

INTRODUCTION

1. Airtricity is proposing to build a windfarm in Upper Clydesdale. This involves construction of 173 wind turbines and associated infrastructure, including connecting access tracks.
2. Although the site is within South Lanarkshire, the application will be determined by the Scottish Executive as it is above the 50 megawatt (MW) threshold set out in Section 36 of the Electricity Act 1989¹. As required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000, the application is accompanied by an Environmental Statement (ES). This Non-Technical Summary summarises the findings and conclusions of the ES in non-technical language.
3. The Environmental Impact Assessment (EIA) has been undertaken by Land Use Consultants (LUC) and associated specialist consultants. LUC obtained a formal ‘opinion’ on the ‘scope’ of the EIA from the Scottish Executive and also directly consulted South Lanarkshire Council, and a wide range of additional potentially interested parties. The ES is based on the results of studies of potential environmental impacts, and includes a description of how the work was undertaken and any assumptions made during the assessment process. It sets out the results of the assessment of likely impacts of the windfarm development on the environment, including design modifications to avoid or reduce impacts and describes further mitigation measures envisaged to minimise any identified environmental impacts. Opportunities for environmental enhancement are also identified.

RATIONALE FOR THE SCHEME

Renewable Energy Policy Context

4. Global climate change is widely recognised as being one of the greatest environmental challenges facing the world today. Reducing dependency on fossil fuels is a key element in tackling climate change and there is now a great deal of support from the UK Government for sustainable energy solutions. The UK Government has made a commitment to reduce its carbon dioxide emissions by 60% below current levels by 2050.
5. In 2000, the Scottish Executive developed the ‘Scottish Climate Change Programme’ in association with the (then) Department of the Environment, Transport and the Regions. In relation to the energy sector, Scottish Ministers adopted a target to generate around 18% of Scotland’s electricity from renewable sources by 2010. In March 2003, Scottish Ministers set an aspirational target to increase further the proportion of electricity provided from renewable sources in Scotland to 40% by 2020. This is being implemented under a Renewables Obligation (Scotland) on all licensed electricity suppliers and illustrates the continued commitment of the Scottish Executive to renewable energy.

SITE CONTEXT AND SCHEME DESCRIPTION

Site Context

6. The site is located between Biggar and Moffat and is split by the M74 motorway running between Abington, Elvanfoot and Crawford (see **Figure 3.1** of main ES). The site occupies approximately 4750 hectares (ha) of farmland, consisting mainly of permanent grassland currently used for sheep grazing, and areas of commercial forestry.
7. In terms of the surrounding environment, the Lowther Hills which form part of the Southern Uplands between Dumfries and Lanark, cross the site and extend to the south and west. Camps and Daer reservoirs are located close to the site and are used for public water supply. To the west of the site are a number of villages including Abington, Crawford and Elvanfoot. To the north of the site lie Crawfordjohn, Robertson, Wiston, Coulter, Biggar and Lanark.

Scheme Description

8. The proposed development (see **Figure 3.2** of main ES) consists of:
 - installation of 173 wind turbines (each with a generation capacity of up to 3.6MW);
 - construction of associated infrastructure comprising: transformers for each wind turbine, access tracks, on-site substations, cabling and wind monitoring masts;
 - associated deforestation and areas of replanting;
 - borrow pits for the extraction of stone and temporary construction compounds;
 - inclusion of a viewing platform on one of the turbines;
 - proposals for additional habitat management.
9. The windfarm will be connected to the national grid via an underground link to an existing substation at Elvanfoot, to the west of the site. An application for connection to the grid will be lodged separately by the local grid operator as required. Although the grid connection is not covered by this application, a desktop scoping study has been undertaken to establish that the connection can be made without significant environmental impacts, including potential cumulative impacts in conjunction with construction of the windfarm. This is summarised as an appendix to the Environmental Statement.

Deforestation and Replanting

10. To construct the windfarm, deforestation of approximately 1070ha of commercial forestry is proposed across ten forest properties. The great majority of the proposed deforestation area supports Sitka spruce, the dominant species in UK commercial forestry. As all of the proposed deforestation areas were planted between 1970 and 1987, the trees are currently 17 to 34 years old. For the most part, the forests on-site are considered to be reasonably well-stocked and in reasonable condition. However, the management of forest crops in this area is significantly limited by the influence of wind. Current forest management practice aims to fell crops before they sustain significant levels of wind damage and many of the crops on the site are within a few years of felling height.
11. The deforestation proposals have been developed by Airtricity, in association with the EIA team and supporting forestry experts, as an integral part of the overall scheme design. This has involved a number of site visits focusing specifically on the forestry aspects of the proposal and additional consultation with the Forestry Commission, individual forest managers and landowners, Scottish Natural Heritage (SNH), the Royal Society for the Protection of Birds (RSPB), and the Red Squirrels In South Scotland Project. Whilst replanting is anticipated for both mitigation/enhancement and commercial purposes, the extent of this cannot be determined at this stage. However, the objectives which remain central to the progression of both the deforestation and replanting proposals recognise the Forestry Commission’s statutory remit to deliver forestry management for multiple benefits, including timber production. They also take account of operational requirements for the windfarm; technical felling considerations; acknowledged good practice in relation to forest landscape design; and additional opportunities for environmental mitigation and enhancement (e.g. selective felling and replanting to support red squirrel populations).
12. Each specialist topic assessment includes a prediction of ‘worst case’ impacts, which, in most cases, is based on an assumption that there will be no replanting. However, any opportunities to further reduce impacts through selective replanting are clearly identified. It is important to note that the felling line required for the windfarm offers scope to visually improve the upper edges of the existing forestry in line with Forestry Commission Guidelines. This offers visual and landscape benefits from a number of key viewpoints and also when moving along the M74 road corridor.

