GLID WIND FARMS

Glens of Foudland Wind Farm Capacity Increase

Non-Technical Summary (Volume 5)

190322
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INTRODUCTION

Background to the non-technical summary and proposed scheme

Introduction to the non-technical summary

This is the non-technical summary of the environmental statement (ES) for the proposed capacity increase at the operational Glens of Foudland Wind Farm. The current wind farm consists of 20 turbines and the proposal is to add a further seven turbines on the existing site.

The NTS describes in non-technical language the proposed scheme and the likely effects it may have on people and the receiving environment (the surrounding natural area). It also describes the measures that the developer proposes to avoid or reduce any potential negative effects that have been identified, including how environmental issues will be managed during and after construction. The Environmental Statement (ES) presents the complete findings of the Environmental Impact Assessment (EIA), and is the main document accompanying the planning application.

Introduction to the proposal

GLID Wind Farms Topco Limited (GLID) is seeking planning permission to increase the capacity of the operational Glens of Foudland Wind Farm located in Marr, Aberdeenshire (see Figure 1). Operating since 2005, the proposal is to increase the 26 Megawatt (MW) 20-turbine existing development by seven turbines; each with a capacity of 2MW. Therefore, the proposed scheme is to increase the total capacity of Glens of Foudland by 14MW to 40MW of renewable electricity. GLID is a joint venture between Centrica Energy and EIG Global Energy Partners set up in October 2009.

In addition to the operational Glens of Foudland Wind Farm, GLID owns and the Lynn and Inner Dowsing Wind Farms located off the coast of Lincolnshire, England. These wind farms produce a total of 220MW of renewable energy.

The project team

GLID has appointed RSK Environment Ltd (RSK), an experienced environmental consultancy, as lead consultant to carry out the EIA and related assessments to accompany a planning application to Aberdeenshire Council. During the EIA, RSK were supported by;

- Dalgleish Associates – providing specialist geological surveys, assessments and support; and
- Aviatica – providing specialist aviation modelling and support.
Planning Process

Consents and Authorisations

GLID has submitted a planning application to Aberdeenshire Council to seek consent for the capacity increase under the Town and Country Planning (Scotland) Act, 1997.

The planning application for the proposed scheme comprises an area totalling 254 hectares, located within the site of the operational Glens of Foudland Wind Farm.

Environmental Impact Assessment

In accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, an EIA has been undertaken to identify the likely significant effects that the proposed scheme potentially could have upon the receiving environment. The purpose of the EIA is to ensure that any environmental effects are fully understood and taken into account during the design, consenting and authorisation process. The method and findings of the EIA are presented in detail within the ES, and are summarised within this non-technical summary.

Consultation

Consultation formed an important part of the EIA process as well as the ongoing development of the capacity increase. Extensive consultation has been undertaken with the local communities, council members and statutory organisations.

This served to not only inform the consultees of the proposed scheme, but also to gain necessary information, environmental data and to agree upon the method of the EIA.

In addition to formal meetings, consultation was also undertaken by way of informal discussion, letters and emails, two public exhibitions, a press release and a dedicated telephone number and website.

Alternatives

As part of the design development for the capacity increase, consideration has been given to a number of alternatives regarding location, design and operational aspects.

When GLID first considered increasing the capacity of the operational wind farm, a number of options were identified whereby additional turbines could be installed. This approach was considered preferable to developing a totally new site, as use could be made of some existing infrastructure resulting in less impact upon the environment.

Opportunities explored for the proposed scheme included a variety of layouts, turbine models and designs. Initial options for the capacity increase comprised 12 turbines located immediately north of the site. Subsequent layouts were then explored for a 10 turbine scheme and later a 9 turbine scheme.

The proposed design evolved as a result of these feasibility studies and the EIA process. The main considerations that were taken into account in the choice of the preferred design were the sensitive habitat of Bissett Moss, noise levels upon nearby residents, visual effects and evolving planning policy.

The final design choice is shown in Figure 2, and this has resulted from a thorough appraisal of the operational wind farm and its surroundings to ensure that the design is the most appropriate for the site.

Planning Policy

National policy guidance and local development plans relevant to the form, location and nature of the proposed development were identified and reviewed to establish overall compliance with planning policy objectives.
National policy identifies a requirement to encourage the use of renewable technologies to tackle the issue of climate change, strengthen the economy and diversify energy supplies.

