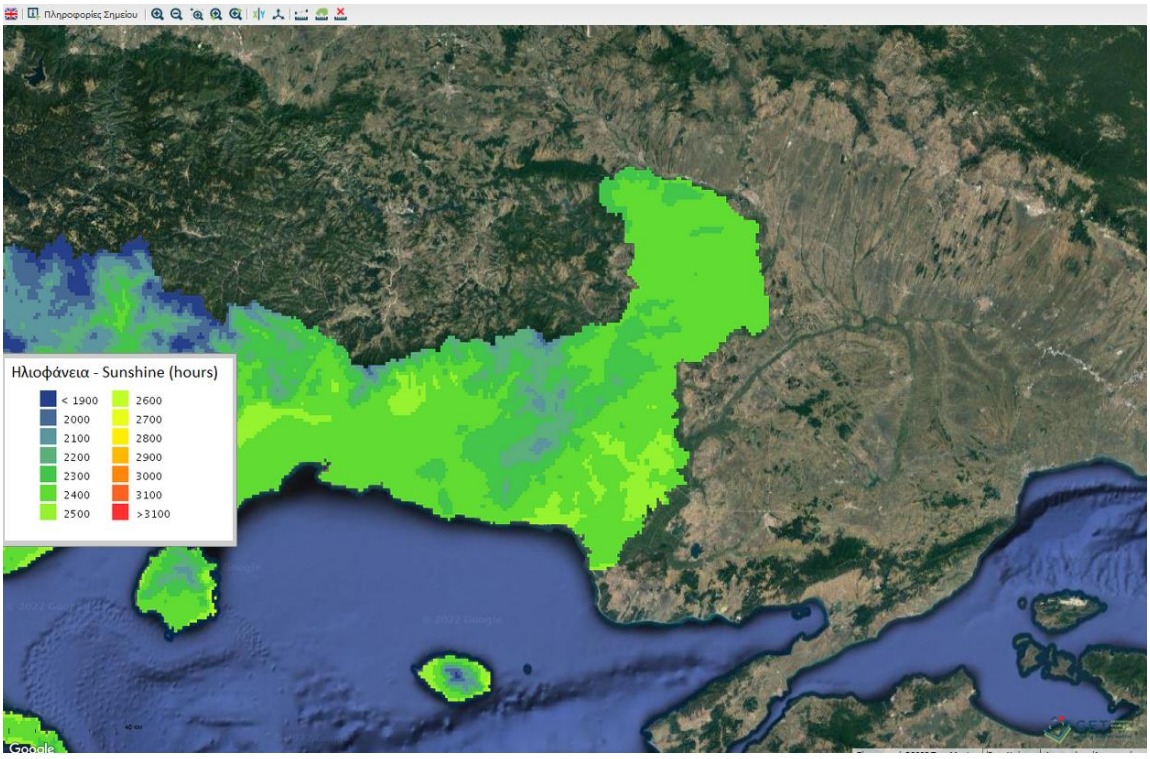

| | ΙΑΝ | ΦΕΒ | ΜΑΡ | ΑΠΡ | ΜΑΙ | ΙΟΥΝ | ΙΟΥΛ | ΑΥΓ | ΣΕΠ | ΟΚΤ | ΝΟΕ | ΔΕΚ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Επικρατούσα Διεύθυνση Ανέμου | Β | Β | ΒΑ | ΒΑ | ΒΑ | ΝΔ | ΒΑ | ΒΑ | ΒΑ | Β | ΒΑ | Β |
| Μέση Μηνιαία Ένταση Ανέμου | 8.0 | 8.2 | 8.0 | 6.2 | 5.4 | 5.4 | 6.6 | 6.7 | 6.5 | 7.3 | 6.7 | 7.8 |

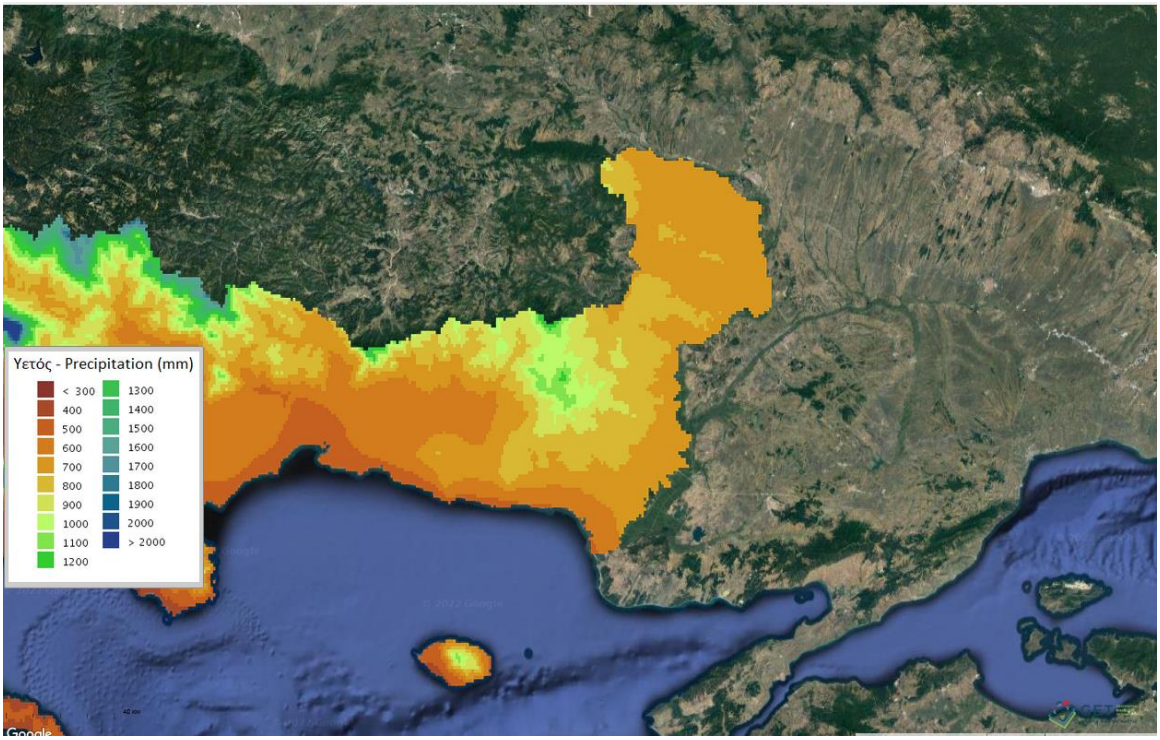
**Figure 28**: Long-term wind intensity and direction data for Alexandroupolis

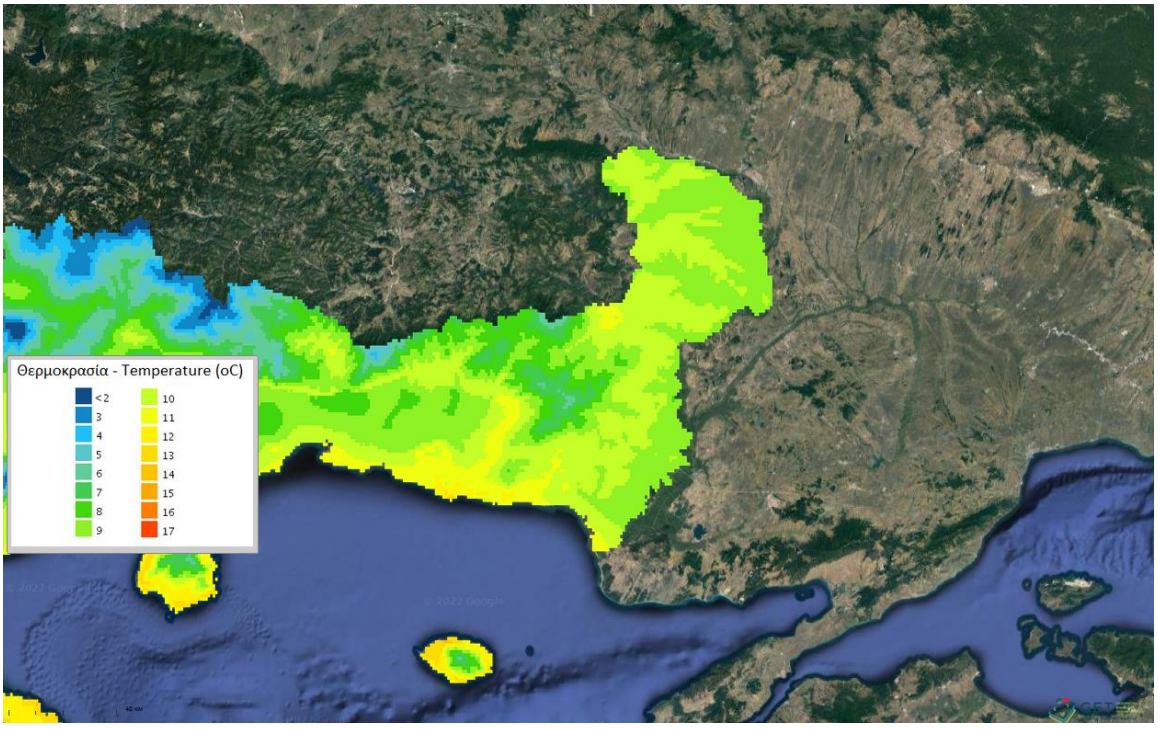



| | ΑΠΝ/ΜΕΤ | ΒΔ | Δ | ΝΔ | Ν | ΝΑ | Α | ΒΑ | Β |
|---|---|---|---|---|---|---|---|---|---|
| Απνοια | 34.15 | | | | | | | | |
| 1b | 0.10 | 0.32 | 0.37 | 0.18 | 0.15 | 0.21 | 0.40 | 0.54 | 0.80 |
| 2b | 0 | 0.57 | 1.54 | 2.63 | 1.65 | 0.66 | 2.83 | 4.20 | 3.25 |
| 3b | 0 | 0.25 | 1.38 | 3.95 | 1.74 | 0.44 | 3.08 | 6.68 | 3.69 |
| 4b | 0 | 0.09 | 0.60 | 1.47 | 1.23 | 0.15 | 1.62 | 5.68 | 4.11 |
| 5b | 0 | 0.02 | 0.10 | 0.24 | 0.70 | 0.04 | 0.36 | 1.67 | 2.10 |
| 6b | 0 | 0.00 | 0.03 | 0.06 | 0.40 | 0.01 | 0.07 | 0.56 | 1.15 |
| 7b | 0 | 0.00 | 0.01 | 0.02 | 0.17 | 0.00 | 0.01 | 0.13 | 0.37 |
| 8b | 0 | 0.00 | 0.00 | 0.01 | 0.09 | 0.00 | 0.00 | 0.04 | 0.19 |
| >=9b | 0 | 0.00 | 0.00 | 0.00 | 0.01 | 0 | 0 | 0.00 | 0.02 |

**Figure 29:** Long -term wind data for Alexandroupolis




Υετός - Precipitation (mm)
< 300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
> 2000


Θερμοκρασία - Temperature (oC)
<2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

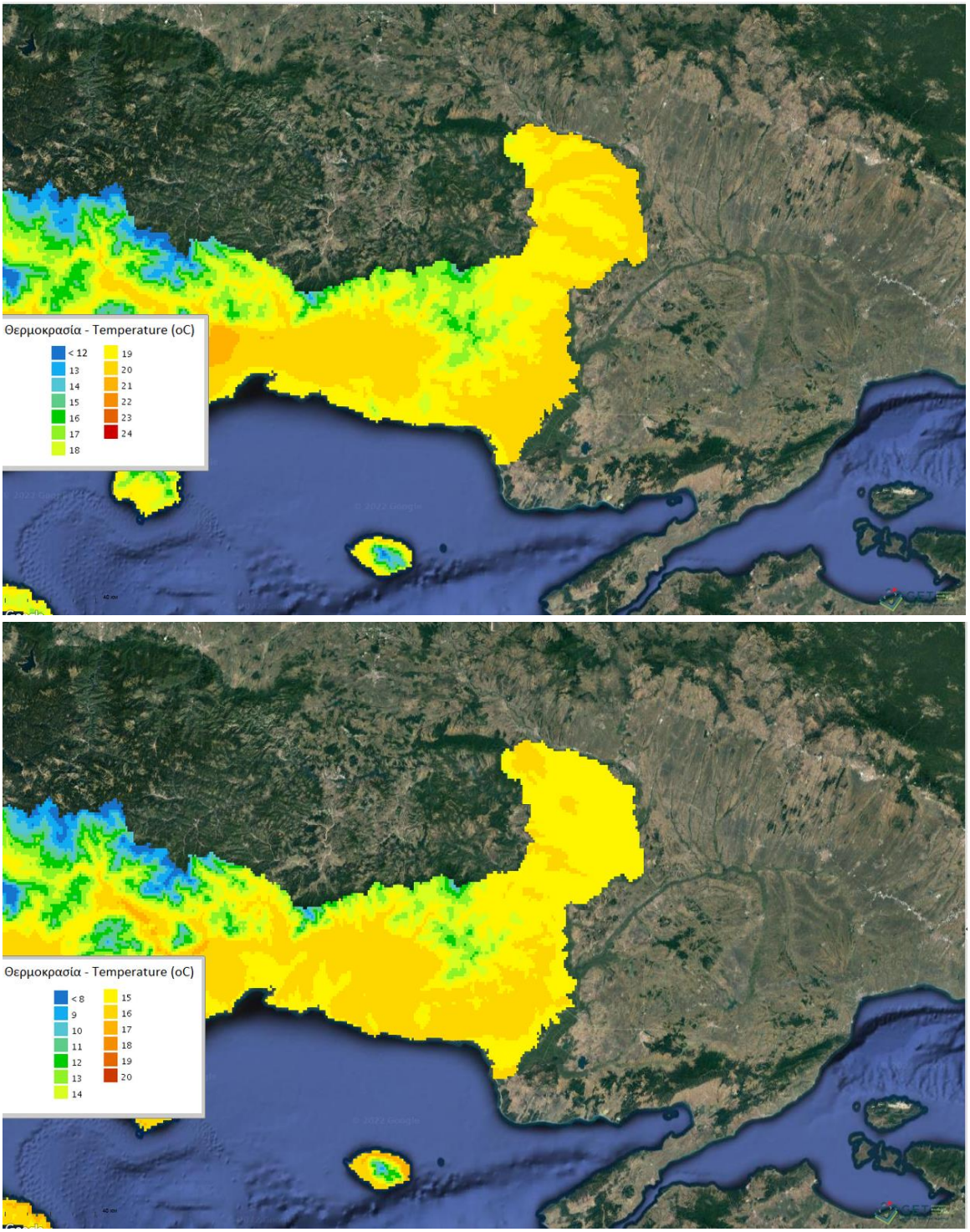



**Figure 30:** Climatic data for the study area – sunshine, rainfall, minimum – maximum – average temperature.

According to the Climate Atlas of Greece, the average annual climate data in the study area are as follows:

- The annual hours of sunshine are from 2300 – 2500 h .
- The forecast for rain is from 600 to more than 800 mm .
- The minimum temperature is from less than 8 $^0$C to about 9 $^0$C.
- The minimum temperature is from less than 19 $^0$C to about 20 $^0$C.
- The average temperature is from less than 15 $^0$C to about 16 $^0$C.

## 8.3 Morphological and topological characteristics

The installation site consists of a relatively smooth ridge - hill , which can accommodate wind turbines. There are no crops on the installation site of the A/P. The installation area of the project is public , as deduced from the initial data, and belongs to the category of forest areas .

The photographic illustration attached to the annex accurately depicts the morphology and topography of the area.

The area required for the installation of the wind power plant belongs administratively to the Municipality of Orestiada of the Regional Unit of Evros.

The map below shows [5]the morphological and topological characteristics of the surrounding area. The wider installation area of the wind power plant, as shown below, is land mainly characterized by broadleaf forests, hardwoods , forest, natural pastures, agricultural land and transitional bushland.

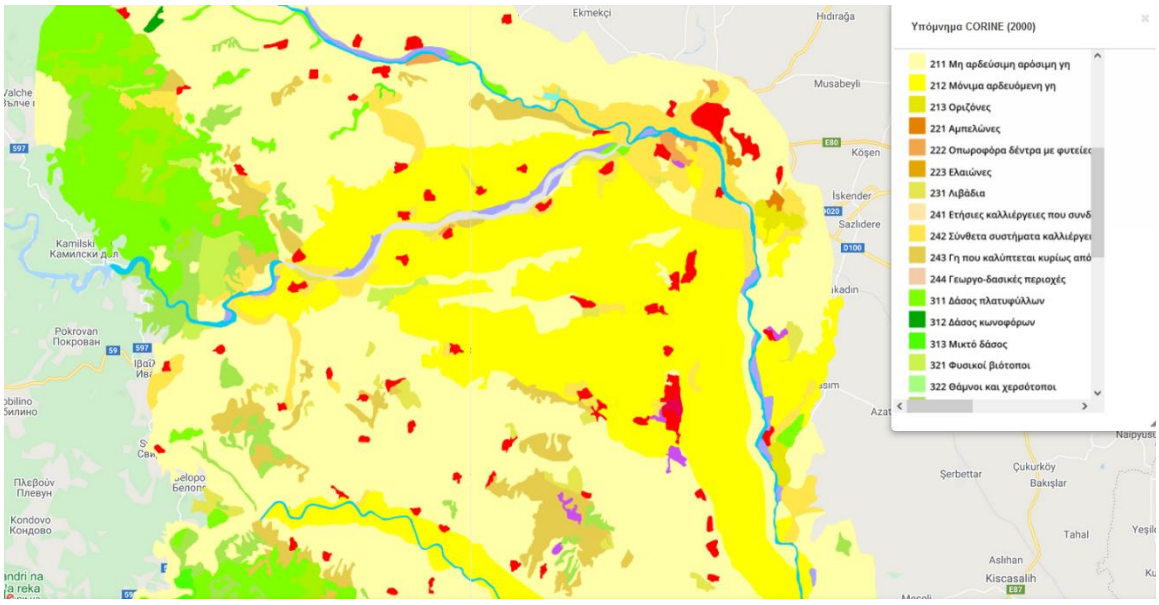



**Figure 31**: Morphology and Topology of the Area.

[5] *Source: http://www.oikoskopio.gr/map/*

## 8.4 Geological, tectonic and soil characteristics

The effects of the construction of the project on the geological and soil characteristics will be short-term and reversible. The tectonic features will not be affected. There will be no impact on the geology (rearrangement, change of rock composition) from the construction of the project, given the superficial nature of the excavations that will be carried out.

The Greek area is distinguished in certain geotectonic zones, according to the image that follows 6(Image 33). The location of the study project is located in the Serbo - Macedonian Zone.

It consists of gneisses , mica and amphibolites slates and amphibolites . A lower unit characterized by the presence of marbles and an upper unit characterized by the presence of large ophiolitic masses can be distinguished. Three magmatic phases produced large masses of granites, granodiorites and diorites and minor rhyolitic rocks. Three main tectonic phases resulted in folding, thrusting and scouring

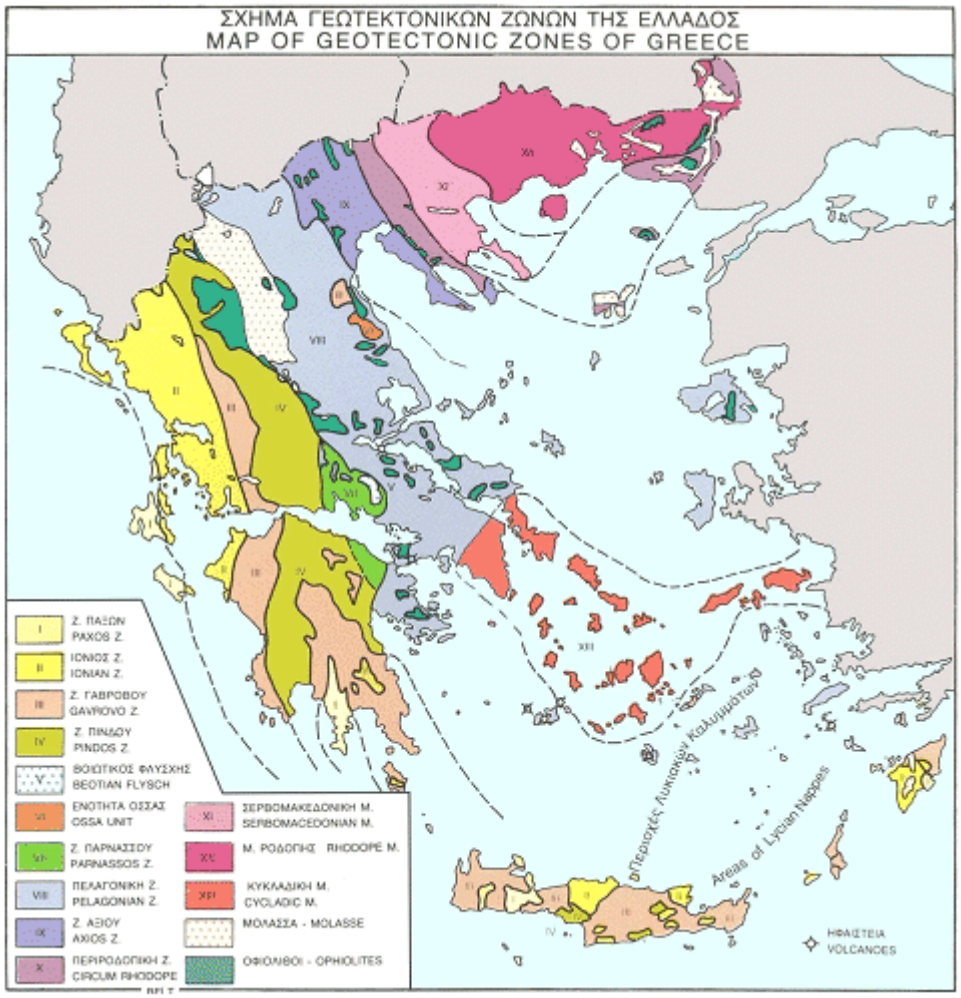



**Figure 32**: Geotectonic zones of Greece.

6 *Source: https://www.orykta.gr/geologia-oryktologia/geologia-elladas*

Tectonic features

The wider area of the project generally does not show strong seismic activity. According to the new map of seismic risk zones contained in the Greek Anti-Seismic Regulation (EAK 2000) and the decision Δ17a/115/9ΦΝ.275/03 amending the EAK 2000, the study area belongs to zone I which is the one with the least seismic activity (map 3b). According to the current Seismic Hazard Map, the value of the effective design ground acceleration α for zone I is α=0.16 g (where g is the acceleration of gravity).

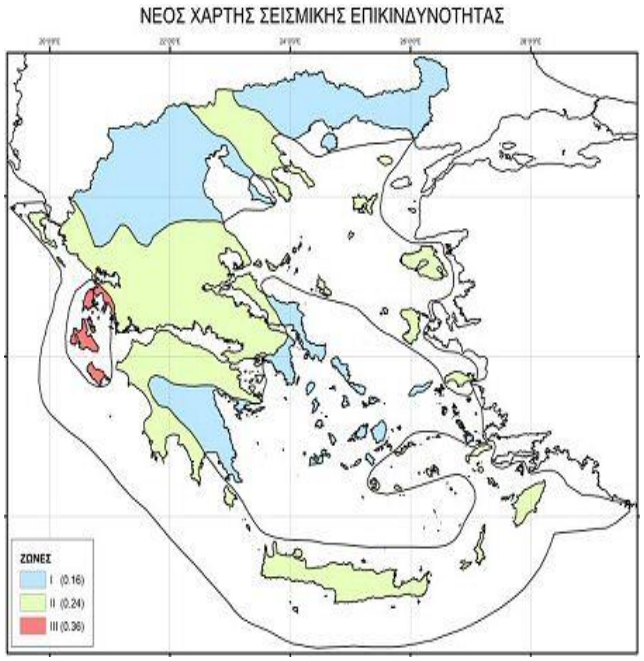



**Figure 33**: Map of Earthquake Risk Zones of Greece.

## 8.5 Physical Environment

### *8.5.1 General information*

The wider installation area of the wind power plant, as shown below, is land characterized mainly by sclerophyllous vegetation, broadleaf forest , natural pastures, agricultural land and coniferous forest.

The **Municipality of Orestiada** is a Municipality of the region of Eastern Macedonia and Thrace that was established with the Kallikratis Program . It arose from the amalgamation of the pre- existing municipalities of Orestiada , Vyssa , Trigonos and Kyprinos . The area of the Municipality is 955.6 sq . km and its population is 37,695 inhabitants according to the 2011 census . The seat of the Municipality is Orestiada .

**Establishment**

Nea Orestiada is the youngest city in Greece since it was founded only in 1923, by Greek refugees who came from Adrianople and mainly from the suburb of Karagats after the Treaty of Lausanne . [1]

Karagats in 1920, after the liberation of Thrace from the Greek army, was renamed Orestiada and was ceded to Greece together with the whole of Western Thrace and the greater part of Eastern Thrace with the Treaty of Sevres (10.08.1920). After the Asia Minor disaster and the Armistice of Moudania (October 1922), the Western Powers gave Eastern Thrace to Turkey and the Greek army was forced to leave within 15 days. The river Evros was originally defined as the border between Greece and Turkey. Therefore, Adrianople , located east of the Evros , now belonged to the Turks, but Karagats , located west of the Evros , remained in Greece. As Eastern Thrace was evacuated of its Greek population, several residents of Adrianople fled to its neighboring suburb, Karagats , on the other side of the river (the western and Greek side), in the hope that something would change and they would return home more easily their.
But at the Lausanne conference, the English with the main representative being the foreign minister Curzon , the French with Prime Minister Poincaré and the Italians with Prime Minister Mussolini , yielded to the demand of the Turkish Ismet Pasha (Inonou) , a member of parliament from Edirne , who asked the Greece as compensation 4 billion gold francs, half the war and commercial Greek fleet, the Ecumenical Patriarchate to leave Constantinople and a referendum in Western Thrace. In the reaction of Eleftherios Venizelos , in May 1923, the French general Maurice Pelle proposed: "Since Greece cannot pay, the old Orestiada - Karagats should be granted to the Turks". His proposal was accepted. Karagac , with the villages of Bosna and Demerdes , was given to the Turks for military and economic reasons and so that Edirne would have a railway station. The 17,000 Greek inhabitants of the triangle of Karagats learned of its concession on May 27, 1923. The abandonment of old Orestiada began in July 1923 and on 9-15-1923 at 10:20 a.m., it was handed over to the Turks.
On June 4, 1923, a committee formed the previous day at a joint meeting of the inhabitants of the old Orestiada- Karagats , went 17 kilometers south, to the uninhabited rural site of Kum-Ciflik (Sandy Tsifliki), to see if a new town could be established. The site was deemed suitable and 900 families were initially relocated. On August 12, 1923, the inauguration of the new town took place which was named Nea Orestias and later Nea Orestiada to remind the old Orestiada, Karagats . The consecration of the inauguration of the new city took place in August 1923 by the Metropolitan of Hadrianoupolis (and for a while Orestiada) Polykarpos in the presence of the Commander-in-Chief of Thrace Spyros Dasios .

**Initial rebuilding and expansion of the city**

Spyros Dasios organized the action plan for the establishment of the city, securing money and building materials to build houses for everyone, but especially for the needy. His presence in the construction of Nea Orestiada was constant, to solve problems, often even to help the residents with his own hands. Out of gratitude for his contribution to the city, the residents of Nea Orestiada declared him an honorary citizen and named the city's central square after him.
The Government, for the purpose of building the city and dealing with the first problems of the refugees, initially established the Housing Fund of Nea Orestiada and the Office of the Land Surveyor , in the fall of 1923, headed by Serafim Serafimidis, to whom he assigned the temporary distribution of the fields and of agricultural tools. This distribution was made according to the number of children in each family. Later, the Nea Orestiada Settlement office was organized, whose Director was again Serafim Serafimidis, and took over all the housing and rehabilitation services of the refugees. Seraphim Serafimidis, being a refugee himself from Pontus, knew the bitterness of the refugee and for this reason he worked zealously for the rehabilitation of the refugees.
Within a year, the first core of Nea Orestiada was built with a few houses and a characteristic feature of the lot of mud. Muds, which made the journeys miserable and the

suffering unimaginable. Indicative of a lot of mud is the following incident: In 1925 the first taxi was bought in Nea Orestiada and in November of the same year it sank into the mud of the main road. Three pairs of oxen tried to pull it out of the mud but failed and the taxi stayed there all winter.
All the houses were built with cobblestones ( kerpitsia ) and, of course, with mud. The whole family worked on the building, since there were few artisan builders, while they faced a big problem with water, as the only pump (tulumba) in the area was located in the plain.
For nine years the area of the city remained the same. In 1932, however, the first natural expansion took place to the north by the inhabitants of the settlements of the plain Oinois and Kleissous and to the south by the inhabitants of the village of Sagini, which was also located on the plain, people who came from Megalo Zaloufi , Leontari and the Krasochori of Eastern Thrace. The reason for their move was the great floods of the river Evros that year. For the same reason in 1956, those residents of the above settlements who had not moved to Nea Orestiada until then, were forced to do so this time, as they realized that not only their properties were at risk but also their lives.

**Name - History**
The new city was decided to be called "Nea Orestias ". Later, the municipal council of Orestiada decided that the seal of the Municipality should have Iphigenia as its emblem, symbolizing the sacrifice of the old Orestiada for the interest of the homeland.
According to tradition, when Orestes killed his mother, Clytemnestra , chased by the Erinyes , he went to the Oracle who advised him to bathe at the confluence of three rivers. Orestes bathed at the confluence of the Arda , Evros and Tonzu rivers and was freed from the Erinyes. In memory of his healing, he founded Orestiada, later Uskudama , which was the capital of the Thracian tribe of the Odrysas . In 127 BC it was named Adrianople in honor of the Roman emperor Hadrian .
In 1361, Adrianople was captured by the Ottomans. In 1920, after the First World War, Adrianople was given to the Greeks, but its liberation lasted only 2 years. After the Asia Minor disaster and the Treaty of Lausanne , the Greeks left Adrianople for good .
The famous Orient Express train passed through N. Orestiada. The passengers of the Orient express before 1923 in the area of N. Orestiada they saw only a small building of the workers of the railway line. In 1925 it became the railway station, the building of which was constructed with optical brickwork and externally covered with wooden cladding.

**Today**
(New) Orestiada is a modern Greek city. It is an important agricultural and commercial center of northeastern Greece, with rail and road connections. In Orestiada, the Faculty of Agricultural Sciences and Forestry of the Demokriteio University of Thrace [18] operates with two departments, the Department of Rural Development and the Department of Forestry and Environmental and Natural Resource Management. The School, beyond its academic dimension and action, actively participates and contributes substantially to the cultural and cultural events of the Municipality of Orestiada, with the leading event being the establishment as an institution of the pan-Hellenic conference entitled "Pan-Hellenic Conference on the History and Culture of Orestiada" and which is organized every two (2) years.
Every summer the music festival of Arda takes place with the participation of well-known Greek and foreign singers and musicians.
In recent years, every December, Christmas events have been held in the square and in the center of the city under the name "Angelon Fos".

**Flora fauna**

Phytosociologically , the area belongs to the subzone of dry deciduous forests ( Quercion confertae ) of the para- Mediterranean zone ( Quercetalia pubescentis ). Today, the wider environment of the city has a strong anthropogenic impact, as all areas have been converted into residential and agricultural land. Of the oak forests that existed in the area, only remnants remain in a degraded tree form. Riparian vegetation survives along rivers and streams in an environment that is decisively intervened by man and consists of aquatic plants ( Randzoudi 2004).

The main forestry species found in the area are the wild apple ( Pirus malus ), the dye ruby ( Rhus cotinus ), the cedar ( Juniperus oxycedrus ), the chickpea ( Pistacia terebinthus ), the bitter gourd ( Cercis siliquastrum ), the cornflower ( Cornus mas ), the hawthorn ( Crataegus oxyantha ), the poplar ( Populus tremula and Populus alba ), the black pine ( Pinus nigra ), the paliurus ( Paliurus spina – christi ), the Sorbia ( Sorbus domestica and Sorbus torminalis ), the maple ( Acer campestre and Acer trilobum ), the blackberry ( Prunus Spinosa ), the sedum ( Tilia cordata ), the hazelnut ( Corylus avelana) and the elm ( Ulmus campestris ).

From the understory vegetation and the green carpet , the species found in the area are the wild rose ( Rosa centifolia and Rosa cantina ), the rush ( Rubus Tomentosus ), the vetch ( Vicia ), the lavender ( Cistus creticus ), the basil ( Chrysopogon grillus ), the pteris ( Pteris agvelina ), oregano ( Origanum officinalae and origanum vulgarea ), the clover (Trifolium repens ), tea ( Salvia glutinosa ) and the strawberry ( Fragaria vesca ).

The species of fauna that live in the wider area are mainly common species that are usually found in agricultural lands and pastures. Listed below are some of the most important species of fauna in the wider region (the list is indicative)

Mamals
– Fox (Vulpes vulpes)
– Badger (Meles meles)
– Marten (Martes foina )
– Hedgehog (Erinaceus roumanicus )
– Weasel (Mustela nivalis)
– Mouse (Mus musculus), Rat (Rattus rattus ) and generally rodents (Microtus quenteri )
– Hare (Lepus capansis )

Reptiles
– Cyrtodactylus ( Cyrtodactylus kotschyi )
– Tyrannosaurus (Lacerta trilineata )
– Channel snake ( Natrix tessellations )
– House snake (Elaphe situla)

Birds
– Quail (Coturnix coturnix)
– Wild pigeon ( Columpa livia )
– Streptopelia _ _ turtle )
– Cuckoo ( Cuculus canorus )
– Gionis (Otus scorps )
– Owl (Athene noctua )
– Coracia garrulous _ _
– Upupa epops _ _
– Galerida cristata ( Galerida cristata)
– Swallow ( Hirundo rustica)

– Nightingale (Luscinia megarchyncos )
– Blackbird (Turdus merula)
– Thrush (Turdus philomelos
– Magpie (Garrulus glandarius )
– Corvus corone _ _
– Corvus corone _ _
– Corvus corax
– Sparrow (Passer domesticus )
– Flower (Carduelis chloris )
– Goldfinch ( Carduelis carduelis )

The proposed project will not affect any kind of flora in the area because the interventions that will be made are minimal and will only occupy an area of approximately 23.75 square meters. for each W/T. The project area is shown in the photograph in the appendix. The type of prevailing vegetation can also be seen on the land use map attached to the appendix. The vegetation in the wider area in several places at lower altitudes is strongly affected by human activities (arable fields and pastures).

The proposed project will not affect any form of tame or wild fauna that lives or moves in the project area because it does not cause a change in any of the parameters related to it. Fauna and flora and land use in general are little affected by wind facilities and only in terms of foundations and access roads.

During the construction phase of the project, the disturbance to the fauna populations will be localized and small. A removal of the most sensitive species from the locations of noise sources may result, as noise during the construction phase is a nuisance factor. However, this impact is reversible, as after the completion of the construction of the project, apart from the occupation of the surface by the W/T, there is no other type of disturbance to the fauna. The species composition of the area will not change. The surface that the W/T will cover will be very small and will not have an impact on the habitats of the mammals in the area. Only a local movement of some items away from the construction axis of the project is expected due to noise during the construction phase. After the completion of construction, any local movement will return because the factors that caused it will be eliminated.

During the operation phase of the project, the connecting corridors will be maintained and the habitats will not be fragmented. The project will not be fenced, the existing and new roads will be category C with very low traffic and will be accessible to mammals. Finally, the noise during the operation of the wind park will be imperceptible and will not cause any disturbance.

### *8.5.2 Areas of the national system of protected areas NATURA 2000*

According to Joint Ministerial Decision 33318/3028/1998 the location of the proposed project **does not belong** to the NATURA 2000 network as shown on maps 4, 5 [7]and 6 [8]. In particular, the location of the W/T does not belong to any "Proposed Area of Community Interest ( PSCI )", nor to any " Special Protection Zone ( SPA )" of the avifauna, in accordance with Directive 79/409/EEC.

[7] http://www.minenv.gr
[8] http://www.oikoskopio.gr/map_fixed.phtml

The location of the wind power plant is outside the NATURA area (except for a part of the underground passage of the interconnection network that passes through the existing Komaron bridge on the river Arda for about 405.0m and is within the NATURA area GR 1110008- SPA ). However, the project development area is in the immediate vicinity of Natura 2000 areas (85 m from ZEP - Yazovir Ivaylovgrad BG0002106 – W/T 9 and 39 m from ZEP - Riparian Forest of Northern Evros and Arda GR1110008 – W/T 17), Therefore it was considered appropriate to carry out a Special Ecological Assessment, which accompanies the submitted E.I.S..

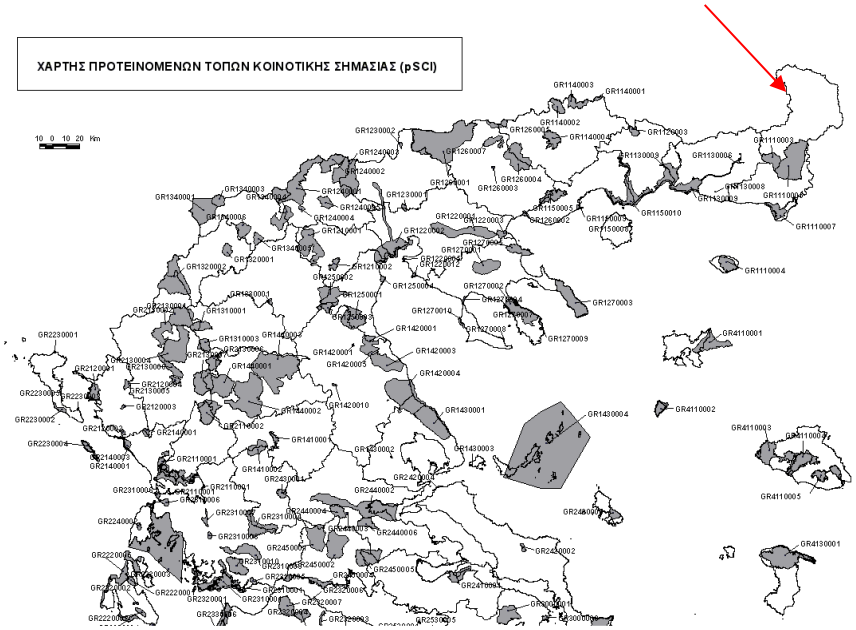



**Figure 34:** Map of Proposed Sites of Community Importance (Scale 1:2,200,000)

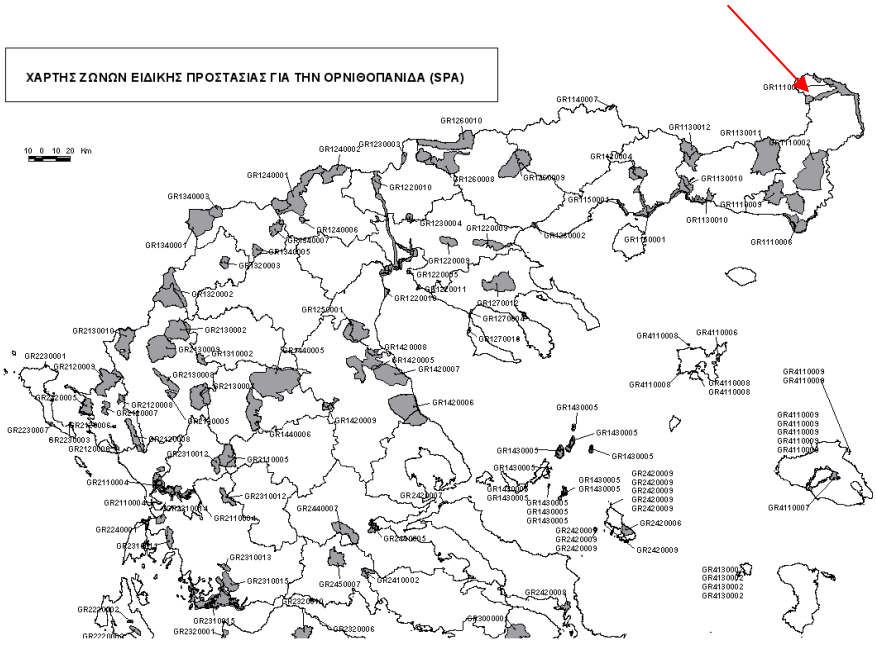



**Figure 35:** Map of Special Protection Zones for Birds (SPA) (Scale 1:2,200,000)

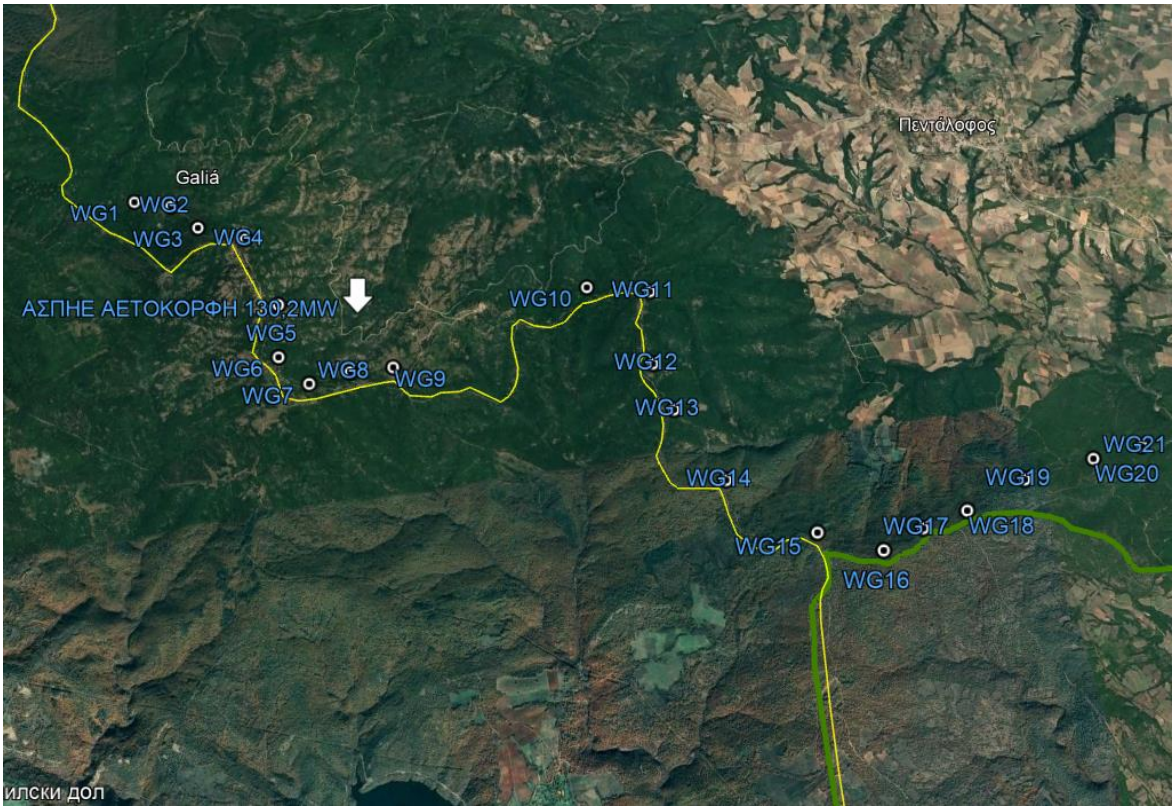



**Figure 36**Natura 2000 Network (with green line) in the vicinity of the site.

Aetokorfi " ASPIE under study is outside the NATURA area (except for a section of the underground passage of the interconnection network that passes through the existing Komaron bridge on the Arda river for approximately 405.0m and is within the NATURA area ).