¹ On granting consent under Section 36 of the Electricity Act 1989, deemed planning permission will be granted under Section 57(2) of the Town and Country Planning (Scotland) Act 1997.

Habitat Management

13. A proposed framework for habitat enhancement and management over the operational lifespan of the windfarm has been drafted, and discussed with SNH, RSPB and landowners and managers. This focuses on measures that are deliverable, appropriate for the habitat and wildlife in the area, and sustainable in the long term. For example, this includes broad-leaved woodland planting; heather moorland and blanket bog enhancement; and restoration of heathland.
14. The framework will be developed further post submission, and discussed with SNH and RSPB at an appropriate stage. The intention will be to establish which of these measures should be progressed further, on the basis of the agreed priorities for action and the likelihood of delivering sustained environmental enhancement over the lifespan of the operational windfarm (it is anticipated that significant ecological benefits can be achieved over this time period). It is suggested that the best means of progressing a detailed Habitat Management Plan to implementation would be through a Habitat Management Forum, which included representation from both these organisations, in addition to landowners and managers.

Construction Programme

15. Construction will be on a phased basis over three years. Following pre-construction site clearance works, the construction period for each year will last for approximately ten months. Subject to the granting of consent, construction is expected to start in Spring 2006 and will involve:
- felling of selected areas of forestry;
 - extraction of stone from borrow pits for track and turbine base construction;
 - upgrading of existing tracks to the site;
 - construction of internal access tracks and passing places;
 - construction of temporary hard standing and temporary site office facilities;
 - construction of turbine foundations and transformer bases;
 - construction of on-site substations;
 - excavation of trenches and cable laying adjacent to site tracks;
 - connection of distribution and signal cables;
 - movement onto site and erection of wind turbines;
 - commissioning of site equipment;
 - site restoration.

Operation and Decommissioning

16. The windfarm has been designed with an operational life of 25 years. At the end of its life, the turbines will be dismantled and removed from the site. Alternatively, an application may be submitted to retain or replace the existing wind turbines.

PLANNING POLICY CONTEXT

17. The proposed development lies within South Lanarkshire, with South Lanarkshire Council being the local authority. The development plans comprise the Glasgow and Clyde Valley Structure Plan (2000), and, at a local level, the Upper Clydesdale Local Plan (1996). These are supplemented by the South Lanarkshire Planning Policies, which represent approved Council policy in relation to topic areas such as renewable energy, where Local Plan coverage does not currently exist. National planning guidance is also material to the decision. **Table I** provides a summary of planning policy.

Table I: Summary of Planning Policy

Policy topics	Key policy issues
Sustainable Development	To promote wise resource use and environmental, social and economic benefits.
Importance of Design	Good design should be the aim of the planning and development process and is important at all scales of development.
Renewable Energy	To support renewable energy developments, whilst recognising the need to avoid/minimise significant impacts on the environment.
Wind Energy Developments	Impacts on landscape and visual amenity, natural and cultural heritage, residential amenity and telecommunications should be fully considered.
Forestry	Recognition of the economic importance of forestry and the need to balance this against environmental considerations. Promotion of the planting of broadleaved and native species to enhance the landscape and conservation value of commercial woodlands.
Landscape and Visual Amenity	Impacts on landscape character and amenity, designated areas of high landscape value and residential amenity should be considered.
Water Environment	Increases in flood risk/pollution and impacts on public and private water resources should be avoided.
Ecology (including Birds)	Designated habitats/species and wider biodiversity should be protected and enhanced.
Noise	Noise pollution should be prevented through the careful siting of developments, monitoring and mitigation.
Cultural Heritage	Archaeological interest should be preserved through avoidance where possible, excavation or recording. Impacts on the setting of cultural heritage features should also be considered.
Traffic and Transport	Traffic generation during construction and operation and the scope to use the rail/sea network should be considered.
Aviation, Defence and Telecommunications	Impacts on transmitting or receiving systems should be avoided. Military low flying must also be taken into consideration.
Air Quality and Climate	Impacts should be prevented through monitoring and management. The important role of renewable energy developments in reducing pollutant emissions is recognised.
Recreation / Tourism / Local Economy	Local employment, expenditure in the local economy, rural and agricultural diversification, recreation, tourism, and amenity should be considered.

