



**SAINT NIKOLA  
KAVARNA WIND FARM**


**Environmental  
Management and  
Monitoring Plan  
(EMMP)**

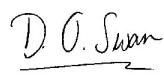
**AGE**

**November 2008**

## **RSK GENERAL NOTES**

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the Quality Management System of RSK Environment Ltd.

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# 1 OVERVIEW

The Environmental Management and Monitoring Plan (EMMP) is intended to be a stand-alone document that will form the basis for management of social and environmental commitments during detailed design, construction and operation of the project. In addition, AGE will develop and implement an Environmental, Health and Safety Management System (EHS MS) for the wind farm operations in Bulgaria. The EHS MS will set out the policies and procedures required to manage environmental and social impacts of the project to comply with applicable Bulgarian and EU legislation and the requirements of performance standards and policy requirements contained within the EMMP.

This EMMP has been prepared to aid delivery of the project's environmental commitments that have been identified through the Environment Impact Assessment (EIA) process and subsequent supplementary works. It sets out how the commitments will be translated into actions in the field and the means by which they will be monitored and verified. It will form part of the construction and operational contracts and will therefore be contractually binding. It outlines the environmental commitments that are to be delivered by the Construction and Operations Contractor, and will be a dynamic working document, which will continuously evolve over the course of the Project detailed design, construction, operation and decommissioning.

The EMMP focuses, in particular, on the following topics that are recognized as being the main mechanisms by which commitments are translated into practice:

- Practical training and awareness of construction and project staff; and
- Supervision and monitoring of environmental, issues in the field.

This section provides an overview of the:

- Project outline;
- The project's approach to management of environmental issues and how its elements will be managed and co-ordinated;
- HSE policy;
- The project's organization, roles and responsibilities, including responsibility for provision and implementation of the various elements of the EMMP;
- Record keeping; and,
- Environmental impacts and mitigation measures.

The purpose of the EMMP Overview is to set out the main elements of the system in order to establish a common understanding between the key staff involved in ensuring effective environmental and social management of the project.

## 1.1 Project Outline

The site of the Project is situated on the community land of the villages of Bulgarevo, Sveti Nikola, Hadji Dimitar, Rakovski and Porouchik Chounchevo in Kavarna Municipality (see Figure 1.1 below).



**Figure 1.1 Project Site Location**

The Project covers a total area of about 60 km<sup>2</sup>, although only 6 hectares (60 decares) will be used permanently for the operation of the wind farm in total (equivalent to 0.09% of the total area of the site).

Including for construction and operational structures, the Project consists of the following key components:

- Up to 52 Vestas V90 wind turbines and foundations (62 turbines were originally planned but were subsequently reduced due to environmental mitigation measures introduced by the relevant authority);
- An electrical sub-station;
- Underground 33 kV electricity cables from the turbines to the sub-station;
- Temporary access tracks to the site and between the turbines; and
- Temporary construction components including a construction and storage areas.

In addition to these components, an overhead 110 kV electricity cable from the substation the wider network Kavarna sub-station will be constructed. The consent for this line has been made under separate notice by National Electricity Company (NEK) and has been obtained.

The turbines will have a capacity of 3 MW each, with an overall height to blade tip not exceeding 150 metres (m). The turbines will be of a typical modern design incorporating tubular towers and three blades attached to a nacelle housing the generator, gearbox and other operating equipment. Closed systems will be used to prevent operational spillages and protect construction and

maintenance staff. There is a minimum distance between the turbines of 500m and a maximum distance of 2 kilometres (km). The detailed design specification for each foundation will depend on the ground conditions at that location. It is anticipated, however, that each turbine foundation will require an area of approximately 900m<sup>2</sup> to provide for a reinforced concrete foundation. Pictured below is the Vestas V90 – 3 MW turbine, which is proposed for the Project and is the latest and most advanced technology in Vestas’ product offering. Vestas is the world’s largest wind turbine manufacturer.

The sub-station compound will occupy a permanent area of approximately 6,000 m<sup>2</sup> and will incorporate the switchgear and metering building. All power and cabling on site from and between the wind turbines and up to the sub-station will be laid in trenches which will then be backfilled with excavated subsoil and topsoil.

It is proposed that 42km of existing municipality-owned dirt roads will be repaired to facilitate construction of the turbines and their foundations and sub-station. Once construction is completed, it is intended to maintain the roads to enable maintenance activities. The site is also crossed by third class roads which will be used for cabling purposes and will be returned to their original state after cable installation.

Construction and storage areas will be restricted to Project-owned land to facilitate localised servicing of the construction of the turbines (up to 15 different plots may be used). Chemicals and materials stored in these locations will be held securely and in accordance with the relevant Bulgarian and IFC Performance Standards.

It is intended that the Project will be implemented in one stage involving construction of a substation, electric power network and 52 wind generators with installed capacity of 156 MW in 2009. The construction period is expected to be 12 months.

The proposed site has been allocated under the current territorial structural plan as land designated for farming and other compatible production activities. As only 6 hectares of land will be permanently required for the development footprint of the Project, the predominant land use will continue to be agricultural production, apart from the limited area of the turbine bases and sub-station building. It is proposed that construction of the Project will be phased to avoid key farming activities and thus times of highest productivity.

## 1.2 Commitments and Action Tracking Registers

The Commitments Register from the EIA (reproduced in Appendix A) will be updated to provide a means by which the actions therein are tracked in terms of implementing and closing out before construction begins (by AGE). The register in Appendix A will be developed from its current format to list how each commitment therein will be implemented via the appropriate plan or procedure and through training, and will provide a means by which progress can be detailed and dated and tracked.

The Action Tracking Register will include a status column that will be regularly updated by AGE's Environmental Officer during the course of the project until each commitment is complete, i.e. discharged.

This EMMP and the Action Tracking Register form part of the construction and operation contract and are therefore contractually binding. The Action Tracking Register, however, is a live document and further items may need to be added during construction and operation. It will be updated during the course of the project by the developer with input from the Construction and Operations Contractor.

### 1.3 Management Approach

The projects approach to Environmental Management is to apply the principles of environmental protection to all activities for which it is responsible. These principles include:

- Prior assessment of environmental impacts;
- Minimization of potential impact through design and other mitigation controls;
- Monitoring efficacy of controls; and,
- Auditing of performance.

### 1.4 Project Organisation, Roles and Responsibilities

In 2006, AES, the international power company, formed a joint venture with GeoPower called AES GEO Energy OOD (AGE) to complete the development and own and operate the Project. The ownership of AGE is 89% AES and 11% GeoPower.

#### **AGE**

AGE is responsible for letting and managing contracts for construction and operation of the project to competent contractors.

AGE will provide an Environmental Officer (EO) who will be responsible for the overall management of environmental performance during detailed design, construction and operation, including update and development of the Action Tracking Register. The EO will report directly to the AGE Project Manager.

#### **Construction/Operation Contractor**

The Construction and Operation Contractor is expected to appoint a suitably qualified Contractor Environmental Representative (CER) to ensure effective implementation of the environmental commitments contained in the EIA. The Construction and Operation contractor is expected to comply fully with those aspects of the EMMP for which they are responsible and it will be the role of the CER to ensure that this happens. The presence of the CER on site will therefore be determined by the Contractor, but will need to be sufficient to ensure compliance is maintained. AGE's EO will monitor the performance of the contractor and CER and will instruct AGE's Project Manager where it is considered greater time is required on site.

## 1.5 Code of Conduct

The following set of rules for behaviour on site, in the construction office and at all other project locations will be adopted:

- Access to the work areas will be restricted to the construction workforce and project staff;
- Personnel will be issued with a permit on completion of their induction training;
- Permits will be carried at all times and be available for inspection on request;
- Access to work areas will be restricted to personnel carrying a permit and authorized visitors on project-related business;
- Authorized visitors will be accompanied by a permit holder at all times;
- Zero tolerance of illegal activities including the use of illegal drugs by construction personnel;
- Zero tolerance of bribery;
- No use of project vehicles for non-work business;
- No use of personal vehicles within construction areas;
- Zero tolerance of alcohol and/or drunkenness;
- Strict adherence to traffic regulations and project speed limits;
- Seat belts to be worn by all drivers and passengers;
- Inconsiderate behaviour towards local land users will not be tolerated;
- No firearms or weapons to be carried;
- Appropriate PPE to be worn (which as a minimum will comprise overalls, safety boots, hard hat and high visibility vest and safety eye wear), and adherence to other AES site safety rules will be required;
- Smoking only allowed in designated areas; and
- Adherence to Bulgaria's laws and regulations.

## 1.6 Record Keeping

A project environmental filing system will be established at the construction office. The system will contain the following documents:

- EMMP;
- EIA;
- Ecological reports (e.g. bird survey and monitoring reports);
- Monthly audit reports;
- Weekly inspection reports;
- Daily diary observations;
- Environmental incident forms;
- Complaints register;
- Environmental and social correspondence;
- Method statements;
- Training materials; and,
- Training plan and records.

## 2 TRAINING

The emphasis of training will be to establish common environmental requirements and standards before or during the first few weeks of construction.

All training will be delivered in Bulgarian and additional languages, as appropriate and delivered through:

- Senior management briefings to management personnel;
- Induction courses for everyone working on the project; and
- Toolbox talks for individual construction teams.

All training will also comply with the relevant standard of investors in the Project

### 2.1 Senior Management Briefings

The AGE project manager, will organize a training workshop for the key senior staff to provide an overview of the EMMP and ensure common understanding of roles, responsibilities and standards for the project.

Following award of contract, AGE's EO or AGE's project manager will repeat the workshop with the Construction and Operations Contractor's senior personnel. This will ensure that they are briefed fully on the EMMP requirements and to AGE's commitment to good environmental performance and community relations.

### 2.2 Induction

All project construction staff will attend an environmental induction course that will take 1–2 hours and will explain the key requirements common to everyone on the site. The induction will have a strong focus on visual presentation – graphics, illustrations, diagrams, photographs – and will contain simple, clear messages. The induction courses will be prepared and delivered by AGE's project manager or AGE's EO with the assistance of the construction and operation contractor's management team. Induction training will be provided to all personnel before they commence work on site. Induction courses will therefore be delivered regularly – particularly during the first few weeks of the project – and a training log will be maintained to record attendance.

The main topics covered will be:

- Bulgarian Environmental Policy;
- The key sensitive receptors and actions required to protect them during day-to-day operations;
- Management of excavated materials;
- Prevention and clean up of spills;
- Archaeological chance finds;

- Ecology;
- Discovery of contaminated land and fly-tipping;
- Traffic safety including access routes and speed restrictions;
- Noise minimization;
- Waste management, handling and storage; and
- Good housekeeping.

## 2.3 Toolbox Talks

In addition to the induction, toolbox talks will be held to provide supplementary information to staff involved in operations with the potential for significant environmental impacts and/or for which there are specific environmental requirements not covered in the general induction. A toolbox talk is a shortened training course, lasting between approximately 15 and 30 minutes, delivered direct to a field crew before a task begins. The toolbox talk will be related closely to the appropriate and defined construction Method Statement for the relevant operation.