In the wider area and in close proximity to the wind power plant there is the following area of the network:

1. Area code: GR11 10008 – SPA, Name: RIVERSIDE FOREST OF NORTHERN EVROS AND ARDA.

**Ramsar wetlands**

According to the **Ramsar Convention which** was ratified with the ND 191/74 (Government Gazette 350/A/1974) "On Sanctioning the Ramsar Convention " and its amendments with Law 1950/91 (Government Gazette 84/A/1991) "On Sanctioning of the Ramsar Convention amendments ', the proposed project **is not located** in any wetland of international importance. The nearest Ramsar Wetlands are 3GR001 - Evros Delta, at a distance of about 90 km.

| Ramsar [9] Wetlands | |
|---|---|
| **Code** | **Area Name** |
| 3GR001 | Evros Delta |
| 3GR002 | Lake Vistonida , Porto - Lagos , Lake Ismarida and adjacent lagoons |
| 3GR004 | Nestos Delta and adjacent lagoons |
| 3GR005 | Lakes Volvi and Koroneia |
| 3GR006 | Kerkini artificial lake |
| 3GR007 | Axios Delta, Loudia, Aliakmona |
| 3GR008 | Lake Mikri Prespa |
| 3GR009 | Gulf of Amvrakikos |
| 3GR010 | Lagoons of Messolonghi |
| 3GR011 | Lagoons of Kotychi |

**Table 24**: Greek Ramsar Wetlands . _

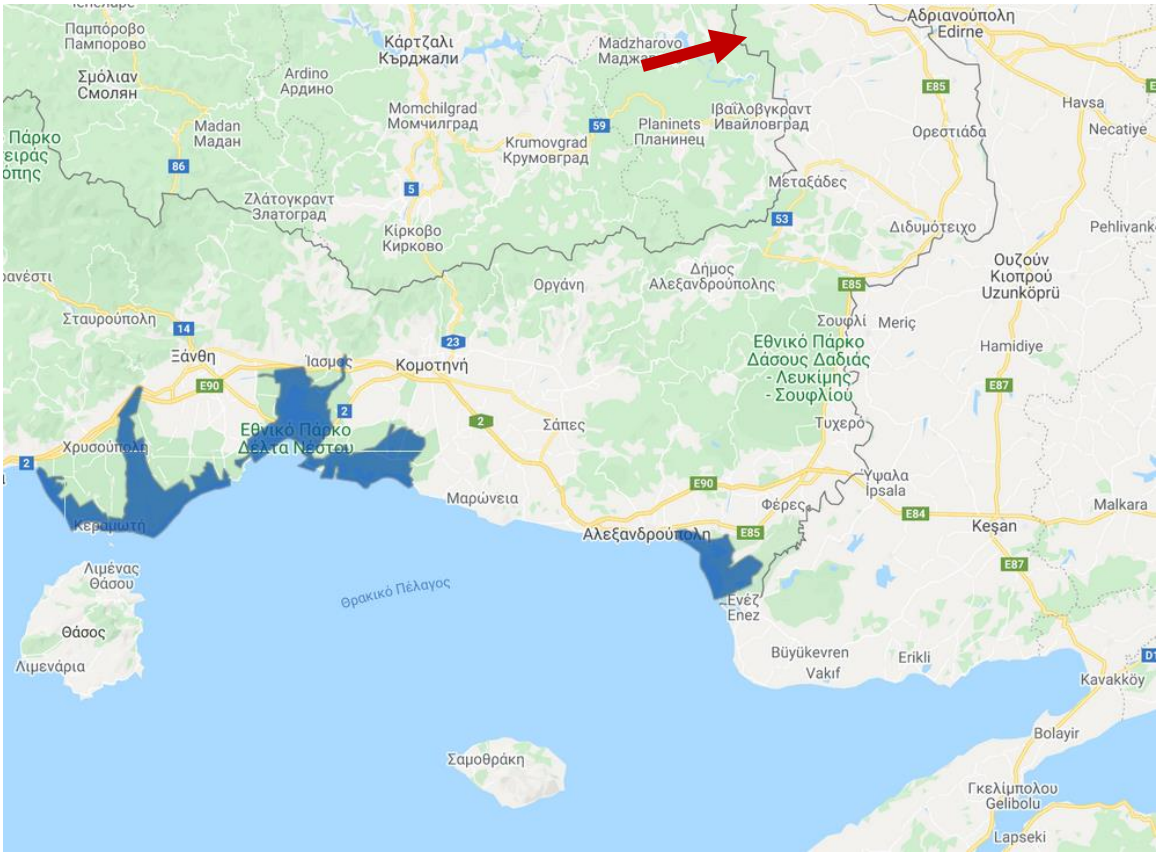



**Figure 37**RAMSAR wetlands in the vicinity of the site.

9 ***Source:*** *http://www.oikoskopio.gr/map/*


**Figure 38:** Ramsar wetlands .[10]

### *8.5.3 Forests and woodlands*

According to what is known, the area of the project belongs to the forest lands and is subject to the provisions of the forest legislation. For the EP of Evros we have posted a forest map of the local and municipal communities of the Municipalities of Alexandroupoli, Soufli , Didymoteicho, Orestiada and Samothraki with no . prot .: 2601/12-02-2021 (AD: 6ZP0OPIY-0B4), as well as on private lands. The ownership status of the lands that are not classified as forest will be investigated in the next stages of the licensing , before submitting an application for the issuance of an Installation Permit, as defined by the current legislative framework for the licensing of RES projects.

### *8.5.4 Other significant natural areas*

**Protected Areas – National Legislation**

- **National Parks**

According to Law 996/1971 which is part of Law 86/1969 "On the Forest Code ", the location of the proposed project **does not belong** to an area of National Forest.


**Figure 39:** National Parks.

[10] ***Source:*** *http://ramsar.wetlands.org/Database/Searchforsites/tabid/765/language/en-US/Default.aspx*

- **National Parks**

According to Law 1650/1986 (articles 18 and 19) the location of the proposed project **is not located** in an area of National Park. At a distance of about 40 km. are the borders of the Dadia National Park .

| National Parks | Area (hectares) | GAZETTE |
|---|---|---|
| National Park of the Lagoons of Messolonghi - Aitoliko, the lower reaches and estuaries of the Acheloos and Evinos rivers and the Echinades islands | 33470.62 | 477/D/2006 |
| North Pindos National Park | - | 639/D/2005 |
| National Park of Wetlands of the Koroneia - Volvi lakes and the Macedonian Tempes | 16,388 | 248/D/2004 |
| Schinia National Park - Attica Marathon | 1,382 | 395/D/2000 |
| Zakynthos National Marine Park | 13,500 | 906/D/1999<br>1272/D/2003 |
| National Marine Park of Alonissos - Northern Sporades | 208,713 | 519/D/1992<br>621/D/2003 |
| Dadia - Lefkimmi - Soufliou National Forest Park | 42,800 | 911/D/2006 |
| Lake Kerkini National Park | - | 98/TAAPTH/2006 |
| National Wetland Park | - | 102/D/2007 |
| Amvrakiko Wetlands National Park | - | 123/D/2008 |
| National Park of Eastern Macedonia and Thrace (E.PA.M.Th.) | 72,677,503 | 497/D/2008 |
| National Park of Tzoumerko - Peristeri and Arachthos ravine | - | 49/D/2009 |
| National Park of Wetlands of Kotyhi - Strofilia | - | 159/D/2009 |
| Delta Axios – Loudia – Aliakmonas National Park (E.P.D.A.L.A.) | 33,800 | 220/D/2009 |
| Prespa National Park (E.PA.P.) | 32,700 | 302/D/2009 |
| Rhodopes National Park (EPOR) | 173.115 | 445/D/2009 |
| Helmos - Vouraikos National Park | - | 446/D/2009 |

**Table 25**: National Parks.

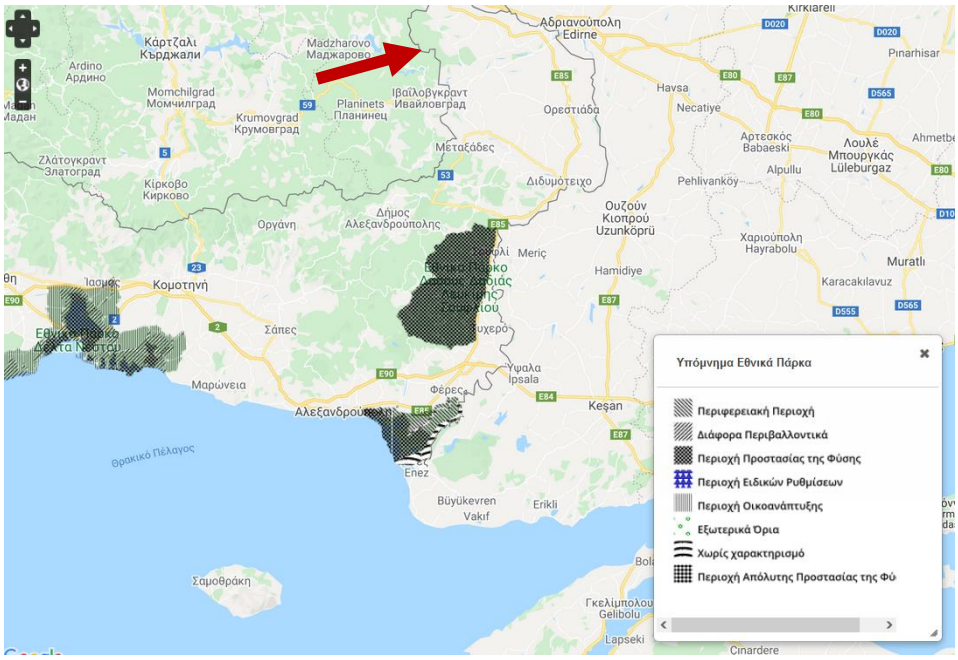



**Figure 40**: National Parks of the wider area.

- **Aesthetic Forests**

According to Law 996/71, the proposed project **is not located** in an area designated as an aesthetic forest.

| **Aesthetic Forests** | **Area** (hectares) | **GAZETTE** |
|---|---|---|
| Vai Lasithiou palm forest | 20 | 170/A/1973 |
| Forest of Kaisariani Attica | 640 | 31/A/1974 |
| of Tempon Valley, Larisa | 1,762 | 31/TA/1974 |
| St. Georgiou – Karaiskakis of Karditsa | 252 | 31/TA/1974 |
| Pine Forest of Xylokastro Corinthia | 27.5 | 31/A/1974 |
| Periastiko Dasos of Ioannina | 86 | 306/TA/1976 |
| University of Patras Watershed Protected Area | 1,850 | 99/A/1974 |
| Forest of Farsala, Larisa | 34.5 | 103/D/1977 |
| Forest of Steni Evia | 674 | 108/D/1977 |
| Dry forest Mongostou Corinthia | 520 | 175/D/1977 |
| Ossa Larissa Forest Complex | 16,900 | 175/D/1977, 160/A/1985 |
| Coastal Forest of Nikopoleos, Mytika, Preveza | 66 | 183/D/1977 |
| Forests of Skiathos Island Magnesia | 3,000 | 248/D/1977 |
| Straits of Nestos Kavala - Xanthi | 2,380 | 283/D/1977 |
| National Independence Forest of Kalavryta Achaia | 1,750 | 404/D/1977 |
| Peri-urban forest of Tithoreas Fthiotida | 200 | 125/D/1979 |
| Almond forests of Kavala | 2.216 | 606/D/1979 |
| Castle Hill Forest and Aelia Trikala | 28 | 609/D/1979 |
| Dry forest Kuri – Almyrou Magnesia | 100 | 99/A/1980 |

**Table 26**: Aesthetic Forests.

- **Preservable Natural Monuments**

According to Law 996/71, the proposed project **is not located** in an area that has been designated as a Protected Natural Monument.

- **Wildlife Refuges**

The project **is not** within the boundaries of a Wildlife Refuge. In the wider area there are the following Wild Nature Refuges (KAZ):

KAZ Code: K 1, KAZ Name: Aggelos ( Komaron ), Current Status: Canceled.

KAZ Code: K 2, KAZ Name: Kalos Gyalos (Platis - Arzou - Rizion ), Current status: unchanged. At a distance of approximately 13.9 km. from the wind power plant.

The Wildlife Refuges located in the wider area are shown on the map below.

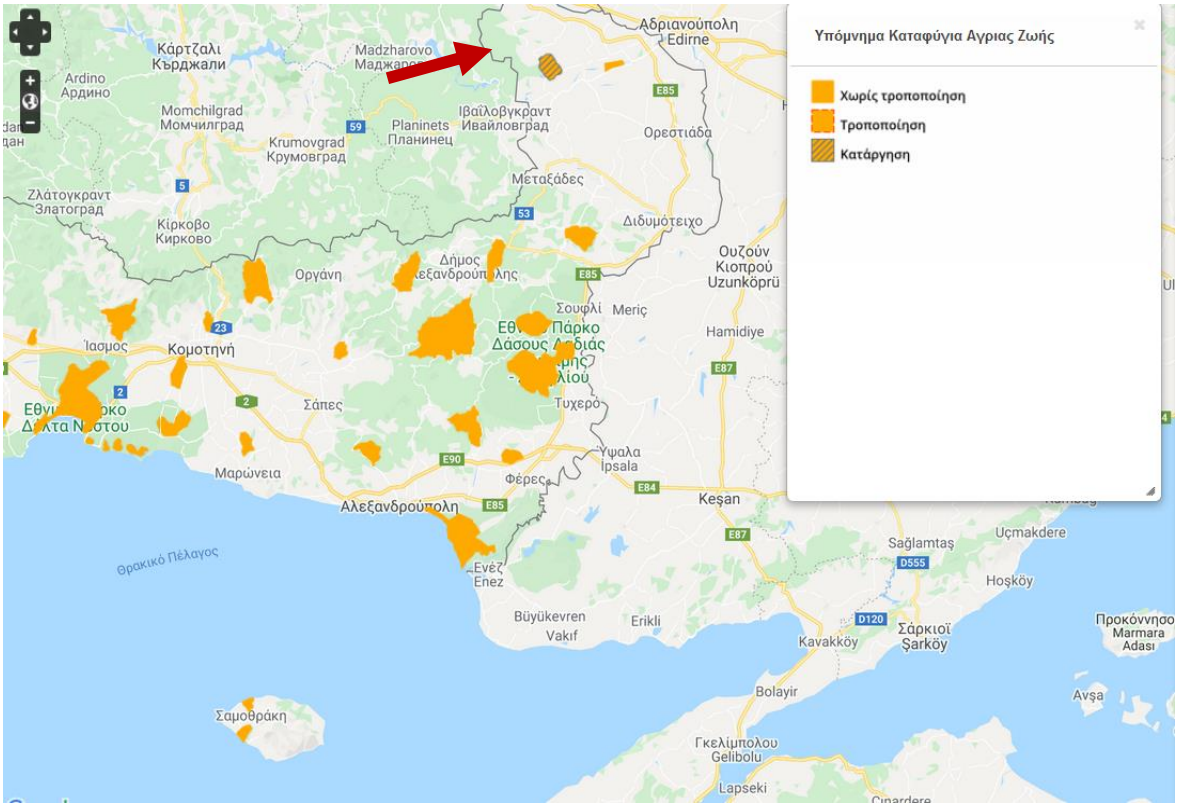



**Figure 41**: Wildlife sanctuaries [11]. The location of the project is marked on the map.

- **Corine habitats**

The project **is located** outside Corine Habitats .

[11] ***Source:*** *http://www.oikoskopio.gr/map_fixed.phtml*

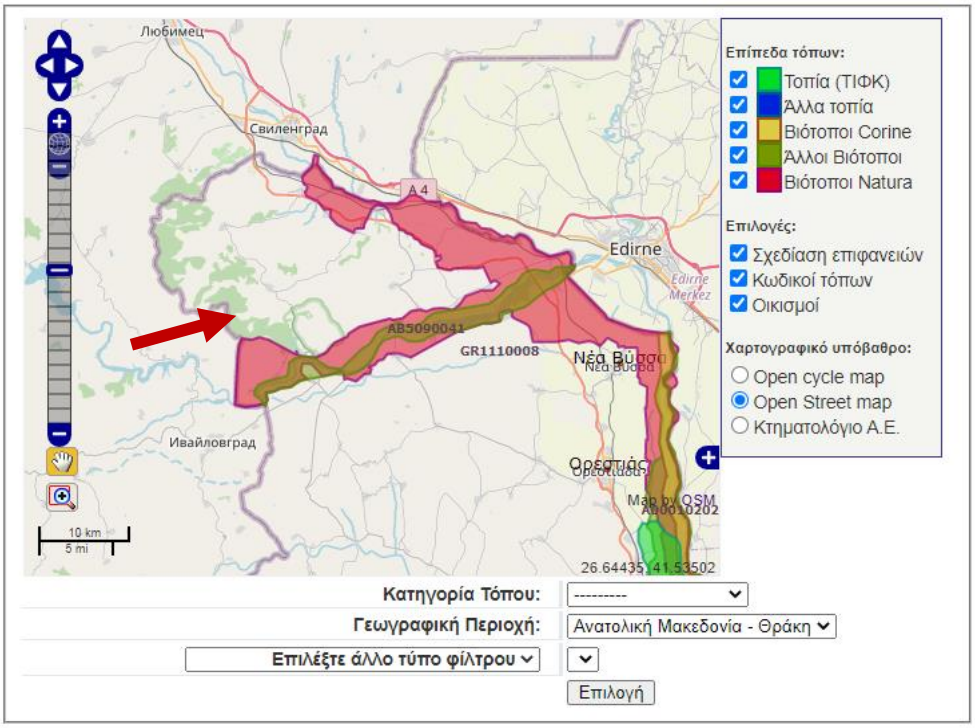



**Figure 42**: Corine habitats [12].

- **Game breeding plants**

According to Law 177/75, as amended by Law 2637/98, the proposed project **is not located** in an area designated as a Game breeding plant.

- **Areas of Absolute Nature Protection**

According to Law 1650/86, the proposed project **is not located** in an Area of Absolute Nature Protection.

- **Nature Protection Areas**

According to Law 1650/86 the proposed project **is not located** in Nature Protection Areas.

- **Protected Natural Formations and Landscapes**

According to Law 1650/86 the proposed project **is not** in Protected Natural Formations and Landscapes.

- **Ecodevelopment Areas**

According to Law 1650/86 the proposed project **is not located in a** Housing Development Area . To date, only Lake Pamvotida has been declared an Ecodevelopment Area (2003).

[12] ***Source:*** *https://filotis.itia.ntua.gr/biotopes/?category=4&geo_code=1%2C1%2C0*

**Protected Areas – Internationally Important**

- **Specially Protected Areas under the Barcelona Convention (Protocol 4)**

According to Law 855/78 (Government Gazette 235/A/1978), Law 1634/86 (Government Gazette 104/A/1986) and the protocol "On specially protected areas of the Mediterranean" the proposed project **is not** in Specially Protected Areas Areas based on Protocol 4 of the Barcelona Convention.

| Specially Protected Areas according to Protocol 4 of the Barcelona Convention | Area (hectares) |
|---|---|
| Aesthetic Forest of Nikopoleos - Mytika | 66 |
| Aesthetic Pine Forest of Xilokastro | 27.5 |
| Samaria National Park (core) | 4,850 |
| Marine Park of Alonissos and Northern Sporades | 208,713 |
| Petrified Forest of Lesvos | 15,000 |
| Aesthetic Forest of Skiathos Island | 3,000 |
| Sounio National Park | 3,500 |
| Aesthetic Forest Vai | 20 |
| Amvrakikos Gulf | 25,000 |

**Table 27**: Specially Protected Areas according to the Barcelona Convention (Protocol 4).

- **Biogenetic Reserves**

The proposed project **is not located** in a Biogenetic Reserve Area.

| Biogenetic Reserves | Area (hectares) |
|---|---|
| Lesiniou Forest Natural Monument | 45.9 |
| Pindos National Park (core) | 3,393 |
| Virgin Forest of the Central Rhodopes | 550 |
| Virgin Forest of Paranesti | 500 |
| Kyparissios Mixed Forest Natural Monument Embona Rhodes | 135 |
| Lagana Bay | 2,450 |
| Grammos Mixed Forest Natural Monument | 130 |
| Ainos National Forest (core) | 2,862 |
| Aesthetic Forest of Kouri - Almyrou | 100 |
| Sapienza Island Evergreen Sycamore Forest Natural Monument | 24 |
| Beech Forest Natural Monument in Chihla - Haidou Xanthi | 18 |
| Aridaia Mixed Forest Natural Monument | 192 |
| Olympus National Park (core) | 3,988 |
| Oitis National Park (core) | 3,010 |
| Prespa National Park (Cedar Forest) | 13 |
| Samaria National Park | 4,850 |

**Table 28**: Biogenetic Reserves.

- **Biosphere reserves**

The proposed project **is not located** in Biosphere Reserve Areas.

| Biosphere reserves | Area (hectares) |
|---|---|
| Olympus National Park (Core) | 3988 |
| Samaria National Park (Pyrinas) | 4850 |

**Table 29**: Biosphere Reserves.

- **World Heritage Sites**

According to the World Heritage Convention, which operates under the auspices of UNESCO, the proposed project **is not located** in a World Heritage Site.

| World Heritage Sites (for their natural environment) | Area (hectares) |
|---|---|
| Antichasia Mountains - Meteora | 387 |
| Mount Athos (Total Area of the Peninsula) | 33700 |

**Table 30**: World Heritage Sites.

- **Regions in which the Eurodiploma has been awarded**

The proposed project **is not located** in an Area that has been awarded a Eurodiploma.

| Eurodiploma | Area (hectares) |
|---|---|
| Samaria National Park (A Class Eurodiploma) | 4850 |

**Table 31**: Eurodiploma.

- **Important Bird Areas of Greece (IBA)**

The W/T **positions are located outside** the SPP. The nearest POIs are as follows:

Code: GR00 1, Name: Riverside forest of northern Evros and Arda , at a distance of approximately 1,807 m from the wind power plant. (A section of the underground passage of the interconnection network that passes through the existing Komaron bridge on the river Arda , is within the GR 001 area for 613 m.).

Code: GR002, Name: Asvestadon – Vrysike area , at a distance of about 25 km. from the wind power plant.

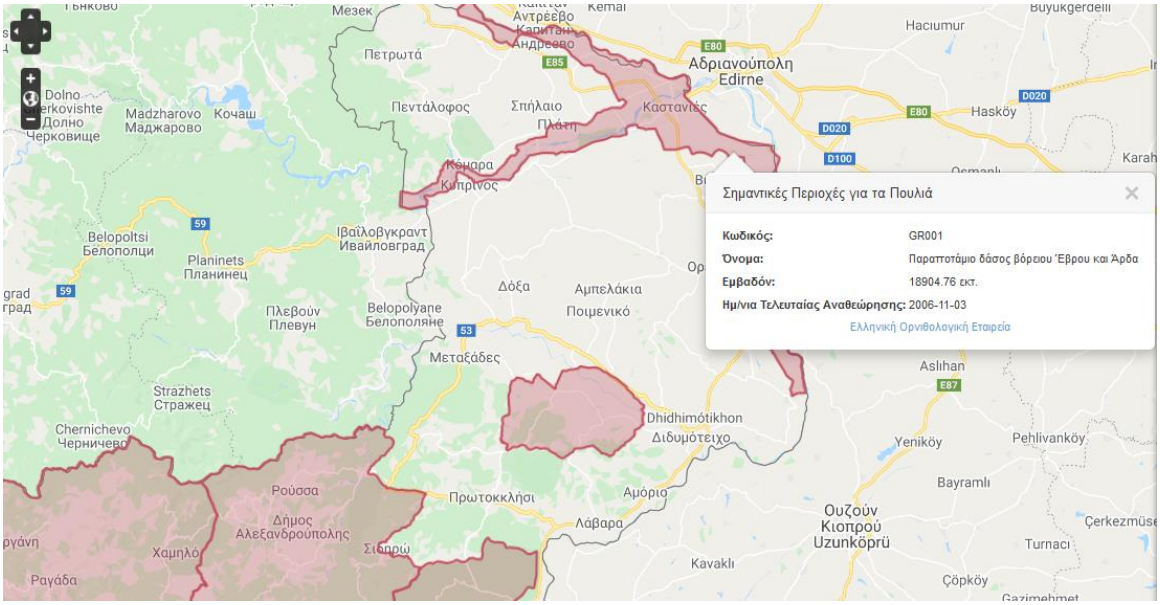



**Figure 43**: SPP in the wider area.

## 8.6 Anthropogenic Environment

There are no residential areas within the intervention limits of the wind power plant proposed for construction.

Due to its remoteness from inhabited areas, there are no constructions of any kind within the intervention limits, such as residences, industrial buildings, stables, corrals, warehouses, etc. Therefore, the density of residents and all kinds of constructions within its limits is zero.

The closest settlements to the project site are:

| APPROXIMATE DISTANCE FROM THE NEAREST WIND TURBINE (in meters) | | | |
|---|---|---|---|
| ***KOMARA*** | *2950* | *ORMENIO* | 11250 |
| ***THERAPEIO*** | *3510* | *PLATI* | 11510 |
| ***PENTALOPHOS*** | *3580* | *ZONI* | 11670 |
| ***MILIA*** | *4210* | *KERAMOS* | 12520 |
| ***KIPRINOS*** | *4298* | *G. DOKSAPARA* | 13200 |
| ***GALHNH*** | *4780* | *DIKEA* | 12780 |
| ***PETROTA*** | *6250* | *KRIOS* | 14520 |
| ***AMMOVOUNO*** | *8070* | *ARZOS* | 14850 |
| ***ELEA*** | *9610* | *DILOFOS* | 17532 |
| ***FILAKION*** | *9650* | *CANADAS* | 17980 |
| ***SPILEO*** | *9960* | *RIZIA* | 18650 |
| ***M. DOKSAPARA*** | *10620* | *KASTANIES* | 23160 |
| ***PTELEA*** | *10500* | *MARASIA* | 23284 |
| ***PALLI*** | *10520* | *ORESTIADA* | 29430 |

**Table 32**: Distances of settlements.

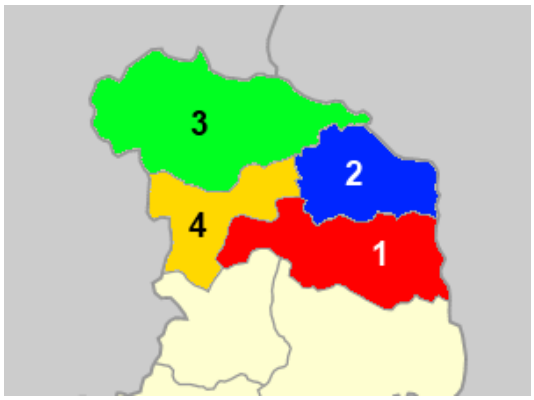
The main characteristics of the nearest settlements from the above, as drawn from the Ministry of Interior, Public Administration and Decentralization and the relevant Regional Union of Municipalities, are listed below:

The **Municipality of Orestiada** is a Municipality of the region of Eastern Macedonia and Thrace that was established with the Kallikratis Program . It arose from the amalgamation of the pre- existing municipalities of Orestiada , Vyssa , Trigonos and Kyprinos . The area of the Municipality is 955.6 sq.km and its population is 37,695 [1] inhabitants according to the 2011 census . The seat of the Municipality is Orestiada .

The Municipality of Orestiada is divided into 4 " municipal units ", which correspond to the 4 abolished municipalities and communities. Each municipal unit is divided into " communities ", which correspond to the departments of the abolished MUNICIPALITYs. The current communities of the Municipality were autonomous communities and municipalities before the implementation of the Kapodistrias program.

Map of the municipal units (former municipalities and communities) of the Municipality of Orestiada.

1 - Orestiada
2 - Plug
3 - Triangle
4 - Carp




**Municipal Unit of Orestiada**

The municipal unit that comprised the Municipality before the amalgamation has a (real) population of 21,730 inhabitants and occupies an area of 245,237 acres. Its seat is Orestiada , from which it took its name.

The following communities and settlements are included:

Community of Orestiada
- Orestiada
- Lepti
- Neos Pyrgos
- Palaia Sagini
- Sakkos _

Community of Ampelakia -- Ampelakia
Swamp Community -- Valtos
Community of Thurio (of the former community of Thurio) -- Thurio
Community of Megali Doxipara -- the Megali Doxipara
New Winter Community - Neo Chimonio
Community of Neohori
- Neohori _
- the Patagi

Handras Community -- Handras

**Municipal Unit of Vyssa**

The municipal unit (and former Municipality) of Vyssa occupies an area of 170,179 acres and has a (real) population of 8,184 inhabitants. The seat of the former Municipality was Nea Vyssa .

The following communities and settlements are included:

Community of Nea Vyssa -- Nea Vyssa
Kavyli Community -- Kavyli
Community of Kastanie -- Kastanies
Rizia community -- Rizias
Community of Sterna -- Sterna

**Trigono Municipal Unit**

The municipal unit (and former Municipality) of Trigonos is located in the northernmost point of Greece, as it is located above the river Arda , at the tripoint between Greece, Bulgaria and Turkey . It occupies an area of 372,256 acres and has a (real) population of 6,656 inhabitants. The seat of the former Municipality was Dikaia .

The area of the Municipality is also called the " MesopMunicipalitymia of Evros" as the area of the Municipality is located between the rivers Arda and Evros , Ardas is the natural southern border of the Municipality and Evros the natural northeastern border.

The following communities and settlements are included:

Community of Rights
- Dikaia
- Dilofos _
- Krios
- Palli _

Community of Arzos
- Arzos _
- Canadas _

Community of Elaia -- Elaia
Community of Therapeio (of the former community of Kyprinos) -- Therapeio
Community of Komara -- Komara
Marasian Community -- Marasias
Milea community (of the former Kyprinos community) -- Milia
Community of Ormenio -- Ormenio
Community of Pentalofos -- Pentalofos
Community of Petrota -- Petrota
Community of Platis -- Plati
Community of Ptelea -- Ptelea
Cave Community -- Spileo

**Kyprinos Municipal Unit**

The municipal unity (and former Municipality) of Kyprinos has a (real) population of 2915 inhabitants and occupies an area of 97,194 acres. The seat of the former Municipality was Kyprinos .

The following communities and settlements are included:

Kyprionos community
- Kyprinos
- Galini

Zoni Community
- Zoni
- Mikri Doxipara _
- Chelidona

Fylakio Community
- Fylakio

- Ammovouno
- Keramos

### *8.6.1 Spatial planning - land uses*

The proposed project is to take place in a location outside the city plan. The wider installation area of the wind power plant is land characterized mainly by broadleaf forests, sclerophyllous vegetation, natural grasslands, agricultural land and transitional shrublands.

### *8.6.2. Structure and functions of the anthropogenic environment*

Orestiada is the administrative center of the Municipality of Orestiada, where almost all services provided by the public and wider public sector are performed. It is the area closest to the large urban center of Alexandroupoli. It is approximately 114 kilometers from the city of Alexandroupoli, offering a relatively easy and quick access to the center of the region.

### *8.6.3. Cultural heritage*

Historic Environment[13]

In this section, reference is made to the Historical Environment of Orestiada.

It is the northernmost urban center of Greece while it is one of its newest cities, as it was founded by approximately 6000 Greeks. It is a modern city with 23,000 inhabitants and is the second most populous in the prefecture after Alexandroupolis. It is located in the middle of a fertile agricultural area with a million arable acres and abundant water from the rivers Evros, Arda and Erythropotamos .

**Name**
According to the myth, Orestes, son of Agamemnon and Clytemnestra, avenging his father's death, killed Clytemnestra's mother. Chased by the Erinyes, he went to the Oracles and they instructed him to bathe at the confluence of three rivers. He started with the help of his father's friends. He arrived at Ainos and from there by boat, he went up the river Evros. At the confluence of the three rivers Arda , Evros and Tunja , he bathed and was saved from the sin of matricide and from the Erinyes. At this point he built a city and gave it his name: Orestiada. Little by little, Orestiada grew and for several centuries was the center of Thrace, as it was the seat of the greatest Thracian Kings. There is another version for the name of the city. The ancients believed that at the confluence of the three rivers, in the abundant waters and dense vegetation, lived the nymphs also called "Orestiadas". So this beautiful location was called Orestiada.

**Antiquity**
In this area of upper Evros, it was inhabited since the 6th century. e.g. the ancient Thracian people the ODRYSAI, with the capital Oskudama , which means wealth, gold.

[13] *https://www.gnoristetinellada.gr/anadromes/thraki/3921-orestiada-istoriki-anadromi-sti-neoteri-poli-tis-elladas*

**Roman years**
In 127 BC the Roman emperor Hadrian visited Orestiada, and after beautifying it and walling it, he renamed it Adrianople . Since then, this name has been established and is preserved to this day even by the Turks, albeit somewhat modified ( Edirne ). During the years of Roman rule and then during the years of the Byzantine Empire, Adrianople was a center of transportation, trade, industry and culture. Greek schools and churches were still functioning since then.
Beyond **Byzantium , however, as a center of trade and culture,** Adrianople was the military stronghold as well as the base of Constantinople. On its strongest walls, the attacks of the hostile enemies of the Byzantine empire were dissipated, and on its plain, bloody battles took place and always easy or difficult the Greek inhabitants managed to win.

**Turkish rule**
In 1361, Adrianople was occupied by the Ottomans. In 1920, after the First World War, Adrianople was given to the Greeks, but its liberation lasted only 2 years. After the Asia Minor disaster and the Treaty of Lausanne , the Greeks left Adrianople for good .

**The Treaty of Lausanne**
The old Orestiada was evacuated from July 1923 (Treaty of Lausanne , 24-7-1923). On 15-9-1923, the old Orestiada - the Karagats , was handed over to the Turks. This was the great injustice of the Treaty. At the Lausanne conference, our allies, the English represented by Courzon , the French with Poincaré , the Italians with Mussolini , yielded to the demand of the Turkish Ismet Pasha, a member of parliament from Edirne , who demanded compensation from Greece of 4 billion gold francs, the half of the Greek military and commercial fleet, to leave the Patriarchate from Constantinople and to hold a referendum in Western Thrace. In the great reaction of Eleftherios Venizelos, in May 1923, the French general Maurice Pelle proposed:

"Since Greece cannot pay, the old Orestiada - Karagats should be granted to the Turks".
His proposal was accepted. This is how the abandonment of the old Orestiada begins in July 1923. the defeated Turks appeared victorious, taking advantage of the jealousies of the allies and the weakness of Greece. For the Orestiadites , a new Golgotha begins .
The 900 families come and build Nea Orestiada and on August 12, 1923, they inaugurate their new city. There is another version for the name of the city. The ancients believed that at the confluence of the three rivers, in the abundant waters and dense vegetation, lived the nymphs also called "Orestiadas". So this beautiful location was called Orestiada.

**Modern Times**
Today, Nea Orestiada, founded by its first inhabitants, no longer exists. Re-creation, reconstruction, beautification swept away all the buildings of the city. In this context of reconstruction, almost nothing was left to remind the refugee city of Nea Orestiada, sometimes with good and sometimes with bad results.

Cultural Environment

The spiritual and cultural development of the city is remarkable. The city is the seat of the Department of Rural Development and the Department of Forestry and Environmental and Natural Resource Management of the Democritus University of Thrace. Many cultural clubs, theater groups, various sports clubs have been created and cultural and other events are often organized.

## 8.7 Socio-economic environment

Most of the population of the Municipality of Orestiada is employed in agricultural and animal husbandry activities. The changes that took place after the 1970s led to widespread phenomena of urbanization and the search for new forms of work in urban centers.

The table below[14] shows the actual, legal and permanent population of the Municipality of Orestiada. A decrease in the real and permanent population is observed.

| Municipality | Actual population | | Legal population | | Permanent Population | |
|---|---|---|---|---|---|---|
| | 2001 | 2011 | 2001 | 2011 | 2001 | 2011 |
| **Orestiada** | **39485** | **37380** | **41532** | **37653** | **39375** | **37695** |

### Municipality of Orestiada [15]- Census 2011

Permanent population: 37,695

Legal population: 37,653

Analysis of permanent population data

Gender & Marital Status

Πίνακας Β04. Απογραφή Πληθυσμού 2011. Μόνιμος Πληθυσμός κατά φύλο και οικογενειακή κατάσταση
Περιφερειακές Ενότητες, Δήμοι

| Γεωγραφικό επίπεδο | Γεωγραφικός Κωδικός | Τόπος μόνιμης διαμονής | Και των δύο φύλων | | | | | Άρρενες | | | | | Θήλεις | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Σύνολο | Άγαμοι | Έγγαμοι, με σύμφωνο συμβίωσης και σε διάσταση | Χήροι και χήρες από σύμφωνο συμβίωσης | Διαζευγμένοι και διαζευγμένες από σύμφωνο συμβίωσης | Σύνολο | Άγαμοι | Έγγαμοι, με σύμφωνο συμβίωσης και σε διάσταση | Χήροι και χήρες από σύμφωνο συμβίωσης | Διαζευγμένοι και διαζευγμένες από σύμφωνο συμβίωσης | Σύνολο | Άγαμες | Έγγαμες, με σύμφωνο συμβίωσης και σε διάσταση | Χήρες και χήρες από σύμφωνο συμβίωσης | Διαζευγμένες και διαζευγμένες από σύμφωνο συμβίωσης |
| 0 | 000 | ΣΥΝΟΛΟ ΧΩΡΑΣ | 10,816,286 | 4,227,476 | 5,436,265 | 820,527 | 332,018 | 5,303,223 | 2,329,207 | 2,723,446 | 124,394 | 126,176 | 5,513,063 | 1,898,269 | 2,712,819 | 696,133 | 205,842 |
| 1 | 1 | ΒΟΡΕΙΑ ΕΛΛΑΔΑ | 3,110,835 | 1,172,244 | 1,613,972 | 247,740 | 76,879 | 1,519,890 | 643,128 | 807,587 | 39,144 | 30,031 | 1,590,945 | 529,116 | 806,385 | 208,596 | 46,848 |
| 2 | 11 | ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ ΜΑΚΕΔΟΝΙΑΣ - ΘΡΑΚΗΣ | 2,490,290 | 942,978 | 1,285,293 | 196,562 | 65,457 | 1,212,336 | 514,598 | 642,355 | 30,495 | 24,888 | 1,277,954 | 428,380 | 642,938 | 166,067 | 40,569 |
| 3 | 111 | ΠΕΡΙΦΕΡΕΙΑ ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ ΘΡΑΚΗΣ | 608,182 | 217,990 | 324,828 | 51,791 | 13,573 | 299,643 | 122,901 | 162,470 | 8,734 | 5,538 | 308,539 | 95,089 | 162,358 | 43,057 | 8,035 |
| 4 | 11103 | ΠΕΡΙΦΕΡΕΙΑΚΗ ΕΝΟΤΗΤΑ ΕΒΡΟΥ | 147,947 | 53,528 | 78,667 | 12,766 | 2,986 | 74,705 | 31,686 | 39,419 | 2,372 | 1,228 | 73,242 | 21,842 | 39,248 | 10,394 | 1,758 |
| 5 | 1110301 | ΔΗΜΟΣ ΑΛΕΞΑΝΔΡΟΥΠΟΛΗΣ | 72,959 | 28,657 | 37,340 | 5,213 | 1,749 | 35,775 | 15,620 | 18,647 | 839 | 669 | 37,184 | 13,037 | 18,693 | 4,374 | 1,080 |
| 5 | 1110302 | ΔΗΜΟΣ ΔΙΔΥΜΟΤΕΙΧΟΥ | 19,493 | 6,340 | 10,737 | 2,068 | 348 | 10,140 | 4,126 | 5,386 | 473 | 156 | 9,353 | 2,214 | 5,352 | 1,595 | 192 |
| 5 | 1110303 | ΔΗΜΟΣ ΟΡΕΣΤΙΑΔΑΣ | 37,695 | 12,440 | 20,956 | 3,665 | 634 | 19,554 | 8,023 | 10,536 | 730 | 265 | 18,141 | 4,417 | 10,420 | 2,935 | 369 |
| 5 | 1110304 | ΔΗΜΟΣ ΣΑΜΟΘΡΑΚΗΣ | 2,859 | 1,132 | 1,444 | 219 | 64 | 1,616 | 815 | 737 | 30 | 34 | 1,243 | 317 | 707 | 189 | 30 |
| 5 | 1110305 | ΔΗΜΟΣ ΣΟΥΦΛΙΟΥ | 14,941 | 4,959 | 8,190 | 1,601 | 191 | 7,620 | 3,102 | 4,114 | 300 | 104 | 7,321 | 1,857 | 4,076 | 1,301 | 87 |

Citizenship

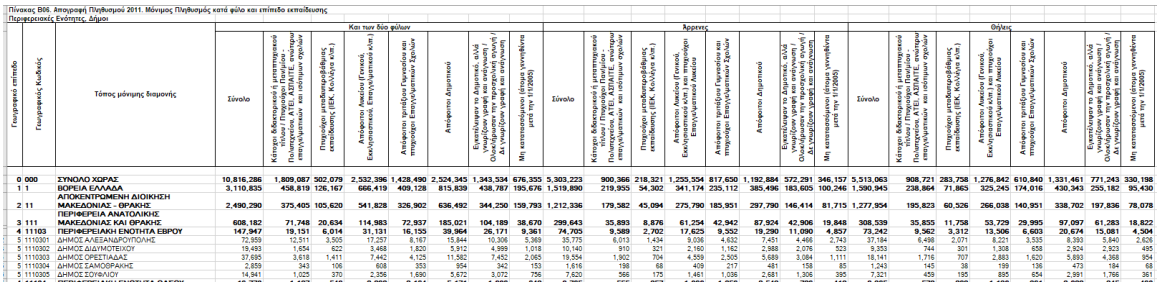
Πίνακας Β09. Απογραφή Πληθυσμού 2011. Μόνιμος Πληθυσμός κατά ομάδες υπηκοοτήτων
Δήμοι

| Επίπεδο | Γεωγραφικός κωδικός | Τόπος μόνιμης διαμονής | Σύνολο | Ελλάδα(1) | Ξένες χώρες | | |
|---|---|---|---|---|---|---|---|
| | | | | | Σύνολο | Χώρες ΕΕ | Λοιπές χώρες / Χωρίς υπηκοότητα ή αδιευκρίνιστη υπηκοότητα ή δε δήλωσε |
| 0 | 000 | ΣΥΝΟΛΟ ΧΩΡΑΣ | 10,816,286 | 9,904,286 | 912,000 | 199,121 | 712,879 |
| 1 | 1 | ΒΟΡΕΙΑ ΕΛΛΑΔΑ | 3,110,835 | 2,941,384 | 169,451 | 31,412 | 138,039 |
| 2 | 11 | ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ ΜΑΚΕΔΟΝΙΑΣ - ΘΡΑΚΗΣ | 2,490,290 | 2,351,416 | 138,874 | 28,136 | 110,738 |
| 3 | 111 | ΠΕΡΙΦΕΡΕΙΑ ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ ΘΡΑΚΗΣ | 608,182 | 586,226 | 21,956 | 7,489 | 14,467 |
| 4 | 11103 | ΠΕΡΙΦΕΡΕΙΑΚΗ ΕΝΟΤΗΤΑ ΕΒΡΟΥ | 147,947 | 143,614 | 4,333 | 2,311 | 2,022 |
| 5 | 1110301 | ΔΗΜΟΣ ΑΛΕΞΑΝΔΡΟΥΠΟΛΗΣ | 72,959 | 70,852 | 2,107 | 707 | 1,400 |
| 5 | 1110302 | ΔΗΜΟΣ ΔΙΔΥΜΟΤΕΙΧΟΥ | 19,493 | 19,285 | 208 | 121 | 87 |
| 5 | 1110303 | ΔΗΜΟΣ ΟΡΕΣΤΙΑΔΑΣ | 37,695 | 36,283 | 1,412 | 1,008 | 404 |
| 5 | 1110304 | ΔΗΜΟΣ ΣΑΜΟΘΡΑΚΗΣ | 2,859 | 2,739 | 120 | 52 | 68 |
| 5 | 1110305 | ΔΗΜΟΣ ΣΟΥΦΛΙΟΥ | 14,941 | 14,455 | 486 | 423 | 63 |

14 *From KEDE – E.ET.A.A. Municipalities in numbers, Athens, May 2013*

15 *From http://www.statistics.gr/*

Gender & level of education



*8.7.1 Per capita income (standard of living) based on ELSTAT indicators*

According to the GDP per inhabitant (or "GDP per capita") index for 2009, Eastern Macedonia & Thrace has had a positive sign of growth since 2000, and is the second most developed region of the entire country. During the nine -year period 2000 – 2009, the average annual growth rate was 2.42%.