18. The application for consent is also accompanied by a Planning Statement which provides a more detailed consideration of the compliance of the scheme with planning policy².

SITE SELECTION

19. The impetus for the scheme has arisen from Airtricity's search of potential windfarm sites throughout Scotland. The development is proposed as one scheme within a programme of development. Airtricity considered a number of alternative sites before identifying the Upper Clyde Valley site.
20. Over 300 potential sites were screened using a decision-making tool that included a range of criteria, including landscape and recreational designations, ecological sensitivity, potential noise issues and proximity to a suitable grid connection.

² See Preface for details of how to obtain this document.

21. Due to increased government targets, Airtricity has made a conscious decision within the principles of the search process, to identify both large and small development sites. They believe larger sites must play a role in meeting government targets and in minimising the overall environmental impact of windfarms in Scotland (smaller but more numerous developments can have a wider 'sphere of influence'). As a consequence, as part of the site selection process, eight potential regions were highlighted in Scotland and Northern Ireland and reviewed for the development of 'large scale' sites. These were defined as any development in excess of 100 turbines.
22. The Upper Clyde Valley emerged from this process as an appropriate site for further consideration, including progression to the EIA stage. For example, in addition to the very good wind resource in the area, the site reflects government advice on windfarm site selection in that impacts on internationally and nationally designated sites of natural heritage and landscape value are avoided. Furthermore, the site contains large tracts of commercial forestry and its ecological value (including to birds) has been reduced considerably by grazing.
23. It was also concluded that turbines could be sited in compliance with government advice on acceptable noise limits associated with operational wind turbines and that impacts relating to construction traffic, including the transportation of turbine components, would be minimised as the M74 motorway runs through the centre of the site. In addition, the site is a considerable distance from operating international airports (including Glasgow, Prestwick and Edinburgh).
24. Importantly, grid capacity is already available and the windfarm will be connected to the national grid at the nearby Elvanfoot substation, in close proximity to the central section of the site. This significantly reduces potential environmental impacts associated with installation of the grid connection cabling.

Do-Nothing Scenario

25. If the windfarm development in the Clyde Valley was not to go ahead, the management of the site would be likely to continue as at present. However, it is possible that the site could be of interest to other electricity companies for the development of wind power.

IDENTIFYING THE ENVIRONMENTAL ISSUES

Consultation

26. Consultation has been an important component of the EIA process, and has been used to obtain initial feedback on the proposal and to identify key concerns; to collect baseline information and confirm survey methodologies; to review survey findings and impact predictions; and to discuss opportunities for scheme modifications and additional mitigation and enhancement.
27. Prior to submitting the application, Airtricity also carried out a series of public consultation events. The events provided an opportunity to disseminate information, answer questions and for the public to voice their opinions. Further public consultation is planned following submission of the application for consent.

Environmental Issues

28. Following consultation, it was decided that the EIA should examine the impacts of the proposals with respect to the following issues:
 - landscape and visual impacts;
 - the water environment;
 - ecology;
 - birds;
 - noise and vibration;
 - cultural heritage;

- traffic and transport;
- aviation, defence and telecommunications;
- air quality and climate;
- social and economic impacts;
- recreation and amenity.

Design and the EIA Process

29. The inherent nature of turbines as bold, modern structures means that a strong, clear cut design strategy is necessary. The main intention of the design strategy was to produce a cohesive layout that relates to the topography of the site and is legible in views from the surrounding landscape.
30. As a consequence of the EIA process, there have been a number of modifications to the design to avoid and minimise environmental impacts without compromising the overall design strategy. This has included the relocation or removal of turbines, access tracks, borrow pits and associated infrastructure to:
 - comply with the overall design strategy;
 - reduce visual impacts from key viewpoints;
 - increase distances between development components and watercourses;
 - avoid key habitats of nature conservation interest;
 - increase distances from bird breeding locations;
 - reduce noise impacts on residential properties;
 - avoid Scheduled Ancient Monuments and other areas of archaeological interest;
 - minimise transport impacts;
 - remove turbines from the MOD's low fly zone;
 - avoid the lines of sight for telecommunications installations.

Landscape and Visual Impacts

31. The landscape and visual impact assessment considered the impact that the windfarm development will have upon the landscape and the people who view that landscape. Based on consultations with South Lanarkshire, Dumfries and Galloway and Scottish Borders Councils and Scottish Natural Heritage, 31 viewpoints were selected for detailed review. The assessment involved a desk study, field survey and computer modelling.
32. With respect to landscape designations, the site lies within the Upper Clydesdale Regional Scenic Area (RSA), and it is judged that there will be major impacts on this RSA. The windfarm will not have significant impacts on views from, and experiences of, the other designated landscapes that occur within the study area of 35km radius from the site. These include the Upper Tweedsdale National Scenic Area, four other RSAs (Moffat Hills, Thornhill Uplands, Terregles Ridge and Torthorwald Ridge RSAs), three Areas of Great Landscape Value (Tweedsmuir Hills, Pentland Hills and Clydesdale AGLVs) and from designated historic gardens and designed landscapes.
33. In terms of landscape character, the EIA has identified that there will be a major impact on the landscape character of the site itself. This is because it will become identifiable as a developed energy-generating site comprising wind turbines, access tracks, and substations. The impact on the 'landscape character types' that cover the windfarm site as a whole are identified as minor for *Southern Uplands* and minor for *Upland Glen*. The impacts on landscape character of surrounding landscape types are judged not to be significant.
34. The EIA assessed the visual impact on views from the 31 agreed viewpoints. Major impacts are predicted from fifteen of these viewpoints and moderate impacts are judged to occur from three of the viewpoints. There are minor or negligible impacts from the remaining 13 viewpoints.

