

Statement

SNH's POLICY ON RENEWABLE ENERGY

Policy Statement No. 01/02

Energy, the environment, and SNH

1. All known forms of energy generation have some impact upon the environment. Most energy is currently derived from fossil fuels. Products of combustion from these include oxides of sulphur and nitrogen which can have direct acidifying effects upon vegetation and freshwater, and there is now widespread agreement that carbon dioxide is causing climate change. Climate change will not only have major consequences for society, in terms of risks of storm and floods, but will also have a direct impact on biodiversity.
2. Extraction of fossil fuels (e.g. opencast) can also bring about changes to the natural heritage, and their transport (e.g. oil spillage) involves other risks. Scotland also generates electricity from nuclear fuels, for which there remain uncertainties over long-term storage and disposal of the waste products. 'Renewable' sources of energy such as wind, wave and water power avoid all these effects, although they have their own impacts on landscapes or habitats.
3. SNH has a remit to ensure that activities which affect the natural heritage are undertaken in a way which is *sustainable*. SNH interprets this as meaning that as well as using resources wisely and efficiently, and within carrying capacity, we should be seeking to safeguard those elements of the natural heritage which are most valued, and that the natural heritage should be managed so as to enrich peoples lives. SNH seeks to advise on natural heritage aspects of energy use and production, and provide Government with advice which enables energy policy to take full account of natural heritage issues.
4. **SNH supports the development of renewable energy as an integral part of the Government's climate change programme. However, there is a risk that the development of renewables could be allowed to obscure the need for the fundamental changes which will be required in the pattern of energy consumption to meet increasingly stringent targets for reductions in emissions. Renewable energy could be used as a means of soaking up new energy demand without reducing existing fossil fuel consumption. SNH's support for renewable energy is therefore dependent on a high priority being placed on securing emissions reductions through energy efficiencies and reductions in energy demand as proposed in the Government's Climate Change Programme.**

Responsibility for Energy under a Scottish Parliament

5. The Scotland Act reserves responsibility for energy policy and the regulation of the energy industries to Westminster, while environmental controls and the promotion of energy efficiency are devolved to the Scottish Parliament. These arrangements have the potential for environmental objectives in Scotland to be compromised by non-environmentally-driven energy policies. However the responsibility for overall planning for renewables development has been 'executively devolved' to the Scottish administration - The Scottish Executive carries this function on behalf of DTI under the terms of a concordat.

The policy context: targets to meet Kyoto protocol

6. Since the last ice age, the concentration of atmospheric carbon dioxide (CO₂) was approximately constant until the industrial era began. Since 1750, it has risen by around 35% and is increasing at 0.4% per annum on average. Most of this increase is thought to have come from burning fossil fuels. CO₂ and other greenhouse gases retain heat which would otherwise be radiated into space. Greenhouse gas levels are thus linked to global mean temperatures and thence to sea level rise, desertification, storm incidence and flood risk. They have therefore become a matter of strong international concern.
7. Climate change also poses a threat to future biodiversity, as temperatures and rainfall change and as conditions may alter more rapidly than species and habitats can adjust. In Scotland, predicted impacts include the loss of arctic-alpine habitats, the invasion of Caledonian pinewoods by oak, and submersion of saltmarshes and machairs.
8. In 1997, at the Kyoto summit meeting, targets were set for the period 2008-2012 in relation to reduction in the emissions of a basket of greenhouse gases, relative to 1990 levels. A number of different sub-targets, relating to reduction in CO₂ alone, or to electricity generation from renewable sources, have been set to help move towards these formal targets. The UK draft Climate Change Programme is the framework which addresses Kyoto targets, looking to deliver emission reductions across a range of sectors, and to adapt to the impacts of climate change in the longer term. Renewable energy generation is just one component of this overall climate change programme.
9. Current DTI projections of energy use are for continued growth of around 0.5% per annum. In spite of this projected increase in use, the Government's 1999 consultation on a Climate Change Programme proposed annual savings in UK greenhouse gas emissions of 51 MtC (megatonnes carbon), against a 1990 emissions baseline of 216 MtC. Of these savings, only 7 MtC are proposed to be achieved through replacement of fossil fuel by renewable energy generation. Around 70% of total overall savings are intended through energy efficiency and demand reduction in business, transport and domestic sectors and the use of waste heat in industry.
10. Further CO₂ emission reductions will be required beyond 2010 to address climate change. The Royal Commission on Environmental Pollution, in its study on 'Energy and the Environment', recommended that a global target should be pursued of restricting atmospheric CO₂ to twice its pre-industrial level. To do so would require the UK to achieve a 60% reduction in CO₂ emissions by the year 2050.

