Preface

This Non-Technical Summary forms part of an Environmental Statement that has been prepared to accompany an application under Section 36 of the Electricity Act 1989 for the Afton Wind Farm, located on land adjacent to Afton Reservoir, near New Cumnock, East Ayrshire.

The Non-Technical Summary provides an “executive summary” of the main Environmental Statement document and its findings and is presented in a non-technical manner. The Environmental Statement also includes two volumes of Technical Appendices.

The documents that comprise the Environmental Statement may be viewed at the following locations during the statutory consultation period:

- East Ayrshire Council
  Council Offices
  Lugar
  Cumnock
  KA18 3JQ

- New Cumnock Library
  The Castle
  New Cumnock
  KA18 4AH

- Dalmellington Library
  Townhead
  Dalmellington
  KA6 7QZ

- Carrick’s Store & Post Office
  Carsphairn
  Castle Douglas
  DG7 3TQ

Further copies of the Non-Technical Summary are available free of charge and the Environmental Statement may be purchased for £200 per hard copy or £10 for a CD-ROM copy from:

- RPS Planning, Transport & Environment
  7 Clairmont Gardens
  Glasgow
  G3 7LW
Non-Technical Summary

1 Introduction

This Non-Technical Summary forms part of an Environmental Statement for the proposed Afton Wind Farm at land adjacent to Afton Reservoir, near New Cumnock, East Ayrshire. The Environmental Statement has been prepared on behalf of E.ON UK Renewables Limited to accompany an application to the Scottish Ministers, under Section 36 of the Electricity Act 1989, for permission to construct and operate a wind farm with a maximum output of 74.25 megawatts (MW) at the location shown on Figure 1.

The proposed wind farm encompasses twenty-seven wind turbine generators, each with a maximum output of 2.75MW, and associated infrastructure, as shown on Figure 2. The wind farm would operate for a period of 25 years after which the turbines would either be decommissioned or the life of the wind farm would be extended by a further application for consent.

Under the terms of the Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2000, an Environmental Impact Assessment (EIA) has been carried out to identify and assess the proposed development’s likely environmental effects and propose mitigation measures. The Environmental Statement contains the findings of this assessment, which are summarised in a non-technical manner within this document.

The Applicant is one of the UK’s leading green generation businesses, with a large portfolio of onshore and offshore wind farms, hydroelectric schemes and biomass-fuelled generation. These include 18 onshore wind farms, the UK’s first offshore wind farm at Blyth, Northumberland, and the UK’s second large scale (60MW) offshore wind farm at Scroby Sands, Norfolk. E.ON UK also operates Rheidol Hydro Station, the largest hydroelectric scheme in Wales. The company has also recently received outline planning permission for a 40MW biomass plant at Lockerbie, Dumfries and Galloway, and has also been trialling the use of co-firing of biomass fuels in its fleet of conventional power stations. E.ON UK currently has two operational wind farms in Scotland, Bowbeat in the Scottish Borders and Deucharan Hill in Kintyre.

2 Project Description

Construction of the wind farm would follow a rolling programme over an anticipated 12-month period, with the following infrastructure being provided within the site:

- 27 Turbines (comprising three-bladed rotor, nacelle and tower with internal transformers)
- Temporary Contractors Compound and Turbine Laydown Area
- Anemometer Mast
- New and Upgraded Site Tracks
- Underground Cabling
- Control Building and Substation

The following activities would take place on site during the construction period:
• **Sourcing of stone**: stone for site tracks would be sourced from an off-site operational stone quarry and from the excavation of turbine foundations.

• **Cement batching**: concrete would either be brought in from a local batching plant or a temporary batching plant would be established on site.

• **Turbine delivery**: turbines would be delivered via the A76(T) on semi-low extendable trailers and erected using a large crane (e.g. 500/350 tonne capacity) in conjunction with a smaller crane (e.g. 100 tonne capacity)

• **Construction of infrastructure and erection of turbines**: upgrade of existing site tracks where necessary, laying out of new tracks, construction of control building and substation etc.

Ongoing maintenance would be carried out throughout the 25-year operational life of the wind farm. Decommissioning of the wind farm would involve dismantling and removal of the turbines and on-site control building and substation. Tracks and foundations would either be retained on site or dismantled where appropriate.

