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Abstracts of communications presented at Wind, Fire and Water: Renewable Energy and Birds

The British Ornithologists' Union Annual Spring Conference 2005 University of Leicester, 1– 3 April 2005

The following are abstracts of communications presented at the BOU spring conference, 1–3 April, 2005, but for which manuscripts were not submitted for publication.

1

THE IMPACTS OF CURRENT ENERGY GENERATION AND THE NEED FOR RENEWABLES

John Lanchbery

RSPB, The Lodge, Sandy, Beds, SG19 2 DL, UK
Email: john.lanchbery@rspb.org.uk

The RSPB consider that climate change poses the single biggest long-term threat to birds and other wildlife. Early in 2004, for example, a paper was published that assessed the extinction risks for sample regions covering approximately 20% of the Earth's terrestrial surface, including parts of Australia, Brazil, Europe, Mexico and South Africa. It concluded that '15–37% of species in our sample of regions and taxa will be "committed to extinction" as a result of mid-range climate warming scenarios for 2050'. Indeed, there is evidence that the degree of change that has already occurred is affecting some species and ecosystems adversely. For example, there is evidence that last year's large scale breeding failure of sea birds on the North Sea coast of Britain was, in large part, caused by climate change. We therefore need to keep any further climate change to a minimum, and the lowest practically achievable limit on mean global temperature rise is probably to peak at 2 °C above pre-industrial levels. To stay below 2 °C, we need to keep atmospheric concentrations of greenhouse gases, mainly caused by fossil fuel burning for energy, to below 450 ppmv, possibly lower. This will, in turn, entail a downturn in global emissions within the next decade and global cuts of 80% or more by the end of the century. For developed countries, greater cuts will be necessary. The UK has set itself a target to reduce carbon dioxide emissions by 60% by 2050. There are two main ways of achieving this target: by reducing energy demand (largely by energy efficiency) and by clean energy supply, such as renewable electricity generation. To achieve deep emission cuts by either means would be hard, however, and so both will be needed to meet the UK target. In practice, renewable generation will initially be largely from wind, both on and offshore, because this is the nearest market of the renewable technologies and the main policy driver for renewable generation (the Renewables Obligation) favours those technologies that are nearest market.

2

OVERVIEW OF RENEWABLE ENERGY IN THE UK – POLICY DRIVERS AND MARKET READINESS

Catherine Mitchell

Warwick Business School, University of Warwick, Coventry CV4 7AL, UK
Email: catherine.mitchell@warwick.ac.uk

The UK's climate change and energy policy has central twin planks of increasing the amount of energy used from renewable energy sources relative to fossil or nuclear based power and reducing the total demand for energy. While successful in some spheres on the demand side, overall government delivery of these policy objectives cannot be said to be successful. The UK has a target for supplying 10% of electricity from renewable electricity sources by

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2010. A proposal to increase this to 15% by 2015 is under discussion and there is an aspiration for 20% to be supplied by 2020. The UK currently supplies about 2.5% of electricity from renewable electricity sources and only about 1% (i.e. from 1.5%) has been added since 1990 when support for renewables in the UK began. Meeting the targets is therefore a major challenge for the government. It will be important that all those in the UK who would wish to generate electricity or produce heat from renewables are helped to do so. Similarly, it is important that consumers are able to reduce their demand as they wish and have choices over their consumption. The mechanism for supporting renewable energy in the UK, the renewable obligation (RO), is almost unique in Europe in that it is a market based mechanism and this has led to it primarily supporting wind power. While wind power is a very valuable source of electricity (and central to meeting the 2010 target), the RO has not been successful in supporting more diverse sources of renewable electricity or nonelectricity technologies. Moreover, it has, on the whole, been beneficial to the large ex-monopoly electricity companies and it has not supported small scale developments nor new entrant companies. The paper puts forward various recommendations for an improvement to policy.

While some sources of renewable electricity are competitive, others are not. Moreover, the scale of the development also affects their competitiveness. The paper discusses this and also places renewable heat and generation in to the context of the wider energy market and within the context of energy regulation. It provides an overview of the various barriers to deployment of renewables and puts forward thoughts on the alternatives to a renewable energy and energy efficiency based energy policy.

3

WIND ENERGY: TECHNOLOGY AND CAPABILITY

Chris Tomlinson

British Wind Energy Association, Renewable Energy House, 1 Aztec Row, Berners Road, London N1 0PW, UK
Email: chris@bwea.com

Chris Tomlinson will outline the progress which is being made in meeting the wind energy element of the renewable energy targets for 2010. He will explore how and where the remainder of the wind energy element will need to be met.

While Chris is self admittedly not a technical expert, wind turbine technology in the broadest sense has moved on in leaps and bounds over the last decade. Chris will update delegates on the current specifications of a modern wind turbine, the power it generates and the homes it supplies. This provides the clue as to why we do not need tens of thousands of wind turbines to meet our target, as some would claim.