Toolbox talks will be developed by the Construction and Operation Contractor's CER with support from AGE's project manager and/or AGE's EO. They will be delivered by the CER, with support, from AGE's project manager and/or AGE's EO.

The content of the toolbox talks is provided in Section 11.5 as the management plan summaries have been written as bullet points to facilitate delivery of the project requirements to the workforce through training.

## 2.4 EMMP Pocket Guide

In order to ensure maximum compliance with the EMMP, a small, laminated pocket guide to the project environmental issues will be produced by the AGE's project manager and/or AGE's EO and distributed to all staff. This guide is intended to augment the training already received and will detail important information such as site emergency contact numbers/emergency radio bands, locations of spill kits and first aid kits, waste segregation and storage and speed limits.

### 3 AUDITS, INSPECTIONS AND OBSERVATIONS

Regular audits and inspections of the project EMMP will be conducted to track progress and performance. Reporting of these will be undertaken, as outlined in Section 4.

Audits, inspections and observations will include:

- Monthly audits led by the CER, with the participation of the AGE's project manager and/or AGE's EO;
- Weekly joint inspections by AGE and the Construction Contractor;
- Weekly reviews by AGE of corrective actions from previous audits;
- Daily observations by AGE and the CER;
- At the beginning of each monthly audit, AGE's project manager and/or AGE's EO will review the close-out of actions from the previous month; and
- One-off checks by AGE (e.g. Waste Audit).

The frequency of monitoring for individual commitments will be identified in the Action Tracking Register. This will be reviewed regularly and will be adjusted as necessary to take account of audit findings.

#### 3.1 Monthly Audits

The monthly audits will involve a full review and update of the Action Tracking Register and will therefore cover all the key elements of this EMMP. The CER will submit an updated version of the Action Tracking Register with a summary report of the audit findings, to AGE within two days of completing the audit.

AGE's project manager and/or AGE's EO will:

- Review and approve each audit report;
- Identify any non-conformances;
- Identify/agree corrective actions (with timescales) with the Construction or Operations Contractor; and
- Monitor the close-out of corrective actions at least weekly.

#### 3.2 Weekly Inspections

The weekly inspections will be simpler, concentrating on day-to-day items such as pollution control, waste storage, and traffic movement. In addition, certain requirements are best monitored through informal daily observations, which are made whilst personnel are travelling around the works.

#### 3.3 Daily Observations

A diary containing daily observations will be maintained by the CER and project manager and/or AGE's EO. The diary should also record the actions taken to correct any observations that could

lead to a breach of the commitments or contract. The diary will be reviewed as part of the monthly audits by AGE.

## 4 REPORTING

The amount of reporting required by the EMMP has been minimized as far as practicable, having regard to the scale and length of the project. However, a minimum of four types of report is required, as detailed below. All reports will be prepared in English to facilitate review.

### 4.1 Incident & Near-Miss Reports

All personnel employed on the project are responsible for reporting all environmental incidents and near misses. Whilst ensuring the safety of themselves and others, all personnel are required to initiate and or/assist in immediate containment/ remediation/corrective action to the best of their capabilities in relation to incidents and near misses.

Incident and near-miss reports will be generated by the CER and project manager and/or AGE's EO, as appropriate, and will be completed after any environmental "incident" or "near-miss". These include spills, environmental damage, accidents, complaints from communities and neighbours, etc. A pro forma will be produced which will include identification of root causes and recommendations for mitigation and improvement.

Incident and near miss reports will be submitted to the Construction or Operation Manager within 48 hours of the occurrence. Each report will be reviewed by AGE who will be responsible for ensuring that appropriate action is taken to prevent a recurrence. Records of incidents and near misses shall be kept at the site office.

### 4.2 Audits, Inspections and Observations

Monthly audit and weekly inspection reports will be generated through the audit process described in Sections 3.1 and 3.2. Daily observations will be recorded informally in a diary as described in Section 3.3.

### 4.3 Monthly Environmental Report

A short Environmental Report will be generated by the CER, and reviewed by AGE each month. This will include:

- Incidents and near misses;
- Status of all non-conformances identified during audits and inspections;
- Complaints;
- Accidents;
- Waste volumes, types and disposal;
- Contaminated land discovered;
- Archaeological finds;
- Ecological issues; and
- Other relevant environmental issues.

## 4.4 Other reporting

### *Land acquisition*

The consent for the overhead 110 kV electricity cable from the substation to the wider network has been secured under separate notice by the National Electricity Company (NEK). In addition, NEK completed the Detailed Territorial Plan (DTP) and easement establishment procedure. NEK is obliged to permit and construct the T-line for interconnection of the WF, however, AGE will take responsibility for negotiating with individual land owners affected by the route. To this end, the deals will be notary stamped by the local registered Notary as required under Bulgarian law. During this process, AGE will be required to report to Project investors on the land acquisition process, including consultations undertaken and possible economic displacement, to ensure that it complies with their standards and requirements. AGE will ensure that negotiations with willing sellers will be based upon the market value at that time in terms of land purchase, crop compensation and any other losses resulting from the Project.

## 5 PLANS AND PROCEDURES

The suite of plans and procedures detailed in this section forms the framework for managing environmental and social issues throughout construction and operation. They will form the contents of the training described in Section 3.

### 5.1 Community Liaison

Consultations and community liaison will be undertaken in line with the Public Consultation and Disclosure Plan (PCDP) produced for the Project. It will include the development of a high-level construction programme that will outline engagement activities at the various stages of project e.g. mobilisation of contractor/workforce, start of excavation activities, equipment transport, etc. It will also include the stakeholder groups that will be consulted, at what stage and why.

In addition to the PCDP, the Construction and Operation Contractors ES&H Officers will:

- Maintain a Communications Log that records discussions with community members;
- Maintain a Complaints Register that records all complaints from local communities. The Complaints Register will be available for project stakeholders and local community representatives to inspect when requested; and
- Provide details of any discussions with Statutory Consultees.

The CER and project manager and/or AGE's EO will monitor the above activities on a weekly/monthly basis respectively. In addition, they will jointly review the Complaints Register monthly. All records kept in relation to the above will be held at the construction offices during construction and site offices once operational. They will be made available to stakeholders on request.

*Deliverables:*

- Communications Log; and,
- Complaints Register:
  - Date complaint was lodged;
  - Name and contact details of the complainant;
  - Nature of complaint;
  - Agreed corrective action and party responsible for implementation;
  - Record of when the correction was completed;
  - Record of outcome as agreed with complainant; and
  - Date of close-out.

### 5.2 Ecology

The principle potential ecological impact is to the local, migratory and possibly winter bird population.

Detailed ornithological surveys have been completed and reported in the Environmental Statement and in subsequent supplementary documents associated with the due diligence procedure and a full assessment of impacts in the absence of mitigation has been completed. A suite of specific mitigation measures has been devised to reduce impacts and these are detailed below. All mitigation and monitoring during the construction and operation phases of the project will be coordinated by an Independent Ornithological Expert (IOE).

Surveys to reduce the impacts on ornithology are discussed first in this section followed by a description of the proposed turbine shut down system and commitments to bird collision modelling.

### **5.2.1 Independent Ornithological Expert and Senior Field Ornithologist**

#### *Independent Ornithological Expert*

An Independent Ornithological Expert (IOE) is to be employed by AGE to facilitate and coordinate all of the ornithological surveys and mitigation monitoring. Protocols for survey and interpretation of survey results will be developed and completed by the IOE. The IOE will not be a direct employee of AES or AGE and will not be an employee or a representative of the investors but should be an independent specialist consultancy employed by AES. The IOE will have relevant experience and detailed understanding of the potential impacts on avian fauna associated with wind farms. They will also have detailed experience of field survey including in-country and local area knowledge and be able to advise on methodology for such survey. The IOE will not have a permanent in-country presence as the scheme will retain a local Senior Field Ornithologist (SFO) to co-ordinate 'on the ground' survey and data collection when the IOE is not present. When the IOE is not present on site, their authority will be delegated to the SFO.

The IOE will hold the authority to instigate the turbine shut down system. The SFO will also have this delegated authority when the IOE directs (primarily when the IOE is not on site). AGE is required to follow the order for a turbine shut down from either the IOE or SFO, when requested. The IOE will have knowledge and understanding of the radar system to be used and will be present during the initial training and installation of this facility. The in-country radar operator(s) will be the principle individuals who will use this technology for the purposes of turbine shut down and the IOE will interact directly with the operator(s) in order to inform turbine shut down decisions appropriately. It is not required for the radar operator(s) to be a field ornithologist, however, all ornithologists, including the SFO, will be trained in the use of the radar in order to understand the procedure and to cover for sickness or any other unforeseen circumstance.

The IOE will initiate the set up of a Turbine Shut Down System and will manage and coordinate it in practice. However the SFO will again have delegated powers in this regard where the IOE directs. Details of the Turbine Shut Down System; methods, protocols and reporting are detailed in Section 5.2.4

The IOE will be present on site for each of the three bird migration activity seasons of autumn, winter and spring (when possible bird collision is most likely to occur) during the first full year of operation, although this presence will not be on a full time basis. The observation timetable for each of these seasons is proposed below but may be altered only by the IOE where required, appropriate, and justified, subject to ongoing review of weather conditions and observed migration activity:

- Autumn: 15 August – 30 September
- Winter: January (subject to survey findings during 2009)
- Spring: 15 March – 15 May

Where departures from this timetable are proposed, they will be agreed with AGE and the Intercreditor Agent prior to making changes and recorded in the survey protocols (see above).

Following the first year of operation, the IOE will maintain a presence on site for a further two years. The seasonal requirement for the presence of the IOE during the two further years will be based upon those for the first year (listed above) but will, however, be informed by the results observed during the first year. For example, bird activity during the first year may indicate that spring migration activity does not require a presence for subsequent years. As with the first year, the timetables for the second and third years will be agreed with AGE and the Intercreditor Agent prior to their commencement and will be recorded in the survey protocols.

Over the course of the first operational year, there will be a gradual transfer of knowledge from the IOE to the SFO. This will continue over the second and third year with the SFO taking increasing responsibility for all ornithological duties on site over the three years (which will also influence the timetable for each year in terms of the presence of the IOE). It is the ultimate goal that, after the third year, the SFO is promoted to the role of IOE. However, this will be subject to the IOE and Intercreditor Agent being satisfied of the SFO's competence. This decision will also be subject to, and informed by, the performance of the Project over the three years in terms of ornithological impacts. For instance, if there has been any statistically significantly adverse impact of the wind farm over the three years (adverse impact is defined under Section 5.2.5 below), then it is likely that the hand over of the IOE role to the SFO could be delayed until such time as this impact has been mitigated to the satisfaction of the IOE and Intercreditor Agent.

#### *Senior Field Ornithologist*

The role of the in-country Senior Field Ornithologist (SFO) is to provide day to day support in the management of the Project obligations with respect to ornithology. During the bird migration activity seasons, the SFO will primarily operate as a mobile field observer and will maintain a constant presence during these seasons, as defined for the IOE above. The SFO will be responsible for reporting on the results of each seasons activities and will forward the results of each field survey for the IOE to review and sign off prior to submitting them to AGE and the Intercreditor Agent. Whilst the primarily responsibility of the turbine shut down will rest with the IOE during the first three years of operation, the SFO will be delegated this duty in the absence of the IOE. As

described above, it is the intention that the SFO will take increasing responsibility for all ornithological duties on site over the three years with a view to being promoted to the role of IOE thereafter (subject to the conditions outlined under *Independent Ornithological Expert* above).

