

Crucea North Wind Farm

## **Non - Technical Summary**

S.C. CRUCEA WIND FARM S.R.L.

August 2013

revision 2

# 1 **NON TECHNICAL SUMMARY - CRUCEA NORTH WIND FARM 99 MW (extension to 108 MW as option)**

## 1.1 **INTRODUCTION**

This Non Technical Summary (NTS) provides an overview on the potential environmental and social impacts associated with the construction and operation of *Crucea North Wind Farm project 99 MW (extension to 108 MW as option)* (hereinafter referred to as “*the Project*”) and on the measures considered to keep these potential impacts at acceptable levels so that no harmful effects will be induced and all applicable norms and regulations are met.

The Project will be developed by Crucea Wind Farm S.R.L. (*the “Developer”*) located in Constanta City, 75 Zorelelor Street, Constanta County, Romania. The main shareholders of the Developer are STEAG GmbH and Monsson Alma.

An Environmental Impact Assessment (EIA) Study was performed for the proposed Project in 2010 in line with the Romanian legal requirements and all needed permits have been obtained. Additional appraisal has been performed (as best practice) for the Project in the course of 2012 and 2013 with the purpose of achieving the highest international standards for impact assessment. Furthermore, additional biodiversity surveys will be performed in the following years, during both the construction and operation phases of the wind farm, with the purpose of confirming the results of the completed assessments and define any additional mitigation if necessary.

As result of the impact assessments above mentioned, the environmental and social changes anticipated to occur as a result of the Project implementation have been identified, and their importance has been evaluated. Where significant adverse changes were identified the measures that can be taken to avoid, reduce or compensate for those changes have been defined and will be implemented during the course of construction and operation of the wind farm.

Additional information on the Project’s environmental and social impact assessment is available for consultation and public comment in the form of an information disclosure package at [www.wcn-site.com](http://www.wcn-site.com) and the complete environmental impact assessment reports are available in hard copy at:

*Constanta City, 75 Zorelelor Street, Room no.4, postal code 900562,  
Constanta County, Romania*

*Email: [postbox@wcn-site.ro](mailto:postbox@wcn-site.ro)*

*Tel: +40 (0) 374 207 853*

The above mentioned disclosure package is also available on EBRD website: [www.ebrd.com](http://www.ebrd.com).

The documents disclosed as indicated above are available in both Romanian and English languages. The Romanian and English documents are equivalent and consistent in describing the project and associated impacts.

There is a mechanism in place to receive and address grievances, complaints and suggestions from stakeholders. Any comments or concerns regarding Crucea North Wind Farm can be submitted as follows:

- by regular mail to: Crucea Wind Farm S.R.L., 75 Zorelelor Street, code 900562, Constanta City, Constanta County;
- by e-mail at: [postbox@wcn-site.ro](mailto:postbox@wcn-site.ro);
- or by contacting project's Community Liaison Officer, Mr. Adrian Simion, at the telephone number: +40 (0) 744 66 44 98.

## **1.2 SITE SELECTION CRITERIA**

The proposed site was considered a feasible location for the Project based on the following attributes that were identified at an early stage:

- the site is located outside any protected and residential areas;
- wind measurements performed indicated that the site has good wind resources;
- there are existing agreements for connection to the national power grid at this site;
- the site has good access via the existing public roads;
- no other significant environmental sensitivities were identified in close proximity.

The wind farm location and design was influenced by consideration of environmental issues such as: avoidance of water courses and wet areas, distance of the site to the nearest protected areas and residential houses, and interaction between turbines to minimize losses.