### 3 Climate Change

#### 3.1 Climate Change and Finite Fuel sources

Climate change (‘global warming’) is a recognised phenomenon caused by an increase in carbon dioxide gas levels in the earth's atmosphere. The Intergovernmental Panel on Climate Change (IPCC), a body of United Nations scientists which is studying the effects of global warming, reports current atmospheric CO₂ concentrations of 379 parts-per-million. This is reaching a level not seen for 55 million years and is continuing to increase at a rate of 3ppm a year.¹

A large proportion of the increased carbon release is due to the burning of traditional fuels such as coal and oil (fossil fuels containing carbon). This increase in the quantity of CO₂ in the atmosphere in turn affects the way the earth retains heat and the world’s leading environmental scientists believe this is leading to an increase in the average temperature of the earth which in turn is causing climate change.

In addition, concerns currently exist about the long-term viability of using fossil fuels to generate energy, due to the finite nature of the fuel resource and the growing need to import fuels from overseas. There are also concerns that too heavy a reliance on imported fuels could threaten the UK's security of supply even in the relatively short-term future, due to political instability and terrorism.

#### 3.2 Renewable Energy

Renewable energy sources (such as wind, solar, hydro and tidal power) do not rely on finite sources available from the earth’s reserves, but instead seek

¹ Data from the IPPC Website: www.ipcc.ch
to harness continually replenished energy provided by the forces of nature. Using renewable energy to generate electricity does not create or release carbon dioxide or other air pollutants, and therefore does not contribute to climate change or local air pollution. Wind power does not deplete reserves of oil, gas or other fuels, and therefore offers a contribution to a secure, long-term energy supply.

3.3 **Climate Change Targets**

The following international and UK targets have been set for reductions in carbon dioxide emissions:

- The Kyoto Protocol\(^2\): an international agreement, resulting in a legally binding target to reduce emissions of greenhouse gases (principally carbon dioxide) by 12.5% relative to 1990 levels over the period 2008 to 2012
- The UK Government has set a target to cut carbon dioxide emissions by 20% below 1990 levels by 2010
- In the recent Energy White Paper, the UK Government set a target of a 60% reduction in carbon dioxide emissions by 2050\(^3\)

In order to outline a means to achieve these targets, the UK Government launched the UK Climate Change Programme in November 2000. This programme aims to encourage the use of new and more efficient sources of power generation, including renewable energy, with a target of 10% of all UK electricity being provided from renewable sources by 2010. The most recent figures show that by 2002 this figure was around 3%\(^4\), indicating that significant further development in renewable energy sources is needed to meet this target.

3.4 **Scottish Renewable Energy Targets**

Scotland is already exploiting significant renewable energy resources and in 2002 generated around 10% of its electricity from renewable sources\(^5\), mainly from hydroelectric schemes. The Scottish Executive, however, has set a target to further increase the use of renewable sources in Scotland to around 18% by 2010. In addition, in 2003 the Scottish Executive set an aspirational target of 40% of Scottish electricity from renewables by 2020\(^6\).

3.5 **Renewables Obligation**

To implement their strategies, the UK Government and Scottish Executive have placed an obligation on all licensed electricity suppliers to provide an increasing proportion of their electricity from renewable sources. This Renewables Obligation places an obligation on all UK electricity suppliers to

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\(^2\) Kyoto Protocol, Third Conference of the Parties (CoP-3) to the UN Framework Convention on Climate Change (UNFCCC), Japan, 1997


\(^4\) DTI, Energy Trends, December 2003, 29-34

\(^5\) DTI, Energy Trends, December 2003, 29-34

provide 5% of their electricity from renewables by 2005, rising to 10% by 2010\textsuperscript{7}.

Under the Renewables Obligation, large-scale hydro and non-biodegradable wastes are not included in the definition of renewable energy.

The proposed development would contribute to the required increase in the provision of renewable energy by supplying renewable energy to electricity suppliers and their customers.

4 Wind Power

Wind energy is one of the best placed technologies available to meet the UK renewable targets. The UK is the windiest country in Europe, with over 40% of the available resource\textsuperscript{8}, and improvements in technology have resulted in the cost of wind power falling to close to those of conventional sources of electricity.

During 2001 the report ‘Scotland’s Renewable Resource 2001’\textsuperscript{9}, commissioned by the Scottish Executive, was published. This study considered a range of available renewable energy technologies examining associated development constraints and costs. The report concluded that Scotland possesses a widely available onshore wind energy resource, and that onshore wind was the most cost-effective of the technologies considered. Therefore, on the basis of cost, and the availability of the necessary resource, onshore wind can be expected to contribute to the bulk of near-term government targets.

National planning guidance supports an increase in renewable energy developments in Scotland.\textsuperscript{10} This guidance acknowledges that much of the new capacity needed by electricity suppliers to meet the Renewables Obligation Scotland would come from wind farms.

