

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT ON
INVESTMENT PROPOSAL**

**for Wind Power Plant Complex in the region of Mount
Murgash on the territory of the Villages of Zhelyava, Eleshnitsa
and Churek**

Investor: *Ecosource Energy EOOD*

January, 2007

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1. General information:

1.1. Investment project title.

Wind Power Station Complex in the region of Mount Murgash on the territory of the Villages of Zhelyava, Eleshnitsa, and Churek.

1.2. Name, National ID No., residence, and citizenship of the Investor (a natural person, a company, seat and unique identification No. of the legal person, contact person – address and telephone number).

Ecosource Energy EOOD, the City of Sofia, the region of Kremikovtsi, 1A Sveti Georgi Pobedonosets Str., registered under Company File No. 2629 on the list of the Sofia City Court for 2005, batch No. 95518, Vol. 1186, register 1, page 68, Unique Identification Code: 121897337, BULSTAT No. 131388801.

Full postal address – *Ecosource Energy EOOD*,
1A Sveti Georgi Pobedonosets Str., the region of Kremikovtsi, Sofia.

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Contact person - Vladimir Antov Nikolov – Manager.

1.3. Specification of the natural and legal persons that may be affected by the implementation of such investment project.

The platforms encompass 44 plots with a total area of 174 258 m², situated on the territory of three villages, as follows: - 13 estates with a total area of 51 825 m² on the territory of the Village of Zhelyava, the region of Kremikovtsi, Metropolitan Municipality (MM), Sofia City District; - 12 estates with a total area of 47 968 m² and 5 estates with a total area of 21 286 on the territory of the Village of Eleshnitsa; - 15 estates with a total area of 53 174 on the territory of the Village of Churek, Elin Pelin Municipality, Sofia District. The property of the Investor *Ecosource Energy EOOD*, acquired through a purchase and sale, under numbers and together with the respective areas allocated under territories, has the following title documents, mentioned hereinafter:

Title deed for the sale of real estates No. 105, Vol. I, reg. No. 2701, File No. 91 dd. 17.10.2005 for the following estates located on the territory of the Village of Zhelyava, *Shiroki Preslap* Area, Code under the Unified Classification of Administrative Territorial and Territorial Units (EKATTE) 29204, the region of Kremikovtsi, Sofia City District, and namely: - No. 001031 with an area of 3 244 m²; - No. 001032 with an area of 2 798 m²; - No. 001033 with an area of 4 228 m²; - No. 001034 with an area of 4 000 m², – No. 001035 with an area of 4 000 m², - No. 001036 with an area of 4 000 m²; No. 001037 with an area of 4 000 m²; - No. 001038 with an area of 4 000 m²; No. 001050 with an area of 4 403 m²; - No. 001051 with an area of 4 233 m²; - No. 002005 with an area of 4 000 m²; - No. 005005 with an area of 4 766 m²; - No. 005006 with an area of 4 153 m².

Title deed for the sale of real estates No. 59, Vol. IV, reg. No. 3058, File No. 466 dd. 28.10.2005 for the following estates located on the territory of the Village of Eleshnitsa, the Murgash Area, Code under the Classification of Administrative Territorial and Territorial Units 34120, Elin Pelin Municipality, Sofia District, and namely: - No. 024041 with an area of 2 446 m²; - No. 024042 with an area of 4 169 m²; - No. 024043 with an area of 4 000 m²; - No. 024044 with an area of 4 000 m²; - No. 024045 with an area of 4 000 m²; - No. 024059 with an area of 4 521 m²; - No. 024060 with an area of 4 000 m²; - No. 024061 with an area of 4 000 m²; - No. 024062 with an area of 4 639 m²; -

No. 024063 with an area of 4 000 m²; - No. 024064 with an area of 4 000 m²; - No. 024065 with an area of 4 193 m².

Contract for the sale of a real estate, private municipal property, by and between the Elin Pelin Municipality and *Ecosource Energy EOOD* dd. 12.06.2006 for real estate No. 024003 with an area of 85 425 m², located on the territory of the Village of Eleshnitsa, the *Bulini Ravnishta* area, Code under the Classification of Administrative Territorial and Territorial Units 34120, Elin Pelin Municipality, Sofia District, with the following estates resulting from partition thereof, and namely: - No. 024083 with an area of 4 000 m². Contract for the sale of a real estate, private municipal property, by and between the Elin Pelin Municipality and *Ecosource Energy EOOD* dd. 29.12.2005 for real estate No. 024087 with an area of 339 413 m² (339 413 m² according to sketch), located on the territory of the Village of Eleshnitsa, the *Bulini Ravnishta* Area, Code under the Classification of Administrative Territorial and Territorial Units 34120, Elin Pelin Municipality, Sofia District, with the following estates resulting from partition thereof, and namely: - No. 024088 with an area of 4 012 m²; - No. 024090 with an area of 4 441 m²; - No. 024091 with an area of 4 551 m²; - No. 024092 with an area of 4 282 m².

Title deed for the sale of real estates No. 59, Vol. IV, reg. No. 3058, File No. 466 dd. 28.10.2005 for the following real estates located on the territory of the Village of Churek, Murgash Area and Jotsova Livada Area, Code under the Classification of Administrative Territorial and Territorial Units 87760, Elin Pelin Municipality, Sofia District, and namely: - No. 544018 with an area of 4 378 m²; - No. 544019 with an area of 1 749 m²; - No. 547042 with an area of 4 659 m²; - No. 547043 with an area of 3 977 m²; - No. 547050 with an area of 1 574 m²; - No. 547051 with an area of 3 499 m²; - No. 547052 with an area of 4 001 m²; - No. 547053 with an area of 3 786 m²; - No. 547061 with an area of 2 978 m²; - No. 547062 with an area of 2 803 m²; - No. 547063 with an area of 3 720 m²; - No. 547064 with an area of 4 000 m²; - No. 547065 with an area of 4 000 m²; - No. 547066 with an area of 4 050 m²; - No. 548002 with an area of 4 000 m².

1.4. Location – map or scheme and a description of the region.

The terrain for the construction of Wind Power Station Complex comprises 44 independent platforms with an average area of about 4 decares¹ (from 1.5 to 4.8 decares) in a rough terrain with altitude from 1 400 to 1 670 m in the region of Mount Murgash, each platform is equipped with a wind turbine of 2.3 MW (or 1 MW). Such platforms shall encompass 44 plots with a total area of 174 258 m², located on the territory of three villages, as follows: - 13 estates with a total area of 51 825 m² in the Village of Zhelyava, the region of Kremikovtsi, Metropolitan Municipality, Sofia City District; - 12 estates with a total area of 47 968 m² and 5 estates with a total area of 21 286 m² in the Village of Eleshnitsa as well as 15 estates with a total area of 53 174 m² in the Village of Churek, Elin Pelin Municipality, Sofia District.

The region constitutes high mountain common pastures with agricultural land of IX category whose designation must be changed prior to implementation of the investment proposal. Wind generators must be distanced at least 500 m away from the territory of the closest settlement. The Mount Murgash Hostel (altitude of 1400 m) located southwest of the mount itself (altitude of 1 687 m) is in immediate proximity. Such hostel is a massive building with a capacity of 60 beds with outdoor lavatories and bathrooms. The hostel is approximately 14 km away from the Town of Buhovo and is connected with it by a macadam road. The Vitinya Throat is located in immediate proximity, as the exit settlements with tourist paths and the time to reach the hostel on foot are the following: the Town of Buhovo (4 hours away), the Village of Zhelyava (3.5 hours away); - the Village

¹ Decare – a measure equal to 1 000 m²

of Churek (4.5 hours away); - the area of Zherkovo (4 hours away); - the Village of Vrachesh (6 hours away).

1.5. Legal and institutional framework.

The platforms encompass landed estates located on the territory of three villages, as follows: - 13 estates with a total area of 51 825 m² in the Village of Zhelyava, the region of Kremikovtsi, Metropolitan Municipality, Sofia City District, - 12 estates with a total area of 47 968 m² and 5 estates with a total area of 21 286 m² in the Village of Eleshnitsa as well as - 15 estates with a total area of 53 174 m² in the Village of Churek, Elin Pelin Municipality, Sofia District.

The sketches for the territory of the Village of Zhelyava, issued by the Municipal Office of Agriculture and Forestry, the region of Kremikovtsi, MM have the following code under the Classification of Administrative Territorial and Territorial Units 29204, *Shiroki Preslap* Area, type of sustained yield – a common pasture with agricultural land of IX category. The sketches for the territory of the Village of Eleshnitsa, issued by the Municipal Office of Agriculture and Forestry – Elin Pelin have the following code under the Classification of Administrative Territorial and Territorial Units 34120, the areas of *Murgash* and *Bulini Ravnishta*, type of sustained yield - a common pasture with agricultural land of IX category. The sketches for the territory of the Village of Churek, issued by the Municipal Office of Agriculture and Forestry – Elin Pelin have the following code under the Classification of Administrative Territorial and Territorial Units 81760, the areas *Jotsova Livada* and *Murgash*, type of sustained yield - a common pasture with agricultural land of IX category.

A change of designation of such independent plots will be required for implementation of the investment intention, as the designation and use of the land of the bases of the wind turbine pylon foundations only will be actually changed.

Figure 1 Map of the landed estates with marked plot locations

The investment proposal is related to execution of town planning procedures that require drawing up of a number of Detailed Development Plans – Building Plans (DD-BP) for the different territories which are to be approved by the respective Municipal Expert Council on the Structure of the Territory (MECST) with the municipalities mentioned.

The Draft DD-BP for the territory of the Village of Zhelyava, the region of Kremikovtzi – development procedure application No. GR-94-V-314/05 for landed estate (LE) No. 001031, 001032, 001033, 001034, 001035, 001036, 001037, 001038, 001050, 001051, 002005, 005005, 005006, code under the Classification of Administrative Territorial and Territorial Units: 20204, Zhelyava Area– *Shiroki Preslap* has been considered at a sitting of the specialized MECTD with the MM in execution of order No. RD-09-09-32/30.09.2005 of the Mayor of MM. A resolution has been adopted for the reasoned proposal to be coordinated with the Ministry of Regional Development and Public Works, the Regional Inspectorate on Environment and Water, the Ministry of economy and energy, and the Ministry of Agriculture and Forestry, and then a permission for DDP (report No. ES-G-136/15.11.2005) to be issued.

The Draft DDP /BP/ drawn up for the territory of the Village of Eleshnitsa, Elin Pelin Municipality – a development procedure under application with Ref. No. UT2-20-132/23.11.05 for the following real estates - No. 024041, 024042, 024043, 024044, 024045, 024059, 024060, 024061, 024062, 024063, 024064, 024065 – has been considered at a sitting of the Territory Structure Municipal Expert Council appointed by order No. 1164/23.11.05 by the mayor of Elin Pelin Municipality. A resolution has been taken for adoption of the Draft DDP /BP/ upon coordination thereof with the *Vodosnabdyavane i Kanalizatsiya*, the Regional Inspectorate for Public Health Protection and Control, *Elektrozpredelenie*, the Regional Fire and Accident Safety Service, and the Regional Inspectorate on Environment and Water and for submission of such Draft DDP /BP/ with the purpose of approval of a platform for design under the procedure of the Agricultural Land Protection Act (ALP) and the Execute Regulation of ALP (Resolution No. 21 from Report No. 7/01.12.2005). A Draft DDP /BP/ has also been drawn up for the following estates on the territory of the Village of Eleshnitsa, Elin Pelin Municipality – No. 024083, 024088, 024090, 024091, 024092.

The Draft DDP /BP/ drawn up for the territory of the Village of Churek, Elin Pelin Municipality – development procedure under Application Ref. No. UT2-20-133/23.11.05 for the following real estates - No. 544018, 544019, 547042, 547043, 547050, 547051, 547052, 547053, 547061, 547062, 547063, 547064, 547065, 547066, 548002 - has been considered at a sitting of the Municipal Expert Council on Territory Development, appointed by order No. 1164/23.11.05 by the mayor of Elin Pelin Municipality. A resolution has been taken for adoption of the Draft DDP /BP/ upon coordination thereof

with *Vodosnabdyavane i Kanalizatsiya*, the Regional Inspectorate for Public Health Protection, *Elektrorazpredelenie*, the Regional Fire and Accident Safety Service, the Regional Inspectorate on Environment and Water and for submission of such Draft DDP /BP/ with the purpose of approval of a platform for design under the procedure of the Agricultural Land Protection Act (ALP) and the Execute Regulation of ALP (Resolution No. 20 from Report No. 7/01.12.2005).

1.6. Sources of information

The following sources of information have been used for drawing up the Environmental Environmental impact assessment report for the Investment Project *Wind Power Station Complex in the Region of Mount Murgash, on the territory of the Village of Zhelyava, the Village of Eleshnitsa and the Village of Churek*:

- DDP /BP/ (four), as follows: - for the territory of Zhelyava, the region of Kremikovtsi, Metropolitan Municipality, Sofia City District; for the Village of Eleshnitsa (two), for the Village of Churek, Elin Pelin Municipality, City District;
- Exploratory designs with attached performance specifications from the producers of generators of the following types - Leitwind, Win Wind and Enercon- as well as researches carried out in the region of the mountain ridge;
- Climate data sheets, scientific literature, school appliances, maps and Internet pages related to the respective parts tackled by the Report;
- Ordinances and methodologies issued by the Ministry of Environment and Water and the respective authorized bodies, including ordinances and methodologies related to determination, moulding and prognostication of the state of environment;
- year books and reports on the environmental status of the Republic of Bulgaria for the period, publication of the Executive Environment Agency with the Ministry of Environment and Water;
- information in writing provided by the Ministry of Environment and Water, the Basin Directorate “Danubian region”, NGO-s and other organizations during consultations part of the Environmental Assessment procedure carried out.

2. Annotation to the investment project:

2.1. Alternatives to: location, project designs, technologies

It has been provided that a total number of 44 Leitner wind turbines of the model LTW 70/77 (Italy) with power of 1.35/1.5 MW and the Win Wind model WWD-1, WWD-3 with power of 1/3 MW (Finland) will be constructed, as 10 of such turbines will be mounted on the first stage, and the rest – on the second one. The total maximum power installed is approximately 12 MW (but it will reach 100 MW when the second stage is completed). In the case that energy efficiency and wind potential is not proven, it is possible to replace the model indicated with smaller turbines.

In the exploratory design a version for the first and second stages with localization of wind turbines under plots has been developed; determination of the exact location of the foundations of such turbines is forthcoming (after execution of a detailed geodetic survey of the terrain and drawing up of a geotechnical report).

The purpose of this investment proposal is renewable electricity production, as it has been ensured by law that *NEK*² will buy all the electricity produced. The location of the terrain and the arrangement of facilities on the platform around Mount Murgash is suitable for implementation of such type of projects.

Implementation of the investment proposal will have a favorable impact on the environmental and social and economic conditions during operation of the site due to the

² The national electrical company

increasing market demand for electricity and the need to comply with the EU requirements for rated increase of the share of renewable energy sources. The main environmental benefit from wind generators is prevention of conventional electricity-related emissions. Wind energy can decrease CO₂ emissions from the energy field of the EU by 11 % by 2040. At the same time Bulgaria is holding at present one of the last positions in electricity production from renewable energy sources (RES). This has been the result from a research of VDEW, the German association of electricity producers. Only 0.5% of electricity produced in Bulgaria is from such energy sources, including wind, solar energy and geothermal sources. Under the National Program of the Ministry of Energy and Energy Resources electricity from RES is to reach 8% of the electricity produced in Bulgaria by 2010. These figures are present in the commitments made under the Kyoto Protocol. Bulgaria has a potential for annual production of geothermal electricity at the amount of 440 000 kWh, electricity from hydroelectric power plants at the amount of 755 million kWh and electricity from biomass at the amount of 30.65 million kWh. (for EcoWAT technologies see www.b2b.bg).

Zero alternative will mean that the terrain which is suitable and is under a procedure for allocation for construction of Wind Power Station Complex in the region of the Mount Murgash on the territory of the Village of Zhelyava, the Village of Eleshnitsa and the Village of Churek and the potential renewable energy source are to remain unused. The better alternative regarding the environmental and social and economic conditions in the region is implementation of the investment proposal.

In 2005 Bulgaria was holding one of the last positions in Europe regarding electricity production from renewable energy sources (RES). Only 0.5% of electricity produced in Bulgaria is from such energy sources, including wind, solar energy and geothermal sources. Electricity production in Bulgaria is primarily based on fossil fuel, nuclear energy and hydraulic power capacity employment. Fossil fuel energy resources in this country are related to combustion of low quality and low calorie raw materials (lignite). Renewable energy sources constitute an alternative for the development of inexhaustible and more or less environmentally sound electricity which is a mandatory condition from the sustainable development strategy.

Under the National Program for Renewable Energy Sources RES (2004-2015) of the Ministry of Energy and Energy Resources as well as the commitments made, this country is to achieve electricity production from RES at the amount of 11% of electricity produced in Bulgaria by 2010 (as per the Treaty of Accession of Bulgaria to the European Community).

The Common Energy Strategy of the European Community aims at: - guaranteeing security of deliveries by means of diversification of energy types and delivery origins; - ensuring better competition environment, and last but not least - achieving sustainable development of the energy field by means of increasing the share of RES. It was necessary to impose a common strategy because of: - the increasing energy dependence of the EU; - the constantly rising petrol prices (per saltum sometimes); - significant changes in the environment; - the significant rise of energy prices in the EU. In this respect one of the priority issues that the government (the State Energy and Water Regulatory Commission) needs to resolve is encouragement of electricity production from RES through adoption of preferential prices. This is the reason why financing of projects under the National Development Plan for encouraging production from RES 2007-2013 is part of the *Environment* Operative Program.

With the ratification of the Kyoto protocol this country has made a commitment to reduce its emissions for the period 2008-2012 by 8 % in comparison with 1988 assumed to be a base year under the framework convention. Such obligation entails a number of

challenges related to the need of sustainable development of the energy field since the structure of electricity production has suddenly changed. At that time electricity production from coal constitutes a comparatively small percent versus the share of nuclear energy. It was namely NPP Kozloduy that held the central position in the structure of electricity production with a share of approximately 40% of the total production, and the other main producer with a share of approximately 30 % was the thermal power plants from the *Maritsa East* Complex. This fact is going to change, though, due too the imposed decommissioning of the first two units of NPP Kozloduy and the impediments to the construction of a new nuclear facility on the NPP *Belene* site.

Switching to electricity produced primarily in coal-fired TPP-s and availability of low calorie lignite as the only local energy resource predetermine high emissions of greenhouse gases in electricity production. Switching to natural gas entails commitment and dependence of the energy field in this country on suppliers of such fuel who are from third countries to the EU. In such a situation with obligations and commitments under the imposed Common Energy Strategy of the EU it seems that the only alternative that remains is the use of nuclear power regardless of the environmental problems it entails in the long run since in the short term perspective it has the advantage that no greenhouse gases are emitted. In this sense, the alternative solution to RES, the big wind farms in particular, for this country is nuclear energy. Some NGO-s who overtly oppose RES projects, unconsciously or directly encourage the future development of NPP in Bulgaria.

At present one of the economically sound ways of eco friendly power production is wind power industry. Carbon dioxide emissions which are reduced from replacement of 1 kWh of electricity from coal with the same amount of electricity derived from wind power are approximately 0.97 kg of CO₂, the other green house gas values are: 1.34 milligrams of sulphur dioxide and 2.9 milligrams of nitrogen oxides as well as approximately 100 grams of ash and plaster. Such data are optimistic since they refer to high calorie imported coal. Our lignite which is used as primary energy source is a more hazardous way of electricity production than high calorie imported coal.

Green house gases generated in the process of production of materials for wind generators and the generators themselves are compensated for by reduction of hazardous emissions through wind electricity production for 3-5 months of operation only. According to this indicator wind power production is definitely holding the first position among the other *clean electricity* power plants. Throughout its economic life a wind turbine of an average size saves more than 3 300 tons of electricity producing coal, prevents emission of more than 7 000 tons of CO₂ equivalent into the atmosphere and avoids hundreds of tons of ash. The economic effect from adverse environmental consequence prevention costs approximately EUR 1 000 000 calculated on the basis of the current price level.

Solar power production is also extremely suitable for electricity production, but it is economically unsound due to the prices of photovoltaic systems, which remain too high, and the low efficiency, especially in the case of high summer temperatures. The idea of the environmental benefit from HPP, widely spread in this country, is an obsolete concept. As early as the last century it was definitively proven that irreversible environmental damages are caused by banking, flooding river beds near dams as well as by deviation of waters through pipe lines near the so called small hydroelectric power plants, popular these days, which significantly change natural water currents, the respective riverine and riparian soil conditions, climate and ecosystems. At the same time the water energy resource in this country is becoming more and more variable due to the increasing impact of the green house effect. Therefore, wind power production will remain, at present and in immediate future, the environmentally sound and investment worthy electricity source which receives

administrative, economic and institutional support not only at a national and European level, but also on a world-wide scale (source: www.b2b.bg).

2.2. Characterization of the investment project; technological scheme; main raw materials and stock; natural resources and energy sources (type, amount, reserves; annual consumption), total required area (in decares; agricultural land or land in forestry funds, category, reclamation stages; proximity to protected sites); social effect (employment, public necessity, social benefits), risky jobs, ensuring health and safety at work.

It has been planned that 44 wind turbines will be constructed; each one of such turbines will be equipped with three screws/blades and the turbine axis height will be up to 65 m (but it may vary from 56 to 66 m depending on the relief) and the blade length will be up to 37 m (but such length may be reduced to 27 m), and each one of such turbines will require approximately 1.4 decares of free erecting area around its foundation. Foundations themselves are with comparatively small surface depending on the pad surface and they may vary from a simple foundation, that is a cylinder from reinforced concrete with a diameter of 19.1 m and depth of 2.6 m, to a circle of piers with diameter of 12.5 m with attached cylinder from reinforced concrete with a diameter of 13.25 m. Laying, enforcement type and the choice of foundation are determined by the turbine height chosen and the geological features of the space chair. Laying the foundations of the turbine towers requires erecting area of approximately 400 m² around them. The difference in surfaces of one and the same model will depend on the option for using different foundations depending on the pad surface. Towers supporting wind turbines consist of 2 (3) sections, with a length of 20-22 m each and a diameter of approximately Ø4 m at the foundation decreasing to Ø3 m at the top.