35. The assessment has also considered cumulative impacts, i.e. the additional impact of introducing the turbines at Clyde, taking into account both existing and other proposed windfarms. The cumulative impacts were assessed for a selection of viewpoints, routes and 'landscape character types' across the study area. From the total of 31 viewpoints, a subset of ten was selected for the assessment of cumulative impacts. Major impacts were judged to occur from four of these, and moderate impacts from two. Of the five routes across the study area considered for cumulative impacts, one was judged to have major impacts, and three to have moderate impacts. Although all of the landscape character types assessed will have a view of more than one windfarm in the same view, or from different parts of the area, the cumulative impacts for all of these are judged to be minor.

The Water Environment

36. A desk study and site walkover surveys were undertaken to assess potential surface water (hydrological) and groundwater (hydrogeological) impacts of the proposed windfarm development and associated deforestation.
37. The site is located within the headwaters of the River Clyde and Evan Water and drains into a number of water catchments. There are many natural watercourses and man-made drainage systems on the agricultural land and throughout the forested areas within the site.
38. The site is located outside the surface water catchments of the public water supply reservoirs owned by Scottish Water, namely Camps Reservoir, Daer Reservoir and the Upper and Lower Cowgill Reservoirs. There are a number of private water supplies within the vicinity of the site. Flooding on site does not generally occur, however a number of locations downstream have experienced flooding in the past.
39. A pollution incident during the construction period is potentially the most significant impact on the water environment. Other potential impacts associated with the construction and operation of the development, including the removal of areas of forestry include:
- erosion and sedimentation;
 - changes to groundwater levels;
 - changes to private water supplies;
 - increasing flood risk due to changes in rainfall run-off;
 - changing drainage patterns through compaction of soils;
 - changes to soil and water quality.
40. In addition to influencing the design of the windfarm layout, management strategies have been developed to minimise potential impacts on the water environment. Measures include the micro-siting of turbines, access tracks and borrow pits as far as practicable from watercourses/sources/supplies; appropriate construction methods for tracks and drains, including watercourse crossings; adhering to pollution prevention guidelines issued by the Scottish Environment Protection Agency (SEPA); the use of attenuation techniques including ponds; and the production of emergency response plans for potential pollution incidents.
41. With the implementation of the management strategies detailed in the Environmental Statement, the impacts of the scheme on the water environment during deforestation, construction and operation are concluded to be of minor to negligible significance.

Ecology

42. Ecological surveys were undertaken to assess the impact of the scheme on important habitats and species.
43. The site is located in an upland area that consists of a mixture of heather moorland, peatland, grassland and conifer forestry. Although the site itself is not covered by any statutory or non-statutory nature conservation designations, the River Tweed Special Area of Conservation (SAC) lies within 2km of the windfarm. However, as none of the windfarm components are within the Tweed catchment, there are no predicted impacts, either directly or indirectly on this SAC.

44. A large area of the site is comprised of conifer plantations, which are considered to be of low ecological value. The main semi-natural habitat types are unimproved acid grassland and marshy grassland, both of which are characteristic upland grassland types. Smaller proportions of the site are dominated by heather, and there are three main areas of blanket bog where the peat depth exceeds 50cm. The scheme has been designed to avoid these larger areas of bog, and where practicable, other smaller patches, resulting in negligible predicted impacts on this habitat.
45. Surveys were undertaken for a number of protected and regionally important animal species, including otter, water vole, badger, red squirrel, mountain hare, invertebrates, reptiles and fisheries. Otter are using most of the main watercourses within the site, and a number of holts (otter shelters) were recorded. Construction activities will not directly impact on this species, and the disturbance impacts are considered to be low. Water vole is absent from the site due to predation by mink. There are currently no badger setts within the site, although badgers are foraging in the area. Impacts on badger are therefore considered to be low.
46. Site searches found evidence of red squirrel in the two large forestry blocks in the south of the site, although at very low density. Although disturbance impacts on red squirrel will be restricted to these areas and need to be viewed in the context of existing proposals for felling and restocking in these areas, impacts are potentially high, given their value. To minimise adverse impacts and offer potential benefits for red squirrel populations, selective felling will be employed where appropriate to retain important squirrel drey and food crop trees. Replanting strategies will also consider red squirrel conservation as a priority. Mountain hare were also recorded in low density across most of the open moorland areas, but impacts on this species will be low.
47. Invertebrate sampling recorded a number of species typical for the types of habitat present within the site. This included a number of Nationally Scarce species, but it is considered unlikely that these will be impacted upon by the scheme. Common lizard and adder are present in low numbers across the site, and again the impacts are considered to be negligible. Brown Trout were the most common and widespread species within the streams and rivers and significant impacts on these fish are not predicted.
48. Mitigation measures will include adapting the construction programme to avoid the times of year (or day) when certain species are particularly sensitive to disturbance, for example, when red squirrels are breeding. As previously mentioned, the Habitat Management Framework will coordinate a range of habitat mitigation and enhancement measures across the site.