The developers have identified the wind conditions at the Afton site as ideal for operation of a viable wind farm. Chapter 2 provides more detail on the site and the proposal and Chapter 3 describes the criteria adopted in selecting the site.

5 Wind Farm Yield and Carbon Dioxide Displacement

It is estimated that the Afton Wind Farm would deliver a net energy yield of 170 gigawatt hours per year.\textsuperscript{11}

The average annual household electricity consumption is 4725 kilowatt hours\textsuperscript{12}, therefore the Afton Wind Farm could serve the equivalent of around

\textsuperscript{7} At date of application the government is consulting with regard to an increase to 15% by 2015
\textsuperscript{8} www.bwea.com
\textsuperscript{9} Scotland’s Renewable Resource 2001. Garrad Hassan and Partners Ltd.
\textsuperscript{10} NPPG 6: Renewable Energy Developments.
\textsuperscript{11} This estimate has been derived from wind data measured on site correlated to long term meteorological data. Analysis of the likely variation of wind speed over the site has also been done.
\textsuperscript{12} UK Domestic Electricity Consumption in 2003 from the Digest of Energy Statistics (115761GWh) and National Statistics 2003 (24.5 Million Households in UK) gives an equivalent annual domestic electricity consumption of 4725 kWh
36,000 households. The number of households in East Ayrshire is 50,346\textsuperscript{13}, therefore the equivalent of over 70% of households in East Ayrshire could have their annual electricity consumption supplied by the Afton Wind Farm.

From the typical UK electricity generation mix, there is 422 grams of carbon dioxide released per kilowatt hour of electricity generated\textsuperscript{14}. Every kilowatt hour of wind energy produced displaces this amount of carbon dioxide emissions, because wind generated electricity is accepted onto the grid whenever it is produced, with other power sources (particularly coal) varying their output to ensure an exact balance of supply and demand on the national grid. Therefore the Afton Wind Farm would prevent 71,740 tonnes of carbon dioxide emissions being released into the atmosphere during each year of operation (1.8 million tonnes of carbon dioxide if the wind farm operates for 25 years).

6 EIA Methodology

As required by the Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2000 an EIA has been carried out for the proposed wind farm development. One of the key aims of the EIA was to influence the layout of the site in order to minimise associated environmental impacts. The Environmental Statement reports the findings of the EIA, which involved the following stages:

- **Site selection:** the careful selection of potential wind farm sites is a critical aspect of the overall wind farm development process. The Applicant utilises a phased site development approach whereby potential wind farm sites are initially screened through a combination of site visits and surveys, use of computer-based Geographical Information Systems (GIS) to identify relevant local/regional/national site designations and constraints, review of relevant planning policy and through direct consultation with key statutory consultees and authorities.

- **Scoping and consultation:** full consultation with a wide range of statutory and non-statutory groups was carried out in order to identify key issues to be addressed during the EIA.

- **Identification of issues:** issues identified at the scoping stage were assessed during the EIA and the results presented within the technical chapters of the Environmental Statement

- **Technical assessments:** the assessments predicted potential effects, informed the layout design and proposed mitigation measures to be adopted

- **Wind farm layout iteration process:** the wind farm design has undergone a number of layout changes, with the main drivers being military low flying restrictions, landscape and visual and topographical issues

- **Preparation of Environmental Statement:** the results of the EIA are reported within the Environmental Statement.

Following the scoping exercise the following technical assessments were undertaken:

\textsuperscript{13} “East Ayrshire by Numbers”, East Ayrshire Council, 2003

\textsuperscript{14} “Greenhouse Gas Emission Reduction”, Report for the DTI by Mott MacDonald, August 2001
7 Environmental Impact Assessment

7.1 Landscape and Visual Amenity

The potential landscape and visual effects of the proposed development are key issues for assessment. The issues in landscape and visual terms identified were the potential effects upon the landscape resource (chiefly its character and valued resources) and upon visual receptors (people) i.e. visual amenity (notably residential and recreational).

The assessment process followed a standard approach:

- baseline studies to identify/confirm the fabric/elements, character, qualities and valued parts of the landscape, its principal features and relevant landscape planning designations which could be affected by the proposal and the type and potential sensitivity of visual receptors likely to be most affected;
- description of the proposal including mitigation measures;
- identification of effects brought about by the proposal on the landscape resource and designations together with visual receptors (people) through desk study and field work (using maps, plans, publications, field work, photographs, wireline diagrams and photomontages) with, in all cases, effect upon visual receptor(s) with the highest sensitivity to such proposals being taken into account;
- estimation of the magnitude of effects and assessment of their significance.

