

## PREFACE

This Environmental Statement (ES) has been prepared in support of a planning application for a proposed wind farm at Meikle Carewe, near Stonehaven, Aberdeenshire.

The ES is contained within two separate volumes:

**Volume I** (this volume) is the Non-Technical Summary of the detailed Environmental Statement.

**Volume II** is the Environmental Statement and also contains the associated technical appendices.

A separate **Planning Statement** has also been prepared to accompany the planning application.

This document identifies the context and need for the proposed development. It includes an assessment of how the proposed development accords with relevant national, regional and local planning policies.

The ES has been prepared by Renewable Energy Systems UK Ltd (RES) in consultation with Aberdeenshire Council and in collaboration with the following specialist consultants:

<p><b>Ecological Assessment</b> Fraser Maxwell Scott Wilson Scotland Ltd 23 Chester Street Edinburgh EH3 7ET</p>	<p><b>Ornithological Assessment</b> Dr. Steve Percival Ecology Consulting Swallow Ridge Barn Old Cassop Durham DH6 4QB</p>	<p><b>Hydrological Assessment</b> Liz Buchanan Entec UK Ltd 6/7 Newton Terrace Glasgow G3 7PJ</p>
<p><b>Landscape &amp; Visual Assessment</b> Lynda Thomson EDAW plc Norloch House 36 King's Stables Road Edinburgh EH1 2EU</p>	<p><b>Planning Statement</b> Marcus Trinick Bond Pearce Oceana House 39-49 Commercial Road Southampton SO15 1GA</p>	<p><b>Archaeological Assessment</b> Lynne Fouracre AOC Archaeology Group Edgefield Industrial Estate Edgefield Road Loanhead Midlothian EH20 9SY</p>
<p><b>Acoustic Assessment</b> Dr. Jeremy Bass RETEC RES Group James Blyth House 7000 Academy Park Gower Street Glasgow G51 1PR</p>	<p><b>Engineering Consultant</b> Will Brimacombe RETEC RES Group Beaufort Court Egg Farm Lane Kings Langley Hertfordshire WD4 8LR</p>	<p><b>Electromagnetic Consultant</b> Rachel Ruffle RETEC RES Group Moretonhampstead Library 2 Fore Street Moretonhampstead Devon TQ13 8LL</p>

**Sequential Landscape Assessment**

Steven Radford  
 Macaulay Enterprises Ltd.  
 Macaulay Drive  
 Craigiebuckler  
 Aberdeen  
 AB15 8QH

The ES has been collated by RES to provide information to the local planning authority, statutory consultees, local residents and other interested parties about the proposed development and its likely environmental effects. The purpose is to inform the decision as to whether planning consent should be granted for the proposed development.

Copies of the ES may be viewed during normal opening hours at the following locations:

<p><b>Aberdeenshire Council</b>                  Planning and Environmental Services                  Kincardine and Mearns Area Office                  Viewmount                  Arduthie Road                  Stonehaven                  AB39 2DQ                   Tel: 01569 768300</p>	<p><b>Stonehaven Library</b>                  Evan Street                  Stonehaven                  AB39 2ET                   Tel: 01569 762136</p>	<p><b>Portlethen Library</b>                  Cookston Road                  Portlethen                  AB12 4PT                   Tel: 01224 781389</p>	<p><b>Banchory Library</b>                  Bridge Street                  Banchory                  AB31 5SU                   Tel: 01330 823784</p>
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Alternatively, copies of the ES are available from RES priced £150 each or £25 for a CD copy. A loan copy of the ES can be supplied free of charge for a limited duration if available. Copies of the non-technical summary are available free of charge. The non-technical summary can also be downloaded or viewed at the Meikle Carewe Wind Farm web site at <http://www.meikle-carewe.co.uk> where other relevant project information can also be found.

The planning application and related documents are also available online at <http://www.ukplanning.com/aberdeenshire/findCaseFile.do?appNumber=APP/2006/3934>

Requests for either document should be made in writing, including payment if purchasing the ES, to Renewable Energy Systems UK & Ireland Ltd, James Blyth House, Unit 7000, Academy Park, Gower Street, Glasgow, G51 1PR, Tel 0141 419 1730. Cheques should be made payable to RES UK & Ireland Ltd.

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## **INTRODUCTION**

### **The Application**

RES Developments Ltd (RES) is applying to Aberdeenshire Council for detailed planning permission to construct a wind farm comprising 12 wind turbines on land at Meikle Carewe Hill, 6.5 km north west of Stonehaven.

Each turbine would have an overall height to blade tip not exceeding 70m. The wind farm would meet the average annual demand of around 5,000 Scottish households. This is the equivalent of the domestic needs of a town greater than the size of Stonehaven.

### **The Applicant**

RES is a wholly owned subsidiary of Sir Robert McAlpine, a British, family-owned construction firm with a pedigree of large civil construction projects throughout the UK and a proud history in Scotland stretching from the Glenfinnan Viaduct to Hampden Park.

RES has grown remarkably over the last ten years and has core interests in developing, constructing and owning/operating wind farms in the UK and Ireland and in key overseas markets in France, USA, Australasia and Scandinavia. Within a Scottish context RES developed, constructed and in 2000 commissioned the Dun Law wind farm in the Scottish Borders. During the same year RES provided the balance-of-plant for Scottish Power's wind farm at Hare Hill in East Ayrshire. In 2003 RES completed the construction of a two-turbine development at Hill of Forss in Caithness and in 2005 a 20 turbine scheme at Glens of Foudland in Aberdeenshire was constructed.