| ΕΠΙΠΕΔΟ ΑΝΑΠΤΥΞΗΣ & ΕΥΗΜΕΡΙΑΣ ΠΕΡΙΦΕΡΕΙΩΝ<br>ΕΤΗΣΙΟΣ ΡΥΘΜΟΣ ΜΕΤΑΒΟΛΗΣ ΑΕΠ/κάτ. 1995 - 2009<br>σε ευρώ και σε σταθερές τιμές 2000 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NUTS 2012** | **ΠΕΡΙΦΕΡΕΙΑ** | **1995** | **2000** | **2004** | **2009** | **1995-2000** | **2000-2004** | **2004-2009** | **2000-2009** | **2007-2008** | **2008-2009** | **2007-2009** |
| EL11 | Ανατολική Μακεδονία & Θράκη | 8.985 | 9.400 | 10.825 | 11.662 | 0,91% | 5,54% | 1,50% | 2,42% | -1,20% | -1,46% | -1,33% |
| EL12 | Κεντρική Μακεδονία | 10.735 | 11.700 | 13.398 | 12.652 | 1,74% | 1,98% | -1,14% | 0,87% | -0,34% | -4,47% | -2,43% |
| EL13 | Δυτική Μακεδονία | 11.085 | 11.500 | 13.221 | 14.329 | 0,74% | 5,65% | 1,62% | 2,47% | -2,94% | -4,27% | -3,61% |
| EL14 | Θεσσαλία | 9.802 | 10.700 | 13.132 | 12.043 | 1,77% | 3,00% | -1,72% | 1,32% | -0,10% | -3,96% | -2,05% |
| EL21 | Ήπειρος | 8.051 | 10.700 | 12.600 | 10.823 | 5,85% | 0,29% | -2,99% | 0,13% | -2,43% | -4,09% | -3,27% |
| **zn-IV** | **Ζώνη IV** | **10.056** | **11.047** | **12.860** | **12.323** | **1,90%** | **2,77%** | **-0,85%** | **1,22%** | **-0,87%** | **-3,97%** | **-2,43%** |
| EL22 | Ιόνια Νησιά | 9.335 | 12.300 | 14.552 | 13.491 | 5,67% | 2,34% | -1,50% | 1,03% | -2,46% | -11,27% | -6,97% |
| EL23 | Δυτική Ελλάδα | 9.218 | 9.900 | 11.624 | 10.899 | 1,44% | 2,43% | -1,28% | 1,07% | -2,50% | -6,66% | -4,60% |
| EL24 | Στερεά Ελλάδα | 16.453 | 15.200 | 15.705 | 14.482 | -1,57% | -1,20% | -1,61% | -0,54% | -0,87% | -4,26% | -2,58% |
| EL25 | Πελοπόννησος | 9.918 | 12.500 | 13.221 | 12.652 | 4,74% | 0,30% | -0,88% | 0,13% | -3,31% | -3,33% | -3,32% |
| EL30 | Αττική | 11.902 | 14.300 | 17.569 | 20.579 | 3,74% | 9,53% | 3,21% | 4,13% | -0,39% | -2,38% | -1,39% |
| EL41 | Βορειο Αιγαιο | 9.218 | 10.200 | 12.422 | 12.652 | 2,04% | 5,53% | 0,37% | 2,42% | 1,43% | -6,14% | -2,43% |
| EL42 | Νότιο Αιγαίο | 11.902 | 15.400 | 17.125 | 18.902 | 5,29% | 5,26% | 1,99% | 2,30% | 2,30% | -6,15% | -2,02% |
| EL43 | Κρήτη | 10.852 | 12.500 | 14.374 | 14.024 | 2,87% | 2,92% | -0,49% | 1,29% | -0,22% | -4,81% | -2,54% |
| **EL** | **Σύνολο Χώρας** | **11.085** | **12.600** | **14.818** | **15.625** | **2,59%** | **5,53%** | **1,07%** | **2,42%** | **-0,63%** | **-3,68%** | **-2,17%** |
| **EU27** | **Ευρωπαϊκή Ένωση (EE27)** | **16.705** | **19.100** | **20.261** | **20.687** | **2,72%** | **2,02%** | **0,42%** | **0,89%** | **-0,26%** | **-4,51%** | **-2,41%** |
| Πηγή Δεδομένων: Eurostat 03/2012 | | | | | | | | | | | | |

**Table 33**: Annual rate of change of GDP 2000-2009 in Regions (data source: Eurostat 03/2012, processed by EGNATIA ODOS S.A. observatory)

In 2009 the "per capita GDP" index in the Region amounted to €11,662. At the Region level, the highest GDP per capita corresponds to the residents of Kavala (82% of the European average), followed by the Region of Xanthi (72%). Drama had the lowest per capita GDP in the Region with a rate of 54%. Evros Region with 71%.

| ΕΠΙΠΕΔΟ ΑΝΑΠΤΥΞΗΣ & ΕΥΗΜΕΡΙΑΣ ΝΟΜΩΝ<br>ΕΤΗΣΙΟΣ ΡΥΘΜΟΣ ΜΕΤΑΒΟΛΗΣ ΑΕΠ/κάτ. 1995 - 2009<br>σε ευρώ και σε σταθερές τιμές 2000 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NUTS 2012 | ΝΟΜΟΣ | 1995 | 2000 | 2004 | 2009 | 1995-2000 | 2000-2004 | 2004-2009 | 2000-2009 | 2007-2008 | 2008-2009 | 2007-2009 |
| EL111 | ΕΒΡΟΥ | 8.401 | 10.700 | 11.624 | 11.738 | 4,96% | 2,34% | 0,20% | 1,03% | 0,21% | -0,15% | 0,03% |
| EL112 | ΞΑΝΘΗΣ | 9.756 | 9.000 | 11.003 | 10.514 | 1,60% | 5,66% | 1,69% | 2,48% | 2,36% | 1,79% | 2,08% |
| EL113 | ΡΟΔΟΠΗΣ | 7.702 | 8.000 | 10.027 | 9.310 | 3,21% | 7,93% | 2,11% | 3,45% | -1,10% | -3,41% | -2,26% |
| EL114 | ΔΡΑΜΑΣ | 10.398 | 8.400 | 10.825 | 10.273 | -1,20% | 0,05% | -3,80% | 0,02% | -5,27% | -3,57% | -4,42% |
| EL115 | ΚΑΒΑΛΑΣ | 12.067 | 9.800 | 10.559 | 12.360 | -3,25% | 10,05% | 5,26% | 4,35% | -1,19% | -3,82% | -2,51% |
| EL121 | ΗΜΑΘΙΑΣ | 11.938 | 11.600 | 12.156 | 11.637 | 3,20% | -3,42% | -1,89% | -1,53% | -3,80% | -2,74% | -3,28% |
| EL122 | ΘΕΣΣΑΛΟΝΙΚΗΣ | 12.965 | 11.700 | 14.907 | 13.884 | 1,67% | 2,31% | -1,21% | 1,02% | 0,31% | -5,32% | -2,54% |
| EL123 | ΚΙΛΚΙΣ | 10.526 | 10.600 | 12.156 | 12.921 | 2,83% | 0,29% | -1,75% | 0,13% | -6,27% | -8,98% | -7,63% |
| EL124 | ΠΕΛΛΑΣ | 10.783 | 9.000 | 11.269 | 10.514 | -0,41% | 1,94% | -1,66% | 0,86% | 0,68% | -3,45% | -1,41% |
| EL125 | ΠΙΕΡΙΑΣ | 9.243 | 9.000 | 11.269 | 10.433 | 2,84% | 2,33% | -0,94% | 1,03% | 3,00% | -0,63% | 1,17% |
| EL126 | ΣΕΡΡΩΝ | 8.601 | 8.100 | 9.406 | 9.149 | 1,20% | 0,25% | -2,27% | 0,11% | -4,47% | -0,94% | -2,72% |
| EL127 | ΧΑΛΚΙΔΙΚΗΣ | 11.810 | 11.300 | 12.866 | 12.761 | 0,34% | 5,87% | 1,07% | 2,57% | -0,02% | -3,82% | -1,94% |
| EL131 | ΓΡΕΒΕΝΩΝ | 8.472 | 8.400 | 10.382 | 10.433 | 2,70% | 2,01% | -1,70% | 0,89% | 7,28% | -11,26% | -2,43% |
| EL132 | ΚΑΣΤΟΡΙΑΣ | 10.783 | 8.900 | 13.931 | 11.075 | 1,96% | -3,67% | -7,77% | -1,65% | 3,99% | -3,53% | 0,16% |
| EL133 | ΚΟΖΑΝΗΣ | 14.634 | 11.700 | 14.020 | 15.088 | -1,08% | 7,16% | 3,46% | 3,12% | -4,47% | -4,06% | -4,27% |
| EL134 | ΦΛΩΡΙΝΑΣ | 8.986 | 9.700 | 11.801 | 11.958 | 4,25% | 11,25% | 5,77% | 4,85% | -4,47% | -3,68% | -4,08% |
| EL141 | ΚΑΡΔΙΤΣΑΣ | 9.756 | 7.700 | 10.115 | 8.828 | -2,05% | 1,77% | -2,99% | 0,78% | 4,63% | -3,59% | 0,44% |
| EL142 | ΛΑΡΙΣΣΑΣ | 10.911 | 10.600 | 14.020 | 12.440 | 3,71% | 1,24% | -2,27% | 0,55% | 0,34% | -4,49% | -2,11% |
| EL143 | ΜΑΓΝΗΣΙΑΣ | 11.810 | 11.000 | 14.374 | 14.205 | 2,42% | 4,87% | 0,36% | 2,14% | -1,45% | -4,73% | -3,10% |
| EL144 | ΤΡΙΚΑΛΩΝ | 9.628 | 7.800 | 11.713 | 10.032 | -0,61% | 3,60% | -3,29% | 1,59% | -2,95% | -1,22% | -2,09% |
| EL211 | ΑΡΤΑΣ | 8.216 | 7.700 | 9.317 | 10.032 | 2,14% | 3,92% | 0,77% | 1,72% | 0,31% | -1,97% | -0,84% |
| EL212 | ΘΕΣΠΡΩΤΙΑΣ | 8.472 | 9.500 | 12.777 | 12.199 | 6,92% | 3,73% | -0,80% | 1,64% | 9,10% | -15,36% | -3,91% |
| EL213 | ΙΩΑΝΝΙΝΩΝ | 9.114 | 10.700 | 13.842 | 12.761 | 6,59% | -1,29% | -4,80% | -0,58% | -7,08% | -2,74% | -4,94% |
| EL214 | ΠΡΕΒΕΖΑΣ | 9.243 | 10.700 | 12.600 | 11.557 | 7,33% | -1,29% | -2,32% | -0,57% | 0,45% | -0,02% | 0,21% |
| zn-IV | ΖΩΝΗ IV | 11.063 | 10.267 | 12.860 | 12.237 | 1,90% | 2,77% | -0,85% | 1,22% | -0,87% | -3,97% | -2,43% |
| EL | ΣΥΝΟΛΟ ΧΩΡΑΣ | 12.195 | 12.600 | 14.818 | 16.212 | 2,59% | 5,53% | 1,07% | 2,42% | -0,63% | -3,68% | -2,17% |
| Πηγή Δεδομένων: Eurostat 03/2012 | | | | | | | | | | | | |

**Table 34:** Annual rate of change of GDP 2000-2009 in prefectures (data source: Eurostat 03/2012, processed by EGNATIA ODOS S.A. observatory)

| ΕΠΙΠΕΔΟ ΑΝΑΠΤΥΞΗΣ & ΕΥΗΜΕΡΙΑΣ ΝΟΜΩΝ, 2009<br>ΑΕΠ/κάτοικο σε ΜΑΔ (Μονάδες Αγοραστικής Δύναμης) και Ευρώ | | | | |
|---|---|---|---|---|
| **NUTS 2012** | **ΝΟΜΟΣ** | **ΜΑΔ** | **Ευρώ** | ***ΠΟΣΟΣΤΟ ΕΠΙ ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ Μ.Ο. ΕΕ27 (ΜΑΔ)*** |
| EL111 | ΕΒΡΟΥ | 16.700 | 15.400 | 71,0% |
| EL112 | ΞΑΝΘΗΣ | 16.900 | 15.700 | 72,0% |
| EL113 | ΡΟΔΟΠΗΣ | 15.700 | 14.600 | 67,0% |
| EL114 | ΔΡΑΜΑΣ | 12.700 | 11.700 | 54,0% |
| EL115 | ΚΑΒΑΛΑΣ | 19.300 | 17.900 | 82,0% |
| EL121 | ΗΜΑΘΙΑΣ | 15.700 | 14.500 | 67,0% |
| EL122 | ΘΕΣΣΑΛΟΝΙΚΗΣ | 19.800 | 18.400 | 84,0% |
| EL123 | ΚΙΛΚΙΣ | 15.800 | 14.600 | 67,0% |
| EL124 | ΠΕΛΛΑΣ | 14.600 | 13.600 | 62,0% |
| EL125 | ΠΙΕΡΙΑΣ | 15.200 | 14.100 | 65,0% |
| EL126 | ΣΕΡΡΩΝ | 11.800 | 11.000 | 50,0% |
| EL127 | ΧΑΛΚΙΔΙΚΗΣ | 19.200 | 17.800 | 82,0% |
| EL131 | ΓΡΕΒΕΝΩΝ | 13.500 | 12.500 | 57,0% |
| EL132 | ΚΑΣΤΟΡΙΑΣ | 13.100 | 12.200 | 56,0% |
| EL133 | ΚΟΖΑΝΗΣ | 23.500 | 21.800 | 100,0% |
| EL134 | ΦΛΩΡΙΝΑΣ | 22.100 | 20.500 | 94,0% |
| EL141 | ΚΑΡΔΙΤΣΑΣ | 12.300 | 11.400 | 52,0% |
| EL142 | ΛΑΡΙΣΣΑΣ | 17.700 | 16.400 | 75,0% |
| EL143 | ΜΑΓΝΗΣΙΑΣ | 20.700 | 19.200 | 88,0% |
| EL144 | ΤΡΙΚΑΛΩΝ | 14.000 | 13.000 | 60,0% |
| EL211 | ΑΡΤΑΣ | 13.700 | 12.700 | 58,0% |
| EL212 | ΘΕΣΠΡΩΤΙΑΣ | 17.400 | 16.100 | 74,0% |
| EL213 | ΙΩΑΝΝΙΝΩΝ | 15.300 | 14.200 | 65,0% |
| EL214 | ΠΡΕΒΕΖΑΣ | 15.900 | 14.700 | 67,0% |
| **zn-IV** | **ΖΩΝΗ IV** | **17.440** | **16.168** | **74,2%** |
| **EL** | **ΣΥΝΟΛΟ ΧΩΡΑΣ** | **22.100** | **20.500** | **94,0%** |
| Πηγή Δεδομένων: Eurostat 03/2012 | | | | |

**Table 35**: Percentage of GDP on the European M.O. in 2009 (data source: Eurostat 03/2012, processed by EGNATIA ROAD S.A. observatory)

| Βασικοί Δείκτες Απασχόλησης (και τα δύο φύλα) | | ΣΥΝΟΛΟ ΧΩΡΑΣ | ΑΝΑΤΟΛΙΚΗ ΜΑΚΕΔΟΝΙΑ ΘΡΑΚΗ | ΚΕΝΤΡΙΚΗ ΜΑΚΕΔΟΝΙΑ | Π.Σ. ΘΕΣΣΑ-ΛΟΝΙΚΗΣ | ΚΕΝ. ΜΑΚ. εκτός Π.Σ. Θεσσ/κης |
|---|---|---|---|---|---|---|
| % επί του Πληθυσμού Εργάσιμης Ηλικίας | Μη Ενεργός Πληθυσμός 15-64 ετών | 32, 2 | 33, 3 | 34, 4 | 35, 2 | 33, 6 |
| | Εργατικό δυναμικό | 68,7 | 67,8 | 66,1 | 65,1 | 67,0 |
| | Σύνολο απασχολουμένων | 52,5 | 51,5 | 49,5 | 46,5 | 52,6 |
| % επί του Συνόλου των απασχο-λουμένων | Απασχολούμενοι σε επιχειρήσεις μέχρι 10 άτομα | 60,9 | 68,6 | 60,1 | 51,8 | 67,5 |
| | Μισθωτοί | 63,2 | 51,2 | 60,7 | 73,7 | 48,9 |
| | Αυτοαπασχολούμενοι | 24,6 | 35,2 | 26,2 | 18,7 | 32,9 |
| | Απασχολούμενοι στην γεωργία | 13,0 | 29,0 | 13,5 | 1,3 | 24,6 |
| | Απασχολούμενοι στην βιομηχανία | 9,5 | 8,5 | 10,5 | 9,6 | 11,2 |
| | Απασχολούμενοι στις υπηρεσίες | 70,4 | 57,0 | 70,4 | 84,1 | 58,1 |
| | Μερική απασχόληση | 7,3 | 7,3 | 6,4 | 5,9 | 6,8 |
| % επί των Μισθωτών | Προσωρινή απασχόληση | 9,9 | 7,8 | 10,3 | 5,7 | 16,6 |
| Ποσοστό Ανεργίας | Σύνολο ανέργων | 23,6 | 24,0 | 25,1 | 28,6 | 21,6 |
| | Άνεργοι νέοι 15-29 ετών | 42,7 | 41,9 | 46,2 | 47,5 | 44,8 |
| % επί του Συνόλου των ανέργων | Νεοεισερχόμενοι Άνεργοι («ΝΕΟΙ») | 23,3 | 23,1 | 24,9 | 25,1 | 24,6 |
| | Μακροχρόνιοι άνεργοι | 59,0 | 62,8 | 66,5 | 66,4 | 66,7 |
| | Άνεργοι που έχουν εργαστεί στο παρελθόν | 76,7 | 76,9 | 75,1 | 74,9 | 75,4 |

**Table 36**: Participation rates of Basic employment indicators 2012 (Source: G.G. ELSTAT, EED 2005-2012, Editing: INE/GSEE-ADEDY (G. Kritikidis ))

| Βασικοί Δείκτες Απασχόλησης (και τα δύο φύλα) | ΣΥΝΟΛΟ ΧΩΡΑΣ | ΑΝΑΤΟΛΙΚΗ ΜΑΚΕΔΟΝΙΑ ΘΡΑΚΗ | ΚΕΝΤΡΙΚΗ ΜΑΚΕΔΟΝΙΑ | Π.Σ. ΘΕΣΣΑ-ΛΟΝΙΚΗΣ | ΚΕΝ. ΜΑΚ. εκτός Π.Σ. Θεσσ/κης |
|---|---|---|---|---|---|
| Συνολικός πληθυσμός | 81 494 | - 107 | 19 068 | - 4 449 | 23 517 |
| Πληθυσμός Εργάσιμης Ηλικίας (15-64 ετών) | - 7 132 | - 1 177 | - 325 | - 15 121 | 14 796 |
| Μη Ενεργός Πληθυσμός 15-64 ετών | 31 936 | 6 565 | 11 670 | - 5 527 | 17 197 |
| Εργατικό δυναμικό | - 59 115 | - 8 434 | - 15 097 | - 11 774 | - 3 323 |
| Σύνολο απασχολουμένων | - 633 844 | - 33 094 | - 115 203 | - 69 242 | - 45 961 |
| Απασχολούμενοι σε επιχειρήσεις μέχρι 10 άτομα | - 490 827 | - 22 911 | - 79 293 | - 32 334 | - 46 959 |
| Μισθωτοί | - 455 131 | - 28 315 | - 85 801 | - 60 757 | - 25 044 |
| Αυτοαπασχολούμενοι | - 43 398 | 142 | - 4 698 | - 2 315 | - 2 383 |
| Απασχολούμενοι στην γεωργία | - 57 706 | - 2 363 | - 13 094 | 1 336 | - 14 430 |
| Απασχολούμενοι στην βιομηχανία | - 123 602 | - 4 266 | - 30 874 | - 20 276 | - 10 598 |
| Απασχολούμενοι στις υπηρεσίες | - 319 333 | - 17 198 | - 51 010 | - 38 661 | - 12 349 |
| Μερική απασχόληση | - 3 417 | - 747 | - 10 604 | - 7 343 | - 3 261 |
| Προσωρινή απασχόληση | - 126 735 | - 4 953 | - 25 154 | - 16 600 | - 8 554 |
| Σύνολο ανέργων | 574 729 | 24 660 | 100 106 | 57 468 | 42 638 |
| Άνεργοι νέοι 15-29 ετών | 167 285 | 7 794 | 27 326 | 14 475 | 12 851 |
| Νεοεισερχόμενοι Άνεργοι («ΝΕΟΙ») | 131 335 | 4 721 | 29 073 | 15 506 | 13 567 |
| Μακροχρόνιοι άνεργοι | 405 707 | 16 705 | 79 363 | 47 259 | 32 104 |
| Άνεργοι που έχουν εργαστεί στο παρελθόν | 443 394 | 19 939 | 71 033 | 41 962 | 29 071 |

**Table 37**: Changes in basic employment indicators 2010-2012 (Source: G.G. ELSTAT, EED 2005-2012, Editing: INE/GSEE-ADEDY (G. Kritikidis ))

The Regional Unit of Evros presents particular natural and agricultural wealth, unemployment rates have increased especially in recent years and per capita income is constantly decreasing, which makes even more imperative the need to implement investments and projects in the region, even more so when they are and environmentally friendly such as the installation of renewable energy sources.

## 8.8 Technical Infrastructure

The technical infrastructure of the area is adequate. There is relatively good road access to the area (Egnatia vertical axis of Ardano-Ormenio Road ). It will be necessary to widen the existing dirt road in some places from the Community of Pentalofos to the ASPIE, in order to transport the equipment to the site. There is no rail network, ports and marinas, airports and combined transport, public transport and parking areas close to the area. As for the environmental infrastructure systems (solid waste management facilities, sewage treatment facilities, sewage network, etc.), they are negligible, as it is a mountainous area, remote from the settlements.

Also in the area there are no water supply networks, electricity transmission and natural gas. There are telecommunications facilities, at a distance from the nearest W/T.

## 8.9 Anthropogenic pressures on the environment

The risks that generally threaten fauna and avifauna are grouped into the following three categories:

- Destruction of habitats due to deforestation, logging, overgrazing , residential development. All species are threatened by this disaster but more so the smaller ones.
- Intense human presence implies disturbance and loss of living space for fauna and avifauna . This risk mainly concerns large predators, which are often suffocated by the intense human presence in the mountains. This fact is especially dangerous during the breeding season, when the presence of people near the nest can lead to its abandonment.
- Hunting and killing with hunting weapons (applies to more or less all species) and poisons (mainly applies to raptor species) as well as the use of pesticides and fertilizers on crops.

The harmful effects on the fauna of the area are obviously anthropogenic and can be distinguished into indirect ones, resulting from disturbance, alteration and degradation of their habitats, and direct ones due to the direct killing of animals. In both cases the risk of shrinking and withering of animal populations exists, especially for some sensitive habitats and animal species. Indirect effects usually have a medium-long- term but ultimately more intense and more generalized harmful effect, since they affect an entire animal community that uses the same or similar habitats.

But in several cases the immediate extermination of individuals of certain species of the fauna causes an equally intense degradation, due to the reduction of the presence of these species and its chain consequences in the structure of biocommunities . Of course both indirect and direct effects are stronger in species with small, sparse or geographically isolated populations.

The human activities that both separately and combined and cumulatively negatively affect fauna habitats are mainly the following:

- Intense and continuous grazing, which alters the floral composition and the character of the vegetation of the habitats used as pastures (meadows, sparse bushes , forest clearings, etc.) This alteration leads to a gradual change in the character of the vegetation and the soil and finally forms a completely different landscape. These conditions exert a varying degree of pressure on the fauna of these habitats , even reaching the displacement of some species.
- Illegal logging and, in general, deforestation of any kind and extent, which remove valuable habitats and microhabitats from many species of fauna. And of course we are not only referring to illegal logging in forests, forest stands or thickets macchia vegetation, but also in other forms of natural vegetation.

A typical example is the natural hedgerows that are created around fields and other crops and which must be preserved, because they are often the only refuges for wildlife in these anthropogenic types of environment. Also single or old trees are valuable habitats and their preservation is in some cases the critical factor for the continued presence in an area of those species of fauna that depend on them.

- The fires, which locally cause significant destruction of habitats , but also shrink the populations of many animal species due to the direct killing of their individuals,
- The pollution of water masses from agricultural, livestock and urban sewage and waste , which in addition to the local ones has broader effects on the ecosystem.
- Hunting, legal and illegal, mainly affects the bird fauna , but some "harmful" mammals (e.g. foxes, ferrets, etc.) are also often shot .
- The use of pesticides and fertilizers in agriculture which poisons animal and bird populations .

But beyond the indirect effects , hunting, increased vehicle traffic, collection of animal organisms for scientific or other purposes, the use of poisoned baits and other human activities also have serious negative effects on the fauna by directly exterminating a significant part of the populations of several species.

In conclusion, the ecosystem is a complex composition of plants and animals, whose balance disturbance during the construction of a project can cause from mild to intense changes in the quality and quantity of this composition.

The construction and operation of the wind park is not expected to have an impact on the ecosystem, because on the one hand the intervention carried out is overall small, on the other hand it does not affect the flora and fauna of the area, because it does not destroy the natural habitats of the birdlife , since all interventions refer to places on the ridges where there are no habitats.

### 8.10 Atmospheric environment - Air quality

The atmospheric environment is burdened by the traffic of agricultural and passenger vehicles.

### 8.11 Acoustic environment and vibrations

In the surrounding area there are no vibrations and radiations, nor high noise levels.

### 8.12 Electromagnetic fields

There is no electromagnetic radiation in the study area and in the immediate area of the project.

## 8.13 Waters

### *8.13.1. Management Plans*

8.13.1.i. Presentation of the forecasts of the Tracian Water Division Management Plan

The location of the project is within the Evros River Basin ( GR 10), in the water department of Thrace ( EL 12 – Gazette 2290B/13.09.2013). In the area there are only surface rivers Y.S. (P. Ardas GR1210R0B131600174H), while the Y.Y.S. is that of Orestiada . The underground water system of Orestiada has code GR12BT010.

- ✓ It is an alluvial aquifer system.
- ✓ It is located in the Evros catchment area (LAP GR10) and belongs geographically to Y.D.12.
- ✓ It has an area of 835.16 $km^2$ , a maximum length of 57 Km, a maximum width of 27 Km and a thickness of approximately 120 m.
- ✓ With surface waters it is associated with the river Arda and the river Evros.
- ✓ Associated with terrestrial ecosystems - protected areas: SPA GR1110008 (Riverside forest of Northern Evros and Arda )

The program of measures is part of the Management Plan and constitutes the "mechanism" for achieving the environmental objectives set in it.

It aims:

- in the prevention of deterioration, the improvement and restoration of surface water systems, the achievement of the objective of their good ecological and chemical status, and the reduction of pollution due to discharges and emissions of hazardous substances
- to protect, improve and restore the condition of groundwater, to prevent its pollution and deterioration with the aim of balancing extraction and renewal
- in the conservation of protected areas

The measures are divided into Basic and Supplementary.

The **Basic Measures** are the elementary requirements that must be met and include:

- Measures to implement Union and National Legislation for water protection
- Other Key Measures. These basic measures are related to the basic principles of the Union and National legislation for water management and are related to the horizontal implementation of actions in groups, usually, of water systems with the aim of achieving or maintaining good status in them.

Supplementary **Measures** are the measures drawn up and implemented in addition to the Basic Measures, with the aim of achieving the objectives defined in accordance with Article 4 of Directive 2000/60/EC. According to the 1st revision of the Water Management Plan, in YDEL12 it was chosen to propose additional measures for the following reasons:

a) To maintain the good condition of surface or underground water systems, as well as to increase knowledge and awareness of special issues for the most rational use of water, targeted users. In this case the additional measures have a horizontal, general application and the affected water systems are not specified.

b) In the water bodies that are estimated that despite the implementation of the program of basic measures, they will not achieve the goal of good status by 2021, and more specifically:

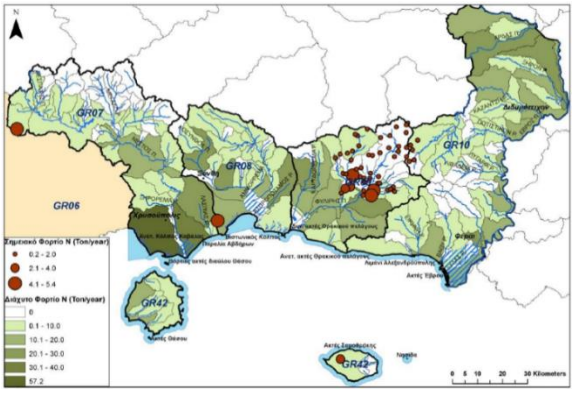
- in water bodies, which, according to measurements of qualitative and quantitative parameters or with the new methodological approach to their grouping, are in a condition below good,
- in water bodies, which are in unknown or good condition, but there are clear indications, through pressure analysis, that they are at risk of not achieving their environmental objectives.

8.13.1.ii. Control of compatibility of the project or activity in relation to the provisions of the water management plans

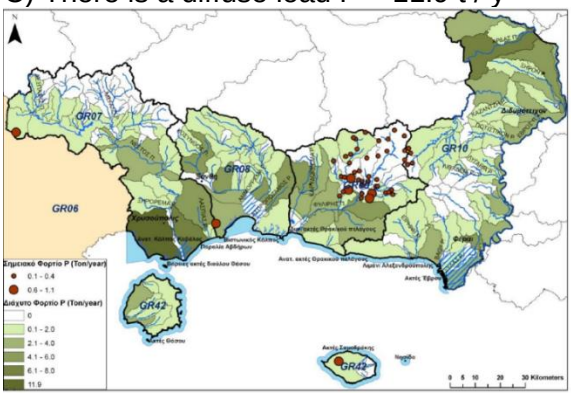
In order to evaluate the compatibility of the proposed project with the provisions of the Management Plan (1st revision), the anthropogenic pressures that exist in the HY EL 12 are presented below. As anthropogenic pressures on water systems, the set of human activities that affect or can affect affect the water systems of the area in which they grow. These pressures are characterized as significant since they are a reason for the YS to be at risk of not achieving the environmental objectives, according to the EU Guidance Document No 03.
Next, elements of the analysis of anthropogenic pressures that have been made, for the needs of the 1st Revision of the SDLAPS, are presented.

- ✓ Point sources of pollution: All point sources of pollution that produce conventional pollutants (BOD, N, P) are included. The list of categories of said pressures includes:
  - Wastewater Treatment Facilities (WTP)
  - Discharge of sewage networks to a natural recipient.
  - Large hotel units.
  - Industrial units.
  - Livestock units.
  - Aquaculture – Fish power planting.
  - Spills from LANDFILLS and LANDFILLS.
  - Effluents from extractive activities (mines, mines)
- ✓ Diffuse sources of pollution: All diffuse pollution sources that produce conventional pollutants (BOD, N, P) are included. The list of categories of said pressures includes:
  - Agricultural activities.
  - Municipal wastewater that does not end up in WWTPs.
  - Livestock (pastoral and stabled).
  - Burden of water from other sources.
- ✓ Hydromorphological pressures: The following table shows aggregated data for the YS that receive hydromorphological pressures.
- ✓ Water withdrawals: The list of categories of activities and uses examined under the common methodology includes:
  - Water supply
  - Irrigation
  - Livestock water
  - Industrial water
  - Other water needs and withdrawals
- ✓ Other pressures: These other pressures refer to the following in brief:
  - Artificial enrichment of groundwater,
  - Change in underground level and quantity of underground water due to underground mining or construction of large underground works.

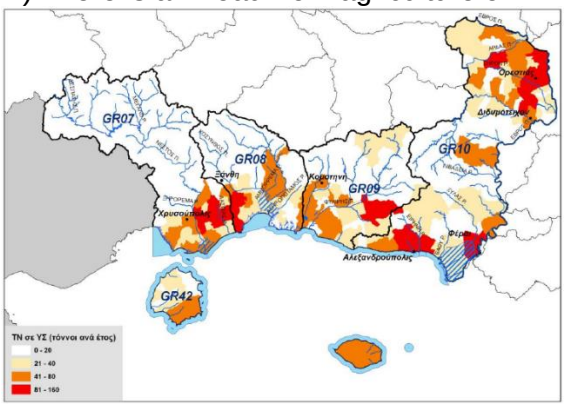
In the study area:
A) EEL do not operate
B) There is a diffuse load N > 57.2 t / y




C) There is a diffuse load P > 11.9 t / y




D) There is a N load from agriculture of 21-40 t / y




E) There is load P from agriculture 0-5 t / y

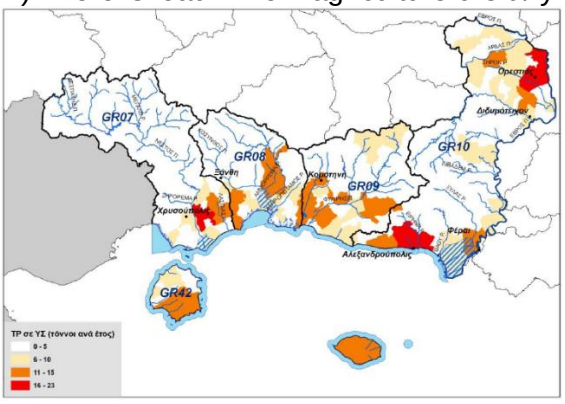



**Figure 44:** Pressures in the YS of YDEL12

In Evros WWTP (EL1210), the total annual loads resulting from the sum of the individual point pressures are **524.2 tn /year BOD, 475.7 tn /year N** and **111.6 tn /year P** . The figures below show, for the Evros LAP (EL1210), the distribution of the annual burden of BOD, N, and P

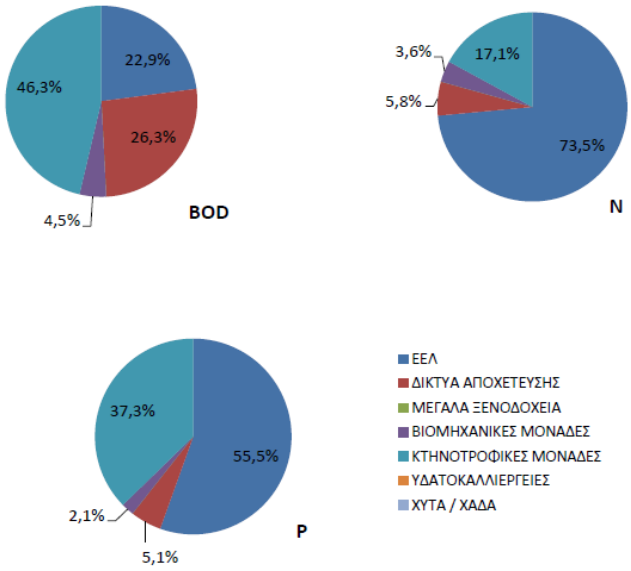



**Figure 45:** Distribution of annual burden of BOD, N and P from point pressures in the LAP Evros (EL1210) of the YD of Thrace (EL12)

In Evros WWTP (EL1210), the total annual surface loads resulting from the sum of individual point pressures are **5,940.4 tn /year BOD, 2,253.0 tn /year N** and **118.0 tn/year P** . The figures below show, for the Evros WWTP (EL1210) the distribution of final annual surface load of BOD, N, and P

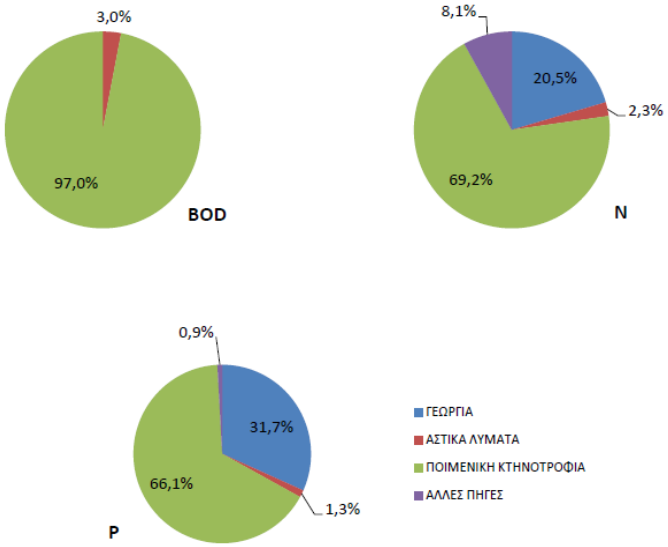



**Figure 46:** Distribution of final annual surface load of BOD, N and P from diffuse pressures in Evros LAP (EL1210) of Thrace (EL12)

In the Ministry of Health of Thrace (EL12), in accordance with Government **Decree 190126/2013** (Government Gazette 983/B/23.04.2013) in order to amend paragraphs A and B of article 2 of joint ministerial decision 19652/1906/1999 (Government Decree) , which has been issued pursuant to article 4 par. 1 and 2 of joint ministerial decision 16190/1335/1997, and amended by joint ministerial decisions 20419/2522/2001 and 106253/2010, with the identification of additional water receivers that exist or may be subjected to nitrate pollution of agricultural origin from the land areas designated herein as vulnerable zones, so that the protection of the aquatic environment can be achieved more comprehensively and effectively. For the purposes of the above decision , the **surface and underground waters of the southern part of the river Evros and the surface and underground waters of the field of Lake Vistonida (plain to the east and west of Lake Vistonida) are added as vulnerable zones to the Thrace water district** according to the 1st SDLAP. In addition, according to **KYA 147070/21.11.2014** (Government Gazette B 3224/B/2.12.2014) "Amendment of Article 2 of 19652/1906/1999 joint ministerial decision ..., as amended and in force", in the Ministry of Thrace (EL12) **the surface and underground waters of the northern part of the river Evros and more specifically the area of the Orestiada are added as vulnerable zones .**
**Vulnerable zones and water bodies that exist or may be subject to nitrate pollution of agricultural origin in the Water Department of Thrace (EL12) are presented in the following table.**

| Ονομασία Ευπρόσβλητης Ζώνης | Υδατικά Συστήματα που υφίστανται ή ενδέχεται να υποστούν νιτρορρύπανση | | | |
|---|---|---|---|---|
| | Κωδικός ΥΣ | Όνομα ΥΣ | Κατηγορία ΥΣ | ΛΑΠ |
| Περιοχή του βόρειου τμήματος του ποταμού Έβρου EL1210NI03 | EL12BT010 | ΣΥΣΤΗΜΑ ΟΡΕΣΤΙΑΔΟΣ | Υπόγειο | EL1210 |
| | EL1210R0B131600174H | ΆΡΔΑΣ Π. | Ποτάμιο | EL1210 |
| | EL1210R00131601175H | ΆΡΔΑΣ Π. | Ποτάμιο | EL1210 |
| | EL1210R0B151900176N | ΈΒΡΟΣ Π. | Ποτάμιο | EL1210 |
| | EL1210R0T020000167N | ΈΒΡΟΣ Π. | Ποτάμιο | EL1210 |
| | EL1210R00021400173N | ΜΠΕΡΔΕΜΕΝΟ Ρ. | Ποτάμιο | EL1210 |
| | EL1210R00021400171H | ΜΠΕΡΔΕΜΕΝΟ Ρ. | Ποτάμιο | EL1210 |
| | EL1210R00021400172H | ΜΠΕΡΔΕΜΕΝΟ Ρ. | Ποτάμιο | EL1210 |
| | EL1210R00021400168N | ΜΠΕΡΔΕΜΕΝΟ Ρ. | Ποτάμιο | EL1210 |
| | EL1210R00021401169H | ΜΑΝΝΑ Ρ. | Ποτάμιο | EL1210 |

**Table 38**: Institutionalized Vulnerable Zones in the YD of Thrace (EL12)

**It is noted here that the project does not interact with either surface WS (rivers, lakes, reservoirs) or underground WS, nor does it consume water during its operation. It is clear from the above that the proposed project does not contribute to any of the above anthropogenic pressures on water systems and is fully compatible with the provisions of the Water Management Plan.**

8.13.1.iii. Control of compatibility of the project or activity in relation to the provisions of the approved Flood Risk Management plan

The Potentially High Flood Risk Zones in YD EL12 "Thrace" as they emerge during the 1st Revision of the Preliminary Flood Risk Assessment are the following:

1. EL12APSFR001 Plain of Xanthi - Komotini (low river zones of Nestos, Kosynthos , Kompsatos , Aspropotamos , Bosbozi , Filiuri and coastal areas of Lake Vistonida)
2. EL12APSFR002 Coastal areas south of Vyssa and delta of Evros
3. EL12APSFR003 Areas west of Loutro St
4. EL12APSFR004 Areas b. Evros and Arda

5. EL12APSFR005 Low zones of N. Thassos
6. EL12APSFR006 Low zones of N. Samothraki

The project area is adjacent to the EL12APSFR004 zone, i.e. to a Potentially High Flood Risk Zone (ZDYKP), with the following characteristics:

| 1η ΑΝΑΘΕΩΡΗΣΗ ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΚΙΝΔΥΝΩΝ ΠΛΗΜΜΥΡΑΣ (2019) | | | | ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΚΙΝΔΥΝΩΝ ΠΛΗΜΜΥΡΑΣ (2012) | | |
|---|---|---|---|---|---|---|
| **Κωδικός** | **Ονομασία** | **Έκταση (km²)** | **Αλλαγές στη 2η Προκαταρκτική** | **Κωδικός** | **Ονομασία** | **Έκταση (km²)** |
| EL12APSFR004 | Περιοχές β. Έβρου και Άρδα | 52,9 | Διευρύνεται με βάση τα αποτελέσματα του 1ου ΣΔΚΠ για πλημμύρες T1000 | GR12RAK0004 | Περιοχές β. Έβρου και Άρδα | 44 |

**Table 39:** Area area ZDYKP project

The figure below shows the distribution of GHGs for the YD of Thrace, while the impact of Climate Change is described in the next paragraph.

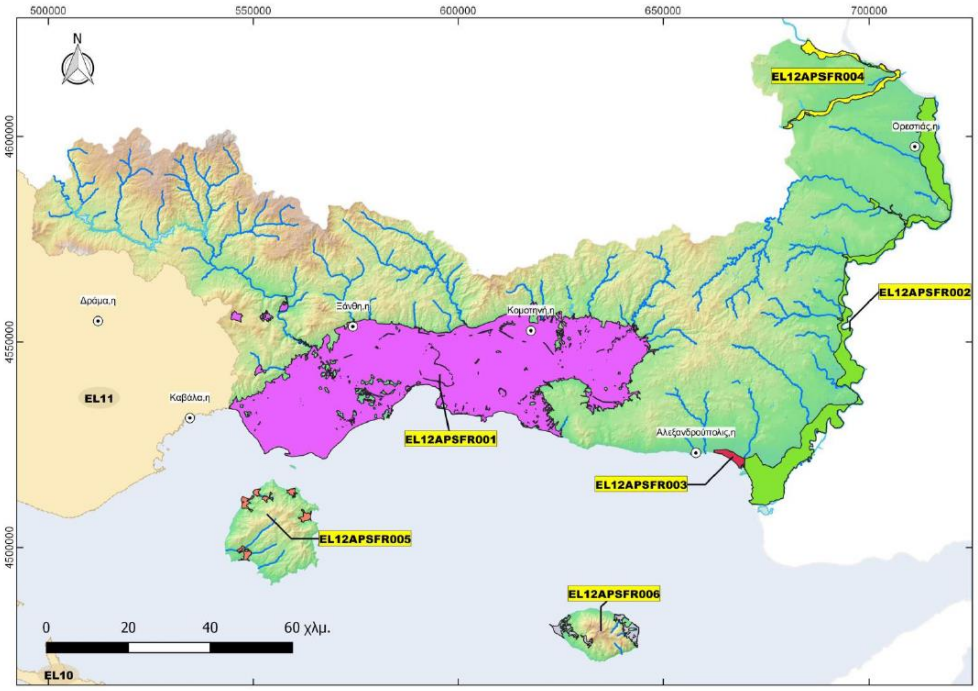



**Figure 47:** Water District of Thrace (EL12) Potentially High Flood Risk Zones

IMPACT OF CLIMATE CHANGE ON RAINFALL INTENSITY

The rainfall intensity of the WD is the main parameter used during the 1st cycle of the implementation of the directive 2007/60/EC to determine the rainfall curves and calculate the flood benefits for recovery periods T50, T100 and T1000. in the watercourses of each Zone of Potentially High Risk of Flooding (ZDYKP). The analysis during the 1st Revision of the Preliminary Flood Risk Assessment also aimed to investigate the effect of climate change on the intensity of rainfall, in relation to the extreme T1000 scenario examined and to determine any modifications that should be made both during the Revision of ZDYKP. The results are listed in the table below.

| ΥΔ | Περίοδος Επαναφοράς έντασης βροχόπτωσης 24h | Σενάρια Κλιματικής αλλαγής | | | |
|---|---|---|---|---|---|
| | | 2050 | | 2080 | |
| | | RCP45 | RCP85 | RCP45 | RCP85 |
| EL12 Θράκη | T=50 | Δεν εμφανίζεται υπέρβαση του T1000 | Δεν εμφανίζεται υπέρβαση του T1000 | Δεν εμφανίζεται υπέρβαση του T1000 | Δεν εμφανίζεται υπέρβαση του T1000 |
| | T=100 | Δεν εμφανίζεται υπέρβαση του T1000 | Εμφανίζεται υπέρβαση σε 3 σταθμούς (~6% του συνόλου των σταθμών) στο κεντρικό τμήμα του ΥΔ | Δεν εμφανίζεται υπέρβαση του T1000 | Εμφανίζεται υπέρβαση σε 6 σταθμούς (~12% του συνόλου των σταθμών) κυρίως στο κεντρικό τμήμα του ΥΔ |

**Table 40:** Evaluation of results in relation to flood hazard and risk for the T1000 scenario as assessed in the EMPs

From the results, it is clear that even in the unfavorable scenarios, there are overflows with the risk of flooding at stations that do not fall within the project area, but in other parts of the DH of Thrace. Although the project area does NOT fall within the ZDYKP, and therefore does not fall within the flood zones with either favorable or unfavorable conditions, and is characterized as a low flood risk area, while also by its nature the project is compatible with the forecasts of the approved Flood Risk Management plan. **In conclusion, the proposed project is not expected to cause any change in the qualitative or quantitative status of surface and underground water systems. It will not increase vulnerability or enhance the effects of potential flooding .**

### *8.13.2. Surface water*

8.13.2.i. Description of surface natural or artificial hydrographic network in the study area

The Thrace Watershed (EL12) consists of five (5) watersheds, those of Nestos (EL1207), the Rem . Xanthi - Xiroremata (EL1208), of Rem . Komotini – Loutro Evros (EL1209), Evros (EL1210) and Thassos – Samothraki (EL1242). The physical characteristics of the basins are presented in the following Table.

| ΚΩΔΙΚΟΣ ΛΑΠ/ΥΔ | ΟΝΟΜΑΣΙΑ ΛΑΠ | ΈΚΤΑΣΗ ($km^2$) | ΥΨΟΜΕΤΡΟ (m) | | |
|---|---|---|---|---|---|
| | | | ΜΕΣΟ | ΜΕΓΙΣΤΟ | ΕΛΑΧΙΣΤΟ |
| **EL1207** | ΝΕΣΤΟΥ | 2.975,5 | 606 | 2.200 | 0 |
| **EL1208** | ΡΕΜ. ΞΑΝΘΗΣ – ΞΗΡΟΡΕΜΑΤΟΣ | 1.662,6 | 363 | 1.822 | 0 |
| **EL1209** | ΡΕΜ. ΚΟΜΟΤΗΝΗΣ - ΛΟΥΤΡΟΥ ΕΒΡΟΥ | 1.958,3 | 289 | 1.459 | 0 |
| **EL1210** | ΕΒΡΟΥ | 4.080,8 | 175 | 1.202 | 0 |
| **EL1242** | ΘΑΣΟΥ - ΣΑΜΟΘΡΑΚΗΣ | 562,8 | 347 | 1.600 | 0 |
| **EL12** | **ΣΥΝΟΛΟ ΥΔ 12** | **11.240*** | | | |

**Table 41:** River Basins of Thrace Region (EL12)

The Evros River Basin, with a total area of 53,000 km $^2$ occupies part of the eastern Balkan Peninsula and is shared between Bulgaria, Turkey and Greece. To the north and west the basin develops on Bulgarian territory, to the southeast mainly on Turkish territory and to the southwest on Greek territory. The river Evros forms the national border between Greece - Bulgaria and Greece - Turkey.
The total length of the river is 528 km , of which 310 km belong to Bulgaria, while 208 km define the borders of Greece with Bulgaria and Turkey. The river basin is divided between the three states it crosses as follows:

- 35,085 km$^2$ (66.2%) belong to Bulgaria,
- 14,575 km$^2$ (27.5%) belong to Turkey, and
- 3,340 km$^2$ (6.3%) belong to Greece.