It is provided that installation will be carried out by means of two truck cranes with a corbel scope of 20 – 25 (30) m. Since rotor installation is the most difficult, the location of the cranes is suitable for installing screws/blades to the hub on the ground and for the next lifting of the whole rotor group. The average area required as space for installation of screws/blades to the hub on the ground and its lifting is approximately 1 400 m² and such area is allocated as follows: - total storage area for screws - 500 m²; storage area for segments / sections from the tower - 300 m²; storage area for the hub/nacelle – 30 m²; - working area around the foundation – 450 m², area of the main crane – 200 m²; - area of the auxiliary crane – 50 m². The platforms on which the two cranes are installed have a total area of 250 m², they need to be levelled, provided that the maximum slope is up to 3-4%, - storage platforms for segments from the tower, components of the nacelle and the screws with a total area of 830 m² allow a bigger longitudinal slope up to 10% and leveling them on all platforms is not required. The free erection area should not have any vegetation but it is not mandatory that it should be a bare terrain.

Wind turbine platforms will be connected to each other by a road with a width of 3.5 – 4.2 m and a curve with a radius from 30 to 100 m, the easement thereof will be used for laying the cable network. Such road must be dimensioned for axis load of 12 tons with a maximum slope of 10% and a horizontal cross section. Road routes are in compliance with existing track remnants on dirt roads along the mountain ridge and around it. A road with a length of 13.6 km and a width from 3.5 to 4.2 m will be constructed on these remnants; such road will constitute a bed of 20 cm sand foundation with 5-10 cm concrete scrap or rubble. Interior platforms near the foundation and the road are required for ensuring access for the necessary transport for installation, repair and maintenance of turbines.

Wind turbines

Wind generators shall be situated at places where the average wind speed actually exceeds 5.5 m/sec. (20 km/h), as places with permanent wind without any sensible fluctuations and strong moment blasts throughout the year are preferred. Favourable conditions for electricity production, depending on the wind speed (at the height of 10 m), are from 5.8 to 8.5 m/sec, and the conditions that are exceptionally good are from 8.5 to 12.5 m/sec, although some turbines operate perfectly well in the range up to 15 m/sec as well. There are also designs of turbines that work efficiently enough even when wind speed is approximately 3 m/sec, but turbines are usually turned off when wind speed is less than 2.5 m/sec since they functions with zero power. In the case of wind speed exceeding 20 (25 m/sec) turbines turn off and reorient.

Reduction of losses from turbulence and increasing of efficiency of wind plants is achieved by proper arrangement of generators. In the case that there is enough space turbines are arranged: - at a distance of more than 3 – 5 times the rotor diameter, perpendicularly to prevailing winds; – at a distance of more than 5 – 9 times the rotor diameter, in the direction of prevailing wind. If there is a possibility for the wind to come from all directions, but with a prevailing frequency in one direction, turbines are drawn apart at a distance of 6 rotor diameters in the prevailing wind direction and 4 diameters in the other directions. What is recommended in the case of a stronger unidirectional or bidirectional wind is detachment at a distance of 8 diameters at the minimum in the prevailing direction and 3 rotor diameters perpendicularly.

It has been planned that 44 wind turbines will be constructed; each one of such turbines will be equipped with three screws/blades and will have a maximum power of 3 MW, as installation of 1 MW turbines is also possible. Although they are quite efficient in comparison with the rest renewable energy sources, wind turbines can reach a maximum efficiency of 60-70% (in the case of optimal wind as per theoretical studies) which is related to the respective reduction of preliminary planned electrical power. The power of electricity produced and the wind energy absorbed by the generator vary depending on wind speed and are assessed by the so called power curves. Thus a WWD-1 turbine with a nominal power of 1 000 kW has the following power: - zero power in the case of wind speed up to 2 m/sec; - 150 kW in the case of 6 m/sec; - 550 kW in the case of 9 m/sec; - 970 kW in the case of 11 m/sec; and - 1 015 kW in the case of speed from 12 to 20 m/sec. This shows that the nominal power of the turbine will be reached only under certain conditions and for a certain period of time.

The type of equipment will be Leitwind (LTW 70/77) or Win Wind (WWD-1 / WWD-3) with a height of the axis of the turbines up to 65 m (from 56 to 66 m) and length of the blade up to 37 m (27 m) with a massive foundation for fixing a tower for the head with the screws. Laying, enforcement type and the choice of foundation are determined by the turbine height chosen and the geological features of the space chair.

Fig.2. Section of a wind turbine

The turbines are with a horizontal axis and each one has three screws/blades, made of fibreglass (epoxy resin-bound glass fibres composites) with integrated anti-lightning protection. The LTW 70/77 capacities are for developing peripheral speed of up to 72-73 m/s determined by the maximum wind speed, at which the turbine operates, that develops during rotation at 6-21-23 revolutions per minute. The capacities of the WWD-1 turbine are for developing peripheral speed of 25-78 m/s, determined by the specified wind speed within the range of 3-25 m/s, which develops during rotation at 8-25 revolutions per minute.

The wind turbines of that kind are with optimized geometry of the blades which allows for reduction of the noise emissions and for easy operation. The blades are made of a composite material: polyester reinforced with glassfibres, which allows for reduction of the noise emissions and easier operation. The blades are made of composite material: glassfibres reinforced polyester. The outgoing voltage and frequency of the electricity produced vary depending on the rotation speed that is why they are transformed by equipment mounted on the turbine itself.

The design wind speed at which turbines operate at total output is 12 m/sec., but they can also operate in the range from 2.5 m/sec. to 25 m/sec. Turbines have an in-process inspection of the turbine axis deviation direction which allows the axis to be directed in the case of comparatively small changes and shifted in the case of stormy winds. Three independent grips of the different blades, brake gear for stormy winds and rotor locking in the case of need have been provided for.

Electrical Network

Oil transformers of 1260-1600 kVA have been envisaged for each turbine for transformation from low voltage to average voltage, usually 11 kV or 33 kV. The wind turbines will be connected serially with a cable routing which will supply a common, so called receiving station. Any 8 generators are to be connected to one bus, and there are 4 separate buses altogether. The substation will be a one-storied building situated on an area of 36.2 m². The transceiver station with 4 ingoing buses will be connected through a power line of 33 kV to a second transformer substation of NEC and will represent the power supply point in the electrical network.

Fig. 3 Scheme of the receiving and the transformer stations

An electrical switchboard for average voltage will be set up at the transmitting station. The 33 kV cable routing will be laid down underground at a length of about 20 km and will follow a routing which will be specified, but will most probably be within the easement of the road. The transformer substation 110/33 kV will comprise three parts: high voltage; a transformer in oil basin; protection, operation and measuring devices.

Primary raw materials and supplies; natural resources and power resources (type, quantity, reserves and resources, annual consumption).

The wind conditions in Bulgaria are distinguished for their exclusively great variety, conditioned by both dynamic and physico-geographical factors. The researches carried out regarding the power potential of wind, show that there are objective possibilities for the development of wind power in this country.

By virtue of the parameters of the wind potential and of the existing social and economic conditions, according to literary data, on the territory of Bulgaria can be outlined three zones in relation to the possibilities of setting up wind facilities.

I zone (small-scale wind power engineering): it encompasses the flat country parts of the Danube Valley and the Upper Tracian Lowland, the high fields of Western Bulgaria and the valleys of the Struma and the Mesta Rivers. The wind resources at 10 m height are less than 100 W/m², the number of hours with wind speed surpassing 3 m/s is about 70-90% of their total number throughout the year, the average annual duration of the interval of speeds of 5 – 25 m/s is 900 hours which is about 10% of the number of hours throughout the year.

II zone (medium-scale wind power engineering): includes the Black Sea coast and Dobrudzha, a strip of land of small width along the bank of the Danube and the open places in the mountains at an altitude of up to 1,000 ASL. The wind resources at 10 m height are less than 100-200 W/m², the average annual speed of the wind surpasses 3 m/s during about 50% of their total number throughout the year, the average annual duration of the interval of speeds of 5 – 25 m/s is about 4,000 hours which is about 45% of the number of hours throughout the year.

III Zone (the large-scale wind power engineering): in includes the open mountain ridges over 1,000 ASL and the parts of the land jugged out into the sea (Cape Kaliakra and Cape Emine). The wind resources at 10 m height are between 200 – 300 W/m², the average annual wind speed surpasses 6 – 7 m/s at a high frequency and low % of quiet weather and wind below 1 m/s throughout the year, the average annual duration of the interval of

speeds of 5 – 25 m/s amounts to 6,600 hours which is about 75% of the number of hours throughout the year.

Fig. 4. Map of zones fit for construction of wind turbines in Bulgaria

The production of electricity in Bulgaria is based mainly on fossil fuels (mainly low calorie lignite coal), nuclear power and hydro power. The classical power resources of the country are insignificant. The renewable energy resources constitute an alternative of the development of inexhaustible ecologically clean energy. The estimated annual output of electricity from one wind turbine with a hypothetical capacity of 2,000 kW ranges from about 2,400,000 kW/h to about 4,800,000 kW/h for each unit. The total output of electricity from the complex of wind facilities will amount to about 150,000,000 kW/h annually.

Total Required Area (sq. m of farm land or forest fund land, category, stages of reclamation; proximity to protected areas)

The sites encompass landed properties situated on the land of three villages, as follows: 13 estates with a total area of 51,825 m² in the Village of Zhelyava, region of Kremikovtsi, Metropolitan Municipality, District of Sofia City; 12 estates with a total area of 47,968 m² and an undistributed into sites estate of 21,286 m² in the Village of Eleshnitsa, and 15 estates with a total area of 53,174 m² in the Village of Churek, Elin

Pelin Municipality, Sofia District. The disposition of the areas according to plots is given in the table below.

For the village land of the Village of Zhelyava, Code under the Unified Classification of Administrative Territorial and Territorial Units 29204, location “Shiroki Preslap”, region of Kremikovtsi, as a type of sustained yield – a pasture, common land category IX, the following sketches have been issued from the Municipal Office “Agriculture and Forests” – Kremikovtsi: - Sketch No. 00642/24.10.2005 of estate No. 001031; - Sketch No. 00643/24.10.2005 of estate No. 001032; - Sketch No. 00644/24.10.2005 of estate No. 001033; - Sketch No. 00645/24.10.2005 of estate No. 001034; - Sketch No. 00647/24.10.2005 of estate No. 001036; - Sketch No. 00648/24.10.2005 of estate No. 001037; - Sketch No. 00649/24.10.2005 of estate No. 001038; - Sketch No. 00650/24.10.2005 of estate No. 001050; - Sketch No. 00651/24.10.2005 of estate No. 001051; - Sketch No. 00642/24.10.2005 of estate No. 001031; - Sketch No. 00652/24.10.2005 of estate No. 002005; - Sketch No. 00653/24.10.2005 of estate No. 005005; - Sketch No. 00654/24.10.2005 of estate No. 005006.

For the village land of the Village of Eleshnitsa, Code under the Unified Classification of Administrative Territorial and Territorial Units 34120, location “Murgash”, Elin Pelin Municipality, as a type of sustained yield – a pasture, common land category IX, the following sketches have been issued from the Municipal Office “Agriculture and Forests” – Elin Pelin Municipality: - Sketch No. 00685/31.10.2005 of estate No. 024041; - Sketch No. 00686/31.10.2005 of estate No. 024042; - Sketch No. 00687/31.10.2005 of estate No. 024043; - Sketch No. 00688/31.10.2005 of estate No. 024044; - Sketch No. 00689/31.10.2005 of estate No. 024045; - Sketch No. 006890/31.10.2005 of estate No. 024059; - Sketch No. 00691/31.10.2005 of estate No. 024060; - Sketch No. 00692/31.10.2005 of estate No. 024061; - Sketch No. 00693/31.10.2005 of estate No. 024062; - Sketch No. 00694/31.10.2005 of estate No. 024063; - Sketch No. 00695/31.10.2005 of estate No. 024064; - Sketch No. 00696/31.10.2005 of estate No. 024065; - Sketch of No. 001147/06.12.2006 of estate No. 24083 (from No. 024003); - Sketch of No. 001152/06.12.2006 of estate No. 24088 (from estate No. 024087); - Sketch of No. 001154/06.12.2006 of estate No. 24090 (from estate No. 024087); - Sketch of No. 001155/06.12.2006 of estate No. 24091 (from estate No. 024087); - Sketch of No. 001156/06.12.2006 of estate No. 24092 (from estate No. 024087).

For the village land of the Village of Churek, Code under the Unified Classification of Administrative Territorial and Territorial Units 81760, location “Yotsova Livada” and “Murgash”, Elin Pelin Municipality, as a type of sustained yield – a pasture, common land category IX, the following sketches have been issued from the Municipal Office “Agriculture and Forests” – Elin Pelin Municipality: - Sketch No. 00406/31.10.2005 of estate No. 544018; - Sketch No. 00407/31.10.2005 of estate No. 544019; - Sketch No. 00408/31.10.2005 of estate No. 547042; - Sketch No. 00409/31.10.2005 of estate No. 547043; - Sketch No. 00410/31.10.2005 of estate No. 547050; - Sketch No. 00411/31.10.2005 of estate No. 547051; - Sketch No. 00412/31.10.2005 of estate No. 547052; - Sketch No. 00413/31.10.2005 of estate No. 547053; - Sketch No. 00414/31.10.2005 of estate No. 547061; - Sketch No. 00415/31.10.2005 of estate No. 547062; - Sketch No. 00416/31.10.2005 of estate No. 547063; - Sketch No. 00417/31.10.2005 of estate No. 547064; - Sketch No. 00418/31.10.2005 of estate No. 547065; - Sketch No. 00419/31.10.2005 of estate No. 547066; - Sketch No. 004405/31.10.2005 of estate No. 548002.

Table.1 Areas exposure by plots and lands

Serial No.	No. of landed estate	Land belonging to one village	Area of the landed, m ²	Note
1.	No. 001031	Village of Zhelyava	3 244	
2.	No. 001032	Village of Zhelyava	2 798	½ in Eleshnitsa
3.	No. 001033	Village of Zhelyava	4 228	
4.	No. 001034	Village of Zhelyava	4 000	
5.	No. 001035	Village of Zhelyava	4 000	
6.	No. 001036	Village of Zhelyava	4 000	
7.	No. 001037	Village of Zhelyava	4 000	
8.	No. 001038	Village of Zhelyava	4 000	
9.	No. 001050	Village of Zhelyava	4 403	
10.	No. 001051	Village of Zhelyava	4 233	
11.	No. 002005	Village of Zhelyava	4 000	
12.	No. 005005	Village of Zhelyava	4 766	
13.	No. 005006	Village of Zhelyava	4 153	
	Total for the Village of Zhelyava		51 825	
1.	No. 024041	Village of Eleshnitsa	2 446	½ in Zhelyava
2.	No. 024042	Village of Eleshnitsa	4 169	
3.	No. 024043	Village of Eleshnitsa	4 000	
4.	No. 024044	Village of Eleshnitsa	4 000	
5.	No. 024045	Village of Eleshnitsa	4 000	
6.	No. 024059	Village of Eleshnitsa	4 521	
7.	No. 024060	Village of Eleshnitsa	4 000	
8.	No. 024061	Village of Eleshnitsa	4 000	
9.	No. 024062	Village of Eleshnitsa	4 639	
10.	No. 024063	Village of Eleshnitsa	4 000	
11.	No. 024064	Village of Eleshnitsa	4 000	
12.	No. 024065	Village of Eleshnitsa	4 193	
			47 968	
13.	No. 024083	Village of Eleshnitsa	4 000	After partition from No 24003
14.	No. 024088	Village of Eleshnitsa	4 012	After partition from No. 024087
15.	No. 024090	Village of Eleshnitsa	4 441	After partition from No. 024087
16.	No. 024091	Village of Eleshnitsa	4 551	After partition from No. 024087
17.	No. 024092	Village of Eleshnitsa	4 282	After partition from No. 024087
	Total for the Village of Eleshnitsa		21 286	
1.	No. 544018	Village of Churek	4 378	
2.	No. 544019	Village of Churek	1 749	
3.	No. 547042	Village of Churek	4 659	
4.	No. 547043	Village of Churek	3 977	
5.	No. 547050	Village of Churek	1 574	
6.	No. 547051	Village of Churek	3 499	
7.	No. 547052	Village of Churek	4 001	
8.	No. 547053	Village of Churek	3 786	
9.	No. 547061	Village of Churek	2 978	
10.	No. 547062	Village of Churek	2 803	
11.	No. 547063	Village of Churek	3 720	
12.	No. 547064	Village of Churek	4 000	
13.	No. 547065	Village of Churek	4 000	
14.	No. 547066	Village of Churek	4 050	
15.	No. 548002	Village of Churek	4 000	
	Total for the Village of Churek		53 174	

The size of the sites is in compliance with the technological requirements during the construction and operation of wind generators, due to which no additional land areas shall be necessary during construction.

The examined terrain does not fall into the limits of a protected natural site or of a potentially protected site, which fact has been confirmed by letter ZDOID3ДОИД-10490/16.01.2007 of MEW³. The reference in writing of MEW has been made following a Decision for providing access to public information No. 7/16.01.2007. In the reference in writing, the investor has been informed that: "Mount Murgash does not fall into potentially protected areas. The nearest potentially protected dwelling area is „Etropole – Bailovo" with code BG0001043."

Social Impact (employment of manpower, social necessity and social benefits)

The region of Mount Murgash is in many cases representative of wind power (good wind indices, relief, density of population, vegetation, geological conditions, etc.). The region is distinguished by constant air currents throughout the year, wind speed and direction, at a comparatively low altitude, good access for transport and availability of power supply network.

After the ratification of the Kyoto Protocol, this country has undertaken the obligation to reduce its emissions for the 2008-2012 period by 8 % in comparison with the year 1988 accepted as basic under the framework convention. The solution of the existing ecological problems relating to the production of power is natural production of power from renewable energy sources. Energy generated by wind is renewable and reduces the use of fossil fuels. It is not related to emission of CO₂, sulphur oxides, dust or any other air contaminants. Upon substitution of 1 kWh of electricity with coal, with the same quantity of wind electricity the following emissions are prevented: about 1 kg of CO₂, about 100 gr of ash and gypsum, 2 mg of sulphur dioxide and 3 mg of nitrogen oxides (when using high caloric imported coals. Greenhouse gasses generated in the production process of wind generators are compensated for by the reduction of the harmful emissions from their electricity production for only 3 – 5 months of operation. By this index, windpower engineering ranks definitely first among the rest of the power plants for the so called "clean electricity". Throughout its economic life, a wind turbine of an average size saves more than 3 300 tons of electricity producing coal, prevents emission of more than 7 000 tons of CO₂ equivalent into the atmosphere and avoids hundreds of tons of ash.

The potential of the solar energy having fallen on the surface of the earth (between 1 and 3 % of it is transformed into wind energy) is 5 times greater than the present consumption of energy in the world. Its production is cheap and is related with storage of harmful substances, generation of waste or other hidden side effects (like the nuclear power engineering, for instance). The construction of wind plants on agricultural land does not cause destruction of the soil layer (save for the bases of the foundations) or the termination of the production of agricultural products. The restoration of the condition of the environment after the termination of the operation of wind plants is related solely with dismantling and removal of the foundations.

The purpose of this investment proposal is the production of renewable electricity, and the purchase of the entire power produced has been legally secured. The location of both terrain and facilities on the platform around Mount Murgash is suitable for the implementation of such type of projects.

In 2005 Bulgaria is holding one of the last positions in Europe regarding electricity production from renewable energy sources (RES). Only 0.5% of electricity produced in

³ Ministry of Environment and Water

Bulgaria is from such energy sources, including wind, solar energy and geothermal sources. Electricity production in Bulgaria is primarily based on fossil fuel, nuclear energy and hydraulic power capacity employment. Under the National Program for Renewable Energy Sources RES (2004-2015) of the Ministry of Energy and Energy Resources as well as the commitments made this country is to achieve electricity production from RES at the amount of 11% of electricity produced in Bulgaria by 2010. The Common Energy Strategy of the European Community aims at: - guaranteeing security of deliveries by means of diversification of energy types and delivery origin; -ensuring better competition environment, and last but not least - achieving sustainable development of the energy field by means of increasing the share of RES. Imposition of a common strategy has become a necessity due to: - the increasing energy dependence of the EU; - the constantly rising petrol prices (per saltum sometimes); - significant changes in the environment; - significant rise in energy prices in the EU.

The implementation of the investment project will have a positive impact in relation to the social and economic conditions during the operation of the wind plant. It can be specified and expressed as follows: considerable capital investments, finding expression in the construction of the plant itself; meeting the increasing demand of electricity on the market and in compliance with the country's requirements and commitments; prevention of emissions of harmful substances and reduction of emissions of greenhouse gasses; transition to sustainable development of the energy field by increasing the share of WS; reduction of the country's dependence on foreign suppliers outside the EU; creation of an alternative to nuclear power through electricity production by WP; creation of local engineering infrastructure; creation of part time jobs; provision of part time employment to a 10 – 15 person construction and design personnel from a Bulgarian construction company; creation of permanent jobs by providing employment for 3 – 5 persons of servicing personnel (security and maintenance).

The realisation of profit from wind power is related also with the respective amendments to the legal conditions: 1. The purchase price of 1 kWh of electricity is sufficiently high and will continue to go up (law provides that the purchase price cannot be less than 80% of the retail price for domestic purposes); 2. For each kWh produced by a renewable energy source, a green certificate will be granted which will be sold regardless of the fact whom the windpower is supplied to (the profit from the contemplated green certificates is equal to the revenues from their price); 3. Legal obligation of NEC to purchase preferentially 100% of the produced wind electricity (at a purchase price of about 2 times higher than the price of electricity from WPPs); 4. All investments in windpower engineering, save for the lands, are depreciated with tax acknowledged annual quotas of 15 to 50%; 5. Wind generator plants do not need numerous operating personnel and have no expenditures on fuel (presently, the taxes in this country are comparatively low, compared with the European ones, but they will inevitably be going up).

Hazardous work places and ensuring safe working conditions

The turbines Leitwind (LTW 70/77) and Win Wind (WWD-1, WWD-3) provided for assembly should satisfy the requirements for safe use of the standards of the International Electro-Technical Commission – IEC 16400.