Local policy acknowledges a need to promote onshore wind energy projects to help to meet renewable energy targets, recognising that Aberdeenshire has a generous wind resource but also contains high quality landscapes which require safeguarding from unsuitable development. As such, Aberdeenshire Council has also recently published guidance on areas that hold capacity for wind energy developments.

EXISTING ENVIRONMENT

The proposed scheme is located 7 km south east of Huntly in Marr, Aberdeenshire at the site of the operational Glens of Foudland Wind Farm. The 254 hectare land within the site is rolling active pastoral grazing and farm land with small areas of woodland mixed throughout.

The Site surroundings are predominantly further agricultural farmland with small scattered settlements and farmsteads, including: Bainshole; Braehead; North Braehead, Lower Millburn and Newton of Begshill. The main transport route is the A96 which passes to the south of the site.

THE PROPOSED SCHEME

The proposed scheme is to increase the capacity of the operational Glens of Foudland Wind Farm, which has 20 1.3MW turbines, each 78 metre to blade tip, by a further seven turbines, each with a capacity of 2MW and a height of up to 100 meters to blade tip. The turbines will be of a typical modern design incorporating tubular towers and three blades, finished with a pale semi-matt off-white colour.

The proposed scheme seeks permission for a 25 year lifespan, although the existing operational turbines would be removed in 2029. This will therefore extend operations at the site by around 13 years.

Temporary construction work will take place in order to allow the turbine installation, which is anticipated to last approximately 6 months and is anticipated to commence in 2017. During the construction phase, it will be necessary for temporary land take for a construction compound, crane hard standings, an area of excavation to supply the necessary crushed stone and an area for temporary storage of equipment and machinery.

Movement of construction vehicles and heavy goods vehicles (HGVs) will be required to, from and within the Site in order to deliver the turbine components and works machinery.

Following the construction phase, areas of temporary land take will be restored with topsoil and re-profiled to reduce any steep slopes to a safe angle.

As part of the proposed scheme, many elements of the existing infrastructure on the site will be used and upgraded where necessary. The existing access tracks would be removed in 2029. This will therefore extend operations at the site by around 13 years.

Temporary construction work will take place in order to allow the turbine installation, which is anticipated to last approximately 6 months and is anticipated to commence in 2017. During the construction phase, it will be necessary for temporary land take for a construction compound, crane hard standings, an area of excavation to supply the necessary crushed stone and an area for temporary storage of equipment and machinery.

Movement of construction vehicles and heavy goods vehicles (HGVs) will be required to, from and within the Site in order to deliver the turbine components and works machinery.

Following the construction phase, areas of temporary land take will be restored with topsoil and re-profiled to reduce any steep slopes to a safe angle.

As part of the proposed scheme, many elements of the existing infrastructure on the site will be used and upgraded where necessary. The existing access tracks will be used as far as possible, with a requirement for additional permanent access tracks to connect the proposed turbines to the existing track network. The proposed scheme will use the existing control building which will be extended by 100m² to allow additional components. All power and cabling on site from and between the turbines will use the existing cable routes that are buried in trenches.

The layout of the proposed scheme in relation to the operational wind farm is shown in Figure 2.
**APPROACH TO THE EIA**

An EIA is a systematic process to identify, predict and evaluate the environmental effects of proposed projects.

The requirements of the EIA were informed by a scoping process which considered all the environmental effects which could occur as a result of the capacity increase given the nature of the receiving environment.

The scoping exercise involved a review of available documentation, consultation with statutory and non-statutory organisations, and desk based and site-based surveys.

The scoping process concluded that the following aspects would require further assessment, in the form of an EIA, due to their potential to cause environmental effects:

- Landscape and Visual Impacts;
- Archaeology;
- Ecology;
- Ornithology;
- Hydrology and flood risk;
- Geology and hydrogeology;
- Noise;
- Traffic and transportation;
- Socio-economics, land use and tourism;
- Electromagnetic interference and shadow flicker; and
- Aviation
- Climate change

With the required assessments identified, the purpose of the EIA was to identify and review environmental receptors and resources within the site and surrounding area and determine their relative value, importance and/or sensitivity toward change.

Key aspects of the EIA were to:

- Provide a baseline against which the proposal’s impacts will be assessed;
- Identify and assess the anticipated negative and positive environmental and social impacts of the proposal, as highlighted in Box 1;
- Determine measures designed to avoid, minimise or remove negative environmental and/or social impacts and optimise potential positive impacts;
- Use the results of the assessments to inform option selection and subsequent design of the proposed scheme;
- Consult with and obtain feedback from key stakeholders.