The Evros LAP (EL1210) includes the above-mentioned part of the wider Evros river basin which is located in Greek territory as well as some smaller watercourses in the southwest of the Evros basin (Loutrou, Irinis, Arapis). The LAP also includes sub -watersheds of two more cross-border rivers, tributaries of the Evros river: the Arda river , in the area of Orestiada, and the Erythropotamos river in the Didymoteicho region. Greece shares both of these tributaries with Bulgaria.

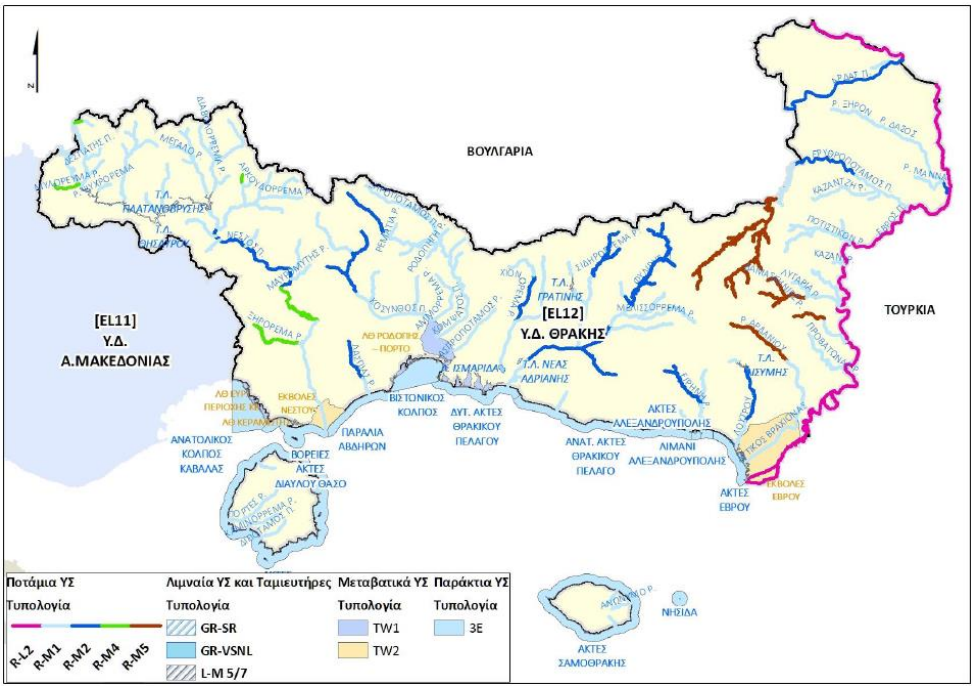



**Figure 48:** Typology of Surface Water Systems of Thrace (EL12), in the context of the 1st Revision

The study area is located within the sub -catchment of P. Arda . To date, human activity has altered the original characteristics of some water systems. These changes, regardless of the reasons for which they were made and the magnitude of the change they have brought about in water systems, make them special in a sense. Therefore, these systems are evaluated in a different way by Directive 2000/60/EC compared to the rest, and are called Specially Modified Water Systems (STP). Accordingly, in some cases, human-initiated projects are constructed that create water bodies in places where they previously did not exist. These systems are called Artificial Water Systems (AWS). P. Ardas is a surface water system -YS- which is divided into two ITIS with the following elements:

| Όνομα ΥΣ | Κωδικός ΥΣ | Κατηγορία | Μήκος (km) | Άμεση Λεκάνη Απορροής (km$^2$) | Αθροιστική Λεκάνη Απορροής (km$^2$) | Μέση Ετήσια Απορροή (hm$^3$) | Τύπος ΥΣ |
|---|---|---|---|---|---|---|---|
| ΑΡΔΑΣ Π. | EL1210R00131601175H | ΙΤΥΣ | 5,20 | 88,41 | 88,4 | 20,33 | R-M1 |
| ΑΡΔΑΣ Π. | EL1210R0B131600174H | ΙΤΥΣ | 37,37 | 273,93 | 5635,0 | 2370,00 | R-M2 |

**Table 42:** Classification of YS in the study area of the project

8.13.2.ii. Description of existing uses, statutory and actual, of surface water resources

The main use of water in the ND is irrigation, as in most areas of the Greek area. The demand for hydroelectric production is also significant. Secondary, in terms of quantities, demands are created in water supply and industry, while the participation of livestock and tourism in the total demand is small. There is even a demand for water to preserve the environment and ecosystems, especially in the estuary of Nestos and Evros, but also to maintain the quality characteristics (mainly salinity ) of the numerous transitional waters (lagoons) of the YD in desirable for the ecosystems that support levels. This demand has not been precisely defined, however there have been various approaches in this direction. The total average annual demand from anthropogenic uses amounts to 1,602 hm $^3$. The largest water demand in the water compartment comes from irrigated agriculture, as mentioned above, which amounts to 941.4 hm $^3$ (58.8%). In relation to consumptive uses, irrigation constitutes 91.7% of the total demand. Hydroelectric production in the Nestos basin uses 582 hm $^3$ (36.3%), and constitutes a non-consumptive use of water.
For other uses, the demand is 60.5 hm $^3$ for water supply (3.8%), of which 0.6 hm $^3$ for tourism (0.06%), 14.1 hm $^3$ for industry (0 .9%) and 3.9 hm $^3$ for animal husbandry (0.2%). The figure below graphically shows the distribution of demand in the DH between the various uses.

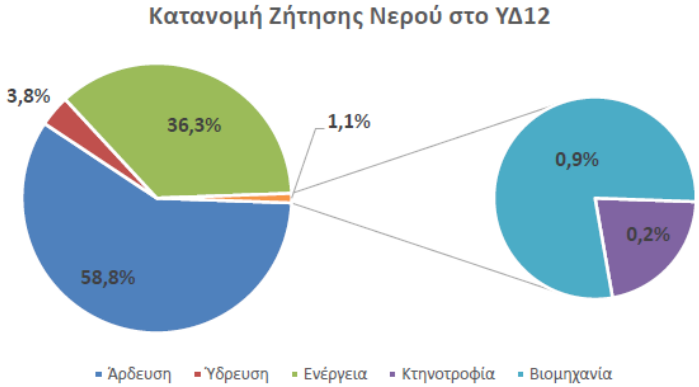



**Figure 49:** Percentage distribution of water demand in the various uses in YD 12

8.13.2.iii. Presentation of available quantitative and qualitative data on the main streams and waters affected by the project

In Evros LAP (EL1210), the total annual water withdrawals for all activities and uses were estimated at 315.47 million m3, based on the LAP's annual needs. In agriculture ( irrigated lands) which is also the main user of water, 92.23% (290.95 million m3 ), in animal husbandry 0.52% (1.65 million m $^3$ ) and in industry 0.32% (1.01 million m 3 ).

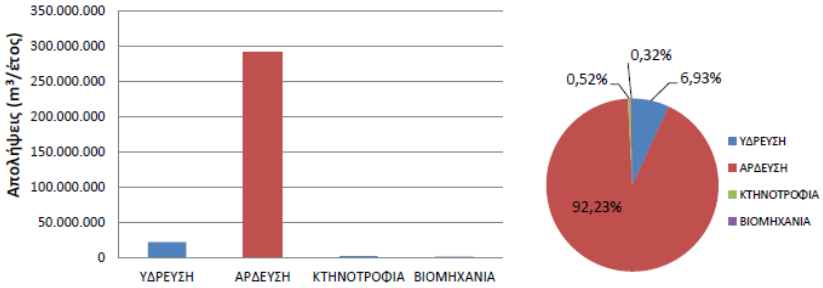



**Figure 50:** Quantities and distribution of annual water withdrawals in Evros LAP (EL1210)

The vast majority of these withdrawals relate to the irrigation of agricultural lands from collective irrigation networks. In the image below, the annual deductible quantities are indicated in EL 1210, where the YS of R. Ardas

| Α/Α | ΚΩΔΙΚΟΣ ΥΣ | ΥΔΑΤΙΚΟ ΣΥΣΤΗΜΑ | ΕΙΔΟΣ ΥΣ | ΕΤΗΣΙΑ ΑΠΟΛΗΨΙΜΗ ΠΟΣΟΤΗΤΑ (εκ.μ³/έτος) | ΣΚΟΠΟΣ ΑΠΟΛΗΨΗΣ |
|---|---|---|---|---|---|
| 1 | EL1210R0B131600174H | ΑΡΔΑΣ Π. | R | 108,49 | ΓΕΩΡΓΙΑ |
| 2 | EL1210R0T020000136N | ΕΒΡΟΣ Π. | R | 42,82 | ΓΕΩΡΓΙΑ |
| 3 | EL1210R0T020000138N | ΕΒΡΟΣ Π. | R | 33,49 | ΓΕΩΡΓΙΑ |

**Figure 51:** Annual water withdrawals from the surface YS of Evros LAP (EL1210)

The DH appears generally surplus covering the demand from both surface and groundwater. Deficits appear only during periods of intense drought, such as the drought event 1989-1993 which is included in the simulation period of the system that was carried out in the management study of the former Ministry of AN . The deficits that appear in this case do not exceed 10-15% of the demand at most. The assessment of the situation of ITIS in the project area and within the YD of Thrace are presented in the table below

| Α/Α | ΟΝΟΜΑ ΥΣ | ΚΑΤΗΓΟΡΙΑ | ΚΩΔΙΚΟΣ | ΟΙΚΟΛΟΓΙΚΗ ΚΑΤΑΣΤΑΣΗ | ΧΗΜΙΚΗ ΚΑΤΑΣΤΑΣΗ | ΑΡΙΘΜΟΣ ΣΤΑΘΜΩΝ |
|---|---|---|---|---|---|---|
| 1 | ΑΜΥΓΔΑΛΟΡΡΕΜΑ Ρ. | ΙΤΥΣ | EL1209R0002040199H | ΜΕΤΡΙΑ | ΑΓΝΩΣΤΗ | 1 |
| 2 | ΑΡΔΑΝΙΟΥ Ρ. | ΙΤΥΣ | EL1210R00020100126H | ΕΛΛΙΠΗΣ | < ΚΑΛΗΣ | 1 |
| 3 | ΑΡΔΑΣ Π. | ΙΤΥΣ | EL1210R0B131600174H | ΜΕΤΡΙΑ | < ΚΑΛΗΣ | 3 |
| 4 | ΑΣΠΡΟΠΟΤΑΜΟΣ Ρ. | ΙΤΥΣ | EL1208R0000010080H | ΕΛΛΙΠΗΣ | ΚΑΛΗ | 1 |
| 5 | ΔΕΣΠΑΤΗΣ Π. | ΙΤΥΣ | EL1207R0B02280041H | ΚΑΛΗ | < ΚΑΛΗΣ | 1 |
| 6 | ΚΟΣΥΝΘΟΣ Π. | ΙΤΥΣ | EL1208R0000030056H | ΜΕΤΡΙΑ | ΚΑΛΗ | 1 |
| 7 | ΛΑΣΠΙΑΣ Ρ. | ΙΤΥΣ | EL1207R0005010050H | ΕΛΛΙΠΗΣ | ΚΑΛΗ | 1 |
| 8 | ΛΑΣΠΙΑΣ Ρ. | ΙΤΥΣ | EL1207R0005010051H | ΕΛΛΙΠΗΣ | ΑΓΝΩΣΤΗ | 1 |
| 9 | ΛΟΥΤΡΟΥ Ρ. | ΙΤΥΣ | EL1210R00090100122H | ΜΕΤΡΙΑ | < ΚΑΛΗΣ | 1 |
| 10 | ΝΕΣΤΟΣ Π. | ΙΤΥΣ | EL1207R0002000002H | ΜΕΤΡΙΑ | ΚΑΛΗ | 1 |
| 11 | ΛΙΣΣΟΣ Π. | ΙΤΥΣ | EL1209R00020000102H | ΜΕΤΡΙΑ | ΑΓΝΩΣΤΗ | 1 |
| 12 | ΛΙΣΣΟΣ Π. | ΙΤΥΣ | EL1209R0002030095H | ΜΕΤΡΙΑ | < ΚΑΛΗΣ | 1 |

**Table 43:** ITYS-TYS rivers with a monitoring station in the DH of Thrace (EL12)

From the table above, it follows that the ecological status of the nearest YS of the study area (EL1210R0B131600174H) is Moderate while the chemical status is lower than Good.

8.13.2.iv. Available temporal changes and development trends of surface water quality and quantity

Differences in the status of the river YS between the 1st and the revised RBMP in the RD of Thrace (EL12) are presented in the table below

| ΚΩΔΙΚΟΣ ΥΔΑΤΙΚΟΥ ΣΥΣΤΗΜΑΤΟΣ | ΟΝΟΜΑΣΙΑ ΥΔΑΤΙΚΟΥ ΣΥΣΤΗΜΑΤΟΣ | ΟΙΚΟΛΟΓΙΚΗ ΚΑΤΑΣΤΑΣΗ/ΔΥΝΑΜΙΚΟ | | ΧΗΜΙΚΗ ΚΑΤΑΣΤΑΣΗ | | ΠΑΡΑΤΗΡΗΣΕΙΣ |
|---|---|---|---|---|---|---|
| | | 1ο ΣΔΛΑΠ | 1η ΑΝΑΘΕΩΡΗΣΗ ΣΔΛΑΠ | 1ο ΣΔΛΑΠ | 1η ΑΝΑΘΕΩΡΗΣΗ ΣΔΛΑΠ | |
| EL1210R00 131601175H | ΑΡΔΑΣ Π. | ΜΕΤΡΙΟ | ΑΓΝΩΣΤΟ | ΑΓΝΩΣΤΗ | ΚΑΛΗ | Στο 1ο ΣΔΛΑΠ λόγω μη δυνατότητας προσδιορισμού του οικολογικού δυναμικού, τα ΙΤΥΣ-ΤΥΣ είχαν αντιμετωπισθεί ως φυσικά ΥΣ. Στο 2ο ΣΔΛΑΠ η ταξινόμηση βασίσθηκε στα διαθέσιμα δεδομένα του ΕΔΠ (σε όσα ΙΤΥΣ-ΤΥΣ διαθέτουν σταθμό). Στα ΙΤΥΣ-ΤΥΣ χωρίς δεδομένα παρακολούθησης η κατάσταση είναι άγνωστη. Νέα μεθοδολογική προσέγγιση ομαδοποίησης των συστημάτων (χημική κατάσταση). |
| EL1210R0B131600174H | ΑΡΔΑΣ Π. | ΜΕΤΡΙΟ | ΜΕΤΡΙΟ | ΑΓΝΩΣΤΗ | < ΚΑΛΗΣ | Αποτελέσματα Δικτύου Παρακολούθησης (μακροασπόνδυλα, ψάρια, Φ/Χ-ΕΡ, Υ/Μ). Η "κατώτερη της καλής" χημική κατάσταση στο 2ο ΣΔ οφείλεται σε υπερβάσεις Hg (2014). |

**Table 44:** Evolution of the state of rivers YS in the project area within the Evros LAP

According to the 1st Revision of the River Basin Management Plan of the YD Thrace (EL12), the main issues to be managed in the surface waters of the YD Thrace (EL12) are briefly the following:

- ✓ **High water intakes** . In the YD of Thrace the main use of water is irrigation with a significant difference from the second largest use which is energy production. Irrigation exerts a significant pressure on the surface YS with more burdened in the case of Nestos p., where the satisfaction of the irrigation needs indirectly also affects the hydroelectric production during the summer season. In order to remove the problems of binding hydroelectric projects to irrigation roles for which they were not designed, it is proposed to develop the Temenus hydropower plant with a reforming and balancing role and with the aim of maintaining the uninterrupted environmental supply in the Delta. At the same time, measures to reduce irrigation withdrawals through loss control, improvement of collective networks and education of the rural population are continuing.
- ✓ **The degradation of the status of several surface water systems** . It originates from: a) point sources related mainly to caged livestock, industry, urban liquid waste from settlements served by sewerage networks and central sewage treatment facilities and old mining operations b) diffuse pollution sources related to discharges of pollutant loads, mainly nutrients, from agricultural activity, animal husbandry and urban liquid waste from settlements that are not served by sewerage networks and central sewage treatment facilities. For example, Vistonida shows increased concentrations of phosphorus, which make it particularly sensitive to eutrophication. This problem is also confirmed by the very low dissolved oxygen concentrations that have been recorded and are of the order of 1.5 mg /L (saturation rate of 10%). At the same time, although the concentrations of nutrients ($NO_3$, $NH_4$ and Total P) seem not to exceed the relative limits of maximum allowed concentrations for water supply water (category A1, after treatment), the increased content of chlorides in the lake water should be pointed out . It is pointed out that the particularly high level of electrical conductivity, chloride ions and sodium absorption index (SAR) is mainly attributed to seawater intrusion.
- ✓ **The hydromorphological alterations of surface water systems.** In the area of the YD of Thrace, these pressures appear over time in the transitional YD of the YD, which has some of the most important wetlands of the country and mainly comes from agricultural and fishing activity. Hydromorphological changes also take place in parts of the water systems that cross lowland, rural areas and have originated in the context of land settlement due to agricultural reclamation and the construction of land improvement and irrigation projects (old and more recent).
- ✓ **Protection of important wetland ecosystems** . Even though Directive 2000/60/EC does not set specific environmental objectives for wetlands, it is evident that their close relationship with water bodies indirectly includes them in the protection objectives of Directive 2000/60/EC. Particular emphasis is placed on the protection of wetland ecosystems through the program of measures, especially when they are spatially or functionally part of a protected area that has been included in the relevant Register of the Directive.
- ✓ **Pressures on transboundary water systems** . The rivers Ardas and Evros mainly and secondarily the Erythropotamos are exposed to transboundary pressures of pollution originating from either diffuse or point sources and to hydrological alteration. In particular, diffuse sources relate to the input of nutrients, agricultural residues, sewage and waste. Point sources of pollution are mainly related to urban liquid waste from settlements and industrial activity. The hydrological alteration concerns Arda p. and is due to the production of hydroelectric power in Bulgaria.

### *8.13.3. Underground water*

8.13.3.i. Description of the hydrogeological characteristics of the study area

In the Water Department of Thrace, three main systems of underground aquifers can be distinguished, which are the granular aquifer, the karstic and the impermeable formations. In the study area of the project there are impermeable and granular aquifers.


**Figure 52:** Hydrolithological System of Thrace

Pumping: It is estimated that significant pressures are exerted on the YSS in question as a drop in water level is recorded in the wells that have been recorded.
Point sources of pollution: The point sources of pollution encountered in the area are related to agricultural activity.
Diffuse sources of pollution: Agricultural activity is considered a diffuse source of pollution.

8.13.3.ii. Presentation of available quantitative and qualitative data to the main underground aquifers , as well as to those affected by the project

The tables below show the distribution of groundwater use by activity, as well as their quantitative and qualitative status.

| Κωδικός ΥΥΣ | Ονομασία ΥΥΣ | Μέση ετήσια τροφοδοσία ($10^6 m^3$) | Μέσες ετήσιες απολήψεις ($10^6 m^3$) | Ύδρευση ($10^6 m^3$) | Άρδευση ($10^6 m^3$) | Κτηνοτροφία ($10^6 m^3$) | Βιομηχανία ($10^6 m^3$) | Ποσοτική Κατάσταση |
|---|---|---|---|---|---|---|---|---|
| **EL12BT010** | Σύστημα Ορεστιάδας | ~61,8 | 6,65 | ~5 | ~0,94 | ~0,09 | ~0,62 | Καλή |

**Table 45:** Withdrawals and quantitative status of the project area's WSS

| Α/Α | Κωδικός ΥΥΣ | Ονομασία ΥΥΣ | Ποσοτική κατάσταση | Τάση πτώσης στάθμης | Χημική κατάσταση | Ποιοτικά προβλήματα | Τάση ρύπων |
|---|---|---|---|---|---|---|---|
| 1 | EL12BT010 | Ορεστιάδας | Καλή | Όχι | Καλή | Τοπική επιβάρυνση για $NO_3$ λόγω ανθρωπογενών πιέσεων. Επιβαρύνσεις σε Al, As, Pb και $SO_4$ λόγω φυσικού υποβάθρου. | Τοπική για $NO_3$ |

**Table 46:** Quantitative and qualitative status of the project area's HMS

8.13.3.i ii . Available temporal changes and development trends of the quality and quantity of groundwater

| ΚΩΔΙΚΟΣ ΥΠΟΓΕΙΟΥ ΥΔΑΤΙΚΟΥ ΣΥΣΤΗΜΑΤΟΣ | ΟΝΟΜΑΣΙΑ ΥΠΟΓΕΙΟΥ ΥΔΑΤΙΚΟΥ ΣΥΣΤΗΜΑΤΟΣ | ΣΧΕΔΙΟ ΔΙΑΧΕΙΡΙΣΗΣ | | 1Η ΑΝΑΘΕΩΡΗΣΗ ΣΧΕΔΙΟΥ ΔΙΑΧΕΙΡΙΣΗΣ | |
|---|---|---|---|---|---|
| | | ΠΟΣΟΤΙΚΗ ΚΑΤΑΣΤΑΣΗ | ΠΟΙΟΤΙΚΗ ΚΑΤΑΣΤΑΣΗ | ΠΟΣΟΤΙΚΗ ΚΑΤΑΣΤΑΣΗ | ΠΟΙΟΤΙΚΗ ΚΑΤΑΣΤΑΣΗ |
| EL12BT010 | Ορεστιάδας | ΚΑΛΗ | ΚΑΛΗ | ΚΑΛΗ | ΚΑΛΗ |

**Table 47:** Change in the quantitative and qualitative situation of the project area HSS

According to the 1st Revision of the River Basin Management Plan of the Thrace Directorate (EL12), the main groundwater issues to be managed in the Thrace Directorate (EL12) are briefly the following:

- ✓ **The significant pumping of groundwater.** The greatest pressures from groundwater pumping, for all uses, are concentrated in the underground water systems (GWS) of Orestiada (45 – 50 $hm^3$/year), Xanthi - Komotini (70 $hm^3$/year) and Nestos Delta (20 $hm^3$/year).
- ✓ **The drop in the level of underground aquifers** . In the eastern part of the Xanthi - Komotini watershed, an annual decrease in the piezometric level is observed, due to overpumping . In the area of the YYS Delta Nestos, an annual decrease in the piezometric level is observed, which is due both to the limitation of the natural replenishment of the underground aquifer and to the overexploitation of the underground water potential. Especially in its eastern part, it is not possible to dig deep wells to satisfy the increased irrigation needs, on the one hand due to quality degradation due to the inundation and on the other hand due to the limited supply.
- ✓ **The surging of groundwater.** Swelling conditions are recorded in the Evros Delta, Alexandroupoli, Xanthi – Komotini and Nestos Delta aquifer systems. In the granular system of the Evros Delta, salinization is mainly due to natural processes, while in the systems of Xanthi - Komotini and Nestos Delta, it is due to intense pressures due to overpumping . In the YYS Delta Nestos the waters of the aquifer well have undergone salinization , which is located up to 6 km from the coast, are characterized by moderate to high salinity and are progressively becoming unsuitable for irrigation use. In the YSS Parevria area - Evros Delta, the phenomenon of surging is located at a distance from the coast greater than 5 km . The upwelling remains strong in the deeper layers which makes it unsuitable for any use in the greater part of the underground aquifer. The waters are characterized as strong sodium chloride with a high to very high risk of salinity and a moderate to high risk of alkalinity .
- ✓ **The pollutant burden of the WWTPs** . In the eastern part of the Xanthi - Komotini watershed, the phenomenon of salinity is strongly observed, while pollution of the underground aquifer due to intense anthropogenic activity is also found in other

places in the inner part of the system. Water characterized by high to very high salinity and a clear tendency to alkalinity should no longer be used even to cover irrigation needs. The Orestiadas watershed shows increased concentrations of EC, Cl and $NO^3$ due to agricultural activities. In several parts of the aquifer, the groundwater presents a high risk of salinity , regarding the prospect of its use in irrigation.

- ✓ **The natural burden on groundwater quality.** In the alluvial nature - Tertiary sediments, there are increased concentrations of Fe , Mn and sulfates which are attributed to the mineralogical composition of the geological formations. High sodium concentrations in groundwater have been attributed to the presence of volcanic rocks. Similar problems have been identified in the areas of Orestiada, Parevria region - Evros Delta, Makris and Nestos Delta.

**Due to the nature of the project, no negative effects are expected either on the surface YS or on the YYS, both in relation to their qualitative and quantitative characteristics.**

## 8.14 Risks to human health, cultural heritage and/or the environment, mainly due to accidents or disasters

This section presents the risks to human health, cultural heritage and/or the environment due to accidents and disasters, in accordance with the requirements of Directive 2014/52/EU, which was incorporated into Greek law with the following YAs:

- KYA oik.5688/2018 "Amendment of the annexes of Law 4014/2011 (Government Gazette 209/A) in accordance with Article 36 A of this law, in compliance with Directive 2014/52/EU "on the amendment of Directive 2011/ 92/EU on the assessment of the effects of certain public and private projects on the environment" of the European Parliament and the Council of April 16, 2014 (Official Gazette 988/B/2018) and
- KYA 1915/2018 "Amendment of joint ministerial decision no . 48963/2012 (B' 2703) and ministerial decision no. 170225/2014 (BI35), which have been issued under the authority of Law 4014/2011 (Government Gazette 209/A ) in compliance with Directive 2014/52/EU "amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment" of the European Parliament and the Council of April 16, 2014 (Official Gazette 304 /B/2018).

According with the UNISDR Terminology on Disaster Risk Reduction, United Nations 2009, are defined the following :

- Disaster : A serious disruption of the functioning of a community or society, with widespread human, material, economic or environmental losses and effects, which exceed the ability of the affected community or society to cope with its own means.
- Exposure : People , property, systems, or other elements that are within the danger zones and therefore subject to possible losses.
- Vulnerability : The characteristics and conditions of a community, system or asset that make them susceptible to the harmful effects of risk. According to Varnes 1984, vulnerability is the degree of loss of a given element, or group of elements at risk (see below), as a result of the occurrence of a natural phenomenon of a certain magnitude. It is expressed on a scale from zero (0) – no damage, to one (1) – total loss.

- Hazard : A ( dangerous ) phenomenon, substance, human activity or situation that can cause loss of life, injury or other health effects, property damage, loss of goods and services, social and economic disruption, or environmental damage.
  - Natural Hazard ( Natural Hazard ): A natural phenomenon or process that can cause loss of life, injury or other health effects, property damage, loss of goods and services, social and economic disruption, or environmental damage. According to Varnes1984, natural hazard is the probability of occurrence, within a specific period of time and in a given area, of a potential harmful phenomenon.
  - Geological Risk ( Geological Hazard ) A geological process or phenomenon that may cause loss of life, injury or other health effects, property damage, loss of goods and services, social and economic disruption, or environmental damage.
- Risk : The combination of the probability of an event occurring and its negative consequences.

In light of the above, disasters and/or accidents due to either natural or technological/man-made causes may occur or occur in an area.

Natural disasters mainly mean the following:
- Strong storms/winds
- Extreme temperatures
- Fires
- Water scarcity - Drought
- Floods
- Avalanches
- Landslides - Earthquakes - Volcanoes - Tsunamis

The effects of natural disasters are mainly found in economic losses, human casualties and ecosystem degradation.
Accordingly, technological accidents mean industrial accidents (e.g. explosion, oil spill), with possible significant effects on the loss of human life and the pollution of ecosystems. The occurrence of a disaster or an accident may also have negative consequences on points of archaeological interest, if they are located within the respective zone of influence. It is estimated that the vulnerability of these elements to physical or technological risk is not assessable. With reference to the study area, as already mentioned in paragraph 8.6.3, there are no declared archaeological sites or monuments.
As regards the risk of storms / floods and winds, as happens with any other meteorological phenomenon, it depends on the particular local conditions of the area and is related to factors such as the transport of gas masses, humidity, temperature changes, etc. Floods and storms are the most important natural hazards in Europe in terms of economic losses. Factors that contribute to the intensity of their effects on the affected area are related to the intensity, duration, surface conditions, morphology and slope of the watershed. In particular, as far as the study area is concerned, according to the records of the nearest weather station (see par. 8.2), the wind conditions of the area are such that the construction and operation of wind power plants is sustainable, while in case of high wind speeds (greater from 20-25 m/s) the W/T brake and stop turning to avoid an accident. The area does not belong to the Potentially High Flood Risk Zones, according to the River Basins Flood Risk Management Plan of Water Division 12 Thrace. And the land relief of the area of the planned projects has sufficient slopes and orientation to favor the smooth drainage of surface water towards the rivers. Consequently, the area's vulnerability to storms/floods and winds remains at low levels.

The presence of extreme (low or high) temperatures is a real risk mainly to human life, however, in Greece the mortality rates due to this risk are small and not evaluated. In fact, in areas where there is no strong urban element and dense construction, as in the study area, the vulnerability to extreme temperatures is extremely limited.
Fires, especially forest fires, are one of the main risks to natural ecosystems, property and human lives in Greece. The main causes include agricultural activities such as burning dry grasses, discarding lit cigarettes, dumping waste in forests and woodlands and burning them as a management method, malicious acts (arson), accidents (traffic, industrial, machinery breakdowns , etc). The wider study area has rich flora and its potential vulnerability to fire is significant. Nevertheless, there is no frequent movement of vehicles and people in the project area, which limits the risk.
Droughts are classified as extreme climatic phenomena of a place, they are presented by the reduction of precipitation to levels significantly below the average of the area or below a critical value that determines the onset of drought. As a consequence, water scarcity occurs, i.e. the lack or deficiency of water. Water scarcity is also occurring due to the irrational use of water resources and the sharp increase in water demand. No particular problems of the phenomenon are identified in the study area.
There is a small risk of avalanches and landslides in the study area, due to the high altitude, but their extent is not expected to bring about general evaluable effects on the anthropogenic and natural environment. Additionally, movement of land masses and landslides can be triggered during an earthquake event.
Regarding the risks that may arise from the occurrence of earthquakes, volcanic eruptions or tsunamis , it is noted that the study area belongs, according to the current Seismic Hazard Map, to zone I, in which the earthquakes that usually occur are small. A strong seismic stimulation can cause effects both on the technical infrastructure of an area and on human lives. In addition, the levels of risk from the occurrence of volcanic eruptions or tsunamis in the Greek area do exist, but are extremely small and cannot be evaluated in the context of this.
In addition to the above, risk may arise in an area from accidents due to human activity (technological risks). These are accidents that can cause material damage, degradation of the natural environment and loss of human life. A Major Technological Accident (MTA) is defined as an event, such as a major leak, fire or explosion resulting from uncontrolled developments during the operation of a facility as defined in the European directive SEVESOIII (Government Gazette 172058/2016, Official Gazette 354/B/17 - 02 - 2016), which causes serious risks, immediate or remote, to human health or the environment, inside or outside the facility and is associated with one or more hazardous substances. Accidents of this type may cause a significant risk, direct or indirect, to human health and safety (death and/or injury to workers and people inside or outside the facility), to the natural environment (burns, fires, pollution of the atmosphere, soil, sea and underground waters) and cultural heritage. (Greece, like other European countries) has included in the current legislation relevant instructions for the prevention and avoidance of large-scale accidents as well as countermeasures in case they occur. This is KYA 172058/2016 (Government Gazette 354/B/17 - 02 - 2016), which harmonizes Directive 2012/18/EU, known as SevesoIII and concerns the definition of rules, measures and conditions for dealing with risks from major accidents area in facilities or units, due to the presence of dangerous substances, in compliance with the provisions of Directive 2012/18/EU "to address the risks of major accidents related to dangerous substances and to amend and subsequently repeal Directive 96/82 /EC of the Council" of the European Parliament and the Council of July 4, 2012 and is a replacement of No. 12044/613/2007 (B΄376), ( SevesoII ). In the above-mentioned KYA, which are the new, existing and other facilities

are defined and the provisions and deadlines for the submission of the required documents for each of them are described.
The analysis of risks from major industrial accidents, either in the context of the European Directive 2012/18/EU - SEVESOIII, or as a separate study, is a powerful tool for identifying risks, determining their probability of occurrence and implementing measures to prevent and limit consequences.
The studied activity does not fall within the scope of the aforementioned legislative framework, as it does not concern an industrial facility for the storage or processing of dangerous substances and therefore the risk of causing a large-scale accident does not exist. Accordingly, the vulnerability of the study area from corresponding accidents does not exist as the area as a mountain mass does not border an industrial zone, facilities or units that fall within the scope of causing major accidents.

✓ Expertise in vulnerability assessment in matters relating to wind power plants

The vulnerability of wind turbines and their accompanying projects (e.g. Power Transmission Networks, Voltage Elevation Substations, Road Construction Projects, etc.), is very small due to their particular characteristics. Serious accidents or disasters can rarely be caused by the operation of a wind power plant. However, at this point we will also consider these possibilities and propose measures to deal with possible risks.
They are exploited data from various sources such as The Guide "Occupational safety and health in the wind energy sector – European Risk Observatory Report" (European Agency for Safety and Health at Work), websites ( Caithness Wind Power plant Information Forum) and fundamentals data www.renewablesafety.org ).

*Possible risks and accidents related to Wind Power plants are the following:*

✓ Accidents while transporting the equipment

The individual parts of the wind turbines, as well as the E/M equipment, are bulky and heavy. For this reason, they are transported with special vehicles. Transport often takes place in adverse conditions, such as steep slopes and bends. Due to these conditions, an accident could occur from equipment falling or an accident to the vehicle, driver and working personnel.

Preventive measures:

The transport of the W/T and the equipment will be carried out by specialized crews and experienced transporters and with the use of special vehicles. All the prescribed safety rules will be observed and the movement of vehicles will be done at a very low speed and accompanied by warning vehicles. The route to be followed will be studied by the transporters, who will be fully prepared. The chance of an accident will be practically nil.

✓ Accidents during the installation of W/T

The installation - lifting and assembling - of the parts of an W/T involves accident risks. Falling of heavy parts and accident to working personnel could occur. The risk is higher when the weather conditions are difficult and mainly there are strong winds.

Preventive measures:

Equipment installation work will be assigned to specialized workshops with the appropriate equipment. Usually the installation is done by the W/T manufacturing company itself. The work is carried out when the weather conditions allow it and with all the necessary protective means.

✓ Extreme weather conditions

Winds of strong intensity hurricanes, tornadoes, cyclones, icing on the blades of W/T, may cause accidents in the wind power plants, the working personnel and the environment of the wind power plants.

Preventive measures

In case of extreme weather, work will be interrupted. The condition of the W/T is constantly checked by remote monitoring and there is the possibility of intervention. The workshops that will be employed in construction, operation and maintenance have expertise and experience. There will also be appropriate warning signage for the public.

✓ Fires

Fires can affect the installations of a wind power plant, since they are mainly installed in forested areas. There is also the possibility of a fire being caused by the electromechanical components of the wind power plant itself, or even by lightning.

Preventive measures:

The wind power plant will have fire protection measures, as provided by the current legislation. At the same time, through remote monitoring , it will be possible to detect a potential problem in time, so that the fire service can be informed and act quickly. The road construction of the wind power plant contributes to the ease of access to deal with possible fires. Fires caused by the E/M components of the wind power plant itself are extremely unlikely, as there will be a program of maintenance and fault detection. It should also be noted that the electrical cables will be installed underground, so they will not be a fire hazard.

✓ Corrosion of equipment

Corrosion in the equipment of a wind power plant could occur and cause an accident.

Preventive measures:

The components are properly designed and made of materials certified to withstand. At the same time, a check will be made during regular maintenance and problems will be repaired if they occur. Corrosion of equipment is not a common occurrence in wind power plants.

Summarizing the above, it is concluded that **the project under study, as well as the wider study area, will not expose human health, cultural heritage and/or the environment to risks due to accidents or disasters** . In order to reduce the possible small-scale accidents that may occur during the construction and operation phase of the project under study, appropriate measures are proposed in the context of the present, as will be presented in subsequent chapters.

## 8.15 Development trends of the environment (without the project)

The evolution of the local environment is slow. The zero solution, i.e. the non-implementation of the proposed project and the continuation of using conventional fuels for the production of electricity, will result in the contamination of the atmosphere with significant amounts of gaseous pollutants ($CO_2$ , $SO_2$ , CO, $NO_x$ , HC, Particles) as shown in the table below.

| | | CO2 | SO2 | CO | NOx | HC | σωματίδια |
|---|---|---|---|---|---|---|---|
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / ΕΤΟΣ | Τόνοι/έτος | 285.600,00 | 5.208,00 | 60,48 | 403,20 | 16,80 | 268,80 |
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / 20 ΕΤΗ | Τόνοι | 5.712.000,00 | 104.160,00 | 1.209,60 | 8.064,00 | 336,00 | 5.376,00 |

**Table 48**: Emission of pollutants avoided by the operation of the wind power plant.

As can be seen from the data in the table, the zero solution will result in the contamination of the environment with over 285,000 tons of carbon dioxide / year as well as the contamination with about 6,000 tons of other dangerous pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide carbon and particles.

The above calculations were made based on the average values of emitted pollutants for the production of a final kWh of electricity in the Greek interconnected system of a conventional power plant.

The need to protect the environment, as well as the management of environmental natural resources, is becoming more and more perceived, to the extent that the environment is constantly receiving the consequences (positive and negative) of the modern development model, which, of course, in turn affects the human-environment relations .

Knowledge of the state of the environment and its development trends is a necessary condition in the effort to protect and rationally manage it. An assessment of the development trends of the various parameters of the environment is then attempted in comparison to the null solution, i.e. the possible development of the environment without the intervention under consideration (wind power plant).

Regarding the evolution of the climatic characteristics of the project area, these are not expected to be affected and changed, as the project does not include interventions that could affect such characteristics.

As for the morphological characteristics of the area, these depend on the hydrogeological and climatic conditions, as well as on the geotechnical characteristics of the rocks. In the study area, the rocks that structure it are generally assessed as stable and as the area is characterized by moderate vegetation , their erosion is generally prevented. However, the developed hydrographic network and the prevailing climatic conditions contribute to soil erosion and the area tends to be characterized as an area with medium erosion potential. According to the above, no significant changes in the morphological characteristics of the soil of the study area due to natural causes are expected, nor are activities planned in the area that would cause changes in this morphology.

With regard to the atmospheric environment , the existing activities in the wider area (thermoelectric plants) contribute to the unfavorable evolution of the quality of the atmosphere, which is constantly being degraded by the emission of pollutants and particles. The proposed project will help to reduce this burden.

The water environment of the wider study area concerns the streams and springs of the area and no change in their quality is expected from the implementation of the proposed project.

As far as the living environment is concerned , no substantial change is expected, as the factors that regulate the ecological balance of the area are not expected to change.

As far as the evolution of the built environment is concerned, the potential state of this depends on the elements concerning the evolution of the social and economic environment and the building. In the study area, a shrinking trend of small settlements is observed, which the municipalities are trying to reverse. In general, no significant changes are expected in the residential environment.

In conclusion, **the operation of the Wind Park will positively affect the development of the environment in the area by reducing the existing environmental impacts** . With reference to the zero solution, no significant advantage is expected to arise from the non-implementation of the Wind Park since, as already mentioned, its implementation is not expected to negatively affect the anthropogenic activities in the wider area, nor the natural development of the area.

# 9. ASSESSMENT AND EVALUATION OF ENVIRONMENTAL IMPACTS

## 9.1 Methodological requirements

The methodological requirements for the assessment of the environmental impacts of the proposed project include:

- ✓ their type and likelihood of occurrence,
- ✓ their extent with reference to the geographical area and the size of the affected population,
- ✓ their intensity with reference to the magnitude of the change,
- ✓ the complexity of the effects they bring about (taking into account the mechanism of occurrence, any components and dependencies with external factors)
- ✓ the times that characterize them
- ✓ the possibilities of preventing, avoiding, reversing or minimizing them
- ✓ the synergies that may be created with other projects and activities,
- ✓ their cross-border character.

By its nature, the project is not going to cause either significant or irreversible impacts on its immediate or wider environment. It is not located within protected or environmentally important areas and is not expected to cause negative effects on flora and fauna/ birds . From an environmental point of view, the local community or project area is not adversely affected.

The positive effects from the implementation of the project are considered important, as it will contribute:

- in delignitization , weaning off fossil fuels and reducing emissions to the environment, in a sustainable and fair way,
- in achieving the objectives of the National Energy and Climate Plan (NECP) for 2030,
- in reducing dependence on conventional energy resources,
- in reducing dependence on the fluctuations of the international economy and in particular the prices of conventional fuels,
- in limiting the outflow of foreign exchange from the national economy, in order to secure the required fuel,
- in energy independence and security of energy supply at national level,
- in reducing emissions of carbon dioxide and other greenhouse gases. The construction of a PV station is a social contribution of the producer as it contributes to sustainable development, quality of life and environmental protection in urban centers and in the periphery,
- in the decentralization of the energy system enabling energy needs to be met at local and regional level, thus relieving infrastructure systems and reducing energy transmission losses. At the same time, it will contribute to the creation of important electricity transmission infrastructures in the region and their strengthening-modernization,
- in reducing power outages due to grid overload,

- in the possibility of utilizing energy resources. The inexhaustible source of energy (solar energy) is used to produce electricity, thus contributing to the saving of conventional energy resources,
- in maintaining local employment.