The assessment concludes that the proposed wind farm would extend an already existing locally characterising influence over the landscape to the effect that there would be an extension of a ‘wind farm landscape’ (due to the presence of existing wind farms locally) in the immediate context of the wind farm adjudged to be within and perhaps up to c800m or thereabouts from the turbines. Beyond this range, the landscape would be read as one which accommodates the wind farm (a mosaic of “Southern Uplands with Wind Farm” and “Southern Uplands with Forestry and Wind Farm” landscape types) thus extending the local landscape sub-type. However, although strongly influenced by it in the local context, the wider landscape would not be overwhelmed by wind farm development and its underlying character would not be compromised.

This has been judged based on the extent to which a range of basic criteria would be met in relation to landscape and visual matters.
Given the arrangement of the turbines and assuming open viewing positions with unobstructed views to a high proportion of the wind farm, and also assuming that the viewer is highly sensitive to the proposal, the magnitude of effects is likely to be High or Medium at or around a distance of c5 km to 7 km of the turbines.

Adopting set criteria, this would give rise to potentially significant visual effects within this range for viewers with a high sensitivity to the proposal in open situations with unconstrained views to a reasonably proportion of the wind farm and would affect a small number of residents and those enjoying recreational activities for whom the visual enjoyment of the landscape is a primary focus. It should be noted however that not all residents and/or recreational participants would be significantly affected since there are many locations within the range up to c5 km to 7 km of the turbines that would not offer such views. In other words, if significant effects are to be found, they would be located within this range but not all effects within the range would be significant.

Turning to the matter of landscape character, it is felt that significant effects (i.e. those of Moderate/Major and/or Major significance) would be likely to be felt locally up to a range of around 3 km to 5 km or thereabouts of the turbines in this landscape which is by and large typical and not unique and is not highly valued at the national level.

Notwithstanding the potentially significant effect, it is considered that there would be landscape character attributes arising from the wind farm development that would be consistent with the existing local mosaic of landscape types and sub-types given the locally characterising effects of Hare Hill and Windy Standard Wind Farms.

Given that significant landscape effects would extend over the range indicated, the change would be limited to direct effects within the Southern Uplands and, given its immediate proximity, Southern Uplands with Forestry landscape type/sub-type. Beyond a distance of around 3 km to 5 km of the turbines, the visual influence of the turbines and therefore the perception of characterising effects in landscape terms would diminish to below significant levels and therefore exert no significant direct effect on other parts of the Southern Uplands/Southern Upland with Forestry or give rise to significant indirect effects in the adjoining landscape types. Following on from this, it is logical to conclude that there would be no significant landscape effects with respect to the host Regional Landscape Character Area i.e. the Southern Uplands.

The development of the wind farm would introduce strong impressions which would give rise to significant landscape and visual effects in the local context. For those of a negative disposition, the proposal would be felt to further alter the attributes of this part of the wider landscape by the further introduction of elements which they may regard as being uncharacteristic with the spirit of the area. As such, they may well consider there to be a significant reinforcement of an already adverse effect upon landscape character and local amenity.

Those viewing the wind farm positively would consider that that which is valued in the local and wider landscape would not be materially harmed – rather the converse and this is the general finding of this assessment. The
wind farm would appear reasonably balanced, controlled, visually permeable, well-related to the broad scale and grain of the landscape and, as such, would introduce a positive image which would add to the landscape experience. When sufficiently distant so as to be capable of being read as a single feature, the wind farm would, notably from the north, demonstrate a horizontal emphasis. Such effects would be of medium- to long-term duration given their reversibility at the end of the working life of the proposal.

The wind farm would also introduce and reinforce a strong, sculptural quality in the landscape. As such, it would add to the atmosphere, add to the sense of place and add to landscape identity. The scheme would achieve a high degree of openness, would substantially avoid perceptions of densely massed turbines, would maintain suitable distances between turbines and dwellings so as to preclude overwhelming effects, and would do so within a landscape that is typical of the wider area.

The proposal would result in an alteration to the environment whose attributes could quickly be recovered through rapid decommissioning and site restoration. Judgements concerning significant effects must be tempered in that light. Whilst influential for their lifetime or for any period that they may be in operation, landscape and visual effects arising from the proposed wind farm, whether regarded as adverse or positive, can be reversed. The landscape would not be destroyed. Rather, the receiving environment would fulfil the role of a landscape ‘on loan’ whose long-term environmental capital would be conserved.

The proposed development would be a positive, long-term, reversible addition to the local scene. Thus, other things being equal, the proposal would also preserve the choice for future generations whether or not (other things being equal) to re-establish what might be thought of as the landscape of today or whether to continue with clean, renewable energy generation.