In 2006, construction of a 22 turbine development at Black Hill near Duns in the Scottish Borders was completed and construction of a four turbine extension to the two turbines at Hill of Forss began early in 2007. RES has also secured resolution to consent at Ark Hill in Angus and for an extension to the Dun Law project in Borders.

### **History**

A previous application for a 14 turbine wind farm at Meikle Carewe was lodged by RES with Aberdeenshire Council in March 2000. In 2001 and as a result of feedback from formal consultation, the application was amended to 10 turbines and resubmitted. The reduction in the number of machines created a layout with increased separation distances from nearby houses. Although the application received a positive recommendation from the planning department, it failed to gain consent in December 2001 due to concerns raised on aviation safety, TV interference issues and visual amenity. These issues have now been addressed and an amended layout consisting of 12 smaller turbines, which also retains the reduced footprint of the 10 turbine scheme has been submitted.

## **NEED FOR THE PROJECT**

Wind farm projects like Meikle Carewe are needed to ensure diversity, security, economy and environmental sustainability in energy supply.

### **Climate Change**

There is clear evidence that the global climate is changing as a result of human activities, primarily as a result of burning fossil fuels. This has serious environmental and social consequences. Climate change threatens habitats, puts pressure on global water resources and global food supply and increases flooding.

### **Greenhouse Gases And Electricity Production**

Fossil fuel combustion is the major source of the UK's CO<sub>2</sub> emissions. Generation of electricity from fossil fuels not only contributes towards greenhouse gas emissions but, by emitting sulphur dioxide and nitrogen oxides, is also a factor in acid rain. In reducing the impact of energy use on the atmosphere, it will be increasingly important to both reduce energy demand by conservation and efficiency measures, and also replace polluting sources of energy with more suitable ones.

About one third of electricity generated in Scotland currently comes from fossil sources and there is scope for reducing this figure.

By displacing polluting fuels, renewable sources reduce emissions, helping to meet the international and national targets set to combat climate change. Every kilowatt-hour (kWh) or unit of electricity generated by wind energy directly displaces a unit of conventionally generated energy (Welsh Affairs Committee, 1994).

Each year, the Meikle Carewe wind farm would prevent between 17,500 - 25,500 tonnes of carbon dioxide entering the atmosphere, as well as over 250 tonnes of sulphur dioxide and 80 tonnes of nitrogen oxide.

Using renewable energy means that the environmental costs of conventional generation are avoided. These include the health implications associated with poor air quality, the damage to the natural and built environment caused by acid rain and radiation related health and safety problems.

In terms of energy-security, renewable energies such as wind are inexhaustible, are not subject to fuel-price uncertainty and have no requirement for fuel transportation, drilling or mining.

## **ENERGY AND ENVIRONMENTAL POLICY**

### **International Policies**

The best known international policy on combating climate change is the Kyoto Protocol established in 1997. This set legally binding targets and timetables for cutting emissions from developed countries. The UK signed the Protocol in April 1998.

### **European Energy Policy**

The main means of supporting renewables at a European Union (EU) level is through the Directive on the Promotion of Electricity from Renewable Energy Sources in the Internal Electricity Market (2001/77/EC), also called the Renewables Directive, which requires each country to commit to specific targets for renewable energy.

Under the Renewables Directive, member states are required to adopt national targets for renewables that are consistent with reaching the Commission's target of 22 per cent of electricity from renewables by 2010. The indicative target that the proposal sets for the UK is 10 per cent of electricity by that date. Scottish renewables have a vital role to play in reaching this target.

### **UK Energy Policy**

In 1999, the UK government committed to targets in 'New and Renewable Energy Prospects for the 21st Century' to generate 5% of UK energy from renewable sources by 2003 and to increase this to 10% by 2010. The 2006 Energy Review updated this commitment with a belief that 20% of electricity generation can be achieved from renewables by 2020. The review also restated the Government's long-term aim of reducing CO2 emissions by 60% by 2050.

### **Scotland And The Scottish Climate Change Programme**

While energy policy is a matter reserved to the UK Parliament in Westminster, the promotion of renewable energy and policies relating to climate change are devolved to the Scottish Parliament. The Scottish Climate Change Programme (2000) commits to "*working in partnership with the UK government in delivering our domestic goal of reducing carbon dioxide emissions by 20% by 2010.*" It further recognises that "*Scotland's geography and climate provide enormous potential for the development of renewable energy sources,*" with the availability of wind resources unparalleled elsewhere in Europe.

The Scottish Executive has set a target of 18% of electricity generation in Scotland to come from renewables by 2010 and 40% by 2020. In July 2005, Nicol Stephen Deputy First Minister for Scotland announced that renewable energy targets would be expressed in GigaWatts rather than as a % of electricity generation. The target of 40% now being expressed as 6 GW.

## Summary

There is therefore a wide range of international and national climate change policies that have created the commercial stimulus for wind farm development. Scotland has particular renewables potential and the Scottish Executive has a vigorous policy to encourage and enable development. In the near term and in addition to legacy hydro, only onshore wind farms can be expected to play a major role in meeting Scotland's renewable energy objectives. The Meikle Carewe Wind Farm would make a useful contribution in meeting Aberdeenshire's share of the national CO<sub>2</sub> reduction target.