Birds

49. Desk based studies, consultation and bird surveys were undertaken to assess the potential impacts of the windfarm development on breeding and migrating birds; the disturbance associated with windfarm construction and operation; and the risk of collision with turbines.
50. The results of the winter bird survey work indicate that red grouse and buzzards were regularly observed across the site, with male black grouse recorded in the southern section of the site. A single young golden eagle was recorded flying along the southern site boundary. There were no sightings of hen harrier, geese or swans during the winter surveys.
51. The subsequent breeding bird survey recorded a range of bird species within the site, including some of moderate to high ornithological importance such as black grouse, curlew, golden plover, hen harrier, lapwing, merlin, peregrine, ring ouzel, short-eared owl and skylark (although not all bred successfully). No geese and few waterfowl were observed within the site during the breeding season. However, the autumn vantage point surveys recorded four pink-footed geese flying over the site.
52. With the exception of grouse shooting, sheep grazing and associated shepherding, the site is currently relatively undisturbed by human activity. It is predicted that construction work will cause localised and unpredictable disturbance impacts that will be most significant for ground nesting bird species. However, to reduce potential impacts of construction activity on breeding birds, forestry, vegetation and ground clearance operations will be undertaken prior to the bird-breeding season where appropriate. It is considered unlikely

that such disturbance will result in the complete abandonment of the site by any bird species, as construction activity will not affect all areas of the site at any one time and substantial areas and suitable undisturbed nesting habitats are likely to be available for most species within the immediate vicinity of the site.

- 53. Most bird species will habituate to regular patterns of medium-low level disturbance, including the regular and predictable pattern of wind turbine noise and movement. Whilst a pair of peregrines may be displaced from the central area of the site, it is considered that the re-instatement of borrow pits with crags suitable for peregrines, as part of the habitat management plan, would provide an alternative habitat for this and other species. Other measures proposed as mitigation for bird disturbance and further environmental enhancement include the creation of black grouse favoured habitat, and moorland management to encourage upland birds. Any increases in black grouse numbers as a consequence of the proposed habitat improvements would also be of benefit to prey species.
- 54. In terms of bird species with high ornithological value, only hen harrier was recorded flying within the airspace where turbines are proposed. The risk of collision for hen harrier is judged to be very low given the numbers of birds recorded, the absence of any breeding attempt and because they tend to hunt most frequently at heights well below rotating turbine rotor blades. Collision risk is also considered to be low for peregrine, merlin and black grouse but more significant for buzzard.
- 55. Where appropriate, additional survey work to confirm the findings presented in the Environmental Statement is ongoing and the results will be provided to the appropriate authorities on completion.

Noise and Vibration

- 56. Noise is generated by the installed wind turbines as they rotate to generate power. The principal causes of noise are from the blades rotating in the air (aerodynamic noise) and from internal machinery, particularly the gearbox and, to a lesser extent, the generator (mechanical noise). With modern turbines however, the blades are carefully designed to minimise noise whilst the internal machinery is well insulated. Activities and traffic movements during the construction phase will also generate noise.
- 57. The noise impact assessment has been undertaken in line with government guidance on assessing construction noise and noise from wind turbines. Measurements of existing noise levels were undertaken at twelve noise monitoring locations agreed with the local authority as being representative of the background noise environment around the site. A noise assessment was carried out for these properties by comparing predicted construction and operational noise levels with the existing background noise levels.
- 58. The results of the construction noise assessment show that with the exception of Upper Howecleugh during the first year of construction, the recommended maximum absolute noise levels will not be exceeded at any properties under 'worst-case' conditions. Construction noise will however be audible at properties for short periods when construction activities are closest to individual properties. However, following adoption of the envisaged mitigation measures, noise levels will be significantly below the absolute limits that are generally deemed to be acceptable for this type of temporary activity. Consequently, it is not predicted that construction noise will give rise to complaints.
- 59. To minimise the potential impact of operational turbine noise, the scheme layout has been reviewed to ensure turbine locations reflect recognised guidance on acceptable distances from residential properties. An assessment of the predicted turbine noise showed that in general, noise at the nearest residential properties will be less than 40dB(A). Whilst this level is likely to be exceeded at three residential properties: Crookedstane Rig; Harecleugh; and Whelphill during the night time period and at Harecleugh and Whelphill during the quiet daytime period, higher limits of 45dB(A) are commonly applied to properties such as these as the occupants have a financial interest in the development. In addition, when the noise levels from turbines surrounding these properties are adjusted to take account of lower sound outputs from those turbines which are upwind, the recommended noise levels are not exceeded. Therefore, the noise impact of the operational windfarm is not predicted to be significant.

