SUPPLEMENTAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT
RUDINE WIND FARM, REPUBLIC OF CROATIA, DUBROVAČKO-NERETVANSKA COUNTY

Prepared by

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Object:	Rudine Wind Farm
Location:	Dubrovačko-neretvanska County
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SUMMARY:

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1 INTRODUCTION

This report was prepared to partially fulfil International Finance Corporation (IFC) /World Bank requirements for due diligence in financing project: WIND FARM RUDINE with total capacity of 70 MW.

Project developer is company Vjetroelektrana Rudine Ltd., established in 2009.

The site is located in Dubrovačko-neretvanska county, municipality of Dubrovačko primorje[1].

Except this Supplemental Environmental Impact Assessment Report, an **ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR WIND FARM RUDINE** (EIA STUDY WF RUDINE, 2006) was made, according to content specified by, at the moment, valid Ordinance on environmental impact assessment (Official Gazette, No 59/2000, 136/2004 and 85/2006).

The Environmental Protection Act and relevant subsidiary legislation specify the process of issuing the permits which demand an environmental impact assessment for all projects/investments in infrastructure (including wind farms) which have to get a permit from the competent Ministry[2].

Based upon the EIA STUDY WF RUDINE an assessment of environmental impact was carried out (period 2006 to 2008) and an Advisory expert committee for the EIA procedure (appointed by the Ministry) adopted Conclusions on acceptability of the wind farm RUDINE on the environment. **DECISION ON ACCEPTABILITY OF THE WIND FARM RUDINE FOR ENVIRONMENT** was issued in April 2008 (details described in chapter 6. DESCRIPTION OF RELEVANT DOCUMENTATION).

Affirmative decision follows after the processes of public consultations and defining environmental protection measures and environmental monitoring program are done, and it is an obligatory document for issuing a location permit (which also includes criteria issued by other authorities and public institutions).

In addition to a comprehensive project evaluation in EIA STUDY WF RUDINE, this report should address ecological and social impacts connected to the proposed wind farm, consolidates the most important facts and results of the environmental impact assessment, including environmental protection measures and environmental monitoring program. This report also includes information regarding existing documentation which was made based upon national regulations and standards and identification of activities which come from alterations to laws and introducing of regulations/guidelines which refer to environmental/nature impact assessment for wind farms.

The rest of this report consists of:

Chapter 2. OBJECTIVE OF THE PROJECT

Chapter 3. EXISTING LEGISLATION

Chapter 4. PROJECT DESCRIPTION

Chapter 5. PROJECT LOCATION

Chapter 6. DESCRIPTION OF RELEVANT DOCUMENTATION

Chapter 7. ENVIRONMENTAL IMPACTS

[1] Dubrovačko primorje municipality is situated in the northern part of Dubrovnik Riviera, with the administrative center in Slano.

[2] At the time of writing this report the competent ministry is Ministry of Environmental and Nature Protection (former Ministry of Environmental Protection, Physical Planning and Construction).

Chapter 8. CUMULATIVE IMPACT ASSESSMENT

Chapter 9. IMPLEMENTATION OF MITIGATION MEASURES

Chapter 10. ENVIRONMENTAL MONITORING PROGRAMME

Chapter 11. STAKEHOLDERS ENGAGEMENT PLAN

The legislative regulations in environmental protection area of Republic of Croatia did not prescribe an obligation to make this document nor for preparation phase nor for the operational phase of wind farm for any other project.

At the time of writing this report, all valid legislative acts regarding nature and environment protection in Republic of Croatia were taken into account because between the time of impact assessment procedure for EIA Study WF RUDINE and now there have been changes to the legislative framework with the goal of adjusting Croatian legislation with the EU Directives, as this was an important requirement Croatia had to fulfil to conclude the EU accession negotiations[3].

This Report was prepared in October 2013 to demonstrate that the project was designed following IFC EHS Guidelines for Wind Energy, as well as to outline the environmental management system for the project – wind farm Rudine.

2 OBJECTIVE OF THE PROJECT

The Republic of Croatia has an area of 87,661 km^2, with 56,594 km^2 of land surface. The territory is organized into 21 counties. It is inhabited by 4.4 million people.

Croatia is in an important moment of transition as the European Union's newest member state, and its energy sector is one of its most dynamic and strategic economic sectors. Croatia currently imports 52.6 percent of its electricity needs. Hydroelectric power alone accounts for over 62 percent of Croatia's electricity production; however, excluding hydropower, only 1.2 percent of Croatia's energy comes from renewable resources. As a member of EU-28 zone, Croatia is now committed to the Europe 2020 agreement, which calls for member states to have renewable energy account for 20 percent of their national electricity markets.

There is an increasing trend towards shifting away from conventional energy production forms to new renewable energy sources (RES), due to the current energy crisis, environment pollution and climate change issues. Energy Development Strategy of the Republic of Croatia (October 2009) and a National Renewable Energy Action Plan (June 2010) sets out the goal to reach 9 to 10 percent of wind generated electricity in overall electricity consumption by 2020, with the estimated installed power of 1,200 MW .

Wind power plants are the most important RES to produce electricity in Croatia (not counting potential in existing large hydropower plants). There is great interest shown by investors which is greatly facilitated by favorable legislation and guaranteed sales prices (feed-in tariffs).

In 2012, the Ministry of Economy implemented 2 by-laws regulating wind power plants and adopted adjustments to the renewable energy pricing system for 2013. These regulations allow for the purchase of generated energy during the experimental stage of operations and extend the period of state incentives for wind power from 12 to 14 years, increasing the profitability of wind power in Croatia.

Wind power in Croatia has been growing since the first wind farm was installed in the country in 2004. A total of 104 MW of new wind capacity has been built in Croatia so far in 2013, on top of the 141.25 MW that were in operation at the end of 2012.

The development of renewable energy sources, along with measures designed to improve energy efficiency, are a priority on the national and European level, on both environmental and energy policy grounds. Implementation

[3] On 1 July 2013 Croatia became the 28th member of the EU.

of the policies in the field of wind energy use has to take into account the protection of the environment and nature.

3 EXISTING LEGISLATION

EU environmental legislation has been transposed into national legislation by laws/acts (adopted by the Parliament), regulations (adopted by the Government) and ordinances (adopted by the Minister). There is an "umbrella" act – Environmental Protection Act, as well as sectorial laws on waste, air protection, nature protection and a number of bylaws (regulations and ordinances) adopted under these laws.

3.1. ENVIRONMENTAL PROTECTION

Environmental protection is based on the observance of generally accepted environmental protection principles, compliance with principles of international environmental law and acknowledgement of scientific achievements.

Environmental Protection Act (Official Gazette, No. 80/13) is an umbrella act in environmental protection based on the definitions of the National environmental protection strategy. In accordance with the quoted Act environmental protection goals in the achievement of sustainable development are: 1) protection of human life and health, 2) protection of flora and fauna, biological and landscape diversity and preservation of ecological stability, 3) protection and improvement of the quality of individual environmental components, 4) protection of the ozone layer and climate change mitigation, 5) protection and restoration of cultural and aesthetic landscape values, 6) prevention of major accidents involving dangerous substances, 8) continuous use of natural resources, 9) rational use of energy and promoting the use of renewable energy sources, 10) elimination of environmental pollution effects, 11) improvement of the disturbed natural balance and restoration of its regeneration capabilities, 12) achievement of sustainable production and consumption, 13) phase-out and substitution of use of dangerous and harmful substances, 14) sustainable use of natural resources, 15) security and development of long-term sustainability, 16) improvement of environmental status and securing a healthy environment. These goals are achieved by implementing the principles of environmental protection and environment protection instruments.

Basic principles of environmental protection are: 1) sustainable development principle, 2) precautionary principle, 3) principle of preservation of natural assets, biological diversity and landscape, 4) substitution and/or compensation principle, 5) principle of removal and remediation of environmental damage at the source, 6) principle of integrated approach, 7) principle of cooperation, 8) polluter pays principle, 9) principle of information access and public participation, 10) promotion principle, and 11) principle of the right of access to justice.

3.2. ENVIRONMENTAL IMPACT ASSESSMENT

Environmental impact assessment (EIA) is a procedure for assessing the environmental acceptability of a planned project and for determining the necessary environmental protection measures to reduce impacts to the minimum and achieve the highest possible level of preservation of environmental quality. The assessment process is carried out at an early phase of project planning, prior to the issuance of the location permit, or other approval for a project for which the issuance of a location permit is not mandatory.

Further on an overview of at the moment valid legislative framework of Republic of Croatia was given which regulates the procedure of carrying out the EIA.

Implementation of EIA is prescribed pursuant to the Environmental Protection Act (Official Gazette No. 80/13) and Regulation on environmental impact assessment (Official Gazette No. 64/08, 67/09). Through the adoption of these regulations the procedure has been systematically regulated and harmonized with the corresponding EU directives: Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, amended by Council Directive 97/11/EC of 3 March 1997 and by Directive

2003/35/EC of the European Parliament and of the Council of 26 May 2003. Furthermore, the adopted regulations are based on the provisions of the international treaty which was ratified by the Republic of Croatia through the adoption of the Act on the Ratification of the Convention on Environmental Impact Assessment in a Transboundary Context (Official Gazette IT No. 6/96).

The EIA procedure is initiated by the developer's written request, the content of which is prescribed in Article 6 of the Regulation on environmental impact assessment (Official Gazette No. 64/08, 67/09). Among other, the respective ENVIRONMENTAL IMPACT STUDY, the mandatory content of which is prescribed in detail in Annex IV which is an integral part of the Regulation, shall be enclosed to the request. The study should assess the environmental impact of the planned project based on factors which, depending on the project and environmental features, determine the impact's spread, intensity and duration.

The *EIA Regulation* classifies projects for which environmental impact assessment is mandatory (Appendix I.) and projects subject to evaluation of the need for environmental impact assessment (Appendix II., Appendix III.), and criteria which define how to make a decision.

According to the *EIA Regulation*, wind farms with total capacity over 20 MW_{el} are aligned to Appendix I. – A list of projects for which EIA is mandatory. Also, the *EIA Regulation* prescribes that wind farm projects with total capacity over 10 MW_{el} have to carry out a procedure of evaluating the need for an EIA.

Carrying out the procedure of evaluating the impact on environment is an independent administration act, and the DECISION ON PROJECT ACCEPTABILITY FOR ENVIRONMENT is one of the documents needed to issue a location permit whose issuing is regulated by the Physical Planning and Building Act (Official Gazette, No. 76/07, 38/09, 55/11, 90/11, 50/12).

Mitigation measures and/or environmental monitoring programme prescribed in the Decision on project acceptability for environment shall be a mandatory part of the content of the project implementation permits which are issued pursuant to special regulations.

3.3. NATURE PROTECTION – ECOLOGICAL NETWORK IMPACT ASSESSMENT

Nature protection is implemented through the conservation of biological and landscape diversity and the protection of natural resources. Major progress was made in the recent years as regards incorporation of the nature protection measures into the documents issued by the sectors of forestry, hunting, spatial planning, and especially by establishing the Croatian ecological network and assuming responsibilities under the Regulation on Proclamation on the Ecological Network and Ordinance on the Appropriate Assessment of the Impact of Plans, Programs and Projects on the Ecological Network (explained below).

The Nature Protection Act (Official Gazette, No 80/13) has already introduced many mechanisms that are aligned with the provisions of the EU legislation on nature/ecological network protection. As such, the mechanism of assessing the acceptability of projects for nature/ecological network was also transposed and is based on the National Ecological Network (Regulation on proclamation of the National Ecological Network, (Official Gazette, No 109/07)) and the assessment of acceptability of plans, programmes and interventions for the ecological network (Ordinance on the assessment of acceptability of plans, programmes and interventions for the ecological network (Official Gazette, No 118/08)).

In order to preserve the biodiversity of wild taxa and habitats and to maintain or restore a favorable conservation status of endangered habitat types and wild taxa, in addition to the protected areas, the Ecological Network was proclaimed. It represents a system of ecologically important areas and ecological corridors for which guidelines for measures aimed at protecting the conservation objectives of the ecological network were prescribed.

Croatia's National Ecological Network (NEN), proclaimed in October 2007, is the basis for the future NATURA 2000 network in Croatia. The NEN includes 19 national and nature parks—approximately 8.5 percent of Croatian land territory—that is managed by dedicated park administrators. It also includes an additional 38.5 percent of

land territory that has national and regional conservation importance, including formal protected areas in different categories and non-protected lands with management oversight by County Public Institutions (for nature protection).

The Regulation on proclamation of the National Ecological Network prescribes the ecological network areas with conservation objectives and protection measures aiming at maintaining or establishing a favourable status of threatened and rare habitat types and/or wild taxa.

All projects and activities in the ecological network areas that could have a negative impact on the area conservation objectives are subject to the procedure of appropriate ecological network impact assessment, pursuant to the Ordinance on the assessment of acceptability of plans, programmes and interventions for the ecological network.

The procedure consists of three stages: screening, main assessment with the assessment of other alternative solutions and establishment of overriding public interest and compensatory measures.

The procedure involves four main subjects: the proponent of the project, the expert or organization preparing the assessment study, the competent authority (Ministry and county administrative offices) and in the function of national expert institution State Institute for Nature Protection.