The main stages of the EIA that were followed are illustrated on the following page. This is only indicative since the actual process is highly iterative and includes additional steps such as stakeholder interaction, which is not shown.

**Box 1: Types of impact considered**

**Direct impacts** may occur when some aspect of a development, physically impinges upon a valued resource, for instance the proposed construction of a house may result in loss of ecological habitat or an archaeological Site.

**Indirect impacts** could occur in either time, or location, from the source – for instance construction works on a slope could result in heavy rainfall washing exposed soil into a nearby watercourse, which could damage aquatic life.

**Cumulative impacts** are defined as:

- Impacts that result from changes caused by a proposed development together with other past, present or future developments;
- Impact interactions that may arise from a combination of separate impacts on one or a small number of receptors due to the same proposed development.

Information on possible future developments was gathered through discussions with Aberdeenshire Council and research of relevant planning documentation. The possibility of cumulative impacts arising has been considered in each of the technical chapters of the ES.
### The main stages of the EIA followed during the Glens of Foudland capacity increase

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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| **Data gathering**     | **Project data gathering**  
Data to describe the construction and operation of the development, including identification of the project activities, materials to be used, discharges and emissions that are likely to occur. |
| **Environmental data gathering** | Collection of available information on the existing environment within a suitable area of search |
| **Scoping**            | **Identification of environmental sensitivities**  
Identification of receptors and their environmental sensitivity, which could be affected by the proposed development. Consultation with regulatory authorities to discuss aspects associated with the proposed project activities. |
| **Site survey work**   | **Surveys of the existing environmental conditions to fill gaps in data, to ensure sufficient and adequate data are available and form a suitable baseline for the determination of impacts.** |
| **Assessment**         | **Environmental impact assessment**  
Detailed assessment of the identified potential impacts associated with project activities. |
|                        | **Evaluation of significance**  
Evaluation of significance, including qualitative and where possible quantitative estimation of magnitude and severity of effects. |
| **Management**         | **Mitigation measures**  
Identification of measures to be applied to eliminate, minimise or manage the potential significant environmental effects. |
| **Compilation of environmental statement** | **Presentation of the findings of the EIA in a systematic way, including determining the significance of the residual effect on the environment; schedule of environmental commitments and monitoring requirements.** |
ENVIRONMENTAL IMPACTS AND MITIGATION

Landscape and Visual Impact

The landscape and visual impact assessment identifies and describes the likely significant landscape and visual effects of the proposed scheme.

The assessment is informed by a combination of published data and field assessments, which includes: a review of planning policy and guidance; a review of landscape character studies; aerial photography and ordnance survey mapping and site visits to agreed representative viewpoint locations.

The assessment focuses on a 30 km radius study area centered on the site, reflecting the extent of potentially significant effects.

The assessment examines the effects that the proposed scheme may have, considering the operational Glens of Foudland Wind Farm and the potential for cumulative effects with other operational, consented and proposed wind farm developments within a 30 km radius.

The site consists of a group of rounded hills and contains an operational 20-turbine wind farm. Along the edges of the site are linear belts of forestry that provide an element of visual enclosure. The study area is relatively sparsely settled, with residential receptors consisting of mainly isolated farmsteads and small groups of properties within 5 km of the Site.

An assessment of the predicted landscape and visual effects of the proposed scheme at Stage 1 (2018-2029) with the operational and proposed scheme present was carried out and it reached the following conclusions:

- The proposed scheme would not give rise to any significant effects on designated landscapes or Historic Gardens and Designed Landscapes;
- The construction of the proposed scheme would not give rise to any significant landscape or visual effects;
- No significant landscape effects have been identified. It is acknowledged that the proposed scheme will increase the scale of the operational Glens of Foudland wind farm and partially extend its influence on the host landscape character area (Northern Rolling Lowlands), however this is to a negligible extent and would not be significant; and
- A localised significant visual effect has been identified on a track which is located adjacent to the north of the site. However, in general the visual effects of the proposed scheme are limited. This is due to the capacity increase being visually contained within the parameters of the operational wind farm.

At Stage 2 (2029-2043), whereby the original turbines have been removed, the effect of the remaining seven turbine development has been assessed against a theoretical baseline with no operational turbines on the site. As a consequence the Stage 2 assessment has identified some effects although the remaining seven turbine development would remain visually balanced and cohesive following the removal of the operational turbines.