## SITE SELECTION & DESIGN

Meikle Carewe, despite pre-dating the recent RES site selection analysis, is shown to be entirely consistent with the up to date selection criteria and procedure used. Indeed, it is concluded that Meikle Carewe is one of the best sites available in Kincardine and Mearns, as well as Aberdeenshire as a whole, in terms of balancing environmental, economic and amenity considerations.

### Site Selection Analysis

RES's current site selection analysis is implemented using powerful Geographical Information System (GIS) tools, removing much of the subjectivity and potential conflict normally involved with weighing up unrelated selection criteria.

GIS enables layering and combination of datasets containing a myriad of disparate information. Factors contributing to the site suitability are arranged and stored on layers. The layers are then combined to establish the most suitable sites. Data can be given values representing the significance and sensitivity of each factor.

*Natural and Built Heritage* - The lead for grading environmental factors has been taken from Scottish Natural Heritage who defined zones of suitability for wind farm development in a 2002 policy report.

*Economics* - The scoring has been primarily based on wind speed.

*Visual Significance* - This represents a combination of visibility, sensitivity and magnitude. Visible, sensitive 'receptors' (mainly houses but also roads) have been given a weighted score, based on distance.

*Technical and Safeguarding Issues* - These factors have been largely addressed outwith the GIS analysis and include radars, electromagnetic interference and TV reception analysis.

*Housing* - Housing has been represented by density, with each house afforded an 800m amenity protection radius.

The different layers were then combined mathematically, allowing objective 'scores' of overall suitability to be generated which achieve a fair balancing of diverse factors.

### **Site Design**

The turbine layout and design has evolved over a number of years with the final layout being driven by a visual approach to design following a detailed mapping of all the constraints to ensure that concerns raised with earlier applications for a wind farm in this location were addressed.

In addressing one of the reasons given by the Kincardine and Mearns area committee for the prior refusal, a decision to downsize the turbines was made by RES to further reduce the perceived visual intrusion. The adoption of smaller turbines also ensured that the vertical scale of the landscape would be better able to absorb the turbines.

By focusing on the visual approach to design but still taking into consideration the environmental constraints, it has been possible to achieve a high quality of design. The evolution of the design was also aided by sophisticated techniques such as the use of 3D visualisation software.

## THE PROJECT

### Location

As shown on Figure 1, the site lies within the Kincardine and Mearns administrative area of Aberdeenshire. The site is approximately 6.5km to the north west of Stonehaven. The hamlet of Rickarton is approximately 3km to the south of the site and the village of Netherley is just over 2km to the north east, Durris Forest lies to the west. The A957 Slug Road passes to the south of the site, and the B979 Netherley road passes to the east.

### Description

The proposal is for a wind farm of 12 three bladed, horizontal axis winds turbines. Each turbine has a tapered tabular tower with an overall height to blade tip not exceeding 70m as shown on Figure 2. The wind farm would produce sufficient energy to satisfy the average electricity requirements of over 5,000 homes, or approximately 6% of all homes in Aberdeenshire.

In addition to the turbines, the development has electricity transformers, access tracks and site entrance, a control building and substation compound and a wind monitoring mast. During construction, there would be temporary works including a roadstone borrow-pit, a guyed wind monitoring mast and a construction compound (See Figure 3). It is proposed that the construction compound and borrow-pit are reinstated as a car park and community recreation\ecology area.

Within the planning application boundary, the land take is small, primarily limited to the area of the towers themselves and the access tracks leading to them, totalling approximately 2% of the site area.

### Construction

Construction of the wind farm will take between 9 and 12 months. This period is somewhat weather dependant and, as such, the events listed below may take place in a different order.

Running between the turbines there will be a network of tracks to allow vehicular access for maintenance and construction. The proposal is that the tracks will be constructed from local rock taken from an area within the site boundary to minimise construction traffic.

It is anticipated that the foundations for the turbine will be of gravity base design. For a typical 850kW machine the foundation will characteristically comprise approximately 150m<sup>3</sup> of concrete reinforced by between 20 - 25 tonnes of steel bar, in a tapered octagonal block of approximately 12m diameter and from 2-3.5m depth. The foundation surface lies up to 1m below the normal ground surface and is back filled with soil and reinstated.

### **Operation and Maintenance**

Wind farms largely operate under local automatic control but secure computer systems allow operation, either on the wind farm or remotely, to intervene. The wind farm site would not be permanently manned, but there would be traffic limited to small maintenance vehicles with up to four maintenance crew visits per month. In addition it is likely that a local person would be employed to inspect the wind farm site regularly, generally on a weekly basis.

The turbines would be automatic in their everyday operation and would shut themselves down in the event of a fault condition. Were a fault to develop which required an operator to intervene then the supervisory control system would make contact with on-duty staff via a mobile messaging system. The operators would be able to shut down one or all of the wind turbines remotely.

### **Decommissioning**

The expected operational life of the wind farm is twenty five years from the date of commissioning. At the end of this period a decision would be made as to whether to refurbish, remove, or replace the turbines. If refurbishment or replacement is chosen, relevant planning applications will be made.

If a decision were to be taken to decommission the wind farm this would entail the removal of all the turbine components, transformers, the substation and associated buildings. Some of the access tracks could be left on site to ensure the continued benefit of improved site access for the landowners, or they could be reinstated. It is not usual to remove the buried concrete foundations from the site as this would cause more land damage than leaving them in situ. The entire foundation would be graded over with soil.

### **Grid Connection**

The Meikle Carewe wind farm will feature a network of underground cables that will gather the electrical output of the wind farm and feed an onsite substation. The substation will be connected directly to the local electrical grid.