NOTE: Ecological Network Impact Assessment procedure (assessment of acceptability of interventions for the ecological network) was not obligatory when EIA Study WF RUDINE was in procedure of acceptance.

NATURA 2000

NATURA 2000 is the ecological network of the European Union which encompasses areas important for the conservation of endangered species and habitat types. The legal bases of the Network are the Directive 2009/147/EC on the conservation of wild birds as amended (Bird directive) and the Directive 1992/43/EEC on the conservation of natural habitats and of wild fauna and flora as amended (Habitats Directive). Each EU member state contributes to the Network by designating Special Areas of Conservation (SAC) according to the article 4 of the Habitats directive. These areas should be chosen in a manner that they secure the survival of the habitats and species listed in annexes I and II of the Habitats Directive. According to the Birds Directive Special Protection Areas (SPA) are designated for the annexed birds. SAC and SPA areas together make the Natura 2000 network. For every of those areas it is need to define and implement management measures that will secure the favorable conservation status of those habitats and species for which those areas are proclaimed as protected.

To prepare the ground for this, the Croatian government adopted, already back in 2003, a Nature Protection Act to establish a nationally and internationally important ecological network of conservation sites across the country (as a precursor to NATURA 2000) and to introduce a legal mechanism for carrying out nature impact assessments in line with the Appropriate Assessment procedure under Article 6.3 of the Habitats Directive.

In the framework of NATURA 2000 network, Croatian obligation is to implement two EU nature protection directives (Bird and Habitats Directive). The NATURA 2000 network is comprised of Special Protected Areas (SPA) for wild birds, designated under Birds Directive, and Special Areas of Conservation (SAC) designated under the Habitats Directive.

The final list of Natura 2000 sites is currently being adopted by the government following a further period of public consultation which ended on 5 June 2013. After that it will be sent to the European Commission together with the Standard Data forms and maps. It is expected that the final list will contain over 700 pSCIs (of which 174 sites are caves) and 38 SPAs.

Government of Croatia adopted (October 2013) new Regulation on ecological network (Official Gazette, No. 124/13). Project location in relation to ecological network area – NATURA 2000 is described in chapter 7.1.

4 PROJECT DESCRIPTION

According to latest Location Permit Amendments issued on May 22, 2013 (DOCUMENT CLASS: UP/I-350-05/13-01/39, NO.: 531-05-13-6) wind farm RUDINE will consist of a total of 24 wind turbines, with total capacity of 70.0 MW installed power.

The turbines used at the RUDINE wind farm will be installed on cca 100 meter towers with blades with a diameter of 100 meters. Each of the turbines will be capable of generating 2.85 MW of power.

In addition to the wind turbines, an electrical substation, transformer station, transmission lines, service roads and underground cabling connecting the wind turbines to the substation and onwards to the national grid will be constructed.

The energy produced is transferred to an electrical generator which transforms the energy into electricity which is input into the grid.

Wind farm RUDINE will be built in 9 steps (phase):

1A-1 part construction of transformer station TS 20/110 kV Rudine

1A-2 part construction of transformer station TS 20/110 kV Rudine

1B part construction of transformer station TS 20/110 kV Rudine

2 it is planned to erect 7 wind turbines with total installed power of 19.95 MW, access road from the existing forest road; new internal roads to each wind turbine from Phase 2; cable route to connect Phase 2 wind turbines with the transformer station.

3 it is planned to erect 5 wind turbines with total installed power of 14.25 MW, access road connected to the existing road Ž-6228; internal roads to each wind turbine from Phase 3; cable route to connect Phase 3.

4 it is planned to erect 5 wind turbines with total installed power of 14.25 MW, internal roads to each wind turbine from Phase 4; cable route to connect Phase 4.

5 it is planned to erect 3 wind turbines with total installed power of 8.55 MW, internal roads to each wind turbine from Phase 5; cable route to connect Phase 5.

6 it is planned to erect 4 wind turbines with total installed power of 11.4 MW, access road connected to the existing road Ž-6228; internal roads to each wind turbine from Phase 6; cable route to connect Phase 6.

7 it is planned to build a connection overhead line from TS 20/110 kV Rudine to overhead line 110 kV Ston-Komolac, over which the wind farms connects to the Croatian power system.

5 PROJECT LOCATION

The Project will be located in Dubrovačko-neretvanska county, municipality of Dubrovačko primorje.

The **municipality of Dubrovačko primorje** comprises the middle part of the Dubrovačko-neretvanska County. Its size is 197.11 km^2. Restraining factors of the sustainable development of the area include a very limited demographical base, depopulated process, especially in the hinterland of Dubrovačko primorje. The reason for this lies in the population ageing and emigration processes of the most productive population segments, which influences the size of the working contingent and the educational structure. Moreover, the infrastructure systems are inadequate for today's needs and therefore represent a great limiting factor for the sustainable development of the area.

The population of its 20 independent settlements is 2,216. The average population density has been only 11.24 inhabitants per km^2.

Location for wind farm Rudine is determined by the Regional (Spatial) plan of the Dubrovačko-neretvanska county ("The Dubrovačko-neretvanska county Official Gazette", No. 6/03, 3/05, 3/06, 7/10, 4/12, 9/13).

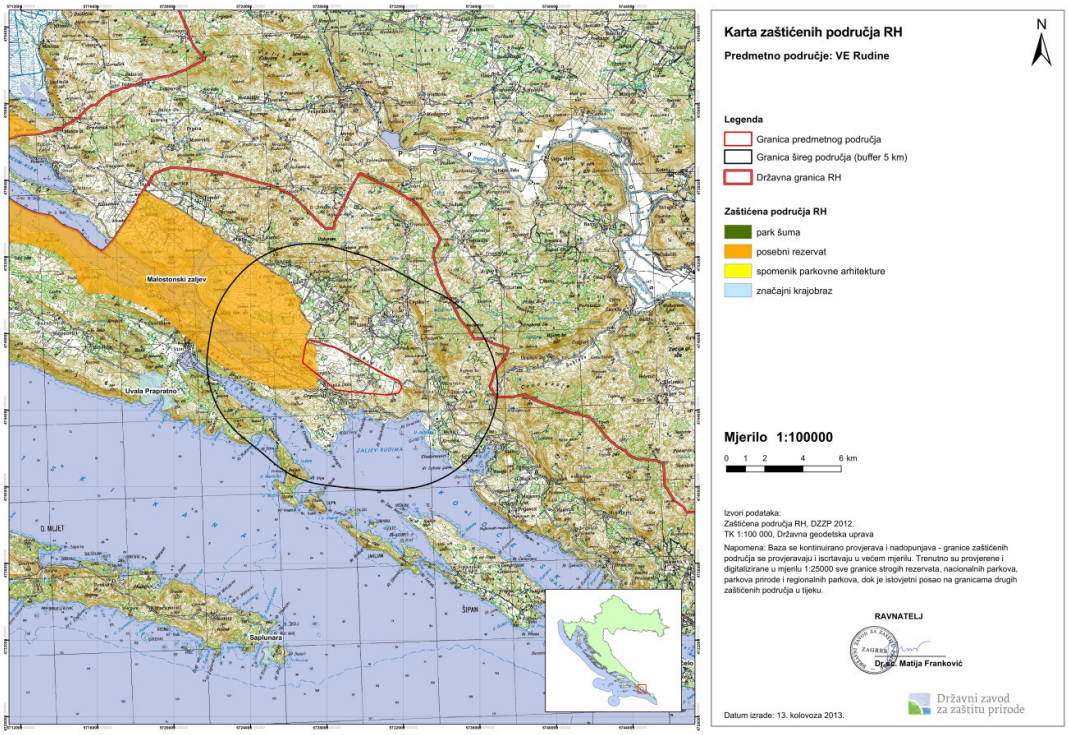
Location Rudine represents karst plateau south of county road Z-6228 from area Vriješće to area Crna Glava. The full project is approximately 5 km, northwest to southeast, at an altitude between 280-400 m above sea level. The nearest housing to any of the turbines is between 500-700 m.

In regard to the high permeability of the terrain there are no permanent water flows in the area. Water springs are very rare. The shortage of water for irrigating of agricultural areas is a restraining factor for the development of agriculture. Likewise the development of tourism as a leading economic activity of this region is considerably slowed down due to the deficiency of drinking water.

Due to the climate and poor pedological conditions the vegetation has xerophyte characteristics. There are a few forests. Macchia, thickets and rocky grounds dominate most of the areas. As the agricultural surfaces have been abandoned due to deagrarisation, the reforestation of those surfaces has intensified and consequently the neglected agrarian landscape is dominantly covered with macchia and thickets.

At the project location there is no protected areas or areas proposed for protection in one of the categories under the Nature Protection Act (Official Gazette, No. 80/13). The nearest specially protected area is located along the Mali Ston Bay in the Adriatic Sea (Croatian: Malostonski zaljev) protected in the category of special marine reserve, covering an area 4821.4 ha). Mali Ston Bay is located between the coast and the peninsula of Pelješac. The waters of the Bay are affected by freshwater discharged by the Neretva River, underground springs and occasional abundant rainfall. The greatest part of Mali Ston Bay was proclaimed as a special reservation at 2002.

Mali Ston Bay is an unpolluted area suitable for the cultivation of the European oyster and Mediterranean mussel. The tradition of oyster and mussel farming in this Bay is centuried old, and it is one of the few areas famous for successful cultivation and fast growth of oysters and mussels.



Project location and nearest protected areas

6 DESCRIPTION OF RELEVANT DOCUMENTATION

Clarification on course of conducted procedures and issue of needed permits for wind farm RUDINE are given below. Relevant documentation and procedure of evaluating environmental impact were done according to then valid national regulations and standards.

6.1. EIA PROCEDURE

The Project EIA and consultation activities were conducted in 2006-2008 in compliance with the Croatian Environmental Protection Act.

The basic document in the EIA process was **ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR WIND FARM RUDINE** (in further text EIA STUDY WF RUDINE), made by: Tehno-ing Ltd., Zagreb.

The reason for drafting EIA STUDY WF RUDINE was based on Article 25 of the Environmental Protection Act (Official Gazette, No. 82/94 and 128/99) for the projects which, pursuant to Article 3 of the Ordinance on environmental impact assessment (Official Gazette, No. 59/00, 136/04 and 85/06), are subject to mandatory procedure of environmental impact assessment.

The EIA STUDY WF RUDINE was drafted in 2006 and, in accordance with Croatian administrative procedure, sent out to advisory expert committee. The committee evaluated the environmental impact of the project, its value and acceptability on the basis of the EIA STUDY WF RUDINE.

Information on the planned project together with EIA STUDY WF RUDINE were made available for comments of the public, including local communities and potential interested parties, such as nature protection bodies and non-governmental organizations.

After the assessment procedure was finalized, a positive decision of the Ministry of Environmental Protection, Physical Planning and Construction on that project's acceptability to environment was issued (DECISION ON ACCEPTABILITY OF THE WIND FARM RUDINE FOR ENVIRONMENT DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008) and it constitutes the necessary legal basis for obtaining a location permit.

6.2. LOCATION PERMIT

According to Physical Planning and Building Act (Official Gazette, No. 76/07, 38/09, 55/11, 90/11, 50/12) location permit is a first step for the intended construction and a document which declare possibility for building (any type of object) on exactly defined area, including all conditions/constraints. Location permit is a document (administration decision-decree) issued based on the physical planning documents, and special laws and directives adopted in accordance with the law.

1. **Location permit** for construction of wind farm RUDINE and TS 20/110 kV Rudine: 70 MW installed power and composed by 28 wind turbines with a power of 2.5 MW each (document CLASS. UP/I-350-05/08-01/164, NO. 531-06-09-24, from September 24, 2009) issued by Department for Physical Planning, Ministry of Environmental Protection, Physical Planning and Construction.
2. **Location permit – change and addendum** (document CLASS. UP/I-350-05/10-01/66, NO. 531-06-11-12, from February 2, 2011), issued by Department for Physical Planning, Ministry of Environmental Protection, Physical Planning and Construction.
3. **Location permit – change and addendum** (document CLASS. UP/I-350-05/13-01/39, NO. 531-05-13-16, from May 22, 2013), issued by Department for Physical Planning, Ministry of Construction and Physical Planning.

According to issued change and addendum to the location permit, wind farm RUDINE has total power of 70.0 MW. Wind turbines are located on 24 locations and each has a power of 2.85 MW. Wind farm will be built in 9 phases which are described in detail in chapter 4. PROJECT DESCRIPTION.

The location permit does not allow construction; a building permit must be issued for that. The Main Project Design must be coordinated with the location permit (Changes and addendums, regulated by the Physical Planning and Building Act).

During the procedure of issuing the Location permit the competent authority for nature protection issued special conditions for nature protection.

7 ENVIRONMENTAL IMPACTS

A wind farm Rudine was subject to environmental impact assessment to ensure an analysis of the initial state of the environment performed to create a comparative basis of impacts after project implementation commences. This involved prediction and analysis of potential socio-environmental impacts that would result from developing, operation and decommissioning of the project.

While estimating some impacts physical models that are based upon expert judgment from the world for similar projects were used, while taking into account local nature and environment characteristics.

Data collection has been achieved from available maps and surveys, site visits, field survey, and discussions with Republic, regional and local officials.

The EIA STUDY WF RUDINE was prepared in accordance with national requirements to assess the significance of these impacts for this Project and where possible identify mitigation measures to reduce impacts.