- 60. There is currently no evidence of potentially significant impacts associated with the vibration generated by operational windfarms. Where studies have managed to correlate measured vibration with operational wind turbines, the levels have been considerably lower than the most stringent levels identified as having any adverse impacts on humans or structures.

Cultural Heritage

- 61. The 'cultural heritage' of an area comprises archaeological sites, historic buildings and other features of the landscape that have the capacity to provide significant information about past human activity, or which have cultural significance due to associations with folklore or historic events. A desk-based study of the windfarm and the surrounding area, including consultation, was carried out to identify all relevant sites of cultural heritage interest. A walkover survey was then undertaken to confirm the details of the known sites and identify any previously undiscovered features. The aim was to predict impacts on known features of cultural heritage importance and potential impacts on unforeseen archaeological remains.
 - 62. Construction of a windfarm can have a direct impact on archaeological remains wherever ground disturbance takes place for turbines, access tracks, borrow pits, compounds or cable trenches. During operation, the cultural heritage of an area can also be affected indirectly by the siting of turbines in proximity to historic buildings and monuments, altering the visual and other characteristics of their settings.
 - 63. Prehistoric remains in the vicinity of the site include a Neolithic henge monument, funerary cairns and barrows, and groups of hut platforms and cultivation remains on the lower slopes of hills. Hillforts, and other forms of enclosed settlement thought to date back predominantly to the Iron Age, are also seen in prominent locations. Important Roman military works in the area include a road, a fort, temporary camps and watchtowers. A number of mottes date to the 12th century, and tower houses and fortified farmhouses known as bastle houses are late medieval or later. There are also abundant traces of medieval and later rural settlement and cultivation, and field walls, enclosures and farm buildings relating to the hill-farming economy of more recent history.
 - 64. Nine sites within the site boundary are statutorily protected as Scheduled Ancient Monuments. These comprise a Neolithic henge monument; a prehistoric funerary cairn; two unenclosed prehistoric settlements; a hillfort; a Roman marching camp, road and watchtower; and a bastle house.
 - 65. Most of the important cultural heritage sites are found in the Clyde valley and its tributary valleys, whilst the ridge-tops on which the windfarm will be located generally lie above the altitude reached by past cultivation and settlement. Through modifications to the layout it has been possible to avoid potential damage to most sites. With adoption of the mitigation measures envisaged, no impacts on remaining sites during construction are considered to be of greater than minor significance. In addition, although the windfarm will be visible from a number of nationally important archaeological sites, in most cases their immediate settings have been avoided and the windfarm will have only minor to negligible impacts on important wider views towards, and from, these sites.
 - 66. Given the archaeological interest known to exist in the area, undiscovered buried remains could be present within the site. There remains a possibility that unknown archaeological remains may be disturbed during construction. This is most likely to occur in the vicinity of known sites, and in more low-lying areas with a greater potential for settlement and agriculture. To mitigate this potential impact, archaeological monitoring will be undertaken and on-site ground disturbances kept to a minimum to minimise impacts on buried archaeological remains.
- Traffic and Transport**
- 67. A desk study, consultation and site visit were undertaken to assess potential traffic impacts of the development.
 - 68. There are several public and private access roads within the site boundary. The M74 motorway runs through the centre of the site, and running parallel to the M74 is the B7076, which runs from the junction with the A702 (Junction 14) to Dalton in the south. To the west and north of the site is the A702, which runs from

Edinburgh in the north-east to Dumfries in the south. This is a trunk road from the M74 Services Junction north to Edinburgh. To the east of the site is the A701, which runs from Penicuik in the north-east to Dumfries in the south. This is a trunk road from the M74 junction south to Dumfries.