The risk of accidents is chiefly due to increasing the revolutions of wind turbines in strong wind or occurrence of power failures in the transmission network. The turbines have a horizontal axis and three blades, constructed of fibreglass (epoxy resin-bound composites) with integrated lightning protection and options for peripheral speed of 25-78 m/sec that develops during rotation at 8 – 25 revolutions per minute. The design wind speed at which turbines operate at total output is over 12 m/sec, but they can also operate in the range from 2.5 m/sec to 25 m/sec. Turbines have an in-process inspection of the

turbine axis deviation direction that allows the axis to be directed in the case of comparatively small changes and shifted in the case of stormy winds. Three independent grips of the different blades, brake gear for stormy winds and rotor locking in the case of need have been provided for.

Other hazardous cases are the cases of icing of the blades and changing the profile at low temperatures and high humidity as well. Tests for determining wind characteristics in 2004-2006 with installed measurement towers have ascertained that in the vicinity of the summit serious icing regularly occurs. Under such conditions, ice could accumulate in layers on the wind turbine blade ends. Ice pieces disconnect from the rotating turbine blades and float at great distances beyond the rotor disk plane and could cause damages and harms. The safety zone behind the installation has a distance of retreat equal to the height of the axis plus the turbine diameter. It is dangerous to stay within the zone with a radius of 35 m around the turbine foundation in seasons with positive temperatures because of the air turbine mechanical impact, and in cases of icing – at about 120 m beyond the plane of the rotating of the blade because of floating ice pieces.

In cases of emergency, the installations stop functioning or are redirected at an angle toward the direction of the wind and in the case of determined icing of the blades, operational strategy for their stopping could be undertaken. Commissioning or resumption of their operational state by redirecting them against the draught is performed following a thorough control over the status of the separate parts.

At O.H.L. 20 kV (in this case 33 kV) the top admissible levels of the physical factors are not exceeded. Passing of such electric power lines through towns and villages is permitted under the operating legislation.

2.3. Investment project implementation: construction; commissioning; operation; investment project changes (development, phases, closing down, other); interdependence on the regional technical infrastructure (including accompanying activities).

The construction of a Wind Power Plant Complex should be effected within two summer seasons. Drawing up of operational project documentation will take about 3 months; the change of the designation of the land - about 6 months; the construction permit - about 4 months; contracting and delivery of equipment - about 7 months; construction - about 12 months (distributed in several years), and by the end of 2007 the first 10 wind generators (LTW 70/77 and WWD-1/ WWD-3) will be installed. Erection and commissioning will take about 4 months in the summer period. The remaining 34 turbines will be erected in 2008.

During the site operation should be developed: a monitoring plan, an emergency operations plan, operating instruction. During the exploratory design stage, there is no developed programme regarding the closing down of the site and subsequent use of the site.

The investment proposal includes construction of an electric power line O.H.L. 33 kV and of the transformer substation 110/33 kV. The underground cable routing (or the bases of the separate poles and their configuration) is to be specified, however they will coincide with the easement of the ro

3. Analysis of the existing state, prognosis and assessment of the possible impacts on environmental components expected to be affected by the implementation of the investment project.

Wind energy does not cause water, air and soil pollution. The impact of the Wind Power Station Complex on environment is related to the following: - removal of tall-stemmed vegetation around the foundation; soil disruption during construction, excavation works and foundation; - additional soil compaction by transport machines during installation of generators; - noise load in the area ; - visual impact and shadowing (the so called quivering shade) of the ridge; - impact on flora and fauna; - possible electromagnetic interference with the radars of Sofia Airport; disruption in the telecommunication systems on the mount; mechanical effect of ice piece ejection.

The region of mount Murgash is exemplary of wind energy usage in many respects (favorable wind values, geography, flora, fauna, geologic conditions, etc.). The region is distinguished by constant air streams throughout the year such as wind speed and direction, it is distinguished as one of the most windy places in this country with windless weather for approximately 3% of the year and wind speed less than 1 m/sec. At the same time the region is comparatively close to the industrial area of Kremikovtzi, at a comparatively small altitude, with ease of access by means of transport and a well developed electrical network.

3.1. Ambient air

3.1.1. Short characterization and analysis of climatic and meteorological factors related to a specific impact and quality of ambient air;

The region examined is part of the highland of the mountain climatic region of a temperate continental climate subzone of the European continental climate zone.

Such region is distinguished by precipitation distribution (summer maximum and winter minimum) typical of the continental climate, as such distribution is enhanced by the orographic impact of the mountains at mean altitude exceeding 1 000 m. Winter in the region is cold with frequent fogs and very strong intermittent winds. The number of days with mean day-and-night negative temperatures is almost 100%. Winter precipitation amount is not very large, but snow cover overlaps and accumulates during the precipitation period as it reaches its peak towards the period mid February - late March. Spring is cool, with average day-and-night temperatures exceeding 10°C, and comes late - no earlier than the end of May, it is distinguished by a high degree of cloud cover, frequent fogs and heavy spring precipitations. Summer is cool and rainy, as the maximum temperature exceeds 20°C only in the case of intensive warming. Autumn is warmer and drier than spring, the number of foggy days is smaller, and clear and warm days are a frequent phenomenon.

Climatic characterization according to meteorological data

1. Sunshine

The region is distinguished by an annual sunshine duration that is mean for Bulgaria (1998 hours) and short duration of air temperature above 10 °C.

Sunshine duration in hours –

Table No. 2

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
94	92	122	149	186	219	276	287	223	169	98	83	1998

2. Cloud cover

Cloud cover has a direct impact on the solar radiation absorbed by the surface of the earth. The degree of sky cloudage is expressed in tenths (a rating grade of 0 for clear sky, a rating grade of 10 for sky covered with clouds).

Average monthly total cloud cover in rating grades under months

Table No. 3

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
7.1	7.2	7.5	7.0	7.0	6.2	4.9	4.2	4.8	5.9	7.2	7.3	6.4

3. Thermal conditions

The region is distinguished by cold and long winter of approximately 6-7 months as the average monthly temperatures in the period November - April are near or below the zero. Summer is short and humid, as the average monthly temperature for the period July – August, the warmest months, varies in the range 12.3 - 12.4⁰C. Temperature amplitude is big and encompasses the range from -26⁰C in winter to +20⁰C in summer.

Average monthly minimum/average/maximum temperature under months *Table No. 4*

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
-3.4	-2.5	-0.1	5.1	10.3	13.5	15.8	16.4	12.8	8.3	3.8	-0.8	6.6
-6.1	-5.2	-2.9	1.8	6.8	10.1	12.3	12.4	9.0	4.9	1.1	-3.2	3.4
-8.7	-7.8	-5.6	-0.8	4.2	7.4	9.2	9.6	6.3	2.6	-0.1	-5.5	0.8

4. Air humidity, fog

The region is distinguished by constantly high air humidity (approximately 80% and more) with winter maximum (up to 86%) and by a heavy fog regime.

Average monthly relative air humidity in percentage: *Table No. 5*

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
83	86	80	83	84	85	81	77	79	81	86	86	83

The region is distinguished by 228.2 days of foggy weather at the average. The fog maximum is in winter (more than 20 days a month in December, January and February), but even in summer it does not fall below 13 days a month.

Number of foggy days under months *Table No. 6*

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
22.9	20.5	22.4	19.6	19.8	18.1	15.5	12.9	13.2	19.4	20.5	23.4	25.4

5. Precipitation

The region is distinguished by a precipitation of 617 mm/p.a. The annual precipitation course is characterized by a maximum of precipitation of 235 mm in spring and 209 mm in summer and a minimum of 140 mm in autumn and 121 mm in winter. Snowfall and icing in winter are heavy, as the presence of a snow cover up to an approximate number of 100-120 days a year is a regular phenomenon.

Average monthly precipitation in millimeters *Table No. 7*

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
39	37	43	61	131	131	95	73	67	52	55	46	617

6. Wind

Average wind speed during the year exceeds 10 m/sec, as stronger stormy wind comes from South in spring (March - April). Wind in winter is so strong that it may hamper walking. There are a number of very strong gusts of wind with speed exceeding

40 m/sec (e.g. 40 m/sec on 24-25.01.2007) several times a year, as such gusts continue for a relatively short period of time (minutes).

Average monthly wind speed in meters per second (Climatic guide) Table No. 8

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
12.7	13.0	11.5	10.9	8.9	8.3	7.9	7.8	8.1	9.7	12.3	12.5	10.3

Wind blowing from the Northern and Southern quarter of horizon (N 24.58 % and 8.4%) prevails throughout the year. The region of the mount is distinguished as one of the windiest places in this country with windless weather for approximately 3.3% of the year and wind speed less than 1 m/sec.

Wind frequency under directions and windless weather in percentage (Climatic guide) Table No. 9

Directions	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	P.A.
N	18.9	17.1	20.5	24.2	28.4	33.4	38.6	33.4	31.5	21.9	13.1	13.6	24.5
NE	8.4	8.5	8.2	11.6	13.2	14.4	17.1	17.7	17.6	10.8	3.9	6.7	11.5
E	2.8	2.0	2.7	3.2	2.7	2.1	3.2	3.7	3.3	4.2	2.5	2.8	2.9
SE	12.4	11.2	13.0	9.8	8.5	7.4	7.8	9.0	11.9	16.5	12.8	10.9	10.9
S	18.6	19.3	20.2	19.7	16.5	14.0	10.9	14.1	12.8	20.1	29.4	24.6	18.4
SW	14.8	16.9	15.0	13.3	11.0	9.4	5.9	6.1	8.2	11.2	18.2	17.1	12.3
W	13.0	14.0	10.7	7.5	8.8	6.9	6.4	5.6	6.5	7.4	11.5	12.6	9.2
NW	11.0	10.9	9.7	10.7	11.0	12.4	10.0	10.9	8.0	8.0	8.6	11.4	10.2
Still	1.7	1.7	2.7	3.7	2.8	4.4	4.0	4.4	4.7	4.0	2.6	2.0	3.3

Average wind speed (calculated for a height of 10 m) in almost all directions exceeds 10 m/sec, as prevailing Southern wind has a speed of 18 m/sec.

Average wind speed in m/sec under months and direction (Climatic guide) Table No. 10

Direction	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
N	12.9	12.6	11.3	10.5	8.9	8.7	8.3	8.3	9.0	9.1	11.3	11.8
NE	12.4	11.2	10.7	8.3	6.9	7.0	7.2	6.6	7.5	8.4	7.9	11.2
E	8.9	10.6	8.2	7.5	7.2	5.2	5.9	5.6	6.1	7.7	9.4	7.9
SE	11.1	11.8	10.5	9.7	9.3	8.0	8.2	7.7	7.4	9.3	12.2	11.5
S	16.8	16.8	14.9	15.5	12.5	10.6	10.1	11.2	10.6	14.0	15.5	18.4
SW	13.8	15.0	13.2	12.6	9.3	8.9	8.5	7.5	9.5	11.5	11.6	14.6
W	10.7	11.6	10.5	10.6	8.5	8.9	7.8	7.2	7.0	8.8	10.3	10.5
NW	11.2	11.0	11.0	10.2	8.4	8.8	8.7	8.5	8.8	8.5	10.8	11.8

A number of sampling masts were installed in 2005. They compare their readings with the ones of the weather station of the Bulgarian Academy of Sciences and provide additional details on wind and wind power density in the different parts of the wind farm. The arrangement of the sampling masts has been graphically presented on figure 5.

In the middle of the highest part of the wind park – a mast near the Weather station (under mount Murgash altitude 1685m): the average wind speed for 2005 is 8.19 m/sec (at 10 m) and the highest speed read - 40 m/sec, with average power density – approximately 1 200 W/m² and North – South direction. In the western part – M1 mast under Murgash Mountain Hostel (in proximity to mount Zla Mogila altitude 1 535 m) – the average wind speed for August December 2005 is 5.72 m/sec (at 66 m) and the highest speed read - 16 m/sec, with average power density – approximately 210 W/m² and North West – South East direction. In the Eastern part – M2 mast (Jotsova Livada Area, altitude 1 488 m) – the average wind speed for August December 2005 is 5.88 m/sec (at 85 m), with average power density – approximately 260 W/m² and North/ North East – South/ South West direction. Results obtained show significant differences in the average wind speed in the different parts of the wind farm due to the essential orographic impact of relief.

*Average wind speed in m/sec under direction for 2005. (Sampling masts)**Table No. 9*

Azimuth^o (direction)	0 (N)	30	60	90 (E)	120	150	180 (S)	210	240	270 (W)	300	330	Total
Mountly	7.6	6.1	7.1	5.62	3.2	7.6	12.2	11.6	8.7	7.2	5.8	7.6	8.3
M1 west	6.2	7.0	6.6	5.1	5.7	4.2	3.2	3.1	3.9	5.5	5.4	6.6	5.7
M2 east	6.2	5.9	5.2	3.1	4.6	5.5	6.3	6.8	7.5	7.0	5.2	4.6	5.9

Figure 5. A map of the location of the sampling masts

3.1.2. Ambient Air Quality Assessment (according to available data);

The terrain for construction of Complex of wind power stations comprises 44 separate grounds having medium surface area of about 4 decares (from 1.5 to 4.8

decares) around the ridge of mount Murgash . In immediate proximity is located Murgash Chalet (1 400 m), to the southwest of the mount itself (1 687 m). The site is situated at about 26 km. to the northwest of Kremikovtzi and at about 14 km. (12.5 km. in straight line) from the town of Buhovo.

The terrain is part of a controlled by the Ministry of Environment and Water (MEW) polluted air basin I. Sofia – Kremikovtzi with supervised atmospheric pollutants: dust, sulphurous dioxide, nitric oxides, hydrocarbon, phenols, lead aerosols, arsenic aerosols. Due to the greater height above the sea level, the rugged relief of the terrain and the directions of the winds prevailing within the region, (from the north to the south), the region is not affected by contamination originating from industrial activities.

3.1.3. Characteristics of the pollution sources contemplated under the project (quantity and concentration of emitted pollutants);

The transformation of wind energy does not cause any air pollution.

3.1.4. Treatment facilities (type, treatment effect);

No use of treatment facilities is envisaged.

3.1.5. Forecast for and assessment of expected alterations in the quality of ambient air (ambient air pollution) including of the air stratum just above the ground, the territorial scope of the zones with polluted air resulting from realization of the investment project, including:

a) emission in accordance with the forecasts outlined in the investment project that are to have a substantial impact on environment, assessed in terms of their nature and significance, sensitivity, impact on climate, etc.;

The transformation of kinetically renewable wind power is not connected with emission of harmful substances, just the opposite:” the obtaining of such type of power is related to the replacement of sources of power obtained from fossil fuels. The use of wind generators is connected with a considerable decrease in emissions (CO₂ and other greenhouse gases)

The potential of solar energy reaching the Earth’s surface (between 1 and 3 % from it is transformed in wind energy) is 5 times greater than the current power consumption. Its production to date however is not sufficiently cheap, and yet it is not connected with storage of dangerous substances, waste generation and other hidden side effects (such as nuclear energetic for instance, has). The construction of wind power plants on agricultural land does not involve destruction of the soil layer (with the exception of the foundations laying stage) or termination of the production of agricultural produce. The restoration of the environment’s condition after termination of the operation of the wind power plants is connected solely with dismantling and removal of their foundations.

The realization of the investment proposal will have a positive impact from the viewpoint of the ecological, social and economic conditions in the course of the site’s operation due to the increasing market demand for power and the necessity of compliance with the EU requirements regarding the increase in per cent of renewable energy sources. The main ecological benefit from wind generators is the prevention of emissions resulting from the production of conventional electric power. Wind power has the potential to decrease the emissions of CO₂ from the EU energy sector by more than 11 % until the year 2040. At the same time, at present (2005) Bulgaria occupies one of the last positions in Europe as far as the production of power from renewable energy sources (RES) is concerned, according to a research carried out by the German Power Producers Association (VDEW). Only 0.5% of the electricity produced in Bulgaria is from such energy sources, including wind, solar energy and geothermal sources. According to the national program developed by the Ministry of Energy and Energy Resources, the energy from renewable energy sources by the year 2010 should reach 8 % of the total electrical energy produced in Bulgaria. These figures are set also as a part of the commitments on the part of Bulgaria with respect to the Kyoto protocol. Bulgaria has a potential to produce 440 000 kWh geothermal power per annum, 755 million kWh from HPPs and 30.65 million

kWh from biomass. (Ecowatt Technologies www.b2b.bg).

b) forecast for the impact on the quality of ambient air with ascertainment of the territorial scope of the existing impact following established methods;

No impact on the quality of ambient air is expected.

c) Determination of the environment components on which the altered quality of ambient air will have significant impact;

The quality of ambient air will not change and therefore no additional negative impact is expected on other environment components.

3.1.6. Assessment of the impact on ambient air according to the applicable in the country norms and standards for admissible contents, and if no such norms and standards are available – in accordance with adopted criteria.

The solving of existing ecological problems connected with the expanding power production lies in the nature-friendly power production from renewable energy sources. Wind-generated power is renewable and spares the use of fossil fuels. It does not result in generation of CO₂, sulphurous oxides, dust or any other air pollutants. Upon replacement of 1 kWh coal-produced electrical energy with the same quantity of wind energy is avoided the following emission: approx. one kilogram of CO₂, approx. 100 grams of ash and gypsum, 2 milligrams of sulphurous dioxide and 3 milligrams of nitric oxides (given the use of high-calorie imported coal). Greenhouse gases generated in the process of production of wind generators will be compensated for by the reduction of harmful emissions from electric power production for not longer than 3-5 months. As per this indicator, wind power is classified in the first position among other types of power plants with regard to the so-called “clean electricity”. During the period of its usable life a wind turbine that is not very big will spare the use of over 3 300 tons of coal, will save the release in the atmosphere of more than 7 000 tons of equivalent CO₂ as well as hundreds of tons of ash.

3.2. Surface water and groundwater:

3.2.1. Characteristics of the hydrological and hydrogeological conditions and factors having an impact on quantity and quality of surface and groundwater;

The orographic extension and branching of the West Balkan morphostructural subarea to the east of the River Iskar Valley covers several mountains the boundaries between which are formed by the deep valleys of the rivers Gabrovnitsa, and Batouliyska, as the ridges meeting to the east form common orographic node - the mount of Murgash.

As per the hydrological regionalization the terrain falls within the Balkan region of the mountainous subarea within an area characterized by continental climatic impact on outflow. It is largest in the subarea – a surface area of 9 266 km² and within its boundaries is formed the main part of the outflow of the Balkan – originating feeders of the rivers Iskar and Danube. The outflow module equals 13.5 l/sec per 1 km², and the annual volume of water resources amounts to 3.944 billion m³. Here summer rainfalls are on the increase and losses caused by evaporation are comparatively small, and therefore the summer seasonal outflow increases in comparison to the winter – $K.(Q_{\text{I}}/Q_3) = 0.9$. The outflow maximum is in April (when temperatures have reached sustainable positive values) because of the intensive snow melting in this month, as the percentage of snow feeding of rivers increases to a significant degree. The outflow's genetic structure is rather favorable, given the low variation coefficient (0.37) and the high per cent of sustainable component.

3.2.2. Quantitative and qualitative characteristics of water resources on the territory of the site and water category of water sites, including emission condition of water in the water site at the points directly preceding and following the point of waste water discharge;

From the ridge between the mount of Murgash (1 686.8 meters above sea level) and mount Mali Murgash (1 602.5 meters above sea level.), drawn like a bow from the east to the west and opening to the south, spring many small rivers. They may be divided into three main groups: - to the east – feeders of the Bebrech River (Vitinska Reka,

Manastirska Reka from the Vitinya mountain pass) flowing into the Mali Iskar River; - to the south/southwest – feeders of the Chureshka River (Metlikovitsa River, Jerkovska River, Bazenska River, the Jelyavska River, etc.), flowing into the Iskar River in the Sofia Field; - to the northwest – feeders of the Batuliyska River (the Eleshnitsa, the Bakyovska River, etc.), flowing to into the Iskar River at the Iskar Gorge.

Within the ridge of mount Murgash where are located the grounds for the wind generators there are no facilities for drinking water supply and water supply for domestic purposes, found mineral and/or thermal springs. The only water source in the region around the site is a small captation (with unregulated SSZ), used by the Murgash chalet. With respect to region of the ridge and mount there are no issued permits for water use or water abstraction from water sites and established SSZ as per Regulation No 3/16.10.2000.

The existing regulated water sources and facilities for drinking water supply and supply of water for domestic purposes of the closest to Murgash land territories of populated areas (as per Letter with issue No 3858 dd. 24.01.2007 of Basin Directorate “Danube Region”) are, as follows:

- for the village of Churek (at a distance of 6.3 km.) – 4 captations in Chureshki Dol (a procedure for updating of SSZ is forthcoming) for water supply for drinking and domestic purposes of the village of Churek managed by ViK EOOD ;

- for the village of Vrachesh – (at a distance of 7.5 km.) – river water intakes (nearest set up SSZ) from the river of Cheshkovitsa at an elevation of 501 m. and from the river of Osenitsa at an elevation of 631 m;

- for the village of Zhelyava (at a distance of 10.5 km.) – river water intake at an elevation of 770 m. (drainage/captation) from the river of Zhelyava (procedure for establishment of SSZ) managed by Sofiiska Voda AD, belt III from SSZ reaches up to the spring of the river – at the foothill of Shumnata Mogila at an elevation of 1 115 m;

- for the village of Eleshnitsa (at a distance of 10.2 km.) – water intake of the Manastirska River, right feeder of the Vitinska River (unregulated and without established SSZ).

The bank of Bebresh Dam, located nearby, is at a distance of over 8 km. in straight line from mount Murgash .

3.2.3. Name of water site (with respect of which is issued permit for use of water site and/or water use), area, populated area, municipality and county;

Due to the nature of the site Complex of Wind Power Plants no issuance of permit for use of water site or water use is contemplated.

3.2.4. Characteristics of water sources and water consumption for the site, as envisaged in the investment project: water quantities separately for each water source; water type (surface water or groundwater, water mains in populated areas, etc.) and objectives of water use; the issuance of permit for water use is mandatory for the cases when within the EIA Resolution is required permit for discharge of waste water;

Due to the nature of the site Complex of Wind Power Plants is not contemplated water consumption or issuance of permit for waste water discharge.