Reporting to the IOE, the SFO will oversee the in-country breeding bird surveys (see Section 5.2.2), and Bird Collision Monitoring in the field (see Section 5.2.5).

Whether the international IOE or the promoted SFO, the role of the IOE will be maintained on site for the duration of the autumn migration season for the life of the Project.

### **5.2.2 Breeding Bird Survey**

All species of breeding bird are protected in Bulgaria under Article 45 of the Biodiversity Act with some annexed species receiving additional protection. All breeding birds, active nests, eggs and dependent young are protected with some rarer or more threatened species receiving higher levels of protection though being listed on various annexes to the Act.

In order to comply with Bulgarian law, for those components of the wind farm to be constructed during the breeding season, a breeding bird survey will be completed in and around the location of those components prior to their construction. This will ensure minimal disturbance to breeding birds during the construction Phase of the project.

The breeding bird survey will be prescribed by the IOE using a variation to the standard guidelines for the completion of breeding bird atlas surveys. Visits will be made to the site by the SFO supported by local field ornithologists where required with all registrations of birds and activity being mapped and recorded. Breeding status will be determined using categories of breeding status set by the European Ornithological Atlas Committee (EOAC). Breeding status is categorised as; confirmed, probable, possible or non-breeding.

If breeding of any species is confirmed and active nests are located in the working area, the SFO will define exclusion zones in consultation with the IOE which will be set based on the species recorded and these zones will not be disturbed until natural cessation of breeding activity (turbine and access road micro-siting will be undertaken in order to allow works to proceed where possible). For breeding birds with precocious young (waders, wildfowl and gamebirds) sufficient space will be allowed for natural dispersal of dependent young once they have hatched and left the nest. Natural cessation of breeding effort will be determined by the SFO on the site and will be when dependent chicks have fully fledged and are capable of strong flight.

The results of the surveys, including definitions of exclusion zones, will be reported by the SFO in the form of an ecological report and reviewed and signed off by the IOE. Any requirements resulting from this survey and report will be reported to the construction manager so that the Action Tracking Register can be updated and suitable measures developed and construction method statements revised to suit. The report will be filed within the project environmental filing system at the construction office (see Section 1.6 –Record Keeping). A copy of the result of the

survey will also be made available to the Intercreditor Agent through the Annual Monitoring Report.

### **5.2.3 Winter Bird Survey**

A winter bird survey will be undertaken under the supervision of the IOE during the 2009 season in order to assess the flight paths over, and use of, the Project site by geese; most notably Red-breasted Goose (*Branta ruficolis*). The Red-breasted Goose is classed as being Endangered by the IUCN and Bulgaria is one of the principle over-winter sites for this species. The results of the surveys will be used to develop suitable mitigation measures, if required, in order to minimise the potential impacts of the Project. Mitigation measures, including phasing construction, will be developed to minimise possible disturbance to wintering geese species through habitat loss and construction activities during the winter period 2008/09. Consideration will also be given to the management of crops on site where it is felt that this is appropriate in mitigating effects, and falls within the remit and jurisdiction of AES to control. Where required measures will be adopted to ensure that the winter bird surveys are not significantly influenced by the works and these will be determined by the IOE in consultation with AGE and the Intercreditor Agent.

### **5.2.4 Turbine Shut Down System**

During the operational phase of the project, the greatest known potential ecological impact is to the local and, migratory bird populations. Due to this, a Turbine Shut Down System, detailed below, will be put in place, along with long term monitoring (described in the monitoring procedures). This method may also be used where the results of the winter bird survey dictate but this will be subject to confirmation, on completion of this survey.

The principle of the Turbine Shut Down System is that, in the event that a significant ‘at risk’ (within the swept path of the turbines) movement of migrating birds is observed, then single turbines, groups of turbines or the entire wind farm will be shut down to minimise the potential for collision. The scale of shutdown will be dependent on the size of ‘at risk’ flock, direction of flight and prevailing weather conditions. The decision as to the need for and scale of shut down will be made by the IOE. Both the IOE and SFO will have the power to order the turbine shut down, however, the SFO shall only instigate the shut down in the field if this duty has been delegated by the IOE (typically this would be at time of absence of the IOE from site).

The shutdown system will include a combination of human observers and radar systems to give early warning of approaching migrant flocks. Using both of these will be essential to enable a full assessment of the oncoming risk and to ensure the appropriate action is taken swiftly. The main periods of concern are the autumn, winter and spring bird migration activity seasons. The Turbine Shutdown System, and thus mitigation monitoring, will therefore operate during the following periods for the first year of operation:

- Autumn: 15<sup>th</sup> August – 30<sup>th</sup> September
- Winter: January (subject to survey findings during 2009)

- Spring: 15<sup>th</sup> March – 15<sup>th</sup> May

With respect to the autumn, the peak migration period is known to occur primarily from the 15<sup>th</sup> August to 15<sup>th</sup> September. The mitigation monitoring will be undertaken from the 15<sup>th</sup> August until the 30<sup>th</sup> September. This will allow for late migration movements to be monitored during this important season and factors in potential changes to migration patterns which may result from changes to global weather and climate patterns. If however after the 15<sup>th</sup> September there has not been a significant (>5% of the total migrating population of that year) movement of birds recorded for three suitable migration days then the survey effort will cease. The Turbine Shut Down System will be operated for the lifetime of the Project for this season.

Parameters for the winter Turbine Shut Down System in terms of timetable will be further refined following the 2009 wintering surveys. For both the winter and spring seasons, the Turbine Shut Down System will be employed for the first three years of operation where surveys and in-field observations indicate this is appropriate. Thereafter, the need to continue the system for these two seasons will be reviewed by the IOE and SFO and a decision made in consultation and agreement with AGE and the Intercreditor Agent. Any decision made will be recorded within the survey protocol for this work, amended in the EMMP and associated documents affected by the decision, and reported within the Annual Monitoring Report. A decision to recommence operation of the shutdown system during spring and winter will be assessed thereafter on an annual basis by the IOE based on bird activity and monitoring data.

#### *Human Observers*

Figure 5.1 shows the location of the observation points to be employed during the peak autumn migration period. The migration monitoring will only operate during daylight hours and observers will be present at these locations from no later than one hour after sunrise to dusk. Whilst travelling from accommodation to observation points, observers will drive through the wind farm site to ensure that no large flocks of birds have roosted overnight within the site and would therefore be at risk of collision on take off.

The observation points that have been selected were researched and agreed upon after site visits during summer 2008. The observation points give full coverage of the main migration routes to the wind farm site (from the north, north-east and north-west) and allow adequate time to make observations and activate the Turbine Shut Down System. Six fixed points will be staffed throughout the migration survey period. It is the intention of AES to construct temporary observation towers at least three of these points to further increase the field of view for the observers. In addition to the six fixed points at least one mobile observer will be employed to track birds from the fixed point to the wind farm. The mobile observer would be in radio or mobile phone contact with the radar base. The SFO will be the mobile observer so that they are able to travel to the fixed points to assist with survey effort, verify the location and flight direction of mobile flocks and be able to confirm shut down and document each shut down event (the procedure for which is described under the Turbine Shut Down section below).

The location of the fixed observers will also allow for all birds that are migrating through the wind farm site to be recorded on an annual basis thus maintaining and augmenting the data set that was collected for inclusion in the ES and other supporting documentation. The observers at each location will record the following information about each bird or flock of birds seen and this information will be reported at the end of each migration season. These observation points will be used for the vantage point surveys to be completed post construction.

At the beginning of each survey the start time and temperature as well as meteorological conditions (wind speed, direction and other observations) will be recorded on the daily sheet. Hourly records of temperature will be taken as well as notes of any significant changes in the weather (e.g. wind speed or direction). The end time of each survey is also to be recorded. For each registration the following information will be recorded:

- Species
- Age and sex (if known – for large flock an estimate of age classes should be recorded if this can be determined)
- Number of birds
- Height
- Direction of flight (i.e. where the bird(s) came from and direction of travel)
- Distance of registration from observer
- General activity (soaring, gliding, flapping, increasing or decreasing in altitude, hunting etc.)

The recording of height needs to be as accurate as possible in order to update and review the CRA on an annual basis (see Bird Collision Risk Monitoring below). The topography of the wind farm site and issues of poor visibility due to heat haze make this recording quite problematic and as such the following height bands will be used to record the heights of birds flying through the wind farm:

- 0 – 10 metres
- 10 – 20 metres
- 20 – 30 metres
- 30 – 50 metres
- 50 – 75 metres
- 75 – 100 metres
- 100 – 125 metres
- 125 – 150 metres
- 150 – 175 metres
- 175 – 200 metres
- 200 – 250 metres
- 250 – 300 metres
- 300 – 500 metres
- Over 500 metres (an estimate of actual flight height can be made if possible)

If observers are unsure of what height the bird(s) is flying at then the lower flight height band will be used (e.g. if an observer estimates the height as being approximately 125 m then the band this registration will be recorded in is 100 – 125 metres). Using these bands for height estimation will allow better analysis of the flight height data at the end of the monitoring season.

The scope and protocol for any winter bird monitoring with respect to the Turbine Shut Down System will be decided upon on the conclusion of the 2009 winter bird survey with the consent of the Intercreditor Agent.

### *Radar*

A bird-tracking radar system will be set up at an appropriate location giving the radar a view over the main migration route into the site (i.e. for the autumn migration birds approaching from a quadrant covering north-west through to north-east – though checks should also be made of birds approaching from other directions). The final choice of site will be decided through trials to determine the best radar visibility. The radar system will include a horizontally-mounted surveillance radar to track bird flight paths and a vertically-mounted radar to measure flight heights.

The radar location point will be manned by an observer and an assistant recorder throughout daylight hours during the period of autumn migration. The assistant observer will also be deployed to provide additional flight observation data and report to the radar base via radio or mobile phone. The radar observer through contact with the SFO will determine when to contact the wind farm operations base to advise on shut down. As discussed under Section 5.2.1 above, the IOE will also have knowledge and understanding of the radar system to be used and will be present during the initial training and installation of this facility. This training will be extended to relevant local regulators where appropriate.

### *Turbine Shut Down*

To ensure a rapid response the shut down procedure will be incorporated into the site operating procedures. Authority for the shutdown will rest with the IOE, although the SFO will have delegate powers where the IOE directs. The fixed ornithological observers will be in contact with each other and the IOE via telecommunications should a large flock of ‘at risk’ birds be observed. Such a flock would be tracked by the fixed observers and one of the mobile observer(s) (the SFO primarily) will be deployed so that they are positioned between the flock and the wind farm. The radar operator will also be alerted by the IOE as to the location of the ‘at risk’ flock and will observe the flock using the radar. The IOE will remain in the field observing the behaviour of the flock but may, if the need arises go to the radar operating system to assist in the field analysis. The IOE will confirm with the fixed observers, mobile observer and the radar operator that the birds are still ‘at risk’ and will decide on the level of shut down required to minimise the risk of collision. The decision to shut down will primarily be based on the professional judgement of the IOE taking account of the information presented by the field ornithologists, radar, their own observations and prevailing weather conditions. In addition, the general principles as listed in Appendix B will also

be taken into account (which would also be followed by the SFO when delegated to undertake these duties).