Connection to the grid will be the subject of a separate planning application that will be submitted by the local grid operator, Scottish and Southern Energy plc. It is likely that the Meikle Carewe grid connection will be via a 1.5km underground cable to the existing but unused 33kV line between Stonehaven and Newtonhill, which runs to the north of the wind farm site.

## **LANDSCAPE AND VISUAL ASSESSMENT**

The effects of the wind farm on the landscape and local views will arise principally from the presence of the turbines, with additional effects likely to result from the access tracks, permanent meteorological mast and substation building, which will be present throughout the lifetime of the wind farm. The temporary compound, laydown areas and borrow pit required during the construction stage will also have additional visual effects.

These components of the wind farm will affect the landscape and local views in four ways: firstly, the physical effect on the fabric of the site; secondly, the effect on the landscape character of the site and study area; thirdly, the effect on views from throughout the local area; and fourthly, the cumulative effects that may arise from the addition of Meikle Carewe to other wind farms.

The assessment of effects on the landscape and local views indicates that the wind farm will have significant effects on two landscape character areas – The Mounth and the Kincardine Plateau; two route corridors – parts of the A957 Slug Road and the National Cycle Network Route 1; and five views included in the formal assessment reported in the Environmental Statement. Figure 4 is a photomontage of the wind farm from the A957 Slug Road. A significant landscape and visual effect may arise within the area described as being the area that would be roughly bounded by a line drawn between – in a clockwise direction – Cairnie Burn, Red Moss, Cookney, Hill of Muchalls, Ury Home Farm, Cowton, Cheyne Hill, The lower slopes of the Hill of Three Stones, Cairn mon Earn, Mundernal and Bruntyairds Wood.

The medium-large scale and horizontal nature of the landscape, together with the appropriate turbine size (70m tip height) proposed for this development, is instrumental in the acceptability of the wind farm. The turbines proposed are considered to be appropriate in size for the scale of the landscape in this part of Aberdeenshire. In this context, a scale comparison that can increase the perceived size of turbines does not arise, and in many of the mid-range and long views the landform effectively accommodates the turbines so that they appear as appropriately scaled components in the landscape. The scale of the landscape also ensures that many views towards the site are vast and open in nature. In this visual context, the wind farm will often cover only a small proportion of the full outlook available, and this too reduces its effect, thus increasing its acceptability.

There are no statutory landscape designations e.g. National Scenic Areas, near the Meikle Carewe site and therefore no effects on any statutory landscape designations. Although there are seven Historic Gardens and Design Landscapes within the landscape and visual study area, the development will have a minimal effect on these, as they are largely outwith the Zone of Visual Influence (ZVI) of the wind farm.

The cumulative assessment i.e. taking into account other wind farms, indicates that there will be two viewpoints where the contribution of Meikle Carewe to the cumulative effect is considered to be

significant. At these viewpoints, the addition of Meikle Carewe will result in the perception of the landscape in the view as being one in which wind farms are a prevailing feature. Despite these significant cumulative effects, it is considered that Meikle Carewe achieves a design sensibility with the consented Mid Hill wind farm which is in the same landscape character area: *The Mounth*. Meikle Carewe and Mid Hill both have organic layouts, which take their arcing, sinuous forms from the natural shapes of the sweeping, elevated, broad ridgelines on which they are sited. The two wind farms will have turbines of significantly different sizes suited to their immediate local landscapes (70m tip height at Meikle Carewe, 125m at Mid Hill) but the separation will be sufficient to avoid disharmony.

It is also worth noting that while the views in close proximity to the site do tend to be significantly affected, there are factors that mitigate the magnitude of change. Whilst this mitigation is not sufficient to make the effects not significant, it can improve the accommodation of the wind farm in the visual context. The three most consistent mitigating factors found at Meikle Carewe are the medium to large scale, simple and rolling nature of the landform, which accommodates the turbines; the sympathetic layout of the turbines, which helps the wind farm integrate with the receiving environment; and the size of the turbines, which at 70m to blade tip, are considered to be appropriate in scale for the local landscape.

## **ECOLOGICAL ASSESSMENT**

A number of assessments and surveys have been undertaken during the development of the wind farm. These have been informed by research, consultations with statutory and non-statutory consultees, and the timing and timescale of the study.

There are no national (e.g. Site of Special Scientific Interest) or international (e.g. Special Protection Area, Special Area of Conservation) statutory designated sites either within the proposed wind farm footprint, or in the immediate adjacent area. There are no non-statutory (e.g. Local Nature Reserve) sites of nature conservation interest either within the proposed wind farm boundary, or in the immediate wider area.

There are however a number of important ecological interests within the boundary of the Meikle Carewe wind farm site, including semi-natural habitats of ecological value and a number of protected species.

Badgers, otter, and water voles are not expected to suffer any direct impacts, either during construction or operational phases due to their location within the site but away from the development.

The key habitat is the upland heathland that dominates much of the area of the site and this will be disturbed during the construction phase. Twelve turbines and approximately 3.5km of access track will be constructed through this habitat, and the significance of the impact has been assessed as moderate and adverse during construction. The impacts upon the other habitats within the site have been assessed as of minor significance during the construction phase.

The potential for construction impacts upon a small common lizard population has been assessed as of minor / moderate significance.

The impact upon all of the ecological interests during the operational phase of the wind farm has been assessed as 'no change'.