3.2.5. *Quantity and composition of waste water per flows – industrial, domestic/fecal and rainwater contemplated in the investment project; type of sewerage system;*

No generation of waste water is contemplated. Rainwater from the upper part of the foundations will drain into and be absorbed in the adjoining terrain.

3.2.6 Situation and technological scheme of the waste water treatment plant, quantity and physicochemical composition of waste water at the entrance and exit of the plant, including reduction of pollutants at the separate treatment stages; quantity and composition of deposits obtained during the treatment process

No construction of waste water treatment plant is contemplated.

3.2.7. Justification of the quantity and physicochemical composition of waste water as to which a permit for discharge is being applied for;

No issuance of permit for discharge of waste water is contemplated.

3.2.8. Scheme of the water site or parts thereof where is envisaged use of water site, including discharge/discharges of waste water in the water site, map materials; location/locations of the water site and mode of use of the water site, including location of discharge in the recipient water body;

No use of water site is contemplated.

3.2.9. The emission norms for admissible contents of hazardous and harmful substances in waste water for which a permit for discharge is being applied for

No waste water discharge is contemplated.

3.2.10. Forecast and assessment of the expected alterations in the regime of surface and groundwater as a result of the contemplated under the investment project: water use and/or use of water sites by altering water flows; construction of dams or other hydrotechnical facilities, removal of inert materials from river beds etc.; as well as the impact of the latter on the general condition of water ecosystems and the processes of self-treatment under conditions typical for normal and dry years; the forecast and assessment are drawn up on the grounds of hydrological research carried out in view of the objectives of this investment project, assessment of the deposit outflow and its dynamic reserves, water balance and water management research, hydraulic calculations, engineering geological research and hydrogeological research:

After the respective research is carried out on the part of Basin Directorate "Danube Region" (BDDR) (Letter with issue No 3858 dd. 24.01.2007) the following has been ascertained: „As regards the region of Mount Murgash where a wind power plant is being constructed there have not been issued any permits for use or water abstraction from water sites and established SSZ as per Regulation No 3 dd. 16.10.2000 around facilities.” At this stage of the procedure for assessment of the investment proposal BDDR has expressed positive opinion.

ViK EOOD Sofia has agreed the investment proposal regarding the region of mount Murgash , since no existing water mains are being affected thereby, neither water supply facilities, water sources and SSZ managed by EOOD „Water Supply and Sewerage Systems” Sofia (Letter filed under No 3 dd. 26.01.2007).

No alterations are expected in the regime of water flows and groundwater since under the project is not contemplated the use of water sites involving the alteration of water flows, construction of dams and other hydrotechnical facilities, removal of inert materials from river beds, etc.

The completion and operation of the site is not to have any impact on the quantitative regime and qualities of groundwater, on the general condition of water ecosystems and on the processes of self-treatment in the conditions of normal and dry years.

3.2.11. Forecast for and assessment of the expected alteration in the quality of water in the water site, including the quality of water within the sanitary security zones upon discharge of waste water (with the specified emission norms), in case of direct and direct discharge into groundwater, activities above the ground surface and in the groundwater site that represent direct or indirect discharge, reinjection in the same groundwater site, artificial feeding of groundwater, etc., taking into account also the loads from other emitters within the discharge region; assessment of the water flows is made taking into consideration the minimal average water quantity per month with security equalling 95%;

No construction of water sites is contemplated within the boundaries of the complex.

3.2.12. Proposal for individual emission restrictions on discharged wastewater with the aim of providing the project category of water in the water site;

No discharge of waste water is envisaged.

3.2.13. Determination of environment components on which the altered hydrological and hydrogeological conditions as well as the altered quality of water are to have significant impact.

Due to the comparatively small volume of the foundations in relation to the overall territory of the site no changes in the hydrological and hydrogeological conditions of the region are expected.

3.3. Waste:

3.3.1. Expected quantity of generated waste (name, code, quantity);

Waste to be generated in the process of construction and operation of the site is compliant with Regulation No 3 dd. 04.2004 for classification of waste (issued by the Minister of environment and the Minister of Health, promulgated in the State Gazette, issue 44 dd. 25.05.2004).

Waste from construction and excavation works:

Code 20.02.02 – soil and stones – the performed types of excavation works for each turbine (depending on the foundation) will have the following scope: for solid foundation (without piles) – with a surface area of 290 m² or a maximal volume of approximately 750 m³; for foundations on piles – 140 m² or approximately 360 m³. The difference in the surface areas, given the use of identical pattern is due to the option for use of different foundations depending on the embedding surface: ordinary foundation, reinforced concrete cylinder having diameter of 19.1 m. and depth of 2.6 m. or a circle of piles having diameter of 12.55 m. with reinforced concrete cylinder having diameter of 13.25 m., attached to the these.

The necessary levelling of each ground to reaching the prescribed maximal slope of the terrain (necessary for location of auto cranes for performance of the fitting works) will be, on average for each ground, at a surface area of approx. 250 m², but with respect to these is not contemplated any excavation outside the ground's boundaries as the excavated earth masses from the higher part will be used for filling in to be carried out in the lower part of the ground.

There will also be an additional necessity of soil removal in connection with the construction of the beds of the road connections between the turbine grounds. The road courses are complied with the existing traces from cart tracks of country roads along the ridge of the mount and around it. Construction of road with length of 13.6 km and width of 3.5 to 4.2 m. that is to comprise a bed of 20 cm. of sand base with 5-10 cm. crushed

concrete or ballast. The removed humus horizon between cart tracks (inasmuch such exists) from a surface area of about 48 decares, which in fact represents the projection of the traces of existing roads along the ridge areas may be used for recultivation of the grounds. The anticipated quantity of earth mass to be excavated in order to shape the road beds will be approximately 10 - 15 000 m.³, part of which will probably be reused for filling in works.

The exact quantities of excavated and reused for land filling earth masses may be determined at the design's working phase. Then is to be performed also a balance of the earth masses. A part of the excavated earth masses will be used for shaping the zone around the foundations and for land filling of the road beds, as the redundant quantities are to be disposed at a depot agreed with the municipalities.

Waste from the operation of the Wind Power Plant

Code 13.03.07 non-chlorinated insulation and heat transmission oils on mineral base.*

At the base of the tower of each wind generator is to be mounted a 1 250/1 600 kVA transformer for transition from low to medium voltage 33 kV, the extender of which is to be filled with oil to the necessary level. A 110/33 kV transformer is to be mounted also at the collection/transmission station.

The cooling of oil is natural (from the ambient air) or intensified by compulsive circulation of air stream. It is envisaged in case of possible failure any leaked transformer oil is to be separately collected at the base of the wind generator tower that is probably to be filled with fire protection layer of large fraction gravel.

The transformer oil, apart from its role of cooling fluid, also performs functions of insulation environment. After a certain operation term, the insulation properties of the oil are periodically subjected to checks since these may deteriorate due to the humidity contents in same. When certain defined indices are exceeded, the oil may be treated by the use of special mobile facility.

The technological process of power transfer is not connected with emitting other hazardous substances or waste with the exception of transformer oil that is periodically delivered (once every two or three years) for recycling or is treated on spot.

3.3.2. Collection and transportation (description of the system, warehouse premises);

In case that no special mobile facility is contemplated for collection of oil from each transformer, a spot collection from each transformer is to be carried out by NEK or other similar company. The collection is to be performed by means of special maintenance technology, once every two or three years.

3.3.3. Processing of waste prior to its delivery for final neutralization;

No waste processing is contemplated.

3.3.4. Land filling:

a) description of depots contemplated within the investment project and existing old contamination with waste, status and condition, including surface area, types of used territories, distance from the site (the populated area), transport availability, plan for closing of the depot; technology of operation, filling type – separate, combined; operation commencement, capacity, operation term;

No land filling or construction of depot is contemplated.

b) a map scheme showing the territorial location of the depot is enclosed;

None.

c) organization and management, system for supervision and control;

None

d) quantities of landfilled waste per types;

None.

3.3.5. Other forms of neutralization;

None

3.3.6. Waste delivered/received for processing/neutralization of/by other enterprises or import/export.**None.**

3.4. Hazardous substances:

3.4.1. Toxic substances – sources, toxicological characteristics;

No use of toxic substances is envisaged.

3.4.2. Other hazardous substances – sources, type, characteristics

No use of other dangerous substances is envisaged.

3.5. Harmful physical factors: noise, vibrations and harmful radiation (ionizing, non-ionizing, thermal etc.), microclimate, high pressure etc.:

3.5.1. Existing sources of harmful physical factors and information for their impact;

With the exception of the facilities to the Murgash Meteorological station there are no other facilities, sources of harmful physical factors, built in the region of the mountain ridge.

3.5.2. Sources of harmful physical factors envisaged in the investment project;

Each working mechanical system generates sound waves from the vibrations of its separate mechanisms and devices during their movement, friction, hitting etc. Hence the noise is unavoidable during the work of the generators too. But in this case in addition to the mechanical noise there is also aerodynamic noise caused by the rotation, vibrations, friction and the other types of interaction of the rotor paddles with the streamline air flow. This noise depends mainly on the rotor revolutions and on the methods of its aerodynamic control.

The wind turbines initially installed during the eighties were very noisy, so the wind parks had to be situated several kilometers away from residential buildings. The decrease of the aerodynamic noise is an issue which the producers have already overcome by decreasing the back side of the wings (with aircraft profile), the material of their construction has been changed, and the active direction towards the wind has been secured. This secured the avoidance of the so called “wind shadow” and the sharp changes in the turbine’s rotations and from there of the impulse noises and vibrations. Simultaneously the producers have also eliminated the noise of the gear box allowing the installation of the turbines near residential buildings.

The contemporary megawatt turbines (ex. 2-3 MW turbine), at 95% of their nominal power rotate with comparatively low revolutions (10-30 revolutions per minute) and generate noise with intensity of about 100-103 dBA. These levels of noise decrease to 40 dBA at a distance of about 250-350 m, and under about 35 dBA at a distance up to 450-550 m (see fig. 7 of item 3.5.3). The smaller power turbines of 1-1.5 MW are less noisy and the distances indicated are considerably smaller with them.

The sources of other physical impacts in the transformation of the wind energy in the region are: - visual impact and shadowing (so called “flickering shadow”) on the ridge – possible electromagnetic interference with Sofia airport radars - disturbance of the telecommunication systems on the peak; – mechanical impact from casting ice pieces.

Because of the levels of the noise, the vibrations and the infrasound, as well as because of the emerging interferences in the range of the radio waves, the wind generators are situated at a distance not shorter than 500 m from the territory of the closest settlement (Article 141, paragraph 1 of Ordinance No. 14 dated 15 June 2005 for the technical rules and norms for design, construction and use of the sites and the facilities for production, conversion, transfer and distribution of electric energy, SG 53/2005 promulgated on 28.06.2005 of MRDPW and MEER). The necessity of the effective isolation from noise,

vibrations and infrasound is envisaged complying with the requirements of the regulatory act (within the meaning of Article 2 for facilities under Article 1). The turbines Leitwind (LTW 70/77) и Win Wind (WWD-1) envisaged for installation should meet the requirements for safe use from the standards of the International Electro-technical Commission – IEC 16400.

3.5.3. Forecast and assessment of the probable causes of the harmful physical factors.

Forecast and assessment of the noise distribution

The turbines envisaged for installation are meant for reaching of peripheral speed of 25-78 **m/sec**, specified by the indicated wind speed within the range of 3-25 **m/sec**, which is gained in rotation with 8-25 revolutions per minute. The exemplary levels for 2-3 MW turbines of this type with height of the axis of 58 m at wind speed from 4 to 8 m sec (at height of 10 m) are within the range 90.7 – 101.9 dBA. The theoretical reaching of noise level of 103 dBA is achieved only at 95% of the nominal power at wind speed of more than 12 (up to 20) **m/sec** (at a height of 10 m), but in fact the actually measured levels under these conditions are of the order of 101.9-102 dBA.

The producers of wind generators provide data for the distribution of the noise around the turbines, by examining the noise field as circular around the generator. In fact the noise from the leeward is perceived as weaker and is distributed at a shorter distance. While in the opposite direction, i.e. in the direction of the wind it is visa versa. Therefore the planimetric diagram of the noise field depends also on the direction of the wind and generally it is not circular but rather with oval noise isolines and the turbine is in the nearest to the direction of the wind focus of the oval. In order to reach territorial comparability of the results the surface of the oval needs to correspond to the surface of the circumference presented by the producer.

The distribution of these oval noise isolines is calculated in conformity with the Method to measure the noise of local and industrial sources from Appendix No. 3 to Article 6 Methods to determine the noise indicators depending on the source, Ordinance No. 6 dated 26 June 2006 for the noise indicators in the environment, recognizing the level of discomfort during different part of the day, the limit values of the noise indicators in the environment, the methods of assessment of the value of noise indicators and of the harmful effects from the noise over the health of the population.

The distribution of the noise isolines, depending on the deleveling of the terrain according the schedule for decrease of the noise level depending on the distance and the difference in height of the source and the calculating point (the place of impact), is determined according to the given dependence (graphics of fig. 4.1. of Ordinance No. 6/26.06.2006). Two levels are accepted as theoretic starting noise levels for the wind generator - a level of 100 dBA (with wind speed of 6 **m/sec**) and of 103 dBA (with wind speed of more than 12 **m/sec**). The distribution of the oval noise isolines for 40, 45, 50, 55 and 65 dBA at deleveling of 0, 25, 50, 75 and 100 m is shown graphically in fig. 6. For easier visual comparison the diagrams for the two levels are situated side by side.

Figure 6 Distribution of the oval noise isolines for exit levels of 100 dBA of the wind generators at deleveling of 0, 25, 50, 75 и 100 m

Figure 7. A map with the noise levels of the Murgash wind generating park

As in fact the measured noise levels for this type of turbines are of the order of 101.5-102 dBA, these values are used as initial in the calculating of the distribution of the noise levels for the terrain. The forecast for the territorial situation of the levels indicated in the oval noise iso lines are shown in the noise map for Murgash wind generating park (fig. 7). In the setting up of the map the principle of superposition has been used for determining the super-positioning noise levels between the generators.

The equivalent noise levels above 65 dBA are only in areas which almost overlay with the projection of the rotating propellers over the surface of the earth. From the noise map and the calculations made it is obvious that the areas with noise level above 55 dBA are 44 ovals with small and big axis of 46 m and 93 m, corresponding to a circumference with radius of about 73 m. Areas with noise levels between 50 and 55 dBA represent several different in form areas around the generators (with configuration determined by the features of the bedding relief) with boundaries, remote at a distance of 73-79 m against, and 145-158 m in, the direction of the wind. The area with noise levels between 45 and 50 dBA covers a total area around the generators (depending also on the relief) with a boundary remote at a distance of 122-131 m against the wind and 245-261 m in the direction of the wind. The area with noise levels between 40 and 45 dBA represents a total strip of land around the generators with boundary remote at a distance of 200-210 m against the wind and 400-420 m in the direction of the wind. According the existing recommended good practices for wind generators (Recommended Good Practice for Wind Turbines) for residential buildings and similar sites a recommended level of 43 dBA during the night is fixed. The equivalent noise level under 40 dBA is below the noise level from a contemporary car with power of 40 hp at a distance of 100 m, and the levels under 35 dBA are characteristic for holiday and recreation areas.

Forecast and assessment for the distribution of other physical factors

Icing up

The cases when the wings are iced up and there is a change in the profile at low temperatures and increased air humidity are dangerous. During the attempts to specify the features of the wind in 2004-2006 by means of installed measuring pillars, it was established that in the area of the peak there usually happen regular icing ups. Under such conditions the ice may accumulate in layers over the end of the wind turbine propellers. Such ice is separated from the rotating turbine propeller at a significant distance behind the plane of the rotating disc and may cause failures and damages. The safe area behind the facility is with a recess distance equal to the height of the axis plus the diameter of the turbine. The area within a radius of 35 m around the turbine foundations is dangerous during seasons with positive temperatures because of the mechanical impact from the air turbines, and in case of icing up – at about 120 m behind the plane of rotation of the propeller due to the casting of ice pieces.

Avoiding metal alloys as material for the propellers and their construction from glass fibers makes the heating of the wings inefficient as a result of which the facilities stop their activity in emergency situations or are redirected under an angle towards the direction of the wind and it is possible to adopt an exploitation strategy for their stop in case of icing up of the propellers. Their setting back into operation or the restoration of their working mode through redirecting against the current is done after a detailed control of the status of the separate parts.

Electromagnetic fields

Wind turbines represent electro generators, which are a source of electro magnetic radiation and may cause interference with signals and communication connections of the type. There is a danger of interruption and interference of the signals of the telecommunication equipment of the Meteorological station at the peak, which channels (probably radio-relay) as directed cross some sites with wind generators.

The area of the peak is situated at about 30 km from Sofia airport and some of the routes/corridors of the flights probably pass above/close to it. The wind generators in a wind park may cause interference in the radar systems and under specific circumstances may cause interferences in the radar installations and the communication connections of Sofia airport. The rotating propellers create electromagnetic interferences, which depend on the location, the relief, the type of the turbines, the size, the form and the construction material of the propellers. The avoidance of metal alloys as material for the propellers and their construction from glass fibers (composites from glass fibers bonded with epoxy resin/polyester) with integrated lightning protection is envisaged. The wind turbines of this type are with optimized geometry of the wings which allows the decrease of the noise emissions and the electromagnetic radiations.

A conversion from low voltage to medium voltage of 33 kV is envisaged and the wind turbines will be connected in sequence by a cable route. The electric power line of 33 kV will be an overhead line with length of about 20 km and will pass along a route to be specified additionally. An electric distributing device for medium voltage will be built in the transmission station and the transformer substation 110/33 kV will comprise three parts: - high voltage; - a transformer in oil bath; - protection, control and measuring devices.

The operation of the electric transferring facilities with medium voltage of 33 kV is not connected with marked electric magnetic impact on the environment. For example, with 20 kV overhead lines (closest to the case of 33 kV) there is no excess in the limit levels of the physic factors. The passing of such electric power lines through settlements is permitted by the existing legislation. The electromagnetic fields of

generators and electric power lines working under medium voltage do not influence strongly negatively the living organisms and do not influence strongly the state of the environment. During the operation of overhead power lines with nominal voltage above 110 kV the impact on the components of the environment is expressed in increase of the values of the natural electromagnetic field as a result of the overlaying of alternating electromagnetic field with frequency of 50 Hz, insignificant change in the noise level in the region as a result of overlaying of vibration noise from the electric power line to the natural background and under specific conditions the inducing of vibrations and flickering.

3.6. Lands and soils:

3.6.1. Characteristics of the state of the soils and forecast and assessment of the impact on soils, incl. damaged lands (eroded, over humidified, salty, acidic, destroyed as a result of business activities and polluted with harmful substances and waste) on the territory of the site and in the lands on its borders by levels and areas of damage;

The terrain subject to the investment proposal falls within a region of metamorphous soils (pursuant "Key to soils" of FAO (1988, 1990)).

1. *Metamorphous soils (Cambisols)* – fall into the group of soils with change in color and structure from weathering and clay formation *in situ*. The type Dystric Cambisols, CMd) – occupy areas with height from 600-700 to 1700-1800 m. They are formed under beech, coniferous and mixed beech-coniferous forests with sub forest of a number of grass types developing powerful turf and turf soil horizon – forming secondary grassed Dystric Cambisols. They are situated on slopes with different exposures and inclinations, with a significant surface water run-off and reduced vertical washing mainly due to their frozen surface during thawing.

A special feature is the presence of C-horizon, characteristic with contemporary processes of its mineral part weathering, the abundance of skeleton and rock fragments in the profile; small depth. The mineral composition depends on the soil formation rocks. All primary chemicals which are more resistant to chemical weathering are preserved. The secondary ones are presented mainly by the clay ones.

- subtype unsaturated (acidic) – these are the former brown ones formatted by various soil formatting materials (eluvium, proluvium), from silicate rocks with profile depth of 40 to 60-70 cm, small power of the humus horizon, acid reaction, low humus reserves, low sorption capacity, unsaturated with bases.

Due to the small base contents and the formation of acid humus the soils have and acid reaction pH 4.5-5 along the whole depth of the profile. They have a well expressed exchange acidity determined mainly by exchange aluminum. Their sorption capacity is small (10-20 mequiv per 100 g).

Generally speaking these soils have favourable physical and chemical properties. They are loose, do not flatten, do not have an expressed plasticity and stickiness, do not form a crust, there is no big resistance when cultivated. The root system of plants penetrates along the whole depth of the profile. Their aeration is good in humid condition too. These soils are characterized with small moisture absorption capacity and big water permeability by reason of which in small power of their profile they cannot keep big quantities of water.

The brown mountain-forest soils almost everywhere are found under woods or pastures and meadows. In anthropogenic loading they are more quickly succumb to degradation, and in clearing of the vegetation they have big potential prerequisites for erosion. These soils have to be afforested with trees that are less demanding towards their nourishing properties and humidity. In intensive use on these soils effective measures for the protection of the soils from erosion have to be undertaken.

According to the main properties and the composition limiting the soil fertility these soils fall into medium to uncertain class of suitability ($S_2 - N_3$) with leading restrictor (r) – poor. Anti-erosive protection is needed.

The soil as an open system is striving for dynamic equilibrium or a stable state. The change of a component inevitably leads to a change in the other components and the establishment of a new dynamic equilibrium.

The soil is characterized also by its multifunctional capability – productive, buffer, carrying, filtering, source of raw materials, securing the ecologic equilibrium in the ecosystem etc.

In the area of the site there are no lands polluted with harmful substances and waste, old landfills. At separate locations there are local sections with erosion. They are on the higher parts and those with higher inclination. With them the plant communities are subjected to a high degree to the influence of the physical damages, caused by strong winds, low temperatures, mechanical influence of torrential rainfalls and hails. As a result of this influence some erosion processes are developed leading to the washing of the humus horizon, to the predomination of shallow, stony soil substrates and to full revealing of the subsoil rock.

3.6.2. Disruption or change of the category of land depending on the extent of pollution or damage of the soil; change of the soil fertility.