## **1.3 SITE LOCATION**

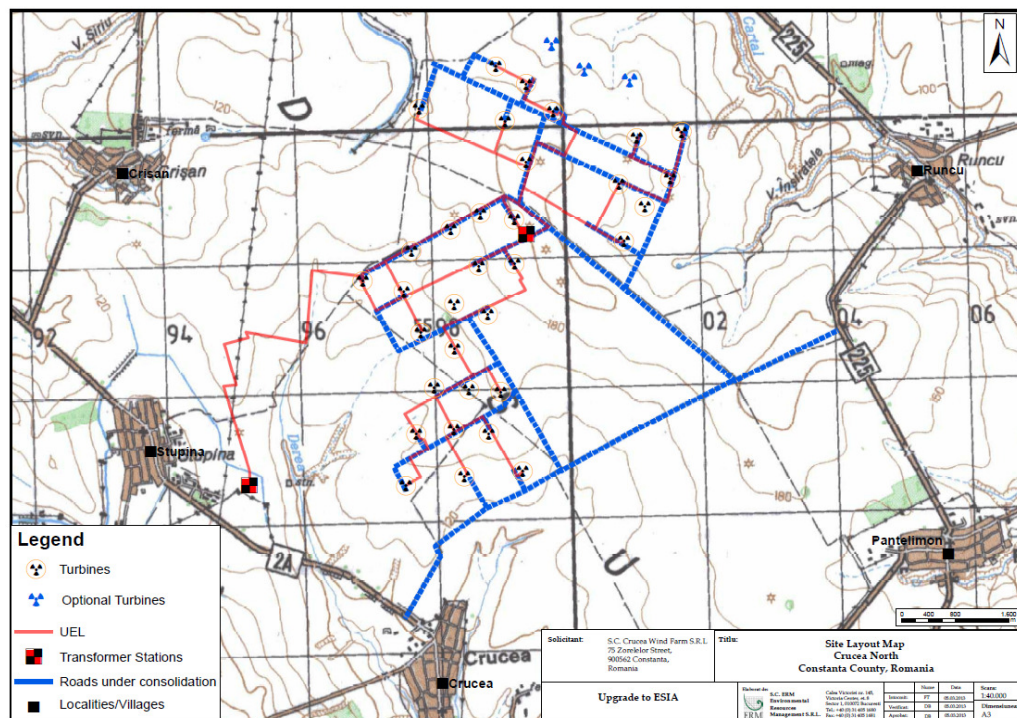
The Project is proposed to be located on the administrative territories of Crucea, Pantelimon and Vulturu communities, Constanta County, southeastern part of Romania. The nearest residential areas to the boundary of the Project site (including the 500 m safety buffer) are listed below:

- Crucea village (Crucea commune) - approximately 1.2 km south;

- Stupina village (Crucea commune) - approximately 2.5 km southeast;
- Crișan village (Crucea commune) - approximately 3.3 km east;
- Siriu village (Crucea commune) - approximately 3 km northeast;
- Vulturu village (Vulturu commune) - approximately 2.4 km north;
- Runcu village (Pantelimon commune) - approximately 2.5 km east;
- Pantelimon village (Pantelimon commune) - approximately 5 km southeast.

Figure 1 below shows the components of the Project, neighboring villages and communities as well as key features of the area.