Below is summary of potential impacts on the environment during preparation and construction of the intervention as well as during usage and in case of an ecological incident.

Impacts during construction phase and operation phase	
Noise	During the wind farm construction period noise in the environment will occur as a result of construction machinery operation and heavy goods vehicles related to operations at construction site. Noise impact during operation phase has been checked using acoustic models. By comparison of the calculated noise levels with the allowed values, it is visible that the expected noise levels, which will occur in the environment as a result of wind farm operation, will be below allowed values prescribed by Ordinance on maximum permissible noise levels in areas where people work and live (Official Gazette, No. 145/04, 46/08). Operational noise will be monitored to ensure compliance with the Environmental Monitoring Programme.
Landscape/Visual Impact	During construction loss and depletion of natural characteristics and visual qualities will occur in the construction site belt. Topographic characteristics of the area will temporarily change but this effect is temporary and limited to the duration of construction works as the contractor and workers will need to return the construction site to the previous appearance. The most affected landscape systems are landscape diversity as an ecological value, than recognition and experience of the area and desirability of the view as a visual value and landscape structure as a structural value.

	The Project will influence the landscape of the local communes and could be considered visually intrusive. To assess the visual impact, computerized visual simulations were prepared for panoramas judged as most vulnerable. The wind turbines will create large elements, contrasting with the existing character and there are limited opportunities for additional mitigation. The wind turbines would become prominent features in the landscape and be partly visible from nearby villages and houses.
Soil	The main negative impacts on soil regard the construction period of the planned project, and differentiated are temporary and permanent land use change. There is no quality agricultural land and agricultural activity in the impact zone is relatively low, so construction and operation of wind farm has no adverse effect. Pollution caused by fuel, grease and oils due to improper and unadvised handling of machines and equipment as well as uncontrolled emission of sanitary waste waters which occur during the stay of workers on the construction field.
Water	During construction, the area for mechanization housing with supporting equipment will be especially fixed up to prevent contamination of underground waters with oils and grease from vehicles and machinery. Oiled water from parking area is going to be passed through oil separator before being let in the perimeter canals. Upholding these conditions will minimize the adverse effect on water. The operation of the wind farm does not affect the water potential in the area.
Air	There can be some dusting on the area due to construction machinery and traffic on roads to the location. These impacts have a local character, reduced time length and are without permanent after effects. During the operation wind farms don't affect the pollution of air.
Flora	Temporary loss of plant communities and distortion of habitats relates only to the work belt. The Project is unlikely to have a significant effect on flora due to its small Project footprint minimizing habitat loss and that there are not significant populations of protected species observed in the area.
Fauna	Ornitofauna field research was conducted at the project location from November 2001. to November 2002., during which they covered all seasons. Summary of conducted ornitofauna research is as follows. The ornitofauna of the wider area of the Rudine location is represented with 51 bird species among out of which 27 are nesting birds. In the bird fauna of Rudine region, two endangered species belonging to the *Charadriiformes* family are very important. Distribution of species in time has shown highest number in time of autumn migration and nesting time and in time of spring migration and lowest in wintering. However, analysis of obtained data has shown that they do not reflect real situation of ornitofauna on „Rudine" area since that most of the birds relatively shortly stay on this area. This is particularly expressed in wintering birds whose number is low because of poor vegetation coverage. Most of the wintering birds stay in oak-hornbeam underbush and macchia and on poor vegetation of rocky lawns. It was recorded small number of five species of breeding birds that, beside of Sombre Tit (*Parus lugubris*) which is recorded as sensitive specie, according to number of population in Croatia belong in stabile species: Black-eared Wheatear

	(*Oenanthe hispanica*), Tawny Pipit (*Anthus campestris*), Black-headed Bunting (*Emberiza melanocephala*), a summer bird. Resident birds, Caspian Gull (*Larus cachinans*) and Hooded Crow (*Corvus corone cornix*) are largest species in the region, but are recorded only in flyby with no longer staying. Other species in the region do not stay long or flyby in significant number. Out of 51 recorded bird species, 47 species or around 92% are stabile, and only 2 or around 4% (*Gallinago gallinago* i *Scolopax rusticola*) according to Lukač (1998) are in category of critically endangered. This two species are recorded only in one location. Because of only 3 recorded species with small number of individual birds, project's zone „Rudine" appear not have any special importance for vultures birds. This finding has a special significance since, beside of dim and night birds (owls and others) not recorded here, according to Anderson et all (1999) extremely interesting as species especially sensitive to collision. Also there was no record that individual species stay more in the projects zone than in surrounding areas; you could even say that is reverse situation. 1. Judging by the number of birds and number of recorded species location „Rudine" do not have significant ornitofauna. 2. Ornitofauna featrures of „Rudine" are in direct connection to its vegetation peculiarities 3. Results of research on elements of ornitofauna go in favour of good selection of location for wind plants 4. Propose is, that after construction of wind plants in two-year time, to perform monitoring to claim if there is a harmful influence on ornitofauna, and if there is in what extent is expressed. The presence of 27 bat species which are all in the category of strictly protected indigenous species has also been determined. (Since only desk study has been conducted, bats survey programme includes pre-construction and post-construction monitoring (see chapter 8.2.3.) It is considered that the although the impact would not be significant on the species population as a whole some localized moderate impacts on birds or bats foraging or commuting across the wind farm area may occur.
Nature protected area	As there are no areas legally protected areas within the impact area, the impact has not been analyzed.

Cultural-Historical Heritage	Archaeological Study (2006) made for EIA STUDY WF RUDINE identified archaeological objects at the project area. Findings are as follows. On the project location, there is an archaeological zone Podimoč - consisting of buildings and ruins (tumuli). Especially a big pile zone south of the Lisac, and buildings and ruins south and west from location. During construction it is possible to find archaeological sites. In that case, all works should be stopped and competent conservatory department should be notified which will then give instructions on how to proceed. Taking into consideration findings on cultural heritage and mitigation measures determined by the Archaeological Study, the Project Layout was changed in order to minimize the impact on cultural- historical heritage (see Appendix 1).
Infrastructure	Wind turbines can have an effect in transmission and reception of electromagnetic waves which are used to transfer telecommunication, navigation and radio/TV signals. In fact that the nearest village is more than 7 rotor diameters from project location interference to radio and TV signals will not exceed the threshold level noticeable disturbance of 2 dB. Disturbances of electromagnetic wave frequencies used in navigational and military purposes which are caused by wind turbines are lower than those by building of same height, so there should be no negative effect.
Sociological effect	Significant positive contribution is a possibility of participation of local industry and service providers during construction. Benefits to the local community arise from compensations (fees) for land use for electricity generation. Ongoing community consultation will be in place with local municipality officials and nearest residents to inform them of upcoming construction activities in the area and the local community will be informed of the grievance mechanism that can be used to raise any concerns about risks from the Project.
Shadowing and flickering	Wind turbines are tall objects and they can produce shadow in the environment. When in operation there can be a disquieting flickering of shadow in area of 10 rotor diameters. The distance and orientation of the turbines in relation to properties that could be affected by shadow flicker has been considered and any potential impact is expected to be minor. Should impacts occur these will be managed through the community grievance mechanism to identify receptors that adversely affected, allowing appropriate mitigation to be implemented.
Decommissioning phase	
	The Project is expected to operate for approximately 30 years. The main impacts of the decommissioning phase will be similar to those during construction.
Ecological incident	
	As an extreme form of wind farm break down there were a couple of situations when the mast of beam loosened because of extreme weather conditions and demolition of the whole turbine structure and detachment of blade parts. As a protection from consequences of

	such accidents it is necessary to pinpoint every turbine sufficiently away (at least two heights) from other objects, roads and paths. The distance is not prescribed by law but often the distance is specified in physical planning documents. The mutual distance between the wind turbines has to meet the requirements of the manufacturers. Before the construction detailed design will be developed and that will include the required safety factor which will minimize the possibility of destruction of the wind turbine and/or its parts in case of an earthquake. The consequences of a lightning strike can be a fire or rupture blades. Each unit will be, therefore, with suitable lightning rods and grounding system.

7.1 NATIONAL ECOLOGICAL NETWORK/NATURA 2000

In the process of accession to European Union, Croatia established the National Ecological Network and Appropriate Assessment procedure. The National Ecological Network covers the areas of Croatia that have been identified as areas of importance for conservation or establishment of a favourable status of threatened and rare habitat types and/or wild tax at the European (Birds Directive and the Habitats Directive and Bern Convention) and national level. National Ecological Network was a base for preparing NATURA 2000 proposal (www.natura2000.hr) (see chapter 3.3 of this Report).

Presently, before the process of issuing Location/Building permits each wind farm has to pass the assessment of acceptability for the ecological network, which is a part of Environmental Impact Assessment.

For the proposed project – wind farm RUDINE the assessment of acceptability for the ecological network was not carried out because at the time it was not legally prescribed. Further on a project correlation with national ecological network area is as follows:

According to recently adopted Regulation on Ecological Network (Official Gazette, No 124/13), wind farm Rudine is planned outside those areas.

Nearest NATURA 2000 area is locality HR2001490 Dubrovačko promorje – Doli (pSCI area proposal).

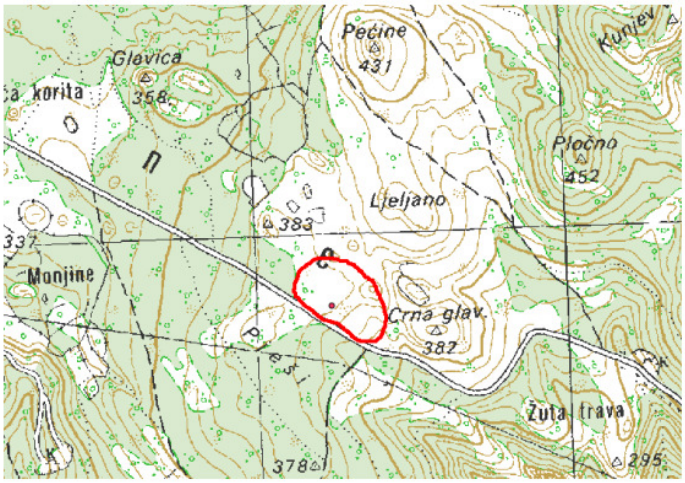
Qualifying species is an **orchid plant *Himantoglossum adriaticum*** (Croatian: jadranska kozonoška). Red List This orchid is found in open oak forests and dry grassland. It often occurs in secondary habitats such as road sides, vineyards and abandoned mines. It can be found from lowland to hill regions. It is subject to several threats including intensification of agriculture, forest management, land abandonment, invasive species, and collection. However those threats are not likely to cause significant population declines in the near future and the species is therefore listed as Least Concern. It occurs in protected areas throughout its range and continuous monitoring of the populations is recommended.

According to data provided by the State Institute for Nature Protection, two individuals of *Himantoglossum adriaticum* were recorded at the top of the road from Black Mravnica-Doli in Rudine.

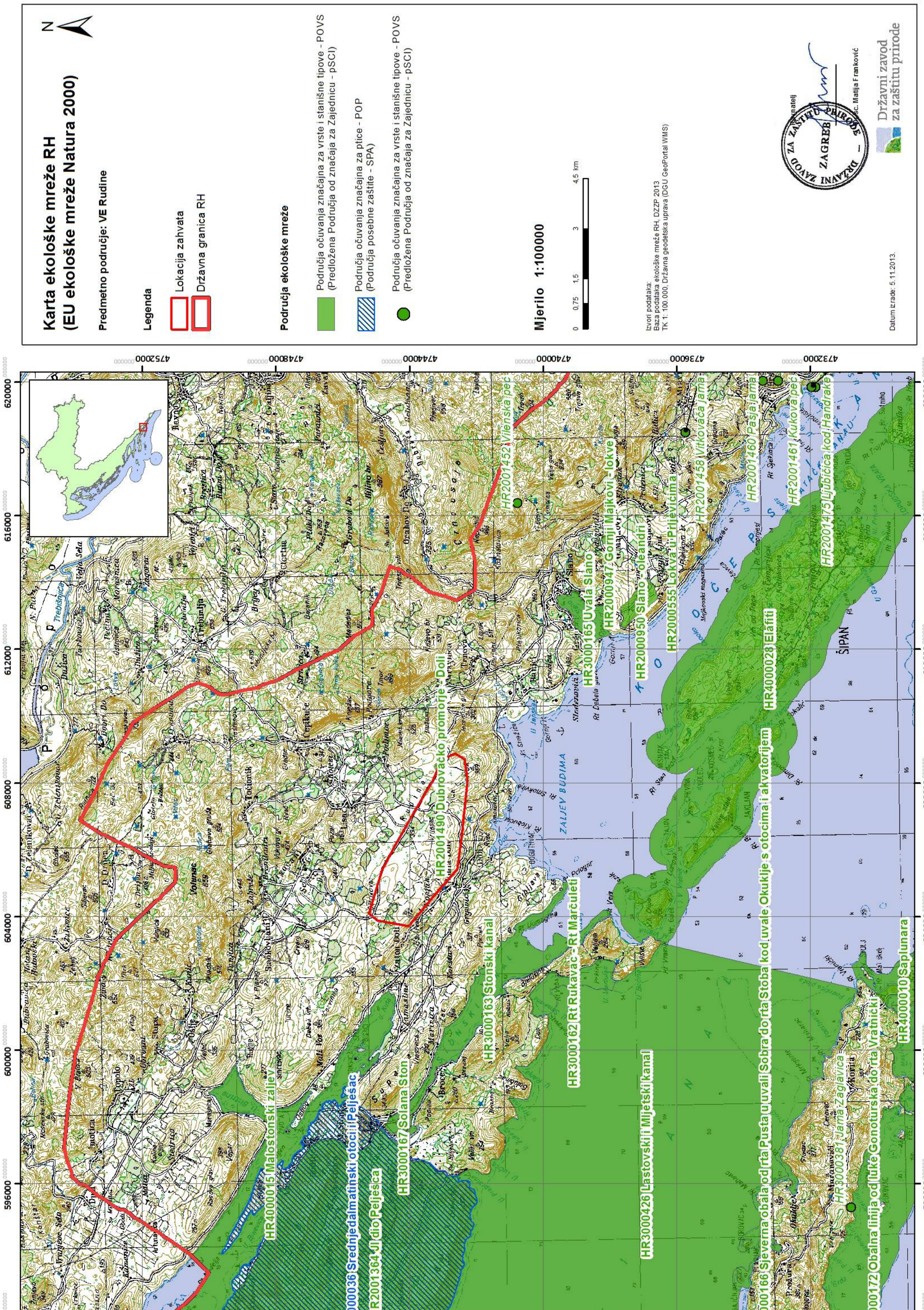
Himantoglossum adriaticum is listed on Annex II of the Habitats Directive. All orchids are included under Annex B of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