The terrain designated for the construction of a Wind Turbines Complex has a total area of 174 253 m², located in the villages territories of three villages, as follows: - 13 real estates with a total area of 51 825 m² in the Village of Zhelyava, Kremikovtzi Region, Metropolitan Municipality, Sofia City District; - 12 real estates with a total area of 47 968 m² and 5 estates with 21 286 m² in the Village of Eleshnitsa; and - 15 real estates with a total area of 53 174 m² in the Village of Churek, Elin Pelin Municipality, Sofia City District.

The sites constitute common pastures with agricultural land of IX category whose designation must be changed prior to implementation of the investment proposal. The acquired through purchase and sale property of the investor *Ecosource Energy EOOD* under numbers and with their respective areas of land, distributed by village territories, has the title deeds specified below.

Title Deed for the sale of real estates No.59, Vol. IV, reg. №2701, дело №91 от 17.10.2005 for the following real estates, located in the territory of the Village of Zhelyava, Shiroki Preslap area, Area Code under the Classification of Administrative Territorial and Territorial Units 29204, Region of Kremikovtzi, Sofia City District, namely: - No. 001031 with an area of 3 244 m²; - No. 001032 with an area of 2 798 m²; - No. 001033 with an area of 4 228 m²; - No. 001034 with an area of 4 000 m²; - No. 001035 with an area of 4 000 m²; - No. 001036 with an area of 4 000 m²; - No 001037 with an area of 4 000 m²; - No. 001038 with an area of 4 000 m²; - No. 001050 with an area of 4 403 m²; - No. 001051 with an area of 4 233 m²; - No. 002005 with an area of 4 000 m²; - No. 005005 with an area of 4 766 m²; - No. 005006 with an area of 4 153 m².

Title deed for the sale of real estates No. 59, Vol. IV, reg. No. 3058, File No. 466 dd 28.10.2005 for the following real estates located on the territory of the Village of Eleshnitsa Murgash Area Code under the Classification of Administrative Territorial and Territorial Units 34120, Elin Pelin Municipality, Sofia District, namely: – No. 024041 with an area of 2 446 m²; - No. 024042 with an area of 4 169 m²; - No. 024043 with an area of 4 000 m²; - No. 024044 with an area of 4 000 m²; - No. 024045 with an area of 4 000 m²; - No. 024059 with an area of 4 521 m²; - No. 024060 with an area of 4 000 m²; - No. 024061 with an area of 4 000 m²; - No. 024062 with an area of 4 639 m²; - No. 024063 with an area of 4 000 m²; - No. 024064 with an area of 4 000 m²; - No. 024065 with an area of 4 193 m².

Contract for the sale of a real estate, private municipal property, by and between the Elin Pelin Municipality and *Ecosource Energy EOOD* dd. 12.06.2006 for real estate No. 024003 with an area of 85 425 m², located on the territory of the Village of Eleshnitsa, the *Bulini Ravnishta* area, Code under the Classification of Administrative Territorial and Territorial Units 34120, Elin Pelin Municipality, Sofia District, with the following estates resulting from partition thereof, and namely: - No. 024083 with an area of 4 000 m². Contract for the sale of a real estate, private municipal property, by and between the Elin Pelin Municipality and *Ekosource Energy EOOD* dd. 29.12.2005 for real estate No. 024087 with an area of 339 413 m² (339 413 m² according to sketch), located on the territory of the Village of Eleshnitsa, the *Bulini Ravnishta* Area, Code under the Classification of Administrative Territorial and Territorial Units 34120, Elin Pelin Municipality, Sofia District, with the following estates resulting from partition thereof, and namely: - No. 024088 with an area of 4 012 m²; - No. 024090 with an area of 4 441 m²; - No. 024091 with an area of 4 551 m²; - No. 024092 with an area of 4 282 m².

Title deed for the sale of real estates No. 59, Vol. IV, reg. No. 3058, File No. 466 dd. 28.10.2005 for the following real estates located on the territory of the Village of Churek, Murgash Area and Jotsova Livada Area, Code under the Classification of Administrative Territorial and Territorial Units 87760, Elin Pelin Municipality, Sofia District, and namely: - No. 544018 with an area of 4 378 m²; - No. 544019 with an area of 1 749 m²; - No. 547042 with an area of 4 659 m²; - No. 547043 with an area of 3 977 m²; - No. 547050 with an area of 1 574 m²; - No. 547051 with an area of 3 499 m²; - No. 547052 with an area of 4 001 m²; - No. 547053 with an area of 3 786 m²; - No. 547061 with an area of 2 978 m²; - No. 547062 with an area of 2 803 m²; - No. 547063 with an area of 3 720 m²; - No. 547064 with an area of 4 000 m²; - No. 547065 with an area of 4 000 m²; - No. 547066 with an area of 4 050 m²; - No. 548002 with an area of 4 000 m².

Each turbine requires a solid foundation and a cleared area of about 1 400 m² around the foundation. The foundations themselves may vary, depending on their pad surface, from a regular foundation (with a diameter of 19.1 m and depth 2.6 m) with an area of 290 m² to a foundation (with a diameter of 13.25 m), fixed to a circle of piers with an area of 140 m² around them. The laying of the foundations on the turbine piers requires an erection area of about 480 m² around them (a rectangular with dimensions 24 x 20 m). The difference in the surfaces of one and the same model will depend on the possibility for using different foundations depending on the space chair.

It is planned the erection to be effected with two autocranes with cantilever range of about 20 – 25 (30) m. The average area necessary for assembling the screws/blades to the head on the ground and later lifting up of the whole rotor unit is about 1 400 m², distributed as follows: - total storage area for the screws - 500 m²; storage area for the segments / sections from the tower - 300 m²; storage area for the hub/nacelle – 30 m²; - working area around the foundation – 450 m², area of the main crane – 200 m²; - area of the auxiliary crane – 50 m². The platforms on which the two cranes shall be erected with a total area of 250 m² must be levelled, and the maximum slope shall be up to 3-4%, - the storage platforms for the segments of the tower, the components of the nacelle and the screws with a total area of 830 m² allow a greater longitudinal slope of up to 10% and levelling them on all platforms is not required. The cleared erection area should not have any durable vegetation but it is not mandatory that it should be a bare terrain. Recultivation of the levelled areas and grassing around the facilities has to be effected after erecting them, as well as taking of antierosion measures (stopping the erosion from the wind and the turbulent currents).

Wind turbine platforms will be connected to each other by a road with a width of 3.5 – 4.2 m and a curve with a radius from 30 to 100 m, the easement thereof will be used for laying the cable network. Interior platforms near the foundation and the road are required for ensuring access for the necessary transport for installation, repair and maintenance of turbines.

The impact on soils can easily be divided conditionally into two types:

- *During construction works* – mechanical disruption of the surface soil layer upon performance of earth works (ditches for the foundations of the facilities); stamping of the soil along the internal roads and working grounds as a result of the use of the construction machinery and equipment (during construction, the tracks of the existing roads will be used, there will be internal roads only during erection).

The excavated quantities of earth mass for the foundation of each piece of equipment will depend on their type: - in the case of a foundation (without piers) – with an area of 290 m² or a maximum volume of about 750 m³; - in the case of a foundation on piers – 140 m² or about 360 m³. The necessary levelling of each site in order to reach the prescribed maximum slope of the terrain (necessary for positioning the autocrane during erection) will be on the average for each site on an area of about 250 m, however in this case no extraction outside the site is envisaged, since the excavated earth masses from the higher part will be used for filling in into the lower area of the site.

The road routes are in compliance with the existing track remnants of the dirt roads along the mountain ridge and around it. The construction of a 13.6 km long and 3.5 to 4.2 m road is planned which will be a bed of 20 cm sand base with 5-10 cm concrete fracture or ballast. The extracted humus level between the tracks (as far as it exists) from an area of about 48 decares, which actually is the projection of the remnants of existing roads along the ridge areas, can be used upon recultivation of the platforms. The estimated quantity of extracted earth masses to form the road beds will be about 10 - 15 000 m³, part of them will probably be used over again during the recultivation of the platforms.

The exact quantities of the extracted and used again for filling in earth masses can be determined in the work design phase. Then a earth masses balance will be made. Part of the excavated earth masses will be used for shaping up the area around the foundations and for filling in the roadbeds, and the surplus quantities will be deposited at a depot in coordination with the municipalities.

For temporary use of the excavated earth mass and the humus level will be used sites within the territory of the allotted terrain. Prior to the commencement of the construction works, the humus soil shall be separated and deposited separately from the rest of the earth mass until further use thereof as planned.

Simultaneously with the construction of the site, the restoration of disruptions should begin as well: arrangement of the erection area around the foundations and the leveled erection sites. The technology of construction must be observed and no pollution of the terrain with petrol oil products from out of order machinery and equipment or from household or other waste shall be allowed. The disruptions of the soil cover will be within the limits of the allotted terrain and along the roadbed.

Simultaneously with the completion of the construction all of the terrains occupied temporarily for construction and erection sites, depots for excavated earth masses, etc. must be restored and arranged in accordance with the general plan of the terrain. Should there be disruptions in the neighbouring bordering terrains, they should also be restored.

Development and implementation of a park design including planting of the areas around the foundations and the sites is required (a possibility is simply creating conditions for secondary succession of the species typical for the region). The requirements for the

maintenance of the grass areas must be observed and no additional pollution or stamping of soil and vegetation must be allowed.

- *During operation* – no negative impact is expected. The sanitary and hygiene requirements regarding site of such type must be observed.

Changes will find expression in the following: even though locally, there will be changes in the physicochemical, hydro-physical and biological processes taking place in the soil substrate; and last but not least, aesthetic changes too.

Due to the specific nature of the site and the engineering infrastructure having to do with its construction, and the peculiarities of the climatic factors, the changes that are expected to take place are of local nature, within the limits of the allotted terrain. No change in soil fertility or pollution of the soil in the adjacent plots is expected.

3.7. Bowels of the Earth :

3.7.1. Geological Environment:

a)Characteristics of the condition of the geological environment;

The region belongs to the Old Mountain Range morphostructural region, Western sub-region. The western border is the valley of the Timok River and it reaches to the Botevgrad saddle on the east. The orographic expansion and spurring of the Western sub-region, east of the valley of the Iskar River, northwards, is represented by several mountains distinguished by the deep valleys of the Gabrovnitsa River and the Batuliyska River, and the ridges on the east congregate in the general orographic knot – Mount Murgash.

The ridge around Murgash covers one of the highest denudational levels in the Old Mountain Range region – the old Miocenic one. There the roundness of the relief is intensified by the available weathering crust, under which, here and there, the very geological substrate with chaotically piled up, protruding above the surface steady quartzite and granite blocks show up.

b) prognosis and evaluation of the estimated environmental changes caused by the implementation of the investment project;

No changes in the geological environment are expected as a result of the realisation of the project.

c) prognosis and evaluation of the expected impacts of the changed geological environment on existing construction and other sites and on the natural environment components.

The realisation of the project will not change the geological environment and will have no impact on the existing production sites and on the natural environment components.

3.7.2. Ores and Minerals:

a) Characteristics of the ore and minerals deposits, including quality and quantity of the deposits and resources thereof ;

There are no data of available ores and minerals on the territory of the site.

b) prognosis and evaluation of the necessary measures for their protection;

There is no need of protection of ores and minerals along the ridge of Mount Murgash.

c) evaluation of the indexes for the rational extraction and use of ores and minerals (losses, exhaustion, extraction upon initial processing, yields and general usability, technological waste);

The project does not treat extraction and use of ores and minerals.

d) ecological evaluation of the project solutions regarding: extraction and primary processing of ores and minerals, including systems of exploitation, processing technologies (dressing); waste (fill up) plants; mine drainage away; disrupted terrains; recultivation.

The project does not treat extraction and processing of ores and minerals.

3.8. Plant and animal world, protected natural territories:

3.8.1. Characteristics of the condition and forecast for and assessment of the impact on plants – on dominant and endangered species; alterations in their conditions as a result of the project's realization;

The terrain for construction of the Complex of Wind Power Plants is situated within a rugged terrain in the region of mount Murgash with height above the sea level of 1400 to 1670 m. The terrain covers the ridge parts around and below the mount of Murgash (1 685 meters above sea level), located to the southwest of the mount of Zla Mogila (1 535 1 685) to the area “Yotsova Livada” (1 488 1 685) to the east that is covered by pastures and common. Secondly spread, even though in individual items only, are the species *Juniperus sibirica* and *Salix silesiaca*.

According to the geobotanic regional classification of the country (I. Bondev) the terrain falls within the Ilarian (phytogeographical and plant-geographical) province, Sofia district, Sofia Region. In the past the region used to be covered by mesophytic forest ecosystems dominated by *Quercus pedunculiflora*, and at present – by mesophytic grass species. The southern slopes as well as the drier plain areas have been covered by xerothermic forest ecosystems with predominant spread of *Quercus frainetto*, and more seldom, cerris oak (*Quercus Cerris*), whereas the higher parts of the slopes have been covered by durmast forests. Nowadays the larger parts of the southern slopes are covered by xerothermic grass species dominated by *Dichantium ischaemum*, *Poa bulbosa*, *Festuca valesiaca*) etc.

According to the geobotanic characteristics of the region where the grounds are situated and the field inspection, the vegetation consists of mesophytic microthermic nemoral vegetation within the oak forest belt.

- from the root vegetation in the proximity of the terrain there are Misian beech forests of (*Fageta moesiaca*), establishing the formation (*form.Fageta moesiaca*). The vegetation covering of the beech forest belt consists mainly of deciduous and mixed coniferous and deciduous forests, predominantly including beech and silver-fir formations. Beech forests are usually characterized by the lack of bush synusia. In the cases of thicker forests there is no grass covering, and in thinner forests such covering is characterized by an extreme variety.

- the whole territory being subject of the investment plan is covered by derivative vegetation. It includes grass formations (*Agrostideta capillaries*, *Nerdeta strictae*, *Bellardiochloeta violaceae*, *Festuca valesiaca*, *Festuca rubra* etc.) at the place of ordinary beech forests (*Fagus sylvatica*) and silver-fir (*Abies alba*). At moderately humid places are predominantly found the plant communities of *Agrostis capillaris*, at more humid places – the formation of *Nardus stricta*, at drier places, often eroded slopes, most often is spread the formation of *Festuca*, *Bellardiochloa violaceae*. Within the top belt have evolved bush formations, as the most often predominant one is *Juniperus sibirica*, blueberries, etc.

The genera having the most prominent role in forming the overall outlook of the flora within the forestless zone are *Carex*, *Alchemilla*, *Campanula*, *Festuca*, *Poa*. The presented genera contain also a number of species typical for open spaces, and the lack of forest – typical vegetation is favourable as to the development of same. A large part of the species are perennial plants spread in mountainous regions and requiring habitats that to a lesser or larger degree are characterized by high humidity levels. The flora distribution within the high-mountain pastures per life forms confirms our idea of an alpine flora, well-adapted to unfavourable seasons (to the climatic and petrographic conditions, as well as the conditions of continuous pasture burden).

Relatively low is the share of annual and biennial plants typical for the lower and warmer parts of the country that are influenced to a greater degree by active anthropogenic presence.

Under the conditions of intensive pasture, the grass plant communities have undergone succession alterations. The excessive grazing and stamping of soil has an unfavourable impact on the development of the majority of grass species, but on the other hand creates perfect conditions for development of *Nardus* grasslands. Due to the excessive enrichment of soil with nitric compounds are formed ruderal plant communities within which prevail *Verbascum longifolium*, *Urtica dioica*, *Carduus nutans*, *Rumex alpine*.

By reduction of the loading of pastures (stamping, application of fertilizers and excessive grazing) the *Nardus* phase falls out and here is the starting point of a recreation (demutation) process of succession changes that are even currently under way. Several species take part in them, such as *Agrostis capillaria*, *Poa media*, *Juncus trifidus*, *Agrostis rupestris*, *Anthoxanthum odoratum*, etc., increasing up to a degree at which they have the role of co-dominants. Frequently, the dominating position of *Nardus stricta* is displaced by *Festuca nigrescens*, *Festuca rubra*, *Agrostis capillaris*, *Bellardiochloa violacea*, *Luzula luzuloides*, *Festuca airoides*, *Plantago atrata*, *Omalotheca supine*, *Thymus sp.div.* etc. There is a sustainable settling also of small bush plant communities of the species *Bruckenthalia spiculifolia* and *Vaccinium vitis-idaea*. No trend for moving of the existing upper boundary of beech forests upwards is being observed.

In the region of the investment intention are observed the following associations and formations:

- Association *Nardus stricta* - *Agrostis capillaries* is spread in moderately humid soils. It is extensively spread in mountain meadows and pastures. It can bear moderate stamping. In the development of said association participate also the following cereal species: *Anthoxanthum odoratum*, *Festuca dalmatica*, *Lerchefeldia flexuosa*, *Cynosurus cristatus*, *Sieglingia decumbens* etc.

Leguminous plants are represented mostly by white, red and golden clover, *Lotus tenuis*, *Genista sagitalis*, *Chamaecytisus*, etc.

From the grass variety participate the following: *Potentilla ternate*, *Bistorta major* S.F.Gray, *B. vivipara* L., *Thymus longicaulis* Presl., *Alchemilla subcrenata* Buser, *Asperula capitata* Kit, *Antenaria dioica* L., *Campanula alpine*, *C. sparsa* Friv, *Viola balcanica* Delip, *Meum athamanicum* Jacq, *Achillea millefolium* L, *Luzula multiflora* Erth., *Hypericum maculatum* Cr., *Hieracium pilosella* L., *Silene roemeri*, *Taraxacum officinale* Webb., *Colchium autumnale*, *Ranunculus montanus* etc.

- The association *Nardus stricta* - *Festuca rubra* – it is typical most often for lower stretches - hollows, ridges foothills, having richer and fresher soil.

The subdominant *Festuca rubra* is a loose tuft plant. It is also a good forage plant bearing well stamping and grazing. After grazing up (respectively, mowing) it grows again fast. It grows well in drained, moderately humid soils rich of nutrition substances.

The following cereal species are also spread: *Anthoxanthum odoratum*, *Agrostis capillaries*, *Festuca dalmatica*, *Festuca nigrescens* Lam., *Deschampsia caespitosa* P.B., *Sieglingia decumbens* etc.

From the leguminous plants common are the white and red clover, *Lotus tenuis*, *Genista sagitalis*, etc.

From the grass variety the most frequent representatives include the following: *Bistorta major* S.F.Gray, *B. vivipara* L., *Potentilla ternate*, *Potentilla erecta* Ranschel, *Viola balcanica*, *Luzula multiflora*, *Meum athamanticum*, *Achillea millefolium*, *Alchemilla*

flabellate, *Plantago lanceolata* L, *Thymus longicaulis*, *Taraxacum officinale*, *Campanula epigaea* Janka, *Ranunculus montanus*, *Colchium autumnale* etc.

- *Agrostis capillaries* - *Lerchenfeldia flexuosa* – it usually covers slightly sloped stretches having comparatively deep soil layer.

The cereal species are also represented by the following species: *Festuca dalmatica*, *F.nigrescens*, *Anthoxanthum odoratum*, *Cynosurus cristatus*, *Sieglingia decumbens*.

The most frequent representatives of the leguminous plants species are the white and red clover, *Genista sagitalis*, etc.

From the grass variety the most common representatives are the following: *Hieracium pilosella*, *Acinos alpinos*, *Luzula luzuloides* Lam., *Viola balcanica*, *Viola monatana*, *Campanula expansa*, *Alchemilla plicatula*, *Gentianella bulgarica*, *Crocus veluchensis*, *Rumex acetosella*, *Verbascum sp.*, *Hypericum maculatum*, *Achillea millefolium*, *Vaccinium myrtillus*, *Thymus longicaulis*, *Ranunculus montanus*, *Colchicum autumnale* etc.

The formation of *Agrostis rupestris*– the formed by the latter plant communities cover restricted territories on higher peaks. These are formed on ridge and saddle terrain or along slightly sloped areas as they grow better on sides facing the north, west or east. The dominant species does not form dense turfs. The horizontal structure of the plant communities is homogenous. The competitive ability is relatively low. In their composition there are a number of accompanying species. The most common grass variety species include the following: *Agrostis capillaries*, *Festuca airoides*, *Festuca nigrescens*, *Lerchenfeldia flexuosa*, *Campanula alpina*, *Potentilla rupestris*, *Ranunculus montanus*, *Thymus jankae*.

The formation *Poa media*– these plant communities are located along ridge stretches and hollows, where soils are not eroded. Other participants are also the following species: *Festuca airoides*, *Avenula versicolor*, *Campanula alpina* etc.

The formation of *Lerchenfeldia flexuosa*– they are common for all parts of the forestless zone. The species is with loose tuft-like structure and restricted competitive abilities. It forms large quantities of life seeds spreading at great distances and relatively fast colonizing territories with reduced competitiveness. The formation is at intermediate succession stage. The following plant associations are observed:

- association *Lerchenfeldia flexuosa* - *Festuca airoides* – in its composition are also common the following species: *Anthoxanthum odoratum*, *Nardus stricta* etc.

- association *Lerchenfeldia flexuosa* - *Anthoxanthum odoratum* – in its composition are common also the following species: *Nardus stricta*, *Lusula sidetica*, *Geum montanum*, *Hypericum maculatum*, *Thymus jankae*, *Ranunculus montanus* etc.

The formation of *Calamagrostis arundinacea* – the ecotops are steep slopes and different exposure. The edificatory in grass stands grows in the form of separate tufts between which the remaining species find their place. The formation also comprises associations in the composition of which are included the following species: *Anthoxanthum odoratum*, *Lerchenfeldia flexuosa*, *Luzula luzuloides*, *Achillea millefolium*, *Festuca valida*, *Festuca paniculata*, *Antennaria dioica*, *Hypericum maculatum*, *Plantago subulata*, *Potentilla erecta*, *Thymus vandasii*, etc.

The formation of *Luzula luzuloides*– in the majority of cases it plays the part of a co-dominant, subdominant or assectator within the plant communities. The species is characterized by a weak competitiveness. In the association participate also the species *Anthoxanthum odoratum*, *Agrostis capillaries*, *Festuca valida*, *Potentilla erecta*,

The formation of *Agrostis capillaris* – it covers vast areas, terrain with different slopes and exposures. Its plant communities are distinguished by great species variety,

including: *Festuca rubra*, *Anthoxanthum odoratum*, *Luzula luzuloides*, *Lusula sidetica*, *Alchemilla flabellate*, *Campanula patula*, *Cerastium banaticum*, *Helianthemum nummularium*, *Euphorbia amygdaloides*, *Hypericum maculatum*, *Trifolium pretense*, *Veronica chamaedrys*, *Thymus vandasii*, *Verbascum longifolium* etc .