69. Access to the site for construction traffic, including deliveries of plant and components, will be via eight access points (A-H) located around the site on the roads detailed above. These same access points will be utilised when the site is operational for maintenance works. Where access issues have been identified within the Environmental Statement, a 'swept path analysis' has been undertaken. This confirms the suitability of the proposed access routes, subject to temporary alterations such as removal of street furniture and temporary upgrading of junctions to allow access to the windfarm for deliveries of larger components (i.e. turbine towers, blades and hubs). Within the site boundary, existing tracks will be used as far as possible (with upgrading where necessary) and new track will be constructed where required to link the development components.
 70. A three year phased construction programme is proposed, with the first phase starting in 2006 (subject to consent) with phase 2 in 2007 and phase 3 in 2008. Following pre-construction site clearance works, each phase will consist of a ten-month construction programme. Vehicle movements to and from the site will vary according to the activities on site and will include those of site staff, deliveries of turbine components, construction vehicles and fuel.
 71. Maximum construction traffic is anticipated to be during May of each year (estimated at 162 two-way vehicle movements) on the B7076 road. The 'worst case scenario' suggests a maximum 27% increase in daily traffic flows on the B7076, 4.2% on the A701, 4.5% on the A702 and 0.7% on the trunk road section of the A702. These increases are not considered to be significant given the existing levels of traffic. The most significant impact on traffic flows is likely to be through delay on local roads caused by slow moving construction or delivery vehicles.
 72. Mitigation measures will include the adoption of a traffic management plan and police notification when abnormal loads are being transported. Residual impacts on the local road network are considered to be negligible during the construction period. Traffic generation during the operational phase will be significantly lower and is also predicted to have a negligible impact on the local transport network.
- Aviation, Defence and Telecommunications**
73. A desk based study and consultation have been undertaken to assess the impact of the windfarm structures on civilian and military air space and radar systems; the potential impact on other military installations, systems and activity; and impacts on established and planned radio, television and telecommunications transmission.
 74. The proposed windfarm is located outside all airport consultation zones and as such no impacts are predicted. The radar on Lowther Hill, approximately 8km to the west of the site, is used by the Scottish Area Control Centre (ScACC), and National Air Traffic Services (NATS). Although there will be no impact on the type of radar used by the ScACC, NATS have indicated that there will be an impact on their use of this radar. As NATS will only consider windfarm proposals in any detail once formally submitted for consent, a detailed assessment has not been possible at this stage and Airtricity will look to progress the resolution of this issue immediately after submission.
 75. There are three Tactical Training Areas (TTAs) in the UK, including one (Area 20T) in the Borders area of northern England/southern Scotland, which includes part of the site. Turbines have been removed from the corridors actively used by the MoD for low-flying activities and discussions with the MoD are ongoing.
 76. To comply with the UK's obligations under the nuclear non-proliferation treaty, the MoD uses a network of seismological arrays to monitor nuclear explosions. Due to an upgrade in the seismological monitoring station at Eskdalemuir, the MoD has recently expressed concern regarding the potential impact of turbine vibration and low frequency noise on the operation of this facility. As a number of windfarm proposals are affected, a joint Working Group has been established and research to clarify the likelihood and extent of

potential impacts is underway. It is anticipated that should the research support the MoD's concerns, technical solutions should be possible (for example, through the addition of vibration reducing 'dampers' to turbines or by upgrading the seismic monitoring equipment at Eskdalemuir).

77. Following consultation with mobile phone operators at an early stage, potential impacts on mobile telephone links as a result of the siting of turbines within the lines of sight between mobile phone masts were identified. As a result, the design of the windfarm has been modified to move the relevant turbines away from these lines. Consequently, it is predicted that there will be no impact on mobile communications.
78. With regard to TV reception, as NTL do not anticipate that many homes receive their signals across the proposed site, widespread problems are not expected. However, remediation may be required for the very limited number of residences within 500m of the development. Airtricity have committed to any mitigation measures necessary to rectify interference to television signals directly attributable to the windfarm and it is anticipated that a legal agreement stating this will accompany the consent for the windfarm. Given this, it is anticipated that there will be negligible residual impact on television reception.
79. From consultation responses received, it has been concluded that the turbines will not have any detrimental impact on fixed public communication links, local emergency services radio, and local or national radio reception in the area.

Air Quality and Climate

80. Potential air quality impacts associated with construction of the windfarm include dust generation from traffic movements, earthworks and borrow pit excavations, and exhaust emissions from the site plant equipment and vehicles.
81. Assessment of air quality monitoring data for the local area shows that air quality is good, which is in keeping with the relatively sparse population and lack of intensive agriculture or industry. It is assumed that there is a slight deterioration in air quality along the transport route corridors, namely the M74, A701 and trunk road section of the A702.
82. In line with planning guidance on the sensitivity of different land uses to dust, Camps and Daer reservoirs, which are located within 1km of the site and owned by Scottish Water, are considered to be medium sensitivity receptors. Residential properties located within 250m of sections of the proposed access tracks are also considered to be receptors of medium sensitivity.
83. Exhaust emissions during construction are predicted to have an insignificant impact on local air quality. A number of dust control measures will be implemented during the construction phase of the works to ensure dust generation is minimised, including the use of dust suppressants, restricting vehicle speeds on access tracks and enclosure of stockpiles. Consequently, the residual impacts are not anticipated to be significant.
84. Once the windfarm is operational, using British Wind Energy Association formula, which have been amended for site conditions anticipated by Airtricity, it is calculated that the scheme will annually contribute maximum pollutant emission reductions of 1,782,932 tonnes of carbon dioxide, 20,732 tonnes of sulphur dioxide and 6220 tonnes of nitrous oxides, in comparison with typical coal-fired power generation. Exhaust emissions from vehicles accessing the site for operational purposes are predicted to have a negligible impact on local air quality.

Social and Economic Impacts

85. The EIA has considered the potential social and economic impacts associated with the construction and operation of the windfarm, including impacts on the local economy, including employment, and public safety. This included a desk-based study to determine the nature of local social and economic conditions.
86. The focus of South Lanarkshire Council with respect to social and economic issues is on developing rural areas, protecting and enhancing the environment and building and attracting businesses. The Council aims to

improve quality of life through focussing on core issues such as poverty and exclusion and personal skills and development.