The following paragraphs list the expected effects (positive or negative) on the natural and man-made environment. Negatives are marked in red, positives in green and neutrals in black.

Based on the current legislation on the ratification and amendment of the Espoo Convention on transboundary impacts (Government Gazette 249/A/15.12.1997, as amended by GOVERNMENT 168/A/17.09.2018), it is checked whether the project may cause possible **significant adverse cross-border effects** . According to the relevant Communication of the Commission (par. 3.1), it is in principle important to determine the type and importance of any impact of a wind project on biodiversity. It is emphasized there that in order to assess the importance of an impact, the principle of proportionality must apply, be compatible with the precautionary principle and take into account :

- ✓ the nature, size and complexity of the plan or project.
- ✓ the expected effects and
- ✓ the vulnerability and irreplaceability of affected EU protected habitats and species.

Criteria usually considered when assessing the significance of the impact include the following:

• Immediate loss of habitat

Habitat degradation

• Habitat fragmentation

• Species disruption

• Indirect effects

For the correct and in good faith implementation of the provisions of the Espoo Convention, it is crucial to define the "significance" of a possible environmental impact (Article 2 par. 1-2 and par. 5). The Espoo Convention stipulates that Parties must take all necessary measures for its implementation, including the adoption of an EIA process with public participation for proposed Annex I projects (art.2(2)). In any case, environmental licensing based on current legislation covers Annex II of the contract regarding the contents of the EIA (Environmental Impact Assessment), while from the definition of cross-border impacts the cross-border nature of each impact is also assessed, according to (art. .1(h)):

"Transboundary Impacts : means any impact, not exclusively global in nature, that could be caused in an area within the jurisdiction of a Party by a Proposed Activity whose physical origin is wholly or partly in an area under the jurisdiction of another Contracting Party" .

## 9.2 Impacts related to climatic and bioclimatic characteristics

The proposed project both during its construction phase and during its operation phase:

- Will not change the climatic and bioclimatic characteristics of the area.

- No emissions of mass and energy in the form of hot or cold gases or changes in heat capacity are expected. Therefore, there will be no changes in the temperature and humidity of the air, with the result that there will be no case of alteration and negative impact on the microclimate
- Will limit the greenhouse effect by reducing the greenhouse gases that cause this effect by avoiding the burning of fossil fuels for electricity generation
- Will contribute to tackling climate change

A number of studies[16] have shown that wind energy installations can affect the microclimate up to 200 meters from the operating W/T. Specifically, they can lead to higher air temperature and absolute humidity at night, as well as increases in air, surface, and soil temperature variability throughout the diurnal cycle[17]. However, these effects are relatively limited (eg less than 0.2 °C) and are not expected to create potentially significant effects on the integrity of the area.

**Cumulative nature:** Due to the lack of other disturbing activities in the project development area, as well as the mild to zero contribution of the Wind Power plants to the change of climatic and bioclimatic characteristics, synergistic cumulative effects of these characteristics with the effects of the project are not expected.

**Cross-border character:** Both during the construction phase and during the operation phase of the project, there are not expected to be impacts on climatic and bioclimatic characteristics, such as: temperature, humidity, rainfall/hailfall/snowfall, neither in the wider area of the project, nor cross-border. Greenhouse gas emissions ( GHG ) that would correspond to power generation from conventional fuels will be replaced by zero emissions from the operation of the project.

In summary, impacts related to climatic and bioclimatic features during the **construction phase** have zero probability of occurrence (PE:0), no extent ( EkE:0 ) and zero intensity (EnE:0), complexity (PoE:0), duration (XE:0), of synergistic action (SD:0) and without cross-border character (DX:0).

During the **operational phase,** it will have a positive impact on dealing with climate change with a high probability of occurrence (PE:H), national extent (EkE:N) and moderate intensity (Ene:M), indirect complexity (PoE:In ), permanent duration (XE:P), irreversible (AE:Ir), without synergistic action (SD:0) and without cross-border character (DX:0). The above conclusions are listed in the next table

| IMPACTS RELATED TO CLIMATE AND BIOCLIMATIC CHARACTERISTICS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Impacts related to climatic and bioclimatic characteristics** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | None | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Impacts related to climatic and bioclimatic characteristics** | High | National | Moderate | Indirect |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | No | No |

[16] *Guidance document on wind energy developments and EU nature legislation , Commission notice C(2020) 7730 final , 18.11.2020*

[17] *Armstrong, A., Burton, RR, Lee, SE, Mobbs, S., Ostle , N., Smith, V., Waldron, S. & Whitaker, J., (2016). Ground-level climate at a peatland wind farm in Scotland is affected by wind turbine operation. Environmental Research Letters . [ e - journal ] 11 044024*

## 9.3 Effects on morphological and topological features

The specific project:

- ✓ It will not alter the morphological and topological characteristics of the area
- ✓ It will not cause changes in the topography, nor in the relief features of the ground surface.

During the design of this project, the wider landscape is considered to assess its sensitivity. Visual nuisance is something subjective and it is difficult to set commonly accepted rules. The density of Wind Turbines and the subjective nuisance caused by them are calculated based on the new zoning framework for R.E.S. Official Gazette 2464, 3/12/2008 article 7. The provisions of Official Gazette 2464 apply to the inclusion of W/T in the landscape.

During the construction phase of the project the visual nuisance in the area will be due to the establishment of the construction site to achieve the necessary works for the construction of the project. This disturbance will be temporary and will not permanently reverse the visual image of the landscape. After the completion of the works, the site area will be fully restored and the visual disturbance will only be due to the installed W/Ts.

In order to minimize the impacts and for the A/P to operate successfully , the topography of the area and the relief of the ground will be exploited during the construction phase. Regarding the morphological and topographical characteristics of the study area, these are expected to change on a very small scale and temporarily during the construction of the wind power plant and mainly by the works for the placement of the wind turbines. The opening of the channels for the placement of the MV cables. it will be done at a shallow depth and parallel to the internal road network. A change in the morphology of the area will also be temporarily caused by the deposition of the excavations (from the excavations of the foundations and channels), which will however be of limited duration, as the volume of the excavations will be used for the necessary embankments .

The above-mentioned temporary interventions will be made in the surface part of the soil, will be small-scale and no change in the physiognomy of the area is expected. The completion of the construction of the wind power plant will cause a change in the landscape of the area mainly due to the extent of the project in height and only from places close to the wind power plant (distance less than 2 km). With this change, however, the view of valuable elements of the landscape or monuments will not be obstructed and environmental factors will not be degraded, which ensure the dynamic development of the aesthetics of the landscape. Also taking into account the fact that all W/Ts are of the same size and type and the distance between W/Ts will be greater than two and a half rotor diameters (i.e. greater than 405m), this will result in the construction of a wind turbine park that will not be a visual nuisance, but will add to the existing environment an interesting visual intervention with modern modern elements. At this point, a comparison can also be made with the windmills that are scattered in Greece and present an interesting visual effect, with architectural elements of the era during which they were built.

In conclusion, the proposed projects will cause only minor temporary disruptions and displacements of the surface layer of the soil, which are not considered significant. No changes are also expected in the relief and topography of the area due to the small extent and intensity of the works. There will be a provision for the cleaning of the site after the completion of the project from the excavation materials and their use.

**Cumulative character:** Due to the non-direct proximity of a sufficient concentration of activities in the project development area, synergistic effects of a cumulative character of morphological/ topological features with the effects of the project are not expected.

**Transboundary nature:** The effects on the topography and the morphology of the ground from the construction and operation of the project from soil excavations for any improvement/opening of new forest roads, for the foundation of W/T, the pits for the laying of power cables and weak currents for the electrical connection of the wind turbines, the underground connection network of the ASPIE with the Network / System are limited to the project area and the Greek area. Additionally, constructions of this type do not cause particular changes in morphological characteristics.

Regarding the topological features and their alteration, an important factor for any visual burden is the size of the W/T image, any shading or reflections. At distances of more than 2 km from a residential area and with visibility to the wind power plant, no shading is created, and there is no significant visual burden. At the same time, due to the painting of the W/T parts, no reflections are created. The existing distances from the location of the project with settlements across the border, for the assessment of the effects of a cross-border nature on the topographic features, are:

- ✓ for the settlement of Mezek in the Bulgarian territory 10km from the nearest W/T 1,
- ✓ for the settlement of Valche pole on Bulgarian territory 7.2km from the nearest wind turbine (W/T 1),
- ✓ for the settlement of Borislavtsi in Bulgarian territory 12.8 km from the nearest wind turbine (W/T 1), and
- ✓ for Pokrovan settlement in Bulgarian territory 9.8 km from the nearest W/T 7
- ✓ for the settlement of Huhla in Bulgarian territory 6.4 km from the nearest W/T 15
- ✓ for the settlement of Ivaylovgrad in the Bulgarian territory 9.0km from the nearest W/T 16

Any visual burden, shadowing or reflection is particularly small to zero due to the size of the image, but also that there is a significant distance between the settlements and the ASPIE in question. **Therefore, any cross-border effects are considered negligible.**

In summary, impacts related to the morphological and topological features during the **construction phase** have a moderate probability of occurrence (PE:M), local extent (EkE:L) and low intensity (EnE:L), no complexity (PoE:0), transient (XE:T), of non-synergistic action (SD:0) and without cross-border character (DX:0).

During the **operational phase** , there will be impacts on the topological features and not on the morphological ones, with a high probability of occurrence (PE:H), local extent (EkE:L) and moderate intensity (Ene:M) as shown by the visual contact analysis in the paragraph 9.11.1.3 below, of no complexity (PoE:0), of permanent duration (XE:P), irreversible (AE:Ir), without synergistic action (SD:0) and without cross-border nature (DX:0). The above conclusions are listed in the following tables

| IMPACTS RELATED TO MORPHOLOGICAL CHARACTERISTICS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Morphological characteristics** | Moderate | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | None | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Morphological characteristics** | Zero | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | None | No | No |

| IMPACTS RELATED TO TOPOLOGICAL FEATURES | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Topological features** | Moderate | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | None | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Topological features** | High | Local | Moderate | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | No | No |

With the closure of the project, the environment will be rehabilitated, as provided by the written provisions (Government Gazette 2464B/2008), fully restoring the existing morphological and topological features.

## Photorealistic illustration

The photorealistic rendering shows approximately what the wind power plant will look like in relation to its installation location. @ GoogleEarth was used to create the photorealistic . The points from which we look towards the wind power plant and the points where the wind turbines will be were given as inputs. The shots to the wind power plant are made from North, East, South and West. The view that will exist towards the wind power plant is shown below.

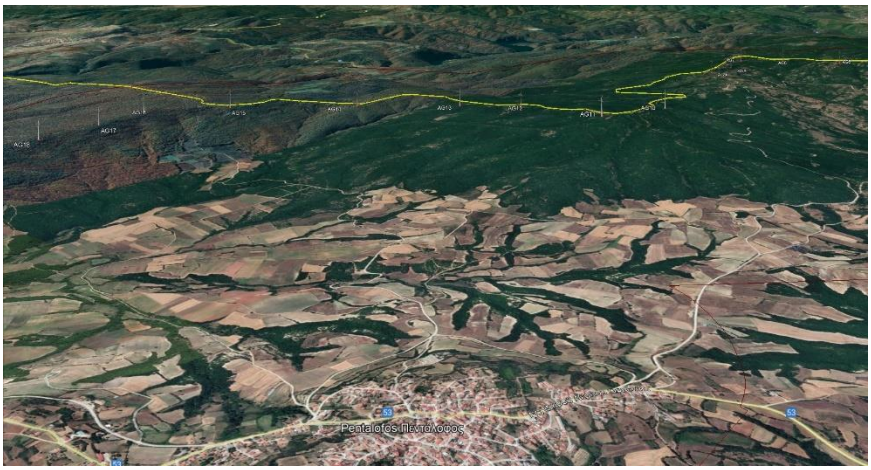


**Figure 53**: Photorealistic rendering from Pentalofos (S-SW direction)

**Figure 54**: Photorealistic illustration from by Pentalofo (SW direction).

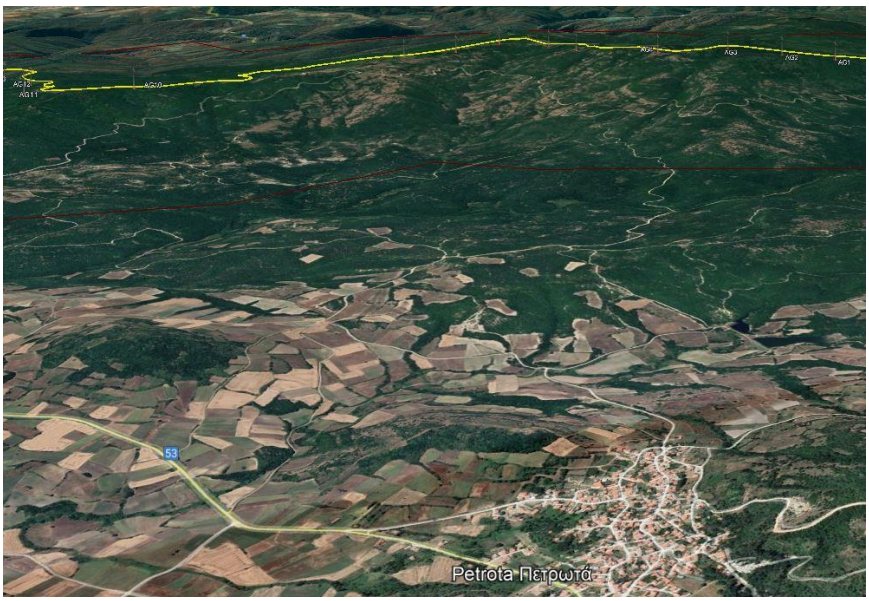



**Figure 55**: Photorealistic rendering from Petrota (N direction)

**Figure 56**: Photorealistic rendering from Komara (SW direction).

## 9.4 Impacts related to geological, tectonic and soil features

It should be emphasized that the implementation of the project requires small-scale earthworks. Any impacts that will have a low intensity and duration only during the construction phase, will be fully addressable and of a local nature. Therefore, the proposed project:

✓ Will not cause unstable soil conditions, nor changes in the geological arrangement of the rocks.

✓ Will not cause splits, displacements, compressions and over-covering of the surface layer of the soil.

✓ Will not destroy, overlap or alter any unique geological or natural feature.

✓ Will not cause an increase in soil erosion by wind or water, on or off site.

✓ Will not cause changes in the deposition or erosion of beach sands or changes in siltation, deposition or erosion which may alter the bed of a river or stream or the bottom of the sea or any bay, inlet or lake. There are no coasts, rivers, streams, coves and lakes near the proposed site.

✓ Will not cause a risk of exposure of people or property to geological disasters such as earthquakes, landslides or mudslides, subsidence or similar disasters.

**Cumulative nature:** Due to lack of concentration of activities in the project development area, synergistic effects of cumulative nature of geological/tectonic/soil features with project impacts are not expected.

**Cross-border nature** : The effects related to the geological, tectonic and soil characteristics of the area are limited to the construction part of the project. These effects will anyway be of a local nature and not cross-border.

In summary, impacts related to the geological, tectonic and soil characteristics during the **construction phase** have a moderate probability of occurrence (PE:M), will be of local extent (EkE:L) and of low intensity (EnE:L), of no complexity (PoE:0), of transitory duration (XE:T), of non- synergistic action (SD:0) and without cross-border character (DX:0).

During the **operation phase** , there will be geological, tectonic and soil effects, with zero probability of occurrence (PE:0), no extent (EkE:0) and low intensity (EnE:L), no complexity (PoE:0), permanent duration (XE:P), irreversible (AE:Ir), without synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| EFFECTS RELATED TO GEOLOGICAL, TECTONIC, SOIL FEATURES | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Geological, tectonic and soil features** | Moderate | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | None | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Geological, tectonic and soil features** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | None | No | No |

## 9.5 Effects on the natural environment

It is reported that with the use of Renewable Energy Sources (RES), such as wind power plants, for the production of electricity, **no natural resources, such as water or fossil fuels , are consumed** . These minerals are non-renewable natural resources and for their extraction and exploitation, large-scale excavations and operations are required, which significantly alter the morphological and soil characteristics of the intervention area. Conversely, wind turbines (A/G) convert wind energy into electricity by harnessing the inexhaustible natural source of local wind potential. The operation of W/T does not require the use of raw materials, except for wind energy and does not emit any form of pollution or waste, i.e. **no gaseous, liquid or solid waste is released that could pollute the air, water table and subsoil** . Also, the produced product is transferred directly to the network for consumption and therefore no kind of conversion of raw material or product is required.

The selection of the project location was made **in accordance with best practices**, as stated:

- In the Commission Communication - Guidance document on wind energy projects and EU nature protection legislation[18], with the potentially proposed measures set **out in the following Table** , and
- In the Good Practice Guide[19] on mitigating the impacts of wind power plants on biodiversity using modern technologies

The pre-selection of the position (macro-sitting) was made after a thorough examination of the area so that it satisfies all the limitations of the relevant legislation, does not affect the environment, the existing settlements and the general activities of the wider area. Thus, the location of the project took place **outside protected areas** , **as far as possible along existing forest roads** , without wind potential being a primary evaluation factor. In addition **, large-sized, fewer in number W/Ts with lower speed wing movement and at sufficient distances between them were selected, parallel to any movement corridors of the birds** (micro-sitting). The proposed location is environmentally compatible with the planned activity, as:

- ✓ It is outside the set of protection areas defined by the legislation, (the nearest W/T is 0.04 km from the boundaries of the nearest protected area)
- ✓ It is a considerable distance from the nearest settlement (Komara - distance over 1 km) and from the nearest archaeological site (over 2.9 km )
- ✓ There are no competing uses of the site

Fauna, flora and land use in general are little affected by wind facilities and only in terms of foundations and access roads. The evaluation of the consequences of the project on the flora, fauna and ecosystems consists in the assessment of the changes that will come from the project under consideration in protected organisms, which are the species of native flora and wild fauna. It also consists of the spatial units that make up the habitats of the aforementioned species from land occupation or even of the factors that will be created by the project under consideration.

Taking into account the principles (based on Law 1650/1986) of protection and conservation of native flora and fauna, all the effects of the project under study on the fauna and its habitats are checked. Situations or phenomena that affect vegetation and

*[18] EUROPEAN COMMISSION , C(2020) 7730 final*
*[19]KOPE, 2018 , in the framework of the LIFE+ Biodiversity project "Demonstration of good practices aimed at limiting the effects of wind farms on biodiversity in Greece" (LIFE12 BIO/GR/000554)*

fauna in general and especially the dominant plant and animal species , as well as those that regulate the ecological balance, are thus evaluated.

*9.5.1 Flora*

The wider installation area of the wind power plant is land characterized mainly by oak forests.

The effects on the flora of the area from the construction of the A/P works are limited to those resulting from the earthworks and embankments due to the foundation works of the W/T and substations, from the installation of the control center and from the cable installation works . It is worth mentioning that land will be occupied by the W/T and the prefabricated control building ( isobox ).

Construction impacts will be limited to the cutting of bushes that may be in the occupation zone of the works, as well as the limited dust coverage of the wider zones with the occupation zone, which will be observed until the end of the construction works. No risks are expected, therefore, from the destruction of rare or endangered species of flora, or from interventions in the normal growth and renewal of plant species. The disturbance of the floral tissue will be localized and temporary and will be located in the areas of the foundation and construction squares of the W/T and will not have an impact on the plant communities of the area.

In the areas where the small-scale projects will be carried out, there will be minimal loss of vegetation, it is very likely that individual bushes will be deforested along the installation of the units, while the continuous presence of people, vehicles , etc. during the projects it is expected to have little negative effect on the existing balance of the ecosystem. The presence of people and machines will practically be zero with the start of the operation of the project.

The introduction of new plant species or the prevention of the natural renewal of existing species is not expected, because the plant -community formations of the area are stable and adapted to the anthropogenic activities that have been carried out in the past.

The proposed project will not bring any change to the existing flora, because it does not affect and does not change the soil and climate conditions of the area. Any small interventions on the soil surface are of small extent and relatively short, so that the native plant species will quickly cover the soil again, especially when these interventions are immediately backfilled. After all, from the existing international experience, it follows that the "harmonious" symbiosis of the wind power plant with the pre-existing flora continues normally.

The proposed project will not affect any kind of flora in the area because the interventions that will be made are minimal and will only occupy an area of approximately 23.75 square meters. for each W/T. The vegetation in the wider area in several places at lower altitudes is strongly affected by human activities (arable fields and pastures). Finally, during the operation of the construction sites, all appropriate fire safety measures will be taken. Also, there is no risk of fire from the operation of the project.

Based on the **due assessment of the submitted E.O.A. (§3.6.1 & §3.6.2)** :

*The planned projects will be carried out in areas of oak forest and gaps, where no species were detected flora which are referred to in article 4 of Directive 2009/147/EU and are included in list of Annex II of Directive 92/43/EEC. The effects on the flora are considered small . In fact, the supervision of ASPIE during the operational phase by the staff of the station, which will have a deterrent effect on the*

*up to now (and recorded during autopsies) significant impact on the forest from illegal logging that mainly takes place through passages through the Bulgarian territory but also in the protection against forest fires through the timely detection of a fire source.*

*The results of the evaluation of the elements of the natural environment in the PEP and in the wider area of the project under study demonstrated the good conservation status of the types of habitats and flora species and the favorable prospects for their conservation. Some of the above negative effects are minimized by the following actions:*

- *After construction, all the excavation trenches will be rehabilitated.*
- *The operation phase of the wind power plant will not affect habitat types and flora species at all, as the changes in air temperature and humidity due to the movement of the blades are considered to be of minor importance and small in extent.*
- *During the operation phase, there will be no significant impact on the vegetation, as the area occupied by the wind turbines is small compared to the Study Area.*

By taking the appropriate measures, it is assumed that the overall construction works of the proposed Wind Park will not cause significant and irreversible, direct or indirect, effects on the flora of the area. There will be no impact on the flora and in general on the ecosystems of the neighboring area.

**Cumulative nature:** Due to the lack of other activities beyond logging in the immediate project development area, synergistic effects of a cumulative nature with the effects of the project on the flora are not expected. After all, any effect will be balanced by the subsequent restoration.

**Cross-border character** : The effects related to the flora of the area are limited exclusively to the construction part of the project. These effects will anyway be of a local nature and not cross-border.

In summary, effects related to the flora during the **construction phase** have a moderate probability of occurrence (PE:M), will be of local extent (EkE:L) and of low intensity (EnE:L), of no complexity (PoE:0), transient duration (XE:T), reversible (AE:R), of non- synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase** , there will be impacts on the flora of the area, they will have zero probability of occurrence (PE:0), no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), permanent duration (XE:P), reversible (AE:R), without synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| FLORA, VEGETATION AND HABITAT IMPACTS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Flora, vegetation and habitats** | Moderate | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Flora, vegetation and habitats** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Reversible | No | No |

*9.5.2 Forests and woodlands*

The main impact of the projects on the forest ecosystems of the area concerns the removal of forest vegetation exclusively from the project intervention surfaces. The forest vegetation to be removed does not, however, include rare or protected species or important robust individuals of forest plants. In addition, the layout and development of the project concerns a small overall area of a linear intervention surface, which does not insulate and does not fragment the wider forest ecosystem. Thus, it does not disturb the biological functions of the species that grow in the study area.

In any case, from the phytotechnical restoration, which will be done with endemic indigenous species of the area, as suggested by the competent forest office, any effects on the forest ecosystems of the area will be mitigated.

Based on the **due assessment of the submitted E.O.A. (§3.6.1 & §3.6.2)** :

*The area of the facilities is located in areas with oak forest vegetation and gaps. THE habitat type representing the project area is not a habitat type priority.*

*The surfaces of the W/T squares will be limited to the absolutely necessary, significantly reducing them logging and the extensive interventions in the forest. The premises of ASPIE in operation will be everywhere free and there will be no fencing or creation of enclosures of large surfaces. Therefore, the effect of habitat fragmentation does not exist . The connection will be made using the existing forest road network that exists in the landscape for decades and already (based on bio - declarative findings) it is widely used since mammals during their movements.*

*Therefore, according to the above,* ***no adverse effects arise from the construction and operation of the wind power plant under study in the ecological functions and in the conservation status of habitat types and flora species*** *, as long as they do not increase synergistic effects exponentially over time .*

*During the construction phase, no large-scale effects on the vegetation are expected habitat types .*

**Cumulative nature:** Apart from the logging activity in the project development area, limited synergistic effects of a cumulative nature are expected with the project's effects on forests and woodlands, due to the existence of the A/P to the north of the project, which has a producer certificate. Synergistic effects are limited due to the significant forest area available compared to the interventions required. Any area of interventions is replaced with an equal area for reforestation.

**Cross-border character** : The impacts related to the forests and forest lands of the region are limited exclusively near the project area. These effects are anyway of a local nature and not cross-border.

In summary, impacts related to forests and forest lands during the **construction phase** have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and of low intensity (EnE:L), transient (PoE:T), temporary duration (XE:T), irreversible (AE:Ir), non- synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase** there will be impacts on the forests and the forest lands will have a zero probability of occurrence (PE:0), no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), permanent duration (XE:P), partially reversible (AE:PR), without synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| IMPACTS RELATED TO FOREST AND FOREST LANDS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Forests and woodlands** | High | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | Irreversible _ | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Forests and woodlands** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Partially reversible | No | No |

*9.5.3 Fauna other than avian fauna*

In the mountainous region of northern Evros, one can meet some of the small mammals of Greece ( Eastern European Hedgehog, Hare, Hippopotamus , Fox, Weasel, Badger, Boar and Wolf).

The proposed project will not affect any form of tame or wild fauna that lives or moves in the project area because it does not cause a change in any of the parameters related to it. All interventions will be carried out in accordance with the instructions of the forestry service, and always within the framework of intervention approval decisions.

Tame fauna

The W/P will not affect the livestock activity of the area, since the greater percentage of the land that will accommodate it, will be available for other uses. According to a report by Greenpeace , approximately 99% of the land that hosts an W/P is available for other uses, while indicatively it is stated that for the production of energy from a power plant that burns coal, up to 4.5 times more land is required than that required to cover the same energy needs with wind energy. It is emphasized that the area of the wind power plant will not be fenced, which will contribute to the continuation of livestock activities in the area during the operation phase of the project. The following photos were taken from a wind power plant that has been in operation for over a decade, and demonstrate in the most emphatic way the harmonious coexistence of animals and wind turbines. They refute the non-existent complaints about the removal of animals due to the W/T operation.

**Picture 57**: Cows resting in the shade of the W/T.

**Figure 58**: Stabled livestock next to W/T in operation.

Wild animal

During the **construction phase** of the project, the disturbance to the fauna populations will be localized and small. A removal of the most sensitive species from the locations of noise sources will result, as noise during the construction phase is a nuisance factor. However, this impact is reversible, as after the construction of the project, lasting approximately 18 months, apart from the occupation of the surface by the W/T, there is no other type of disturbance to the fauna.

The species composition of the area will not change. The surface that the W/T will cover will be very small and will not have an impact on the habitats of the mammals in the area. Only a local movement of some items away from the construction axis of the project is expected due to noise during the construction phase. After the completion of construction, any local movement will return because the factors that caused it will be eliminated.

During the **operation phase** of the project, the connecting corridors will be maintained and the habitats will not be fragmented. The project will not be fenced, the existing and new roads will be category C with very low traffic and will be accessible to mammals. Finally, the noise during the operation of the wind park will be imperceptible and will not cause any disturbance.

Based on the **due assessment of the submitted E.O.A. (§3.6.3)** :

*The analysis of the due impact assessment is done for fauna species included in Annex II of the U.P. 14849/853 /E 103. In the project under study, it is estimated that the following species are active and directly affected.*
**Testudo hermanni *(Mediterranean turtle):*** *The project is expected to affect the behavior of the taxon (disturbance) during the construction of the W/T construction site, the improvement and opening of the access and connection roads and the transfer of the wind turbine elements,* ***impact on which is considered to be of low importance, of short duration and ultimately reversible after the end of the work.*** *Additionally, during the operation of the project, no disturbance is expected, as the noise production from the wind turbines is estimated to be at low levels.*

**Myotis emarginatus *( Pyrromyotida )*** *: It is a relatively small bat, with a weight of 6-9gr and a wingspan between 22 and 25cm. Included in Annex II of the Berne and Bonn Conventions, as well as Annexes II and IV of EU Directive 92/43. Protected by Presidential Decree 67/81 and by UNEP/EUROBATS. It is internationally classified by the IUCN as a species of Least Concern. In Greece is classified as Near*

*Threatened as, while it is widespread, it presents heavy reliance on caves and other subterranean habitats and its populations are rather fragmented. At the northern end of its distribution populations have declined significantly due to loss of its hunting habitats and the use of agrochemicals , while fragmentation of the landscape due to road construction is an equally significant threat. It is also threatened by tourist exploitation of caves and in general the disturbance in underground shelters. The species will possibly affected by the installation of the project under study, although the possibility of impact there are not many.*

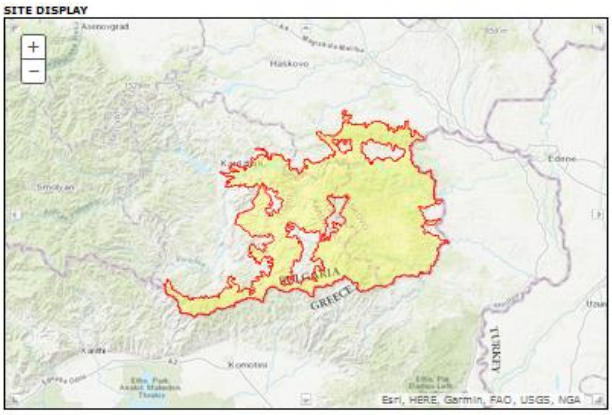
*The species of* ***chiroptera (bats)*** *that will be affected by the installation under study are the following :* ( Rhinolophus ferrumequinum ) *, Micromyotid (* Myotis blythii *), Tranomyotid (* Myotis myotis *), Pyrromyotida* ( Myotis emarginatus ) *, Horned bat* ( Eptesicus serotinus ) *, Mustache bat* ( Myotis mystacinus ) *, Micro-night bat* ( Nyctalus leisleri ) *, Nanobat* ( Pipistrellus pipistrellus ) *,* Microbat ( Pipistrellus pygmaeus ) *, mountain bat* ( Hypsugo savii ) *, Gray eared bat* ( Plecotus austriacus ) *, Pyrromyotida* ( Myotis emarginatus ) *, Bat* ( Miniopterus schreibersii ) *. The project* ***is expected to affect the behavior of chiroptera species (mainly non-Annex II species) during the night operation of the wind turbines*** *, mainly on windy nights, between the summer months and the first months of autumn. It is proposed to carry out a program to monitor the activity of the worst species in the project area. In addition, it is proposed to carry out a monitoring program of the effects on the behavior and ecology of chiroptera during the construction phase and during the operation phase of the project under study, in order to ensure effective protection.*

**Canis lupus *(Wolf) :*** *Its presence is confirmed by bibliographic sources and records of bioindicator traces during field work. The project is expected to affect the behavior of the taxon during the construction phase of the ASPIE (opening/ widening of the road network, transportation and placement of pylons)... In conclusion, the project is expected to have an* ***impact on the spatial behavior of the wolf during the construction phase of the wind power plant*** *, as the territory of the species is located within the PEP,* ***without this having irreversible consequences for the ecological taxon balance .*** *According to the data of recorded attacks of the species of the year 2013 in the wider area of the project there are no declared disasters from attacks on power plant animals. Of course, we mention that the livestock capital of the region is very small. In addition, a follow-up program is recommended to check if it is necessary by regions (depending on the appearance of the species) to stop work on the project (phase construction) during the wolf's breeding season, that is, between January and March, so that there is no disturbance in its biological cycle. In any case the implementation monitoring program should focus on behavioral effects and ecology of the wolf during the construction phase and during the operation phase of the project under study.*

**Cumulative nature:** Due to the lack of other activities outside of animal husbandry in the project development area, synergistic effects of a cumulative nature with the project's effects on the fauna of the area are not expected.

**Cross-border character:** Regarding the cross-border effects of the project on the natural environment, it should be noted that within the Bulgarian territory and on the borders with the Greek border, the following area is located which is part of the Natura 2000 network:

• The Special Protection Zone ( ZEP ) with the name " Yazovir Ivaylovgrad » and code BG0002106




As is the case with the nearest Natura 2000 areas within the Greek territory, the project does not significantly and in terms of duration affect the extra-border protected areas, both due to distance and character (not a SPA). Therefore, no cross-border effects are likely to occur.

In summary, effects related to the flora during the **construction phase** have a moderate probability of occurrence (PE:M), will be of local extent (EkE:L) and low intensity (EnE:L), immediate (PoE:I), transient duration (XE:T), partially reversible (AE:PR), of non-synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase** , there will be impacts on the flora of the area, they will have zero probability of occurrence (PE:0), no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), permanent duration (XE :P), reversible (AE:R), without synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| **IMPACTS RELATED TO FAUNA** | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Fauna** | Moderate | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | Partially _ reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Fauna** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Reversible | No | No |

*9.5.4 Avifauna*

The proposed wind power plant is not expected to significantly affect the avifauna of the area, even more so when compared to other human activities, such as hunting or agriculture or industrial activity and the operation of polluting facilities. On the contrary, avoiding, where possible, the use of polluting processes for energy production can in the long term offset the general degradation of the atmosphere, having positive effects on the existence of a rich and varied birdlife in the area.

The effects in terms of avifauna concern:

- Risk of collision of birds with W/T .

The rotation speed of the wind turbine blades is low - from 4.3-12.1 revolutions / minute-. A consequence of this is that the fins are recognizable to birds and birds avoid them and/or pass between them (Figure 61).

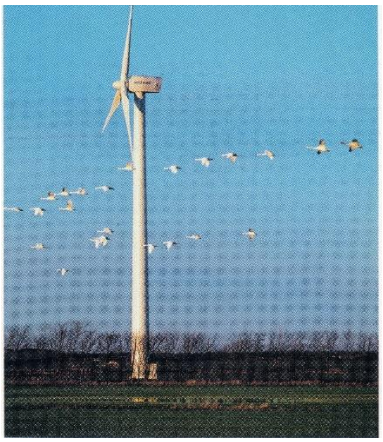


**Figure 59**: Bird crossing from W/T

Wind speed, temperature, humidity, as well as the behavior, age and phase of the bird's annual cycle, affect the risk of collision because they affect the birds' ability to perceive an obstacle and avoid it. The risk is greater in strong winds, which affect the birds' ability to control their movement, especially in rain, fog or dark nights. It should also be taken into account that the location of the wind turbines is on the ridge at a relatively high altitude where bird habitats are scarce and therefore bird traffic is very low. Also the lower part of the blade of the wind turbine is at a height of 45 meters from the ground. It has been observed that birds in their flight overcome low-altitude ridge barriers, while birds flying at higher heights - raptors - usually fly over ravines, valleys & cliffs and not over ridges.

For all the above reasons, the impact of the wind power plant on the avifauna is minimal.

GREENPEACE article states that according to studies for every 10,000 bird deaths caused by non-hunting, less than one is caused by W/T. In comparison, about 5,500 deaths from the above are caused by collisions with buildings and windows, while about 1,000 deaths are caused by cats. The causes of death of the birds can be seen in detail in the diagram below:

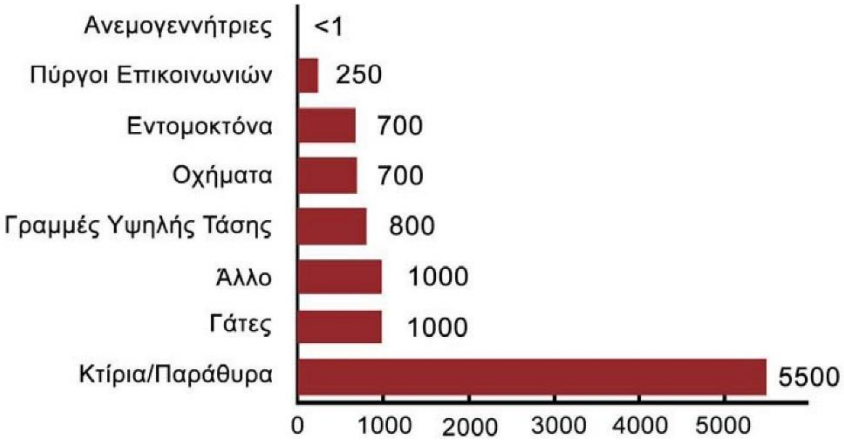



**Figure 60:** Causes of bird mortality (number per 10,000 deaths)

Furthermore, it is reported in a recent study in the journal Nature that 15-37% of bird species will have disappeared by 2050 due to global warming, a symptom that the installation of the wind power plant will help to cure.

- Disturbance of birds (from noise, presence of vehicles and W/Ts during construction and operation)

  In terms of disturbance to birds, while there are some reports of some degree of bird disturbance, a greater number of reports conclude that there is no effect.

  Blyth wind power plant in the UK, cormorants were temporarily relocated during the construction of the project, but returned when the wind power plant was completed. For other species no movement was observed and the number of birds compared remained comparable after construction.

  In addition, a possible effect is the disorientation of the birds. Some studies have shown that some species change their course to avoid wind power plants. This fact, however, has the positive effect of avoiding bird collisions with W/Ts.

- Risk of destroying the breeding, habitat and foraging sites of birds .

  There are no other activities in the area to cause cumulative effects on sensitive habitats. The existing road is still used today, in order to cover the needs of the residents resulting from the activity of logging and animal husbandry in the area. During the construction and operation phase of the wind power plant, the road will also serve those who work at the wind power plant and will not be widely used, resulting in no daily increase in vehicular traffic and further impacts. The removal of topsoil as noted will be limited to what is absolutely necessary with the required restoration work.

After listing the potential risks to the birdlife from the A/P, it is also important to assess the scope of each impact from which the birdlife of the area is at risk from the project. The importance of an impact cannot be easily coded as it varies according to its characteristics:

- the size of
- her type,
- its duration,
- its intensity,
- the time in which it occurs and the
- chance of happening.

The importance of the impact also depends on the receiver of the impact, where in this case it is the species of birds (the number of their population, their distribution, their reproduction, etc. ). Because there are no other activities in the area that have a cumulative effect and the distances between the W/Ts are greater than two and a half rotor diameters (ie about 405 meters) , it is estimated that **the effects on the bird population will not be significant** .

Usually the network of access roads fragments the habitat structure , resulting in a patchwork of small patches of habitat crossed by wide dirt roads. Many studies[20] demonstrate the negative effects of habitat fragmentation caused by such roads on reptiles, amphibians and small mammals. However, the area of a wind power plant and the area with an outer boundary of 200 m from the external wind turbines was considered

[20] *Fahrig , L. (2003). Effects of habitat fragmentation on biodiversity. Ann . Rev. Ecol. Evol . Syst. 34: 487-515*

as the minimum area potentially affected by fragmentation [21]. Again, however, in this particular case, the project is sited in such a way that **there is no network of access roads and therefore a case of habitat fragmentation** .