Renewable electricity targets for Scotland

11. In England and Wales, a target of 10% renewable electricity by 2010 has been proposed, increasing the proportion from around 5% at present (largely hydro electricity from Wales). Scottish Ministers are likely to set separate Scottish targets for renewables,

and have consulted upon the principle that a target should be set at an additional 5%. With a little over 10% already from large-scale hydro, and 2.5% from existing and planned proposals supported by the Scottish Renewable Orders (see below), this would bring the total in Scotland to 18% from renewable sources.

- Targets for reduction in emissions by 2010:

EU obligation	8% greenhouse gases
UK obligation	12.5% greenhouse gases
UK target	20% CO ₂ emissions
[Royal Commission on Environmental Pollution recommendation: 60% reduction in CO ₂ by 2050]	

- Targets for proportion of electricity from renewables by 2010:

EU target	12%
UK target	10%
Scottish target	+5 % new (raising total to 18%)

Electricity in Scotland

12. In Scotland, electricity generation capacity is about 10GW, against a peak winter demand of under 6GW, although a grid interconnector with England has capacity to transmit about 2.2GW (and with upgrades to this and another 0.5MW interconnector in future to N Ireland raising the total to more than 3GW) elsewhere to make use of some of the surplus. Of the five main generating units in Scotland, the output from two nuclear stations (Torness and Hunterston B) and the gas-fired power station at Peterhead currently meet base-load demand. This leaves marginal output, to meet peak demand, to be met from the coal-fired power stations of Longannet and Cockerzie (most of the output from Cockerzie passes to England over the interconnector). Because of the high proportion of (carbon-free) nuclear in the Scottish mix the carbon-reducing benefit of the 'dash for gas' has been less marked in Scotland than in England, other than through the conversion of the Peterhead generator to gas. Some 10% of Scotland's electricity is already generated from renewable sources (large scale hydro).

13. The latest date for closure of Chapelcross is thought to be 2007-9, and Hunterston B 2011. Even though Scotland currently has an electricity surplus, these dates signal an impending need for alternative sources of supply if nuclear generators are not to be replaced or their life extended.

14. Traditionally, electricity generation in the UK has relied upon a small number of power stations, using energy-dense fuels, with a radial grid carrying electricity outwards to distributed consumers. Grid connections are well-developed between population centres and power stations; in Scotland these are predominantly in the south and east.

Renewable resources in Scotland

15. Scotland is considered to have the best wind resource (onshore and offshore) in Europe. Associated with high windspeeds, Scotland also has excellent wave power resources. There is not thought to be significant further opportunity for large hydro, other than in areas which would be regarded as environmentally contentious. There are still opportunities for further small-scale hydro, although the total energy potential is likely to be relatively small once environmental constraints are addressed. Scotland's firths have received little attention for tidal barrages, but strong tidal movements raise the possibility of underwater turbines operating in tidal streams in future. Opportunities exist for biofuels from agricultural or forestry land.

16. The availability of technology - and the costs of generation - from different renewable sources vary widely. In the present electricity supply market, new generators have to compete against the marginal cost of producing additional electricity from established, underused coal power stations. Technologies which are currently close to being competitive in the UK include energy from wastes and some biomass residues, landfill gas, onshore wind, hydro and passive solar. Additional technologies which are likely to take longer to become competitive include energy crops and offshore wind, with wave and tidal power being seen as further off.
17. All costs have dropped over the last few years through the competitive action of the Scottish Renewable Obligation, to the extent that electricity from some onshore wind locations is now price-competitive with the cost of electricity from fossil fuels. There is considerable pressure on Scotland to realise some of its further wind and hydro potential to help meet the above targets, since these technologies seem to offer the best potential in terms of cost and environmental impact to deliver the required proportion of renewable energy by 2010. Other technologies, such as offshore wind and wave, offer the prospects of larger energy resources in the future. There is every reason to expect that the cost of electricity so generated could be lowered through appropriate research and investment.
18. In the more distant future the development of hydrogen as a clean fuel may also be of significance, the hydrogen being extracted either from organic material (the remains of which are otherwise disposed of) or from water using electricity from renewable sources.