A cumulative assessment was undertaken, which included a consideration of sequential cumulative effects on main roads within 15 km of the Site. This considered the visual effects of the capacity increase in the context of developments in the study area. Neither the cumulative assessment nor the cumulative sequential assessment identified any significant landscape or visual effects.
Archaeology and cultural heritage

The assessment of impacts upon the archaeology and cultural heritage on or around the site involved a desk based assessment, walkover survey and consultation with Historic Scotland and Aberdeenshire Council.

A 1km study area was used to assess any physical impacts upon known archaeology or cultural heritage assets. A second study area of 10km radius was used to assess visual/indirect impacts on designated heritage assets, such as listed buildings, scheduled monuments or designed landscapes.

Archaeological remains found within the site include multiple examples of abandoned and ruined farmsteads and crofts. Several cropmarks suggesting earlier occupation or use of the site in prehistoric times are also present. There is a record of the discovery of a carved stone ball, a type of prehistoric object found only in Aberdeenshire, close to Bog Farm near the site.

The assessment confirmed that within the 1km of the site, there are no known archaeological and heritage sites of very high or high importance. There is one site of medium importance and 56 sites of low importance. The location of the proposed new turbines and access tracks has been designed in such a way as to avoid impacting on known archaeological sites. Known sites close to proposed turbines or access tracks will be fenced off during construction, and an archaeological watching brief will be maintained during topsoil stripping.

During the operational phase, the proposed scheme may visually impact upon the setting of a monument, by interrupting sight lines or affecting the way that the monument can be appreciated in its wider setting. Assessment of impacts on the setting of monuments within 10km of the site indicated a moderate effect on the setting of Waddies Cottage, a Category B listed building, and a minor effect on the setting of the scheduled monument of Gerrieswells long barrow and round cairn. No significant effects on any sites were predicted.

Ecology

Ecological surveys at the site included a Phase 1 Habitat Survey as well as detailed surveys for bats, Badger, Otter, Pine Marten, Red Squirrel, Water Vole and Wildcat. A survey to determine Groundwater Dependent Terrestrial Ecosystems within or in the immediate vicinity of the site was also undertaken. A background data search for protected sites and species within 2km of the site was undertaken to inform these ecological surveys.

The habitat surveys revealed that the following habitats are present on or immediately adjacent to the site:

- dry heath;
- wet heath;
- coniferous plantation;
- scattered coniferous and broad-leaved trees;
- arable fields;
- semi-improved grassland;
- improved grassland;
- open water;
- running water;
- scrub; and;
- species - poor hedgerows.

Bissett Moss is an area of wet heath which lies only marginally within the site boundary and extends to the north of the site.

Bat surveys revealed that there at least four species of bats using the site for foraging and commuting. The vast majority of bats recorded were Common and Soprano Pipistrelles with only a low number of Brown Long-eared Bats and Myotis species being recorded. No bat roosts were found on site. There is a very active Badger population on the site and Common Lizards were also observed using the site. No evidence of Pine Marten or Red Squirrels was recorded although it is possible these species are present in the wider
area. There is anecdotal evidence that Wildcat use the site although no conclusive evidence was found during scat analysis (DNA testing of faeces) or the use of camera traps. No evidence of Otter or Water Vole was found although both these species are known to be present in the wider area and Otter especially may use the site on occasion.

The layout of the new turbines has been designed to minimise the land uptake by ensuring that existing access tracks and infrastructure are utilised as much as possible. As such, only small areas of land will be lost and no areas of wet heath will be affected. Areas of dry heath within close proximity to works will be protected by fencing. All habitats will be protected during construction and operation by measures to control run off and sedimentation. During operation, plant will be regularly checked for oil leaks etc to reduce the chances of pollution runoff.

Plantation around new turbines will be managed to reduce the risks of bats colliding with turbines while using trees as foraging and commuting routes. There are no Badger setts within 30m of the proposed turbines and pre-construction checks will determine whether new setts have been built and that appropriate mitigation is put in place where necessary. Pre-construction checks for Otter, Pine Marten, Red Squirrel, Water Vole and Wildcat will also be undertaken and hand searches and watching briefs for amphibians and reptiles will also be carried out when works are within suitable reptile habitat.

In summary, with the above mitigation measures in place, residual effects on ecology are expected to be minimal.

**Ornithology**

The ornithological assessment examines the potential for impact upon birds. The assessment was based on a combination of desk and field surveys, with the latter comprising specific surveys for breeding birds (including vantage point surveys) and flight activity across the site. Scottish Natural Heritage and the Royal Society for the Protection of Birds (RSPB) were consulted to identify relevant data and agree survey methodologies.