**Figure 1** *Project site location and layout*



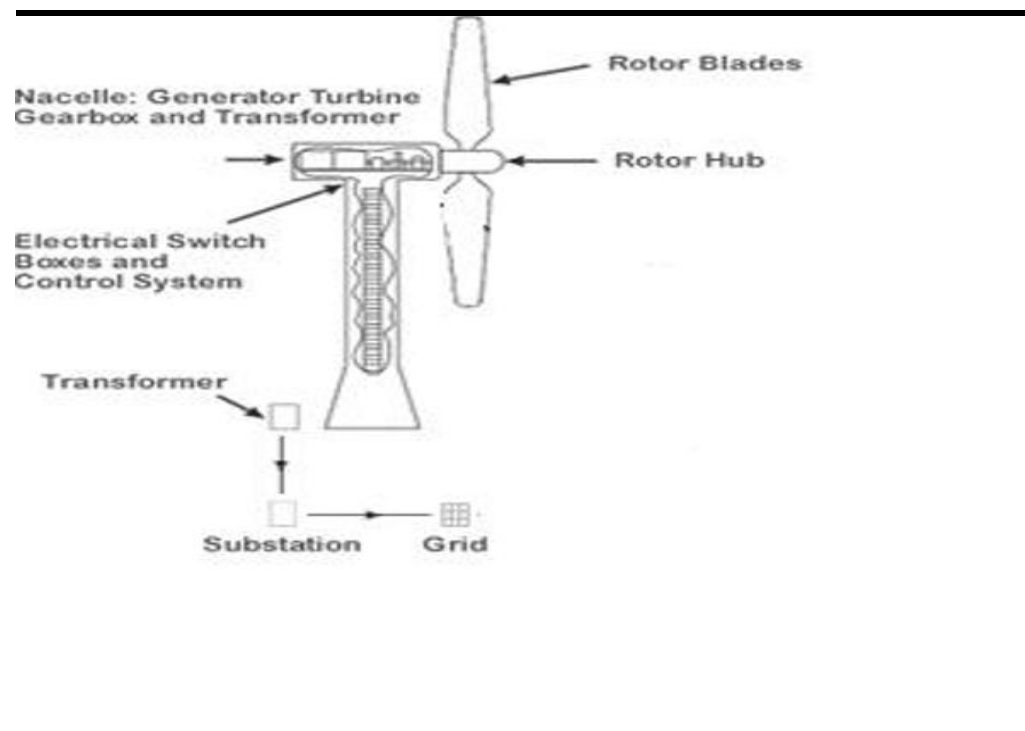
## 1.4 PROJECT DESCRIPTION

The main components of the Crucea North Wind Farm 99 MW (extension to 108 MW as option) are:

- 33 wind turbines (after extension 36 turbines), 3 MW each, total capacity of approximately 99 MW (after extension: 108 MW) - a diagram of a wind turbine is provided in Figure 2 below;

- construction of a Project Substation 33/110 kV to be located within the wind farm site boundary;
- construction of a 400/110 kV new Transformer Station Stupina 2 with one 250 MVA transformer, which will be connected to the existing Stupina 110/400 kV transformer station;
- a temporary construction compound within the wind farm site boundary (to be removed upon completing the wind farm construction);
- construction of a concrete foundation for each turbine;
- construction of crane pads;
- upgrade of approximately 45 km of existing agricultural service roads and construction of approximately 6 km of new access roads to the turbines;
- construction and operation of approximately 43 km of underground medium-voltage (33 kV) electrical connection lines to link the turbines and the 33/110 kV Project Substation (within the wind farm site boundary);
- construction and operation of approximately 8.8 km of underground high-voltage transmission lines (110 kV) from the 33/110 kV Project Substation to the 400/110 kV Stupina 2 Transformer Station;
- construction and operation of approximately 150 m of underground high-voltage transmission lines (400 kV) connecting the 400/110 kV Stupina 2 Transformer Station to the Power Distribution Grid owned by C.N.E.E. Transelectrica S.A. via the existing 110/400 kV Stupina Transformer Station.

**Figure 2** *Diagram of a wind turbine*



The Project site is approximately 22.64 km<sup>2</sup> and includes the project footprint, the wind safety area and a development buffer area. The project footprint (the area effectively occupied by turbine platforms, project substation, access roads and permanent crane pads) is 0.905 km<sup>2</sup> (90.5 ha) and comprises the total area that was rezoned to industrial use.

The new access roads will occupy approximately 0.024 km<sup>2</sup> (2.4 ha), while the existing agricultural service roads, following modernization works, will cover an area of approximately 0.1856 km<sup>2</sup> (18.56 ha).

The cession and superficies agreements for the land required for the Project were concluded with willing land owners/users. No owners were forced to give up their land and no physical resettlement will be required for the development of the Project.

The construction of the wind farm will comprise the following key phases which may overlap: logistics (works regarding the construction of access roads and upgrade of existing exploitation roads), electrical works, turbine installation and commissioning and restoration of the area. The logistics works are planned to be completed by May 2013 and the commissioning of the Project is expected to take place in June 2014.

At the end of the construction period, the land areas not occupied by turbines and other infrastructure will be restored to agricultural use according to a Restoration Plan.

## **1.5 OVERVIEW OF THE BASELINE CONDITIONS**

The Project site is located on arable farmland, in the Casimcea plateau. The Black Sea is approximately 41 kilometres to the southeast and the Mihail Kogalniceanu airport is approximately 27 km southeast. The Danube River is at approximately 30 km west of the site and the Romanian-Bulgarian border is approximately 70 kilometres to the south. The Project site and the local area are characterized as follows:

- the soil at the Project site is Chernozem which is common in the region and is quite fertile. There is no history of soil contamination known within the Project site;
- small communities and settlements typically comprising single story rural dwellings with basic amenities exist within the Project area;
- the nearest residential area to the wind farm is Crucea Village located approximately 1.2 km south of the site;
- no protected sites are located within the wind farm site boundary;
- surrounding flat, open farmland is cultivated with cereal crops and has therefore been significantly altered by human activities;
- the closest permanent surface water body is Cartalu Creek, located approximately 1 km northeast of the Project site;
- the groundwater table was not encountered at the site in the geotechnical borings performed at depths between 15- 21 m below ground level <sup>1</sup>. However, drinking water to Crucea village is supplied from two wells drilled to 15 and 20 m below ground level, respectively.