By following the mitigation measures included in the Environmental Statement such as design of the turbine layout to avoid the limited mire and bog habitats and the use of buried foundations to allow the vegetation to be reinstated up to the turbine base, any effects identified during construction or operation are minimised during the lifetime of the wind farm.

With regard to cumulative impact on habitats, wildcat, reptiles and badgers may suffer a slight loss of suitable foraging habitat within the wider area due to both the recent construction of the TRANSCO pipeline and the wind farm. This will primarily affect upland heathland habitat. Although the loss of these habitats is a permanent adverse and indirect impact upon these species, these habitats are widely distributed and common within the wider area, and only small proportions of these habitats within the site will be lost.

None of the effects have a significance greater than moderate (construction impacts upon the heathland) and are therefore not material to the planning decision making process.

## **ORNITHOLOGICAL ASSESSMENT**

The potential effects of the proposed wind farm on the study area's bird populations fall into three main areas:

- direct loss of habitat through track and turbine construction: this would be an effect of low/negligible magnitude, with only a very small area taken up by the turbine bases and access tracks. Careful selection of routes for the access tracks and turbine locations has ensured that such effects would not be significant in terms of their effect on birds;
- risk of collision with wind turbines: there have been a number of wind farms that have caused bird mortalities through collision but their characteristics are very different to those at the proposed Meikle Carewe site. Such problems have occurred where large numbers of sensitive species occur in close proximity to very large numbers (hundreds/thousands) of turbines, and usually also where the wind farm area provides a particularly attractive feeding resource.
- loss of habitat through disturbance: this could potentially affect a rather greater area than direct habitat loss. Disturbance is likely to be particularly high during construction.

### **Very High Sensitivity Species**

Two very high sensitivity species were identified using/potentially using the proposed wind farm site's airspace and its surrounds, pink-footed goose and greylag goose. Meikle Carewe is on the fringe of

the main feeding range of the geese that roost at the Loch of Skene, and as such the farmland around the site is not likely to be important for this species. Overall the risk of disturbance to these birds is negligible, particularly when taking into consideration the behaviour of geese at existing wind farms and the availability of alternative feeding areas. Collision risk has been assessed and has been shown to be below the level that could be considered to be significant. Overall there would be a negligible magnitude risk of collision or of disturbance, which would not be significant.

### **High Sensitivity Species**

A single record of Peregrine was obtained during the baseline bird surveys: a single bird perched on the existing electricity pylons and then flew off over the site. There are not any known breeding sites within or in the vicinity of the proposed wind farm site. There may be a very small loss of foraging habitat if any birds were to be displaced from the vicinity of the turbines, but as the wind farm area does not form an important part of their foraging range, any disturbance effects would be of negligible magnitude and not significant. Additionally, no significant disturbance effects have been reported for this species at existing wind farms, making the likelihood of any such effects at Meikle Carewe even lower.

No evidence was found of any merlins breeding within the potential impact zone of the wind farm or indeed within the whole study area. There were no records at all during any of the surveys. RSPB did however report that they had records of birds foraging in the area. The potential for any significant effect on this species would be negligible.

### **Medium and Low Sensitivity Species**

One species was breeding within the study area in regionally important numbers, curlew. Numbers within the potential impact zone were low, but it has still been classed as medium sensitivity. It is also an amber-listed species of conservation concern. Given that only a single pair was breeding within 300m of the proposed wind turbines (and only 2 pairs within 500m), any effects on this species would be at most of low magnitude (and more likely negligible) and not significant.

Four other medium sensitivity species were recorded breeding within 300 m of the proposed wind farm, skylark, song thrush, linnets and reed bunting. All are priority species under the UK BAP. None of these would be likely to be affected by the development, given experience from other wind farms and their relatively large UK population sizes. Effects would be of negligible/nil magnitude and not significant.

The low sensitivity species are of less concern, as a high magnitude effect would be necessary in order for a significant effect to occur. As these species are generally at low density within the study area, such a magnitude of effect would be very unlikely and it can therefore be concluded that there would not be any significant effect on any of these species.

## **HYDROLOGICAL ASSESSMENT**

The proposed Meikle Carewe wind farm is located within an area of average rainfall, and there are three sub-catchments identified, associated with the Cowie Water, the Burn of Muchalls and the River Dee, that could potentially be impacted by the proposed development site. The current surface water draining from the site to these rivers is classified by SEPA as of good quality.

56 private water supplies have been identified within several kilometres of the site, and a very small number have catchments that could potentially be affected by the proposed development. Care has been taken to avoid construction on deposits that could be feeding the spring source at West Raedykes. The impact assessment has taken account of all hydrological features. High-risk buffer zones (i.e. proximity to watercourses and private water supplies) have been identified as development constraints and the location of development infrastructure has avoided these areas where possible.

The assessment has highlighted a number of potential impacts on site hydrology, primarily during wind farm construction, but potentially also during site operation and decommissioning. These impacts are associated with a range of activities, including access track construction and wind turbine erection. The most serious potential impacts are associated with sediment-laden runoff from exposed ground entering watercourses and damage to peaty soils.

Mitigation measures have been proposed to reduce the likelihood of a pollution event resulting from the development. These mitigation measures have been defined for all stages (construction, operation and decommissioning) of the development and for each on-site element (i.e. track, turbine, substation, borrow-pit etc). Measures, in addition to the avoidance of high risk areas, include use of existing upgraded access tracks and avoidance of the construction of new culverts where-ever possible. Method statements detailing the best practise methods for construction on peat will be developed with SEPA prior to construction.