If the decision has been reached, based on the observation data and radar data, to shut down turbine(s) the IOE will contact the site's operator via telecommunication and request a shut down making it clear to the site operator which turbines require shut down. The turbine shut down will take the form of blade feathering, whereby a gradual slow down of the turbine blades will occur. This can be achieved in under two minutes of the verbal instruction to shut down. Given observers will be located approximately 5 km from the project site and the radar system can "see" out a further 5-10km, such shut down procedure is viewed sufficient. Only in extreme circumstances where shut down is required in a shorter timeframe than the feathering can achieve will immediate shut down be employed in order to minimise wear a tear on the turbine equipment (bringing the turbine(s) to an almost immediate stop). At this point the IOE will proceed to the operations centre. Once shut down is commenced, the IOE will provide and sign a formal Notice to Shut Down by way of recording the shut down event and submit to the site operator. The fixed observers in the field will remain in place but will monitor the passage of the birds over, past, or through the site during shut down in order to observe behaviour and to relate any change in behaviour to the IOE and site operator should further action be required.

Once the 'at risk' bird flock has passed the wind farm, all observation points, the mobile observer and the radar operator will be contacted by the IOE to confirm that there are no more 'at risk' flocks approaching. If the IOE considers that the key risks have sufficiently abated then turbine operations will then re-commence. This process will be documented by the IOE in the form of Notice to Commence Operations, which he/she will complete, sign and submit to the site operator. Whilst the IOE and SFO hold the authority to request turbine shut down, it is the site operator who will perform the shut down.

During the observation period, where roosting birds are observed on the Project site, the relevant turbine(s) will be shut down until such time as the birds have left the site and are no longer at risk. If birds are seen roosting outside but close to the Project site boundaries the birds will be observed until such time as they move, whereupon the IOE will use reasonable and professional judgement in line with the approach outlined above for birds that have taken flight to inform the need for turbine shut down. Moreover, if it is determined during the 2009 winter bird survey that there are significant flocks of geese using the wind farm site for feeding or roosting then a monitoring and shut down procedure will be developed to reduce any potential negative impact on these species.

The shut down system for the whole site will be reviewed annually, in conjunction with the monitoring programs; this will allow the system to evolve, based on site specific data.

#### *Recording and logging*

As described under Turbine Shut Down above, Notices to Shut Down and Notices to Commence Operation will be completed and signed off by the SFO for each event where turbine shut down is required. Copies of these notices will be submitted to the site operator who will record the

shutdown on Environmental Incident Forms (see Section 1.6 above) and copies will be kept by the SFO. A log book of the shut down events, containing the incident forms and including details of the time shut down occurred, duration of shut down and observations of bird behaviour on site during shut down, will be kept. To tie in with the role of the IOE, the log book, which will contain the results of the recording made during the migration season, will be retained on site for last 3 years on site and up to 10 years at AES head office in Sofia. Along with the results of other site monitoring e.g. breeding bird and collision monitoring (see below), the results of the analysis of this data will be made available to relevant stakeholders on a yearly basis including but not limited to BirdLife International, the BSPB, Bulgarian Academy of Sciences, Intercreditor Agent, and relevant local inspectors.

### **5.2.5 Bird Collision Monitoring**

The following methodology follows that developed in the USA for bird collision monitoring at operational wind farms (Morrison 1998). A core area of 100 m radius around each turbine will be carefully searched on foot. The 100 m distance is set conservatively as bird fatalities have rarely been documented over 70 m from turbines at other farms (Johnson *et al.* 2000). Sectors around each turbine will be slowly searched, taking particular care to search any taller clumps of vegetation, and openings of animal burrows. In addition, if ground conditions allow, a further 250 m area around each turbine will be scanned with binoculars to check for large bird carcasses. The precise location of any carcasses found will be recorded and mapped (by reference to the distance and direction to the nearest turbine and using a GPS recorder). Each turbine will be subject to a detailed carcass monitoring survey once per week, during the peak migration season. Outside of the season a check once per month will be undertaken. Site staff will complete the monthly checks outside of the migration season. It is estimated that the collision risk monitoring and carcass search should take approximately 30 minutes per turbine. All carcasses will be photographed to enable confirmation of species by either the IOE or SFO. Feather spots (e.g. a group of feathers attached to skin) and body parts will also be recorded. For all casualties the following data will be collected and reported at the end of each migration season (or each month, outside of the migration season):

- Species
- Sex and age (if known)
- Date and time collected
- Location
- Distance and direction (degrees) to the nearest turbine
- Condition
- Any other comments regarding possible cause of death e.g. distinction between those deaths caused by collision and other causes

Similar data in terms of mortality of bats will also be recorded as part of carcass monitoring.

With respect to the final bullet point above, whilst for some of the carcasses the nature of the cause of death will be obvious if they have died through collision with turbines (dismembered body parts, etc), there will be a category of lower certainty that will be given greater consideration during interpretation and the necessary precaution taken to highlight any that cannot be suitably determined. However, this is more likely for smaller birds rather than the larger key species considered at most risk with the Project and so the misinterpretation of cause of death for species of interest is considered unlikely.

The condition of each carcass will be recorded in the following manner:

- Intact – carcass completely intact, it is not badly decomposed and shows no sign of being fed upon by a scavenger or predator.
- Scavenged – entire carcass that shows sign of being fed upon by a predator or scavenger or a portion(s) of a carcass in one location (e.g. wings, skeletal remains, legs, pieces of skin etc).
- Feather spot – 10 or more feathers at one location indicating predation or scavenging.

In addition to monitoring of wild bird carcasses, a sample of 50 dead birds (e.g. feathered chickens) will be obtained in order to study the rate of carcass removal and to test observer efficiency. These will be placed in the search area at intervals through the study by someone independent of the carcass searcher. These carcasses will be marked appropriately (e.g. with coloured tape) to identify them as experimental birds. The location of these marked carcasses will be recorded in a similar way to non-experimental birds by the observer. These birds will be placed in the vicinity of each turbine by an individual who will not be completing the carcass monitoring (primarily the SFO). These will be left on site until they disappear. The purpose of the experimental carcasses being left on the site is to (i) check the effectiveness of the carcass monitor (i.e. what percentage of known carcasses are missed by this person) and (ii) to gain an understanding of the amount of predators/scavengers within the wind farm site.

With respect to the latter, as part of the survey effort, the SFO will review the locations and status of the experimental dead birds and, taking into account all those discovered by the searchers and those that have disappeared through natural decomposition, will calculate the number of experimental birds that go missing for other reasons such as animals scavenging, and removal by landowners and the public. The proportion missing due to these other circumstances will be used to factor the number of non-experimental carcasses found in order to calculate actual mortality on site (which will then be used for the purposes of CRA). If many of the sample experimental bird carcasses are being removed in this way, then an increase in the survey effort will be required in order to minimise the potential for the under-recording of actual collisions.

The bird collision monitoring will be carried out for the whole of the year to investigate real collisions and to enable the CRA undertaken during the due diligence to be updated. The CRA will be rerun after each migration season based on observation data and the result of the carcass monitoring and will take account of updates to species populations. It is anticipated that this

process will be a test of the CRA to assess the relationship between predicted and actual impact based on the results of the previous years modelling and the actual recorded and observed data.

Following completion of the CRA re-run, if actual collisions are proven to be statistically worse than 1% increase over the existing baseline mortality, it is considered that this will equate to adverse impacts. Should adverse impacts be reported, then this will trigger the requirement to revise the mitigation strategy for the Project by the IOE, SFO and AGE in order to ameliorate the effects of the Project. The measures employed to achieve this will depend upon the scale of adverse impacts reported and the possible cause(s) and cannot, therefore, be defined here. However, in each case, consideration will primarily be given to the revision of the Turbine Shut Down System and possible requirements for permanent shut down or decommissioning of a turbine or group of turbines where considered necessary.

Any changes to the overall mitigation strategy will be captured in the relevant protocols and the EMMP, and presented in the Annual Monitoring Report to the Intercreditor Agent.

#### *Deliverables*

##### Construction

- Pre-construction Ecological report.

##### Operation

- Annual Turbine Shutdown Review including rerun of the SNH Collision Risk Model (CRA).
- Any reported birdstrike i.e. bird collisions with turbines, will be recorded on Environmental Incident Forms by the SFO and copies given to the site operations manager. The Environmental Incident Forms will be reported as part of the Annual Turbine Shutdown Review.

## **5.3 Cultural Heritage**

AGE, in consultation with Monuments of Cultural Heritage (NIMNC) and the Town History Museum of Kavarna, will design and carry out, a Field Reconnaissance and desk based survey. This survey will provide the following:

- Avoidance of the large mounds and settlement resources;
- Accurate identification of the location and extent of NIMNC sites; and,
- Identification any potential previously unrecorded sites of cultural heritage interest.

Based on the above preconstruction survey, the follow mitigation will be put in place to protect known archeological interests:

- All identified sites will be preserved in-situ, through amendments to the layout of the project where practicable. Where this is not possible, a scheme of archaeological investigation would be undertaken in close consultation with the NIMNC and Kavarna Town Museum.

The following will be put in place to protect unknown archaeological interests:

- Archaeological watching brief during all ground breaking activities;
- On discovery of an unknown find, appropriate recording and treatment of find will be carried out by the onsite archaeologist.

## 5.4 Pollution Prevention and Control

The Construction and Operation Project Manager (assisted by the CER) will prepare a Pollution Prevention and Control Plan, which will cover the prevention and control of pollution resulting from dust, noise, fuel/oils, chemicals. This will include the following as a minimum:

The Construction and Operation Project Managers (assisted by the CER) will:

- Prepare Pollution Prevention and Control Plan that shall be reviewed by, and agreed with, AGE;
- Ensure full implementation of the Pollution Prevention and Control Plan;
- Ensure that all staff are trained in pollution prevention and control measures and the use of oil spill containment and clean up equipment;
- Locate oil spill clean up and containment equipment (granules, booms etc) at the all areas of construction and maintenance activity; and
- Develop additional mitigation measures, where relevant, e.g. the imposition of tighter speed limits, if necessary, to avoid causing nuisance to residents or land users.

All foremen (i.e. construction team leaders) will:

- Check all machinery on first arrival and reject it, or send it for maintenance, if it:
  - Emits excessive visible smoke;
  - Emits exhaust gases that smell of excessive unburnt hydrocarbons; or
  - Is leaking oil or fuel.
- Make daily visual observations of plant and vehicles for oil leaks and exhaust smoke/odour;
- Organize maintenance for, or replacement of, any plant or vehicles with oil leaks or emitting exhaust that is black or smells of unburnt hydrocarbons;
- Ensure that no hazardous chemicals (including fuels and oils) are stored within 30m of any permanent or seasonal watercourses or securely stored in an impermeable store;
- Ensure runoff risk is assessed (with respect to either permanent or seasonal waterbodies) and mitigated for through the use of grips, sumps and silt fencing; and,

- Ensure that the points included in induction training for the entire workforce (see below) are implemented.