Planning and support for renewables in Scotland

19. The Scottish Executive's strategic planning framework for renewables developments is provided by National Planning Policy Guideline 6: Renewable Energy. Further relevant detail in relation to individual developments is found in Planning and Advice Note 45.
20. Because traditionally more expensive than electricity from fossil fuels, renewables will not be brought forwards sufficiently by the market alone. Until the 1998 Energy Review renewables were supported by the Fossil Fuel Levy. Assured supply contracts were offered under the Non-Fossil Fuel Orders (NFFO) in England and Wales and the Scottish Renewable Orders (SRO) in Scotland, which were allocated after a competitive bidding process. These schemes were unsatisfactory because assessment was entirely cost-based; environmental considerations were not taken into account in the allocation of contracts. NFFO and SRO have now been superseded: under the new system of electricity regulation there will be an obligation on all electricity suppliers to include a certain proportion (yet to be agreed) of renewables within the supply mix, this proportion to be increased incrementally so as to raise the likelihood of realising the full obligation by 2010. Alternatively suppliers can exempt themselves from the supply obligation by paying a 'buy-out' price (currently 3p/kwh), or by purchasing Renewables Obligation Certificates (ROC) (a British 'green certificate' certifying that the electricity has been generated and supplied elsewhere) from another renewable generator.
21. Market pressures will make electricity suppliers favour electricity from renewables, or the purchase of green certificates, where the net costs of these options are less than the sum of the market price for conventional electricity plus the buy-out premium. This is intended to create a band of prices (around 2-5p/kWh) within which new renewable electricity will become marketable, in contrast to the situation under the SRO in which

only the lowest cost renewables bids had a chance of bidding successfully. Even if it does act this way, the price band excludes many of the technologies still in a state of development. Because of the different costs of generating from different technologies it is anticipated that the majority of proposals in the short term will be from onshore wind, with some waste-to-energy and biomass.

22. For the purposes of climate change it matters only that fossil fuels in general are substituted by renewables: it does not matter *where* renewable energy is generated (although all countries need to participate in changing their economies). Tradable green certificates allow renewable energy to be generated where it is favoured by the market, with suppliers at a distance being able to meet their obligation without the need to transfer the actual electricity generated. This is likely to lead to demand for new renewable energy development in Scotland considerably in excess of the above +5% target, with the climate change benefit going to help meet obligations elsewhere in GB where planning approval for windfarms may be harder to secure (the rate of refusal of windfarms in the planning system in England has to date been very high). There is also discussion of an EU-wide green certificate mechanism in the future.

Impacts of renewables upon the natural heritage

23. Renewable energy developments have the potential to affect valued elements of the natural heritage. The frameworks of policy, planning, and support need to help get the right technologies, and the right kinds of developments, in the right places so as to minimise impacts on the natural heritage.

Landscape and visual impacts

24. Scotland is renowned for the diversity of its landscapes and the quality of its scenery - qualities which all developments, including all forms of renewable energy, have the potential to change. Some of the areas of highest repute for their natural heritage are also valued for their qualities of wildness, or for the absence of obvious human impact. As well as contributing to the quality of life for those who live in Scotland, our landscapes are a major economic asset as a basis for the tourism industry which is Scotland's largest employment sector. Concern for the future of this industry presents an economic argument for avoiding adverse impacts on those aspects of the Scottish landscape which attract tourism.
25. Because of their large size, modern, human, industrial character, and suitability for upland locations which are often not already developed, windfarms offer a particular challenge to Scotland's landscapes. The effect on people's experience of the countryside caused by this kind of development, and by the track systems to service them, can be considerable. Opportunities for hydro schemes, too, may be found in areas where landscapes are relatively unmodified by humankind. Good practice is emerging on how windfarm siting, design and layout can encourage a positive image in the landscape. Nonetheless, while most types of landscape can accommodate change to some degree, a development of too large a scale, or insensitively designed, can change the character of any area. Small-scale developments serving individual farms or houses can usually be accommodated in most landscapes with sensitive siting. Developments of any scale may not easily be accommodated within undeveloped landscapes valued for their wildness or other intrinsic qualities.
26. If not carefully guided, large-scale encouragement of new renewables technologies could result in a major and pervasive built intrusion into Scottish landscapes, some of which are already substantially modified by large hydro schemes. If a primarily market-