An assessment of cumulative landscape and visual effects considering the Afton proposal along with other existing and proposed wind farm developments within 30 km of the proposed scheme and within or close to 30 km of the representative viewpoints has been undertaken. The potential for significant cumulative effects has been assessed as being broadly restricted to those which relate to the nearby existing Hare Hill and Windy Standard Wind Farms and proposed Windy Standard Extension and, to a lesser extent, with the Wether Hill proposal to the south-east and the agglomeration of the Kyle Forest proposal (north and south) plus the Chalmerston proposal to the west.

The proposed wind farm development is assessed as sustainable from a landscape resource and long-term visual amenity perspective as well as acceptable in terms of existing landscape character, visual amenity and current background landscape planning policy in relation to its operational effects.

A Zone of Visual Influence (ZVI) diagram, highlighting the theoretical visibility of the wind turbine hubs and blade tips on a “bare earth” basis (i.e. it does not take into account vegetation, buildings or other obstructions to visibility) is included as Figure 3. A wireframe computer simulation view and a photomontage simulation view of the proposal from adjacent to the Afton Reservoir are shown on Figure 4.
7.2 **Ecology**

The assessment of habitat ecology included a Phase 1 Habitat Survey, limited National Vegetation Classification (NVC) Survey and a survey of protected mammals. The potential effects on ecology were assessed using Institute of Ecology and Environmental Management Guidelines\(^{15}\). These guidelines require the assessment to identify “Valued Ecological Receptors” (VERs), and assess impacts of the development in relation to these receptors.

The site and surrounding area does not fall within any statutory nature conservation designations. The site however does form part of the Afton Uplands Wildlife Site, a non-statutory site designated by the Scottish Wildlife Trust (SWT). This wildlife site contains a number of botanically rich areas, however none of these are within the proposed wind farm site.

Survey work and consultation identified the following VERs within or adjacent to the site:

- Acid Grassland – considered to be a VER of low local value
- Wet Modified Bog – considered to be a VER of moderate local value
- Otter – due to its statutorily protected status otter is classed as a VER of regional value
- Migratory Salmonids (Atlantic Salmon and Sea Trout) – due to their high economic value salmon and sea trout are considered as VERs of regional value
- Brown Trout and Grayling – due to their economic resource for angling and a prey resource for otters they are considered to be a VER of moderate local importance

The assessment of effects on the above VERs found that the construction of access tracks and turbine bases would lead to the loss of some Acid Grassland and Wet Modified Bog. There is potential for otters using shelters close to the control building and substation to be disturbed. Otters making use of watercourses and ditches within the turbine area may also be disturbed during the construction period and the potential exists for construction activities to cause pollution of watercourses that may damage salmonid species, brown trout and grayling.

The following mitigation measures are proposed in order to reduce the likelihood of adverse impacts occurring:

- Designation of an “out of bounds” area around otter shelters and micro-siting of the control building and sub-station
- Prevention of runoff to and contamination of watercourses by adhering to measures outlined within the site Pollution Prevention Plan (see Section 4.4)
- Appropriate design of watercrossings to allow otters unimpeded movement

Providing the above mitigation measures are implemented no significant ecological effects are predicted.

7.3 Ornithology

Following consultation with key bodies such as Scottish Natural Heritage and RSPB, the following surveys were undertaken at the proposed wind farm site over the period 2003-2004:

- Breeding Bird Survey
- Black Grouse Survey
- Vantage Point Watches

Survey work identified the following “Valued Ecological Receptors” (VERs – see Section 4.2 above) at the Afton site:

- Merlin – considered to be a VER of high sensitivity
- Peregrine – considered to be a VER of high sensitivity
- Black Grouse – considered to be a VER of medium sensitivity
- Golden Plover - considered to be a VER of high sensitivity
- Short-eared Owl - considered to be a VER of high sensitivity
- Skylark – considered to be a VER of medium sensitivity
- Snow Bunting – considered to be a VER of high sensitivity

Formal and informal consultation also suggested that Golden Eagle and Barn Owl would also be considered as VERs of high sensitivity. Merlin, Golden Plover, Snow Bunting and Golden Eagle were not formally assessed, as their use of the site was believed to be so infrequent that no adverse effects on their population are predicted to occur at any stage of the development.

The potential for effects on the remaining VERs were assessed in terms of land take, construction effects, operational effects, decommissioning effects and collision risk.

The wind farm infrastructure (site tracks and turbine foundations) would result in the loss of a very small proportion of the available habitat within the site. The potential effect on birds is considered to be negligible.