The entire workforce will be advised that:

- Plant and vehicles speeds will be restricted within construction areas and comply with the legal limit on roads;
- Equipment must be well maintained and adequately silenced to avoid causing nuisance;
- Additional noise attenuation measures (e.g. noise barriers) Shall be used where reasonable deemed necessary to prevent nuisance;
- Construction plant and equipment must be switched off when not in use;
- Mobile plant must not be refuelled within 30m of the of a permanent or seasonal watercourse;
- Drip trays must be used under all static plant and equipment;
- If a spill occurs at a location that might lead to flow into a watercourse or drain, cut off trenches should be dug to intercept it;
- All spills shall be cleaned up promptly and contaminated materials disposed to a project approved facility; and,
- No silt-laden water to be discharged directly into a permanent or seasonal watercourse.

All drivers will:

- Observe all national and project speed limits;
- Ensure that plant and vehicles are maintained regularly; and
- Sheet vehicles carrying soil, spoil or other fine materials.

The construction crew will:

- Damp down the working areas whenever necessary to prevent dust nuisance.

*Deliverables:*

Contractor

- Construction and Operation Pollution Prevention and Control Plans (to be reviewed and approved by AGE), to be included as an Appendix to the EMMP;
- Log of vehicle/equipment maintenance and checks; and
- Training logs for Inductions and Tool Box Talks.

## 5.5 Emergency Response

The Construction and Operations Project Managers (assisted by the CER) will prepare Emergency Response Plans detailing the procedure to follow in the event of an environmental emergency.

This should include:

- Emergency contact numbers;
- Closest medical facility;
- Definitions of hydrocarbon spills, e.g. small spill <10 litres; and
- Procedures for responding to different spill sizes.

*Deliverables:*

Construction:

- Emergency Response Plans (to be reviewed and approved by AGE) to be included as an Appendix to the EMMP.

## 5.6 Traffic Management

The Contractor's Construction Manager will ensure that a Traffic Management Plan is developed, in consultation with the National Road Agency and Traffic Control Police. This will detail:

- Approved routes to and from construction areas;
- The type of construction traffic permitted to use access routes to the working areas, including particular restrictions (height, weight, etc.) and sensitive receptors;
- Indicate areas of limited or no access to construction traffic;
- The requirements to ensure areas of restricted or no access are adequately signed;
- Approved site transit methods;
- Arrangements and routes for abnormal loads;
- Arrangements for deliveries of abnormal loads will be made outside peak hours and where appropriate during the night;
- The procedure for informing residents in advance of abnormal load deliveries;
- The traffic-control measures (e.g. stop-go boards, traffic lights and signage) required at road crossings and construction sites;
- Procedures for crossing roads with heavy plant, e.g. use of tyres for surface protection; and,
- Health and safety requirements at site entrances and areas where construction occurs adjacent to the roadway.

The Traffic Management Plan will also detail procurement measures to minimize impacts on roads and residents, such as:

- Locally sourcing materials where practicable; and,
- Utilize existing areas of hard standing for access tracks where possible.

All drivers will:

- Use only defined access routes, identified within the Traffic Management Plan;
- Ensure all vehicles are adequately maintained so that all safety features including brakes, lights etc., are in good condition. Maintenance records to be held within the construction site office;
- All drivers and passengers to wear seatbelts at all times;
- Adhere to the construction site speed limits; and
- Adhere to national limits on other roads.

*Deliverables:*

Contractor

- Traffic Management Plan (to be reviewed and approved by AGE), to be included as an Appendix to the EMMP.

## 5.7 Waste Management

AGE will:

- Review of hazardous and non-hazardous waste disposal sites within 50km of the project site; and,
- Identify the waste disposal sites that meet the requirements of the EU Landfill Directive (1999/31/EEC). These sites referred to in are this document as the 'project approved' landfills.

The Construction and Operational Contractor's Managers (or nominated representatives) will ensure that:

- Wastes are reasonably minimized;
- Wastes are segregated;
- Wastes are reused or recycling in preference to being sent to a landfill site;
- Wastes are stored in a secure manner pending disposal;
- Hazardous wastes are stored separately in locked containers;
- Sewage disposal is to a local sewer, or septic tank that is emptied by a licensed contractor;
- All waste is disposed of promptly and is only taken to a project approved facility; and
- Maintain records of waste disposal including the volume, nature of waste(s), disposal site, date and time for each load.

*Deliverables:*

AGE

- Review of waste disposal sites.

Construction and Operation Contractor:

- Waste Management Plans (to be reviewed and approved by AGE), to be included as an Appendix to the EMMP; and
- Waste disposal records to be transferred to AGE on completion of construction, and kept for at least two years.

## 5.8 Monitoring

AGE will produce a monitoring plan, in consultation with the relevant authorities, detailing all monitoring programs ongoing for the site during construction and operation.

### Noise & Vibration

A baseline monitoring survey for sensitive receptors will be undertaken prior to construction to confirm background noise levels and will include measurements of wind speed and direction which can be attributed to the background noise climate over the same time period. Further monitoring at these locations will also be undertaken following commissioning of all the turbines. Noise measurements will also be taken by the CER for individual activities during construction, to ensure noise limits are not exceeded. The noise monitoring program will be developed and refined in consultation with the relevant authorities, where reasonable limits for construction noise will be agreed.

Vibration measurements in the region of the villages of Bulgarevo, Hadji Dimitar, Poruchik Chunchevo and Sveti Nikola will also be undertaken prior to, and following construction in order to confirm the predicted effects of vibrations from the Project. The vibration monitoring program will be further developed and refined in consultation with the relevant authorities.

### Water

A baseline monitoring survey of groundwater quality will be undertaken prior to construction, in consultation with the relevant authorities. Further sampling will be carried out quarterly to ensure that the project is having no impact on water quality. There are no known permanent watercourses on site although seasonal flows have been considered possible in the ES for the Project. Commensurate measure should be undertaken to ensure no impact on water quality of such features.

### Bats

AGE will commission a bat monitoring programme to assess whether the predicted impact level on bats is correct. This will include monitoring surveys of bat activity in adjacent woodland/shelterbelts within the site (close to turbines) and comparison with similar habitat outside the site. The results of such a study will help inform both the monitoring responsibilities of the project site and also provide a valuable data set for future impact assessments for wind turbines in similar habitats.

### Birds

AGE will commission an extensive monitoring programme, consisting of multiple surveys, over the lifetime of the project, detailed below. Survey methodologies will follow those outlined in Section 5.2.

- *Bird use of the wind farm site and its surrounds*  
The purpose of these surveys is to measure the bird use of the area within the Project, to investigate disturbance effects throughout the year (including breeding surveys). They will be undertaken before construction, during construction and during years 1, 2, 3, 5, 10 and 15 after construction.
- *Breeding Bird Survey (April-June)*  
Three surveys of the Project site will be made, one in April, one in May and the third in June (with at least 3 weeks between them). The extent of the study area will include the Project plus a 500m buffer, where access/viewing is possible, plus an appropriate reference area (an area of similar size at least 1km from the Project site (and any other wind turbines) in similar habitat). This will enable a full Before-After-Control-Impact [BACI] analysis to be undertaken.
- *Non-breeding Bird Survey (July-March)*  
Non-breeding Bird Counts will be taken on a field-by-field basis within the study area (this should cover the core Project site and an additional 1km buffer zone). Each year a total of 18 of these surveys will be undertaken from July through to March at approximately fortnightly intervals.
- *Habitat/Crop Surveys*  
Initial mapping of the habitats and crop types available at the start of the works will be made, and updated once every two months. This will enable the birds' habitat preferences to be investigated and habitat to be taken into account in the analysis of the effects of the wind turbines.
- *Bird flight activity (Vantage Point Surveys)*  
Bird flight activity, will be assessed by Vantage Point Surveys, which will cover the Project site and 2km buffer. They will be undertaken prior to construction, during construction and for the following years post-construction: 1, 2, 3, 5, 10 and 15.
- *Turbine shut-down bird flight activity monitoring (Autumn, Winter and Spring)*  
The turbine shut-down programme will require continuous observation of the migratory birds flying towards the wind farm site throughout the August to September autumn migration period and potentially for the winter and spring seasons. Data will be recorded in the same way as the vantage point surveys above. This work will continue annually through the lifetime of the Project during autumn and for the three years following commissioning for winter and spring, subject to review.
- *Bird Collision Monitoring*  
The proposed collision monitoring methodology follows that developed in the USA for bird collision monitoring at wind farms (Morrison 1998)<sup>1</sup>. It will be carried out each year during the lifetime of the Project.

A report will be prepared based on the results of the monitoring. The report with the conclusions must be submitted to RIoEW – Varna within one month upon monitoring accomplishment.

### **Electromagnetic Fields**

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<sup>1</sup> Morrison, M.L. 1998. Avian Risk and Fatality Protocol. National Renewable Energy Laboratory Report, 8 pp.

The electromagnetic field values will be measured in the villages of Bulgarevo, Hadji Dimitar, Poruchik Chunchevo and Sveti Nikola to prove the conformity with the top admissible rates according to Regulation No 9 for the top admissible rates of EMF in inhabited territories of and definition of hygiene-protective zones surrounding the emitting objects (SG, issue 35, 1991, amended).

## 5.9 Reinstatement

The Contractor will produce a full reinstatement plan, detailing specific reinstatement procedures on a plot by plot basis. This will detail:

- Land owner requirements;
- Boundary reinstatement;
- Seeding, if required;
- Ecological requirements;
- Run-off prevention measures; and,
- Methodology.

A further decommissioning plan will be developed by AGE, during the projects lifetime, incorporating up to date technology and methods.

### *Deliverables*

Contractor

- Reinstatement Plan

AGE

- Decommissioning Plan

## 5.10 Change Control Procedure

### ***Introduction***

During the course of a project, there will inevitably be changes to the planned methods of working. It is essential that these are not considered in isolation and that the potential impacts of proposed changes are reviewed in the context of commitments given in the EIA. The object of this Change Control Procedure is to control such changes to ensure that the associated environmental, social and health risks remain at an acceptable level and that the effects they have are advised around the project in a logical manner.

### ***Procedure***

Once a potential change is identified, the identifier is to advise his/her manager and start to complete the Change Notice (CN) form (to be written in consultation with the contractor), by completing the Scope and the Justification sections.

The most usual justifications for changes include the following:

- Technical scope change;
- Health/safety/environmental/social – the change will potentially affect the health and safety of persons, or protection of the environment and community, during fabrication, construction, commissioning, operations, maintenance or decommissioning. The change could be outside of the scope of approvals received and may require additional approvals/notifications;
- Constructability – an element of the project cannot be fabricated or constructed as designed or specified;
- Statutory – the change is necessary to comply with legislation or other mandatory requirements;
- Commercial – allowing for the cost of the change, there is commercial benefit in making the change;
- Schedule – the schedule may be at risk if the change cannot be accommodated;
- Procurement – a supplier cannot meet previous commitments and obligations; and
- Security – exposure to security risk is increased/decreased.