Based on the **due assessment of the submitted E.O.A. (§3.6.4)** :

*From the construction and operation of the ASPIE in the " Aetokorfi " location, the possible potentials effects, including synergistic effects, of the project on the structure; coherence and functioning of the ZEP area GR1110008 "Riverside forest of northern Evros and Arda " of the Natura 2000 Network , mainly refer to:*

*(a) in the evaluation of the loss or change of breeding and feeding habitats or rest of the birds of Annex I of Directive 2009/147/EC from the construction of ASPIE,*

*(b) in estimating the probabilities of being killed by possible bird strikes on pylons and on the wings of the W/T during the operation of the ASPIE, and (c) in the evaluation of the disturbance or the displacement of the avian species both during the stage construction as well as during the operation of ASPIE.*

*The proper impact assessment for the avifauna is done exclusively for its species Annex I of Directive 2009/147/EC and is analyzed in the construction and operation phase.*

***Effects on avifauna from habitat loss***

***Construction phase***

*Partial habitat loss is caused during the construction phase of the ASPIE under study. This specific type of impact does not greatly affect the existence of suitable habitat (sufficient area and good quality) of the SPA designation species and therefore does not affect their conservation objectives. The loss of habitat for birds of prey and waterfowl recorded in the PEP is* ***"small"*** *in terms of the size of the ecological impact (loss of* ***0.15%*** *of the SPA - ratio of area of works (Roads, W/T squares) to area of SPA) , since they are active in large areas, the surface of the W/T bases will bring about small changes in their feeding , reproduction or rest. Also, the effect from the construction of the groove for the placement of the energy transmission cables is judged to be* ***"nil" .*** *Therefore,* ***the overall nature of the ecological impact on birds is considered to be 'minor'*** *as no major population changes are expected, but neither are conservation objectives for these species expected to be affected over the period of the works, as it does not coincide with the breeding season. Ostriches and mid - sized birds are active in a smaller area, which may be a few hundred square meters around their nest, and therefore even a small loss of space can affect their density.* ***However, due to the very small scale of interventions in the area of the SPA, and especially on surfaces not used for reproduction by the designated species, no significant effects are expected on the populations of the above species, nor a negative effect on their conservation objectives and favorable reference values ( ETA).*** *The loss of the surface from the formation of the bases for the placement of the W/T is expected to be* ***"negligible"*** *for the ostriches , and* ***"neutral"*** *in terms of the overall ecological impact on these species. Conversely, rutting may have* ***"positive"*** *ecological effects on ostriches , from soil disturbance and the creation of potentially suitable nesting sites for species that nest on the ground or on road slopes. In conclusion,* ***the loss of habitat from the placement of the bases and the***

[21] *Technical assessment of the potential effects of the construction and operation of wind farms in northern Dobrogea (Romania), Arcadis, 2011.*

***excavation of the groove during the construction stage of the ASPIE is not expected to negatively affect the populations of the species of Annex I of the Directive 2009/147/EC, while some species of ostriches may be favored by certain works of the ASPIE under study.*** *Changes in habitat preferences, due to the works of the installation of the wind power plant, destruction of nests, as well as possible losses of birds , due to works or impact must be recorded, if detected.*

***Operation Phase***

*During the operational phase, the bird species that use the habitat, and especially the most sensitive to human intervention and disturbance, either leave the area, or enter a process of adapting to the new conditions, thanks to the survival instinct. Beyond that there is no further loss of habitat as there will be no additional deforestation. The project site is mostly accessed using existing roads (improvements) and is not located in remote and roadless natural areas. The pitches and access roads will remain free for shared use and there will be no areas blocked off by fencing (apart from the small area of the control booth). Therefore, there is no impact of habitat fragmentation during the operational phase.*

***Effects on fauna and avifauna from collisions***

*The effects of collisions of birds with the W/T may exist only during the operation of the ASPIE under study. These refer mainly to the killing of birds that may be caused by their impact with the mobile (wings) or stationary (tower) parts of the W/T. The type of impact may affect population size, thus its dynamics , and thus shape species' population levels in the long term. Therefore, collision kills may affect the breeding population of species listed in Annex I of Directive 2009/147/EC. The impact of collisions is different in the groups of birds, with that in ostriches and medium-sized birds being negligible, while in large-sized birds (raptors, aquatic birds, geese , storks ) it varies according to their biological characteristics, technical characteristics and the installation location of the birds. each ASPIE. Specifically, and per recorded species of Annex I of KYA H.I.P.37338/1807/ E103, the results are as follows:*

***A) Vulture ( Gyps fulvus ) The species does not nest in the project area and does not show frequent activity beyond small-scale infrequent crossings.*** *The wider area is a spread area of the species which reproduces in the area of Dadia . It is known that Vultures are now almost exclusively dependent on extensive animal husbandry to ensure their food. Thus, they have now synchronized their annual biological cycle with the practices of extensive /nomadic animal husbandry to take advantage of seasonal food availability. In winter, vultures are found at lower altitudes, often at the edges of the plains, where they always build their nests on inaccessible cliffs. At this time the mountains are covered with snow and the herds are in low altitude areas. In summer, the return of the flocks to the mountain pastures also marks the shift of the vulture flocks to higher altitudes. There are cases in which vultures make daily movements between nesting sites and mountain meadows, while at other times they establish new roosting sites (summer roosts) at high altitudes, away from breeding sites so that they are closer to the foraging area . the possibility of the species hitting a wind turbine increases in the event of an approach due to the existence of a body in the wider area of the ASPIE and around the W/T. These effects are reduced by the immediate removal of corpses from the area near the W/T. The impact on the species is estimated to be small due to the fact that the livestock activity in the area is very small. The use of the bird detection system using cameras and a sound emission system to prevent and stop W/Ts is an important method of preventing the impact of the species. The project operator, in the context of minimizing the effects of ASPIE on the phenomenon of mortality, will place the*

*systems in all W/Ts by investigating the possibility of placing a thermal camera. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference prices (ETA = 300) are 300 pairs. For the ZEP area GR1110008 no ETA price has been set for the item. From analysis of field data and telemetry data from online database Movebank shows that the species passes mainly south and south-west of the project sites on the axis connecting the colony of Dadia with the population of Bulgaria. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 7.027 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0444 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0222 people per year. Therefore, in the area where the ASPIE is proposed to be installed, the foraging habitat of the species is not expected to be degraded. From field observations, no breeding territory is confirmed in the project area. According to the second evaluation criterion, the size of the impact of the construction and operation of the ASPIE is* ***"low".*** *Therefore, the importance of the impact of the construction and operation of the ASPIE on the species is estimated as* ***"small".*** *Overall, the construction and operation of the ASPIE is expected to minimally affect the integrity of the population, both in the study area and in the area of spread, and therefore the nature of the impact from the ASPIE is characterized as small .*

***B) Black vulture ( Aegypius monachus ):*** *It was recorded in the area of ASPIE in simple crossings, one of which at the site of the works (YKP). The species does not nest in the area, but shows intense activity in the wider area within a radius of up to 20Km from the project. After all, as it appears from the data telemetry using GPS transmitters on individuals of the species the usual routes of the species are located at a considerable distance from the projects. The wider area is a distribution area of the species which nests in Dadia and appears throughout the region of Thrace. The possibility of the species hitting a wind turbine increases in case of approach due to the presence of a corpse in the wider area of the ASPIE and around the W/T. These effects are reduced by the immediate removal of corpses from the area near the W/T. The impact on the species is estimated to be small due to the fact that the livestock activity in the area is very small. The use of the bird detection system using cameras and a sound emission system to prevent and stop W/Ts is an important method of preventing the impact of the species. The project operator, in the context of minimizing the effects of ASPIE on the phenomenon of mortality, will place the systems in all W/Ts by investigating the possibility of placing a thermal camera. According to the statistical analysis of the field data and the application of the Band model, the number of passages for the species was estimated at 9.486 individuals per year, while the expected mortality including the avoidance rate was estimated at 0.0614 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0307 people per year. At the National level of the distribution area of the Black Vulture the favorable reference values (ETA = 50) are 50 pairs. From the analysis of field data and telemetry data from the Movebank online database it appears that the species mainly passes south and south-west of the project sites on the axis connecting the Dadia colony to the Bulgarian population. Therefore, in the area where the ASPIE is proposed to be installed, the foraging habitat of the species is not expected to be degraded. From field observations, no breeding territory is confirmed in the project area. According to the second evaluation criterion, the size of the impact of the construction and operation of the ASPIE is* ***"low".*** *Therefore, the importance of the impact of the construction and operation of the ASPIE on the*

*species is estimated as **"small".** Overall, the construction and operation of the ASPIE is expected to minimally affect the integrity of the population, both in the study area and in the area of spread, and therefore the nature of the impact from the ASPIE is characterized as small .*

***C) Golden eagle ( Aquila chrysaetos )** Recorded in single-person flights at high altitude. We consider the wider area to be a passage and foraging site for the species and territory of a breeding pair. In the PEP and within a radius of up to 5Km, no possible nesting site was identified . The activity and frequency of passage of the species from the position of ASPIE is common and should be taken into account when planning the monitoring program. **The use of the Dt system Bird or Digisec is an important method of preventing collision of the species.** As mentioned in the case of Orni , many flights of the Golden Eagle were recorded at a height below the position of the ASPIE and this carries the risk of the species hitting a wing of the W/T during its ascent from the bottom up. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 8.919 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0415 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0207 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference prices (ETA = 150) are 150 pairs. For the ZEP area GR1110008 no ETA price has been set for the item. Overall, the construction and operation of the ASPIE is expected to moderately affect the integrity of the population in case the proposed measures are not taken, both in the studied area and in the spreading area and therefore the nature of the effect from the ASPIE is characterized as small.*

***D) Serpent eagle ( Circaetus gallicus )** was recorded several times in flights at the project site and at a distance from it. Recorded in foraging and demonstration flights. The behavior of the species and its flight ability in combination with records of its behavior in an operational ASPIE (studies by the author of this ASPIE Tortoise Monitoring Program in D.E. Karystos 2018-2019, ASPIE Pyrgos Monitoring Program in D.E. Karystos 2018-2019 and Monitoring Program ASPIE Mikri Toumba in NE Sidirokastro 2016-2017) showed a very good adaptation to the construction and operation of W/T without recording mortality. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 20.192 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.841 individuals per year. Using the tracking systems, the above mortality is estimated at 0.042 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference prices (ETA = 300) are 300 pairs. For the ZEP area GR1110008 a value of ETA = 2 persons with a spread of 236.00 $km^2$ has been set. Overall, the construction and operation of the ASPIE is expected to moderately affect the integrity of the population without measures being taken, both in the studied area and in the area of spread and therefore the nature of the effect from the ASPIE is characterized as moderate .*

***E ) Hieraaetus _ pennatus )** Recorded a total of 21 times in flights of a mature male. Recorded on feeding flights . The activity of the species in the location of ASPIE is frequent mainly in the west and NW . As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 18,851 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0636 individuals per year. Using the tracking*

*systems, the above mortality is estimated at 0.0318 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference values (ETA = 100) are 100 pairs. For the ZEP area GR1110008 no ETA value or spread range has been defined.*

***F) Bald eagle ( Clanga pomarina )*** *Recorded thirteen (13) times in flights in the wider area. The wider area of the wetland of the Arda and Evros water streams is the habitat of the species. The species does not nest near the project and was not recorded any other time. The use of the DtBird system or Digisec is an important method of preventing collision of the species. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 6.298 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0309 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0155 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At the National level, the favorable reference values (ETA = 90) are 90 pairs. For the ZEP area GR1130008 a value of ETA = 2 pairs with a spread range of 259.31 km² has been set. Overall, the construction and operation of the ASPIE is expected to moderately affect the integrity of the population without taking measures, both in the studied area and in the spreading area and therefore the nature of the effect from the ASPIE is characterized as low .*

***G) Accipiter brevipes ( Saini )*** *Recorded once in flight from perch to tree and in flights at a distance from the site of the works. Forests are the species' main habitat, therefore we believe that the location of the project will affect the species . As derived from using the Band method to estimate expected mortality due to impact, the expected crossings of the species are 0.554 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0013 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0007 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference values (ETA = 1000) are 1000 pairs. For the ZEP area GR1110008 a value of ETA = 20 people with a spread of 235.10 km² has been set.*

***H) Ciconia nigra ( Black Stork )*** *It was recorded a total of eleven (11) times in flights of one and two people and in three cases in a standing position in a stream bed and at a distance from the W/T positions. The activity of the species was recorded in high-altitude flights of 100 - 200m but also descents in gullies and canals. The usual activity was at a distance from the project site mainly to the north in the Arda river bed and in ravines and canals in the wider area. The impact of the projects due to their location between two important water ecosystems of the rivers Evros and Arda is judged to be moderate to significant and the countermeasures proposed here must be taken into account. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 4.066 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.020 individuals per year. Using the tracking systems, the above mortality is estimated at 0.01 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At the National level, the favorable reference values (ETA = 80) are 80 pairs. For the ZEP area GR1110008 No ETA value has been set but a spread of 259.00 km² .*

***I) Ciconia ciconia (Stork)*** *Recorded repeatedly from March to September. During spring and summer observations significant numbers of up to 250 individuals were recorded foraging in threshed and recently harvested fields some distance from the works to the east. In fact, a significant number was recorded in search of food alongside harvesting operations in the fields. The species nests in artificial and natural nests in and near settlements and uses the agricultural lands of the region for foraging. Typical flights include movements from the nests to the agricultural and barren areas where they forage and return to the nests to carry food to the chicks. The flights are mainly medium and low altitude within the W/T's ESA zone. The impact of the projects is considered small , nevertheless, all the proposed countermeasures must be taken, such as the use of identification systems and sounds to prevent and shut down the W/T and the implementation of a monitoring program. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 6.588 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0208 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0104 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference prices (ETA = 2500) are 2500 pairs. For the ZEP area GR1110008 No ETA value has been set but a spread of 259.00 km$^2$ .*

***I) Falco peregrinus ( Pteritis )*** *Recorded once in flight. No nesting sites were identified in the project area. According to the bibliographic data and the SDF of the Bulgarian NATURA 2000 area, the territory of a breeding pair exists in the area. The impact of the projects due to their location is considered moderate to small and the countermeasures proposed here must be taken into account . As derived from using the Band method to estimate expected mortality due to impact, the expected crossings of the species are 0.841 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0019 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0009 people per year. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference prices (ETA = 350) are 350 pairs. For the ZEP area GR1110008 no ETA value has been set.*

***K) Pernis apivorus ( Sfikiaris )*** *It was recorded twice (2) at the end of September, during the migratory season. No nesting sites were identified in the project area. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 70.26 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.27 individuals per year. Using the tracking systems, the above mortality is estimated at 0.13 people per year. The overall impact is considered very small . The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level the favorable reference values (ETA = 1000) are 1000 pairs. For the GR1110008 ZEP area, no ETA value has been set, but a spread of 259.31 km $^2$ .*

***B) Milvus migrants (Tsiftis)*** *Recorded four times during migration in flight and perched close to works. As derived from using the Band method to estimate expected mortality due to impact, the expected crossings of the species are 0.666 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0024 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0012 people per year. The overall impact is considered*

*very small . The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level, the favorable reference values (ETA = 20) are 20 pairs. For the GR1110008 ZEP area, no ETA value has been set, but a spread of 259.31 km$^2$ .*

***I) Circus aeruginosus ( Kalamokirkos )*** *Recorded in numerous measurements at the site of the works throughout the year and more often during migration. The hornbill does not use the project area for foraging , as it was recorded in the agricultural lands to the east. The lowland area between the rivers Arda and Evros is a feeding place and an important area between their wetland ecosystems. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 4.681 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0179 individuals per year. Using the tracking systems, the above mortality is estimated at 0.009 people per year. The overall impact is considered small . The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At the National level, the favorable reference prices (ETA = 80) are 80 bfe . For the ZEP area GR1110008 No ETA value has been set but a spread of 259.00 km$^2$ .*

***N) Circus cyaneus ( Chimonokirkos ) Records*** *were made in flights at a distance from the ASPIE positions during the measurement period of November - February. It was found in the area of agricultural crops and not in the locations of the planned projects. As derived from the use of the Band method to estimate expected mortality due to impact the expected crossings of the species amount to 4.344 per year, while the expected mortality taking into account the avoidance rate was estimated at 0.0166 individuals per year. Using the tracking systems, the above mortality is estimated at 0.0083 people per year. The overall impact is considered small. The conservation objectives outlined for the SPA for the species are the protection of suitable habitats and the conservation of breeding pairs. At National level Favorable Reference Prices (FRPs) have not been defined. For the ZEP area GR1110008 No ETA value has been set but a spread of 259.00 km$^2$ .*

***IE) Aetomachos ( Lanius collurio )*** *Recorded in a number of observations mainly of one individual and two individuals. The activity of the species during the summer is frequent in the wider area. Given that the construction works will be done outside the breeding season, the impacts during the construction phase will be significantly reduced. The probability of encountering W/T is considered negligible for the species, as its flights are restricted to low altitude outside the scanning area of W/T and usual activity occurs in bushy and wooded areas. The conservation objectives described for the SPA for the species are to protect suitable habitats. At National level the favorable reference prices (ETA = 10,000) are 10,000 pairs. For the ZEP area GR1110008, an ETA value has been set = 11 people per 1 Km $^2$ in a spread of 259.31 km $^2$. Overall, the construction and operation of the ASPIE is expected to have little impact on the integrity of the population, both in the study area and in the spread area, and therefore the nature of the impact from the ASPIE is characterized as low.*

***IS) Hippolais olivetorum ( Liostrichida )*** *Recorded 3-4 times in solitary bushes and 2 individuals, it is estimated that the project will affect the species only during the construction phase. By implementing the measures and basically avoiding work during the breeding season, the overall impact is considered small. After all, the nature of the works is not part of the ecological threats to the species. The conservation objectives described for the SPA for the species are to protect suitable habitats. At National level the favorable reference prices (ETA = 5000) are 5,000*

*pairs. For the ZEP area GR1110008, an ETA value has NOT been set, but a spread of 179.79 km $^2$ .*

***IZ) Melanocorypha calandra (Galiandra)*** *It is found in the wider area, and in agricultural lands, it was recorded several times at the site of the works in bushy places. By implementing the measures and basically avoiding work during the breeding season, the overall impact is considered small. After all, the nature of the works is not part of the ecological threats to the species. The conservation objectives described for the SPA for the species are to protect suitable habitats. At National level the favorable reference prices (ETA = 5000) are 5,000 pairs. For the ZEP area GR1110008, an ETA value has NOT been set, but a spread of 259.00 km$^2$ .*

***ITH) Balkan Woodpecker ( Dendrocopos syriacus ) – Middle Woodpecker ( Dendrocopos medius ) – Black Woodpecker ( Dryocopus martius )*** *Woodpeckers are not expected to show mortality from impact on the structural elements and wings of the W/T under study and the neighbors in this ASPIE. The ASPIE under study will not affect the species during its operation. The effects on the species are mainly related to disturbances during construction. Reconnaissance of nesting sites in hollow trees is recommended prior to commencement of work, and restriction of works outside the breeding and rearing season until they have left the nests is a measure to mitigate impacts on species. The conservation objectives described for the SPA, for Dendrocopos syriacus is the protection of suitable habitats. At National level the favorable reference prices (ETA = 10,000) are 10,000 pairs. For the ZEP area GR1110008, an ETA value has NOT been set, but a spread of 212.28 km $^2$. The conservation objectives described for the SPA, for Dryocopus martius is the protection of suitable habitats. At National level the favorable reference prices (ETA = 1500) are 1500 pairs. For the ZEP area GR1110008, an ETA value has NOT been set. The conservation objectives described for the SPA, for Dendrocopos medius is the protection of suitable habitats. At National level the favorable reference prices (ETA = 10,000) are 10,000 pairs. For the ZEP area GR1110008, an ETA value has NOT been set, but a spread of 202.00 km $^2$ .*

***K) Langona ( Phalacrocorax pygmeus )*** *One individual was recorded twice in June in an irrigation canal a long distance east of the ASPIE and in the Komara dam lake . The species uses the riparian areas, streams and irrigation canals of the region as its habitat. Movements of waterfowl individuals to and from these locations on water surfaces with flights over rural locations are frequent. The project does not affect the genre. At National level No favorable reference prices (FRPs) have been set. For the ZEP area GR1110008, an ETA value has NOT been set, but a spread of 259.31 km$^2$ .*

### *Nuisance effects*

*The nuisances that may cause effects on the species in the area where the ASPIE is to be installed and during their operation stage, refer mainly to the noise produced by the rotational movement of the W/T blades and the visual disturbance from the presence of the W/Ts /C and of the personnel moving for the maintenance work in the ASPIE, to the species of avifauna that use the area. This type of impact may affect displacement of breeding pairs, due to intolerance of human activities, reduction of reproductive output or cessation of reproductive effort, change in foraging behavior and displacement to adjacent areas (partial displacement), up to complete abandonment of territory by certain species that do not tolerate human presence at all (complete displacement). Consequently, the breeding population of these species and their conservation objectives (ie ETA values) may be affected. Displacement (partial or total) in raptors as a consequence of disturbance has been studied internationally and there is disagreement among scientists about its*

*magnitude ( Langston & Pullan 2003, Madders & Whitfield 2006). In some cases it has been found that some species, while using the area before the construction of the ASPIE, exhibit behavior avoidance after its installation. In other studies from before-and-after construction ASPIE no significant effects have been found and in fact some species appeared in the areas that were made the ASPIE, while they did not exist before their construction. The movement of the wings and the noise from the operation of W/T in the short term may cause the displacement of certain species, in the long run, however, these species may become accustomed to the presence of W/T and they use the area as before the construction of ASPIE. In a study – monitoring program done by the study team at ASPIE in Sidirokastro P.E. Serres, it was found that Aetogerakina and Gerakina exhibited enough tolerance to the presence of W/T and were observed to pass through the hazard height zone of impact W/T that were close to active territory, but no impact was recorded . Also, it is not expected that there will be significant nuisance effects from the operation of the sub ASPIE study in other species of predators that occur during migratory movements or during hibernation because these are observed as random visitors by individuals. For ostriches and small - sized birds the data from the international literature are minimum. The operation of the ASPIE under study is not expected to displace bird species small and medium-sized, as the displacement area from suitable foraging habitats for these species it is considered "negligible". In conclusion, no significant effects are expected from disturbance during the operation of the ASPIE under study for the above species in their populations or in their distribution range and in the fragmentation of their habitats, and therefore not conservation objectives for these species are expected to be affected.*

Thus, the ASPIE project under consideration (subject to the implementation of all countermeasures):

- ➢ It is not likely to delay or interrupt progress towards achieving the conservation objectives of the Natura 2000 areas concerned.
- ➢ It may not reduce the area or fragment the habitat types of Natura 2000 areas or affect the representativeness and degree of conservation of their structure and functions.
- ➢ It may not reduce the population size of the species or affect the degree of conservation of their habitats or fragment them or affect the balance between species or affect the degree of their isolation.
- ➢ It is not likely to cause changes in vital parameters (eg nutrient balance, soil degradation from possible erosion, dynamics of relationships between biotic and abiotic parameters), which determine how Natura 2000 home sites function.
- ➢ May not have interactions with predicted or expected natural changes in the home Natura 2000 areas.

Any disturbance to the birdlife will be temporary and greater during the construction-installation phase of the wind power plant, while it will practically be eliminated during the operation phase of the project. **However, as a precaution, it is considered advisable that the construction works of the project with the greatest potential disturbance, do not coincide with the breeding season of the avifauna (March - June).**

**Cumulative character:** To the north and east of the project, wind power plants are located at a distance of more than 5 km and 2.5 km respectively from the nearest W/T 1 and W/T 11. This distance, although important, may not prevent limited synergistic effects of a cumulative nature with the effects of the project on the avifauna of the area, if the projects are implemented. In any case, in the signed E.O.A. it is stated that (§ 3.6.9): *The eventual construction of all the above projects cannot create significant negative effects on the natural environment of the study area. The zoning of ASPIE is very sparse in distances between projects (>3Km) and zoning has not been done in consecutive rows, creating the barrier effect. The synergistic effect of ASPIE projects is estimated to be small.*

**Cross-border character:** Regarding the cross-border effects of the project on the natural environment, it should be noted that the nearest protected area for avifauna is within the Greek territory, while on the borders with the Bulgarian border there are protected areas included in the Natura 2000 network (BG0002106 and BG0001032). , which were taken into account during the Special Ecological Assessment and cannot be significantly affected neither during the construction phase, nor during the operation phase of the project, as the appropriate measures will be taken regarding the protection of the avian fauna .

In summary, impacts related to avifauna during the **construction phase** have a moderate probability of occurrence (PE:M), local extent (EkE:L) and low intensity (EnE:L), immediate (PoE:I), transient duration (XE:T), partially reversible (AE:PR), of non-synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase** there will be effects on the avifauna by taking appropriate measures, with a low probability of occurrence (PE:L), local extent (EkE:L) and low intensity (EnE:L), direct (PoE:D), permanent duration (XE:P), partially reversible (AE:PR), with possible synergistic action (SD:0) with a cross-border character (DX:0).

| IMPACTS RELATED TO AVIFAUNA | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Avifauna** | Moderate | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | Partially reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Avifauna** | Low | Local | Low | Direct |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Partially reversible | Yes | Yes |

## 9.6 Effects on the anthropogenic environment

The proposed project:

- ✓ Will not obstruct the view of the horizon, nor will it result in the creation of an aesthetically unacceptable landscape, accessible to public view, as the photorealistic illustration shows.
- ✓ Will not cause an increase in the noise level in the nearby settlements, as the Noise Study shows.
- ✓ Will not affect the quality or quantity of existing recreational opportunities.
- ✓ Will not result in a change or destruction of any archaeological site.

**Population**

The proposed project is not expected to cause a change in the growth rate or population density of the area. On the contrary, it will have favorable effects on the standard of living and the economic development of the residents of the area, since there will be some employment for them, mainly during the construction of the projects, but also a permanent influx of resources from the operation of the project which can be used for the development of the local community.

**Residence**

The project does not affect the creation of an additional residence and does not change the structure of the existing residence.

**Human health**

By their nature, the projects do not contain any risk of damage to human health, both for the staff and for the residents of the wider area. For the operating staff, all appropriate measures will be taken to protect them against any accidents.

The type of project does not involve risks from production processes or from the storage of hazardous or toxic materials.

No adverse transboundary impact on the anthropogenic environment is expected.

### *9.6.1 Spatial planning - land uses*

The proposed project will not adversely affect land uses. Animal husbandry can continue to be implemented without problem, as can logging and other activities in the wider area.

The land uses of the wider area are forest-agricultural lands. The A/P will not affect the livestock activity of the area, since the greater percentage of the land that will accommodate it, will be available for other uses. According to a report by Greenpeace , approximately 99% of the land that hosts an A/P is available for other uses, while indicatively it is stated that for the production of energy from a power plant that burns coal, up to 4.5 times more land is required than that required to cover the same energy needs with wind energy.

It is emphasized that the area of the wind power plant will not be fenced, which will contribute to the continuation of livestock activities in the area during the operation phase of the project. It is also emphasized that wind power plants are the most environmentally friendly way of producing large-scale Renewable Energy because they occupy and bind 50 times less land than Photovoltaic Plants for the same energy produced.

All the lands occupied by the proposed project are forest- grassland . All interventions will be carried out in accordance with the instructions of the forestry service, and always within the framework of intervention approval decisions.

**Cumulative nature:** Due to the lack of other organized activities in the project development area, synergistic effects of a cumulative nature with the effects of the project on land uses are not expected.

**Transboundary character:** No adverse transboundary impact on spatial planning and land uses is expected.

In summary, impacts related to spatial planning and land uses during the **construction phase** will have a low probability of occurrence (PE:L), will be of local extent (EKE:L) and of low intensity (Ene:L), of no complexity (PoE:0), of transitory duration (XE:T), of non- synergistic action (SD:0) and without cross-border character (DX:0).

During the **operation phase,** impacts related to spatial planning and land uses will have a low probability of occurrence (PE:L), will be of local extent (EkE:L) and zero intensity (EnE:0), of no complexity (PoE:0), of permanent duration (XE:P), irreversible (AE:Ir), without synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table

| SPATIAL PLANNING AND LAND USE IMPACTS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Spatial planning and land uses** | Low | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | None | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Spatial planning and land uses** | Low | Local | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | None | No | No |

### *9.6.2. Structure and functions of the anthropogenic environment*

There is no built environment in the surrounding area within a radius of approximately 2,950 meters. Any impacts are limited to a local level and mainly concern recreation as the works in the construction phase affect parts of the hiking trails in the area.

**Cumulative nature:** Due to the lack of other organized activities in the project development area, synergistic effects of a cumulative nature with the effects of the project on the functioning of the anthropogenic environment are not expected.

**Transboundary character:** No adverse transboundary impact on the structure and functions of the anthropogenic environment is expected.

In summary, impacts related to the functions of the anthropogenic environment during the **construction phase** will have a low probability of occurrence (PE:L), will be of local extent (EkE:L) and of low intensity (EnE:L), of no complexity (PoE:0), temporary duration (XE:T), fully reversible (AE:R), non-synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase,** impacts related to the functions of the anthropogenic environment will have a low probability of occurrence (PE:L), will be of local extent (EkE:L) and of zero intensity (EnE:0), of no complexity (PoE:0), of no duration (XE:0), reversible (AE:R), without synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table

| IMPACTS RELATED TO ANTHROPOGENIC ENVIRONMENTAL FUNCTIONS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Functions of anthropogenic environment** | Low | Local | Low | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Functions of anthropogenic environment** | Low | Local | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |

### *9.6.3. Cultural heritage*

There will be no negative effects on the Historical and Cultural Environment of the surrounding area from the operation of the proposed wind power plant.

The project is not located within a designated archaeological zone and the area where the works are carried out does not belong to any protection zone of archaeological, cultural and historical sites. However, during the construction of the project, the competent archaeological agency should be notified, which will issue an opinion on the matter in case any archaeological finds are discovered. In this case, the construction process of the project will be subject to the instructions of the competent Archaeological Service of the Ministry of Culture.

**Cumulative nature:** The project is not expected to cause impacts on cultural heritage and therefore synergistic cumulative effects are not expected.

**Transboundary character:** No adverse transboundary impact on cultural heritage or impacts on historical monuments or other sites of historical and cultural interest across the border is expected.

In summary, impacts related to cultural heritage during both the **construction** and **operation phases** will have zero probability of occurrence (PE:0), will be of no extent (EkE:0) and zero intensity (EnE:0), of no complexity (PoE:0), of no duration (XE:0), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| CULTURAL HERITAGE IMPACTS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Cultural heritage** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Cultural heritage** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |

## 9.7 Social - economic effects

The proposed _ project :

- It does not cause negative effects on the Social physiognomy of the area.
- It will strengthen the development profile of the region by creating employment opportunities in the local communities.
- It will support the tourism sector for environment-friendly development and eco-tourism.
- It will support the local municipalities with the revenue of the compensatory fee which they will receive from the operation of the project.
- Finally, it has a positive impact on the quality of life of residents by replacing electricity produced by conventional fuels with clean electricity produced by harnessing the wind.

In the context of environmental tourism and environmental education, it can be considered that wind energy enhances tourism, as it is a method that is not widely known and widespread and is an attraction for visitors with environmental and educational concerns. It also contributes to local development both by increasing employment during the construction of the project and its operation, as well as by the economic and social revitalization of the area, bringing significant resources for local development.

Due to its nature, the proposed project is not expected to cause an increase or decrease in the population density of the settlements in the wider area, with the result that their social and economic conditions will not be affected. The project will not cause changes to existing housing conditions. A temporary increase in the population of the settlements in the area may be observed during the construction of the project, which will be due to the workforce that will be employed. The staff will come either from people in the settlements of the area or outside them, provided by the contractor - contractor of the project. During the operation phase of the Wind Park, (8-10) jobs will be created, which will be filled by local staff. Thus, the socio-economic effects of the construction and operation of the project are primarily positive and concern the wider area of the project where they are installed.

**Cumulative nature:** Positive synergistic effects of a cumulative nature are expected with the socio - economic effects of the project, in case of parallel development of the wind power plants to the north and east of the project.

**Cross-border nature:** No adverse cross-border socio - economic impact is expected.

In summary, the positive socio-economic impacts during the **construction phase** will have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and of moderate intensity (EnE:M), indirect (PoE:I), of temporary duration (XE:T), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border character (DX:0).

During the **operation phase,** the positive socio - economic impacts will have a high probability of occurrence (PE:H), will be of regional extent (EkE:R) and moderate intensity (EnE:M), no complexity (PoE:0), permanent duration (XE:P), irreversible (AE:Ir), without synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| SOCIO-ECONOMIC EFFECTS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Socio -economic effects** | High | Local | Moderate | Indirect |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Temporary | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Socio -economic effects** | High | Regional | Moderate | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | Yes | No |

## 9.8 Effects on technical infrastructure

There will be no negative impacts on the water supply, sewerage and telecommunications networks both during the construction phase and during the operation phase of the project. The project is expected to have a positive impact on the technical infrastructure of the area, as this activity, in combination with all the side activities (access road construction, transport lines, etc.) will contribute to the improvement of the local

infrastructure. During the construction phase only, there will be a temporary, local burden on road traffic due to the transport of W/Ts and other necessary equipment and the movement of construction site vehicles and machinery.

**Cumulative nature:** Due to the lack of other organized activities in the project development area, synergistic effects of a cumulative nature with the effects of the project on the technical infrastructures are not expected.

**Cross-border nature:** No adverse cross-border impact on technical infrastructures is expected.

In summary, the impacts on the technical infrastructures during the **construction phase** will have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and of low intensity (Ene:L), direct (PoE:D), temporary (XE:T), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border character (DX:0).

During the **operation phase,** the positive effects on the technical infrastructures will have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and of moderate intensity (EnE:M ), of no complexity (PoE:0), of permanent duration (XE:P), irreversible (AE:Ir), without synergistic action (SD:0) and no cross-border character (DX:0).

The above conclusions are listed in the next table

| EFFECTS ON TECHNICAL INFRASTRUCTURES | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Technical infrastructures** | High | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Temporary | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Technical infrastructures** | High | Regional | Moderate | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | No | No |

## 9.9 Correlation with anthropogenic pressures on the environment

### *9.9.1. Potential for excessive amplification of one or more of the anthropogenic pressures on the environment*

During the construction phase of the project, the effects will be of short duration, while it is not expected that there will be an excessive strengthening of pressures on the environment of the area. Transient pressures will be limited to the site area of the project and its supporting facilities. During the operational phase of the project, there will be no correlation with the other anthropogenic pressures on the environment, which are particularly mild in the area anyway. Thus, during the construction phase, no other anthropogenic pressure will be enhanced, rather it will remain the same, while during the operation phase, the pressures will decrease.

### *9.9.2. Possibility of creating new pressures on the environment due to the project*

The construction and operation of the station is not expected to bring new pressures on the environment and the ecosystem.

**Cumulative nature:** Due to the lack of other particular pressures on the environment in the project development area, synergistic effects of a cumulative nature with the effects of the project are not expected.

**Transboundary nature:** No adverse transboundary impact is expected in association with anthropogenic pressures on the environment.

In summary, the impacts due to association with other anthropogenic pressures on the environment during the **construction phase** will have a zero probability of occurrence (PE:0), of no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), of zero duration (XE:0), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase,** the impacts due to association with other anthropogenic pressures on the environment will have a zero probability of occurrence (PE:0), of no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0) , of zero duration (XE:0), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border character (DX:0).

The above conclusions are listed in the next table

| IMPACTS RELATED TO EXISTING OR NEW ANTHROPOLOGICAL PRESSURES | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **New/ associated with existing anthropogenic pressures** | Zero | None | Zero | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **New/ associated with existing anthropogenic pressures** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |

## 9.10 Effects on air quality

Construction phase

During the execution of the project, it is expected that there will be impacts on the air quality in the project area, which will come from the operation of the construction site. These effects are located in the gaseous pollutants that will be produced by the movement of vehicles, on the one hand for the transport of materials and on the other hand for the construction work of the project, as well as from the construction machinery as products of oil combustion ($NO_x$, soot, hydrocarbons, $CO_2$, $SO_x$ and aldehydes). However, it is obvious that the total burden throughout the construction of the project will be negligible, as it is a non-permanent and limited duration effect and is not capable of degrading the quality of the area's atmosphere.

The impacts from the operation of the construction site include the creation of dust from excavations, unloading and deposits of construction materials. The amount of dust that will be produced depends on the method of excavation, the excavation materials, as well as the particular climatic conditions that will prevail in the area during the construction period of the project. In addition, it is possible that some unpleasant odors will be created on site from the burning of diesel fuel and from the operation of machinery.

The aforementioned effects are not considered capable of degrading the quality of the atmosphere in the project area, because they will be temporary and reversible. In addition, the construction works of the project will be carried out at a great distance from

settlements and any disturbance is not expected to affect their residents. On the contrary, the operation of the project will cause positive effects on the atmospheric environment.

Operating phase

The proposed project not only does not emit pollutants and greenhouse gases into the air but on the contrary:

- It causes positive effects on the atmospheric environment
- It limits the greenhouse effect because it will reduce greenhouse gas emissions from burning conventional fuels in power plants. The gaseous pollutants produced during the operation of a conventional power plant are shown in the table below:

| | | CO2 | SO2 | CO | NOx | HC | σωματίδια |
|---|---|---|---|---|---|---|---|
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / ΕΤΟΣ | Τόνοι/έτος | 285,600.00 | 5,208.00 | 60.48 | 403.20 | 16.80 | 268.80 |
| ΠΟΣΟΤΗΤΑ ΡΥΠΩΝ ΠΟΥ ΕΞΟΙΚΟΝΟΜΕΙΤΑΙ / 20 ΕΤΗ | Τόνοι | 5,712,000.00 | 104,160.00 | 1,209.60 | 8,064.00 | 336.00 | 5,376.00 |

**Table 49**: Emission of pollutants avoided by the operation of the wind power plant.

As can be seen from the data in the table, the zero solution will result in the contamination of the environment with over 285,600 tons of carbon dioxide / year as well as the contamination of over 6,000 tons of other dangerous pollutants such as sulfur dioxide, nitrogen oxides, monoxide of carbon and particles. In a 20-year horizon, which is also the projected lifetime of the project, the positive environmental effects of the project will be multiple and the reduction of gaseous pollutants due to the operation of the project will exceed 5,712 thousand tons of $CO_2$. The above calculations were made based on the average values of emitted pollutants for the production of a final kWh of electricity in the Greek interconnected system of a conventional power plant.

- It promotes the goals of the global community regarding the reduction of gaseous pollutants and the penetration of RES in the total electricity generation, at a rate of 30% by 2030.

**Cumulative nature:** The project is not expected to cause impacts on the atmospheric environment and therefore synergistic effects of a cumulative nature are not expected.

**Transboundary nature :** No adverse transboundary impact on air quality is expected. Any negative impacts are solely related to the construction phase and only locally affect the project area. On the contrary, indirect positive effects will arise from the operation of the project, but without having a cross-border nature.

In summary, the impacts on air quality during the **construction phase** will have a high probability of occurrence (PE:H), will be of local extent (EkE:L) and of moderate intensity (EnE:M), immediate (PoE:I), of temporary duration (XE:T), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border character (DX:0).

During the **operation phase,** the positive effects on air quality will have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and of low intensity (EnE:L), indirect (PoE:I), of permanent duration (XE:P), irreversible (AE:Ir), of non-synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table

| IMPACTS ON AIR QUALITY | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Air quality** | High | Local | Moderate | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Temporary | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Air quality** | High | Local | Low | Indirect |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | No | No |

## 9.11 Noise or vibration effects

The proposed project does not cause vibrations and any form of radiation. The surrounding settlements will not be disturbed by the operation of the wind power plant. Attached below is the relevant Noise Study for the proposed wind power plant. Even at the project site the noise generated at ground level is no greater than that generated by the wind as it blows through the bushes and trees.

There will be impacts on the environment from the noise of the machinery during the construction of the project. It is pointed out that all the works will be carried out far from residential areas, will last a relatively short period of time, approximately 18 months, and therefore no disturbances are expected for the residents of the settlements in the wider area. However, it is recommended that the specifications of the correct operation of the machines be respected, that machines with reduced noise pollution, well maintained and that the permitted acoustic power levels are respected according to the K.Y.A. 37393/2028/2003.

In addition to the above K.Y.A. there are legislative regulations on sound protection of the environment during the use of jackhammers and other noisy machines. In the case of using such machines, the manufacturer is obliged to apply the applicable legislative regulations for the protection of the environment from noise during the construction of the project (Ministerial Decisions 56206/1613 Official Gazette 570/B/ 9-9-86, 69001/1921 Official Gazette 751/B/18-10-88 and A5/2375 Official Gazette 689/B18).

One of the factors considered during the siting of W/T and A/P is their contribution to the noise level of the installation area.

The location of the A/P is mountainous, with no residential activity, with little agricultural development and livestock activity. This fact combined with the limitation of the noise produced by the W/T minimizes the nuisance caused by the noise produced.

The sound produced by a wind turbine is due to:

- in the rotation of its wings (aerodynamic noise) and
- on the rotating parts of the Electromechanical Equipment (speed multiplier and generator).

Consequently, when an W/T is not working, no sound is produced at all.

Competent public authorities worldwide use decibels , dB ( A ) on the A-weighting scale for sound intensity, because this scale best corresponds to sounds perceived by the human ear. The dB ( A ) scale is a logarithmic scale. This means that if the sound pressure or energy is doubled the loudness of the sound increases by 3 dB ( A ). That is, a sound level of 100 dB ( A ) contains twice as much energy as a sound level of 97 dB ( A ). According to the above, if two wind turbines are installed instead of one at approximately

the same distance from our ears, the sound energy reaching them will be doubled, so the sound level will increase by 3 dB(A).

The volume of sound decreases as the square of the distance from the sound source. That is, if someone moves 200m. from an W/T, the volume will be a quarter of what it would be if it were 100m away . Doubling the distance reduces the dB(A) level by 6 dB(A).

The sound level at a distance of 40m. from a wind turbine is 50-60 dB(A), which is equivalent to the volume of a conversation and does not differ from the sound of a 4-5 Beaufort wind blowing through the trees. Already the wind turbine carrier is at a height of approximately 149 meters from the ground, therefore at ground level and at the base of the W/T the noise level is no greater than 40-45 dB(A). At a distance of 200 meters from the base of the W/T, the noise level drops below 40 dB(A), downwind of the wind turbine, for a wind speed of 8 m/s . It is important to understand that due to the windiness of the W/T installation area, there will be no sound burden on the fauna due to the wind power plant: The ambient noise level due to the blowing wind is greater than that created by the W/Ts. To understand the physical meaning of the decibel scale , which is used to measure sound intensity, it is enough to refer to known noise levels, which give a measure of comparison:

| Source / Activity | Indicative noise level dB ( A ) |
|---|---|
| Hearing threshold | 0 |
| Noise limit at night in the countryside | 20-40 |
| **Quiet Bedroom** | **35** |
| Car at 40 mph and 100 m | 55 |
| Office | 60 |
| **Wind turbine at 200m** | **35-45** |
| Truck at 30mph in 100m | 65 |
| Drilling rig at 7m | 95 |
| Aircraft at 250m | 105 |
| Pain threshold | 140 |

**Table 50:** Average noise levels in dB (A).

Locally, noise is generated at the location of the wind turbine during its operation, mainly due to its rotating blades. However, this noise is insignificant because firstly it is of low intensity and secondly because of course it does not bother anyone since the wind power plant is located in a windy location. Then a noise study of the wind park is attached, which describes in detail the noise level due to the park in the surrounding areas.

### *9.11.1 Noise study*

#### 9.11.1.1 Theoretical background of noise study

In this section, the sound nuisance from the operation of the wind power plant is assessed, and in particular the noise in the wider anthropogenic environment.

The noise disturbance that may be caused in the immediate environment is mainly due to the noise emission from the operation of the wind turbines. Wind power plants, to be economically viable production units, are mainly installed in open areas where strong

winds blow. This fact results in the overlap of the noise produced by the noise caused by the wind itself.

On the other hand, the areas where wind power plants are installed are usually isolated and distant from settlements and other centers of human activity (tourist facilities, archaeological sites , etc. ), resulting in a reduction of any disturbance due to noise. During the operation of a wind turbine, noise emissions are due to mechanical noise, produced by the operation of the mechanical components, and aerodynamic noise, which depends on the wind speed and the aerodynamic design of the blade.

Mechanical noise is mainly dealt with by using sound insulation in the inner wall of the structures and anti- vibration footings of the components . Aerodynamic noise is distinguished into the noise caused by the rotation of the blades and the noise caused by the wind turbulence (turbulence) in the fins and the back. part of the impeller.

To deal with aerodynamic noise, techniques are applied to reduce the factors that cause it with the aerodynamic design of the engine and wings and the use of suitable materials for the construction of the parts. During the last 10 years, significant progress has been made in the direction of reducing the noise produced by wind turbines, with the result that today's wind turbines produce noise at ground level that is almost of the same intensity and characteristics as the noise created by the wind blowing in the trees and bushes. Thus, the operation of the wind turbines does not change the existing natural noise levels in the area.

In the present case, experimental studies demonstrate that the noise produced by a representative Vestas wind turbine V 162-6.2 MW below the impeller (at the top of the support tower) amounts to 105 db ( A ) approx. The calculation of this noise level corresponds to a wind speed of 8 m / s which is measured - the speed of the wind - at a height of 10 meters from the ground. So already at ground level, which is 149.0 meters from the top of the support tower, the noise level has decreased significantly and is below 50 dBA . Besides, the design of the wind turbine gives a reduced production of both mechanical and aerodynamic noise.

In order to assess the noise disturbance caused by the installation and operation of the particular wind power plant, a special noise study was prepared. The methodology followed for the study and the results are then presented. The study is implemented with the WINDPOWER PLANT software , which has appropriate code to calculate the noise distribution caused by wind turbines around their installation locations. The Danish noise propagation determination model according to ' Description is used to calculate the sizes Of Noise Propagation Model Specified By Danish Statutory Order Mr Noise From Windmills ( Nr . 304, 14 May 1991)' and is accepted by the Danish Ministry of the Environment. According to this model, the propagation of noise in space and the noise level at each point around each wind turbine are affected by factors such as the absorption of noise by the air and its attenuation with distance, as well as the effect of the topography of the ground . The final noise intensity value at each point results from the logarithmic summation of the individual noises of the wind turbines.

The results of the study are presented graphically in db (A) units .

### 9.11.1.2 Presentation of noise study results

To carry out the noise study, the locations and type of W/Ts on the map as well as the locations of the settlements are used as inputs. The software then calculates the noise level over the entire solution area and presents the result with equal noise level curves. It also solves separately at the locations of the settlements and gives the expected value of

the noise intensity in each settlement, as well as the contribution of each W/T to the calculated value. It is noted that for each settlement a solution point is obtained, the one closest to the wind power plant.

The resolution was made for the nearest settlements. From the results, presented below, it follows that there will be no disturbance in the settlements, since the noise level at the boundaries of the settlements will not be particularly noticeable. It is noted that the calculated noise level is much lower than the legal limits. According to the current legislation - PD 1180/81, the maximum permitted noise limit for facilities in contact with residential buildings is 45 db (A), while for areas where the urban element prevails, the limit is 50 db (A) .

| House ID | Settlement | Easting | Northing | Noise ( dB ) |
|---|---|---|---|---|
| 1 | Pentacle | 681243 | 4612431 | 14.68 |
| 2 | Therapy | 682225 | 4604874 | 15.93 |
| 3 | Milea | 680139 | 4603644 | 9.59 |
| 4 | Serenity | 681446 | 4603383 | 7.25 _ |
| 5 | Komara | 685302 | 4606776 | 14.28 |
| 6 | Carp | 685119 | 4604739 | 5.73 |
| 7 | Pebbles | 677160 | 4617281 | 0.00 |

**Table 51:** Noise Study Results - Noise level in the settlements.

**Cumulative character:** Due to the lack of other disturbing noise emitting activities in the project development area, synergistic cumulative effects with the project impacts are not expected. The possibility of cumulative effects from the operation of neighboring parks to the north and east of the project was studied and presented in par. 13.1.

**Cross-border nature:** The impacts expected on the acoustic environment during the construction phase are expected to be weakly negative and local (work area), within the Greek territory. As can be seen from the image above , no cross-border noise impact is expected. During the operational phase, on the basis of the isonoise curves determined, it follows that no noise effects are expected, both for the nearest settlement to the ASPIE under study in the Bulgarian territory ( Huhla ) which is approximately 6.4 km from the nearest to it W/T (W/T15) but also the closest one in Greek territory ( Komara ) which is approximately 2.95 km from the closest W/T (W/T 31). The noise level is below the level of 45 dB ( A ), which is also the limit for all residential activities.

The following map shows the curves of the same noise level. In the center of the area, with the 21 bright circles is the source of the noise – 21 W/T.