During construction, it has been assessed that impacts of minor significance may occur in the short-term on Peregrine, Black Grouse and Short-eared Owl. Similarly, during operation it is assessed that the proposal would result in impacts of minor significance on Peregrine, Black Grouse and Short-eared Owl.

Collision risk is calculated using data from on-site surveying and the use of an accepted collision risk model. It has been assessed that the magnitude of collision effects to be low resulting in effects of minor significance on Peregrine, Black Grouse and Short-eared Owl.

Effects during construction and decommissioning are proposed to be mitigated by starting the construction and decommissioning programme outside of the bird breeding season. The effects on Short-eared Owls would be mitigated by habitat enhancement in adjacent areas, improving foraging ground for this species.

Overall, it is assessed that none of the predicted impacts on birds are significant in terms of the EIA Regulations.
7.4 **Geology, Hydrology and Hydrogeology**

An assessment of the potential effects on geology, hydrology and hydrogeology including water quality was carried out by desk-based consultation, data gathering and on-site survey.

The southern parts of the proposed site lie partly within the drinking water catchment of the Afton Reservoir. The northern parts of the site drain into the Afton Water north of the reservoir. Both the reservoir and river contain fisheries.

Potentially polluting effects likely to arise during the development of a wind farm include chemical pollution from oil or fuel, erosion and sedimentation and subsequent effect on watercourses, and impedimentation to flows in watercourses due to new access tracks.

Potentially polluting activities would be managed and controlled by implementation of a site Pollution Prevention and Incident Plan (PPIP). This PPIP would be agreed with SEPA and Scottish Water prior to construction and would contain site procedures to be followed by all construction and operational personnel.

Taking into account the mitigation measures, the residual effects of the wind farm were assessed as minor or negligible.

7.5 **Cultural Heritage**

An assessment of the known archaeology and cultural heritage within the application area was carried out. In addition an assessment of the potential for further archaeological deposits to be present and an analysis of the visual effects of the wind farm on the settings of Scheduled Monuments, listed buildings, Historic Gardens and Designed Landscapes, Conservation Areas and sites listed on local Sites and Monuments Records identified within the zone of visual influence (ZVI) was conducted.

The baseline study revealed no designated Scheduled Monuments or listed buildings within the proposed site or other sites and monuments registered as of national, regional or local importance. The proposal will therefore have no direct effect on any known archaeological or cultural heritage features.

Outwith the site boundary twenty-seven Scheduled Monuments (three within 10km), two Inventory Designed Landscapes and Historic Gardens (none within 10km), eighty-eight listed buildings (three within 10km) and six conservation areas (none within 10km) were identified within the 30km ZVI.

Indirect visual effects on the settings of the following Scheduled Monuments (SM) and listed buildings (LB) are predicted, and are assessed of minor significance, however any effects are temporary and reversible:

- Craigengillen Cairn (SM)
- Cairn west of the Water of Deugh (SM)
- King’s Cairn (SM)
- Ruins of the Old Church and Graveyard, New Cumnock (Category ‘B’ LB)
- Martyrs Parish Church, New Cumnock (Category ‘B’ LB)
• Mosspark of Oldmill, New Cumnock (Category ‘C(S)’ LB)

After decommissioning any visual impacts on settings would be reversed.

An assessment of the cumulative effects of the existing Windy Standard and Hare Hill wind farms and Afton Wind Farm on cultural heritage features found that the addition of Afton would have a neutral effect.

The development of the wind farm is therefore not considered to produce any significant effects in terms of the EIA Regulations on the cultural heritage of the area.

7.6 Noise

An assessment of the potential noise impacts of the proposed wind farm on nearby residential properties, during both the construction and operational phases of the wind farm, was carried out.

Construction Effects

Construction noise would be restricted to 12 months and is likely to arise during: construction of access tracks, laydown area, contractors compound and turbine foundations; erection of turbines; site cabling; operation of the concrete batching plant; and substation installation.

There are no agreed UK criteria for determining the noise impact of construction work, this assessment therefore refers to WHO Guidelines\(^{16}\) as a means of assessing overall impacts. Noise predictions were made for 5 sensitive receptors around the site.

The construction and decommissioning noise assessment predicts the worst-case impacts at the nearest properties are likely to be of short-term, moderate adverse significance.

Mitigation measures proposed during construction include the selection of the quietest available plant and machinery, use of acoustic enclosures and screens for stationery plant, control over the timing of deliveries to site and control over the timing of works.