The employment of mitigation measures, in accordance with current best practice, will ensure that any negative effect that does occur is of minor significance and quickly controlled.

## **CULTURAL HERITAGE ASSESSMENT**

There are 50 known remains of cultural heritage significance located within the wind farm study area, though only three of these lie on the sites of the proposed wind farm infrastructure (access tracks). Two of these features have already been subject to a detailed archaeological investigation prior to construction of the TRANSCO access track to the summit of Hill of Allochie for the insertion of a gas pipeline. The wind farm will make use of this existing track.

The remains are generally associated with prehistoric and later post-medieval settlement although Roman activity on the site has also been demonstrated. There is a possibility that hitherto unknown archaeological remains of a similar nature or date might be concealed beneath the current ground

and/or vegetation at Meikle Carewe. Such remains might be disturbed by ground breaking works by the development. A watching brief will be undertaken on the site during ground breaking works on the lower slopes.

There are four Scheduled Ancient Monuments (White Hill House and Field System, Raedykes Roman Camp, Nether Auquhollie Inscribed Stone and Campstone Hill Cairns) located within 1 km of the proposed wind farm and one Listed Building (Ury House North Lodge). There are no anticipated direct effects on any of these sites. The significance of visual effects on the Scheduled Ancients Monument and Listed Buildings in the vicinity range between none, negligible, low and moderate particularly as topography and urban structures combine to limit views.

There are many Listed Buildings located within Stonehaven a Conservation area south-east of the proposal. However, it is anticipated that due to the distance from the development and the massing of intervening urban structures which will block views of the wind farm from the majority of these sites the effect on these buildings will be of negligible significance.

There are currently no wind farms operating in the vicinity of the proposed development, however two wind farms, (Mid Hill and Tullo), have recently received planning consent and a further two, (Cloch-na-hill, Hill of Auquhire) have live applications. Due to the distance of these wind farms from the proposed development (the nearest being Hill of Auquhire approximately 9 km away) it is unlikely that there will be significant cumulative effects on the majority of cultural heritage sites and landscapes identified during this assessment.

## **TRANSPORTATION AND ACCESS**

The wind farm access route would be from the A90 (T) onto the B979 Netherley road. Access onto the site would be via the existing entrance and gas main track up to the Hill of Allochie. The on-site track would continue on from the gas main track to the turbines and would exit the same way.

A number of alternatives have been considered and the proposed route has been selected in consultation with the Highways Department as it provides the best option for delivery of turbine components to the wind farm site and minimises environmental, disturbance and technical problems.

With the traffic management measures and single minor widening work proposed the route is considered adequate for the wind farm construction vehicles.

Increased traffic levels would only be experienced during the 9-12 months of construction. The access track and turbine foundation construction period is potentially the busiest for traffic movements as these are constructed at the same time. However, a borrow pit is proposed at Meikle Carewe to provide road stone for access tracks and therefore the movement of road stone lorries on the public highway will be minimised.

Traffic management measures would be implemented prior to, and during, the construction phase in consultation with the relevant highways authorities and the police to ensure road safety. For example,

abnormal load deliveries during the turbine erection phase will be timed so as not to coincide with peak travel hours or school run hours.

It is considered that the local transport network would be able to absorb the additional traffic movements associated with the construction of the wind farm. When considered over the life of the project, the short term effect of disturbance to local residents and other road users is considered to be slight. During operation, the effect of the wind farm in terms of driver distraction is considered to be slight and no appreciable effect of operation and maintenance traffic on the local road network is anticipated.

## **ACOUSTIC ASSESSMENT**

The acoustic impact for the proposed Meikle Carewe wind farm on nearby neighbours has been assessed in accordance with the guidance on wind farm noise assessment as issued in the DTI publication 'The Assessment and Rating of Noise from Wind Farms'.

Background noise surveys have been carried out at 3 nearby properties and the measured background noise levels used to determine appropriate noise limits, in accordance with this document's recommendations.

The predicted noise levels are within both quiet waking hours and night-time noise limits at all considered wind speeds.

The proposed wind farm therefore complies with the relevant guidance on wind farm noise and the impact on the amenity of all nearby properties would be regarded as minimal.

It is not anticipated that there will be any significant disturbance from construction noise at properties within the vicinity of the wind farm. It is expected that decommissioning of the wind farm will be generally similar to, or quieter than, the construction phase.

There is no significant infrasound<sup>1</sup> or low frequency noise from the modern design of wind turbines proposed for Meikle Carewe.

## **ELECTROMAGNETIC INTERFERENCE**

Wind turbines can potentially interfere with communication systems that use electromagnetic waves as the transmission medium (e.g. television, radio or microwave links) due to their ability to reflect signals. Any effect depends on the turbine design and location and the fact that wind turbine rotors are not stationary.

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<sup>1</sup> Sound waves, particularly in the atmosphere, whose frequencies of pressure variation and of vibration are below the audible range.

### **Television Reception**

Wind turbines have the potential for causing interference to television reception, primarily where a viewer is in the 'shadow' of and within a few km of the wind farm, with their aerial pointing through the wind farm. Problems are unlikely if the receiver has a clear line-of-sight to the transmitter. Viewers in the shadow but without line-of-sight can have their signal 'scattered' causing loss of picture detail, loss of colour or buzz on sound. Viewers situated to the side may experience periodic reflections from the blades, giving rise to a delayed image or 'ghost' on the picture, which is liable to flicker as the blades rotate.