- 87. The construction of the windfarm will create between 200 and 250 full time equivalent jobs over the three year construction period. Approximately £120 million will also be spent on infrastructure works including tracks and underground cabling. It is Airtricity's policy to encourage local companies to tender for such work to ensure maximum benefits are accrued by the local community. To facilitate the awarding of contracts, Airtricity proposes to hold a register of local companies wishing to tender, and will liaise with the Community Councils regarding this. Discussions have been also been held with South Lanarkshire Council Economic Development Team regarding opportunities to link in with current Council initiatives by promoting local supplier involvement in both the construction and ongoing maintenance of the windfarm.
- 88. The windfarm will be visible from a number of visitor attractions in the vicinity of the site including the Southern Upland Way, Tinto Hill and Moffat. Whilst the visual impacts of the windfarm on tourism areas will vary from major to negligible, overall, it is considered that this will not have any significant impacts on tourism.
- 89. It is not predicted that the windfarm will have any adverse impacts on public safety during construction and operation.
- 90. Airtricity supports the principle of setting up Community Funds to provide community benefits from the operation of the windfarm. The purpose of such funds is not directed to mitigating any potential impacts of the development and discussions regarding the provision and management of such funds normally take place once the development is under construction. However, it is anticipated that a Trust will be set up to distribute funds to local communities in South Lanarkshire.

Recreation and Amenity

- 91. The EIA has considered the potential impacts of the windfarm on recreation and amenity, both on the site and in the surrounding area. This included a desk based study and consultation with local organisations to determine the existing recreational use.
- 92. The site and the surrounding area are used infrequently for shooting and motorcycle endurance riding. There is a low level of walking activity across the area and the Southern Upland Way (long distance footpath) lies to the south of the site. National Cycle Route No 74 runs though the centre of the site parallel to the M74.
- 93. Based on the findings of the noise and air quality assessments, and the limited recreational use of the site itself, it is concluded that there will be no significant adverse impacts on recreational users from noise or dust on site or in the surrounding area, both during construction and operation. There will be no access restrictions to the site during operation. The new connecting tracks will be available for use by the public for walking, being accessed by stiles located at gates to the site.
- 94. The windfarm will change the character of the current recreational resource. Some will view the creation of access tracks as an enhancement to recreational opportunities. However, the windfarm will have a visual impact on users of the site and those who particularly value the current absence of any development will perceive the introduction of the windfarm as a negative impact. Enhancement measures associated with the scheme include the creation of an optional extension loop to the Southern Upland Way and this is seen as a positive benefit to users of this long distance walking route.
- 95. Recreational shooting will continue within the site in accordance with the landowners and shooting clubs, and the site will continue to be available as previously to the Enduro cross biking club.

Conclusions

- 96. An environmental impact assessment has been carried out for a windfarm development in the Upper Clyde Valley, in accordance with regulatory requirements and guidance on good practice. This has resulted in a number of layout modifications. The results of the EIA show that, with the envisaged mitigation measures in

place, many remaining potential environmental impacts associated with the construction and operation of the windfarm can be further avoided or minimised.

- 97. It is important to acknowledge at the outset that the level of potential impact identified in this ES needs to be placed in the context of the contribution that the operational windfarm will make to government targets for renewable energy, which have been set as a response to the threat of global climate change. This includes a considerable reduction in pollutant emissions when compared to conventional power stations.
- 98. Given the inherent nature of wind turbines, predicted impacts of major or moderate significance include a number of landscape and visual impacts. However, by taking account of the principles set out in the Forestry Commission Forest Landscape Design Guides, the proposed deforestation provides opportunities for improving the visual qualities of the existing forestry, including visual and landscape benefits from key viewpoints and also moving along the M74 road corridor and from higher locations.
- 99. When noise levels from the turbines near the three residential properties (with financial involvement in the scheme) are adjusted from 'worst case' to take account of lower sound outputs from the upwind turbines, the noise levels at all agreed assessment locations are predicted to be of minor to negligible significance. Whilst discussions with NATS and MoD in relation to radar and military installations are ongoing, it is envisaged that there will be technical solutions to any concerns identified.
- 100. Implementation of the proposed habitat management framework will mitigate many of the residual impacts on ecology (including birds) and will provide habitat enhancement opportunities for a number of species.
- 101. Finally, a number of economic benefits have been identified, including employment opportunities, construction expenditure, the setting up of a Community Fund and the direct income to the landowners. The creation of an optional extension loop to the Southern Upland Way may be welcomed by users of this long distance route and the inclusion of a viewing platform will provide an additional resource for managed visitor trips to the site.
- 102. Due to the increased government targets for renewable energy, Airtricity has made a conscious decision within the principles of the Company's search process to identify larger development sites. It is the applicant's opinion that following the review of alternative large sites, the detailed work undertaken for the EIA has confirmed that the Upper Clyde Valley is an acceptable site for a windfarm development of this scale.



CLYDE WINDFARM