The CN Form, with any associated support documents, will be raised and signed by the project manager of the Construction Contractor, and will include details of estimated costs, schedule, social and environmental impacts. Any extended comments and relevant backup documents should then be included with the CN and forwarded to the AGE's Project Manager.

Each CN will be assigned a unique number by the AGE's Project Manager and circulated to the relevant personnel for review and signature. The CER of each company will review the Environmental implications of each CN and advise the project manager if any represent an acceptable risk. A CN is only accepted once it has signature from the CER and Project Managers.

Once approved, a CN must be circulated to all interested parties. Any instruction to the Contractor shall be made in writing. If at any stage the CN is not accepted, it shall be returned to the AGE's Project Manager who will advise those involved.

### ***Environmental Considerations***

From an environmental and social perspective the Management of Change process must address the following:

- Changes to the execution strategy and methodology that have the potential to affect implementation of mitigation measures agreed through the EIA process;
- Contract deviation requests which have the potential to impact environmental, mitigation measures or the functioning of the EMMP;
- Design changes initiated which have the potential to impact the ability of the project to meet project environmental standards, e.g. emissions, discharges, noise;
- Changes to locations for temporary facilities to those contained in the EIA;
- New activities which have not been assessed as part of the EIA process; and,
- Major changes to construction planning such as an introduction of additional working areas and implications on training and resources.

### ***Management of Change Process***

The Management of Change process should include the following elements:

- Identify – identification of whether the change has the potential to have environmental implications;
- Assessment – evaluation of the potential impacts of the change in terms of environmental issues as well as the potential ramifications on schedule as a result of the environmental implications;
- Decision – three options:
  - Change accepted;
  - Rejected; or
  - Accepted with additional mitigations.
- Follow up – if the change is accepted with mitigations then the follow up will consist of one or more of the following:
  - Communicate the requirement for additional mitigations to persons responsible for implementation;
  - Determine whether regulatory approval is required and time required for this;
  - Document requirement through update of procedures;
  - Implementation of additional mitigations;
  - Communicate changes to stakeholders; and
  - Track implementation of additional mitigations
- Transparency – regardless of the outcome of the change, the whole process must be transparent and auditable by ensuring adequate paper trail.

## **5.11 Method Statements and Procedures**

The Construction and Operations Contractor will produce method statements (MS) or procedures to address all key activities. Before works begins, AGE will review and approve all MS and procedures to ensure that they incorporate environmental requirements, as detailed in the EIA.

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## **Appendix A: Commitments Register**

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
<b>General Environmental Management</b>			
AGE will provide an Environmental Officer (EO) (or expand the role of the project manager) who will be responsible for the overall management of environmental performance during detailed design, construction and operation, including update and development of the Action Tracking Register. The EO will report directly to the AGE Project Manager	Construction	To control the environmental management of operations during construction and operation of the Project.	AGE
The Construction and Operation Contractor will appoint a suitably qualified Contractor Environmental Representative (CER) to ensure effective implementation of the environmental commitments contained in the EIA.	Construction	To ensure that the contractor complies with the environmental requirements of the contract during construction.	Contractor
<b>Ambient air</b>			
Reinstatement of disturbed areas as soon as possible after construction and installation works are completed.	Construction	Dust suppression.	Contractor
Regular humidification/damping down of the temporary roads used for transportation of excavated earth to the temporary storage sites.	Construction	Dust suppression and secondary ambient air pollution prevention.	Contractor
Regular humidification/damping down of the construction site in dry weather.	Construction	Dust suppression and secondary ambient air pollution prevention.	Contractor
Regular maintenance of plant and equipment including checking all machinery on first arrival and reject it, or send it for maintenance, if it emits visible smoke; emits exhaust gases that smell of unburnt hydrocarbons; or is leaking oil or fuel.	Construction	To minimize air emissions from exhausts	Contractor
Covering stockpiles of materials, especially soils if stored over long periods	Construction	Dust suppression	Contractor
Turning off stationary plant and equipment when not being used	Construction	To minimize air emissions from exhausts	Contractor
Plant and vehicles speeds will be restricted within construction areas and comply with the legal limit on roads.	Construction	Dust suppression	Contractor
<b>Climate (local)</b>			
Disturbance to existing forest shelterbelts will be avoided by the	Design	Forest shelter belt preservation to	AGE/Contractor

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
construction and operation activities		avoid localized changes in conditions	
<b>Water</b>			
Provision of deliveries of drinking water of acceptable quality to the site during construction.	Construction	Provision of drinking water for workers.	Contractor
A chemical toilet will be provided for the substation personnel construction and operation of the Project.	Construction Operation	To ensure no pollution from sanitary wastes.	Contractor
Provide deliveries of drinking water of acceptable quality and water for household purposes for the project personnel during operation.	Operation	Provision of drinking water for employees.	AGE
Employ measures to manage potential impacts upon groundwater and surface waters (including seasonal waterbodies/features). These will be developed and described within a dedicated pollution prevention and control plan and will include: <ul style="list-style-type: none"> <li>• Make daily visual observations of plant and vehicles for oil leaks;</li> <li>• Organize maintenance for, or replacement of, any plant or vehicles with oil leaks or emitting exhaust that is black or smells of unburnt hydrocarbons;</li> <li>• Ensure that no hazardous chemicals (including fuels and oils) are stored within 30m of a watercourse or drain or securely stored in an impermeable store;</li> <li>• Mobile plant must not be refueled within 30m of the of a watercourse or drain;</li> <li>• Ensure runoff risk is assessed and mitigated for through the use of grips, sumps and silt fencing;</li> <li>• Drip trays must be used under all static plant and equipment;</li> <li>• If a spill occurs at a location that might lead to flow</li> </ul>	Construction	Groundwater (and surface water where applicable) protection from contamination.	Contractor

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
<p>into a watercourse or drain, cut off trenches should be dug to intercept it;</p> <ul style="list-style-type: none"> <li>All spills will be cleaned up promptly and contaminated materials disposed to a project approved facility; and,</li> <li>No silt-laden water to be discharged directly into a watercourse or drain.</li> </ul>			
<b><i>Geological foundation and earthquakes</i></b>			
Perform an assessment of the seismic effect (risk) likely to materialize during simultaneous operation of all wind power generators at the stage of designing their foundations and under conditions of operation.	Design Operation	Reliable connection of the foundation to the base and guaranteed trouble free operation.	AGE
Conduct a geological engineering study for each generator foundation step at the detailed design stage.	Design	Reliable connection of the foundation to the base and guaranteed trouble free operation.	AGE
Generator foundation works should be carried out taking account of the estimated loads and the recommendations put forward in the geological engineering reports.	Design	Reliable connection of the foundation to the base and guaranteed trouble free operation.	AGE
<b><i>Land and soil</i></b>			
Reinstatement/recultivation of the affected land will be developed according to the requirements of Order No 26/96 for recultivating of disturbed terrains, improvement of poorly yielding lands, removing and utilizing of humus layer (SG, issue 89, amended)	Construction	To allow appropriate reuse of land by landowners after construction	Contractor
Construction and installation works will be organized so as to minimize the risk of soil damage due to the passage of construction, installation and transport machinery.	Construction	To protect the soil layers a minimize compaction.	Contractor
Minimize to the greatest possible extent the surface area affected	Construction	Soil layer protection and	Contractor

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
by excavation around the wind power generator sites.		erosion prevention.	
Employ appropriate reinstatement measures for earthwork sites and the affected surrounding areas.	Construction	Erosion prevention.	Contractor
Construction and installation works will take place at soil humidity levels within the range of the so called physical soil maturity (soil humidity <50 - 60 % of W <sub>nne</sub> – maximum field humidity).	Construction	To minimize secondary soil compaction.	Contractor
Ameliorative deep decompaction will be carried out after completion of construction works or, optionally, deep ploughing with layer turnover in combination with organic fertilization.	Construction	To restore soil porosity.	Contractor
Crops with a deep-reaching root system will be grown during the first 1-3 years.	Operation	To prevent topsoil layer restoration.	Contractor
Any repairing of construction or installation machinery should take place at specifically designated locations off-site the facility (maintenance facilities).	Design Construction	Prevent the contamination of adjacent areas with oils and oil products from construction machinery.	AGE/ Contractor
Topsoil and subsoil excavated will be stored in dedicated temporary areas during foundation works and reinstated following construction.	Construction	Prevent the mixing of soils with each other and adjacent areas to construction.	Contractor
Grass seed soil bunds in case of prolonged excavation and exposure of earth material.	Construction	Soil layer protection and erosion prevention.	Contractor
Change the status of the agricultural lands earmarked for the construction of the wind power generator park in accordance with the Regulations for Implementation of the Agricultural Land Conservation Act – for an area of 12 ha only.	Design	Topsoil layer protection and restoration.	AGE
<b>Flora</b>			

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
The rock material excavated during the foundation works will be reused for covering the concrete foundation steps and paving the on-site communication routes.	Construction	Remediation of areas affected by the construction process and revegetation.	Contractor
In carrying out future excavation works at locations earmarked for installation of equipment and associated communications, the tillable soil layer will be disposed of at designated locations and purposefully used in subsequent reinstatement.	Construction	Prevent the mixing of adjacent areas with earth material and reuse for reinstatement.	Contractor
No trampling, pollution and disturbance of soils and vegetation in neighbouring terrains will be allowed	Construction	Prevent impacts on neighbouring habitats	Contractor
Avoid removal of trees and treebelts when constructing the wind farm. Where removal is required trees will be replanted to compensate for the loss of vegetation	Construction	Prevent net loss of vegetation and impacts upon bat species	Contractor
In carrying out excavation works, the topsoil will be excavated, stored separately and reinstated over the concrete foundation.	Construction	Restore the natural vegetation within a reasonable period of time.	Contractor
All reinstatement of flora will be undertaken either via natural colonisation or by planting with indigenous flora. No alien species will be introduced.	Construction	To maintain the existing biodiversity	Contractor
<b><i>Fauna</i></b>			
In conducting site works, no areas greater in size than those specified in the design documentation will be encroached upon.	Construction	To minimize impacts of the construction footprint	Contractor
Train all workers involved in construction and installation works with the aim of preventing any damage to flora and fauna in the area. The construction contractor will assume responsibility for preventing any workers and employees from killing or capturing any animals, destroying their shelters, collecting bird eggs etc.	Construction	Fauna conservation.	Contractor