## **1.6 SUMMARY OF IMPACTS DURING PROJECT CONSTRUCTION AND OPERATION**

### **1.6.1 Soil and Groundwater**

By their nature, construction environmental impacts are temporary and all changes to the soil are reversible. As mitigation measure, the topsoil will be stored separately in designated areas of the construction compound so that it is not mixed with subsoil or driven over by vehicles. Overall, no significant impacts to soils are predicted during the construction of the wind farm.

*(1) Geotechnical stud, SC GTF Prospect SRL, August 2012*



Any compaction of the soil from the movement of heavy vehicles and machinery during construction will be mitigated through the implementation of best practice soil handling techniques.

Leaks or spills of diesel or lubricants from equipments or machinery during construction period may cause potential impacts to the groundwater. To minimize such risks, only well maintained equipment will be used and any maintenance and fuelling will be restricted to sealed, hard standing areas within the construction compound or at specialized existing service workshops. Measures to be taken in the unlikely event that an incident does occur during construction or operation are set out in the Emergency Response Procedure which has been developed for the Project. No significant impacts to groundwater are predicted to occur as a result of the construction of the wind farm.

During the operation of the Crucea North Wind Farm 99 MW (extension to 108 MW as option), potential impacts to groundwater may result if the contaminants reach the groundwater through a pathway which could be created by the installation of turbines with deep foundations. However, no existing contamination has been identified and the foundations will not be deeper than 2.5 m below ground level (well above the 15-21 m depth where the groundwater is estimated to be present<sup>(2)</sup>). Additionally, the use of potential contaminants during maintenance activities will be strictly controlled within standard turbine maintenance procedures. Therefore, no significant impacts to groundwater are anticipated during operation.

### **1.6.2 Hydrology**

There are no permanent surface water bodies within the Project site. The closest permanent surface water body is Cartalu Creek (a tributary to Casimcea River), located approximately 1 km northeast of the Project site. The second closest permanent surface water body is Darea Creek located 2 km southwest of the Project site and is a tributary to the Danube River.

The construction works will minimally interfere with agricultural field drains and any potential effects will be temporary.

During operation, the wind farm will have no water demands and no discharges will be made. The hard-standing areas (including new access roads, crane pads and turbines bases), although small in size as compared to the total wind farm site area, will minimally increase impermeable areas, resulting in a small increase in runoff rates and peak flood flows across the site. No significant impacts are anticipated either on the run-off rates or on the drainage patterns during the operation of the wind farm.

*(2) Geotechnical study, SC GTF Prospect SRL, August 2012*



### **1.6.3 Air Quality**

During the construction period of the wind farm, air emissions will consist of dust generated from construction activities (e.g. land moving) and combustion related emissions from vehicles and construction equipment. As part of this Project, there will be relatively small areas of ground breaking or land disturbance. Dust control measures will be employed during construction and overall no significant adverse impacts are predicted from dust generation.

As combustion emissions from construction traffic will be distributed across the travel route, and are not large in nature, these impacts are not anticipated to impact the air quality in the area.

During operation, the wind farm will not have any source of emissions, so no pollutants will be released into atmosphere. Operational traffic emission impacts associated with the wind farm will be insignificant due to the low numbers of vehicles accessing the site for maintenance.

Every unit of electricity produced by wind power has the potential to replace a unit of electricity generated by other means. As such, wind farm development reduces greenhouse gas emissions and other emissions, which can cause regional and local air pollution. In addition to benefits from the overall emissions reductions, acid deposition (acid precipitation) induced by sulphur dioxide and nitrogen oxides will also decrease.

### **1.6.4 Traffic and Transport**

The site can be accessed via national road DN2A, county roads DJ225, DJ226B and local agricultural service roads existing in the area. The final construction transport route will be discussed and agreed in consultation with Constanta County Council and the National Highway and Roads Company.