led approach were to result in widespread development on high, exposed or remote ground, the areas proposed for development may be ones valued for their scenic, recreational, and undeveloped qualities. There is a strong need to guide renewables, in scale and location, to those landscapes which can accept change or those which are not held in high value. There is an abundant renewables resource and effective and positive guidance of this sort is not likely to hinder achievement of Government's present renewable energy targets.

27. Offshore renewables developments, and especially those at a distance from the shore, are less likely to have significant visual impacts.

Ecological impacts

28. Windfarm developments carry a risk of bird collision impacts with moving rotors and fixed structures, including any additional overhead wiring. The risk is most significant where windfarms straddle regular flight lines, for example the daily flight lines for geese flying between roosting and feeding grounds, or where birds such as raptors make use of the windfarm habitat for hunting. Species most likely to be subject to significant risks are raptors, geese, divers, gamebirds, and some seabirds and seaduck. Rare species, and those protected under national and international legislation, require careful risk assessment on a site-specific, and species-specific, basis. Where windfarm proposals overlay the core feeding range of golden eagles the habituation to particular nest sites, the frequency of hunting flights, and the long natural lifespan of individual birds may make the collision risk significant. Potentially, this is a concern which may constrain development at a significant number of upland sites in Highland Scotland. Projects which would have an adverse effect on nature conservation interest of international importance should only be considered where there is no alternative solution, and there are reasons of over-riding public interest.
29. Turbine and track construction can have direct impacts on sensitive natural habitats, especially peatland; careful design, siting and drainage of tracks is required in these areas.
30. Even quite small hydro schemes can change river flow rates, affecting surrounding vegetation, lower plant and in-river invertebrate communities. Unlike run-of-river schemes, impoundment schemes require dams which present difficulties for migratory fish and create drawdown zones which are ecologically sterile as well as of high visual impact.
31. Tidal barrage schemes would reduce the extent of the intertidal zone, which is important for feeding birds. Most of the major Scottish estuaries hold internationally important numbers of waterfowl, and contain land or intertidal areas designated as SPAs or SACs under the EC Birds or Habitats and Species Directives. These estuaries gather wintering waterfowl and seabirds from a large part of the northern hemisphere, with some species migrating long distances through many countries. Estuarine management in Scotland therefore forms part of an international conservation responsibility for these migratory bird species.
32. SNH does not as yet have detailed experience of tidal stream proposals and their potential locations or impacts. High velocity tidal channels are areas of distinctive marine natural heritage interest, but there are large areas of Scotland's coastal waters where tidal movements, though slower than the tide-races, are still strong.

33. Biomass plantations are unlikely to be a concern where they are small-scale and take the place of intensive agriculture or commercial forestry. However the large-scale introduction of short-rotation coppice has the potential to impact on landscapes. There is further potential to detract from the natural heritage value of land if they are planted on semi-natural habitats. Like many commercial crops, biomass plantations might receive applications of pesticides and fertiliser which would have an impact on the wider environment.

Renewables developments and the natural heritage in Scotland

34. The three SRO orders to date have awarded 30 contracts for large wind developments, amounting to some 150MW installed capacity.
35. Since 1994, SNH has advised on a series of proposed renewable energy developments. In a relatively large number of windfarm cases, SNH has had cause to object to proposals, on landscape grounds or on ecological grounds¹. Others have involved extended negotiation between SNH and developers to reach a satisfactory outcome. Some of this is because of the relative newness of the industry, some because developers have been led towards environmentally sensitive sites because of the requirements of the technology or the support mechanism. There has been a particular concentration of windfarm applications in high-wind western areas, though there is some sign within SRO3 that more easterly, lower-wind areas are becoming more commercially viable. Issues of cumulative development are arising: there are several current windfarm applications in Kintyre and if all go ahead there could be 115 turbines on the peninsula.
36. In general, however, SNH has been supportive of renewables developments. There are five windfarms with SRO contracts now in operation. At these, SNH either did not object or withdrew objections after negotiation.
37. The Scottish Executive has proposed that, as part of addressing climate change targets, Scotland should supply 18% of electricity from renewables sources by 2010 - about 5% above what will be delivered through the existing large hydro and the SRO. If, as suggested, much of this additional capacity were to come from onshore wind, and depending upon the size of turbines installed, this 5% could imply some 380-760 turbines. If these were within windfarms of the scale of around 15-20 turbines currently being developed, this would amount to some 25-40 new windfarms across Scotland.