Survey work undertaken at the site in 2013-2014 recorded sightings of Hen Harrier, Northern Goshawk, Peregrine Falcon, Kestrel, Common Buzzard, Sparrowhawk, Eurasian Curlew, Northern Lapwing, Golden Plover, Barnacle Geese, Canada Geese, Greylag Geese, Pink-footed Geese, Black-headed Gull and Herring Gull.

Both Hen Harrier and Northern Goshawk were recorded during the Spring migration period and were single bird flights. Peregrine Falcons are known to breed within the wider area and during the surveys were recorded once near the Site. Curlew and Northern Lapwing were recorded occasionally on the site. None of the geese species use the site to feed or roost and were all recorded flying past the site in various directions indicating that the site does not sit on a favoured flight route for the species.

Of those birds recorded, Northern Goshawk, Eurasian Curlew, Golden Plover, Pink-footed Geese, Black-headed Gull and Herring Gull were assessed for collision risk as they flew at a potential collision height over the Site.

Using field data on bird flight activity (species, location, height, frequency), the collision risk of these species with operational turbines was estimated. The assessment undertaken concluded that the likely impacts of the operation of the Glens of Foudland Wind Farm including the proposed capacity increase on all bird species will be of negligible significance.

In addition 47 small passerine species, 16 of which are of conservation concern, were recorded including; Common Gull, Curlew, Dunnock, House Martin, Lapwing, Linnet, Meadow Pipit, Mistle Thrush, Reed Bunting, Skylark, Song Thrush, Snipe, Starling, Swallow, Willow Warbler and Yellowhammer.

The number of breeding passerine species on the site was low with only eight confirmed as breeding on the site including Skylark and Meadow Pipit. Both these species are adapted to grassland habitat areas which form the majority of the site. A small area of conifer plantation will be
removed creating a more diverse woodland structure which will benefit woodland bird species. The loss of habitat to these birds due to construction of turbines and associated works i.e. access tracks was assessed as minimal.

A search for active raptor nests in 2013 identified up to three active Buzzard nests on the Site. No other active raptor nests were located within 2 km of the Site.

While the proposed turbines are being built (and decommissioned) birds could be affected by disturbance, habitat loss, noise and the presence of the construction workforce, leading to disruption of breeding and foraging.

Disturbance due to tree felling and construction works will have short-term adverse impacts of negligible significance on all bird species as assessed at the scale of the Scottish and UK populations.

Once operational, the wind farm may lead to impacts such the alteration of habitat types present as a result of changes in forest cover, indirect habitat loss due to the presence of the operating wind turbines and collision with rotating turbine blades. These habitat modification and displacement effects are predicted to have an impact of negligible significance for all bird species at the scale of the Scottish and UK populations.

**Hydrology and flood risk**

The hydrology assessment examines the likely significant effects on hydrology and water resources as a result of the proposed scheme.

The assessment examines the potential effects upon water quality, private water supplies and abstraction points and flood risk.

The extent of the assessment was confined to a study area of within 250 metres of the proposed scheme boundary (see Figure 2). Within this area, 6 watercourses were identified including; Glen Water; Mill Burn; Den Burn; Burn of Denend; Peterden Burn and one unnamed watercourse. Impacts on downstream watercourses (River Urie, Burn of Drumblade (Keithny Burn / Forgue Burn) and River Deveron) were also considered.

The assessment found that the site is at low risk of all forms of flooding. The potential impact of the development to the water environment is generally considered not significant; the development will change little in terms of existing flood risk, either fluvial, pluvial, groundwater other forms. The impacts are temporary, of negligible or minor significance and predominantly during the construction and decommissioning phases.

The greater potential for impacts during the construction comes from uncontrolled sediment runoff created during the construction at the site or spillages of chemical pollutants (oils, cements, paints etc) entering either the watercourses in close proximity to the site and potentially impacting upon private water supplies.

The mitigation proposed, particularly during the construction and decommissioning phases, will reduce the likelihood and impact of the proposed scheme and largely consists of following Pollution Prevention Guidelines, best practice and acquiring consents where required.

**Geology and hydrogeology**

An assessment was undertaken of the physical environment (i.e. soils, geology, hydrogeology and geotechnical issues) within a 1km area of the site.