In 2001 both RES and NTL cautiously stated the possibility that some widespread interference may occur in the area forward of the wind farm with respect to the Durriss transmitter. It was thought unlikely that problems would extend beyond 5km from the wind farm.

Since that date RES has developed a more realistic prediction model and calibrated this against data from operational wind farms. Further validation has been undertaken using measurements taken at Lendrums Bridge wind farm specifically for this purpose.

In 2001, although it was felt that the RES analysis was very conservative RES, data were not available to support a more realistic prediction. The earlier analysis led to a proposal for a new TV relay to resolve any interference.

Based on the new analysis and improved knowledge and experience, it has been safely concluded that a relay or self-help transmitter would not be required. Interference to Durriss has been predicted for a small area east-north-east of the wind farm. There are up to 40 properties within the area with the potential to suffer interference but it is likely that this figure will be much less. There are 3 straightforward solutions available: terrestrial digital TV (Freeview), an improved aerial receiving from Angus and satellite digital TV. Most of the properties are likely to be receiving digital services already.

As the BBC suggest, the planning authority should enter an agreement with RES to meet the cost of investigating and rectifying any problems that may arise. This will be made under Section 75 of the Town and Country Planning Act 1997 or similarly binding agreement. RES have similar agreements in place at existing facilities. Any work required would be funded entirely by RES.

### **Microwave Links**

Microwave links form the core of today's telecommunications networks. Three beams pass in close proximity or through the site. The turbine layout has been designed to avoid these links and the operators, T-mobile and Cable & Wireless have no objection.

### **Aviation Safeguarding**

In December 2001, the primary reason given for refusal of the scheme was insufficient clarity on the potential risk to safety of air traffic. Over the course of 2002, RES worked with BAA in looking at the proposed site in more detail and established that the wind farm would actually not cause a significant

effect on the safeguarding of Aberdeen Airport. This was confirmed by BAA in February 2003, hence the decision to resubmit an application was made.

The Meikle Carewe wind farm site lies 21km south-south-west of the Aerodrome Reference point for Aberdeen airport. The wind farm will be visible to the Radar at Perwinnes. Aberdeen Airport takes a feed from these radar but do not manage them. They are managed by NATS En-Route Ltd (NERL).

NERL have no objection to the proposal. Air Traffic Control at Aberdeen have been reconsulted and are currently objecting due to the visibility of the wind farm on the radar at Perwinnes. The concern does not relate to safety but to operational considerations of routing high volumes of commercial and private traffic through the southern approach to the controlled airspace about the airport. This is also an issue for other proposals in the Kincardine and Mearns area. RES are again working with NATS and BAA to re-establish the position in 2003 when there was no objection from the aviation industry.

In 2000, the MoD responded stating that they had no objections to a wind farm at Meikle Carewe. In 2006, the MoD has responded again and in light of the terrorist events of 2001 now has a more precautionary view on wind farms. The MoD has raised concerns, in common with a large number of proposals near the east coast of Britain, with regard to the proximity of Meikle Carewe to their Air Defence (AD) radar, in this case at RAF Buchan. The turbines will in line of sight but are 56km from the radar. RES is currently seeking to understand the operational significance of visibility of Meikle Carewe and will continue to cooperate with the MoD on this matter.

## **SOCIOECONOMIC ASSESSMENT**

### **Attitudes to Wind Energy in Scotland**

Public attitude surveys consistently confirm there is clear support for wind farm developments both in general and also on a site-specific basis.

In 2003, the Scottish Executive commissioned MORI Scotland to examine the attitudes of over 1,800 adults who lived within a 20km zone of 10 operational wind farms.

The results indicate that people are three times more likely to say they feel their local wind farm has a positive impact on the area (20%) as they are to say it has had a negative impact (7%). Most people feel the wind farm has had neither a positive nor a negative impact. People living within 5km of a local wind farm hold the most positive views with 45% saying they think the overall impact has been positive and only 6% saying they think it's been negative. The proportion of respondents who had anticipated problems prior to the development (46%) was far higher than the proportion that actually experiences 'problems' after the development (8%).

Research conducted on behalf of the RSPB in 2001 found that wind energy, often cited as being of most concern to communities, was actually found to be the most accepted form of electricity generation.

Another major study of over 4,000 people was commissioned by the Scottish Executive, in conjunction with Scottish Natural Heritage and the Forestry Commission in 2002. Respondents indicated that they would prefer almost half (49%) of electricity to be generated from renewables. Wind power came out as the most popular form of generation, and was consistently ranked as the least expensive, least polluting and most reliable form of energy generation. 43% of Scots were in favour of building lots of small and a few big wind farms, as opposed to only 2% who said no wind farms should be built.

Typically, public support increases after the construction of a wind farm, as people gain personal experience of operation, suggesting that opposition groups may generate needless concerns amongst the wide population. As noted in the Scottish Executive's Renewable Energy Planning Advice Note, PAN 45 (Revised 2002):

"Public concern over the visual impact of past (and many current) proposals has been a recurring feature. Experience, following construction, suggests that much of the fear is unnecessary."

### **The Economics of Renewable Energy**

Onshore wind is the only renewable technology currently economically competitive with conventional supplies. The cost of electricity from wind power is forecast to fall further in the future and is predicted to remain the cheapest renewable option.

The Government's Energy Review (PIU, February 2002) forecasts that, in 2020, the projected costs for electricity from onshore wind power will be cheaper than the price for electricity from gas fired plant and nuclear. Wind energy will therefore help ensure that the costs of electricity production are kept low which in turn benefits individuals, industry and the economy.