Renewable energy and rural development

38. The magnitude of renewable energy resources means that they offer considerable economic opportunities for Scotland as a whole, and in principle the availability of abundant energy raises the prospect of quality-of-life benefits. In addition, because of their widespread and dispersed nature, renewable energy developments have potential

¹ SNH has opposed windfarms in Islay and in Kintyre on account of the potential collision risk to White-fronted Geese protected by SPA, and windfarms near Helmsdale on landscape grounds. Our view has been upheld in all these cases following public inquiry. We have opposed a small hydro development at Shieldaig, on grounds of the impact on a popular wild land resource. However we have withdrawn objection to a hydro development in Assynt after considerable re-design. More recently, we have opposed one windfarm in Kintyre on grounds of collision risk with eagles, and withdrawn objections to another after negotiating re-siting of a proportion of the turbines away from the main eagle hunting areas.

as the basis for rural enterprise and diversification. Local economic benefits can be realised from installation, maintenance, ground-rent and electricity sales. Large scale renewables development may also bring the prospect of manufacturing jobs (e.g. turbines). Some renewable resources like offshore wind, wave energy, and tidal streams are represented particularly well in relatively remote areas in north and west Scotland and therefore may present attractive opportunities to areas which are economically fragile.

39. Prospective rural development benefits from renewables, and decisions about what technologies and what forms of development are appropriate in a given location, need to be understood bearing in mind the role of the natural heritage in other forms of rural development. The potential impacts on natural heritage values should be assessed, and in particular their significance for tourism which is a major component of the economy in most economically fragile areas. This may indicate that small scale developments which can be accommodated within the landscape are best suited to such areas.
40. The intermittency in supply from many renewable sources means that they are usually best linked to the grid. A technical limitation to wider exploitation is that at present the grid infrastructure and regulatory procedures are not well geared towards facilitating dispersed generation.

SNH's position

41. In deriving a policy position on renewable energy, SNH wishes to safeguard those elements of the natural heritage which are of most value, to ensure that the natural heritage can continue to enrich the lives of people who live in and visit Scotland, and to encourage the sustainable use of natural resources.
42. SNH recognises the importance of addressing the issues of climate change, and the contribution which renewable energy can make towards that programme. Renewable energy development can also contribute to wider sustainability objectives, including rural employment. SNH therefore supports the development of renewable energy sources as a replacement for energy produced from fossil fuels. However, renewable energy developments have the capability of causing significant adverse impacts on landscapes, habitats, and individual species. In supporting the development of renewables, SNH recognises that some change to some of Scotland's landscapes may be unavoidable. A priority for renewables policy should be to foster kinds of energy technology, and approaches to their adoption, which are most likely to be consistent with overall natural heritage objectives.
43. **We seek a strategic approach in which renewable energy development is guided towards the locations and the technologies most easily accommodated within Scotland's landscapes and habitats without adverse impact, and which safeguard elements of the natural heritage which are nationally and internationally important.**
44. One important element of such an approach should be that much less emphasis should be placed on securing renewable energy at least cost. **SNH considers that the principle should be that greenhouse gas emissions need to be reduced without diminishing the overall quality of life, and this should include protecting the high quality of the Scottish environment.** The price of energy to consumers should not be driven down if in so doing environmental costs are incurred.