Operational Effects

A computer model has been used to predict noise from the turbines based on the procedure set out in ISO 9613\(^{17}\). The use of this technique is considered to be appropriate for predicting the noise from the proposed wind turbine installation.

A Noise Contour Plot has been created and predictions of turbine noise have also been obtained at the nearest residential property (Craig an Dhu) for the range of wind speeds between 4m/s (turbine cut-in speed) and 12m/s (the

\(^{16}\) World Health Organisation, Guidelines for Community Noise, WHO, 1999

\(^{17}\) ISO 9613:1996 (E) Acoustics – Attenuation of sound during propagation outdoors Part 1: Calculation of the absorption of sound by the atmosphere and; Part 2 General method of calculation
maximum required by ETSU-R-97). The predicted turbine noise levels are compared to daytime and night-time noise criteria derived from the baseline noise monitoring data in accordance with ETSU-R-97.

The operational noise impacts were assessed as being insignificant at the nearest residential property.

7.7 Traffic and Transport

During the 12 month construction period an increase in local road traffic would occur as a result of HGV's, cars and oversized vehicles accessing the site. The increase in traffic numbers was calculated by comparing predicted vehicle numbers with existing traffic numbers on the public road network around the site.

Access to the site would be from the existing forestry track located off Afton Road near Craigdarroch. Delivery of turbine components would be from the A76(T) via the roundabout junction with the B741 in New Cumnock and the priority junction onto Afton Road. From here the delivery vehicles would follow Afton Road due south to the junction with the existing track at Craigdarroch. Local contractors and other deliveries would approach the site in a similar manner.

The total number of vehicle journeys (i.e. two vehicle movements – arriving and departing) associated with construction of the wind farm is anticipated to be 5433, comprising:

- 175 abnormal vehicle journeys associated with turbine delivery
- 3518 HGV journeys
- 1740 journeys of cars / LGVs, associated with construction personnel travelling to site

The peak number of vehicle journeys in any month is 1200 during month 3. This equates to 74 maximum daily journeys.

Due to the existing low traffic levels on the Afton Road and B741, increases in traffic on sections of these routes during the 12 month construction period has been assessed as significant. The A76(T) at New Cumnock already carries high levels of traffic and the increase in traffic as a percentage of these levels is small. As a result, the traffic due to the wind farm construction is assessed as not significant on the A76 (T).

Mitigation measures would be employed in order to manage traffic movements and associated effects. A Traffic Management Plan would be drawn up outlining the following measures:

- Upgrading parts of the local road network
- Timing of deliveries
- Maintaining roads and ensuring wheel cleaning facilities are used prior to vehicles leaving sites
- Erecting signs to warn road users of traffic increases

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Agreement of turbine delivery times with East Ayrshire Council
Escorting turbine deliveries form point of origin

During the operational phase of the proposed wind farm, only very low levels of traffic associated with operation and maintenance will be generated. These are likely to amount to no more than a few vehicles movements per day under normal circumstances, and such would have an insignificant effect on local traffic numbers.

7.8 **Tourism, Socio-Economic and Land-use**

An overview of the likely effects of the wind farm on tourism, the socio-economics and land-use of the area was carried out.

With reference to tourism within the local area, potential tourist attractions were identified. In order to evaluate potential effects on such attractions reference was made to recent surveys which have looked at the effect of wind farms on tourism in Scotland. A MORI poll commissioned by the Scottish Renewables Forum and the British Wind Energy Association in 2002 found that over 90% of visitors would return to Scotland for a holiday whether or not there were wind farms in the area. 80% said they would go to a wind farm visitor or information centre during their stay.\(^\text{19}\)

A second survey by the Visit Scotland tourism agency recorded that 75% of visitors were either positive or neutral towards wind farm development in general, although less positive about specific visual impact. The attitude of those who had actually seen a wind farm tended to be more positive than those who had not. 63% said it would make no difference to their decision to holiday in Scotland if the number of wind farms increased.\(^\text{20}\)

Effects on the amenity of tourists would result from indirect visual effects when visiting attractions. There would be no direct effect on any tourist attractions in the area.

There are a number of rights of way and areas and tracks with informal access within Glen Afton. Some of the tracks are located within the vicinity of the proposed wind farm structures. During construction temporary restrictions on access may have to be instigated for health and safety purposes. Signage and rerouting would be provided where possible. There will however be no long-term effects on access and recreation as a result of the proposal.

There would be opportunities and benefits for local business created during the construction, operational and decommissioning phases, including construction jobs and sourcing of materials. Construction of the wind farm would not result in any fundamental or long-term changes in population, structure of the local community, local services or employment.