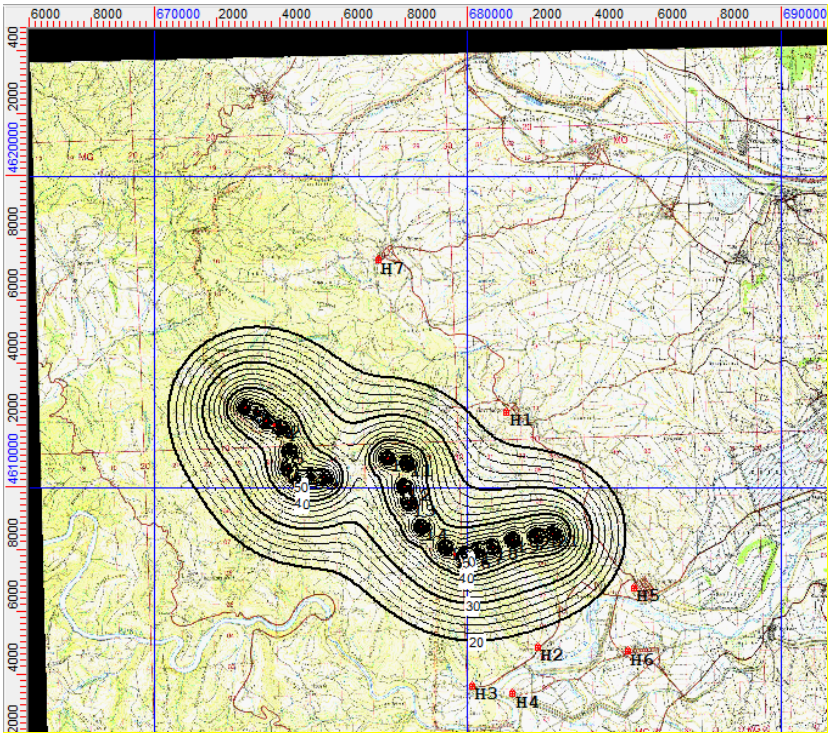



**Figure 61:** Noise curves from the operation of the wind power plant.

In summary, the noise impacts during the **construction phase** will have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and moderate intensity (EnE:M), immediate (PoE:I), temporary duration (XE:T), fully reversible (AE:R), of non-synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operational phase,** the noise impacts will have a high probability of occurrence (PE:H), will be of a local extent (EkE:L) and low intensity (EnE:L), immediate (PoE:I), permanent duration (XE:P), irreversible (AE:Ir), of non- synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table.

| **NOISE EFFECTS** | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Noise** | High | Local | Moderate | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Transient | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Noise** | High | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | No | No |

9.11.1.3 Eye contact study

Another issue related to the impact of the siting of a wind power plant is the issue of line of sight. The map below shows the visual contact with the wind power plant from the nearby settlements. In green are the positions from which there is visual contact with 1-5 W/T, in blue the positions from which there is visual contact with 6-10 W/T, in pink 11-15

W/T and in yellow 16-21 W/T. In the areas where there is no coloring, no W/T will be visible.

The study was done using the corresponding code of WINDPOWER PLANT, entering the positions and type of W/T, as well as the positions of the settlements. According to the results of the study, visual contact will be limited from the nearby settlements. There will be visual contact with the upper sections of W/Ts (the upper half of each W/T) in more distant settlements. Visual contact will exist provided the atmosphere is clear. The results of the eye contact study are approximate and indicative.

By combining the visual contact of the settlements with the wind power plant together with their distance from it, we conclude that there will be no visual disturbance in the surrounding areas.

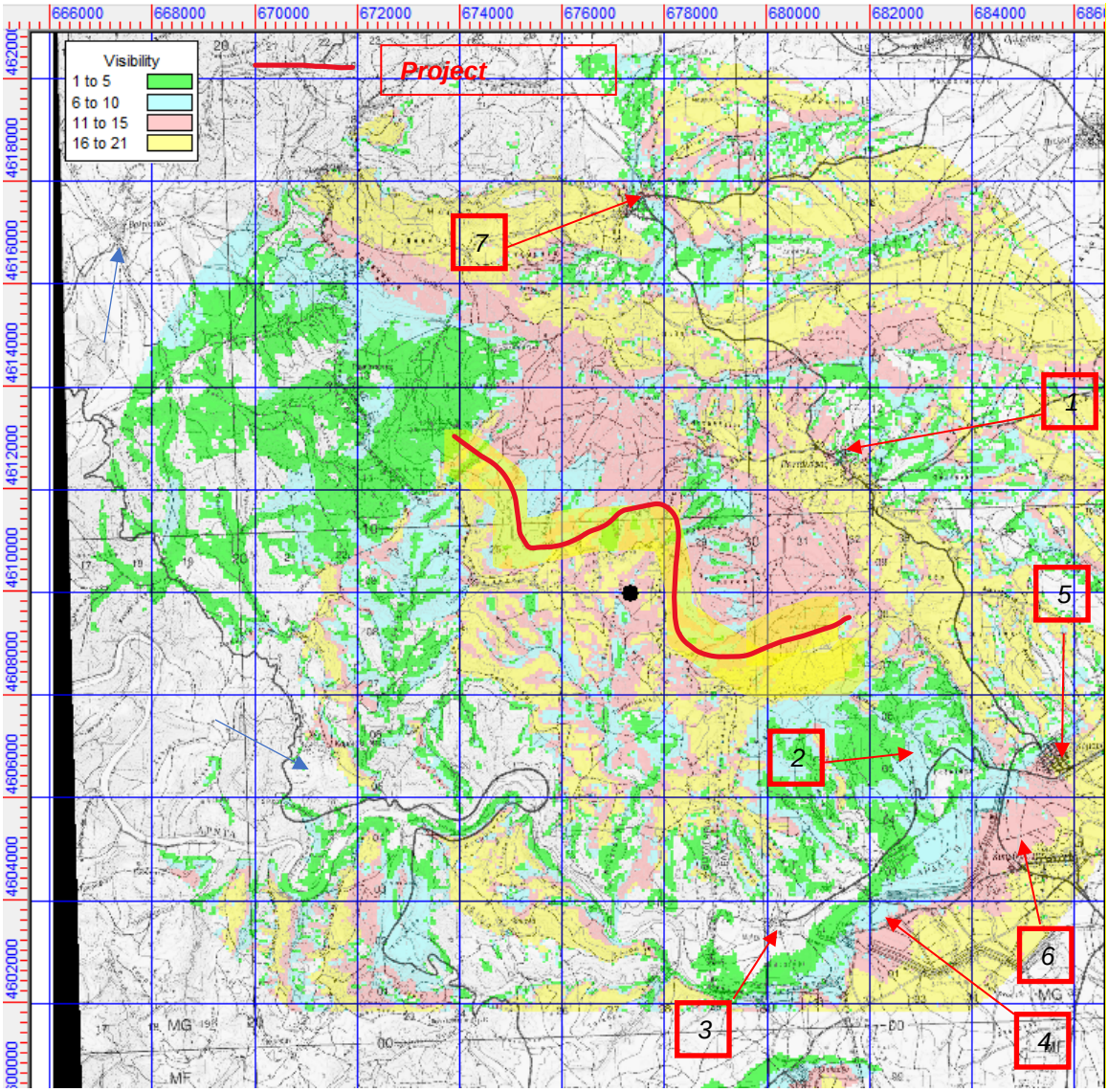



**Figure 62:** Visual contact of the wind park with the surrounding settlements.

**Cumulative nature:** Due to the lack of other activities in the project development area, synergistic effects of a cumulative nature with the effects of the project are not expected.

**Cross-border character:** As can be seen from the image above , there is no cross-border impact of visual nuisance (settlements in Bulgarian territory with blue arrows).

In summary, the effects of visual nuisance during the **construction phase** will have a low probability of occurrence (PE:L), will be of local extent (EkE:L) and of low intensity (EnE:L), immediate (PoE:I), temporary duration (XE:T), fully reversible (AE:R), of non-synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase,** the effects of visual nuisance will have a low probability of occurrence (PE:L), will be of a local extent (EkE:L) and of low intensity (EnE:L), immediate (PoE:I), permanent duration (XE:P), irreversible (AE:Ir), of non- synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table.

| EFFECTS OF VISUAL NUISANCE | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Visual nuisance** | Low | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Temporary | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Visual nuisance** | Low | Local | Low | Immediate |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | Permanent | Irreversible | No | No |

## 9.12 Effects related to electromagnetic fields

The creation of electromagnetic interference problems refers on the one hand to problems caused by the wind turbines due to their location in relation to already existing television or radio stations and on the other hand to possible electromagnetic emissions from them.

Propagation of broadcasts on television or radio frequencies (mainly on FM broadcast frequencies ) is affected by obstacles interposed between transmitter and receiver. The main problem with wind turbines comes from the moving blades which can cause signal fluctuations due to reflections. This was much more pronounced in the first generation of wind turbines that had metal blades. With today's W/Ts whose blades are synthetic, interference effects have been eliminated. W/T according to EWEA ( European Wind Energy Association ) cause interference in telecommunications, due to the fins that sometimes scatter the signal as they rotate. In the study area, as found, there are telecommunications facilities, but at a considerable distance from the nearest W/T, which are not expected to be affected by the construction and operation of the proposed project. In terms of emitted radiation, the only subsystems that could be considered to "emit" low-level electromagnetic radiation are the generator and the medium voltage transformer. The electromagnetic field of the generator is extremely weak and is limited to a very short distance around its shell which is placed above the ground. The radiation of these devices is less than that of the PPC cables on the wooden poles that bring the electric power to the houses.

In this case, the generator is placed at a height of 149 m from the ground, while the medium voltage transformer is placed in an enclosure of specially formed sheet steel, and for this reason there is no real issue of exposure to electromagnetic radiation even at the base of the wind turbine.

**Cumulative character:** The project is not expected to cause effects related to electromagnetic fields and therefore synergistic cumulative effects are not expected.

**Cross-border character:** There is no cross-border impact of electromagnetic fields and due to the long distance from the border, but also because no radiation is emitted.

In summary, the effects of electromagnetic radiation emissions during the **construction phase** will have a zero probability of occurrence (PE:0), have no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE :0), no duration (XE:0), fully reversible (AE:R), non- synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase,** the effects of electromagnetic radiation emissions will have a zero probability of occurrence (PE:0), will have no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), no duration (XE:0), fully reversible (AE:R), of non-synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table

| EFFECTS OF ELECTROMAGNETIC RADIATION | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Electromagnetic radiation** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Electromagnetic radiation** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |

## 9.13 Effects on Water

*9.13.1 . Effects on the priorities or objectives of the measures approved with the Watershed Management Plan of the concerned Water Division, as well as the effects of the project in relation to the measures provided for in any approved Flood Risk Management Plan*

Both during the construction phase and during the operation phase there are no expected impacts on the priorities or objectives of the measures approved with the Watershed Management Plan of the relevant Water Division, or in relation to the measures provided for in the approved Flood Risk Management Plan

*9.13.2. Effects on surface water*

The proposed project during both its construction and operational phases:

- It will not cause changes in the currents, nor changes in the course or direction of the movements of all kinds of surface liquids.
- It will not cause changes in the rate of absorption, drainage pathways, or the rate and amount of soil leaching.
- It will not cause changes in the flow of flood waters.
- It will not cause changes in the amount of surface water in any body of water.
- It will not cause outflows of liquid waste into surface waters with a change in their quality.

### *9.13.3. Effects on groundwater*

The proposed project during both its construction and operational phases:

- Will not cause outflows of liquid waste into underground waters with a change in their quality.
- Will not cause a change in the direction or supply of groundwater.
- Will not cause a change in the quantity of ground water either by direct addition of water or its withdrawal, or by blocking an underground feeder of such water in fields or excavations.
- Will not reduce the amount of water that would otherwise be available to the public.
- Will not lower the level of underground aquifers .
- Will not cause a risk of exposure of people or property to water damage such as flooding or tidal waves.
- Even in the event of a fire, the proposed project is not going to cause surface water and underground aquifers to be burdened with dangerous substances.

**Cumulative nature:** The project is not expected to cause impacts on water and therefore synergistic cumulative effects are not expected.

**Transboundary nature:** Due to the nature of the project, there is no transboundary impact on water, surface or underground.

In summary, the impacts on surface and underground water during the **construction phase** will have zero probability of occurrence (PE:0), will have no extent (EkE:0) and zero intensity (EnE:0), of no multiplicity (PoE :0) , of no duration (XE:0), fully reversible (AE:R), of non- synergistic action (SD:0) and of a cross-border nature (DX:0).

During the **operation phase,** the effects of electromagnetic radiation emissions will have a zero probability of occurrence (PE:0), will have no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), no duration (XE:0), fully reversible (AE:R), of non-synergistic action (SD:0) and cross-border (DX:0).

The above conclusions are listed in the next table.

| EFFECTS ON WATERS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Surface and groundwater** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Surface and groundwater** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |

## 9.14 Assessment of the expected impacts arising from the project's vulnerability to major accident or disaster risks associated with the project in question

As discussed in paragraph 8.14, the proposed project does not have high levels of vulnerability to natural disasters. The most important risks of failure of the project are focused mainly on the occurrence of an earthquake and high wind intensity. For the first case, the foundations of the wind turbines are dimensioned based on the predicted values

for seismic Zone 1, to which it belongs. Regarding the second case, in case of high wind speeds (greater than 20-25 m/s) the W/Ts brake and stop turning to avoid an accident.
Also, as presented in paragraph 8.14, the vulnerability of wind turbines and their accompanying projects (eg Electricity Transmission Networks, Road Construction Projects, etc.), is very small due to their particular characteristics. Serious accidents or disasters can rarely be caused by the operation of a wind power plant. Possible risks and accidents related to Wind Power plants are the following:

✓ Accidents while transporting the equipment:

The individual parts of the wind turbines, as well as the E/M equipment, are bulky and heavy. For this reason, they are transported with special vehicles. Transport often takes place in adverse conditions, such as steep slopes and bends. Due to these conditions, an accident could occur from equipment falling or an accident to the vehicle, driver and working personnel.

Preventive measures:

The transport of the W/T and the equipment will be carried out by specialized crews and experienced transporters and with the use of special vehicles. All the prescribed safety rules will be observed and the movement of vehicles will be done at a very low speed and accompanied by warning vehicles. The route to be followed will be studied by the transporters, who will be fully prepared. The chance of an accident will be practically nil.

✓ Accidents during the installation of W/T:

The installation - lifting and assembling - of the parts of an W/T involves accident risks. Falling of heavy parts and accident to working personnel could occur. The risk is higher when the weather conditions are difficult and mainly there are strong winds.

Preventive measures:

Equipment installation work will be assigned to specialized workshops with the appropriate equipment. Usually the installation is done by the W/T manufacturing company itself. The work is carried out when the weather conditions allow it and with all the necessary protective means.

✓ Extreme weather conditions:

Winds of strong intensity hurricanes, tornadoes, cyclones, icing on the blades of W/T, may cause accidents in the wind power plants, the working personnel and the environment of the wind power plants.

Preventive measures:

In case of extreme weather, work will be interrupted. The condition of the W/T is constantly checked by remote monitoring and there is the possibility of intervention. The workshops that will be employed in construction, operation and maintenance have expertise and experience. There will be appropriate warning signage for the public.

✓ Fires:

Fires can affect the installations of a wind power plant, since they are mainly installed in forested areas. There is also the possibility of a fire being caused by the electromechanical components of the wind power plant itself, or even by lightning.

Preventive measures:

The wind power plant will have fire protection measures, as provided by the current legislation. At the same time, through remote monitoring , it will be possible to detect a potential problem in time, so that the fire service can be informed and act quickly. The road construction of the wind power plant contributes to the ease of access to deal with possible fires. Fires caused by the E/M components of the wind power plant itself are extremely unlikely, as there will be a program of maintenance and fault detection. It should also be noted that the electrical cables will be installed underground, so they will not be a fire hazard.

✓ Corrosion of equipment :

Corrosion in the equipment of a wind power plant could occur and cause an accident.

Preventive measures:

The components are properly designed and made of materials certified to withstand. At the same time, a check will be made during regular maintenance and problems will be repaired if they occur. Corrosion of equipment is not a common occurrence in wind power plants.

✓ Detachment of blades:

The blades of the wind turbines are subject to great stresses throughout their life cycle. The risk of detaching part or the whole wing is very small, but it does exist.

Preventive measures:

It will be checked during routine maintenance and problems, if any, will be fixed before they develop.

Summarizing the above, it is concluded that the project under study, as well as the wider study area, do not have an assessable vulnerability to risks to human health, cultural heritage and/or the environment due to accidents or disasters. In order to reduce the possible small-scale accidents that may occur during the construction and operation phase of the project under study, appropriate measures are proposed in the context of the present, as will be presented in subsequent chapters. KYA 172058/2016 – Official Gazette 354/B/17-2-2016 concerns the Determination of rules, measures and conditions for dealing with risks from large-scale accidents in facilities or units, due to the existence of dangerous substances, in compliance with the provisions of the directive 2012/18/EU. No hazardous substances are used in this particular project, only wind energy.

**Cumulative character:** Due to the lack of other activities in the project area, synergistic cumulative vulnerability effects are not expected.

**Transboundary nature:** Due to the nature of the project, there are no transboundary impacts resulting from the project's vulnerability to major accident or disaster risks.

In summary, the impacts of the vulnerability of the project to risks of serious accidents or disasters during the **construction phase** will have a zero probability of occurrence (PE:0), will have no extent (EkE:0) and zero intensity (EnE:0), no complexity (PoE:0), of no duration (XE:0), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border nature (DX:0).

During the **operation phase** , the effects of the vulnerability of the project to the risks of serious accidents or disasters will have a zero probability of occurrence (PE:0), will have no extent (EkE:0) and zero intensity (EnE:0), of no complexity (PoE:0), of no duration (XE:0), fully reversible (AE:R), of non- synergistic action (SD:0) and without cross-border nature (DX:0).

The above conclusions are listed in the next table

| IMPACTS OF PROJECT VULNERABILITY TO SERIOUS ACCIDENTS OR DISASTERS | | | | |
|---|---|---|---|---|
| **Construction phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Vulnerability to major accident or disaster risks** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |
| **Operating phase** | **Probability of occurrence PE** | **Extent EkE** | **Intensity EnE** | **Complexity PoE** |
| **Vulnerability to major accident or disaster risks** | Zero | None | Zero | None |
| | **Timing XE** | **Dealing with AE** | **Synergistic action SD** | **Cross-border nature DX** |
| | None | Reversible | No | No |

## 9.15 Summary of effects in tables

In the table below, the environmental impacts are presented in aggregate, in tabular form.

| Impact on | PS | LO | EI | II | IC | IT | IA | SA | CC |
|---|---|---|---|---|---|---|---|---|---|
| Climatological/ bioclimatic characteristics | C | M | NA | 0 | NA | NA | NA | N | N |
| | O | H | E | M | I | P | I | N | N |
| Morphological characteristics | C | M | L | L | NA | PE | NA | N | N |
| | O | 0 | L | L | NA | PE | NA | N | N |
| Topological characteristics | C | M | L | L | NA | PE | NA | N | N |
| | O | H | L | M | NA | P | I | N | N |
| Geological/architectural/soil characteristics | C | M | L | L | NA | PE | NA | N | N |
| | O | 0 | NA | 0 | NA | NA | NA | N | N |
| Flora, vegetation, habitats | C | M | L | L | NA | PE | R | N | N |
| | O | 0 | NA | 0 | NA | P | R | N | N |
| Forests and woodlands | C | H | L | L | D | PE | I | N | N |
| | O | 0 | NA | 0 | K | P | PR | N | N |
| Fauna | C | M | L | L | D | PE | PR | N | N |
| | O | 0 | NA | 0 | K | P | R | N | N |
| Bird fauna | C | M | L | L | D | PE | R | N | N |
| | O | L | L | L | D | P | PR | Y | Y |
| Spatial planning - Land use | C | L | L | L | NA | PE | NA | N | N |
| | O | L | L | 0 | NA | P | NA | N | N |
| Structure/functions of the man-made environment | C | L | L | L | NA | PE | R | N | N |
| | O | L | L | 0 | NA | NA | R | N | N |
| Cultural heritage | C | 0 | NA | 0 | NA | NA | R | N | N |
| | O | 0 | NA | 0 | NA | NA | R | N | N |
| Socio-economic environment | C | H | L | M | I | PE | R | N | N |
| | O | H | R | M | NA | P | I | Y | N |
| Technical infrastructure | C | H | L | L | D | PE | R | N | N |
| | O | H | R | M | NA | P | I | N | N |
| Correlation with anthropogenic environment Pressures on the environment | C | 0 | NA | 0 | D | K | R | N | N |
| | O | 0 | NA | 0 | K | K | R | N | N |
| Air quality | C | H | L | M | D | PE | R | N | N |
| | O | H | L | L | I | P | I | N | N |
| Noise/Vibration | C | H | L | M | D | PE | R | N | N |
| | O | H | L | L | D | P | I | N | N |
| Electromagnetic fields | C | 0 | NA | 0 | NA | NA | R | N | N |
| | O | 0 | NA | 0 | NA | NA | R | N | N |
| Water | C | 0 | NA | 0 | NA | NA | R | N | N |
| | O | 0 | NA | 0 | NA | NA | R | N | N |
| Serious accidents due to natural disasters | C | 0 | NA | 0 | NA | NA | R | N | N |
| | O | 0 | NA | 0 | NA | NA | R | N | N |

Project Stage (**PS**): **C** – Construction, **O** – Operation
Likelihood of Occurrence (**LO**): **0** -Zero, **L** -Low, **M** -Medium, **H** – High
Extent of impact (**EI**): **NA** – None, **L** – Local, **R** – Regional, **N** – National
Impact intensity (**II**): **0** -Zero, **L** -Low, **M** -Medium, **H** – High
Impact complexity (**IC**): **D** -Direct, **I** – Indirect, **NA** - None
Impact Timing (**IT**):**PE**–Periodical, **R**–Repeatable, **P** –Permanent, **NA** -None
Impact assessment (**IA**): **I** – Irreversible, **R** –Reversible, **PR**– Partially Reversible, **NA**-None
Synergistic action (**SA**): **Y** -Yes, **N** - No
Cross-border character (**CC**): **Y** -Yes, **N** - No

## 10. ADDRESSING ENVIRONMENTAL IMPACTS

Based on the Commission Communication - Guidance document on wind energy projects and EU nature protection legislation[27] , the potentially proposed mitigation measures for environmental impacts in relation to the life cycle stages of a wind energy project are presented in the table below , from the design stage to decommissioning.

Based on the above, as well as the effects identified in the previous chapter, the proposed measures to mitigate the environmental effects of the wind power plant are analyzed in the following paragraphs.

### 10.1 Detailed description of additional measures proposed to address significant adverse effects of the project on the environment, beyond those incorporated in the design of the project or activity.

The additional measures proposed to address the significant adverse effects of the project on the environment, beyond those incorporated in the project design, are:

- Adherence to the fuel quality limits that will be used by the machines during the construction of the project, as defined in the existing regulations.
- The frequent wetting of spaces to reduce the emitted dust and suspended particles during the execution of the technical construction works of the park (e.g. new road construction zone, construction sites, wind turbine erection squares).
- The establishment of maximum speed limits on all dirt surfaces.
- machines are facing upwards and not towards the ground.
- All trucks carrying loose materials must be covered.
- The restoration of vegetation where it is cleared by the technical works during the construction phase.
- Any excess of the excavations will be disposed of in the areas of the wind turbines' squares or in suitable areas.
- The covering of the possible slopes with vegetable land and planting in minimal places with endemic plants so that the anthropogenic effect on the landscape does not become intense, by changing the floral landscape of the area.
- The immediate removal of dead animals (dogs, goats, sheep, horses , cows, etc.) located within a radius of 500 meters from the base of the wind turbines. These dead animals should be moved to safe locations away from the wind power plant (for example in organized supplementary feeding areas), but remain available to scavenging birds. In this way, the risk of carrion-eating species hitting the wind turbines when they find each dead animal will be reduced, while the availability of their food will not be affected.
- Compliance with the specifications for the correct operation of the excavation machines and the permitted acoustic power levels, based on the K.Y.A. 37393/2028/2003, during their operation. It is also suggested, as a measure to reduce noise, the use of machines with reduced noise pollution, well maintained so as not to burden the acoustic environment of the study area. Regarding the noise, during the operation phase of the project, it comes from the rotation of the blades and from the rotating parts of the electromechanical equipment. The noise level is low and will not be a nuisance for the personnel working on the project either.

- Removal of solid waste mainly from the abandonment of bases, packaging materials, pieces of machinery and other special waste in areas suitable for them.
- Removal of the solid products of the excavations that are not considered suitable for filling the pits. It is the contractor's responsibility both for the proper operation of the construction site and for the collection of waste, which, in cooperation with the local authorities, can be deposited in areas suitable for them (e.g. collection of waste and feed residues in plastic bags and transporting them to the waste collection bins of the area). Measures will also be taken for the priority sorting of aggregates and recyclable materials at the construction site and their separate collection to make their utilization easier. Also, the collection bins will be monitored during the day's work and at the end of the day they will be protected with a suitable cover to avoid dropping foreign objects and mixing with other waste. The transport of the waste to approved treatment facilities or to the utilization and disposal sites will be carried out by means of transport equipped with suitable covers, in order to prevent their dispersion or diffusion on the roads.
- During the operation phase of the project, the generated solid waste will come from both the personnel and the maintenance and restoration of the machines. The staff of the A/P will have the responsibility of collecting the waste it produces and transporting it to an appropriate collection area of the nearest MUNICIPALITY, in order to avoid the movement of waste trucks in the area, for a small volume of waste production (the staff will be employed for a few hours per day).
- In terms of safety and other risks to the natural and man-made environment, the effects of a wind power plant are negligible. For the further safety of workers and the environment during the construction phase of the project, the following are recommended:
    - Fencing of transported bulky materials and, where applicable, vehicles and machinery.
    - Marking of the work area with appropriate signs to inform passing pedestrians and vehicles.
    - Take simple fire safety measures.
    - Also, in addition to the helmet and appropriate footwear and uniforms (if required), special care should be taken and measures taken:
        - During the movement of pedestrians, machines and vehicles at the excavation stage, and during the transport of materials and tools.
        - When supporting the sides of the trenches and removing them.
        - When cleaning the bottom of the trenches from excess excavation products, shaping it, lowering pipes or other materials, concreting them, etc. It is pointed out here that no objects or tools should be left on the edges of the trenches that could fall into she.
        - During the movement of passing pedestrians and vehicles by fencing off the area as much as possible and marking it with signs in accordance with the K.O.K. and other relevant provisions.
        - When using chemicals, if required, by using a suitable face mask and carefully removing them after the end of work.
- The operation of the project under study and especially the electricity transmission lines represent an increased risk of fire from any short circuit. This risk for the specific project does not exist because its entire network will be underground on existing or new roads under construction.

*10.2 Structure of measures*

The structure of the proposed measures is based on the analysis of the effects on the various parameters of the environment and are distinguished as follows:

1. Climatic and bioclimatic characteristics
2. Morphological and topological features
3. Soil, geological and tectonic features
4. Natural environment
   i ) Habitats
   ii) Flora
   iii) Fauna and Avifauna
5. Man-made environment
   i ) Land Uses
   ii) Historical & Cultural Environment
   iii) Atmospheric Environment
   iv) Acoustic Environment
   v) Waste – Solid Waste

**10.3 The proposed measures must aim in order at the following ways of dealing with environmental impacts:**

*10.3.1. Prevention-avoidance*

In terms of safety and other risks to the natural and man-made environment, the effects of a wind power plant are negligible.

For the further safety of workers and the environment during the construction phase of the project, the following are recommended:

- Fencing of transported bulky materials and, where applicable, vehicles and machinery.
- Marking of the work area with appropriate signs to inform passing pedestrians and vehicles.
- Take simple fire safety measures.

Also, in addition to the helmet and appropriate footwear and uniforms (if required), special care should be taken and measures taken:

- During the movement of pedestrians, machines and vehicles at the excavation stage, and during the transport of materials and tools.
- When supporting the sides of the trenches and removing them.
- When cleaning the bottom of the trenches from excess excavation products, shaping it, lowering pipes or other materials, concreting them, etc. It is pointed out here that no objects or tools should be left on the edges of the trenches that could fall into she.
- During the movement of passing pedestrians and vehicles by fencing off the area as much as possible and marking it with signs in accordance with the K.O.K. and other relevant provisions.
- When using chemicals, if required, by using a suitable face mask and carefully

removing them after the end of work.

The operation of the project under study and especially the electricity transmission lines represent an increased risk of fire from any short circuit. He proposed that the network be underground and within the existing roads.

With regard to the noise from the operation of the wind turbines and the impact of the noise on the workers who will be in the area of the Wind Park, what is stated in accordance with the P.D. 85/1991 (Official Gazette 38/A/18-3-1991).

Noise at work is assessed and, if necessary, measured in order to identify the area and the workers working in it who may be affected by the noise. Noise assessment and measurement are planned and carried out at appropriate intervals under the responsibility of the employer. The methods and instruments used must be adapted to the existing conditions, taking into account in particular the characteristics of the measured noise, the duration of exposure, the environmental factors and the characteristics of the measuring instruments. In general, the risks created by noise exposure should be reduced to the lowest reasonably practicable level, taking into account technical progress and available noise control measures, particularly at the source.

According to Article 6 of the P.D. 85/1991, when a worker's daily individual sound exposure exceeds 90 dB (A), individual hearing protection devices (e.g. earplugs) must be used, while when the above sound exposure exceeds 85 dB (A), they must be placed in providing employees with personal hearing protection equipment.

*10.3.2. Reduction in intensity and extent.*

The wind power plant, as long as it has been properly designed and in accordance with the legislation, is not located within a protection area and the minimum siting distances are respected and the conditions and restrictions imposed by the competent services during the licensing of the project, does not have high intensity effects.

The proposed environmental conditions that must be imposed in order to protect the environment during the construction and operation of the wind power plant are as follows:

- Adherence to the fuel quality limits that will be used by the machines during the construction of the project, as defined in the existing provisions.
- The exhausts of all machines should point upwards and not towards the ground.
- Establishment of maximum speed limits on all dirt surfaces.
- Rests and walkways should be kept clean and moist.
- Frequent wetting of areas (e.g. access zone and new road construction, construction sites, wind turbine construction sites) to reduce emitted dust and suspended particles during the execution of the technical construction works of the park.
- According to Greek Legislation, all trucks transporting loose materials must be covered.
- All machinery and equipment used in construction should be in good condition and meet the manufacturer's specifications to minimize dust emissions.
- Minimization of excavations, restoration of trenches and embankments, rainwater drainage projects, etc. ).
- Interventions on the ground should occupy the smallest possible area. Excavations should be limited only to those required for the construction of the projects under study (erection of wind turbines, construction of access roads).

- To restore the vegetation where it was destroyed by the technical works during the construction phase.
- Any excess of the excavations will be disposed of in the areas of the wind turbines' squares or in suitable areas.
- If any archaeological find or trace is found during the construction of the project, the competent archaeological service should be notified immediately, which will issue an opinion on the matter. In this case, pursuant to the provisions of article 37, par. 1 of Law 3028/2000 "For the protection of Antiquities and the Cultural Heritage in general", the work should be stopped immediately until the completion of the excavation survey and the receipt of the decision, based on the Law, regarding their fate.
- To observe the specifications for the correct operation of the excavation machines and the permitted acoustic power levels, during their operation. It is also suggested, as a measure to reduce noise, the use of machines with reduced noise pollution, well maintained so as not to burden the acoustic environment of the study area.
- Removal of solid waste mainly from the abandonment of bases, packaging materials, pieces of machinery and other special waste in areas suitable for them.
- Removal of the solid products of the excavations that are not considered suitable for filling the pits. The transport of the waste to approved treatment facilities or to the utilization and disposal sites will be carried out by means of transport equipped with suitable covers, in order to prevent their dispersion or diffusion on the roads.
- Removal of mineral oils, material residues and waste from the operation of the construction site in areas suitably configured for this purpose.
- During the operation phase of the project, the A/P staff will be responsible for collecting the waste it produces and transporting it to an appropriate collection area of the nearest MUNICIPALITY, in order to avoid the movement of waste trucks in the area, for a small volume of waste production . The rest of the waste, depending on its type, will be collected by appropriate agencies for further disposal in recycling and utilization units.
- Fencing of transported bulky materials and, where applicable, vehicles and machinery.
- Marking of the work area with appropriate signs to inform passing pedestrians and vehicles.
- Take simple fire safety measures.
- The interconnection network should be underground and within existing roads.

### *10.3.3. Restoration*

During the construction phase it is recommended:

- To restore the vegetation where it was destroyed by the technical works.
- Any excess of the excavations will be disposed of in the areas of the wind turbines' squares or in suitable areas.

When wind turbines are decommissioned, most of them (over 90% by weight) can be recycled, thus being a sustainable form of energy production throughout its life cycle. Furthermore, since the support tower is removed, any apparent change of the environment ceases: the field of view is completely restored to the pre-installation state of the park.

10.4 The measures refer to the location, size, type, applied technology and general technical characteristics of the project or activity, as described in the proposed solution

The wind power plant of the present study consists of 21 A/G and is proposed to be installed in the Aetokorfi location of the Municipality of Orestiada in the Regional Unit of Evros. The specific project is proposed to be implemented in a forest area, according to the posting of forest maps by the P.E. Evros.

The location of the wind power plant is outside the NATURA area GR 1110008- SPA as well as outside the SPP (except for a part of the underground passage of the interconnection network that passes through the existing Komaro bridge on the Arda river for approximately 405.0m and is within the NATURA area GR 1110008- SPA and of SPP GR001 for 613 m). The project has no negative environmental impact. It is an environmentally friendly renewable energy project from which there are no emissions (liquid, solid or gaseous waste, gaseous pollutants) to the environment. On the contrary, the project will have significant positive environmental effects by reducing the emissions of pollutant gases & greenhouse gases to the environment.

The project was designed taking into account important parameters so as not to have significant impacts, such as:

- It is not located within a SCI and SPA protected area of the PHYSI 2000 Network.
- It is not located near a core of a National Forest or a National Park.
- It is not located near a RAMSAR area.
- B is located outside protected areas of SPP .
- It is not located in or near cultural heritage elements
- It is not located in or near significant residential activity. It is 2950m away. from the boundaries of the nearest settlement – Komara .
- The safety distance from main road axes, road network under the responsibility of the MUNICIPALITYs is satisfied. and railway lines
- The safety distance from high voltage lines, Telecommunication infrastructure (antennas), RADAR is satisfied
- Safety distance from aircraft facilities or activities is met
- Safety distance from highly productive agricultural land, tillage zones, irrigated lands, Fish power plants is satisfied
- caged livestock units is satisfied
- The safety distance from quarry zones and activities is satisfied,
- The safety distance from operating surface mining - mining zones and activities is satisfied
- The safety distance from theme parks, tourist ports and other statutory or designed tourist areas, Tourist accommodation and special tourist infrastructures is satisfied
- The minimum distance between wind turbines is met

The negative impacts concern the construction phase of the project and the appropriate measures described in the following paragraphs will be taken, in order to be as minimal as possible.

## 10.5 Documentation of environmental measures, conditions and restrictions that have been incorporated into the design of the project, for each thematic unit (environmental instrument)

This chapter describes the proposed measures to deal with the effects caused by the construction and operation of the project on the environmental means and parameters developed in the previous chapter. These measures concern the design phase, the construction phase and the operation phase of the project. Particularly:

### *10.5.1 Non-biotic features*

#### 10.5.1.1 Climatic and bioclimatic characteristics

The remedial measures proposed to deal with the environmental impacts on the climate and bioclimate of the area concern the following:

- Adherence to the fuel quality limits that will be used by the machines during the construction of the project, as defined in the existing provisions.
- Frequent wetting of spaces to reduce emitted dust and suspended particles during the execution of the technical construction works of the park (e.g. new road construction zone, construction sites, wind turbine erection squares).

#### 10.5.1.2 Morphological and topological features

The small scale of the project, in terms of intervention in the local geomorphology, does not require special restoration actions, beyond those usual in technical projects (minimization of excavations, restoration of trenches and embankments, rainwater drainage projects, etc. ). The excavation products that will be produced during the opening of the bases will be used to form the squares around each base of the wind turbines. Any quantities of excavated material that will be left over will be removed from the project by trucks and will be disposed of in a suitable area, excluded from the forest and grassland areas.

#### 10.5.1.3 Soil, geological and tectonic features

The remedial measures proposed to deal with the environmental impacts on the soil, geology and tectonic features of the area concern the following:

- Interventions on the ground should occupy the smallest possible area. Excavations should be limited only to those required for the construction of the projects under study (erection of wind turbines, construction of access roads).
- To restore the vegetation where it was destroyed by the technical works during the construction phase.
- Any excess of the excavations will be disposed of in the areas of the wind turbines' squares or in suitable areas.

### *10.5.2 Physical Environment*

#### 10.5.2.1. Habitats

All interventions on the ground will occupy the smallest possible surface, while the vegetation where it is cleared by the technical works during the construction phase will be restored.

10.5.2.2. Flora

The entire area occupied by the proposed project is public and belongs to the forest category. All interventions will be carried out in accordance with the instructions of the forestry service, and always within the framework of the intervention approval decisions that will be issued.

All interventions on the ground will occupy the smallest possible area. In the places where excavation is required, the vegetation that will be excavated by the technical works during the construction phase will be restored and the earthworks and embankments will be placed in places that will not affect endemic and interesting plant species.

The removal of the flora land that will be done for the construction of the project will be limited to what is absolutely necessary and the natural environment will be fully restored after the end of the work, so that the flora that existed before the construction can grow.

It is proposed to cover the eventual slopes with vegetable land and plant endemic plants in a few places so that the anthropogenic impact on the landscape does not become strong, by changing the floral landscape of the area. In general, from the data currently available to researchers, it appears that there will be no need for plantings, as due to the characteristics of the area (frequent rainfall, etc.) it is expected that the natural restoration of the flora tissue will be rapid.

In case of planting, the plant species must be selected based on the following parameters:

- increased ability to adapt to the soil and climate conditions of the project area,
- sufficient development speed,
- great disease resistance,
- minimal maintenance requirements and
- market availability and low cost.

The design of the wind power plant under study contributed to the prevention of adverse effects on the avifauna , as the W/T pylons are tubular type and the W/T placement is not dense. Game disturbance is only detected during the construction phase and only from the noise generated and the occupation of land by the construction site. However, the effect is reversible and of little intensity.

10.5.2.3. Fauna and Bird Fauna

10.5.2.3.1. Measures proposed to be implemented

During the installation and operation of the wind power plant, it is proposed to take and implement various measures that will minimize or eliminate any possible effects on the avifauna of the area, and for this reason a special ecological assessment study was prepared. The measures proposed are:

**Construction phase**

- A key measure proposed to minimize the impact on avifauna during the construction phase of the Wind Power plant is to organize and carry out the works at a time of year **EXCEPT the breeding season, which for most species lasts from mid-February to the end of April** . In this way, a part of the bird fauna and its normal activity in the project area is protected. In the case of removal and permanent abandonment of items due to nuisance, there are no countermeasures.
- It is proposed to carry out field work in order to locate and identify woodpecker nests before the start of construction work. In the case of locating nesting sites in dead trees in the work zone, it is recommended to delay intervention in the specific areas until the completion of chick development and plumage development, when they can be removed from the nests.
- The planning of the projects should ensure the shortest time of their stay in the area of execution of the works in order to reduce the consequences of noise and dust emissions.
- Vehicles should be driven at a low speed within the areas and vehicle movements should be kept to a minimum.
- Workplace lighting should ideally be limited to areas required for work and safety. It should also be directed downwards in such a way as to minimize light spilling outside the work area.

**Operating phase**

During the operation phase of the Wind Power plant, a series of measures are proposed, which in principle concern the minimization of the possibility of collisions with birds and helicopters as follows:

- Sealing of control room doors and windows.
- Keeping the area of the Wind Station clean and the immediate removal of carcasses of dead animals which are likely to attract scavenging birds from greater distances.
- Elaboration of a special program for recording expected mortality with the application of a specific protocol. It is recommended that the check be done by an expert. A forester of the institution, or of the Directorate of Forestry, or of the Forestry Office, or by an authorized person from above (Monitoring Program).
- Installation of a detection system (in each W/T) of avian species , through the appropriate algorithms and cameras, analysis of the flight path and timely reproduction of the appropriate sound pattern to repel the bird and avoid collision with its wings or pylon W/T.
- The tracking systems should have the possibility of stopping the rotation of the W/T in the event that a bird does not move away with the sound signals.
- During the construction phase and for a period of at least 2 years from the operation of the ASPIE, a program for monitoring the effects on Avifauna will be drawn up and annual reports will be submitted to the Management Unit of the area and the competent services.
- Due to the impossibility of detecting birds in conditions of dense fog and low cloudiness that often prevail in the location, it is recommended to install thermal cameras in the detection and stopping systems of W/Ts.
- It is recommended to paint the wings with colors that repel the attraction of birds or be noticed in time. In Kaliarka , Bulgaria, in the SNWF park , coloring the tips of the wings with red color had positive results in reducing the incidence of collisions.
- Implementation of a training program for the ASPIE staff by specialist scientists or under the responsibility of the Management Unit of the area regarding the required

actions in case of detection of a dead or injured bird.

- Mesh structures that allow birds to sit or congregate on them should not be used in any facility.
- Underground power transmission cables must be placed after very careful planning.
- After the end of the construction work, it is proposed that all unnecessary roads and interventions be restored in order to limit access to the area, thereby limiting its disturbance.

10.5.2.3.2. Measures whose feasibility will be examined in the next stages of monitoring

According to the assessment of the state of the natural environment in the area under study of the ASPIE in the " Aetokorfi " location, the negative effects on the conservation status of habitat types and species of flora and fauna are of moderate importance and are largely countered by the foreseen measures will be included in the AEPO and those proposed in this EOA study. The intervention in the area's flora (oak forest) is considered to have a moderate impact.

It is clear that the wind power plant development and installation company must be in direct cooperation with the Supervisory Management Unit and OFYPEKA to monitor the effects of the installation of the projects on bird species and to take protection measures.

*10.5.3. Man-made environment*

10.5.3.1. Land use

The project under consideration will not bring changes to existing land uses as 99% of the area covered by the project will be available for other uses. There are no human activities in the area, and the exploitation of the land for agricultural use is very small-scale. Any animal husbandry activities in the area may continue even after the work is completed.

10.5.3.2. Historical & Cultural Environment

The project under study is not expected to cause changes in the historical and cultural environment of the area. As mentioned above, the study area does not belong to any protection zone of archaeological, cultural and historical sites. In addition, there are no visible traces of monuments or antiquities in the area of the operation. However, during the construction of the project, if any archaeological find or trace is found, the competent archaeological service should be notified immediately, which will issue an opinion on the matter. In this case, pursuant to the provisions of article 37, par. 1 of Law 3028/2000 "For the protection of Antiquities and the Cultural Heritage in general", the work should be stopped immediately until the completion of the excavation survey and the receipt of the decision, based on the Law, regarding their fate.

10.5.3.3. Atmospheric Environment

The effects on the atmospheric environment are limited, as mentioned in a previous chapter, to the construction phase of the project and concern the gaseous pollutants that will be produced by the construction machinery, as products of oil combustion, and the production of dust, as a product of excavation.

The amount of gaseous pollutants is considered negligible given the limited operating time of the machines. Regarding the avoidance of dust generation, it is recommended to wet the excavated soil and moisten the movement corridors of the

machines as well as observe and apply the Road Traffic Code in terms of dust protection measures.

Regarding the avoidance of dust generation, from the movement of construction workers vehicles, it is recommended:

- ✓ Wetting of the excavated soil and moistening of the movement corridors of the machines.
- ✓ Establishment of maximum speed limits on all dirt surfaces.
- ✓ The exhausts of all machines should point upwards and not towards the ground.
- ✓ Rests and walkways should be kept clean and moist.
- ✓ More general site management measures to control dust include:
- ✓ According to Greek Legislation, all trucks transporting loose materials must be covered.
- ✓ Wetting during movements and deposits of sand and gravel as well as washing the wheels of all vehicles leaving the work area to reduce the dust emitted. Vehicles leaving the work area must be clean.
- ✓ All machinery and equipment used in construction should be in good condition and meet the manufacturer's specifications to minimize dust emissions.
- ✓ For the volume of the excavations and until it is used for the needs of the embankments, the necessary measures will be taken such as wetting the embankments and covering the volume of the embankments , so that the embankments are not dispersed and dust is created.

10.5.3.4. Acoustic Environment

During the construction of the works, an increase in noise is expected in the area where the work is carried out, which will be mainly due to the operation of the construction site. It should be noted that all the works will be carried out outside a residential area and therefore no significant inconvenience is expected for the residents of the settlements in the wider area.

However, it is suggested that the specifications for the proper operation of the excavation machines and the permitted acoustic power levels, based on the K.Y.A. 37393/2028/2003, during their operation. It is also suggested, as a measure to reduce noise, the use of machines with reduced noise pollution, well maintained so as not to burden the acoustic environment of the study area.

Regarding the noise, during the operation phase of the project, it comes from the rotation of the blades and from the rotating parts of the electromechanical equipment. The noise level is low and will not be a nuisance for the personnel working on the project either.