A desk based review of various data sources including: historical and geological mapping; aerial photographs; floodplains and pollution incidents was undertaken in order to inform the physical environment baseline.

The area of Bisset Moss to the north east of the Site is underlain by peat. The remaining area of the Site is overlain by superficial glacial stony and sandy clays deposits.

The location of the site on the Hill of Bainshole is partly within the River Don and River Deveron catchment. The area is estimated to have a shallow groundwater level of between 1m and 3m below ground level.
The identification of peat during the assessment of the proposed scheme influenced the design so as to avoid construction and disturbance to this area.

During the construction phase there is potential for impacts upon soils, geology and groundwater from activities such as excavation for foundations, disturbance of existing drainage and potential release of chemicals or materials during construction. The potential impacts of the construction phase vary from slight to moderate significance. The area (borrow pit) used to obtain material for use in on-site concrete production and in the track construction will be located adjacent to the former borrow pit used during the operational wind farm.

During operation, no impacts are predicted other than the potential for accidental release of materials or chemicals that could cause slightly significant impacts. Adopting best practice working techniques would minimise this risk.

**Noise**

Following the scoping process, it was deemed necessary to assess the potential for significant impacts from construction noise and vibration (traffic and plant), and noise from the operation of the proposed wind turbines.

In order to assess the noise impact from the capacity increase, it was necessary to establish a baseline condition that excluded noise from the operation of the existing 20-turbine wind farm. In addition, the specific operational noise from the existing wind farm was established during this exercise, so that the cumulative effect of the existing wind farm and noise from the proposed scheme could be assessed.

Noise surveys were undertaken at the following locations:

- Within the garden of ‘The Old Post Office’;
- A ruin approximately 350 metres to the east of North Braehead;
- Within the garden of Lower Millburn;
- Bisset Moss, (as conservative representation of the noise environment at receptors to the north of the wind farm); and
- Westfield Croft, Ythanwells

In addition to noise measurements, weather data (including rain, wind speed and wind direction) was recorded at two heights as per relevant guidance.

The assessment found that no significant noise or vibration effects are predicted from the operation of the proposed scheme. Predicted noise levels of the existing operational, and proposed turbines are not predicted to exceed either the daytime or time-time criteria, and as such pose no significant impact.

During the construction phase, works may be occasionally audible but not at a level that would result in disturbance to residential receptors. Equally, during peak construction traffic movements along the A96 (proposed route of the construction), construction traffic noise contributions has the potential to be intrusive. However when considered in the context of existing traffic movements along the A96, the resulting assessment classes construction traffic noise to be ‘not significant’.

In terms of construction related vibration, a review of road conditions prior to the construction phase to repair any discontinuities (i.e. potholes etc.) is recommended, therefore eliminating the potential for construction vehicle induced vibration.

**Traffic and transportation**

The traffic and transport assessment examines the significance of effects of traffic associated with the proposed scheme.

The assessment was undertaken in-line with the guidance documents published by the relevant professional bodies. The methodology considered the following against a given significance criteria:

- Relevant transport policies;
• The road sections likely to be affected by the traffic associated with the proposed scheme;
• The existing character of the road network;
• Existing traffic levels on the road network;
• The additional traffic generated by all stages of the capacity increase;
• The effect of the additional traffic has; and
• An appropriate mitigation strategy was prepared to ensure that any potential traffic effects are kept to a minimum.

No objections were received from Transport Scotland, Aberdeenshire Council or Bear Scotland on the grounds of transportation.

The key route of regional significance to the proposed scheme is the A96 that links Aberdeen to Inverness. The Aberdeen Western Peripheral Route also is of importance, as it crossed the A96 at Craibstone where a new junction is under construction and due to be completed by Autumn of 2016. This is not predicted to impact the proposed scheme.

The main impact upon traffic from the proposed scheme is predicted to be during the construction phase. During this period, abnormal loads and heavy goods vehicles are predicted in order to deliver the turbine components and necessary machinery. The principal route anticipated for the construction traffic would be via the A96. The predicted increase in traffic flows is not anticipated to exceed 10% on any road link of the A96 and was therefore found to not be significant.

The retained access that serves the operational wind farm would be used for the proposed scheme.

There are negligible effects associated with the operational phase, with comparatively lower potential impacts during decommissioning as compared to the construction phase as decommissioning will only involve the removal of above ground infrastructure.

Socio-economics, land use and tourism

The assessment aimed to review the effects that the proposed scheme would have upon the local economy, tourism and land use.