The formation of *Thymus vandasii*– it participates as accompanying component in the composition of a great number of plant communities. It grows on slopes with southern exposure and slight sloping of the terrain and has restricted competitiveness. In the association are included also the species: *Agrostis capilaris*, *Calamagrostis arundinacea*, *Festuca rubra*, *Festuca airoides*, *Dianthus superbus*, *Euphorbia cyparissias*, *Hypericum perforatum*, *Plantago subulata*, etc.

The formation of *Dactylis glomerata*– covers terrain with small slopes and southern exposure. The horizontal structure of plant communities is homogenous. The association includes the following species: *Agrostis capilaris*, *Brachypodium sylvaticum*, *Dactylis glomerata*, *Rumex alpine*, *Urtica dioica* etc .

The formation of *Festuca pratensis* – the grass stand is closer to the meadow plant communities. In its composition take part species, such as: *Festuca rubra*, *Poa angustifolia*, *Cynosurus cristatus*, *Agrostis capilaris*, *Anthoxanthum odoratum* etc. Within the species composition there are no rare species representatives.

The formation of *Juniperus sibirica*– spread single representatives in territories where subdominants are cereal grass species. The following species participate: *Bruckenthalia spiculifolia*, *Genista depressa*, *Calamagrostis arundinacea*, *Lerchenfeldia flexuosa*, *Festuca airoides*, *Potentilla erecta*, *Hypericum maculatum*, *Silene vulgaris*, *Agrostis capillaries*, *Nardus stricta*, *Festuca rubra*, *Scleranthus perennis*, *Thymus vandasii*, *Plantago subulata*, *Antennaria dioica*, *Potentilla rupestris*, *Agrostis capillaris*, *Poa media*, *Sesleria comosa*, *Campanula velebitica*, *Veronica officinalis* etc.

The formation of *Epilobium angustifolium* and other ruderal and pioneer species – these are fragmentarily represented in different parts of the territory. Also common are the following species: *Verbascum longifolium ssp. pannosum*, *Calamagrostis arundinacea*, *Rumex acetosella*, *Viola tricolor*, *Scleranthus perennis*, *Hypericum perforatum*, *Veronica chamaedrys*, *Senecio vernalis*, *Stellaria holostea* as well as others having good seed renewal.

The formation of *Festuca rubra*– perennial loose tuft plant having short creeping root, tuft formed by a multitude of base, flat or groove-like leaves or groove-like leaves and several stems covered scarcely with leaves. It grows better in fresh, moderately humid and comparatively deep soils.

Apart from *Festuca rubra*, the turf of the association is formed also by the following cereal species: *Festuca nigrescens*, *Festuca dalmatica*, *Nardus stricta*, *Agrostis capillaries*, *Anthoxanthum odoratum*, *Cynosurus cristatus* etc.

Leguminous plants are represented mainly by the white and hybrid clover.

The most common grass variety species are the following: *Rumex acetosa*, *R. alpine L.*, *Potentilla ternate*, *Alchemilla plicatula*, *Bistorta major*, *Thymus vandasii Vel*, *Alchillea millifolium*, *Carex curvula All*, *Campanula sparsa Friv*, *C. velebitica Borb.*, *Hypericum perforatum*, *Luzula italica L.*, *L. sudetica Parl*, *Crocus veluchensis*, *Verbascum sp.*, *Ranunculus montanus*, *Colchicum autumnale* etc.

Upon inspection of the terrain have been found the following plant species: *Lerchenfeldia flexuosa*, *Festuca airoides*, *Rumex acetosella*, *Festuca valesiaca*, *Agrostis capillaris*, *Scleranthus perennis*, *Stellaria perennis*, *Dactylis glomerata*, *Poa media*, *Festuca heterophylla*, *Calamagrostis arundinacea*, *Luzula luzuloides*, *Anthoxanthum odoratum*, *Festuca paniculata*, *Lusula sidetica*, *Festuca nigrescens*, *Agrostis rupestris*, *Thlaspi praecox ssp.alpinum*, *Sedum acre*, *Antennaria dioica*, *Anthemis carpatica*,

Trifolium aureum, *Chamaespartium sagittale* = *Genista sagitalis*, *Epilobium angustifolium*, *Lotus corniculatus*, *Veronica officinalis*, *Senecio jacobaea*, *Pleuropteryrum undulatum*, *Bruckenthalia spiculifolia*, *Acinos alpinus*, *Stellaria holostea*, *Stellaria graminea*, *Anthemis carpatica*, *Potentilla erecta*, *Ranunculus acris*, *Hieracium hoppeanum*, *Campanula sparsa*.

On the terrain, apart from the grass species may be seen also the species that are gathered as herbs: *Astragalus glycyphyllos*, *Betonica officinalis*, *Carlina acanthifolia*, *Colchicum autumnale*, *Euphrasia species diversa*, *Filipendula ulmaria*, *Galeopsis tetrachit*, *Galium verum*, *Herniaria glabra*, *Hypericum perforatum*, *Origanum vulgare*, *Rumex acetosa*, *Rumex acetosella*, *Tanacetum vulgare*, *Verbascum thapsiforme*, etc.

In the region of Murgash mount the natural habitats are as follows: (Directive 92/43/EEC, Appendix 1):

6520 Mountain hay meadows

6230 *Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and sub mountain areas, in Continental Europe)

These habitats are common for mountainous regions throughout the country. No existing rare or endangered by extinction species, including the species included in BAB, have been found within the terrain's boundaries.

The examined terrain does not fall into the limits of a protected natural site or of a potentially protected site, which fact has been confirmed by letter AAPIM-10490/16.01.2007 of MEW. The reference in writing of MEW has been made following a Decision for providing access to public information No. 7/16.01.2007. In the reference in writing, the investor has been informed that: "Mount Murgash does not fall into potentially protected areas. The nearest potentially protected dwelling area is „Etropole – Bailovo” with zip code BG0001043."

Each turbine requires a solid foundation and a cleared area of about 1 400 m² around the foundation. The foundations themselves may vary, depending on their pad surface, from a regular foundation (with a diameter of 19.1 m and depth 2.6 m) with an area of 290 m² to a foundation (with a diameter of 13.25 m), fixed to a circle of piers with an area of 140 m² around them. The laying of the foundations on the turbine piers requires an erection area of about 480 m² around them (a rectangular with dimensions 24 x 20 m). The laying of foundations for the piers of the turbines requires mounting surface of about 480 m² around these (rectangle with dimensions 24 x 20 m). The laying of foundations for the piers of the turbines also requires levelling of approximately 250 m² (for location of the auto cranes during the fitting works performance). The road courses are complied with the existing traces of cart tracks on country roads along the ridge of the mount and around it. The construction of road that 13.6 km. long and 3.5 to 4.2. km. wide covering an area of about 48 decares is contemplated.

Figure 8 Map of the region with the location of the nearest protected territories
(provided by MEW by Letter No

In the Red Book of Bulgaria are indicated species typical for the Western part of the Balkan, and it is possible that some of them could be found also in the region around Murgash mount under certain conditions: *Thesium linophyllum* (Santalaceae family) – perennial grass plant, rare species; *Anemone sylvestris* (Ranunculaceae family) - perennial grass plant, endangered species; *Drosera rotundifolia* (Droseraceae family) - perennial grass insectivorous plant, rare species; *Sempervivum velenovskyi* (Crassulaceae family) - perennial grass plant, rare species; Balkan endemic plant; *Saxifraga marginata* (Saxifragaceae family) - perennial grass plant, rare species; *Alchemilla erythropoda* (Rosaceae family) - perennial grass plant, rare species; *Alchemilla bulgarica* (Rosaceae family) – perennial grass plant, rare species, Balkan endemic plant; *Genista pilosa*, (Fabaceae family) – bush, endangered species; *Vicia dumetorum* (Fabaceae family) - perennial grass plant, rare species; *Daphne cneorum* (Thymelaeaceae family) – evergreen bush, rare species; *Huetia cynapioides* (Apiaceae family) - perennial grass plant with tuber, rare species; *Angelica pancicii* (Apiaceae family) – biennial or perennial grass plant, rare species, Balkan endemic plant; *Laserpitium krapfii* (Apiaceae family) - perennial grass plant, rare species; *Gentianella praecox* (Gentianaceae family) – biennial grass plant, rare species; *Melampyrum bihariense* (Scrophulariaceae family) – annual grass plant; *Symphyandra wanneri* (Campanulaceae family) – perennial grass plant, rare species; *Anthemis orbelica* (Asteraceae family) – biennial grass plant, rare species, Bulgarian endemic plant, and is included in the list of the European rare, endangered and endemic species under the category “rare”; *Tragopogon balcanicus* (Asteraceae family) – biennial grass plant, rare species, Balkan endemic plant. If any of the above listed species is available, it is necessary to take measures for their conservation and protection.

The impact on vegetation might be conditionally divided into two phases:

During construction works

The entire grass vegetation will be removed upon basing the piers for the rotors, i.e. under the spot for the foundation with an area of 290 (140) m² and under the roadbed of the routing of the road connections (where it exists). The vegetation between the levelled platforms for the auto cranes with an area of 250 m² that will as well be removed during the erection, may be recovered thereafter. The grass vegetation will be trodden all over the cleared (erection) area of 1,400 m².

Simultaneously with the construction works forestation with local species is necessary – (low bushy vegetation, if necessary grass as well) around the foundations, as well as provision of anti-erosion measures. The grass species have great self-recovery ability and extra measures are not needed, such as secondary lying down in grass. Excluding the very foundations and the road-beds, the remaining area will not be irrevocably damaged.

During the operation period

No impact on the existing vegetation in the afforested territories below the ridge is expected. The operation of the site will not have a negative impact on the vegetation in the neighbouring terrains under such conditions.

3.8.2. Characteristics of the condition and forecast for and assessment of the impact on fauna – on dominant and endangered animal species; alterations in their conditions as a result of the project's realization; migration passages; alterations resulting from the project's realization;

The wind power station platform is located out of the European migratory passages and the region has no particular significance for the migration and wintering of the separate bird species. The terrain is part of a territory that by its biocenotic value might be classified as biocenosis under anthropogenic influence of high level of tolerance of floral and fauna

elements. The partial urbanization of the territory (presence of mountain hostels, forestry enterprise buildings, shelters, meteorological stations, tourist paths) has stimulated the growth of a variety of synantropic bird species and has helped their spread up in the mountains.

According to the zoogeographic regionalization of the country the terrain falls within a northern region, in the Balkan subregion. The fauna in this subregion is characterized by its Euro-Siberian and European spreading. It comprises also a significant number of Carpathian elements (as for instance, some species of snails, centipedes, grasshoppers, etc)

As a whole, the ornitofauna is characterized by a high degree of detachment which is due to a number of specific features in the conditions comprising its life environment.

The terrain is part of an area covered with pastures and common, where cereal plants are the most frequent. High stem plants, mainly *Fagus sylvatica* are located on a lower height above the sea level and at a particular distance from the terrain. As a whole the terrain is a part of a territory which, as per its biocenotic value is with a high degree of tolerance of the flora and fauna elements.

The region is not typical as and specified as bird migration corridor.

Table 10 Probable species composition and protection status of amphibia in the region:

Genus		BAB 77/2002	CITES	Bern Convention	Directive 92/43 EEC	Directive 838/97/EEC
AMPHIBIA						
<i>AMPHIBIA</i>						
Salamander	<i>Salamandra salamandra</i>					
Yellow bellied toad	<i>Bombina variegata</i>	+		Appendix II	Annex II Appendix IV	
Common toad	<i>Bufo bufo</i>	+		Appendix III		
Tree-frog	<i>Hyla arborea</i>	+		Appendix II	Appendix IV	
Agile frog	<i>Rana dalmatina</i>			Appendix II	Appendix IV	

Table 11 Probable species composition and protection status of reptiles in the region

Genus		BAB 77/2002	CITES	Bern Convention	Directive 92/43 EEC	Directive 838/97/EEC
REPTILES						
<i>REPTILIA</i>						
Lizards						
<i>Sauria</i>		+				
Blind worm	<i>Anguis fragilis</i>	+		Appendix III		
Green lizard	<i>Lacerta viridis</i>			Appendix II	Appendix IV	
Wall lizard	<i>Podarcis muralis</i>			Appendix II	Appendix IV	
Snakes						
<i>Ophidia</i>						
Aesculapian snake **	<i>Elaphe longissima</i>	+		Appendix II	Appendix IV	
Smooth snake	<i>Coronella austriaca</i>	+		Appendix II		

Table 12. Probable species composition and protection status of birds in the region

Genus		SPEC/ Threat Status	CCIIT ES	Bern Convention.	Bonn convention	Directive 79/409/EEC	Directive 338/97/E EC
Honey buzzard **	<i>Pernis apivorus</i>	4/S	Annex II	Annex II	Annex II	Annex I	Annex I
Northern goshawk **	<i>Accipiter gentilis</i>	S	Annex II	Annex II	Annex II		Annex I
Eurasian sparrowhawk **	<i>Accipiter nisus</i>	S	Annex II	Annex II	Annex II		Annex I
Common buzzard	<i>Buteo buteo</i>	S	Annex II	Annex II	Annex II		Annex I
Golden eagle *	<i>Aquila chrysaetos</i>	3/R	Annex II	Annex II	Annex II	Annex I	Annex I
Northern hobby **	<i>Falco subbuteo</i>	S	Annex II	Annex II	Annex II		Annex I
Woodpigeon	<i>Columba palumbus</i>	4/S				Annex II/1 & III/1	
Turtle dove	<i>Streptopelia turtur</i>	3/D	Annex III	Annex III		Annex II/2	Annex I
Eurasian tawny owl	<i>Strix aluco</i>	4/S	Annex II	Annex II			Annex I
Long-eared owl	<i>Asio otus</i>	S	Annex II	Annex II			Annex I
Common swift	<i>Apus apus</i>	S		Annex III			
Alpine swift	<i>Tachymarptis melba</i>	(S)		Annex II			
Grey-headed woodpecker	<i>Picus canus</i>	3/D		Annex II		Annex I	
Green woodpecker	<i>Picus viridis</i>	2/D		Annex II			

Great spotted woodpecker	<i>Dendrocopus major</i>	S		Annex II		
Middle spotted woodpecker	<i>Dendrocopus medius</i>	4/S		Annex II		Annex I
Crested lark	<i>Galerida cristata</i>	3/(D)		Annex III		
Woodlark	<i>Lullula arborea</i>	2/V		Annex III		Annex I
Skylark	<i>Alauda arvensis</i>	3/V		Annex III		Annex II/2
Eurasian crag martin	<i>Ptyonoprogne rupestris</i>	S		Annex II		
Bam swallow	<i>Hirundo rustica</i>	3/D		Annex II		
Wren	<i>Troglodytes troglodytes</i>	S		Annex II		
European robin	<i>Erithacus rubecula</i>	4/S		Annex II	Annex II	
Black redstart	<i>Phoenicurus ochruros</i>	S		Annex II	Annex II	
Common blackbird	<i>Turdus merula</i>	4/S		Annex III	Annex II	Annex II/2
European thrush (redwing)	<i>Turdus iliacus</i>	4*/S		Annex III	Annex II	Annex II/2
Mistle thrush	<i>Turdus viscivorus</i>	4/S		Annex III	Annex II	Annex II/2
Wood warbler	<i>Phylloscopus sibilatrix</i>	4/(S)		Annex II	Annex II	
Common chiffchaff	<i>Phylloscopus collybita</i>	S		Annex II	Annex II	
Blue tit	<i>Parus caeruleus</i>	4/S		Annex II		
Great tit	<i>Parus major</i>	S		Annex II		
Red-backed shrike	<i>Lanius collurio</i>	3/(D)		Annex II		Annex I
Eurasian Jay	<i>Garrulus glandarius</i>	(S)				
Chaffinch	<i>Fringilla coelebs</i>	4/S		Annex III		
Brambling	<i>Fringilla montifringilla</i>	S		Annex III		
Linnet	<i>Carduelis cannabina</i>	4/S		Annex II		
Hawfinch	<i>Coccothraustes coccothraustes</i>	S		Annex II		

Table 13 Probable species composition and protection status of mammals in the region

Genus		BAB 77/2002	CITES	Bern Convention	Bonn Convention	Directive 92/43 EEC	Directive 338/97/EEC
1	2	3	4	5	6	7	8
Insectivora	Insectivora						
European hedgehog	<i>Erinaceus concolor</i>	+		Annex III			
European mole	<i>Talpa europaea</i>						
Common shrew	<i>Sorex araneus</i>			Annex III			
Complex of forest species	Chiroptera						
Bats							
Lagomorpha	Lagomorpha						
Brown hare	<i>Lepus europaeus</i>						
Rodents	Rodentia						
Squirrel	<i>Sciurus vulgaris</i>			Annex III			
Ground squirrel	<i>Spermophilus citelus</i>	+		Annex II		Annex II	Annex IV
Forest dormice	<i>Dryomys nitedula</i>	+		Annex III		Annex II	Annex IV
Yellow-cheeked vole	<i>Sylvaemus flavicollis</i>						
Common wood mouse	<i>Sylvaemus sylvaticus</i>						
Common vole	<i>Microtus arvalis</i>						
Predators	Carnivora						
Fox	<i>Vulpes vulpes</i>						
Cloven-footed	Artiodactyla						
Wild boar	<i>Sus scrofa</i>						
Roe deer	<i>Capreolus capreolus</i>			Annex III			

Key:

According to the Red Book of the Republic of Bulgaria (1985): *- rare species, ** - endangered species, *** - extinct;

BAB – Bulgarian Act on Biodiversity (77/2002); **CITES**: Convention for International Trade in Endangered Species from the wild flora and fauna (1973); **Bern Convention**: Convention for protection of European wild flora and fauna and natural habitats (1979); **Bonn Convention**: Convention for protection of migrating species of wild animals(1997).

Directive 92/43 – Directive of the European Union dated 21.05.1992 for protection of natural habitats and the wild flora and fauna

Directive 338/97 - Directive of the European Union for protection of wild flora and fauna species by way of regulating the trade in same.

Directive 79/409 - Directive of the European Union dated 02.04.1979 for protection of wild birds SPEC/Threat Status of birds (Tucker & Heath 1994) – species having worldwide environmentalist significance – species concentrated in Europe having unfavourable protection status - species not concentrated in Europe having unfavourable protection status - species concentrated in Europe and having favourable protection status; **E – endangered species, V- vulnerable, R – rare, D – decreasing, L – localized, S - stable.**

Taking into account the condition and analysis of the fauna in the region (and since any actual impact is expected solely with respect to the ornitofauna), we are of the opinion that the contemplated investment proposal may have impacts mainly in the following directions:

Impact of the noise from the rotation of the blades on birds. During rotation the blades emit specific noise due to the mechanical influences and streamline surmounting the air resistance. Due to the great height at which the blades are located and the lack of surface absorption it is expected that the noise will spread over a significantly larger distance than measurements and calculated noise zones on the earth surface show. On the other hand such noise has varying parameters that are the function of the wind strength and direction. It could be expected that in comparatively quiet weather the birds will perceive that noise by night at great distance and since they do not recognize it, they will react inadequately. Wind turbines from that type have optimized geometry of the blades that allows reducing noise emissions and electromagnetic impacts.

The turbine blades have been provided for peripheral speed of 25-78 m/sec, developed at rotation of 8-25 revolutions per minute. In spite of the comparatively slow motion, there is a risk of birds hitting the wind power station blades. The risk will depend on the wind speed and the visibility. In case of fog, low clouds and bad visibility birds fly lower, at the height of the wind power station masts. In such conditions the probability impacts is greater even if the blades do not rotate.

Impact of the reflection of the rotating blades during the daytime. In sunny weather the rotating blades will produce strong reflections or “flickering shadow” that the birds will see at great distance. In all cases they will perceive this as danger and will perplex the flight of the birds. The avoidance of the “flickering shadow” is not a problem if the distance between the generators is increased to 10 times the rotor diameter.

Impact of the magnetic field changes in the region of the electric power stations. The magnetic field changes owing to the work of the electric power station would result in confusion and disorientation of some of the birds. Such information could be found out in a number of specialized ornithological magazines, discussing this problem, but in that case it is provided for the blades to be constructed of glass-fiber-resin materials (epoxy resin-bound composites) without metals or alloys that strongly reduces electromagnetic disturbances.

The electric poles of high voltage (33 kV) that will be constructed for transmitting the produced electricity behind the transformer are a real danger for birds. These devices are enticing perches for many species and under conditions for creation of electric arc (wet weather, etc.) there is a risk birds to get killed. Appropriate designing of the top part of the pylons and provision for appropriate constructions might reduce the risk to a minimum.

The impact of wind power stations on fauna might be sought chiefly in relation to migrating birds. They could not strongly affect local fauna to an extent that could be

considered dangerous and limiting the distribution and reserves. This is so, because local species get accustomed to the specific features of the station devices with respect to the noise, as well as to all other impacts. And since it cannot be expected that the rotating blades will strike and kill lots of birds (particularly in good daytime visibility), the other impacts on migrating birds that will be analyzed, are practically without influence on local ornithofauna.

In contrast to aircraft engines at airports, birds cannot cause problems or be themselves dangerous to wind turbines, however precautions may be taken for reducing such effect. On the geographical map of the country is indicated the potential of areas suitable for development of wind energetics, but no map has been drawn yet (with the exception of the protected zones as per the Directive for birds of the map material under Natura 2000) on which are indicated the inappropriate places for construction of wind generators from the viewpoint of birds' migration.