On Croatian territory was allocated 20 potential Natura 2000 sites where *Himantoglossum adriaticum* is target species for which the country after the proclamation of the network to establish the necessary conservation measures. It is included in national red list: Near Threatened in Croatia

For other areas of ecological network/NATURA 2000 surrounding the project location, in the distance of 5 km and more there are a couple of pointy sites – important areas for wild species and habitat types. Considering the distance and types of habitat species which were highlighted as goals for protection it is estimated that the project will not have any impact on preservation of stability in these areas.



Locality HR2001490 Dubrovačko promorje – Doli



Project location and nearest ecological network area - NATURA 2000 according to recently adopted Regulation on ecological network (Official Gazette, No. 124/13)

8 CUMULATIVE IMPACT ASSESSMENT

Strategic environmental assessments (SEAs), a key tool for site selection of wind power facilities, typically produce overlay maps that show where the zones of high wind power potential—based mainly on wind speeds and proximity to the power transmission grid—are located in relation to the areas of major environmental and social sensitivity. Some SEAs also generate zoning maps for prospective wind power development. Specifically, SEAs may recommend where wind farms or transmission lines should be prohibited, allowed only with special precautions, or actively promoted. SEAs are also important in terms of assessing the cumulative environmental impacts of multiple wind farms within a wind resource area.

In Republic of Croatia making of SEA is a obligated by law and it was adopted by the act Regulation on Strategic Environmental Assessment of Plans and Programmes (Official Gazette, No 64/08), and one of the reasons for its introduction was a need to think about goals and consequences for the environment sooner, and about long term cumulative effects on the plan/program level, that it is on fulfilling the sustainable development. The purpose of analysis is to find possible effects on the environment and to find best alternatives with better procedure transparency and to cooperate with the public during the making of plan/program. The planned development of renewable energy sources as a part of Strategy of energetic development did not fall under the making of SEA so all impacts of the planned wind farms including the cumulative impacts are valued through separate environmental impact assessments.

8.1. REGIONAL PLANNING DOCUMENTATION

The umbrella regional planning document is the Regional (Spatial) plan of the Dubrovačko-neretvanska county ("The Dubrovačko-neretvanska county Official Gazette", No. 6/03, 3/05, 3/06, 7/10, 4/12, 9/13).

County Regional plan proposed potential wind farm location in the hinterland of the County and on the Pelješac peninsula (Table 1) that have been identified and marked on the plan map 2c: "Infrastructure systems - Power Engineering".

One wind farm envisioned by County Regional plan is already in operation and that is on locations Ponikve (34 MW).

Tablica 1. Potential wind farm location, Dubrovačko-neretvanska county

Municipality/Town	Settlement	Locationa	Area (ha)
Dubrovnik	Mravinjac	Glave*[4]	193,92
Ploče	Plina Jezero, Šarić Struga	Plina	92,79
	Plina Jezero	Rujnica*	122,88
Dubrovačko primorje	Visočani, Podimoč, Doli	Rudine	481,28
	Topolo, Stupa, Ošlje	Vrtog	257,27
	Točionik, Trnovica	Grabova gruda*	294,23
	Podgora, Mravica, Čepikuće	Štrbina	185,77
	Trnova	Vjetreno 1	50,52
	Trnova	Vjetreno 2	40,48
	Trnovnica, Čepikuće	Trštenovo*	98,05
	Majkovi	Glave*	374,70
Konavle	Jasenice/ Stravča/ Duba	Konavoska brda	672,56
Kula norinska	Borovci, Desne	Rujnica*	450,93
	Borovci, Nova Sela	Zveč-Šubir-Raotina	57,28

[4] * in addition: defined as a potential for the solar power

Orebić	Trstenik, Potomje, Pijavičino	Ćućin	195,76
	Potomje, Donja Banda, Podobuće	Bila ploča	80,48
Pojezerje	Pozla Gora, Dubrava, Brečići, Mali Prolog, Kobiljača	Zveč-Šubir-Raotina	130,72
Ston	Dančanje, Zabrđe, Sparagovići, Boljenovići	Ponikve	690,35
Zažablje	Vidonje, Badžula	Čukovica	188,45
TOTAL			**4.392,79**

During the evaluation of EIA STUDY WF RUDINE; project location was identified by the County Regional plan map what is a pre-condition to start EIA procedure.

Project was developed in accordance to article 160. of Regional (Spatial) plan of the Dubrovačko-neretvanska county which determine the guidelines for wind farm location as follows:

- to place wind power plants:
    - out of coastal area
    - out of protected and planned for protection parts of nature out of planned construction sites, infrastructural corridors, high woods and agricultural land
    - out of zones exposed to views of valuable landscape and from sea and protected cultural and historical complexes out of known bird's flyby corridors and corridors of bats migration
- to remove wind power plant zone away from settlements and other objects at least 500 m and level of noise should not exceed 40 dB(A) to coordinate setting of wind power plants regarding telecommunications devices (radio and TV transmitters, navigation devices) to avoid electromagnetic disturbances
- to take into account size and color of blades and pier because of possible visual degradation of space
- to make computer visualisation for characteristic locations to assess wind power plant impact on landscape physiognomy

According to the Spatial plan of the Municipality of Dubrovačko Primorje ("The Dubrovačko-neretvanska county Official Gazette", No. 6/07, 9/12) an important impulse to the development of Primorje would be given by the construction of the mixed business zone for ecologically clean activities in Banići and the construction of a new business-production zone, airport and wind power plant in Rudine (near future nodes of the Adriatic highway and high-speed road Ploče – Pelješac – Rudine).

Wind power as an energy facilities are in infrastructural systems which, according to Article 10, the Spatial Plan, plan to land development and landscaping outside of the village and the land for development and planning outside of construction areas.

Within County's Spatial plan was made study „**Guidelines of energetic development of Dubrovačko-neretvanska county"**(2000) **(developed by: Energy institute Hrvoje Požar)** in which was discussed energetics, gasification and use of renewable sources of energy. In first place it should strengthen electric power connection of County with energetic system of Croatia by building 400 kV network. It is planned widening of hydroelectric power plant Dubrovnik in Plat (installation of third generator). In study is also discussed program of

building little hydroelectric power plants in Konavosko polje, program of solar energy exploitation, program of wind power use and use of biomass (organic trash from industry). Strategic plan on the county's level is development of energetics where would be promoted clean technologies, gasification, energetic efficiency, use of renewable sources of energy, development of entrepreneurship and environmental protection.

Dubrovačko-neretvanska County plans to get involved in projects of renewable sources of energy according to Strategy of energetic development of Republic of Croatia and EU Directive who plan to increase share of renewable sources of energy. As a first step it is planned making a study "**Plan for use of renewable sources of energy in Dubrovačko-neretvanska County**". With this document would be determined guidelines for energetic development of County where would be promoted clean technologies, energetic efficiency, renewable sources of energy and environmental protection. Based on Plan, Strategic environmental impact assessment would be conducted according to Regulation on strategic environmental assessment of plans and programmes (Official Gazette, No. 64/08).

Plan for use of renewable sources of energy in Dubrovačko-neretvanska County is in making process (developed by: OIKON Ltd.) but it is not available for the public.

8.2. DESCRIPTION OF THE CUMULATIVE IMPACTS

The key potential cumulative impacts are described in the EIA STUDY WF RUDINE as:

- Noise impacts – increase in noise levels with resultant disturbance to noise-sensitive ecological species.
- Avifauna and bats – potential for mortality due to direct collisions with or pressure changes due to turbines, disruption to migratory routes and flight pathways and barrier effects reducing available flying space;
- Impacts with other infrastructure projects (determined by the planning documentation: airport Lisačke Rudine, golf course Tri sestrice)

8.1.1 Noise

Noise can have an effect on the environment and on the quality of life enjoyed by individuals and communities. There are two sources of noise associated with wind farm developments, that arising from engineering activities during construction and decommissioning of a wind farm, and that arising from operation. Cumulative operational noise issues could arise due to the distance between the other identified potential wind farm projects. This is particularly pertinent when receptors are located between the sites.

For the period of use the monitoring which includes environmental noise evaluation was prescribed.

8.1.2 Birds

There are three key potential cumulative impacts associated with the wind farm projects to be considered. Direct habitat loss, is not considered as a cumulative impact as it tends to be limited given the relatively small footprint of the turbines themselves:

- Direct mortality associated with collision with and proximity to turbines/ overhead power lines;
- Disturbance / avoidance impacts; and
- The 'barrier effect'.

According to the particular impact of the each wind power plant, by the realization of several projects of the wind power plants a possibility for the birds endangering has been increased, especially endangered vultures. This bird species fly over the large areas in order to find food so there is a threat of their killing by wind power aggregates which have been placed several hundreds kilometres far from their nests. However, the number and intensity of the collisions depends about other environmental impacts such as flow and intensity of migration, intensity of bird's transit by day and night, position and configuration of the field, available food resources, the number of days with fog and clouds etc.

The total number of bird species recorded at Rudine location is 51 of which 27 are nesting.

There are no species at risk nationally, nor significant bird species.

Passage migrants are present on the surface Rudine, but in smaller numbers. The absolute number of birds and the number of breeding pairs is extremely small.

In a review of important habitat for bird populations at the national level (Radović and others (2005), the project area is not listed as important for birds (ecological network, NATURA 2000).

Based on the location data and bird data, it is estimated that there will be no cumulative impacts.

Bird monitoring is obligatory during first two years of operation. See chapter: 9,1

8.1.3 Bats

Mortality caused by collision with turbines may be a more significant problem for bats than for most birds (Sovacool 2009) partly because bats have a lower annual reproductive output and a long life expectancy, so their populations may be susceptible to even small amounts of increased mortality.

Bats do not need to be struck by turbines to be fatally injured by them; "barotrauma" caused by rapid pressure changes in the lungs as bats pass close to a moving blade, is the more significant cause of mortality (Baerwald et. al 2008). This mortality is largely thought to occur when bats are migrating or swarming at mating time and thus not using their echolocation (for foraging) although this is by no means established by empirical data (Rodrigues et. al. 2008).

The potential for wind farms to cause disturbance to bats, or for the turbines to produce some kind of barrier effect to the movement of bats, both at a local level and when migrating, is little-studied.

Fauna of bats on wider area of wind plant Rudine is very rich (around 25 species) and represented with several important colonies located tens of kilometres away from location of project (Neretva delta, hinterland of Dubrovnik). Bats activity is greatest in area by the sea and on slopes which rise to plateau. Rudine plateau by its small productivity and wind exposure does not represent an attractive habitat for bats so their activity is reduced to activity of species which use low vegetation, sinkholes and stonewalls as shelters from the wind and to causal passage of larger species (Tadarida, Nyctalus) in search for prey.

Based on the location data and bats data, it is estimated that there will be no cumulative impacts.

Bats monitoring is obligatory during first two years of operation.

See chapter: 9.2.

8.1.4 Infrastructure projects – planned

Planned infrastructure projects (described below) are only included in the County spatial plan as potential developments for the area. Only in second stage where a viable business plan is put in motion, investment funds

secured are the possibilities analysed in detail considering all existing structures on site and their combined influence. The Wind Park with valid building permit is such an existing structure and all further developments have to take it into account when considering feasibility of the new structure.

GOLF COURSE

EIA STUDY WF RUDINE examined cumulative impact of the project and the golf course Rudine planned near the wind farm, between county road and planned highway.

With Spatial plan of Dubrovačko-neretvanska county the golf course on area of Lisačke Rudine is planned as a zone "in research" because of planned infrastructural (highway, pipeline, airport, wind plants etc.) and economic facilities (manufacturing zone), as also because of vicinity of special reservation Malostonski zaljev and Malo more and possible significant impact on characteristics of special reservation.