A desk-based review of available public records, statistics, policy and mapping was used to identify the baseline socio-economic conditions. Predictions were then made using specific information of the proposed scheme on the effects it would have upon the receiving socio-economic environment during the construction, operational and decommissioning phases.

The findings of the assessment concluded that the existing land is used for agricultural purposes in parallel with the operational wind farm. Within the surrounding rural environment, the nearest village is Ythanwells, lying 2.5km to the north-east and the nearest large conurbation of Huntly 7km north-west: the main area of economic activity and accommodation. Unemployment is low in the surrounding area, with local employment being in the health, retail, construction and education sectors. Locally, visitor and tourist activities are largely outdoor activities such as walking and cycling, with the main attractions being Gartly Moor and Bennachie hill range. There are no recorded public rights of way, core paths or heritage paths within the Site. Huntly Castle and Leith Hall and Gardens make up the main local cultural attractions.

During the construction phase there will be temporary disruption to agricultural activities and public use of access tracks in order to facilitate the works. A minor positive impact is predicted upon the local economy and employment as a result of using local supplies and workforce for a variety of works, and through employees using local accommodation and shops.

During the operational phase of the proposed scheme all temporary land take will be reinstated and restored to allow land use to return to as before. Key to the local economy will be continuation of GLID's contributions to the existing Glens of Foudland Community Trust Fund. The level of contributions will be agreed with
members of the Trust and with the Council. Extending the operational life of the wind farm will in turn continue the requirement for routine maintenance and so use of local accommodation and amenities.

During the decommissioning phase, only minor positive impacts are predicted similar to that during the construction phase.

**EMI and shadow flicker**

*Electro-magnetic interference*

Electromagnetic signals (such as microwaves, broadcast and other radio links) are transmitted throughout the country by a wide range of operators. These transmissions work best if there is a clear path between the source of a signal and the intended destination. Large structures (including wind turbines) within, or near to, this path can affect the signal.

The main impact on the reception of electromagnetic signals from wind turbines is from the rotating blades. As the blades are moving objects, their effect on electromagnetic signals is variable and hard to predict. In order to establish the location and nature of electromagnetic signals in the vicinity of the Site, consultation was undertaken with a number of operators.

Where operators provided details of links that may be affected, these were mapped using GIS software and assessed in terms of their location in relation to the operational and proposed turbine locations.

Where a turbine (either operational or proposed) was found to fall within the required separation distance for a link, as specified by the operator, further assessment was undertaken to determine the likely extent of impact from the proposed scheme.

Three microwave links may be affected by the operational Glens of Foudland turbines and proposed turbines when operating together and two of these microwave links may be affected by the proposed turbines once the operational turbines have been decommissioned.

As the 20 operational Glens of Foudland turbines have been in operation since July 2005 with no known problems or complaints, it is unlikely that the seven turbine capacity increase would cause additional impact. As such, no mitigation is considered to be necessary. However, the Applicant will seek to investigate and mitigate any interference that may arise.

*Shadow flicker*

Shadow flicker may occur under certain circumstances when the sun passes behind the rotor of a wind turbine and casts a shadow over neighbouring properties. As the blades rotate, the shadow ‘flicks’ on and off. This effect is known as shadow flicker.

Shadow flicker is not considered a problem outdoors, but a moving shadow cast over a narrow opening (such as a door or window) could have a more pronounced effect. This effect, however, is generally restricted to a specific distance and direction from the turbine locations. The extent of shadow flicker effects also depends on the size of the turbines and weather conditions.
The number of hours and days per year that each receptor within the vicinity of the Site could be affected by shadow flicker were calculated. It was established that only one residential dwelling could be affected by the operational and proposed turbines in terms of shadow flicker. This property is Lower Millburn, located to the east of the Site.

The calculated effects for Lower Millburn from the operational and proposed turbines operating together are a maximum duration of 38.1 shadow flicker hours per year (equating to 0.43% of the time), for a maximum of 0.66 hours per day (equating to 39.6 minutes) and on a maximum of 92 days per year. These shadow flicker effects would be caused by only three of the 27 turbines – one operational turbine and two proposed turbines.

When the annual mean sunshine duration for Huntly (37%) is taken into account, the potential number of shadow flicker hours experienced as a result of the proposed scheme is likely to be reduced to a more realistic expected value. The realistic expected duration of shadow flicker per year at Lower Millburn as a result of the operational and proposed turbines operating together would be 14.1 hours (equating to 0.16% of the time).