Experience shows that for many bird species and their habitats correct designing and localization of wind generators is related to minimum impact. The chief impact is the risk of "hitting" the bird with the blades, thus causing injuring or death. Probability for such an event depends on the flight characteristics of the given species and the related to the season behavior of the birds. It is expected that most birds in flight will take precautions to avoid the moving obstacle, although various species act in different ways to avoid it. (see <http://www.scotland.gov.uk/publications/2002/pan45>)

Researches on birds, affected by wind turbines, show that their number is considerably smaller than birds, killed by other human activities – traffic, hunting, high-voltage lines as well as the negative impact of intensive use of fossil fuels. For instance, in the United Kingdom where there are several such turbines being operative, one bird is killed by turbine per year, whereas about 10 million birds are annually killed by road traffic. Researches show that migrating birds are wiser, wiser than we knew until recently, and are capable of successfully avoiding wind turbines. Published data for wind parks in the USA indicate even smaller number of birds killed by turbines - 0.19 birds per turbine a year. This provides grounds to the Royal Society for the Protection of Birds to draw the conclusion that: "available evidences have lead us to believe that appropriately situated wind farms do not endanger birds significantly." (the statement of the Royal Society for the Protection of Birds can be found at: <http://www.rspb.org.uk/policy/windfarms/index.asp>).

3.8.3. Characteristics of the condition and forecast for and assessment of the impact on protected natural territories and sites and alterations in their condition as a result of the investment project's realization.

The region that is an object of the investment proposal does not fall within the borders of a protected territory. The nearest potentially protected dwelling area is „Etropole – Bailovo” with zip code BG0001043.

Subjects and objectives of protection (pursuant to Art. 8, para 1, item 2 of BAB)

Objectives of protection – Protection of the area of natural habitats and the habitats of species and their populations being the object of protection within the borders of the protected zone.

Preservation of the natural condition of natural habitats and the habitats of species being object of protection within the borders of the protected zone, including of the natural for these habitats species composition, typical species and conditions of the environment.

If necessary, restoration of the surface area and natural conditions of priority natural habitats and the habitats of species, as well as the species populations, subject to protection within the borders of the specified protected zone.

Subject of protection – Natural habitats

- 3260 Water courses of plain to mountain levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation
- 4060 Alpine and Boreal heaths
- 6230 * Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and sub mountain areas, in Continental Europe)
- 62D0 Oro-Misian acidophil grasslands
- 6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
- 6520 Mountain hay meadows
- 8110 Siliceous scree of the mountain to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)
- 8220 Siliceous rocky slopes with chasmophytic vegetation
- 8230 Siliceous rock with pioneer vegetation of the *Sedo-Scleranthion* or of the *Sedo albi-Veronicion dillenii*
- 9110 *Luzulo-Fagetum* beech forests
- 9130 *Asperulo-Fagetum* beech forests
- 9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion*
- 9170 *Galio-Carpinetum* oak-hornbeam forests
- 9180 * *Tilio-Acerion* forest on slopes, screes and ravines
- 91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
- 91M0 Pannonian-Balkan turkey oak-sessile oak forests
- Mammals*: *Ursus arctos*, *Canis lupus*, *Lutra lutra*
Amphibia and reptiles: *Triturus karelinii*, *Bombina variegata*, *Emys orbicularis*
Fish: *Barbus plebejus*, *Cobitis taenia*, *Rhodeus sericeus amarus*

At a distance of over 5 km. are situated the following sites:

- Hunter's chalet "Tarsava" (Hunter's residence) located within the land territory of the village of Yablanitsa, municipality of Svoge. The existing variety of plant species, the great number of rivers and mountain brooks, the vast alpine meadows create excellent conditions for wholesome recreation all the year round. In the adjacent area is located also the hunting region "Tarsava" covering approx. 5 000 hectares. In this region under natural conditions are bred red deers, fallow deers, roes and wild boars that are subject of hunting tourism. For the purposes of hunting tourism are constructed special hunting facilities providing excellent conditions to hunters for watching and shooting of different game species.

- Vracheshki Monastery „St. Forty Martyrs” is located on the left bank of the Cheshkovitsa River, below Murgash mount (1687 m. above sea level), at about 7 km. to the west from the town of Botevgrad and at 4 km. to the west from the village of Vrachesh. The monastery was founded in XIII century, it was burnt down in XV and XVIII cent., and it was subsequently restored in XIX cent. (1891). Currently the monastery is active. Over the monastery looms a steep peak on which there can be found the remnants of a fortress called Gradishte (Cheshkovgrad). The monastery has a status of cultural monument.

These sites are located sufficiently far from the complex's terrain. No negative alterations are expected in their condition as a result of the project's realization.

3.9. Landscape

3.9.1. A brief description of the main features of the structure and the functioning of the landscapes in the region under consideration and the assessment of their potential for the implementation of the aims, changes in the structure and the functioning of the landscapes;

According to the system of the regional taxonomic units in the country's landscape dividing into regions the site falls within the Balkan Mountains area, West Balkan Mountains sub-area with Rzhano-Murgash region. It encompasses: mountainous landscapes Class, moderately humid mountain forest landscapes Type, landscapes of middle mountainous deciduous forests on noncarbonated sediment rocks

Group; landscapes of high mountainous meadows Type; landscapes of high mountainous sub-alpine meadows and bushes on intrusive rocks Group.

Each landscape region differs from the neighboring regions in the local features of the rock substrate, the mesorelief, the horizontal and vertical landscape structure. From geo ecologic point of view it is indispensable to take into account the anthropogenic factor. The anthropogenic activities cause changes in the micro climate and in the local climate. The fauna and the flora, the soils and the waters are the most affected by man natural geo components.

The region subject to the investment intention is experiencing a characteristic anthropogenic interference. A meteorological station Mount Murgash comprising of a building and facilities is built on the peak. The Murgash hut is situated in close vicinity of the site (1400 m above sea level, to the Southwest of the peak itself (1687m above sea level)). Such hostel is a massive building with a capacity of 60 beds with outdoor lavatories and bathrooms. The hut is some 14 km away from the town of Buhovo on a macadam road. The Vitinya Throat is located in immediate proximity, as the exit settlements with tourist paths and the time to reach the hostel on foot are the following: the Town of Buhovo (4 hours away), the Village of Zhelyava (3.5 hours away); - the Village of Churek (4.5 hours away); - the area of Zherkovo (4 hours away); - the Village of Vrachesh (6 hours away).

The separate components of the landscape are described in the separate items.

The presumed influence of the pollutants over the landscape may be divided into two phases:

- during the construction itself – during the construction works the landscape will be changed, the changes relate to the damages of the geologic base, the surface earth layer, the vegetation and the visibility – from the use of machines and facilities (noise, harmful emissions, as well as the accumulation of certain quantities of excavation earth mass, the duration of the influence is very short and depends on the particular climate conditions;

- during the operation – the main negative influence of the wind energy facilities is a change of the visual aesthetic media; the period of influence is unlimited (as long as the operation continues).

The process of the site operation is related to a lasting change in the existing visibility (dominating up to about 2 km, relative up to 5 km and visible only in clear weather up to 15 km), but without a change of the case landscapes structure.

3.9.2. Analysis and assessment of the pollutants in the landscapes;

The terrain falls within broken ground of 1,400 to 1,670 m above the sea level in the Mount Murgash region. The construction of 44 wind turbines is provided for, each of which needs approximately 140 000 acres cleared erection area around its foundation. The rotors will have three blades that will be lifted up at about 65-70 m above the earth surface as a result of which the wind park will be visible from kilometres. The visual impact of the simultaneous work of 44 identical wind turbines with three blades of 37 m each might as well cause negative sensation of far too strong human intervention in this high-mountainous open country.

Wind generators should be situated at a distance not shorter than 500 m from the territory of the closest settlement and effective noise, vibrations and infrasound isolation should be envisaged.

The influence of this mainly physical type of pollutants on the landscape may be divided into two phases:

- during the construction itself – the use of heavy construction equipment (noise, harmful emissions, trampling and pollution of the soil with domestic and construction waste, destruction of grass vegetation, harming of certain wildlife habitat). The duration of the influence is short and depends on the concrete climate conditions.

- during the operation of the site – noise from the work of the wind generators, vibrations, infrasound and interferences in the range of the radio waves. The influence will be of local character.

3.9.3. Assessment of the potential for self-purification and self-restoration of landscapes;

Each landscape has its own genesis, dynamics and development, often caused by the interference of external factors. Often the landscape may develop under its own internal reasons, which means self-development. The development of the landscapes is of cyclic character, i. e. It has the potential to recover itself, to develop forward and not to repeat its previous state. Usually the transformation of a landscape into another one is done when its more stable components and elements are significantly changed. When the slow quantity accumulations grow into a new negative quality further self-development and self-restoration of the landscape is not possible.

For the landscapes two types of changes are inherent: reversible and irreversible, many of the irreversible changes are caused by the disproportionate interference of man in the landscapes structure.

Each landscape has its own aesthetic potential, determined by its external structure and ecologic potential, related to its internal structure. The aesthetic potential is defined by the limit maintaining the visual unity and the aesthetic harmony in the landscape. The ecologic potential is determined by preserving the self-regulating mechanisms of the landscape, securing the preservation of the existing ecologic equilibrium. A potential for restoration of the landscapes regarding the mechanical disruption of the geological base practically does not exist.

After the construction phase it is necessary to undertake measures for the restoration of the damaged terrains, especially around the foundations, the working grounds, as well as their layout with suitable grass and low bushes vegetation (in conformity with all technologic requirements for the work of the facilities). Initiating anti-erosion measures, upper layer recultivation as well as the preservation the natural look of the affected terrains will mitigate the change of the landscape and the artificial introduction of such a landscape dominant. The overshadowing and the movement of the shades themselves may have an adverse effect only in the presence of residential houses or other sites nearby.

3.9.4. Forecast and assessment of the expected damages of the landscapes, taking into account their stability against the particular type of influence.

The specific requirement in the structure of the industrial landscapes is determined by the functional use of the territory. The most aggressive ones are the anthropogenic damages – industrial elements and structures negatively influencing the demonstration of the favourable ecologic and aesthetic impact of the agricultural landscape.

There will be a specific impact on the landscape during the construction phase. The use of heavy construction equipment, the accumulation of construction materials, the substantial excavation works, the temporary storage of earth masses and humus soil will disturb the aesthetics of the existing landscape media.

In the project implementation the landscape will change visually but the type of the existing landscape will not be changed. The elements influencing the aesthetics and the appearance are connected with the location, design and uniformity of the turbines and cannot be clarified in the pre-project studies. The visual impact of the simultaneous work of 44 identical wind turbines may also cause negative sensation of far too strong human intervention in such high-mountainous open country. The rotors will be lifted up at about 65-70 m above the earth surface and the wind park will be visible from kilometres. The perception of the wind park will be sensed as: - dominating the landscape silhouette – up to about 2 km; - comparatively dominating silhouette – from 2 to 5 km; - visible peculiarity only in clear weather as a part of wider landscape – from 5 to 15 km; - perceivable peculiarity only in very clear weather, as a minor element of the landscape - from 15 to 30 km.

According to the approved visibility as a function of the distance, a part of the wind park will be as also visible from Sofia in clear weather. However the wind generators will be a factor dominating the landscape only in the region of the ridge. Provision for anti-

erosion measures, upper layer recultivation as well as self-grassing of the affected terrains will mitigate the change of the landscape and the artificial introduction of such a landscape dominant.

The overshadowing and the movement of the shades themselves may have an adverse effect only in the presence of residential houses or other sites nearby.

The issues arising from the interaction between the technical infrastructure as a functional system and the landscape as a territorial system depending on their origin and character may be the following:

- *economic – as a result of the interaction of the technical infrastructure and the economic development – a necessity resulting from the maximum protection of the natural facts and the investing of small means for the restoration of the damages;*
- *technical – the construction of the site in conformity with the basic natural components which the simplified construction depends on, the perfect functioning and the easy maintenance - the character of the facility is very specific and it is necessary that all hygiene and sanitary requirements are complied with;*
- *aesthetic – they necessitate the dependence of the system built and its components on the particular landscape for maximum preservation of its character, structure, extent and aesthetic harmony – the visual impact of the change in the type of the terrain may be mitigated with the realization of a suitable vegetation layout.*

In implementation of the investment intention envisaged by the project the landscape shall be changed, but the type of the existing landscape will not be changed.

3.10. Cultural heritage:

3.10.1. Presence of historic, archeological and architectural monuments;

The terrain under consideration does not fall within the boundaries of a protected natural area. The nearest protected territories are located at a distance bigger than 5 km from the region subject to the investment intention.

At a distance above 5 km the following are situated:

- *Tarsava hunting lodge (Tarsava hunting residence), situated on the land of Yablanitza village, Svoge municipality. The extraordinary geographic features of the region nominate it one of the best places in Bulgaria for eco and hunting tourism. The presence of a variety of vegetation species, the great number of rivers and mountain brooks, the spacious high-mountain meadows, create excellent conditions for recreation of full value during all seasons of the year. The vicinity of Mount Murgash represents marvellous opportunities for one-day tourist outings. Tarsava hunting region covering about 5 000 hectares is also situated in the area. Red deer, fallow deer, doe and wild boar, subject to hunting tourism, are raised in the region under natural conditions. For the purposes of the hunting tourism special hunting facilities are built providing the hunters with excellent conditions for watching and shooting various game species.*

- 'Holy 40 Martyrs' Vrachesh Monastery is situated on the left bank of Cheshkovitsa river in Murgash Mountain, part of the West Balkan Mountains, under Mount Murgash (1 687 m above sea level), at about 7 km to the West of Botevgrad and at 4 km to the West of Vrachesh village. Historic Development and Present State: the monastery is founded in the XIII century, it has been destroyed by fire during the XV and the XVIII century and is rebuilt during the XIX century. (1891). Currently the monastery is operating permanently. Above the monastery a sharp peak is rising where the remains of the Gradishte (Cheshkovgrad) fortress are situated. The monastery is declared a monument of cultural heritage.

3.10.2. Forecast and assessment of the influences over the state of the historic, archeological and architectural monuments as a result of the investment project realization.

There is no data for presence of historic, archaeological and architectural monuments on, and in the immediate vicinity of, the project site terrain.

4. Health and Hygiene Environmental Aspects: analysis of the existing situation and prognosis for the presumable impacts on human health and the hygiene and sanitary conditions of the environment that are expected to be affected as a result of the implementation of the investment project.

4.1. Determining potentially affected population and territories, areas and/or sites with specific hygiene-protected status or subject to health protection depending on the envisaged territorial scope of the impacts on the environment components.

The construction of 44 wind turbines is provided for, each of which needs approximately 1,4 decares cleared erection area around its foundation. The height of the turbine axis is up to 65 m above ground level (but it may vary from 56 to 66 m depending on the type of the relief) and length of the blade of up to 37 m (but it may be reduced to 27 m). The wind park will be visible in clear weather at a distance of up to 15 km.

The planned to be erected turbines Leitwind (LTW 70/77) and Win Wind (WWD-1 and WWD-3) must meet the requirements for safe use according to the International Electro-Technical Commission – IEC 16400. The wind generators shall be positioned at a distance of no less than 500 m away from the territory of the nearest settlement, according to Art 141, para 1 of Regulation No. 14 of June 15, 2005 on technical rules and normative for designing, construction and use of the sites for production, transformation, transfer and distribution of electricity, SG 53/2005, promulgated 28.06.2005 of the Ministry of Regional Development and Public Works and the Ministry of Environment and Water. Within the meaning of para 2, efficient isolation against noise, vibrations and infrasound shall be stipulated for the facilities under para 1, subject to compliance with the requirements of the respective normative acts.

In immediate proximity is Murgash Hut (1400 m) which is situated southwest from the mount (1687 m) itself. It is a solid three-storied building with a capacity of 60 beds with outdoor lavatories and bathrooms. The hut is about 14 km away from the Town of Buhovo along a macadam road. In immediate vicinity is the Vitinya Pass, and the starting point settlements with tourist paths and the time to reach the hut on foot are as follows: the Town of Buhovo (4 hours away), the Village of Zhelyava (3.5 hours away); - the Village of Churek (4.5 hours away); - the area of Zherkovo (4 hours away); - the Village of Vrachesh (6 hours away).

The examined terrain does not fall into the limits of a protected natural territory a potentially protected area, which fact has been confirmed by letter **ZDOIDЗДОИД-10490/16.01.2007** of MEW⁴. The reference in writing of MEW has been made following a Decision for providing access to public information No. 7/16.01.2007. In the reference in writing, the investor has been informed that: “Mount Murgash does not fall into potentially protected areas. The nearest potentially protected dwelling area is „Etropole – Bailovo” with code BG0001043.” On the terrain itself and within a radius of 5 km around the ridge there are not territories with a more specific status; the following sites are situated a distance of 5 km:

*- **Hinter’s Hut Tarsava (Hunter’s Residence)** “situated in the territory of the Village of Yablanitsa, Svoge Municipality. The exceptional geographical peculiarities of the region specify it as one of the best places in Bulgaria for eco- and hunting tourism. The availability of various vegetation species, the great number of rivers and mountain streams and the spacious high-mountain meadows provide excellent conditions for adequate rest throughout all seasons all-year-round. The proximity of Mount Murgash*

⁴ Ministry of Environment and Water

provides wonderful possibilities for one-day tourist trips. The hunting area of "Tarsava" covering about 5 000 hectares is also situated in the region. Red deer, stags of fallow deer, roe and wild-bore, who are target of hunting tourism, are bred in the area under natural conditions. Special hunting facilities have been built for the purposes of hunting tourism providing excellent conditions for observation and shooting down of the various types of game.

- The Vrachesh Monastery "St. Forty Martyrs" is situated on the left bank of the Cheshkovitsa River in the Murgash Mountain of the Old Mountain Range, under Mount Murgash (1 687 m ASL), at about 7 km distance from the Town of Botevgrad and 4 km westwards from the Village of Vrachesh. Historical development and present condition: the monastery was established in the 8th Century, was burnt down in the 15th and 18th centuries, and was restored in the 19th Century (year 1891). Presently, the monastery is continuously functioning. A steep peak, keeping the remnants of the Gradishte (Cheshkovgrad) Fortress, rises above the monastery. The monastery has been announced a monument of culture.

4.2. Identification of the risk factors causing harm to human health: it is carried out taking into consideration the environment components, the type (the nature) of the risk factors and the conditions (prerequisites) of their harmful effects.

The wind generators shall be positioned at a distance of no less than 500 m away from the territory of the nearest settlement, according to Art 141, para 1 of Regulation No. 14 of June 15, 2005 on technical rules and normative for designing, construction and use of the sites for production, transformation, transfer and distribution of electricity, SG 53/2005, promulgated 28.06.2005 of the Ministry of Regional Development and Public Works and the Ministry of Environment and Water. Within the meaning of para 2, efficient isolation against noise, vibrations and infrasound shall be stipulated for the facilities under para 1, subject to compliance with the requirements of the respective normative acts.

The transformation of wind power does not cause air, water or soil pollution. The impact of the Complex of Wind Power Plants on the environment has to do with the following: - clearing away the durable high-stemmed vegetation around the foundation; - disruption of the soil layer during construction and excavation works and basing; - further thickening of the soil layer by the transport machines during erection of the generators; - noise loading in the vicinity; - visual effect and shadowing (the so-called "flickering shadow") of the ridge; - impact on the fauna; - possible electromagnetic interference with the Sofia Airport radars; - disturbance of the telecommunication systems on the summit; - mechanical impact in case of throwing out of ice pieces.

Due to the remoteness from settlements, no change in the health condition of the population is expected during the operation of such kind of sites.

4.3. Characteristics of the separate factors in relation to their impact on human health and their comparison to the operating hygiene norms and requirements.. Determining the leading in significance risk factors.

The risk of accidents is chiefly due to increasing the speed of the wind turbines in strong wind or occurrence of power failures in the transmission network. Turbines have a horizontal axis and three blades each, made of fiberglass (epoxy resin/polyester-bound glass fibers composites) with integrated lightning protection and capacities for peripheral speed of 22-80 m/sec, developed during rotation at 6-23 revolutions per minute. Hazardous are also the cases of icing of the blades and changing the profile at low temperatures and high humidity of the air. The facilities stop operating in case of emergencies or are redirected at an angle against the direction of the wind and shall be set into operation or redirected against the current after a detailed control on the condition of the separate

components. Ice pieces break loose from the rotating turbine blades and float at great distances beyond the rotor disk plane and could cause damages and harms. The safety zone behind the installation has a distance of retreat equal to the height of the axis plus the turbine diameter. It is dangerous to stay within the zone with a radius of 35 m around the turbine foundation in seasons with positive temperatures because of the air turbine mechanical impact, and in cases of icing – at about 120 m beyond the plane of the rotating of the blade because of throwing out of ice pieces.

In cases of emergency, the installations stop functioning or are redirected at an angle against the direction of the wind and in the case of determined icing of the blades, operational strategy for their stopping could be undertaken. Commissioning or resumption of their operational state by redirecting them against the draught are performed following a thorough control over the condition of the separate parts.

Transformation from low to average voltage of 33 kV is envisaged, and the wind turbines will be connected serially with a cable routing. The distribution line of 33 kV will be of an electric power line about 20 km long and will pass along a route which will be within the easement of the road. The transmission station will be constructed a medium voltage distribution switchboard, like the transformer substation 110/33 kV. At of an electric power line 20 kV (in this case 33 kV) the top admissible levels of the physical factors are not exceeded. The passing of such electric power lines through towns and villages is permitted under the operating legislation. During the operation of air distribution lines with a nominal voltage above 110 kV, the impact on the environment components find expression in increase of the values of the natural electromagnetic field with a frequency of 50 Hz, change of the level of noise in the region as a result of the overlapping of the noise from the distribution line with the natural background and, under certain conditions, induction of vibrations and oscillations. The air distribution lines do not have a strong negative impact on the visible aesthetic natural environment.

4.4. Assessment of the possibilities for combined, complex, cumulative and remote impact of the ascertained factors.

As a whole, the wind generator park will have several effects concerning the environment – mainly as regards the harmonious appearance of the existing landscape, as in their essence these are restricted to local impact (in difference from the entailing global ecological benefits). Many of these effects may be reduced – the main obstacles up to now are noise, visual effect, to a greater or lesser degree, electromagnetic disturbances, disruption of bird and animal habitats, use of land, etc. With the development of technologies however, as well as by employing appropriate mechanisms for regional planning and strict licensing such problems may be and are already solved.

The wind-generated power spares the use of fossil fuels, it is not connected with emission of CO₂, sulphurous oxides, dust or other air pollutants. Its production does not involve storage of hazardous substances, waste generation or other hidden effects (such as nuclear energetics, for instance, has). The construction of wind power plants on agricultural land is not connected with destruction of the soil layer (with the exception of the foundation laying stage) or termination of agricultural production. The restoration of the environment's condition after termination of the wind power plants operation involves solely dismantling and removal of the foundations.