Within making of Changes and amendments of Spatial plan was made Study/Ideal solution of airport Lisačke Rudine and especially Sector study "Evaluation of possible displacement of location intended for golf course R1* from location Lisačke Rudine to location Sestrice" (2011.) which evaluated this locations from aspect of space protection (landscape, impact on groundwater, morphological characteristics, possibilities of infrastructural equipping and other) and assessed displacement of golf course as reasonable and possible and suggested size of zone.

Based on performed analysis, in Target Changes and amendments of Spatial plan (proposal) is predicted displacement of golf course from location Rudine to location Sestrice, in cove Tri sestrice in settlement Doli.

Changes and amendments suggest during assessment of exact borders and location of golf course to make hydrogeological study which will prescribe measures that exclude possibility of penetration of protection agents in groundwater and sea. It will also be prescribed obligation of quarterly monitoring in the first year of exploitation.

Also is predicted that during construction work on planned sports and recreational zone Tri sestrice at the same time to protect cultural estates, respectively archaeological sites as cave in Domaglina cove and prehistoric stone stack settled northwest from the cave. For performance of any type of work in vicinity of mentioned sites the investor will have to obtain approval from conservators.

Within surface planned for golf course is predicted also accommodation of following content as are buildings with high-class accommodation (villas), club houses with restaurants, etc. and following sport and recreational content (tennis courses, etc.)

AIRPORT LISAČKE RUDINE

In network of air traffic in accordance with conception of better linkage of remote parts of States border area, respectively hinterland part of Community and significant tourist and recreational areas (golf courses) as also because of life safety increase in hinterland (health service, rescuing, fire fighting activities etc.) **on location "Lisačke rudine" is indicated surface within which is possible seating of airport 2C category**.

More detailed location of airport building will be determined when is completed overall procedure necessary for positioning this kind of buildings. With this procedure will be determined exact position and possibility for seating airport on subject area considering other planned projects (highway with junctions, manufacturing zone, golf course, wind farm) as also the existing structures (county road) in her immediate surroundings.

8.1.5 Compatibility analysis of wind plant and airport

According to ICAO and legislation of Republic of Croatia, natural and artificial obstacles can not go through access road, take-off and transitional surface, and should not go through inner horizontal and conical.

Furthermore, ICAO suggests exploitation of land around airport to control environmental impact and to reduce probability of death of third parties. It is necessary to assess central path of take-off and landing runway so none of the limitation surfaces of obstacles that should not have breach of objects is out of wind plant field. The most remote part of limitation surface of obstacles is outer edge of transitional surface which is 225 m far off sideways edge of primary track of take-off and landing runway.

With preliminary insight especially in M 1: 5 000 was found that is possible to plan take-off and landing runway so wind turbine wont in any position of wings penetrate through three above mentioned surfaces. Thereby was taken in account position of some wind turbines according to plan, and width was calculated in measures.

Breach of wind turbine through inner and conical surface is impossible to avoid. According to Appendix 14 of Convention on international civil aviation locations that have breaches through inner horizontal and conical surface are not rejected but can be accepted and adequately mark obstacles that breach through inner horizontal and conical surface.

It can be concluded that planned wind farm does not threaten location for airport Rudine with condition of established location of take-off and landing runway as also with referential code (1A or 1B) and instrumental equipment (non-instrumental take-off and landing path) from the perspective of safe landing and taking off respectively air traffic.

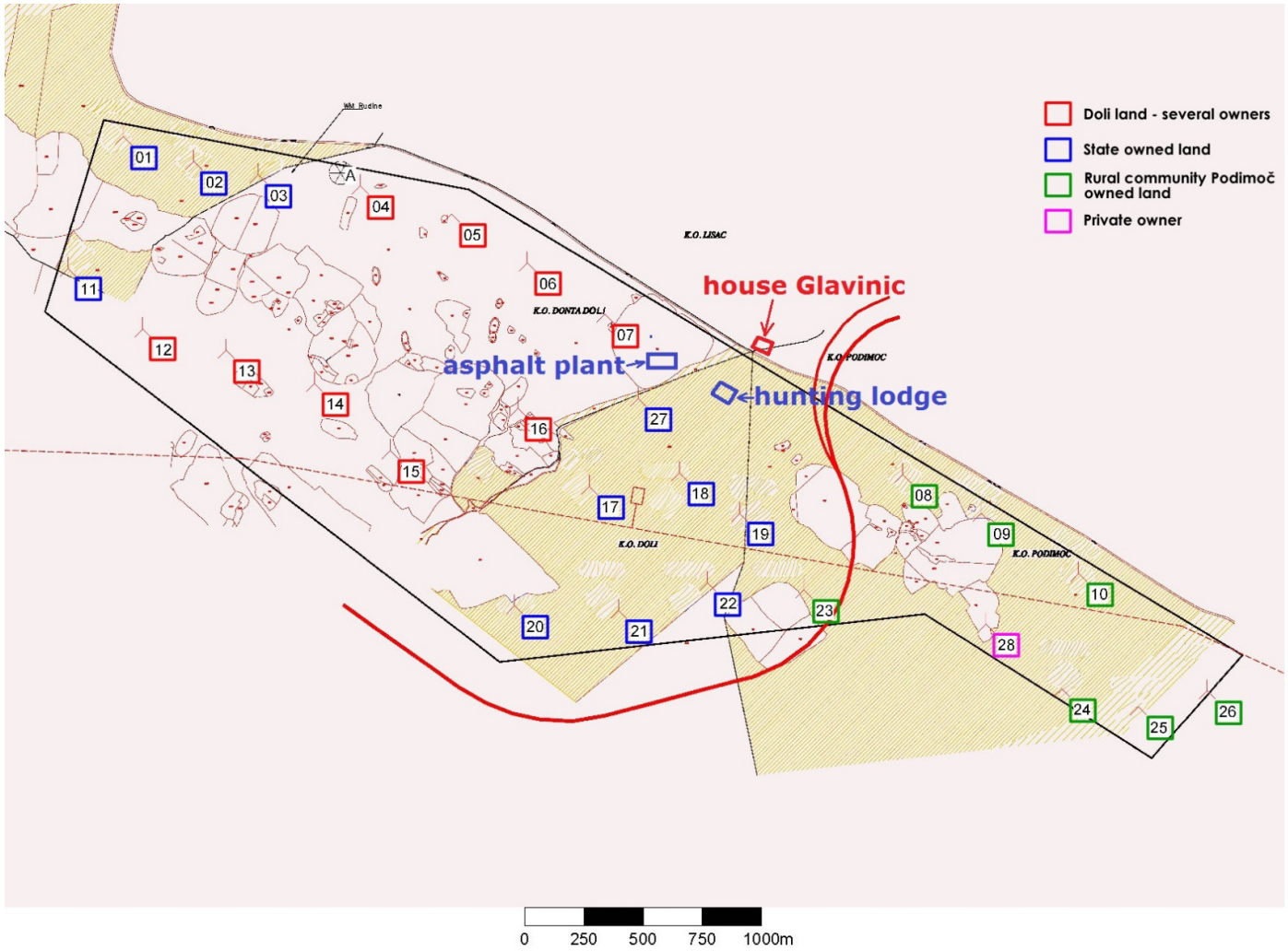
8.1.6 Existing facilities

In the project area there are few existing facilities as follows: asphalt plant, hunter's lodge, house located just next to the main road / opposite the asphalt base (shown in picture below).

Asphalt plant is a temporary (mobile) facility, considered as such in compliance with regulations which state that production up to 40.000 t/year can be considered as such. It is scheduled to be moved once work is finished on building sites in proximity. Such status cannot be in conflict with the proposed project – WF Rudine.

Hunters lodge, by its nature (no permanent residence) is by exception allowed to be built even in non constructible terrain. It is also not in conflict with the proposed project – WF Rudine due to its above status

House on the main road, confirmed by municipality head Nikola Knezic, has no permanent residents, the couple occupying it has legal residence in Dubrovnik, and therefore this would have second residence status. The house is situated over 500 m from the nearest turbine which is in compliance with the provisions prescribed by the **Regional (Spatial) plan of the Dubrovačko-neretvanska county ("The Dubrovačko-neretvanska county Official Gazette", No. 6/03, 3/05, 3/06, 7/10, 4/12, 9/13).** Building is not in conflict with the proposed project – WF Rudine for both above reasons.



Project WF Rudine in relation to existing facilities

9 MONITORING PROGRAMME

9.1 THE ORNITHOFAUNA MONITORING PROGRAMME AND METHODOLOGY

Monitoring of impact of project's work on bird population should be carried out through at least first two years after beginning of project's work. Observation should be based on results and methods of ornithological part of EIA STUDY WF RUDINE, and should consist of observation of local population of nesting birds and observation of flight over and wintering population of birds through twelve field works.

Monitoring consists from following parts:

- **Scanning of WT (wind turbine) surrounding area and recording of injured birds**

This activity begins when WT is placed and starts to work. It should exam the area in circle of 80 meters from WT and record injured birds. For every finding should note down position of injured bird, age and sex and all identified injure. After that bird should be left there and look again the next day to determine how many corpses the predators will take away. If the bird is there the next day, it should look again on third day.

In every detour should exam whole area in radius of 80 meters if possible. In case that a part of area could not be examined, it should estimate how much of the area is examined. The detour of surface in radius of 80 meters, depending on visibility of field, should take 1 to 2 hours, on average 1 and a half hour.

Before placing the WT it should undertake the activity of setting of dead birds. Dead birds be obtained on Faculty of Veterinary or Shelters for injured wild birds (in Croatia are 4 such shelters) and freeze. On every following surface should place one corpse and in next seven days determine what percent of birds is taken away. The observer efficiency test will be performed according to the results.

Based on this information will be estimated the activity of local predators. This information, along with information on size of successfully examined surfaces, will help to better estimate amount of injured birds for every WT and whole wind farm.

Field activity of placing the dead birds.

month	Activity of placing the dead birds	People required	Required person/day	Location
1ST	Getting of dead birds	1	2	Zagreb, Zaprešić, Šibenik, Slavonski Brod
2	Placing of dead birds	1	1	WF Rudine
	Control of dead birds	1	2	WF Rudine
3	Analysis of obtained data			Zagreb
..4				
..5				

..6	Placing of dead birds	1	1	WF Rudine
..7	Control of dead birds	1	2	WF Rudine
..8	Analysis of obtained data			Zagreb
..9				
..10				
..11				
..12				

- **Observation of flights from permanent observation points (Vantage Point)**

On the project location are required three points from which will be recorded all flights of prey birds and larger species in migration. Every flight will be drawn on map with drawn rotor's diameter. Data required are height and speed of flight, way of flight, if bird is flying rectilinear or circulating. When the WF starts to work it will be recorded if the bird avoids the rotor's propeller or not and etc. Data obtained by this method before the beginning of operational phase will serve for review of estimations in EIA Study Rudine, while data obtained after the beginning of work will serve as monitoring and provide insight in real effect of WF on problematic species.

Field dynamic of observation from permanent points (Vantage Point)

month	Activity of observation from permanent points (Vantage Point)	People required	Required person/day	Location	Remark
Sept	Vantage Point	3	6	WF Rudine	Required 12 hours of observation per point in total 36 hours of observation. Needed 3 persons, each on one point during two days.
Oct	Vantage Point	3	6	WF Rudine	Same as in September
Nov	Vantage Point	3	6	WF Rudine	Same as in September
Dec					
Jan					
Feb					
March	Vantage Point	3	6	WF Rudine	Same as in September

April	Vantage Point	3	6	WF Rudine	Same as in September
May	Vantage Point	3	6	WF Rudine	Same as in September
June	Vantage Point	1	3	WF Rudine	Required 6 hours of observation in total 18 hours. Needed one person during three days.
July	Vantage Point	1	3	WF Rudine	Required 6 hours of observation in total 18 hours. Needed one person during three days.
Aug	Vantage Point	3	6	WF Rudine	Same as in September

- **Monitoring of nesting population of prey birds on surface of 2 km around WF Rudine**

To obtain concrete number of pairs all of prey birds on surface of WF Rudine it is required to examine all suitable nesting places for species nesting on the rocks (Peregrine Falcon, Golden Eagle and Kestrel). For this activity is needed to carry out three two-day excursions from March to May. Method used is Territory mapping where presence of pair is established by finding of nest or determining one or more ways of nesting behaviour on surrounding nesting places- cliffs.

Species nesting on trees and in forests will be searched by method called Tape Recording Technique, and is carried out on the answers induced by broadcasting of territorial tweet of this species. On whole area are placed stations from which are broadcasted voices using auto-radios with CD devices of minimal power of 2x40 W. On every station direction and distance of response are recorded. Through analysis are obtained territories of breeding pairs. For this activity are required three two-day excursions in period from March to May.

Research before placing the WT will serve for precisely positioning of all nesting pairs of prey birds, and after beginning of WF Rudine work will serve as monitoring of project's effects on them.