Once the operational turbines are decommissioned, the calculated shadow flicker effects for Lower Millburn are a maximum of 26.0 shadow flicker hours per year (equating to 0.30% of the time), for a maximum of 0.43 hours per day (equating to 25.8 minutes) and on a maximum of 78 days per year. These shadow flicker effects would be caused by only two of the seven turbines.

When the annual mean sunshine duration for Huntly (37%) is taken into account the realistic expected duration of shadow flicker per year at Lower Millburn as a result of the proposed turbines alone would be 9.6 hours (equating to 0.11% of the time).

No mitigation is proposed at this time for any stage of the proposed scheme, but if proven to be required further investigation and mitigation can be initiated. Mitigation of shadow flicker effects has been successful in a number of cases across Europe using turbine shut down.

**Aviation**

To assess the likelihood and significance of any impacts the proposed scheme may have upon existing aviation and defence facilities an aviation assessment was undertaken.

The assessment addressed the likely significant effects on: air traffic control; air defence and meteorological radars; aeronautical radio navigation aids; military low flying and operations from airfields, airstrips and other aviation activities in the vicinity of the Site. This was achieved by reviewing relevant statutory legislation and policy, undertaking desk based modeling and consulting with the Ministry of Defence and National Air Traffic Service (NATS).

Within 125 km of the Site, the following air traffic control and air defence primary surveillance radars were identified:

- NATS En Route Allanshill;
- NATS En Route Perwinnes Hill;
- RAF Buchan;
- RAF Leuchars;
- RAF Lossiemouth; and
- Inverness Airport.

The radars at RAF Leuchars, RAF Lossiemouth and Inverness Airport would be unaffected since intervening terrain will block their line of sight to the proposed scheme.

NATS undertook a Technical and Operational Assessment which concluded that the capacity increase is either operationally manageable or acceptable to all NATS Air Traffic Control (ATC) units apart from Prestwick Centre ATC. However, the proposed scheme would not increase the area within which controllers might observe wind turbine-generated radar returns from the wind farm. Furthermore, flight path evidence shows that controllers do not currently re-route aircraft to avoid the radar returns generated by the...
The proposed scheme therefore is found to have no greater impact on Prestwick Centre ATC than the impact on the other three NATS units that have judged the proposed scheme to be acceptable.

As part of the proposed scheme, two of the seven turbines would be within line of sight of the RAF Buchan radar. However, 10 of the 20 operational turbines are calculated to already be within line of sight of the radar. Considering that the Ministry of Defence held no objections to the operational wind farm, the marginal impact of two additional turbines is not likely to create a significant impact.

Overall, the proposed scheme would have no significant impact upon air traffic control radars, RAF Buchan radar or on other aviation receptors.

Climate change

A key driver and benefit of wind farms is the reduction in emissions of carbon dioxide and other "greenhouse gases" that cause global warming. When wind farms are proposed in areas of forestry or peatland, however, carbon emissions from impacts to these natural carbon stores during wind farm construction can cancel out such operating benefits.

The Scottish Government has prepared a carbon assessment tool for wind farms to help ensure such cases are avoided, and this assessment tool has been applied to the proposed scheme.

The carbon assessment has shown that, because the scheme is designed to avoid areas of deep peat, only minor carbon emissions are predicted from the removal of a small area of forest (approximately 3.8 hectares), and the manufacture of the turbines accounts for the majority source of total construction phase carbon emission (26,919 tonnes of CO2 equivalent (CO2e)). Once operating the proposals are predicted to save 22,333 tonnes CO2e each year, and therefore construction phase carbon emissions will be ‘offset’ within only 1.2 years (14.4 months).

Total carbon savings of 134,851.6 tonnes of CO2e are predicted which is considered a climate change benefit of major significance.
WHAT HAPPENS NEXT?

The planning authority will consider the findings of the ES, of which this non-technical summary forms a part, together with other documents submitted as part of the planning applications for the proposed scheme. Once the planning application has been validated, there will then be a period of 21 days during which comments can be made.

If the Council were to grant planning permission for the proposed scheme, then it is envisaged that construction would commence in 2017, with the scheme becoming operational around 2018.

CONTACT DETAILS

Further information can be found on the project website at: www.glenswindfarm.com

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If you would like to comment on any aspect of the ES or non-technical summary or you would like to make an appointment to view the documents, then please contact the Aberdeenshire Council Planning Office, at the following address or use the council’s e-planning portal:

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