The use of renewable energies also provides a 'hedge' against future cost inflation. Wind energy, being a renewable source with zero fuel cost, has complete forward security. Towards the end of 2005, the UK became a net importer of gas from Europe and further a field. Volatility in gas prices is to be expected, and deriving a higher proportion of our supplies from wind energy will help minimise this impact.

Another major benefit of using renewable energy in preference to fossil fuels is the avoided cost of pollution such as the health costs associated with poor air quality and the damage to the natural and built environment caused by acid rain.

### **Local Economic Benefits during Development and Construction**

RES tries to ensure that wherever possible local contractors and employees are used in all aspects of wind farm development. The major opportunity lies during the construction phase when suitably qualified local firms are identified and invited to bid for a significant portion of the construction work, on roads, foundations and buildings. At Meikle Carewe a temporary workforce varying between 10 and 35 and averaging 25 would be created during the 9-12 month construction stage. It is anticipated that 80% of these construction jobs would be sourced locally. The wind farm would also create at least 1 part-time job in operation and maintenance.

### **Local Economic Benefits during Operation**

Wind farms are subject to local business rates. In 07/08 the poundage is 44.1p in the pound and at RES's Glens of Foudland wind farm wind turbines attracted a rateable value of over £12,000 per MW of installed capacity. On this basis, the Meikle Carewe Wind farm would contribute approximately £54,000 per annum to the funding of local government services.

### **Public Access**

Various public access management measures are being proposed by RES. These will be funded and implemented by RES and constructed when the wind farm is built. It is proposed to convert the construction compound into a car park on completion of construction. The access track to the wind farm would be gated and locked to prevent unauthorised vehicular access. The car park is being proposed to provide adequate and safe parking for members of the public who wish to view the wind farm. Arrangements for maintenance of the car park will be agreed with the Local Authority.

A stile and an interpretation board about the wind farm would be installed next to the gate. The car park would enable members of the public to view the wind farm in safety and away from the road. The interpretation board would provide information about the wind farm development, the surrounding landscape, estate activities and the Country-Code. This would indicate that people can also view the wind farm on the western side of the proposed site where existing footpaths/tracks exit Durriss Forest for example the Elsieck Mounth route at Bawdy Craig.

### **Community Recreation and Ecological Area**

A new addition to the wind farm application compared to that submitted previously is the inclusion of an on site stone extraction pit (borrow-pit) near the site entrance. The pit will be used to supply the stone for the wind farm access tracks and will greatly reduce the lorry movements on the public highway.

In developing the public access plans it was realised that rather than simply reinstating the borrow-pit by contouring and reseeding for example, it would be possible to make a feature of the area that could provide long lasting ecological and public benefit. Various ideas have been investigated leading to a conceptual proposal as shown on Figure 5. It is recognised that there is a developing national and local backdrop to access and recreational promotion within the area and RES will amend its plans appropriately should evolving conditions require it.

### **Community Fund**

As an alternative to investing in the community recreational and ecological area there is potential for a community fund associated with the wind farm to be created. RES accepts that economic benefits to the immediate local community, who are in closest daily contact with the wind farm, are largely indirect, whilst environmental benefits can be perceived as somewhat intangible and of more regional or national consequence.

RES's preferred model arrangement would be for local communities to establish a single charitable community company. RES would put in place a covenant with that company that would see the wind farm making profitability linked payments for the specific purpose of enabling and assisting projects in the vicinity of the wind farm that promoted sustainability.

### **Effect on Existing Users of Site**

The site is part of an estate farmed as grazing land for sheep. It is RES's aim that neither the construction of the wind farm nor its operation should significantly disrupt these existing activities, and given the evidence from other wind farms that occupy farming land, there is no reason to believe that coexistence is not possible.

### **Tourism and Education**

Local tourism has seen no negative effect due to the wind farms operating in the UK. Indeed the evidence from wind farms operated by RES, and others, suggests that the general public is often interested in visiting wind farms particularly in a holiday area. Where provision is made wind farms can prove to be tourist attractions that can bring positive financial benefits to local businesses.

It is not intended to develop the Meikle Carewe site as a tourist facility. However, the public access measures proposed including the recreation area should adequately provide places to view the wind farm and interpretation boards about the development are planned for those with an interest. Although the wind farm is not expected to have any significant effect on tourism in the area, it can be envisaged as becoming a feature of interest.

The wind farm would represent a useful educational resource for the area with most schools and colleges now having energy and the environment on the curriculum. Wind farms make an ideal study for technical, social and environmental projects. RES undertakes talks at schools and arranges site visits for school groups at it's existing wind farms in the UK. Similar activities could be arranged at Meikle Carewe if requested by local schools and other groups.

## **CONCLUSION**

The likely effects of the Meikle Carewe Wind Farm have been reviewed. It is considered that the proposed wind farm would have few significant adverse environmental effects on the local environment and of these most can be reduced or prevented through mitigation measures.

In addition, the proposed wind farm has associated positive environmental effects related to displacement of fossil fuels and the contribution that the scheme will make to the government's renewable energy targets.

The planning statement prepared as a separate document to the ES states that granting consent would be consistent with the relevant policies in the Structure Plan and the Local Plan, which together comprise the development plan. The planning statement concludes by stating that no material considerations have been identified which provide an argument against the grant of planning permission, and consent should be granted for the Meikle Carewe Wind Farm, subject to the imposition of appropriate conditions.