The cumulative impact will be connected with the simultaneous operation of the 44 turbines within the wind park. In the respective sections of the report are made assessments of such impacts (e.g., noise map, landscape alterations, etc.).

4.5. Characteristics of the exposure.

Due to the remoteness from populated areas no change is expected in the health condition of the population resulting from exposure to harmful factors connected with the wind park.

4.6. Health condition of the affected population

Wind generators are to be located at a distance of not less than 500 m. from the territory of the nearest populated area, pursuant to Art. 141, para 1 of Regulation No 14 dd. 15 June 2005 for the technical rules and statutory requirements for design, construction and use of sites and facilities designated for production, transformation, transmission and distribution of electrical energy, promulgated in the State Gazette, issue 53/2005 as of 28.06.2005 of the Ministry of Regional Development and Public Works and of the Ministry of Energy and Energy Resources. As per the meaning of paragraph 2 for the facilities under paragraph 1 is contemplated efficient insulation from noise, vibrations and infrasound in compliance with the requirements laid down under the respective statutory deeds.

There are no data as to any change in the health condition of population resulting from the operation of similar types of sites given the compliance with the requirements set forth in the statutory documents. The project's realization is not expected to affect the population.

4.7. Assessment of health risks, measures for health protection and risk management.

Due to its remoteness from populated areas the wind generator park is not expected to create any risks for the population.

5. List of the used methods for assessment and forecast regarding the impacts on environment specifying the sources where the former are published.

The methods and regulations for assessment of the impact on environment used in the report are indicated in the respective points hereof.

6. Possible ways for attainment of the investment project's objectives:

6.1. Availability and characteristics of the possible ways for realization of the investment project – location, technological potential, capacity.

The construction of the Complex of wind power plants is to be performed within two summer seasons. The working documentation for the project will be prepared in approx. 3 months, as the respective documentation regarding the change in the land designated use – in approx. 6 months; obtaining of building permit - approx. 4 months; contracting and supply of equipment – approx. 7 months; construction –12 months (distributed over a couple of years), as until the end of the year 2007 will be mounted the first 10 wind generators (LTW 70/77 and WWD-1 / WWD-3). Mounting and commissioning - approx. 4 months during the summer season. The remaining 34 turbines shall be mounted in the year 2008.

The investment proposal includes construction of electric transmission network - high-voltage line 33 kV and the transformer substation 110/33 kV. The routing of the cables to be laid underground (or the stages of the separate piers and their configuration) is to be additionally specified.

6.2. Analysis of alternatives regarding the impact on environment, including analysis of “zero” alternative.

The zone around Murgash mount is in many aspects representative for the use of wind power (wind indices, geographical location, height above sea level, relief, vegetation, geological conditions, etc.). “Zero alternative” means no utilization of the wind power potential of the terrain.

Alternative are the location of the separate wind turbines at the second stage, the final dimensions and make of the separate turbines, the routing of the road connections

between these, the routing of the electric transmission network - high-voltage line 33 kV and the location of the transformer substation 110/33 kV

6.3. Characteristics of the possible ways for achievement of the objectives of the investment project, taken into account during its development phase, as well as the motives on the grounds of which these are not accepted.

The projects as well as the main facilities of the plant are complied with the statutory regulations applicable in the country and therefore, no alternative solutions have been considered or developed.

7. Measures for reducing the negative consequences: the measures that should be provided, developed or carried out as conditions for permitting the operation of the site shall be specified.

The measures for protection and management of risk are an inseparable part of the documentation and instructions for normal operation of the site.

The practical measures involve, as follows: change of the turbine blades colour and their marking with risk signalling colour combinations; use of pylons and rotor axes without apparent possibility for nesting, driving birds in the breeding period; assembly of screening umbrellas on the pylons of air lines; lack of refuse, carrion or whatever foodstuffs in the station region that could attract birds; radar or carrying out appropriate watch of sufficient scope to alarm the turbine operators for approaching bird flocks; possibility of comparatively fast stopping the blades in case of risk of entry of birds in the windpark region. The driving back of birds that successfully adjust to various devices in open country is carried out by any means but guaranteeing lack of foodstuffs and permanent vegetation in the region is particularly important.

8. Assessment of actions planned in emergency situations and volley pollutions: it is prepared on the basis of the emergency plan, presented by the investor, and comprises of:

Description of the planned actions in emergency situations and volley pollutions is set apart in the emergency plan of the site.

9. Plan for in-house monitoring, prepared in conformity with the requirements of the environmental law; in case of need, organisation of an environmental monitoring at characteristic points with a view to limit and prevent the harmful impact on the human health and the environment.

The monitoring system should include main surveillance and control of the impact of the wind power stations complex on the fauna, related to taking into account: - the actual noise load in the vicinity; - the visual impact and the overshadowing of the ridge; - the impact on birds and the animal world; - the probable electromagnetic interference with the Sofia airport radars; - the disturbance in the telecommunication systems on the peak; - the mechanical impact in casting of ice pieces.

The control shall be done by the investor and the respective authorised institutions. The plan for in-house monitoring shall be an integral part of the site's operation documentation and should be presented in accepting the site by an independent supervisor.

10. Conclusion: it contains the Environmental Report authors' recommendations on the restricting parameters which should be complied with upon passing over to a further stage of design or construction and the operation of the

newly designed investment project, in conformity with the norms and standards of allowable pollution of environment operating in this country.

After the ratification of the Kyoto Protocol, this country has undertaken the obligation to reduce its emissions for the 2008-2012 periods by 8 % in comparison with the year 1988 accepted as basic under the framework convention. In 2005, Bulgaria was holding one of the last positions in Europe regarding electricity production from renewable energy sources (RES). Only 0.5% of electricity produced in Bulgaria is from such energy sources, including wind, solar energy and geothermal sources. Electricity production in Bulgaria is primarily based on fossil fuel, nuclear energy and hydraulic power capacity employment. Under the National Program for Renewable Energy Sources RES (2004-2015) of the Ministry of Energy and Energy Resources as well as the commitments made this country is to achieve electricity production from RES at the amount of 11% of electricity produced in Bulgaria by 2010. The Common Energy Strategy of the European Community aims at: - guaranteeing security of deliveries by means of diversification of energy types and delivery origin; -ensuring better competition environment, and last but not least - achieving sustainable development of the energy field by means of increasing the share of RES. Imposition of a common strategy has become a necessity due to: - the increasing energy dependence of the EU; - the constantly rising petrol prices (per saltum sometimes); - significant changes in the environment; - significant rise in energy prices in the EU.

The solution of the existing ecological problems relating to the need of expanding production of electric power is in expanding the share of nature related production of all production of power from renewable energy sources.

The region of Mount Murgash is in many aspects representative of wind power (good wind indices, relief, density of population, vegetation, geological conditions, etc.). The region is distinguished by constant air currents throughout the year, in terms of wind speed and direction at relatively low latitude, with a comparatively good transport access and available power distribution network.

The impact of the Wind Power Plant Complex on the environment involves the following: - clearing the permanent high-stem vegetation around the foundation; - disrupting the soil layer during building-excavation works and basing; - extra compression of the soil layer by vehicles during assembly of generators; - noise loading in the region; - visual impact and overshadowing (the so-called “flickering shadow”) of the ridge; - impact on the fauna; - possible electromagnetic interference with the Sofia Airport radars; - disturbance of the telecommunication systems on the summit; - mechanical impact in case of throwing out of ice pieces.

Impact on the atmospheric air quality

The project implementation and electric power production will not cause pollution or generation of harmful emissions, since wind generated power is renewable and saves use of fossil fuels. It does not cause emission of CO₂, sulphur oxides, dust or any other air pollutants. Upon substitution of 1 kWh of electricity with coal, with the same quantity of wind electricity, the following emissions are prevented: about 1 kg of CO₂, about 100 gr of ash and gypsum, 2 mg of sulphur dioxide and 3 mg of nitrogen oxides (when using high caloric imported coal. Greenhouse gases generated in the production process of wind generators are compensated for by the reduction of the harmful emissions from their electricity production for only 3 – 5 months of operation. By this index, windpower engineering ranks definitely first among the rest of the power plants for the so-called “clean electricity”. Throughout its economic life, a wind turbine of an average size saves more than 3 300 tons of electricity producing coal, prevents emission of more than 7 000 tons of CO₂ equivalent into the atmosphere and avoids hundreds of tons of ash.

Impact on surface and underground waters

In the region of Mount Murgash, no permits have been issued for use or water drawing from water sources and established SPZs under Ordinance No. 3/16.10.200(???) near facilities, no existing watermains, water-supply facilities, water-supply sources or SPZs are affected. No changes in water currents or underground waters regime is expected, since the project does not stipulate use of water sources upon correction of water flows, construction of dams or other hydrotechnical facilities and corresponding extraction of aggregates from riverbeds, etc. The project implementation and operation will not affect either the quantity regime or underground waters qualities or the water ecosystems status in general.

Generated Waste

The technological process of windpower production and electric transmission is not related to harmful stuffs or waste emissions, safe for the transformer oil that is delivered periodically (once each 2-3 years) for recycling or is treated on the spot.

Noise Load

The noise isolines territory distribution prognosis is given in the Murgash Windgenerating Park noise map. The equivalent levels of noise over 65 dBA are only in zones, almost overlapping the land surface projection of the rotating blades. The zones of noise level over 55 dBA are 44 ellipses, corresponding to a circumference with a radius of about 73 m. The zones of noise level between 50 and 55 dBA represent several differently shaped areas around the generators with borders outlying at a distance of 73-79 m against and 145-158 m in the direction of the wind. The zone of noise level between 45 and 50 dBA covers a total area around the generators (depending also on the relief) with a border, outlying at a distance of 122-131 m against and 245-261 m in the direction of the wind. The zone of noise level between 40 and 45 dBA represents a total strip of land around the generators, outlying at a distance of 200-210 m against and 400-420 m in the direction of the wind.

Electromagnetic Fields

There is a risk that the signals of the Meteorological station telecommunication facilities at the summit, whose channels (very likely radio-relay ones) cross the wind generators platforms, be interrupted or jammed. The wind generators may cause interference with the Sofia Airport radar systems, and under certain conditions they may cause disturbances to the radar installations and communications of the Sofia Airport. The provided for transformation from low to medium voltage of 33 kV, power cable and transmission station are not related to significant electromagnetic impact on the environment.

Lands and Soils

Each turbine needs a solid foundation, varying from a common foundation with an area of 290 m² to a foundation, attached to a circle of piers, with an area of 140 m². Laying the foundations of the turbine towers requires erecting area of approximately 480 m² around them. The average area, needed for assembling the blades to the hub on the ground followed by lifting the entire rotor unit shall be about 1,400 m² and the platforms, where

the two cranes should be erected on an area of a total of 250 m², must be levelled at a maximum slope of up to 3-4%.

Wind turbine platforms will be connected to each other by a road with a width of 3.5–4.2 m and a curve with a radius from 30 to 100 m, the easement thereof will be used for laying the cable network. The taken away humus level between the wheel-tracks (as far as it exists) of an area of about 48 decares that is the projection of the tracks of existing roads along the ridge parts, could be used for recultivation.

Flora and Fauna

The examined terrain does not fall into the limits of a protected nature territory or of a potentially protected site, which fact has been confirmed by letter AAPIM-10490/16.01.2007 of MEW. The Ministry of Environment and Water reference in writing of MEW has been made following a Decision for providing access to public information No. 7/16.01.2007. In the reference in writing, the investor has been informed that: “Mount Murgash does not fall into potentially protected areas. The nearest potentially protected dwelling area is „Etropole – Bailovo” with zip code BG0001043.” No presence of rare or endangered of extinction vegetation species, included in the LBD, has been found.

No impact on the existing vegetation in the afforested territories below the ridge is expected. The terrain of the ridge itself is part of a territory that by its biocenotic value might be classified as biocenosis under anthropogenic influence of high level of tolerance of floral and fauna species (IX category agricultural land – pastures and village territories).

The impact of wind power stations on the fauna might be related chiefly to migrating birds, however, the windpower station is located out of the European migratory passages and the region has no particular significance for the migration and wintering of the separate bird species. The researches show that migrating birds are wiser than we knew until recently and are capable of successfully avoiding wind turbines and available proofs suggest that correctly located wind plants do not present considerable risk for the birds. The wind generators could not have great impact on the local fauna that could be considered dangerous and limiting the distribution and the reserves. This is so, because local species get accustomed to the specific features of the station devices with respect to the noise, as well as to all other impacts. And since it cannot be expected that the rotating blades will strike and kill lots of birds (particularly in good daytime visibility), the other impacts on migrating birds that will be analysed, are practically without influence on local ornithofauna.

Disruption to Landscape

The visual impact of the simultaneous work of 44 identical wind turbines may also cause negative sensation of far too strong human intervention in such high-mountain open country. The perception of the wind park will be sensed as: - dominating the landscape silhouette – up to about 2 km; - comparatively dominating silhouette – from 2 to 5 km; - visible peculiarity only in clear weather as a part of wider landscape – from 5 to 15 km; - perceivable peculiarity only in very clear weather, as a minor element of the landscape - from 15 to 30 km. According to the approved visibility as a function of the distance, a part of the wind park will be also visible from Sofia in clear weather. However the wind generators will be a factor dominating the landscape only in the region of the ridge.

Impact on Human Health

Due to the wind park remoteness from any settlements, no change in the state of the health of the population is to be expected during its operation. The risk of accidents is chiefly due to increasing the revolutions of wind turbines in strong wind or occurrence of power failures in the transmission network. Turbines have an in-process inspection of the turbine axis deviation direction which allows the axis to be directed in the case of comparatively small changes and shifted in the case of stormy winds. Three independent grips of the different blades, brake gear for stormy winds and rotor locking in case of need have been provided for.

The Wind Power Plant Complex in the region of Mount Murgash on the territory of the villages of Zhelyava, Eleshnitsa and Churek meets the ecological and the respective other normative requirements of the Republic of Bulgaria for designing such sort of projects. Provided during the project implementation the recommended measures for protection and recovery of the environment are fulfilled, the necessary construction and operation normative requirements are observed, as well as the requirements of the wind generators manufacturers, the impact on the environment will be local and limited with respect to the examined physical factors and landscape, in view of which we propose to the Honourable Expert Council to RIEW Sofia to grant an affirmative conclusion on the report for EIA and to permit the project implementation upon conformity with the recommendations for reducing the impact made in the report.

Manager of the Team of

Licensed EIA Experts:

/ Dr. Eng. Valentin V. Kamburov /

Photographs from the ridge of Mount Murgash

Normative acts and plans

1. Title Deed for the sale of real estates No. 59, Vol. ²V, reg. No. 2701, case No. 91 dated 17.10.2005 – 1 pce;
2. Plans, by Agriculture and Forests Municipal Office – Kremikovtzi district, Metropolitan Municipality for the land of Zhelyava village with UCATTU 29204, Shiroki Preslap neighborhood, with IX category of land for the following real estates: - No. 001031 with area of 3 244 m²; - No. 001032 with area of 2 798 m²; - No. 001033 with area of 4 228 m²; - No. 001034 with area of 4 000 m²; - No. 001035 with area of 4 000 m²; - No. 001036 with area of 4 000 m²; - No. 001037 with area of 4 000 m²; - No. 001038 with area of 4 000 m²; No. 001050 with area of 4 403 m²; - No. 001051 with area of 4 233 m²; - No. 002005 with area of 4 000 m²; - No. 005005 with area of 4 766 m²; - No. 005006 with area of 4 153 m² – 12 pcs;
3. Title Deed for the sale of real estates No. 59, Vol. ²V, reg. No. 3058, case No. 466 dated 28.10.2005. – 1 pce;
4. Plans, by Agriculture and Forests Municipal Office – Elin Pelin municipality for the land of Eleshnitsa village, with UCATTU 34120, Murgash and Bulini Ravnishta neighborhoods, for the following real estates: - No. 024041 with area of 2 446 m²; - No. 024042 with area of 4 169 m²; - No. 024043 with area of 4 000 m²; - No. 024044 with area of 4 000 m²; - No. 024045 with area of 4 000 m²; - No. 024059 with area of 4 521 m²; - No. 024060 with area of 4 000 m²; - No. 024061 with area of 4 000 m²; - No. 024062 with area of 4 639 m²; - No. 024063 with area of 4 000 m²; - No. 024064 with area of 4 000 m²; - No. 024065 with area of 4 193 m² – 13 pcs;
5. Title deed for the ownership of real estates, acquired on the grounds of sales and detachment No. 584, vol. I, Reg. No. 492, case No. 59 dated 31.01.2007 – 1 pce;
6. Contract for the sale of a real estate – private municipal ownership between Elin Pelin Municipality and Ecosource Energy EOOD dated 12.06.2006 and plan for real estate No. 024003 with area of 85 425 m², located on the land of Eleshnitsa village, Bulini Ravnishta neighborhood, UCATTU 34120, Elin Pelin Municipality, Sofia region, – 2 pcs;
7. Contract for the sale of a real estate – private municipal ownership between Municipality Elin Pelin and Ecosource Energy EOOD dated 29.12.2005 and plan for real estate No. 024087 with area of 339 413 m² (339 413 m² as per plan), located on the land of Eleshnitsa village, Bulini Ravnishta neighborhood, UCATTU 34120, Elin Pelin Municipality, Sofia region – 2 pcs;
8. Plans, issued by Agriculture and Forests Municipal Office– Elin Pelin municipality for the land of Eleshnitsa village, with UCATTU 34120, Murgash and Bulini Ravnishta neighborhoods, for the following real estates, received as a result of partitioning of property: - No. 024083 with area of 4 000 m²; - No. 024088 with area of 4 012 m²; - No. 024090 with area of 4 441 m²; - No. 024091 with area of 4 551 m²; - No. 024092 with area of 4 282 m² – 5 pcs;
9. Title Deed for the sale of real estates No. 59, Vol. ²V, reg. No. 3058, case No. 466 dated 28.10.2005 – 1 pce;
10. Plans, issued by Agriculture and Forests Municipal Office–Elin Pelin municipality for the land of Churek village, with UCATTU 81760, Yotsova livada and Murgash neighborhoods for the following real estates: - No. 544018 with area of 4 378 m²; - No. 544019 with area of 1 749 m²; - No. 547042 with area of 4 659 m²; - No. 547043 with area of 3 977 m²; - No. 547050 with area of 1 574 m²; - No. 547051 with area of 3 499 m²; - No. 547052 with area of 4 001 m²; - No. 547053 with area of 3 786 m²; - No. 547061 with area of 2 978 m²; - No. 547062 with area of 2 803 m²; - No. 547063 with area

of 3 720 m²; - No. 547064 with area of 4 000 m²; - No. 547065 with area of 4 000 m²; -
No. 547066 with area of 4 050 m²; - No. 548002 with area of 4 000 m²-

- 15 pcs

11. Acts for irrigation from No. 1685 to No. 1674 dated 02.11.2006 for the land of
Zhelyava village issued by Irrigation Systems EAD Sofia branch - 13 pcs;

12. Acts for irrigation from No. 1645 to No. 1657 dated 02.11.2006 for the land of
Eleshnitsa village issued by Irrigation Systems EAD Sofia Branch - 14 pcs;

13. Acts for irrigation from No. 1659 to No. 1673 dated 02.11.2006 for the land of
Churek village issued by Irrigation Systems EAD Sofia Branch - 15 pcs

Letters of agreement issued by authorized bodies

14. Letter with issue No ЗДОИД-10490 dd. 16.01.2007 of MEW, following to adopted Resolution for providing access to public information No7/16.01.2007;

15. Letter with issue No 3858/24.01.2007 of Basin Directorate “Danube Region” for the mount Murgash region with respect to which no permits have been issued for use of water or water abstraction from water bodies as well as established SSZ as per Regulation No 3 dd. 16.10.2000.

16. Letter filed under No 3 dd. 26.01.2007 – EOOD Water Supply and Sewerage Systems – Sofia for agreement of the investment proposal for the region of Murgash mount, confirming that no existing water supply pipelines, water supply facilities, water sources and SSZs managed by said company are affected.

Projects and letters for Detailed Urban Plan (DUP) – Construction Plan (CP)

17. Project for DUP – CP for the land territory of the village of Zhelyava, Kremikovtzi area – application for performance of regulation procedure No ГР-94-B-314/05 for LEs (land estate) No 001031, 001032, 001033, 001034, 001035, 001036, 001037, 001038, 001050, 001051, 002005, 005005, 005006, ICATTU (unified classificatory ICATTU of administrative – territorial and territorial units) 20204, area of Zhelyava – “Shiroki Preslap”, examined at a meeting held by the specialized composition of Municipal Expert Council for Territory Regulation at the Sofia Municipality, following to Order No ПД-09-09-32 dd. 30.09.2005 issued by the Mayor of Sofia Municipality (Minutes No EC-Г-136 dd.15.11.2005);

18. Project for DUP – CP for the land territory of the village of Eleshnitsa, municipality of Elin Pelin – regulation procedure carried out following to application filed under No YT2-20-132 on 23.11.05 regarding land estates with the following numbers: 024041, 024042, 024043, 024044, 024045, 024059, 024060, 024061, 024062, 024063, 024064, 024065, examined at a meeting of the Municipal Expert Council for Territory Regulation appointed by Order No 1164 dd. 23.11.05 of the Mayor of the municipality of Elin Pelin (Resolution No 21, Minutes No 7 dd. 01.12.2005).

19. Project for DUP – CP for the land territory of the village of Eleshnitsa, municipality of Elin Pelin – for land estates having the following numbers: 024083, 024088, 024090, 024091, 024092.

20. Project for DUP – CP for the land territory of the village of Churek, municipality of Elin Pelin – regulation procedure performed following to an application filed under No YT2-20-133/23.11.05 for land estates having the following numbers: 544018, 544019, 547042, 547043, 547050, 547051, 547052, 547053, 547061, 547062, 547063, 547064, 547065, 547066, 548002, examined at a meeting of the Municipal Expert Council for Territory Regulation, appointed by virtue of order No 1164/23.11.05 issued by the Mayor of the municipality of Elin Pelin (Resolution No 20, Minutes No 7 dd. 01.12.2005).

ad.