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
A speed limit of 30 km/h should be imposed on any vehicles travelling to and from the site in order to avoid running over slower moving animals.	Construction	Fauna conservation.	Contractor
All necessary advance precautions to avoid any risk of fires, spills of fuels and lubricants, disposal of waste, defective machine parts or residual concrete or any activities that may bring about inflicting damage on animals and their natural habitats, will be taken.	Construction	Conservation of animals and their natural habitats.	Contractor
Works will be restricted to daylight hours to avoid use of artificial lighting that may be a nuisance to the animals, many of which are active during night time including bat species.	Construction	Minimize the disturbance to animal species.	Contractor
The turbine blades will be designed in colour or marked so as to repel any birds during daytime and be easily distinguished from afar in conditions of poor visibility, as well as by night-active bird species.	Construction Operation	Reduce the adverse impact of the blades on birds.	AGE/ Contractor
Similar repelling and safety devices should reasonably be installed along the edge of the site.	Operation	Conservation of animals.	AGE/ Contractor
During the period 1 August – 30 September, in the year of construction, no construction works/erection of turbines will be undertaken to minimise disturbance to migratory bird species.	Construction	To minimize disturbance during construction	Contractor
A provision for shutting down the turbines will be establishing during the migration of birds across the Project site (including autumn, winter and spring). This shutdown provision will be a combination of radar and human observations on site during the period of migration. The shut down of turbines will be determined through professional judgement underpinning by the principles outlined in Appendix 2.	Operation	Reduce the adverse impact of the blades on birds.	AGE
RIoEW – Varna requested that a bird monitoring programme be undertaken before during and after construction of the wind farm, with monthly reporting undertaken. A description of these surveys is	Construction Operation	Determine the adverse impact on the fauna, if any.	AGE

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
provided in Section 5.8 above and includes the key surveys and monitoring commitments described below.			
A wintering bird survey will be undertaken during the core wintering season, primarily January 2009. The results of this will influence the level of mitigation required during subsequent seasons. Irrespective of the results of the first survey an additional two years survey will be completed for the whole of the winter period (December to March) to record winter bird activity. The results of these surveys will further assist with any mitigation that may or may not be required, including possible temporary turbine shut down.	Pre-construction (of turbines)	To determine the level of activity across the site with respect to Geese (Red Breasted Geese of particular interest) and thus inform the required mitigation to be agreed with the investors and relevant authorities.	AGE
To develop and implement appropriate mitigation measures for construction prior to the wintering season in 2009, if required, to minimise any potential disturbance through loss of habitat with respect to geese (Red Breasted Geese of particular interest).	Construction	Whilst the wintering surveys in 2009 will establish the level of use of the site by geese and mitigation can be refined thereafter, in order to ensure the results of the surveys are not significantly biased or affected by possible loss of habitat through foundations establishment, suitable measures may be required.	AGE
<p>During the three key bird migration activity seasons of autumn, winter and spring, where survey results dictate, a system of monitoring will be instigated.</p> <p>For the autumn migration season (between 15<sup>th</sup> August and 30<sup>th</sup> September subject to review), monitoring of migration activities will be undertaken yearly throughout the lifetime of the Project in order to</p>	Operation	To minimise impacts on birds primarily in flight.	AGE

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
<p>inform the proposed Turbine Shut Down System. The will be the responsibility of the IOE or SFO.</p> <p>For the winter season, the requirement for mitigation will be determined by the winter bird surveys proposed for 2009 (see above). For both the winter (January) and spring seasons (15<sup>th</sup> March – 15<sup>th</sup> May), where surveys and/or field observations dictate, monitoring will be undertaken for the three years following commissioning. After three years the requirement for further monitoring will be reviewed by the IOE and a decision made as to whether monitoring should continue or cease. Any changes to the monitoring plan will be agreed with AGE and the Intercreditor Agent, and appropriately recorded before being enacted.</p>			
<p>Bird Collision Monitoring will be undertaken annually for the lifetime of the Project.</p> <p>Should a significant mortality rate be proven during operation, i.e greater than 1% increase over the existing baseline mortality for any given bird species, and winter bird survey where appropriate, the mitigation strategy for the Project in respect of birds will be reviewed. The Turbine Shut Down System will be revised and, where appropriate, consideration will be given to decommissioning turbines contributing significantly to this outcome.</p>	Operation	Minimise to the adverse effects on migrant species	AGE
<p>Any construction and installation works will take place outside the bird mating period (May – June) when the offspring have flown away and the harvest has come to an end.</p> <p>Where this is not possible, a breeding bird survey will be undertaken prior to construction of those components that occur within the breeding bird season, and mitigation measures prescribed where required including identification of temporary exclusion zones where relevant.</p>	Construction	Minimize the adverse effects on the nesting bird species.	Contractor

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
The layout of temporary routes providing access to the local sites will be undertaken in such a way as to minimise the possible destruction of any habitats. Upon completion of construction, the temporary roads and embankments should be restored to their initial condition.	Design Construction	Reduce the adverse impact on the animal species.	AGE/ Contractor
Pre-construction surveys will be undertaken for mammals and reptiles in order to ensure the construction works do not disturb species. Particular attention will be paid to bat species	Construction	Prevent any collisions during bird migration.	AGE/ Contractor
Post construction surveys of bats will be undertaken in order to assess the potential impacts of the Project on these species. Mortality monitoring for bats will be annual for the first three years of operation. Where no significant effect is seen, monitoring will cease. Where effects are seen then measures will be developed and agreed with the funders and relevant authorities prior to implementation. Such measures to be considered include: planting suitable habitat (where acceptable to landowners) to divert bat activities away from the turbines, possible bat relocation and erection of bat boxes away from the turbine cluster, and use of possible deterrents (scarers to dissuade bats from passing close to turbines).	Operation	To monitor the impacts upon bat activity	AGE
<b><i>Landscape</i></b>			
General height of the wind generators must be less than 150 m; if possible generators must be arranged in straight lines, and three blade turbines used.	Design	Reduce the adverse visual impacts caused by the turbines.	AGE
The wind power generators should be designed in colour and their blades provided with an antireflection paint coating (semi matt pale grey advised).	Design Construction Operation	Reduce the adverse visual impacts caused by the turbines.	AGE/ Contractor

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
Avoid removal of trees or severance of existing tree belts.	Construction	Reduce the adverse visual impacts caused by the turbines.	Contractor
Returning the earth material onto the generator concrete steps and covering thoroughly the latter with humic earth should take place upon completion of construction and installation works.	Construction	Ensure integration into the surrounding flora and landscape.	Contractor
Maximise use of existing tracks on site	Design Construction	Reduce the adverse impacts on landscape features.	AGE/ Contractor
<b><i>Cultural Heritage</i></b>			
<p>In consultation with Monuments of Cultural Heritage (NIMNC) and the Town History Museum of Kavarna, a Field Reconnaissance and desk based survey will be undertaken . This survey will provide the following:</p> <ul style="list-style-type: none"> <li>• Avoidance of the large mounds and settlement resources;</li> <li>• Accurate identification of the location and extent of NIMNC sites; and,</li> <li>• Identification any potential previously unrecorded sites of cultural heritage interest.</li> </ul> <p>All identified sites will be preserved in-situ, through amendments to the layout of the project where practicable. Where this is not possible, a scheme of archaeological investigation will be undertaken in close consultation with the NIMNC and Kavarna Town Museum.</p> <p>The following will be put in place to protect unknown archaeological interests:</p> <ul style="list-style-type: none"> <li>• Archaeological watching brief during all ground breaking</li> </ul>	Construction (pre)	Accurate identification of the location and extent of NIMNC sites. Avoidance of the large mounds and settlement resources. Identification any potential previously unrecorded sites of cultural heritage interest.	AGE

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
<p>activities;</p> <ul style="list-style-type: none"> <li>On discovery of an unknown find, appropriate recording and treatment of find will be carried out by the onsite archaeologist.</li> </ul>			
<p>All identified sites will be preserved in-situ, through amendments to the layout of the project where practicable. Where this is not possible, a scheme of archaeological investigation would be undertaken in close consultation with the NIMNC and Kavarna Town Museum.</p>	Construction	Protection of cultural heritage resources	AGE/ Contractor
<p>Archaeological watching brief will be undertaken during all ground breaking activities. On discovery of an unknown find, appropriate recording and treatment of find will be carried out by the onsite archaeologist.</p>	Construction	Protection of cultural heritage resources	Contractor
<b>Waste</b>			
<p>Construction wastes and the surplus earth mass will be submitted on the grounds of written contract to entities having the relevant document under art. 12 from the Wastes Management Act. A copy of these contracts will be placed with RIoEW – Varna within 14 days upon contraction.</p> <p>Construction wastes will be transported by routes and must be deposited at places, determined by the Mayor of Kavarna municipality on the grounds of art. 18, paragraph 2 from Wastes Management Act.</p> <p>An application will be made to RIoEV for issuing a permit for work with dangerous wastes (worked off lubricants, coolants, etc.) under art. 37 from Wastes Management Act.</p>	Construction	Appropriate consents required for waste management and treatments	Contractor
<p>A waste management programme in accordance with the requirements of Article 29, Paragraph 1, Item 3 of WMA, will be developed and the</p>	Construction	Prevent the pollution of	Contractor

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
required permit for carrying out activities involving storage of hazardous waste will be obtained (as above).		adjacent areas by waste	
Any surplus earth material from construction will be disposed of during construction in line with waste management requirements.	Construction	Prevent the pollution of adjacent areas by earth material.	Contractor
Waste will be segregated into appropriate containers for collecting the various types of wastes generated during wind construction pending their subsequent transportation to the locations for disposal or reuse.	Construction	Prevent the pollution of adjacent areas by waste.	Contractor
Waste will be managed complying with the following hierarchy: reduction of waste generated, reuse materials, recycle materials, dispose.	Construction	To minimise waste generated from site through consideration of alternatives	Contractor
<b><i>Harmful physical factors</i></b>			
Observe the 500 m sanitary protection zone around the wind power generation facilities and prohibit any " <i>construction of residential buildings, hotels, hostels, preschool establishments, schools and public healthcare facilities</i> " therein, as stipulated in Article 5 of Regulation №7.	Design	Reduce the adverse impact on the public.	AGE
Noise level measurements will be undertaken at the closest appropriate sensitive receptors (primarily dwellings) prior to and upon completion of the installation of the facilities and during their initial operation.	Construction Operation	Reduce the potential for adverse impact on the public.	AGE
Equipment must be well maintained and adequately silenced to avoid causing nuisance.	Construction	Reduce the potential for adverse impact on the public.	Contractor
Additional noise attenuation measures (e.g. noise barriers) will be used where necessary to prevent nuisance.	Construction	Reduce the potential for adverse impact on the public.	Contractor
Electromagnetic radiation measurements in the low and radio-frequency range, as well as vibration measurements will be undertaken	Operation	Reduce the potential for adverse impact on the public.	AGE