Territory mapping for breeding prey birds

month	Territory mapping for breeding prey birds	People required	Required person/day	Location	Remark
Sept					
Oct					
Nov					
Dec					
Jan					
Feb					

March	Search of cliffs and broadcasting of voice for forests species (Tape recording)	2	4	WF Rudine	Two days for cliffs and two days for forest prey birds
April	Same as in March	2	4	WF Rudine	Same as in March
May	Same as in March	2	4	WF Rudine	Same as in March
June	Data analysis	1	1	Zagreb	Analysis in Zagreb enters in cost of monitoring organisation
July					
Aug					

- **Monitoring of potential impact on community of smaller birds and song birds through Transect**

Observation of local community of nesting birds consists from carrying out two transects in length from 2 to 2.5 km in central part of surface. Every transect should be carry out at least two times, first being made in middle of April (from 10th to 20th of April) and second in middle of May (from 10th to 20th May). Transects should be carried out in stabile weather without precipitation and no stronger wind. In case that during process of transect weather gets bad, whole transect should be carried out again on next day in morning hours. By transect are recorded enough precise density of sing-birds and smaller birds species.

Research is carried out before the beginning of WF Rudine work and will serve as zero-state regarding insight in birds amount before work of WF, and in years after beginning of work as monitoring of real impact of WF.

Field dynamics of transects

month	Transect for community of Passerines	People required	Required person/day	Location	Remark
Sept					
Oct					
Nov					
Dec					
Jan					
Feb					
March	setting up of transects	2	1	WF Rudine	Need to determine exact route of transect with GPS points
April	Carrying out of transects	2	2	WF Rudine	One transect a day in morning hours

May	Same as in March	2	2	WF Rudine	One transect a day in morning hours
June	Data analysis	1	1	Zagreb	Analysis in Zagreb enters in cost of monitoring organisation
July					
Aug					

9.2 THE BAT FAUNA MONITORING PROGRAMME AND METHODOLOGY

Methodology of bat fauna monitoring is designed according to national guidelines (*Ministry of Environmental Protection, Physical Planning and Construction and APO Ltd. 2010. Guidelines for the preparation of environmental impact studies for wind power plants*) and international guidelines of UNEP/EUROBATS - Agreement on the Conservation of Populations of European Bats (*Rodrigues et al. 2008 - Guidelines for consideration of bats in wind farm projects*, *EUROBATS 2012 Report of the IWG on Wind Turbines and Bat Populations etc.*).

The first year of pre-construction monitoring will be carried out through a detailed one-year preliminary study of bat populations in the wider area around the planned construction site. Field survey will be conducted in total of 24 field days during one year, throughout a timescale which reflects the full cycle of bat activity.

Post construction bat fauna monitoring will be conducted for two years and it will include bat mortality monitoring as well (4 days per month in a period from the beginning of March to the end of October).

1. COLLECTION AND ANALYSIS OF EXISTING DATA	
• **Spatial data GIS analysis**	Analysis of the spatial positioning of the planned construction site, aerial images, maps, habitat survey maps etc.
• **Literature data review**	Review of all available data on potential or actual significant roost sites (underground sites, buildings etc.), findings and distribution of individual bat species in wider area of planned construction site.
• **Survey design**	Determining different research points and linear transects on which to conduct field survey.
2. FIELD SURVEY S– ONE-YEAR PRELIMINARY PRE-CONSTRUCTION MONITORING	
• **Investigation of potential roost sites (caves, tunnels, buildings etc.)**	Reconnaissance and identification of potentially significant bat roosts (type of roost, species abundance and composition etc.) in the area up to 5 km from the planned construction site
• **Periodic bat detector monitoring (Elekon Batlogger, Petterson D240x) along linear transects**	Reconnaissance and identifications of other locations important for bats (important foraging sites, daily and seasonal migration routes) by recording bat activity in different types of habitat in the area up to 5 km from the planned construction site, with special emphasis on the area up to 1,5 km.
• **Continuous bat detector monitoring (Song Meter SM2BAT) on a stationary point**	Bat activity analysis in the immediate area of planned construction considering the time of year, month, day and microclimate parameters.

with data logger	
• **Mist netting (Ecotone Mist Nets)**	Identification of present species, sex, age and reproductive status.
3. FIELD SURVEYS – TWO-YEAR POST CONSTRUCTION MONITORING	
• **Investigation of important bat roost sites (caves, tunnels, buildings etc.)**	Monitoring of possible changes in species composition and abundance, disturbance and possible loss of important roosts.
• **Periodic bat detector monitoring (Elekon Batlogger, Petterson D240x) along linear transects defined during the preliminary one-year monitoring**	Monitoring of possible changes in species composition, activity and behaviour, given the results recorded during the preliminary one–year bat detector monitoring.
• **Continuous bat detector monitoring (Song Meter SM2BAT) on a stationary point with data logger**	
• **Searching for bat fatalities in a 70 m radius around each wind turbine once or twice per month (April – May and August-October)**	Bat mortality monitoring which includes definition of bat fatality species, including sex, age and spatial distribution of findings between different wind turbines.
4. PROCESSING AND ANALYSIS OF COLLECTED DATA	
• **Echolocation/sound analysis (BatSound, Sonobat, BatExplorer software)**	Identification of present species, bat activity index and type of activity (over flights, foraging etc).
• **Mapping of degree of bat space use (DSU)**	Definition of degree of bat space use in wider area around planned construction site considering present habitats, microclimate, terrain morphology, important roost and foraging sites proximity as well as other collected field survey data.
• **Mortality rate analysis**	Detailed mortality rate analysis, identification of potentially endangered bat species in correlation with recorded bat activity in immediate area of planned construction site.
5. REPORTS	
• **Report on project progress**	Information for investor about the progress of the project and conducted field research.
• **Annual report**	Report on the results and analysis of all activities during the monitoring, the assessment of possible need for additional mitigation measures and / or modification of existing ones.

• **Final report**	Report on the results and analysis of all the activities during the monitoring, the assessment of possible need for additional mitigation measures and / or modification of existing ones, as well as the need for further monitoring.

	GENERAL TIME SHEET																						
	ONE-YEAR PRELIMINARY MONITORING												TWO-YEAR POST CONSTRUCTION MONITORING										
ACTIVITY	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Collection and analysis of existing data																								
• Spatial data GIS analysis																								
• Literature data review																								
• Survey design																								
Field surveys																								
• Investigation of potential roost sites (caves, tunnels, buildings etc.)																								
• Periodic bat detector monitoring along linear transects																								
• Continuous bat detector monitoring on a stationary point																								
• Mist netting																								
• Searching for bat fatalities																								
Processing and analysis of collected data																								
• Echolocation/sound analysis																								
• Mapping of degree of bat space use (DSU)																								
• Mortality rate analysis																								
Reports																								
• Report on project progress																								
• Annual report																								
• Final report																								

10 IMPLEMENTATION OF MITIGATION MEASURES

Table below provides a summary of potential environmental impacts and mitigation measures to minimise impacts. Measures are prescribed by **Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme** (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008).

Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008)				
PROJECT PREPARATION AND CONSTRUCTION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES**	**STARTING DATE**
			SUPERVISIONS	**COMPLETION DATE**
Landscape	- Use of wind turbines in a gray-white color. - Access roads designed in such a way to avoid existing drystone walls, bays and valleys with deep agricultural soils. - Transformer station design in a way to fit into the landscape. - Within the scope of project documentation development, in accordance with legislative ordinances which regulate spatial planning and construction (Preliminary design / Final design), develop the Design for construction and construction site organisation.	Within the project budget	Designer/Operator SUPERVISION: Nature protection inspection, Inspection of the construction	Together with starting construction works/completion of construction works
Noise	- All machines and devices, as well as all other equipment, have to be in accordance with Croatian and international norms and specifications and meet all requirements prescribed by law. - Noise levels which occurs during works in open spaces and on buildings between 08:00 and 18:00 hr are regulated by Article 17 of the Ordinance on the maximum permitted noise levels in an environment in which people work and live (OG No. 145/04) and other articles of this Ordinance and they should be adhered to. During the day, highest permitted noise level out in the open and in buildings is 65 dB(A).	Within the project budget	Designer/Operator SUPERVISION: sanitary inspection, supervising engineer	Together with starting project documentation and construction works/completion of construction works
Soil	- Perform the ascents along all the traces of access roads on a safe way in order to prevent collapsing i.e. erosion of surrounding soil. - Avoid damage to the soil in the bays and sinkholes. - Parking of vehicles and machinery if any, as well as other areas where	Within the project budget	Designer/Operator SUPERVSION:	Together with starting construction works/completion of

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PROJECT PREPARATION AND CONSTRUCTION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES** **SUPERVISIONS**	**STARTING DATE** **COMPLETION DATE**
	they may arise oily or otherwise contaminated water (fuelling areas, etc.) should be designed with a waterproof base, closed drainage system to collect sewage water which must be purified (for example, passed through a separator with sedimentation) prior to discharge into the recipient. - All waste generated during construction should be disposed of in appropriate landfills in accordance with applicable regulations. - Materials can either be recycled or use on site or into new construction. - During the performance of earth works separate surface layer of higher quality, deposit it separately; protect it from pollution and use for repair and return of location into natural state upon completion of construction works. - Repair of machinery and vehicles carried out at the project location. - Ensure watertight system of collection and rainwater from surfaces possibly contaminated with fats and oils.		Water management inspection, Inspection of the construction, Supervising engineer	construction works
Flora	- Construction works should be performed in a provided zone within the intervention. - Movement of machinery and vehicles during construction limited to the lower surface.	Within the project budget	Designer/Operator SUPERVISION: Nature protection inspection, Inspection	Together with starting construction works/completion of construction works

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PROJECT PREPARATION AND CONSTRUCTION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES**	**STARTING DATE**
			SUPERVISIONS	**COMPLETION DATE**
			of the construction	
Fauna	- Use the latest knowledge on the type of wind turbine blades, signal lights, etc. that reduce negative impacts on populations of birds and bats. - Incorporate the results of research on the fauna of birds and bats in order to avoid possible negative impact of the projects on priority fauna species of birds and bats. - Protection measures during the construction of a wind turbine carried out in collaboration with the Institute for Ornithology, Croatian Academy of Sciences and Arts. - Work on the construction of facilities and access routes perform outside the nesting season of birds. - In the case of lighting site use luminous bodies that give a yellow light that does not attract insects and the illumination directed towards the ground.	Within the project budget	Designer/Operator Independent ornithological expert SUPERVISION: Nature protection inspection, supervising engineer	Together with starting construction works/completion of construction works
Cultural-Historical Heritage	- Accept the results of archaeological investigations and escape locations foundations of archaeological sites and implement protective measures.	Within the project budget	Designer/Operator	Together with starting project documentation and

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PROJECT PREPARATION AND CONSTRUCTION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES** **SUPERVISIONS**	**STARTING DATE** **COMPLETION DATE**
	- 1. Archeological sites GOMILE 1, 5, 6a, 6b, and 7 are directly endangered archeological sites. It is necessary to either displace wind turbines at least 250 m from each stack or perform systematic archeological researches on every location that include excavation, documenting and adequate conservation of mobile findings from stack, after what is possible undisturbed construction of wind turbine of intended location - 2. Archeological site GOMILA 8 is indirectly endangered archeological site. It is necessary to ensure archeological oversight during preparatory actions and construction wind turbine WTG 32 and access roads. - 3. Archeological site KURILO, Đonta Doli is directly endangered potential archeological site. It is necessary to ensure constant archeological oversight during preparatory actions and construction wind turbines WTG 18, 19 and access roads. In case of finding cultural layers it is necessary to perform systematic archeological researches excavation, documenting and adequate conservation of mobile findings. - 4. Because of always present possibility to detect yet unknown cultural layers it is necessary to conduct occasional archeological oversigdt		SUPERVISION: Cultural heritage inspection supervising engineer	construction works/completion of construction works Measure of displacement is implemented in project documentation (see Appendix 1).

Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008)				
PROJECT PREPARATION AND CONSTRUCTION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES** **SUPERVISIONS**	**STARTING DATE** **COMPLETION DATE**
	during preparatory actions and construction of wind turbines and access roads and to conduct legal obligation of stopping the actions and informing of competent Department of conservation in case of hitting upon archeological site or finding.			
Waste management	- Separate collection of waste by type and organization of waste transport from the site by an authorized company and the disposal of certain types of waste in accordance with strictly defined requirements of respective regulations.			
Others	- Actions perform with mechanization whose emissions of exhaust gases are in legally allowed limit follow approved project documentation and to respect regulation control this construction. - Mining can perform only authorized company in accordance to professional rules in business hours from 08:00 to 17:00 - Conduct work safety measures in accordance to measures from implementation project - Filling machines and vehicles with fuel on location site in case when is necessary to ensure by using mobile unit (pump) at authorized legal person and conducting measures to prevent spilling.			

Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008)				
PROJECT PREPARATION AND CONSTRUCTION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES** **SUPERVISIONS**	**STARTING DATE** **COMPLETION DATE**
Emergency Response	- Wind turbines locate at least 500 m away from nearest residential buildings and 150-200 m from infrastructural objects. - Manufacturing units place at distance at least 300 m in between - On plant design complete system of protection from thunder strike and fire. - Special attention dedicate to static safety of plant and systems for protection in case of extreme wind speed and gust. - Use model of wind turbine designed for gust over 50 m/s - Plan turbines with prescribed marks for air traffic safety accordingly to vicinity of planned airport. - When planning exact location of wind turbine it is possible to correct location of wind turbines in central part of northern peripheral zone (along county road Ž 6228) of wind farm and other planned content and in accordance to local district unit.	Within the project budget	Designer/Operator SUPERVISION: Environmental protection inspection, supervising engineer	Together with starting project documentation and construction works/completion of construction works
It is necessary to follow all the protection measures described in agreements, conditions, confirmations and opinions of amenable public administration bodies, i.e. legal persons which agreements, conditions, confirmations and opinions have been component of the location and construction permit.				

Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008)				
OPERATION PHASE				
SUBJECT	**MEASURES TO BE TAKEN**	**COST**	**RESPONSIBILITIES** **SUPERVISON**	**STARTING DATE** **COMPLETION DATE**
Fauna	- Apply known technical solutions to prevent collisions of birds and bats with wind turbines that experts will recommend. - If monitoring finds that some of wind turbines or spatial-time aspect of wind plants work effects on mortality increase in birds or bats, apply recommended solution that will downsize mortality to acceptable measure.	Within the project budget	Operator SUPERVISION: Nature protection inspection	Commissioning of plant/expiring of economics life of the plant
Emergency Response	- Apply measures of avoiding ecological accident that include stopping work of wind plant in case of risk of accident, application of safety measures in case of fire, application of safety measures in case of ground and water contamination, measures of removing hazards for people and material goods.	Within the project budget	Operator SUPERVISION: Environmental protection inspection, supervising engineer	
Others	- Regularly maintain all equipment and devices especially mechanical parts of turbines.	Within the project budget	Operator SUPERVISION: supervising engineer	

<table>
<tr><td colspan="5">Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008)</td></tr>
<tr><td colspan="5">DECOMMISSIONING PHASE</td></tr>
<tr><td rowspan="2">SUBJECT</td><td rowspan="2">MEASURES TO BE TAKEN</td><td rowspan="2">COST</td><td>RESPONSIBILITIES</td><td>STARTING DATE</td></tr>
<tr><td>SUPERVISION</td><td>COMPLETION DATE</td></tr>
<tr><td>General impacts</td><td>- After finishing the use, production units have to be removed and carried away form the location.
- Ensure properly disposal and management of waste that will appear as a consequence of plant removal.
- Energy and communication cables will be removed according to special regulations.</td><td rowspan="2">Within the project budget</td><td rowspan="2">Designer/Operator

SUPERVISION:
Environmental protection inspection, supervising engineer</td><td rowspan="2">Decommissioning of plant</td></tr>
<tr><td>Landscape</td><td>- Foundations of wind turbines remove by crushing, cover with stone material in level with surrounding area and leave to process of succession.</td></tr>
<tr><td colspan="5">It is necessary to follow all the protection measures described in agreements, conditions, confirmations and opinions of amenable public administration bodies, i.e. legal persons which agreements, conditions, confirmations and opinions have been component of the location and construction permit.</td></tr>
</table>

11 ENVIRONMENTAL MONITORING PLAN

The overview of the environmental protection measures prescribed by the Decision about environmental acceptance of the project issued by the competent Ministry after performed environmental impact assessment is given bellow:

Decision on which the intended project – wind farm RUDINE is acceptable to environment with implementation of environmental protection measures and environmental monitoring programme was issued (DOCUMENT CLASS: UP/I 351- 03/06-02/00043; NO. 531-08-1-1-07-08-10 from April 15th 2008).

NOISE	Establish a system for measuring wind speed and direction. Before the construction of wind farms perform one-time measure "zero state" noise which will include a representative climatological weather conditions: wind speed greater than 10 m/s in the working range of wind turbines during the prevailing winds. During the first year of operation perform a measurement 2 times a year in hot and cold period, which will include representative climatological conditions. The measurement should be carried out in accordance with points that were used for the calculation of noise level. At the first measurement analyse wind frequency. If it turns out that wind farm does not emit particularly expressed particular frequency (which is to be expected), the second measurement can be performed without frequency analysis. If the first and second measurements confirm the results of the noise modelling, and hence the acceptability of the level of noise further monitoring is not required, except in the case of installing new equipment or complaints.
BIRDS BATS	During the first two years intensively follow ornitho fauna and bats fauna (i.e. animal behaviour in accordance to the wind power plant, mortality of the animals within the each wind generator). On the basis of the obtained results, confirm the impact of the each single wind generator and the wind field in general and after that perform the corresponding additional protection measurements. Conduct the bird monitoring during the two years of operational period (one field research per month). Notify the bird activity every half an hour, number of the species and behaviour (fly, walk, stand still), and in the case of the flight, flight direction, the distance between the wind generator and the height in comparison to the wind generator (below the level of propellers, in the level of propellers,, above the top of the propellers). Search the area around the wind turbine in order to find injured or dead birds, and for the each founded bird notify the species, position, conditions, estimated time of death etc. Conduct the bat monitoring during the two years of operational period, form the February up to November. Monitor bat activity around the wind turbines from sunset to down (ultrasound detectors, visually by the appropriate optics); determine the flight directions and behaviouristic profile of the each detected species. Determine the relationship of the local bat populations from the larger colonies and the wind farm. Monitor the bat mortality around each wind turbine by searching the defined field (for the estimated type of the wind turbine by the use of the polygonal shape with the ending points distanced up to 150 m). Collect dead animals, determine gender and age. Determine if any of the wind turbines causes unacceptable level of the deaths in the bat populations, taking into the account the number of the animals, status and vulnerability.

12 STAKEHOLDERS ENGAGEMENT PLAN

11.1. BACKGROUND

This Stakeholder Engagement Plan (SEP) describes the key stakeholders and the information and communication plans intended in regard to the development of wind farm RUDINE, Dubrovačko-neretvanska county, municipality of Dubrovačko primorje.

The SEP takes into account best international practice in relation to information disclosure and outlines the general engagement principles that project developer will adopt and those which will be used for the current modernisation programme.

The SEP will be reviewed and updated on a regular basis. If activities change or new activities relating to stakeholder engagement commence, the SEP will be brought up to date.

The SEP will also be reviewed periodically during project implementation and updated as necessary.

11.2. OBJECTIVES OF THE SEP

The methods, procedures, policies and actions undertaken by Vjetroelektrana Rudine Ltd. to inform stakeholders, in a timely manner, of the potential impacts of projects are the key subject of this document.

A level of stakeholder engagement has already taken place as part of the requirements of the Environmental Impact Assessment of the project, during EIA procedure 2006 to 2008.

Communication will continued as further planning and design activities are progressed and through the project implementation.

Key stakeholders have been identified in this document. If any stakeholders have not been identified, they should contact Vjetroelektrana Rudine Ltd. and ask to be included in the future information and communication. Furthermore, this document describes the way that any concerns or grievances will be handled by the company.

This document also provides a time schedule for consultations, which may be subject to revisions during project initiation, design and implementation.

11.3. CROATIAN LEGISLATION

Environment protection act determines the principles of environmental protection, amongst which the „principle of access to information and participation of the public“ which gives the public a right to access information on the environment, right to due information on environmental pollution and the right to participate in procedures relating to environmental protection. This principle entices a more democratic decision making mechanism and inclusion of the public in resolving questions regarding environmental protection which strengthens the position of the public when accessing information on the environment and their participation in adoption of plans and programs as well as concrete decisions which relate to the environment.

With the *Ordinance on informing and participation of the public and interested parties in environmental protection matters* (Official Gazette No. 64/08), the Republic of Croatia has completely harmonized its obligation towards the Aarhus Convention which was ratified by the Croatian parliament in December 2006.

Purpose of reporting and familiarizing the public is a substantial familiarization of the public with the intended intervention in space, which represents a method of project quality improvement and dedicates special attention to informing the public about the project as well as includes it into the environmental effect assessment procedure. Environmental impact assessment procedure is constituted in a way that it recognizes and includes the public or interested parties in the earliest stage possible.

According to the definition Public concerned is the public which is affected or likely to be affected by environmental decision-making and which lives or works in an area where adverse environmental effects are

possible or likely to occur. Civil society organizations which are active in the field of environmental protection and meet all the requirements in accordance with this Act shall be deemed to be concerned parties.

The obligation of the informing and assuring of the public and interested parties participation in the environmental impact assessment procedures have been arranged by the *Environmental Protection Act*.

With the more details the way of informing of the public and interested parties within EIA procedure has been prescribed by the *Ordinance on informing and participation of the public and interested parties in environmental protection matters* (Official Gazette No. 64/08). *The Ordinance on informing* presents legal base for the practical performance of informing and participation.

Within the procedure of the environmental impact assessment for the particular project the public and interested parties participate via **public discussion, which includes public inquiry and public presentation.** During public discussion the public, interested public and other participants such as the bodies and/or persons determined by the special regulations, local and regional authorities and other bodies (in the further text: participants in the public discussion), within the period and in a way prescribed by the *Ordinance on informing*, gives suggestions and objections connected with the subject of the public discussion – environmental impact assessment study for the project.

The competent body gives the information about conducting of the public discussion for the particular project on the web site and in the daily newspapers. This announcement could be given in the official gazette of the local and regional authorities and in a locally common way of the public disclosure, if it is not determined differently, at least 8 days before the start of the public discussion. The announcement contains identification of the public discussion subject, the place and the date of the beginning and duration of the public discussion, the place of the public discussion and the deadline for the submitting of the written opinions to the competent body, suggestions and objections concerning to the subject of the public discussion. The competent body beside this announcement, if it is obligatory by the special regulation, written announcement of the public discussion delivers too:

- the bodies and persons determined by the special regulations;
- the bodies of the local and regional government;
- the other bodies, if needed.

The public discussion, including the public inquiry and public presentation, have been coordinated and conducted by the ministry authorized for the environmental protection issues, i.e. competent governmental body of the county and City of Zagreb, depending on the prescribed competences regarding to the list of projects according to the ordinance for the arrangement of environmental impact assessment of the project.

After delivering the announcement about the public discussion conducting, the subject of the public discussion has been posted to the public inquiry which takes 30 days at least.

Public and interested parties participate in the public discussion in a way to:

- have the rights in the access to the project of the public discussion;
- interrogate the questions during the public presentation, about given settlments, which will be answered by the persons from the article 19., *Ordinance on informing*, orally or in written form acoording to the reqests of the public discussion participants;
- can submit suggestions and objections in the book of suggestions which is obligatory enclosed to the subject of the public discussion;
- give suggestions and objections for the report during public presentation;
- direct the written suggestions and objections to the competent body within the deadline determined in the announcement of the public discussion.

The suggestion and objections which has not been submitted on time or it was not written clearly, will not be taken into the account during the preparation of the public discussion report.

During the public discussion the competent body organize **the public presentation.**

The public presentation has been participated by the representatives of the project holder, representatives of the environmental impact assessment study for the project, project designer and the representatives of the local i.e. regional government from the area where the public discussion and public presentation have been conducted.

The public presentation has been **reported**, beside the report, the tape recording about public presentation can be arranged. The report about public presentation contains questions, suggestions and opinions of the participants raised by the stakeholders presented on the public inquiry meeting.

If within the deadline determined in the decision document about the public discussion, participated parties, competent bodies and the bodies of the local government, i.e. the bodies of regional government have not submitted its opinions, objections and suggestions regarding the subject of the public presentations it is considered that they did not have objections.

About performed public discussion the competent body prepares the report which includes:

- data about the subject of the public discussion. i.e. notice that this subject was the part of the particular report;
- the lists of the invited public discussion stakeholders according to the special announcement;
- the lists of the stakeholders in the public discussion which objections and suggestions referring to the subject of the public defence have been accepted;
- the identification of the objections and suggestions of the stakeholders, which have not been accepted or being accepted partially with the explanation of its not acceptation, i.e. reasons of the partial acceptation;
- the lists of the stakeholders public discussion which opinions, suggestions and objections, has been given outside the limitation of the deadline.

The acts, copies and other evidences about public discussion announcement, invitations and special announcements about public discussion, reports about public presentations, evident of public presentations of the invited stakeholder speakers in the public discussion and the book of objections have been the components of the report of the pubic discussion.

11.4. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE REQUIREMENTS

12.1.1 The requirements

Public consultations and information disclosure to be undertaken by Vjetroelektrana Rudine Ltd. will comply with the requirements of the legislation of Republic of Croatia and best international practice, as described in requirements of the European Bank for Reconstruction and Development (EBRD), World Bank (WB) and International Finance Corporation (IFC).

Specific EBRD and IFC guidance used in the preparation of this SEP includes:

EBRD (2003). EBRD Consultation and Disclosure Requirements - Guidance for Category A Projects. EBRD Environment Department, July 2003.

EBRD – Guide to Performance Requirement 10; Information Disclosure and Stakeholder Analysis, EBRD Environmental and Social Policy. May 2008.

IFC – Guidance Note 1. Social and Environmental Management Systems (July 2007).

IFC – Guidance Note 4. Community Health, Safety and Security (July 2007).

IFC Stakeholders Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets

12.1.2 General Stakeholder Communication Records Maintenance

A formalized grievance mechanism has been developed and implemented by the company to cover both the construction and operational phases of the wind farm RUDINE.

The grievance mechanism will be also incorporated into the environmental, health and safety management system that the Vjetroelektrana Rudine Ltd. will implement for the sites. The system will also be publicized on notice-boards in public venues in local communities, and via local media (newspapers/radio).

A communication records procedure will be developed which will log the key information provided to stakeholder and also the key incoming communication (i.e. general questions, complaints etc) to Vjetroelektrana Rudine Ltd., along with a summary of action taken. As part of this communications procedure, Vjetroelektrana Rudine Ltd. will record and update these ongoing stakeholder engagement activities on an ongoing basis.