10.5.3.5. Waste – Solid Waste

During the execution of the project, solid waste arises mainly from the abandonment of boxes and packaging materials at the execution sites of the works as well as from the waste generated by the workers. Solely responsible for the disposal of solid waste is the project contractor. The latter should take care to achieve a reduction of potential negative impacts from the operation of the construction site. It is recommended that the following be implemented by the site manager:

- Removal of solid waste mainly from the abandonment of bases, packaging materials, pieces of machinery and other special waste in areas suitable for them.
- Removal of the solid products of the excavations that are not considered suitable for filling the pits. It is the contractor's responsibility both for the proper operation

of the construction site and for the collection of waste, which, in cooperation with the local authorities, can be deposited in areas suitable for them (e.g. collection of waste and feed residues in plastic bags and transporting them to the waste collection bins of the area). Measures will also be taken for the priority sorting of aggregates and recyclable materials at the construction site and their separate collection to make their utilization easier. Also, the collection bins will be monitored during the day's work and at the end of the day they will be protected with a suitable cover to avoid dropping foreign objects and mixing with other waste. The transport of the waste to approved treatment facilities or to the utilization and disposal sites will be carried out by means of transport equipped with suitable covers, in order to prevent their dispersion or diffusion on the roads.

- Removal of mineral oils, material residues and waste from the operation of the construction site in areas suitably configured for this purpose.

During the operation phase of the project, the generated solid waste will come from both the personnel and the maintenance and restoration of the machines. The staff of the A/P will have the responsibility of collecting the waste it produces and transporting it to an appropriate collection area of the nearest MUNICIPALITY, in order to avoid the movement of waste trucks in the area, for a small volume of waste production (the staff will be employed for a few hours per day).

The disposal of mineral oils during construction and operation will be done in accordance with the provisions of the P.D. 82/2004.

### 10.6. Necessary measures after the final cessation of the project

When wind turbines are decommissioned, most of them (over 90% by weight) can be recycled, thus being a sustainable form of energy production throughout its life cycle. Furthermore, since the support tower is removed, any apparent change of the environment ceases: the field of view is completely restored to the pre-installation state of the park.

### 10.7. Preparedness and response measures to mitigate negative impacts

The measures for preparedness and dealing with or mitigating the negative effects on the environment concern:

- Lightning hazard

W/Ts, due to their construction and the places they are installed (bare mountaintops), attract lightning. For their protection, as well as the protection of the man-made and natural environment, the following measures have been taken:

➢ Lightning current collection spike on all extreme parts of the W/T on the fuselage and wings, so that the lightning current can be discharged safely and quickly.

➢ Appropriate earthing system so that the lightning current is discharged within the appropriate time interval. The grounding system includes the foundation grounding of the W/T, the perimeter grounding, possible improvement mesh and the interconnection of the groundings of all the W/T with each other. In this way, the safe work of technicians, the safe passage of pedestrians and other visitors and the safe contact of workers, residents and animals with the metal parts of the equipment is achieved, having ensured that the values of step and contact stresses are within the permissible limits .

- Risk of severe weather

The W/T operation is fully automated and ensures the smooth and safe operation of the equipment, even under particularly strong and extreme weather conditions. This is achieved in the following ways:

- Automated shutdown in case of extreme weather. In the event of extreme weather conditions, particularly extremely high winds of over 20 m / s , the W/T automatically shuts down for safety reasons. With this process, the vanes rotate 90° and stop rotating. Braking of the blades is done in a smooth way (aerodynamic braking) and the wind turbine is put into pause mode mode ) as long as extreme weather conditions prevail. For added safety, the system is configured and programmed in such a way as to allow the W/T to restart only when an appropriate 10-minute speed is detected. In this way, continuous restarts of the W/T are avoided and it is ensured that its re-operation takes place in mild and safe weather conditions.

In addition to the automatic shutdown at particularly high wind speeds, the W/T has sensors to stop its operation due to other external factors. More specifically, the W/T stops automatically in cases where:

i) Intense vibration which may be due to a malfunctioning part of the equipment or even strong wind pressure

ii) High temperatures inside the nacelle , part of the equipment or the external environment

iii) Flash detection inside an electrical panel.

All of the above possibilities have been configured in the W/T supervisory control system and in any case enable the W/T user to receive a warning message ( alarm ) or to automatically disable the W/T for safety reasons. The treatment of such phenomena is done with preventive methods and preventive procedures. Preventive methods have to do with the scheduled regular checks of all the static parts of the W/T, including the check of clamps. Preventive methods have to do with the automatic shutdown of the W/T after recognition of specific external conditions or sequence of specific errors. With the above methods, it is ensured that the W/T works safely and in extreme cases it is shut down.

- Fire hazard

Fire protection during the operation of the W/T is ensured by the temperature, glare and smoke sensors, which are placed inside the W/T and automatically stop its operation. However, since work within the W/T is carried out even if the W/T is stopped, there are preventive means to be able to deal with such an event even in the event that the W/T does not work. For this reason, suitable fire extinguishers have been provided and installed at the base of the W/T, in the fuselage and in lofts that have some equipment. During the operation of the W/T, the protection is automated through suitable sensors which, as mentioned above, send a warning message ( alarm ) or even stop ( trip ) the W/T.

- Danger to aviation

W/Ts are installations that can potentially cause problems in air navigation, due to the height of the installation. For this reason, the opinion of the competent services (YPA and GEETHA) is requested during licensing . In addition, the prescribed day and night markings are applied, so that they are visible in any case.

## 10.8 The effectiveness of the proposed measures is documented by the summary assessment of the environmental impacts expected after their adoption.

The following table summarizes the results of the assessment and evaluation of the effects of the project under study, before and after the implementation of the proposed and/or compensatory measures.

| Impact on | PS | LO | EI | II | IC | IT | IA | SA | CC | MM | IBM | IAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Climatological/ bioclimatic characteristics | C | M | NA | 0 | NA | NA | NA | N | N | NR | 0 | 0 |
| | O | H | E | M | I | P | I | N | N | NR | P | P |
| Morphological characteristics | C | M | L | L | NA | PE | NA | N | N | R | N | 0 |
| | O | 0 | L | L | NA | PE | NA | N | N | NR | 0 | 0 |
| Topological characteristics | C | M | L | L | NA | PE | NA | N | N | R | N | 0 |
| | O | H | L | M | NA | P | I | N | N | R | N | 0 |
| Geological/architectural/soil characteristics | C | M | L | L | NA | PE | NA | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | NA | N | N | NR | 0 | 0 |
| Flora, vegetation, habitats | C | M | L | L | NA | PE | R | N | N | R | N | 0 |
| | O | 0 | NA | 0 | NA | P | R | N | N | NR | 0 | 0 |
| Forests and woodlands | C | H | L | L | D | PE | I | N | N | R | N | 0 |
| | O | 0 | NA | 0 | K | P | PR | N | N | NR | 0 | 0 |
| Fauna | C | M | L | L | D | PE | PR | N | N | R | N | 0 |
| | O | 0 | NA | 0 | K | P | R | N | N | R | N | 0 |
| Bird fauna | C | M | L | L | D | PE | R | N | N | R | N | 0 |
| | O | L | L | L | D | P | PR | Y | Y | R | N | 0 |
| Spatial planning - Land use | C | L | L | L | NA | PE | NA | N | N | R | N | 0 |
| | O | L | L | 0 | NA | P | NA | N | N | NR | Θ | P |
| Structure/functions of the man-made environment | C | L | L | L | NA | PE | R | N | N | R | N | 0 |
| | O | L | L | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Cultural heritage | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Socio-economic environment | C | H | L | M | I | PE | R | N | N | NR | P | P |
| | O | H | R | M | NA | P | I | Y | N | NR | P | P |
| Technical infrastructure | C | H | L | L | D | PE | R | N | N | NR | 0 | 0 |
| | O | H | R | M | NA | P | I | N | N | NR | P | P |
| Correlation with anthropogenic environment Pressures on the environment | C | 0 | NA | 0 | D | K | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | K | K | R | N | N | NR | P | P |
| Air quality | C | H | L | M | D | PE | R | N | N | R | N | 0 |
| | O | H | L | L | I | P | I | N | N | NR | P | P |
| Noise/Vibration | C | H | L | M | D | PE | R | N | N | R | N | 0 |
| | O | H | L | L | D | P | I | N | N | NR | 0 | 0 |
| Electromagnetic fields | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Water | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| Serious accidents due to natural disasters | C | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |
| | O | 0 | NA | 0 | NA | NA | R | N | N | NR | 0 | 0 |

Project Stage (**PS**): **C** – Construction, **O** – Operation
Likelihood of Occurrence (**LO**): **0** -Zero, **L** -Low, **M** -Medium, **H** – High
Extent of impact (**EI**): **NA** – None, **L** – Local, **R** – Regional, **N** – National
Impact intensity (**II**): **0** -Zero, **L** -Low, **M** -Medium, **H** – High
Impact complexity (**IC**): **D** -Direct, **I** – Indirect, **NA** - None
Impact Timing (**IT**):**PE**–Periodical, **R**–Repeatable, **P** –Permanent, **NA** -None
Impact assessment (**IA**): **I** – Irreversible, **R** –Reversible, **PR**– Partially Reversible, **NA**-None
Synergistic action (**SA**): **Y** -Yes, **N** - No
Cross-border character (**CC**): **Y** -Yes, **N** - No
Mitigation measures (**MM**) : **NR** – Not required, **R** – Required
Impact Before Measures (**IBM**): **0** – Zero, **P** – Positive, **N** - Negative
Impact After Measures (**IAM**) : **0** – Zero, **P** – Positive, **N** - Negative

**Table 52**: Areas of impact and intensity from the operation of ASPIE.

## 10.9 Measures, projects, actions and interventions in the context of Corporate Social Responsibility

The investing company sets the following axes in the context of strengthening corporate social responsibility:

- Ensuring competition in the domestic energy market
- The reduction of greenhouse gas emissions
- Safety at work
- Ensuring and protecting human rights
- The elimination of all kinds of discrimination in the workplace
- The defense and observance of transparency in corporate procedures
- Continuous staff training
- Strengthening the volunteer spirit
- The priority in the contribution of socially vulnerable groups.
-

**Signatures**

**STUDY:**

| | |
|---|---|
| **Dimitrios Konstantinidis**<br>Dipl. Chemical Engineer – Holder of Mel. Degree 27 | DIMITRIOS KONSTANTINIDIS<br>Digitally signed by DIMITRIOS KONSTANTINIDIS<br>Date: 2023.01.11 16:44:08 +02'00' |
| **Sgembas Vasileios**<br>Forester - Environmentalist<br>Owner Mel. Degree 24 | VASILEIOS SGEMPAS<br>Digitally signed by VASILEIOS SGEMPAS<br>Date: 2023.01.10 16:01:20 +02'00' |

**IMPLEMENTING BODY:**

| | |
|---|---|
| **ANEMOS THRACE IKE** | KONSTANTINOS VASILEIADIS<br>Digitally signed by KONSTANTINOS VASILEIADIS<br>Date: 2023.01.12 11:18:53 +02'00' |

# 11. ENVIRONMENTAL MANAGEMENT AND MONITORING

The monitoring of the facilities must be done with cameras, while the observance of the Environmental conditions by implementing an environmental monitoring program.

The project owner will implement a program to detect and monitor the effects of the ASPIE on the avifauna and at the same time record the species of the avian fauna in order to control the operation of the ASPIE under study and the interventions with the aim of minimizing or completely eliminating the effects from the operation of ASPIE in the avifauna of the region.

The monitoring program will be designed and developed by specialized scientists and trained personnel in collaboration with the Management Unit that oversees the area.

## 11.1 Environmental management

During the installation and operation of the wind power plant, it is proposed to take and implement various necessary measures which will minimize or eliminate any possible effects on the avifauna of the area. These measures are listed below:

- **Resting or monitoring positions:** Mesh structures that allow birds to sit or congregate on them will not be used in the facility.
- **Wind power plant lighting:** Constant lighting of wind turbines should be avoided to reduce the risk of collision. If this is unavoidable, flashing lighting, as less attractive to birds, could be considered. This measure, with its irregular illumination, is now used in almost all new technology wind turbines, such as the wind turbines in the wind power plant under construction.
- **Cable undergrounding :** The connection of the project is proposed to be underground.
- **Removal of dead animals:** The immediate removal of dead animals (dogs, goats, sheep, horses , cows, etc.) found within a radius of 500 meters from the base of the wind turbines is foreseen. These dead animals will be transported to safe locations away from the wind power plant (for example in organized supplementary feeding areas), but remain at the disposal of scavenging birds. In this way, the risk of carrion-eating species hitting the wind turbines when they find each dead animal will be reduced, while the availability of their food will not be affected. The responsibility for the collection and transport of dead animals will belong to the construction and operation company of the wind power plant. The appropriate disposal sites should be demonstrated by the competent services after a relevant scientific study and licensing , and the cost of their study, creation and proper operation should be borne by the competent regional bodies.

After the construction and operation of the wind power plant, active management of the habitats in and around it will be considered, so that birds are not attracted to the zone of influence of the wind turbines and move away, to locations that do not present any impact risks. The responsibility for the planning and implementation of these management actions belongs to the wind power plant operating company. A key measure is the restoration of the surrounding area: After the end of the construction work, it is proposed that all unnecessary roads and interventions be restored in order to limit access to the area, thereby limiting its disturbance. Apart from the above measures, no other type of monitoring, with technical or other equipment, is proposed, which cannot replace the

experience and judgment of specialized observers and can very easily lead to an underestimation or overestimation of situations and impacts. Special attention and care must be given to the opening and restoration of the site as provided for in the EIA of the project.

## 11.2 Environmental Monitoring

It is proposed to implement an environmental monitoring program, as follows:

- ✓ During the operation phase of the project, a two-year environmental monitoring program with the following proposed characteristics should be drawn up:
  - Include year-long field surveys to obtain reference data, during which a minimum of 40 days will be devoted to field work, distributed to cover avian critical days per year, to determine the populations of birds using the survey area an annual cycle.
  - The recordings from Supervisory Points ( Vantage Points ) to have a minimum monitoring limit of 36 hours.
  - Non-breeding migration records should be conducted both during the day and during the night. Nocturnal predators will also be recorded in the night recordings. The data recording specifications will be determined by the Ministry of Health.
- ✓ The permanent staff at the project site will be informed and trained about the required actions in case of finding a dead or injured bird, while correspondingly, the residents of the area who move near the W/T will also be informed about the timely collection and diagnosis of the causes of death/injury. In case of detection of any injured pole, the competent Services will be informed immediately. Especially in case of finding any injured bird that is unable to fly, the Forestry Service should be notified immediately, so that the appropriate procedure can be followed and the necessary care can be provided as soon as possible.
- ✓ Depending on the results of the monitoring program, the need to install an automated collision avoidance system (either with cameras, sensors or radar ) will be assessed, according to the systems described in the Renewable Energy Center Good Practice Guide. Two such systems, Bird , are mentioned as examples Monitoring System ® developed by Digisec AE and DTbird of KOPE

## 12. CODIFICATION OF RESULTS AND PROPOSALS FOR THE APPROVAL OF ENVIRONMENTAL TERMS

The proposed environmental conditions that must be imposed in order to protect the environment during the construction and operation of the wind power plant are as follows:

- Adherence to the fuel quality limits that will be used by the machines during the construction of the project, as defined in the existing provisions.
- The exhausts of all machines should point upwards and not towards the ground.
- Establishment of maximum speed limits on all dirt surfaces.
- Rests and walkways should be kept clean and moist.
- Frequent wetting of areas (e.g. new road construction zone, construction sites, wind turbine erection sites) to reduce the emitted dust and suspended particles during the execution of the technical construction works of the park.
- According to Greek Legislation, all trucks transporting loose materials must be covered.
- All machinery and equipment used in construction should be in good condition and meet the manufacturer's specifications to minimize dust emissions.
- Minimization of excavations, restoration of trenches and embankments, rainwater drainage projects, etc. ).
- Interventions on the ground should occupy the smallest possible area. Excavations should be limited only to those required for the construction of the projects under study (erection of wind turbines, construction of access roads).
- To restore the vegetation where it was destroyed by the technical works during the construction phase.
- Any excess of the excavations will be disposed of in the areas of the wind turbines' squares or in suitable areas.
- If any archaeological find or trace is found during the construction of the project, the competent archaeological service should be notified immediately, which will issue an opinion on the matter. In this case, pursuant to the provisions of article 37, par. 1 of Law 3028/2000 "For the protection of Antiquities and the Cultural Heritage in general", the work should be stopped immediately until the completion of the excavation survey and the receipt of the decision, based on the Law, regarding their fate.
- To observe the specifications for the correct operation of the excavation machines and the permitted acoustic power levels, during their operation. It is also suggested, as a measure to reduce noise, the use of machines with reduced noise pollution, well maintained so as not to burden the acoustic environment of the study area.
- According to Article 7, paragraph 3 of Law 4014, a separate Technical Environmental Study (TE.PE.M.) should be submitted for special works, activities and facilities that will arise during the detailed planning of the project.
- The collection, transport, storage and general management of solid waste must be done in accordance with the applicable legislation, and the provisions of the decisions: KYA 29407/3508/2002, KYA 50910/2727/2003 for non-hazardous solid waste and of KYA 13588/725, KYA 24944/1159 for hazardous solid waste as they apply.
- The management of waste streams that fall within the scope of Law 2939/01 (Government Gazette 179A') should be carried out in accordance with the provisions of either this Law or the corresponding Decree issued in implementation of the same Law. Particularly:

1) Collected packaging (paper, metals, etc. ) to be delivered to licensed companies for recycling, through approved alternative management systems in accordance with Law 2939/01.
2) Waste lubricating oils to be collected and delivered through an appropriately licensed material collector of this type, to an approved alternative management system for further processing, with priority given to their regeneration. To be managed in accordance with the P.D. 82/2004
3) The collection of electrical and electronic equipment to be retired, at the end of its life cycle, to be managed in accordance with the P.D. 117/2004.
4) Any accumulators, which were used to cover the project's energy needs in the event of a power outage, to be managed after the end of their useful life in accordance with KYA 41624/2057/E103/2010.

- Household type waste will be placed in special waste bins and will be removed either by collection crews of the Municipality of Orestiada or by a licensed solid waste collection / transport operator in order to be disposed of in an approved solid waste disposal area.
- Processing and disposal of hazardous waste within the project site is prohibited. All hazardous and potentially hazardous waste to be stored in areas that meet the requirements of chapter 2 of the Addendum to KYA 24944/1159/06 and to be disposed of in accordance with the provisions of KYA 13588/725/2006, as applicable from time to time.
- All hazardous waste temporarily stored in the facility, to be delivered, following a relevant contract, to an operator / subcontractor, who must have a permit for the collection and transport of hazardous waste and a contract with the final recipient of the waste. The AEPO of the final recipient to allow the receipt of said waste at his facility . Accordingly, the company should dispose of the AEPO of the respective recipients as well as the other supporting documents.
- For the delivery of waste to third parties, the relevant documents must be available to monitor the further management of the waste outside the facility. For hazardous waste, the "Identification form for the collection and transport of hazardous waste" must be properly completed in accordance with the provisions of KYA 24944/1159/06.
- The files and registers of article 20 of Law 4042/2012 must be kept and kept for as long as provided. To be drawn up and submitted during the month of February, with the data mentioned in the previous year, the Annual Report of the Waste Producer in the electronic system of article 42 of Law 4042/2012.
- The burning of solid waste and any other category of materials both outdoors and indoors is prohibited in accordance with KYA 11535/93, as well as the burning of used oils (KYA 10315/93).
- During the operation phase of the project, the A/P staff will be responsible for collecting the waste it produces and transporting it to an appropriate collection area of the nearest MUNICIPALITY, in order to avoid the movement of waste trucks in the area, for a small volume of waste production . The rest of the waste, depending on its type, will be collected by appropriate agencies for further disposal in recycling and utilization units.
- At the substations of each wind turbine there will be a collection chamber for the oils in order to avoid any deposition or disposal of them on the ground and, by extension, in the underground water table. The chambers will be waterproofed and the oils will be collected by the staff and without mixing them with other liquids in special sealed containers.
- Fencing of transported bulky materials and, where applicable, vehicles and machinery.

- Marking of the work area with appropriate signs to inform passing pedestrians and vehicles.
- Take simple fire safety measures.
- Underground interconnection of ASPIE with the network.

**Measures for Fauna - Avifauna**

**Construction phase**

- A key measure proposed to minimize the impact on avifauna during the construction phase of the Wind Power plant is to organize and carry out the works at a time of year **EXCEPT the breeding season, which for most species lasts from mid-February to the end of April** . In this way, a part of the bird fauna and its normal activity in the project area is protected. In the case of removal and permanent abandonment of items due to nuisance, there are no countermeasures.
- It is proposed to carry out field work in order to locate and identify woodpecker nests before the start of construction work. In the case of locating nesting sites in dead trees in the work zone, it is recommended to delay intervention in the specific areas until the completion of chick development and plumage development, when they can be removed from the nests.
- The planning of the projects should ensure the shortest time of their stay in the area of execution of the works in order to reduce the consequences of noise and dust emissions.
- Vehicles should be driven at a low speed within the areas and vehicle movements should be kept to a minimum.
- Workplace lighting should ideally be limited to areas required for work and safety. It should also be directed downwards in such a way as to minimize light spilling outside the work area.

**Operating phase**

During the operation phase of the Wind Power plant, a series of measures are proposed, which in principle concern the minimization of the possibility of collisions with birds and helicopters as follows:

- Sealing of control room doors and windows.
- Keeping the area of the Wind Station clean and the immediate removal of carcasses of dead animals which are likely to attract scavenging birds from greater distances.
- Elaboration of a special program for recording expected mortality with the application of a specific protocol. It is recommended that the check be done by an expert. A forester of the institution, or of the Directorate of Forestry, or of the Forestry Office, or by an authorized person from above (Monitoring Program). The project operator must arrange for the preparation of a two-year environmental monitoring program during the operation phase of the project with the following characteristics:
  - To include annual field surveys for the acquisition of the reference data, during which at least 40 days will be devoted to field work, distributed so as to cover the critical for the avifauna days per year to determine bird populations using the survey area on an annual cycle.
  - Recordings from Surveillance Points ( Vantage Points ) to have a minimum monitoring limit of 36 hours.
  - Migration records outside the breeding season should be carried out both during the day and during the night. Nocturnal predators will also be recorded in the night recordings. The data recording specifications will be determined by the Ministry of Health.

- The report of the results will be submitted to the Department of Protected Areas of the Ministry of the Interior
- The permanent staff at the project site should be trained on the required actions in case of finding a dead or injured bird. In case of detection of any injured pole, the competent Services will be informed immediately.

- Installation of a detection system (in each W/T) of avian species , through the appropriate algorithms and cameras, analysis of the flight path and timely reproduction of the appropriate sound pattern to repel the bird and avoid collision with its wings or pylon W/T.
- The tracking systems should have the possibility of stopping the rotation of the W/T in the event that a bird does not move away with the sound signals.
- During the construction phase and for a period of at least 2 years from the operation of the ASPIE, a program for monitoring the effects on Avifauna will be drawn up and annual reports will be submitted to the Management Unit of the area and the competent services.
- Due to the impossibility of detecting birds in conditions of dense fog and low cloudiness that often prevail in the location, it is recommended to install thermal cameras in the detection and stopping systems of W/Ts.
- It is recommended to paint the wings with colors that repel the attraction of birds or be noticed in time. In Kaliarka , Bulgaria, in the SNWF park , coloring the tips of the wings with red color had positive results in reducing the incidence of collisions.
- Implementation of a training program for the ASPIE staff by specialist scientists or under the responsibility of the Management Unit of the area regarding the required actions in case of detection of a dead or injured bird.
- Mesh structures that allow birds to sit or congregate on them should not be used in any facility.
- Underground power transmission cables must be placed after very careful planning.
- After the end of the construction work, it is proposed that all unnecessary roads and interventions be restored in order to limit access to the area, thereby limiting its disturbance.

During the installation and operation of the wind power plant, it is proposed to take and implement various necessary measures which will minimize or eliminate any possible effects on the avifauna of the area.

- Resting or monitoring positions: Do not use mesh constructions in the facility that enable birds to sit or gather on them.
- Wind power plant lighting: Consider flashing rather than constant lighting as less attractive to birds. This measure, with its irregular illumination, is now used in almost all new technology wind turbines, such as the wind turbines in the wind power plant under construction.
- undergrounding : The connection to the network should be underground for the entire network as well as the part that falls within the SPA.
- Removal of dead animals: The immediate removal of dead animals (dogs, goats, sheep, horses , cows, etc.) found within a radius of 500 meters from the base of the wind turbines is foreseen. These dead animals should be transported to safe places away from the wind power plant (for example in organized supplementary feeding areas), while remaining at the disposal of scavenging birds.
- Restoration of the surrounding area: After the end of the construction work, it is proposed that all unnecessary roads and interventions be restored in order to limit access to the area, resulting in the limitation of its disturbance.

# 13. ADDITIONAL STUDIES

## 13.1 Specialized studies

In this section, a Cumulative Action study is presented, for the nearest wind power plants with a Production Permit, Installation Permit and Operation Permit.

Two wind power plants are located at a distance of up to 5 km from the project with a Producer Certificate [22]:

**Entity: TERNA ENERGY ANONYMOUS INDUSTRIAL COMMERCIAL TECHNICAL COMPANY A E**
**Code _ application number: Γ-010266**
**Location: Mavri Petra**
**Municipality: Orestiada**
**P.E.: Evros**
**Power: 45.0MW**
**With Manufacturer's Certificate**

**AG coordinate table in EGSA '87**

| | | |
|---|---|---|
| 1 | 673578 | 4620070 |
| 2 | 672813 | 4619590 |
| 3 | 672203 | 4619245 |
| 4 | 672296 | 4618242 |
| 5 | 672030 | 4617930 |
| 6 | 672602 | 4617835 |
| 7 | 672988 | 4617701 |
| 8 | 673424 | 4617628 |
| 9 | 673825 | 4617601 |

and

**Operator: AEOLIKI TRIGONOU IKE**
**Code _ application: Γ-013017**
**Location: Pentalofos - Cave**
**Municipality: Orestiada**
**P.E.: Evros**
**Power: 136.4 MW**
**With Manufacturer's Certificate**

**AG coordinate table in EGSA '87**

| | | |
|---|---|---|
| 1 | 678147.74 | 4615687.87 |
| 2 | 679029.65 | 4615335.38 |
| 3 | 679439.12 | 4615796.29 |
| 4 | 679615.61 | 4616214.00 |
| 5 | 680148.86 | 4616374.98 |
| 6 | 681054.76 | 4616007.88 |

[22] http://www.rae.gr/geo/

| | | |
|---|---|---|
| 7 | 678969.21 | 4614534.01 |
| 8 | 679359.69 | 4613835.35 |
| 9 | 679345.76 | 4613058.61 |
| 10 | 684179.07 | 4611038.88 |
| 11 | 686062.58 | 4609329.04 |
| 12 | 686674.73 | 4609177.74 |
| 13 | 688950.03 | 4612264.05 |
| 14 | 689721.07 | 4612042.39 |
| 15 | 689534.77 | 4613240.77 |
| 16 | 690322.61 | 4613391.13 |
| 17 | 690853.29 | 4613368.89 |
| 18 | 689413.92 | 4615534.00 |
| 19 | 689650.74 | 4616344.36 |
| 20 | 690046.86 | 4616640.65 |
| 21 | 691359.61 | 4616391.93 |
| 22 | 691854.10 | 4616373.24 |

The positions of these stations are shown in the image below.

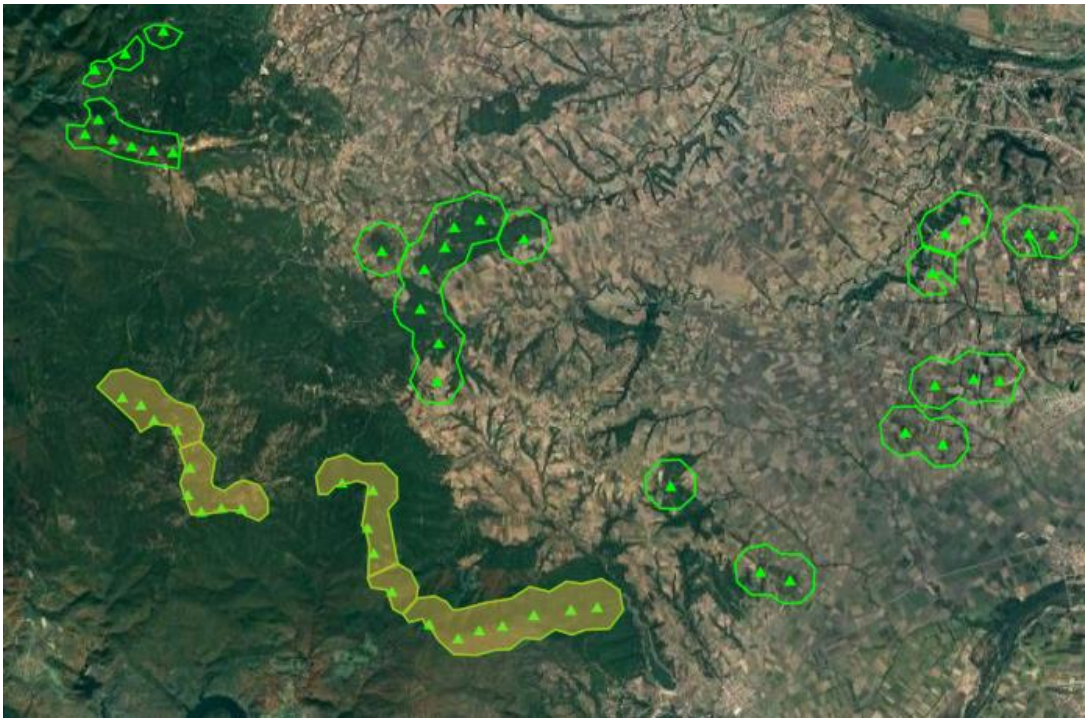


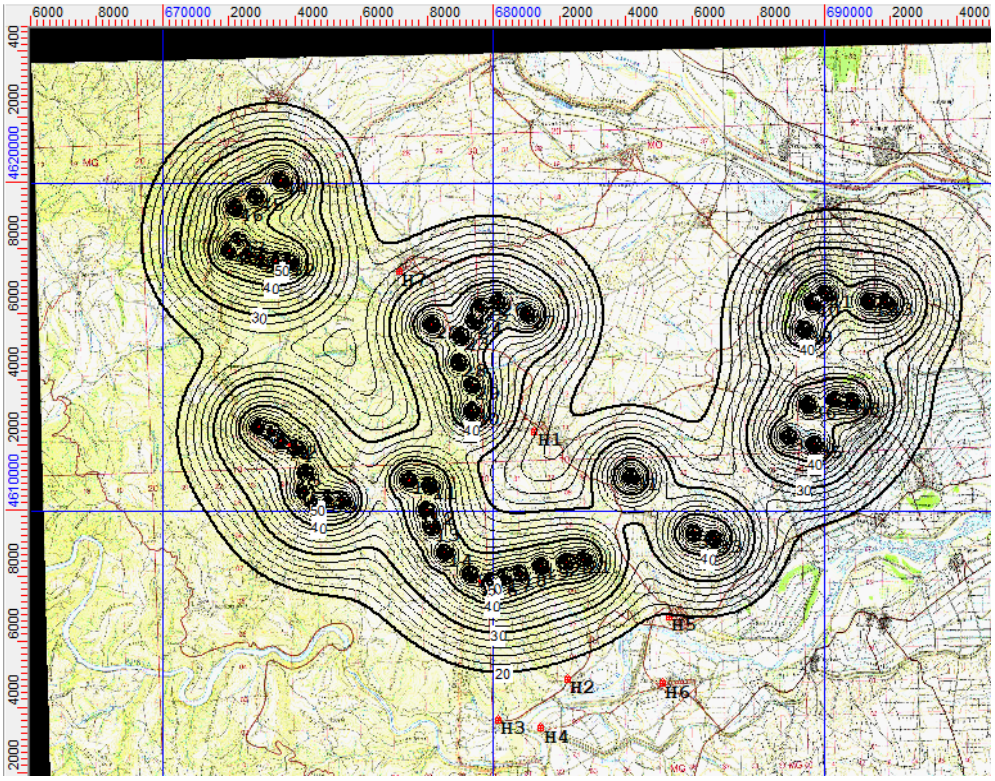
**Figure 63:** Location of wind power plant and the geographical footprint of applications for RES projects in the surrounding area[23]

For the above wind power plants we will consider overall noise and visual nuisance.

Cumulative Noise Study

[23] ***Source:*** *http://www.rae.gr/geo/*

From the results of the cumulative noise study, it follows that there will be no significant additional disturbance in the settlements. Furthermore, it is noted that the calculated noise level is lower than the legal limits. According to the current legislation - PD 1180/81, the maximum permitted noise limit for facilities in contact with residential buildings is 45 db (A), while for areas where the urban element prevails, the limit is 50 db (A) .




| House ID | Settlement | Easting | Northing | Noise ( dB ) |
|---|---|---|---|---|
| 1 | Pentacle | 681243 | 4612431 | 24.34 |
| 2 | Therapy | 682225 | 4604874 | 15.97 |
| 3 | Milea | 680139 | 4603644 | 9.60 |
| 4 | Serenity | 681446 | 4603383 | 7.27 |
| 5 | Komara | 685302 | 4606776 | 23.79 |
| 6 | Carp | 685119 | 4604739 | 7.73 |
| 7 | Pebbles | 677160 | 4617281 | 30.58 |

**Figure 64:** Cumulative noise study results.

Cumulative Eye Contact Study

The map below shows the visual contact with the above wind power plants from the nearby settlements. In green are the positions from which there is visual contact with 1-13

W/T, in blue the positions from which there is visual contact with 14-26 W/T, in pink with 27-39 W/T and in yellow the positions from which there is visual contact with 40-52 A/G. In the areas where there is no coloring, no W/T will be visible.

According to the results of the study, there will be visual contact between the settlements and the W/T, which depends on the relative position of each settlement and is of course subject to the purity of the atmosphere. The results of the eye contact study are approximate and indicative.

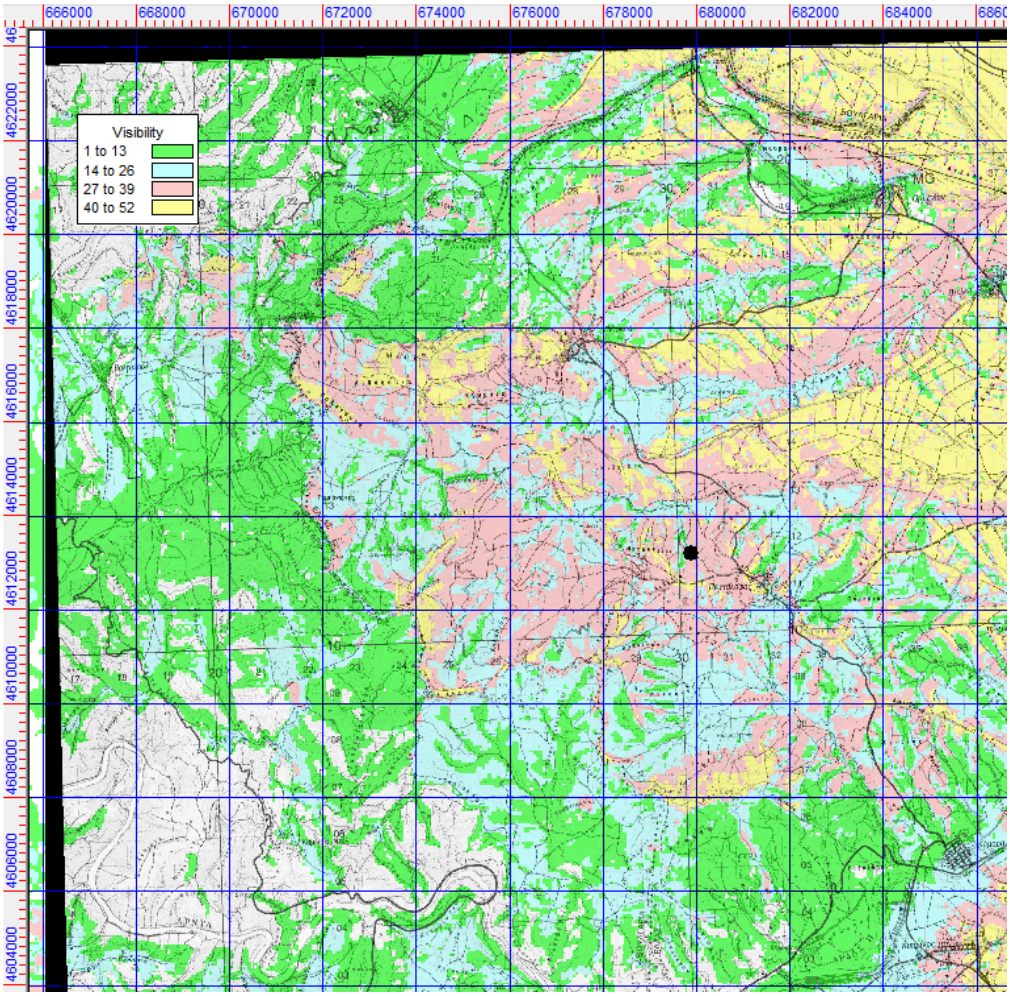



**Figure 65:** Results of cumulative eye contact study.

Special Ecological Assessment Study

The project development area is in the immediate vicinity of Natura 2000 areas (ZEP - Yazovir Ivaylovgrad BG0002106), while its accompanying projects (interconnection) run for a limited distance through the Natura 2000 area (ZEP - Riparian Forest of Northern Evros and Arda GR1110008). Therefore, it was considered appropriate to carry out a Special Ecological Assessment, which accompanies the submitted M.P.E.

## 13.2 Processing Issues and Remedies

No difficulties arose during the preparation of the EIA.

## 14. PHOTOGRAPHIC DOCUMENTATION

The following map excerpt shows where the following photos were taken.

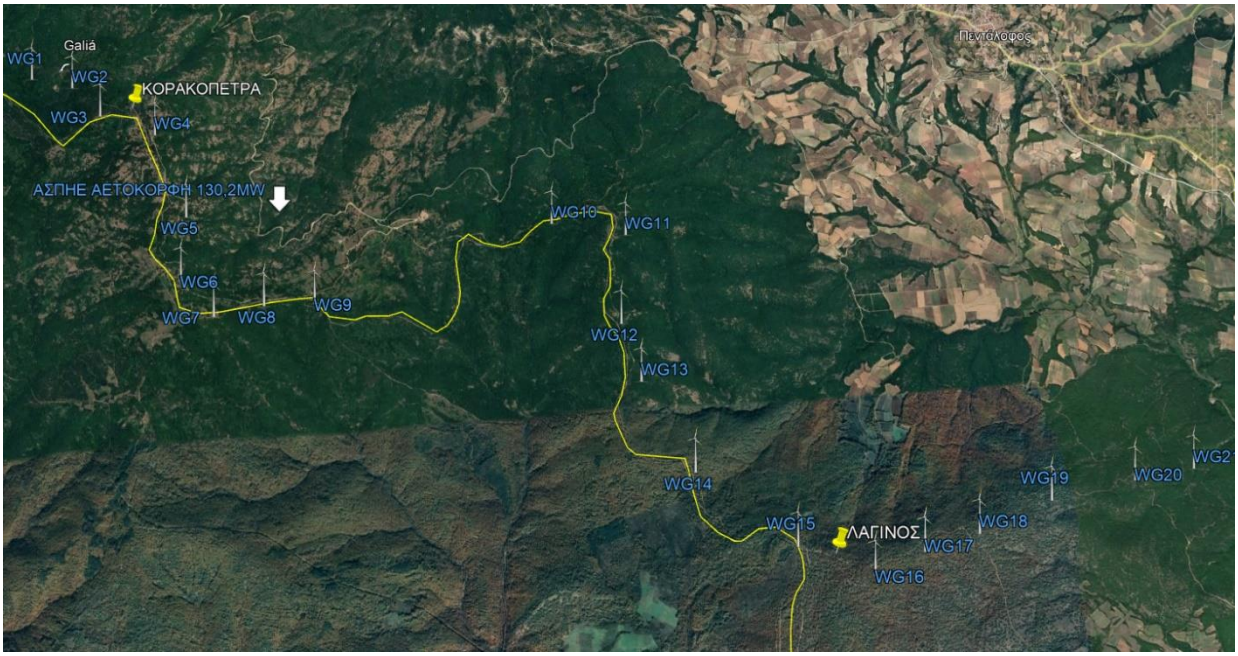



**Figure 66:** Photo taking points.

**Photo 1: View of the Korakopetra site to the East**

**Photo 2: View of the site Korakopetra to the South**

**Photo 3: View from the Korakopetra site to the West.**

**Photo 4: View from the Korakopetra site to the north.**

**Photo 5: View of the Laginos site to the north.**

**Photo 6: View of the Laginos site to the East.**

**Photo 7: View of the Laginos site to the South.**

**Photo 8: View of the Laginos site to the West.**

## 15. MAPS - DRAWINGS

### 15.1 Orientation Map

An orientation map, scale 1:50,000, is attached
( design no . 299.5.1.1)

### 15.2 Study Area Map

A map of the study area, scale 1:5,000, is attached
( design no . 299.5.1.2)

### 15.3 Map of Alternative Solutions

A map of alternative solutions, scale 1:50,000, is attached to the annex
( design no . 299.5.1.3)

### 15.4 Geological Map

There is no geological map, scale 1:500 000, in the annex

### 15.5 Land Use and Cover Map

A map of land uses and coverage, scale 1:50 000, is attached to the annex
( design no . 299.5.1.5)

### 15.6 Topographic Diagram of the Project and accompanying Projects

Attached to the annex is a topographic project diagram, scale 1:5 000, with the location of the wind power plant and accompanying projects.
( design no . 299.5.1.6)

### 15.7 Interconnection Network Map

A map of the interconnection network is attached
( design no . 299.5.1.7)

### 15.8 Intervention surface map - Intervention Surface Measurement Table

A map of intervention surfaces and a surface measurement table are attached to the appendix
( design no . 299.5.1.8)

### 15.9 Map of protected areas

A map of protected areas is attached
( design no . 299.5.1.9)

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## 17. APPENDICES

Appendix I: Maps - Topographic Charts

I.1_DESIGN_299.5.1.1_ORIENTATION_MAP

I.2_DESIGN_299.5.1.2_STUDY_AREA_MAP

I.3_DESIGN_299.5.1.3_MAP_OF_ALTERNATIVE_SOLUTIONS

I.5_DESIGN_299.5.1.5_LAND_COVER_USES_MAP

I.6_DESIGN_299.5.1.6_TOPOGRAPHIC_PROJECT_&_PROJECT_SESSIONS_MAP_1_2

I.6_DESIGN_299.5.1.6_TOPOGRAPHIC_PROJECT_&_PROJECT_SESSIONS_MAP_2_2

I.7_DESIGN_299.5.1.7_INTERCONNECTION_NETWORK_MAP

I.8_DESIGN_299.5.1.8_INTERVENTION _SURFACES_MAP

I.8.1_INTERVENTION_SURFACES_MEASUREMENT_TABLE

I.9_DESIGN_300.5.1.9_MAP_OF_PROTECTED_AREAS

Annex II: Degree of Researcher

II.1_STUDY_DEGREE_KONSTANTINIDIS

II.2_SCHEMBAS_RESEARCHER'S DEGREE

Appendix III: Technical characteristics AG

III_Performance Specification V162-6.2MW

Annex I V : Certificates Producer

IV .1_PRODUCER_CERTIFICATE_2710_2021

IV .2_MODIFICATION_OF_DERIVATIVE_CERTIFICATE_1104_2021

IV .3_MODIFICATION_OF_DERIVATIVE_CERTIFICATE_566_2022

Appendix V : EPHSAA Compliance Check Issue

V_COMPATIBILITY_ISSUE

Annex VI : The Road Construction Study

VI .1_TECHNICAL_EXPORT

VI .2_FORECASTING_STUDY

VI .3_DESCRIPTIVE_INVOICE

VI .4_HEALTH AND SAFETY PLAN & SAFETY AND HEALTH FILE

VI .5_DESIGN_FOLDER

VI .5.1_HORIZONTAL_DESIGN

VI .5.2_DESIGN_OF_ROAD_ALIGNMENT_OF_LENGTH

VI .5.3_DESIGN_OF_CROSS-SECTION

VI .5.3_DESIGN_OF_TUBULAR_TECHNICAL_WORKS

Appendix VII : Special Ecological Assessment Study

VII _STUDY_EOA_ASPIE_AETOKORFI_ANEMOS_EVROU

VII.T1_AREAS_OF_ENVIRONMENTAL_INTEREST

VII. T 2_HABITAT_ FIELD_INVESTIGATION_AREA

VII.T3_ AREA_OF_GERMINATION

VII.T4_ FIELD_WORKS

VII.T5_RECORDS_OF_FLIGHTS_OF_SPECIES_OF_BIRDS

VII.T6_ POINT_SURVEYS_OF_BIRD_SPECIES

VII.T7_ HIGH_RISK_FLIGHTS_OUTSIDE_ZONE_350METRES