The construction of the wind farm will be associated with an assumed worst-case peak of approximately 965 one-way truck movements and 750 one-way car movements per month. Based on the construction schedule calculation a 6-day working week, it is estimated that there will be a worst-case peak of approximately 72 two-way truck movements per working day. Based on the same calculation methodology, it is assumed that there will be 55 two-way car movements per day, which is estimated to remain unchanged throughout the entire construction period. The above-mentioned trucks include:

- Restricted Access Vehicles (RAV) longer than 19 m or heavier than 42.5 tons, which will be used to transport wind turbine components; and
- Semi-trailers used to transport pad mounted, foundation cages, reinforcing steel for foundations, transformer for the Project substation, miscellaneous Project substation equipment; and
- Cement trucks.

By implementing a set of mitigation measures which will be set out in a Traffic Management Plan, including the use of minibuses to transport construction workers to the Project site, the impact of the construction traffic flows to the peak hours will be reduced and will result in minor adverse impact to local or county roads.

Traffic during the wind farm construction is not anticipated to have significant impacts to the local road infrastructure (county and community roads) and or traffic safety measures. No significant impacts are anticipated to occur to the local road network as a result of wind farm's operational traffic flows.

### **1.6.5 Ecology and Nature Conservation**

There are no national parks or wetlands protected under RAMSAR Convention (international treaty on wetlands conservation) within 10 kilometres of the proposed Project site. The nearest RAMSAR wetland is *Insula Mica a Brailei* located approximately 30 km west of the Project site.

The nearest natural protection area is *Cheile Dobrogei* (part of Natura 2000 network of EU protected sites), which at its nearest point is approximately 2.5 km east-northeast of the Project site.

Biodiversity surveys have been performed in 2010 at the site as part of the impact assessment and a monitoring program based on refined methodologies has been initiated as of March 2013. The results of the surveys performed in 2013 were consistent with those of the surveys carried out as part of the impact assessment process and confirmed the impact assessment conclusions summarised below.

No impacts on the integrity of the nearby Natura 2000 sites are expected as result of the project implementation.

#### *Terrestrial Habitats and Protected Species*

The construction of the wind farm will temporarily disturb or result in the loss of small parcels of agricultural habitat and marginal habitats (on access roads) on site.

Restoration of the temporary construction work areas and access roads not required for the operation of the wind farm will be undertaken to a high standard and the land returned to agricultural use.

The biodiversity survey work performed as part of the environmental impact assessment process identified the presence on site of two lizard species and of the ground squirrel, all protected under the EU Habitats Directive.

Biodiversity surveys will be performed during construction and operation phases of the project and as a result, any additional mitigation that may be deemed necessary will be implemented.

### Birds

Three main effects on birds are expected to potentially arise from the implementation of the project:

- displacement of birds from feeding or breeding areas;
- direct mortality through collisions; and
- increased energy expenditure avoiding wind farms during migration (barrier effect).

In order to minimise the above effects, a set of mitigation measures will be defined as needed based on the results of the bird surveys (covering all seasons) to be performed during both the construction and the operation stages of the project and extended over several years. The mitigation measures implemented will be adapted on-going as needed, based on the results of the surveys.

### Bats

The bat usage assessment of the site performed to date indicated very low use of the site between May and October, with some increased activity in August and September.

In December 2012, a walk-through of the site confirmed the absence of structures that are suitable for bats. Limited areas of semi natural vegetation, including small defiles leading to quarry areas near Runcu, were identified during the December walk-through but overall the general habitat of bats is poor.

Based on the above, it is anticipated that the construction and operation of the wind farm will not cause significant adverse impacts on bats. However, bats will be monitored post construction in order to confirm these assumptions, detect changes in the use of the site by bats and define any mitigation measures that may be deemed necessary.

## **1.6.6 Landscape and Visual Impacts**

A landscape and visual impact assessment has been performed as part of the environmental impact assessment process.

This included producing photomontages of the proposed project with the purpose of visualising the aspect of the area upon project implementation. A photomontage example of the project is provided below.



The proposed wind turbines are located on flat, open agricultural land with sparse vegetation.