12.1.3 Best International Practice

The key principles of effective engagement are summarized as follows:

Providing meaningful information in a format and language that is readily understandable and tailored to the needs of the target stakeholder group(s);

Providing information in advance of consultation activities and decision-making;

Providing information in ways and locations that make it easy for stakeholders to access it and that are culturally appropriate;

Respect for local traditions, languages, timeframes, and decision-making processes;

Two-way dialogue that gives both sides the opportunity to exchange views and information, to listen, and to have their issues heard and addressed;

Inclusiveness in representation of views, including ages, women and men, vulnerable and/or minority groups;

Processes free of intimidation or coercion or incentivisation;

Clear mechanisms for responding to people's concerns, suggestions, and grievances; and

Incorporating, where appropriate and feasible, feedback into project or program design, and reporting back to stakeholders.

12.1.4 Stakeholder Identification

This section of the document identifies interested parties i.e. stakeholders and others affected at a local, district and regional level.

Stakeholders could also be individuals and organizations that may be directly or indirectly affected by the project either in a positive or negative way, who wish to express their views.

Vjetroelektrana Rudine Ltd. has undertaken an initiative to identify its key national stakeholders. In doing this the following definitions have been applied:

- Stakeholders: any person, group or organization with a vested interest in the outcome of a body of work; and
- Key stakeholder: any stakeholder with significant influence on or significantly impacted by, the work and where these interests and influence must be recognized if the work is to be successful.

Stakeholders can be grouped into the following categories:

Stakeholder	Description	Method of communication	Frequency
IFC	International lenders	Official EHS monitoring reports, meetings, official communication, e-mail	Continuosly
Government (regional and local)	Ministry of Environmental and Nature Protection, Ministry of Construction and Phyisical Planning, State inspectorate Dubrovačko neretvanska county, HROTE, HERA, State Institute for Nature protection	Official correspondence Information on request (monitoring reports)	Periodicly, on request
Local comunity	Municipality of Dubrovačko primorje	Bilboards, web, meetings, personal communication, e-mail	At the beginning of the project, Continuosly
Advisory/non government	Energy Institute Hrvoje Pozar		
Services/suppliers;	GE Wind Energy GmbH,, HEP d.d., HEP OPS d.o.o., Hrvatske šume	Official correspondence Information on request	Continuosly
Institutions (nature universities, think tanks, etc)			
The construction and construction materials industry			
Internal stakeholders (Employees, labour unions)		Internal communication	Continuosly

		through the existing system	
General communities			
Public groups	NGOs, cultural heritage organisations, Catholic church, individual ecologist, individuals interested in nature protection, environmental experts	Official web site of the project – Non-technical summary, Summary of monitoring reports and other relevant information and announcement on official web	Continuosly, on request

11.5. STAKEHOLDER RELATIONS

12.1.5 Previous public consultation and disclosure

Following sections describe the public participation and consultation meetings and disclosure of information previously conducted for the proposed Project.

Environmental impact assessment procedure is constituted in a way that it recognizes and includes the public or interested parties in the earliest stage possible.

The public has the opportunity to get the information about the project of the wind farm RUDINE through the "public inquiry" – process where the EIA STUDY WF RUDINE was "disclosed" and subject to public review and comments.which lasted 30 days from May 7th until 28th in 2007. Public access to the EIA STUDY WF RUDINE was enabled in following locations: administrative building of the Dubrovačko-neretvanska county and Municipality Dubrovačko Primorje.

During the time period that the public could submit comments on the EIA STUDY WF RUDINE, one public consultation meeting was organized, on May 11th 2007 in Slano.

Public consultation process was announced in the local newpaper, Ministry and County website.

Coordinator of the public consultation process was Administration authority for the communal affairs and environmental protection of the Dubrovačko-neretvanska county.

At the public consultation process, the Project and the associated construction the operation activities were described and explained to the public and questions, opinions, comments and concerns of the public related to the project were gathered.

During public discussion written objections were delivered and they were considered during the session of the Advisory expert committee for evaluation impact assessment for the wind farm Rudine.

Report on public discussion is attached in Appendix 2.

12.1.6 Overview of existing stakeholder relations

During project preparation, developer has repeatedly informed all the relevant authorities and institutions about project status.

Vjetroelektrana Rudine Ltd. is involved in the local community and has good community relations. A summary of existing engagement activities is shown below.

Objavljeno 24.01.2013. u 08:43

U IŠČEKIVANJU VELIKOG INVESTICIJSKOG ZAMAHA

Počinje izgradnja vjetroelektrane Rudine

Sviđa mi se | Tweet 0 | +1 0

Sličnim prizorima uskoro ćemo svjedočiti i u Dubrovačkom primorju / Nikša Stipaničev / CROPIX

Neposredno uoči Uskrsa, na platou Lisačkih rudina u Dubrovačkom primorju počinje realizacija 250 milijuna kuna "teškog" projekta izgradnje vjetroelektrane Rudine, koja će s 12 vjetrogeneratora imati instaliranu snagu od 35 MW.

Tvrtka "Adria Wind Power" ishodila je sve nužne dozvole, a riječ je o početku gradnje prve faze VE Rudine, koja bi i u drugoj fazi trebala imati istovjetnu instaliranu snagu i broj generatora, a očekuje se da bi vrijednost trebala također iznositi 250 milijuna kuna.

- Investitor radova bit će "VE Rudine" d.o.o., dok je na projektu i ishođenju dozvola koje su pravomoćne već godinama radila tvrtka "Adria Wind Power". Istina, ishođenje je dozvola trajalo vrlo dugo i od svega smo se malo umorili, ali je uspješno okončano pa će radovi početi i prije Uskrsa. S Općinom Dubrovačko primorje imamo korektne odnose i radujemo se otvorenju gradilišta u sklopu kojeg će se izgraditi i trafostanica TF Rudine 110/20 kV. No, o drugoj fazi radova još je prerano govoriti – najavljujući radove, ističe direktor i vlasnik tvrtke "Adria Wind Power" Tonči Panza, koji je na Pagu realizirao prvu hrvatsku vjetroelektranu.

Početku radova se raduju i u Općini Dubrovačko primorje.

- Zamislite, projekt privatnog investitora vrijedan više od 500 milijuna kuna čekao je pune dvije godine!? Koliko su od toga koristi mogle imati država i lokalna zajednica, osobito stoga što je riječ o hvalevrijednom "zelenom projektu"? Nije tajna kako će se VE Rudine graditi nedaleko od lokacije na kojoj je planirana buduća istoimena zračna luka, a instalirana snaga vjetroelektrane od ukupno 70 MW je čak za 7 MW veća od snage buduće HE Ombla - naglašava načelnik općine Dubrovačko primorje Nikola Knežić, koji također ima samo riječi hvale za investitora, tvrtku "Adria Wind Power".

Ahmet KALAJDŽIĆ

SOURCE:

http://www.slobodnadalmacija.hr/Dubrovnik/tabid/75/articleType/ArticleView/articleId/200250/Default.aspx

Rudine wind project was presented at the workshop" Meteorology and Wind Energy Management", on July 9th 2013 within the project: Innovative Meteorological management support wind power - WILL4WIND (IPA2007 / HR / 161PO / 001-040507)

11.6. DISCLOSURE OF INFORMATION

12.1.7 The types of information to be disclosed

The information that will be disclosed will be assessed on a specific basis as part of the overall Project developer investment programme for the proposed wind farm. In general terms, internal and external communications are handled by company Vjetroelektrana Rudine Ltd. in a number of ways as detailed below.

The objectives of external communications are to provide continuous engagement with targeted audiences to inform about the company activities, including company performance, company development and investment plans and their implementation.

12.1.8 The methods and communication

The methods of communication to be utilized by company Vjetroelektrana Rudine Ltd. are summarized in the following Stakeholder Engagement Programme and will include:

- Publication for public review of the Stakeholder Engagement Plan, Non-technical Summary and Environmental and Social Action Plan;
- Meetings with regulatory bodies;
- Public meetings;
- Published on Local council website;
- Announcements in local media;
- Provision of general information on notice-boards at key public locations; and
- Publication of project information including Environmental Statements for wind farm development, a Non-Technical Summary, Environmental and Social Action Plan and additional information on the company website

12.1.9 The future programme

The project developer is obliging that during the project operation environmental protection measures prescribed originally for the preventive public health protection as well as environment in general going to be conducted and the results will be available for the competent bodies and interested parties at the same time.

11.7. GRIEVANCE REDRESS MECHANISM

If there are questions or complaints, the following grievance mechanism will be used:

Vjetroelektrana Rudine Ltd.

Slano (Općina Dubrovačko Primorje), Slađenovići 2

Director: Bojan Reščec, d.i.g.

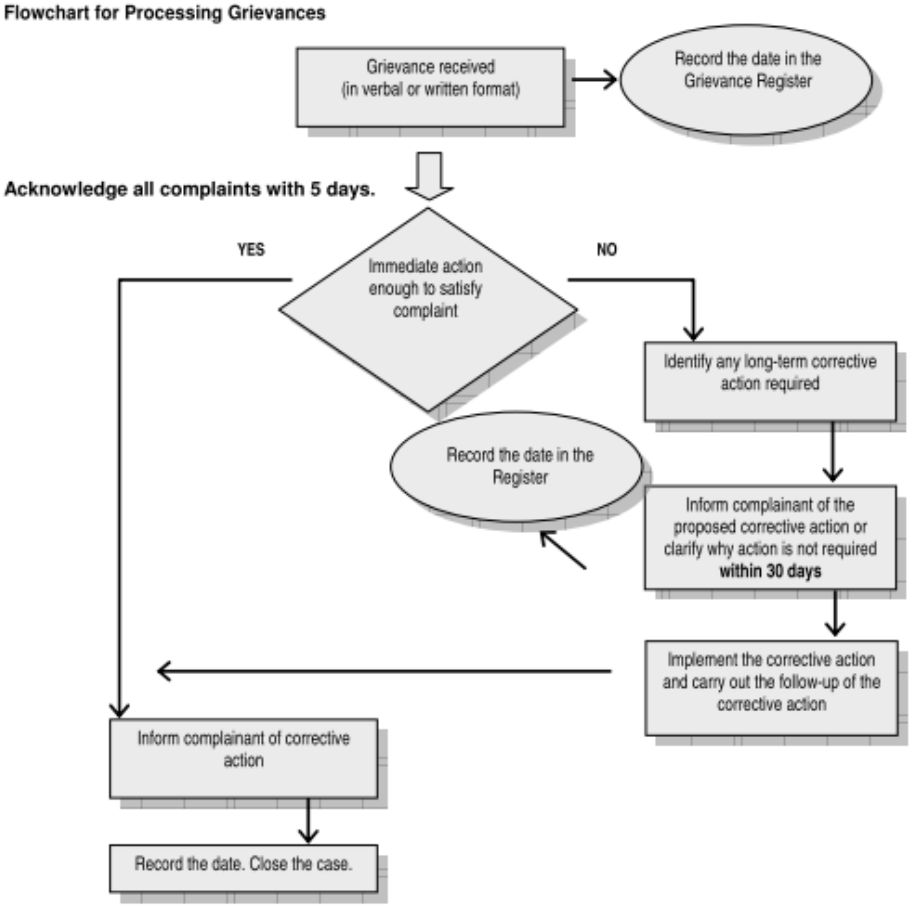
External complaints relating to the environmental impact of the wind farm Rudine will be recorded and kept in a communications/ complaints log book.

Time Frame for Redressal of the Grievances: All communications will be acknowledged within 5 business days and a response within 30 business days.

A communications procedure and log will be developed by Vjetroelektrana Rudine Ltd. for use during the period of the Stakeholder Engagement Plan. This will be used to log all significant incoming and outgoing communications.

The company Vjetroelektrana Rudine Ltd. welcomes ongoing comments and suggestions on the project. Attached is a form for grievance.

Flowchart for Processing Grievances



PUBLIC GRIEVANCE FORM				
Reference No.:				
Full name *Note: you can remain anonymous if you prefer or request not to disclose your identity to the third parties without your consent*	First name Last name I wish to raise my grievance anonymously I request not to disclose my identity without my consent			
Contact Information Please mark how you wish to be contacted (mail, telephone, fax, e-mail)	By Post: Please provide mailing address: By telephone: By fax: By e-mail:			
Preferred language for communication:	Croatian YES NO		English YES NO	
Description of Incident of Grievance:	What happened?	Where did it happened?	Who did it happen to?	What is the result of the problem?
Date of Incident/Grievance				
	One time incident/grievance Date	Happened more then once (how many times?)	On-going (currently experiencing problem)	
What would you like to see happen to resolve the problem?				
Signature:				
Date:				
Please return this form to: Direktor: Bojan Reščec				

11.8 MONITRORING AND REPORTING

Public consultation and disclosure activities held during EIA phases of the Project were reported as described in Section 11.5.1.

Future engagement activities as defined in Section 11.6 will be monitored and reported.

Results of the post construction monitoring, apart from submitting to authorities, are initially planned to be provided for the public via website.

The SEP will be monitored by Project Managing Director.

The implementation of the SEP will be monitored and the evaluations will be provided in the annual environmental, health and safety reports submitted to the financial institution as will be agreed.