Long-term

45. In the longer term we expect it to become necessary to increase the proportion of generation from renewable sources above current targets, so as to continue to reduce emissions of carbon dioxide. This will become even more necessary if Government decides not to replace Scotland's nuclear capacity. **Strategic decisions about which should be the preferred renewable technologies to meet future energy needs, and how to encourage these, should take full account of their impacts upon the natural heritage.** The visual impact of large-scale renewable generation means that future bulk electricity supply is likely to be served best by encouraging at least a proportion of such generation to take place offshore.
46. In future the pattern of electricity supply and consumption may be very different from the existing grid, based either on bulk generation from new renewable sources concentrated in certain areas, or on new dispersed energy sources generating comparatively low outputs for more local consumption. **SNH will support strengthening the grid where this enables the opportunities offered by renewable energy to be gained without significant disbenefits for the natural heritage - particularly in areas of low landscape sensitivity and value.**

Short to medium-term

47. In the short-medium term, in view of the potential for technologies which are currently close-to-market to have adverse impacts on landscapes and habitats, **SNH considers that meeting energy needs requires a strong strategic planning framework to ensure that development is well-structured, with technology types and development proposals guided towards areas which are able to accept them with least impact on natural heritage quality.** Current generation targets could be met through a great variety of development options in terms of the size, number, and spatial distribution of individual components.
48. The following general principles will inform SNH's views on proposals for renewables development:
 - **SNH will encourage assessment of all renewable energy schemes for their natural heritage impacts.**
 - **SNH supports the general guidance on locational considerations set out in NPPG 6 and will provide advice to local authorities and developers within that context. This guidance includes the need to avoid significant adverse effects on the qualities for which areas of national or international importance have been designated.**
 - **To accommodate future renewable energy generation on the scale required to help in addressing climate change, there is likely to be a need for change to be accepted in some of Scotland's landscapes. SNH will seek to steer development which is of a scale (individually or cumulatively) that changes landscape character towards areas where the landscape is already developed or visually man-modified, and which are relatively close to centres of population. Such areas may include agricultural land, forests or brownfield land within or close to the Central Belt. Areas which are highly valued for recreation and amenity should however be protected.**

- In areas - often at some distance from centres of population - where natural heritage value is associated with low evidence of human intervention, and where renewable energy developments would be likely to significantly detract from these values, SNH will seek to safeguard such qualities. Small-scale renewable development aimed primarily at serving individual properties may still be possible, and should be given special consideration where it contributes to the sustainability of an isolated community such as on an island.
- Over the remaining area of Scotland, SNH will support renewable energy developments where they can be accommodated (individually or cumulatively) without significant adverse impact on the character of the landscapes into which they are placed or the natural heritage value for which these areas are appreciated.
- SNH supports exploration for one or more locations for very large windfarms, substantially larger than developed to date, which may offer the prospect of meeting a significant proportion of Government's renewable energy targets in Scotland. Such sites should be within or relatively close to the Central Belt or major population centres.
- Particularly in more populated parts of the country, there may be pressure to locate renewable developments in areas which are out of sight. This could displace developments towards areas where natural heritage values depend upon low human impact. SNH will wish to see overall natural heritage impacts minimised, and will therefore resist such displacement where it is likely to lead to natural heritage impacts being greater than otherwise necessary.
- SNH will expect renewable energy to be developed in a way which provides net benefits for the rural economy.
- SNH will look to renewable energy to be developed with regard to minimising transmission losses, such as to foster efficient use of renewable resources.
- The impacts from new renewables developments derive not only from the generating technology, but also from the track infrastructure required to service them. SNH therefore supports the exploration of opportunities to place new developments in areas where a track infrastructure already exists, e.g. in forestry. The possibility of mixed forest and wind development should be explored.
- SNH encourages exploration of the natural heritage impacts of offshore wave and wind energy developments. Outwith areas of high scenic or marine wildlife value, such impacts may be lower than for land-based renewables. SNH supports strategic identification of appropriate locations and the development of appropriate technologies.

50. In delivering the above policies SNH will:

- advise planning authorities and developers on the location of features of natural heritage importance, the sensitivity and value of different landscapes and their ability to accommodate windfarm development.
- be willing to assist local authorities in planning strategically for renewable energy, by publishing guidance and by assisting in local capacity explorations which may be required.
- maintain effective liaison with the renewables industry and seek joint approaches to areas of common interest such as developing standard methodologies for assessing impacts on landscapes and birds.
- share experience, train its local staff, and develop advice to help promote skills and consistency in the assessment of renewable energy proposals.

Contact: Dominic Counsell
Address: SNH, (National Strategy), 12Hope Terrace, Edinburgh, EH9 2AS
Phone: 0131 446 2213
E-mail: dominic.counsell@snh.gov.uk

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