On a local level, two landscape character types were identified and their sensitivities were assessed. The surrounding settlements and communities are considered to be of medium to low sensitivity given their current quality and condition. Surrounding farmland type is also assessed as of low sensitivity due to the presence of detracting features (components of other wind farm projects already constructed in the area: electrical lines, turbines, poles).

Other wind turbines can be seen within the landscape as intrusive elements within the landscape. The Project in combination with the other wind farms in the area will result in a visual change on the landscape as the wind turbines are standing out as technological structures on the background of arable agricultural land, however, not constituting substantial changes in the existing spatial patterns.

As wind turbines started to become a common view on the Project area as well as on the agricultural landscape in south-eastern Romania in general, the projects' infrastructure elements will not induce a significant visual change.

### 1.6.7 *Socioeconomics*

The socioeconomic assessment addressed social, economic and health impacts and effects anticipated to arise in the local communities as a consequence of the proposed Project. It focused on impacts to the Crucea, Pantelimon and Vulturu Communities, which are most likely to experience the impacts of the Project.

Baseline data were collected from publicly available information and via a questionnaire completed by Crucea Mayorality aimed at gathering information on the socioeconomics of the community. A field visit and face-to-face meetings were also held with the community mayors in order to gain a better understanding of the local living conditions.

#### *Impacts Management*

An Environmental, Health and Safety (EHS) Management System is available for the Project to effectively address potential impacts during all project stages (design, construction and operation).

The management system includes among others:

- clear allocation of tasks and job description for each employee;
- a human resource policy;
- land acquisition procedure for potential future investment in the area (based on open negotiation and market value), easements and right to use land;
- permanent consultation with land owners and users by implementing a Stakeholder Engagement Plan including a procedure to address public grievances.

The wind farm will have minor adverse impacts on land use as only 0.905 km<sup>2</sup> of the 22.4 km<sup>2</sup> site were rezoned to industrial in order to allow the construction of turbine foundations, project substation, permanent crane pads and access roads. Where possible, construction activities will avoid the crop growing seasons. However, should crops be damaged during this period, compensation will be provided and land will be fully reinstated according to the provisions of the Compensation Action Plan. Also, after the completion of the construction works agricultural activities will continue on the lands not affected by wind farm operation and maintenance.

The construction of the Project will involve a total workforce of 445 workers who will be employees of the subcontractors awarded the respective works. It is not anticipated that all these workers will be on site at the same time. Only a small part of the construction workforce will be employed from the manpower

available locally. During the operation of the Project, a team of 20 employees will ensure its operation and maintenance.

Employment for locals will have a noteworthy effect on those who are employed; however, this will be only a very small percent of the total population.

Impacts on the housing situation in the local communities are expected to be negligible taking into account that the construction workforce is anticipated to be accommodated in Ovidiu town. Accommodation conditions need to comply with the relevant national and international standards.

There is no evidence that migrant workers have introduced difficulties associated with import of diseases in the past and due to the relatively small scale of the project and construction staff it is likely that the impact on host communities will be limited. Smoking, alcohol and drug abuse are not generally considered to be significant problems in the area and the Project is not expected to have any impact on this issue. A code of conduct will be available and mandatory for all non-local workers.

The procurement of local goods and services will benefit those supplying the Project. A potential increase in demand for certain supplies with associated impacts on local prices and availability cannot be excluded.

Construction works will lead to the long-term improvement of local infrastructure by the upgrade of approximately 50 km of existing agricultural exploitation roads. While the construction of a network of new roads to provide access to the turbines will imply land use impacts, it will also have positive impacts by providing local farmers with improved access to the agricultural land.

The Project developer will pay annual taxes to the local communities for the lifetime of the Project.

The operation of the wind farm will have no negative impact on air quality. On the contrary, it will displace approximately 140,000 tonnes of CO<sub>2</sub> per year, which would otherwise be produced by non-sustainable sources such as the burning of fossil fuels.

Operational traffic emissions are anticipated to be negligible and not to have adverse effects on human health as associated air quality impacts are expected to be insignificant.

To increase the positive effects and reduce the negative ones during the operation of the wind farm, the following mitigation measures can be applied:

- all land not affected by wind farm operation and maintenance will be returned to agricultural use;

- the taxes to the local communities will be paid in a timely and transparent manner;
- local farmers will be allowed to use the access roads to the turbines.