As part of the wind farm development a community fund would be established based on established figures for other developments of this type within Scotland. A specified amount of money per megawatt per annum would be input into the fund.

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Land developed due to the proposed wind farm would include rough grazing agricultural land and potentially some plantation forestry. No high quality agricultural land would be lost. The amounts lost due to the wind farm would be insignificant when assessed with the large amounts of such land in Ayrshire.

7.9 Miscellaneous Issues

An examination of the impacts arising due to the construction and operation of the wind farm on health and safety, shadow flicker, turbine blade ice throw, communications (including telecommunications, television and radio broadcasting links, civil and military aviation, and emergency services) and other infrastructure, was carried out.

Potential issues identified would be mitigated as outlined below.

With reference to communications issues consultation with the appropriate organisations raised no concerns relating to military radar, military low flying zones, mobile phone communications, television and radio reception, emergency service communications and other fixed link communications systems. National Air Traffic Services has stated there is potential for interference with their Lowther Hill facility.

The following mitigation measures have either been included within the design of the wind farm or would be adopted prior or during construction:

- Health and Safety procedures would comply with legislative requirements.
- Turbine operational controls would be imposed to prevent any shadow flicker effects.
- Operational procedures to ensure safety in relation to ice throw where appropriate.
- Any interference to domestic television reception resulting from wind farm operations would be further investigated and rectified by the developer although it has been advised that this is unlikely.
- Discussions with National Air Traffic Services to ensure there is no interference with their Lowther Hill facility.
- Continuing discussions with Glasgow Prestwick International Airport to ensure there is no interference with their systems.

8 Statement of Significance

The proposed wind farm design has undergone a number of iterations in response to environmental constraints identified during the assessment period; this includes results of environmental studies and consultation with statutory consultees. The main drivers resulting in changes to layout have been:

- Design of wind farm to fit with the local landform and minimise visual impact
- Avoidance of areas utilised for military low flying
- Avoidance of areas of steep slope and those adjacent to watercourses
Remaining impacts would be mitigated by further measures including implementation of a Pollution Prevention and Incident Plan and Habitat Management Plan. Monitoring would be carried out as required by these plans.

Individual effects have been identified and their magnitude assessed within each technical assessment. The findings show that other than landscape and visual effects, which are inherent to the technology proposed, mitigation measures proposed within the design, construction and operational phases would minimise environmental impacts wherever possible.
Afton Wind Farm

Figure No. 2
Site Layout Plan

Key
- Site Boundary
- Turbine Locations
- Site Access Tracks
- Control Building and Substation Area
- Temporary Laydown Area
- Anemometer Mast (N48 282630, 501960)

Scale: 1:25000 @ A0

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AFTON WIND FARM

Non-Technical Summary

Figure 3: Zone of Visual Influence

Theoretical visibility of turbine hubs and blade tips

Number of turbines theoretically visible:

- 1 to 6
- 7 to 13
- 14 to 20
- 21 to 27

Wind energy site: Afton (Proposed)

Number of turbines: 27

Hub height: 80m except 5 turbines 60m

Rotor diameter: 80m

Maximum tip height: 130m

This ZVI was prepared on WindFarm software on a “bare earth” basis. It does not take account of vegetation, buildings or other obstructions to visibility. Curvature of the Earth is taken into account.

Visibility to turbine hub height

Visibility to turbine blade tip height

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AFTON WIND FARM
Non-Technical Summary

Figure 4: Wireframe and Photomontage simulations of the wind farm proposal

See main ES for comprehensive set of visual materials

GRID REFERENCE: 262221E  606173N
DISTANCE TO NEAREST TURBINE: 298m
VIEWPOINT ELEVATION: 455m
NUMBER OF HUBS VISIBLE*: 26
NUMBER OF TIPS VISIBLE*: 26

*No. hubs/tips relates to Afton only

Please note that due to the closeness of this viewpoint to the proposal, there are a further 3 turbines to the right and behind the viewer which it would not be possible to include without a much wider panorama.

VIEWPOINT LOCATION:

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NOTES:

Number of Turbines: 27
Hub Height: 80m except 5 turbines (Nos 20,21,22,23,25) at 60m
Maximum Tip Height: 120m except 5 turbines (as above) at 100m
Camera Lens: 50mm
Camera Height: 1.6m above ground level
View angle: Approx 90° for each frame above
Recommended view distance: 25cm

Project: Afton Date: 22/10/2004
Prepared by: VRW Checked by: JS

Wireframe computer simulation of view, Afton turbines in green, Windy Standard in blue

Photomontage computer simulation of view