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
following the installation of the facilities in the first year of operation.			
<p>A shadow flicker assessment has been. The results of the assessment show that no significant impacts are predicted. However, the actual effects of shadow flicker will be monitored during the first year of operation (through consultation with the local community) to ensure that no real effects are experienced.</p> <p>Appropriate colour design of the facilities depending on the colours prevailing in the surrounding environment will be selected (visual perception against the existing backdrop).</p>	Design Construction Operation	Mitigate and minimize the adverse visual impacts on the public, ensure unimpeded integration into the landscape, ensure safe passage for the migrating birds.	AGE
Measures to reduce the noise impact by shutting down any of the facilities (as is normally done during preventive maintenance), or using personal protection equipment (earplugs) in cases where doing so with the remaining facilities is unworkable. PPE will be used as required by local regulations or AGE policy, whichever is more stringent.	Operation	Minimize the adverse noise impacts.	AGE
Precautionary markings will be installed to restrict the access of visitors and passers through the area.	Operation	Mitigate and minimize the adverse impacts.	AGE
An effective public relation system will be established dealing with the physical factors and safety issues in order to ensure safe passage around the Project site	Design Construction Operation	Smooth out the social tensions and alter people's attitude in respect of the wind power generation issues.	AGE/ Contractor
<b><i>Health and hygiene aspects of the environment</i></b>			
<b><i>Measures to prevent and minimize the significant harmful impacts on Workers and the Public</i></b>			
AGE will develop and adopt a written human resources policy setting out its approach to managing employees. Under the policy, AGE will provide employees with information regarding their labour rights	Construction Operation	Protection of staff welfare.	AGE

Measures	Implementation Period/Stage	Reason for Measure	Responsibility
<p>including rights related to wages and benefits. The policy will be clear, understandable and will be made accessible to each employee prior to any contracts of employment being agreed. The human resources policy and employment contracts will be comply with the requirements of investors in the scheme.</p>			
<p>AGE will evaluate the risks and impacts to health and safety of the affected community during the lifetime of the Project and will establish appropriate preventative measures. Consideration will be given to infrastructure and equipment safety, hazardous materials safety, environmental and natural resources issues, and disease exposure. An emergency preparedness and response plan will be prepared as part of the EMMP detailing the measures to be employed.</p> <p>Where the project poses risks to the health and safety of affected communities, AGE will disclose this EMMP document and any other relevant information in order to inform stakeholders of the risks and how they will be managed.</p> <p>All AGE staff and contractor staff (including security staff) will be trained in the health and safety procedures, measures, policies and requirements.</p> <p>All risk assessments and training will be undertaken in accordance with the requirements of the investors.</p>	Construction	Community health and safety.	AGE
<p>Excavation works for laying the turbine foundations and cables will be carried out using suitable machinery and monitored for strict compliance with the safety at work regulations.</p>	Construction	Minimize the adverse impacts on workers' health.	Contractor
<p>The delivery, unloading and installation of foundations and turbines will be carried out under the surveillance of individuals qualified to conduct such activities using heavy machinery and cranes.</p>	Construction	Minimize the adverse impacts on workers' health.	Contractor

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
The routes intended for traffic of heavy machinery and cargo vehicles to each turbine installation site will be identified and captured within the Project Traffic Management Plan.	Construction	Minimize the adverse impacts on workers' health.	Contractor
Workers should wear safety helmets, suitable shoes with rigid caps, earplugs, protective gloves and work clothing suitable for the season.	Construction	Protection of workers' health.	Contractor
The Traffic Management Plan will be developed in order to manage traffic movements to and from site and will include: the type of construction traffic permitted to use access routes to the working areas; areas of limited or no access to construction traffic; measure to ensure areas of restricted or no access are adequately signed; approved site transit methods; arrangements and routes for abnormal loads; arrangements for deliveries of abnormal loads will be made outside peak hours and where appropriate during the night.	Construction	Minimise disruption to the public and reduce potential for traffic incidents and accidents.	Contractor
No work will be allowed to be carried out in rainy, gusty or snowy conditions.	Construction	Minimize the adverse impacts on workers' health.	Contractor
An initial briefing on all hazards of occupation will be undertaken relevant to the works being undertaken.	Construction Operation	Protection of workers' health.	AGE/ Contractor
Spills of fuel oils, spent lubricating, engine and machine oils will be minimize by implementation of the appropriate management plans and procedures	Construction	Protection of workers' health. Soil, surface and groundwater and vegetation pollution prevention.	Contractor
A round-the clock telephone connection will be provided to avoid any complications and undertake urgent actions in the event of an incident. Medical assistance from the town of Kavarna will be called on, in the event of injuries.	Construction	Protection of workers' health.	Contractor

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
Prevent the access of unauthorized persons during works involving foundation preparation and turbine installation. This will apply above all to curious children and teenagers from nearby towns and villages.	Construction	Prevention of injuries to the public.	Contractor
The construction works will be undertaken during the daytime. Where additional limitations might be necessary during the active tourist season, these will be agreed with the Kavarna municipality where required.	Construction	Prevention of disruption to the public and tourism.	Contractor
Provide special information on the health risks for owners of agricultural lands operating in proximity to the area of the facility.	Operation	Prevent the adverse effects on public's health.	AGE
Warnings signs will be provided to motor vehicle drivers of the risk of sudden dazzling by flashes produced by the blade rotation at low sun angles (this will be subject to shadow flicker assessment prior to construction).	Operation	Prevention of injuries.	AGE
Where local residents inform of potential failures in the telecommunication network, measures will be put into place to eliminate this.	Operation	Prevent adverse impact nuisance on the local population.	AGE
Maintenance and repairing of wind power generators will be carried out in conformity with the international standards by duly qualified individuals.	Operation	Prevent the occurrence of major accidents and injuries (the sites are not fenced in or guarded).	AGE/ Contractor
A Emergency Plan dealing with the prevention of the possible hazards in the event of a natural disaster (storm, blizzard, icing, flooding, torrential rain) will be developed for the Project.	Design Construction Operation	Protection of workers' health, risk management, minimization of the environmental impact in emergency situations.	AGE
<b>Compensation</b>			
Compensate farm owners for crops damaged/lost as a result of construction activities or obstruction to harvesting (as reasonably	Construction	To compensate farm owners for lost revenue that results from the	AGE

<b>Measures</b>	<b>Implementation Period/Stage</b>	<b>Reason for Measure</b>	<b>Responsibility</b>
demonstrated by farm owner).	Operation	construction and operation of the wind farm and associated development.	
Easement payments to landowners for wind turbine blade overhang.	Operation	To compensate landowners for the restrictions imposed on the use of land due to blade overhang.	AGE

## **Appendix B: Turbine Shut Down Principles**

## Shut Down Principles

The decision to shut down a turbine or collection of turbines will be one primarily based upon professional judgement of the IOE or, where the IOE has delegated his/her duty, the SFO. In making the decision to shut down, however, it is important that a number of general principles are considered by the IOE/SFO.

These general principles, which provide a procedural checklist, are listed below and should be used to inform the decision making process. It should be noted that, due to the complexity of possible combinations of conditions that may be experienced on site, the principles are not scenario based (i.e. the potential number scenarios, when considering all species and circumstances at any one time, would be too numerous to prescribe).

1. As soon as a significant number of birds are detected flying in close proximity to the wind farm (definition of ‘close proximity’ will vary with weather conditions and general visibility but anything sighted within 5kms should be considered), either through field observation or radar, the IOE should be notified of this activity. This bird activity should be tracked to determine the direction of flight.
2. Determination of what is considered a significant number should be based upon a combination of the species in the flock and their number. As a broad example, a small number of key migrant species (as defined within the Supplementary Information Report) could be considered as important as a larger number of non-key species, and vice versa. The determination whether the number of birds is significant will be the responsibility of the IOE or delegated SFO, informed by the field ornithologists and/or radar operator.
3. Where the direction flight lies close to the wind farm but appears unlikely to pass through the site then the activity should be observed until such time the birds have passed the site and out of close proximity. The IOE will make the final decision of when a flock of birds, considered as significant, no longer lies in close proximity and thus when observations of that flock can cease.
4. Prevailing wind conditions and directions for the site and surrounding area will have been established at the outset of each day and should be considered in terms of its possible influence on flight direction of birds

(particularly soaring species). It will be particularly important to consider times where strong coastal thermals could result in large, and potentially unexpected, migration across the site. It follows that, wind conditions and their potential for sudden change, should be considered for flights that appear to be avoiding the site, as described in the bullet above.

5. Where the direction of flight lies in close proximity and appears to be heading towards any part of the wind farm, the activity should continue to be observed from the relevant vantage point(s) (see Figure 5.1). If not already detected on the radar, the IOE should instruct the operator detect and track this activity also in order to further inform the decision making process.
6. The IOE will make the decision of if and when to shut down the relevant turbines informed by his/her own observations, the observations of the field ornithologists and the radar operator. In doing so, the IOE will be required to make this decision through the consideration of a combination of the following:
  - The species within the flock (this determines issues such as likely avoidance behaviour, speed of flight, height of flight and relative importance);
  - The height at which the flock is approaching the wind farm;
  - The speed at which the flock is approaching the wind farm (this will be a function of the type of species within the flock and prevailing wind conditions);
  - The direction of the flight (in order to inform the number of turbines that could require shut down);
  - The known typical behavioural patterns of the species in terms of turbine avoidance;
  - The weather conditions, primarily in terms of the prevailing wind directions, the possibility of changes in direction, and strength; and
  - The time lag between verbally instructing a shut down and cessation of blade rotation (see bullet below for further information).
7. It should be noted that the time lag between the verbal notification to shut down and cessation of blade rotation is considered to be in the order of up to 2 minutes. The decision of when to instruct a shut down will take account of this time lag.

8. Where the species identified are those key species addressed within the Project Supplementary Information Report<sup>2</sup>, specific regard should be paid to their endangered status and a precautionary approach should be taken in each case of potential shut down i.e. where doubt exists as to whether the birds will enter the wind farm a shut down should be enacted.
9. Where the IOE takes the decision to instruct a shut down, he/she shall do so following the Turbine Shut Down System procedure outlined in Section 5.2.4 of the EMMP. The notification to commence operation will be made by the IOE and will follow the same principles as detailed in bullet 3 above.
10. Where a flock heading towards the wind farm eventually takes evasive action, avoids the wind farm, and thus a shut down is not enacted by the IOE, the principles established in bullet 3 above should be followed.
11. For birds observed as roosting on the site at dawn, the IOE will instruct the operations office to shut down the relevant turbines that could potentially cause a risk to the birds when they take flight. Once the birds have taken flight the same procedure as detailed in bullet 9 above should be followed.
12. For birds observed as roosting close to the site at dawn (the definition of this will be informed by the principles established in Bullet 1 above), the activity will be observed and the IOE will make a professional judgement as to whether to shut down the relevant turbines based upon:
  - Proximity of the flock to the wind farm;
  - The species within the flock (this determines issues such as take off behaviour, speed of flight, height of flight likely avoidance behaviour, and relative importance);
  - The weather conditions, primarily in terms of the prevailing wind directions, the possibility of changes in direction, and strength;
  - Likely direction of flight when the birds take off, where possible (by way of illustration, if geese are observed it is possible that, once they have finished roosting, they will take flight northwards towards Shabla);

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<sup>2</sup> Saint Nikola Kavarna Wind Farm Supplementary Information Report, Rev04, July 2008, AES Geo Energy

- The time lag between verbally instructing a shut down and cessation of blade rotation (see bullet below for further information).
13. Where shut down is enacted, the same principles as detailed under bullet 11 above will be followed.
14. Where shut down isn't enacted, observations of the birds will be maintained until such time as they take flight. Once they have taken flight, if they move away from the wind farm then the principles detailed within bullet 3 above will be followed. If they move towards the wind farm then the principles detailed under bullets 5 to 9 above will be followed.