#### **1.6.8 Cultural heritage**

No museums or tourist attractions of international or national value are known to be located in the local communities.

Constanta County Directorate for Culture and National Heritage issued the approval no. 116/27 April 2012 for the Project and the Developer concluded an archaeological surveillance agreement with the Constanta Museum of National History and Archaeology, applicable for the excavation works. This agreement would become an archaeological research service agreement should the excavation works reveal the presence of any unknown archaeological values.

#### **1.6.9 Electromagnetic radiation**

Wind turbines could potentially cause electromagnetic interference with aviation radar and telecommunication systems (e.g. microwave, television, and radio). As part of the construction permitting procedure, the relevant authorities have been contacted and no concerns were raised with regards to the Project at that stage.

#### **1.6.10 Shadow flicker**

Shadow flicker is a flickering or strobing effect that moving shadows of the rotating blades can cause when perceived by humans. The distance from the nearest residential area (Crucea village) to the wind farm boundary is approximately 1.2 km. Given that shadow flicker effects may be perceived at a maximum distance of approximately ten times the rotor diameter (i.e. 900 m), no associated impacts are expected on the residential areas.

#### **1.6.11 Ice throw**

Wind farms operating in cold climates may suffer from icing in certain weather conditions and a failure in the rotor blade or ice accretion can result in the 'throwing' of a rotor blade or ice from the wind turbines, which may affect public safety.

This is only deemed a problem where there is the possibility of people being near the turbines. There are no recorded rights-of-way on site that people use and the distance from the turbines to the nearest existing paths and tracks



is approximately 100 m. In addition, no agricultural works are carried out on fields during winter time and therefore associated safety impacts are unlikely.

## **1.7 CUMULATIVE IMPACTS**

An assessment of cumulative impacts has been performed based on information available to date and considering all projects at the agreement and/or permitting stage within a radius of 10 km of the Crucea North Project (21 wind farm projects).

Cumulative impacts on (i) flora and habitats, Annex IV species, bats, birds and on the protected areas have been considered.

In general the land use, topography, and lack of proximity to protected areas suggests that Crucea North's contribution to cumulative impacts is unlikely to be significant for most features. Direct loss of protected areas will not occur and cumulative impacts on mobile features such as bats will be minimal.

Further work on displacement and its effects on qualifying bird species is required although initial work suggests such impacts are minimal. Information drawn from the literature, results from surveys and assessment work performed for other projects in the wider region, current positive population dynamics of species exposed to turbines, all indicate that actual collision impacts for migratory birds are low and below the level required to affect populations.

The original surveys for the Crucea North site suggested impacts in isolation on migratory birds would be insignificant. Further work to model collision risks is underway to improve the robustness of predictions. This data may allow some extrapolation to the impacts of similar wind farms within the 10 km buffer.

Data from other wind farms would be valuable in increasing the robustness of the cumulative impact assessment, but access and the quality of such data appears limited.

## **1.8 ENVIRONMENTAL AND SOCIAL ACTION PLAN**

An Environmental and Social Action Plan has been defined to include the further actions for implementation to ensure that the project is in compliance with the applicable international standards and performance requirements.

The most relevant components of the Environmental and Social Action Plan to be implemented in the next period are the following:

- Prepare an Environmental and Social Management Plan (ESMP) transposing identified mitigation measures into clearly defined actions to be implemented along all stages of the projects.
- Appropriate construction, materials storage and waste management practices will be employed during construction to reduce potential significant impacts occurrence.
- Implement the occupational health and safety plan which covers all activities, including those developed by contractors.
- Undertake one year biodiversity survey (birds, reptile, amphibians, and mammals) during construction period. If required implement additional mitigation and/or offsets to ensure that the protected sites do not lose site integrity.
- Carry out regular birds carcass (death birds) searches using appropriate protocols. Searches will be performed weekly during peak migration periods and fortnightly searches outside of migratory season.
- Identify and refine mitigation measures and if necessary compensatory measures in response to the survey efforts. In response to full survey data identify deliverable, proportionate and appropriate mitigation strategy.
- Implement a Chance Finds Procedure documenting the means by which Crucea Wind Farm S.R.L. will deal with any unexpected cultural heritage finds, in line with national requirements and best practices.