Even when the technology and capability is evident, there are still a range of factors which need to be considered in the exact siting of wind farms. BWEA is this year updating its Best Practice Guidance for developers, and during the presentation, Chris will be highlighting the key locational factors for finding suitable sites, as well as answering some of the frequently asked questions on the subject of wind farms.

Finally, in the spirit of the conference, Chris will present some approaches wind farm developers use in collecting data for Environmental Impact Assessments. He will also investigate the monitoring procedures used post construction and the benefits this can provide for a better understanding of wind farms and potential impacts on birds.

4

WIND FARMS AS OBSTACLES TO MIGRATING BIRDS

Colin J. Pennycuick

School of Biological Sciences, University of Bristol, Woodland Road, Bristol BS8 1UG, UK
Email: c.pennycuick@freeuk.com

Like other obstructions, wind turbines present little hazard to migrating birds that are dispersed horizontally and vertically, but become hazardous when sited at a point where a migration stream tends to concentrate. The first step in managing the hazard is to identify concentration points, and avoid them when siting turbines. Some concentration points operate even in fine weather, being caused by geographical features such as a mountain pass, or the start or finish point of a sea crossing. Others come into effect when migrating birds are

forced down by low cloud. As the cloud comes down ahead of an approaching low-pressure system, any migration stream is concentrated below the 'cloudbase' level, eventually forcing birds to fly in the height band occupied by obstructions. When these conditions occur at migration times, they cause heavy mortality at TV towers and bridges. The same effect will occur at wind farms on a larger scale, because of the large numbers of turbines usually deployed. The hazard can be reduced to some degree at the planning stage by siting turbines on high ground, and avoiding gaps in the hills, because these become concentration points when cloudbase descends below the hill tops.

The proposed wind farm on Lewis in the Outer Hebrides coincides with a well known concentration point for migrating Whooper Swans, at the British end of the shortest sea crossing between the British Isles and Iceland. Being underpowered because of their large size, these birds usually fly low, and have very limited capacity for sudden climbs or changes of course. This makes them vulnerable to collision hazards, especially overhead cables. It is possible that Whooper Swans might pass safely below the proposed turbine discs, but overhead cables are lethal to swans, and would have to be replaced in the design by underground cables. As a large fraction of the Whooper population passes through the proposed wind farm site twice in each year, the project is likely to cause continuing attrition of the population, probably above the level that can be offset by reproduction, even without overhead cables. This will not be popular in Iceland. The environmental survey at the Lewis site failed to identify this problem, obvious though it is.

Current survey methods concentrate on occupancy by breeding and wintering birds, but do not address the heights at which birds fly, or identify factors that concentrate flying heights and tracks into the region occupied by the turbines. Specially designed surveys are needed to identify concentration points on migration routes, and to measure the heights at which both resident and migrating birds fly, to determine whether they use the height band occupied by any proposed turbines. Flying heights can be measured in daylight with rangefinding binoculars (Leica Vector) interfaced to a laptop computer, while tracking-radar surveys could be used to identify concentration points that occur when nocturnal migrants are forced down by low cloud.

5

EXPERIENCE OF WIND FARMS ON SMØLA (NORWAY) IN RELATION TO WHITE-TAILED SEA-EAGLE

Alv Ottar Folkestad

Norwegian Sea-Eagle Project, Eiksund, N-6065, Ulsteinvik, Norway
Email: alv.o.folkestad@ulstein.kommune.no

The Norwegian company Statkraft obtained a licence for developing a wind farm on the island Smøla, mid-Norway in December 2000. The Smøla archipelago has been designated an Important Bird Area (IBA) since 1989 with international importance for a wide variety of bird species, particularily wetland and coastal birds. Attention has been focused on the breeding population of White-tailed Sea-eagle, estimated at least at 65–70 territorial pairs, most of them nesting on the ground in a very low and barren landscape of heath, moors and mires. The EIA for the wind farm concluded that the development of a wind farm in this area was expected to have a detrimental effect on nature and particularly on a number of bird species, several on the national or international red list, with the White-tailed Sea-eagle as a key species. BirdLife International brought the Smøla case to the Bern Convention Standing Committee in 2001 saying that the licence was in conflict with a number of the statements in the Bern Convention. Based on the fact that the Norwegian Government said that mitigation measures should be put forward to reduce the negative effects of the wind farm, the Standing Committe decided not to open a case file against Norway.

The Norwegian Ornithological Society (BirdLife Norway) in cooperation with the Norwegian Government and a number of nature conservation societies has been running a national monitoring program on the White-tailed Sea-eagle from 1974 onwards, including the Smøla archipelago. Based on these studies there has been established a study on the effects of the develompent of a wind farm in the breeding grounds of the Sea-eagles on Smøla. The studies include the pre building situation with the status of nesting pairs in and close to the wind farm and their reproductive output, compared to the situation during the period of developing and finally operating the wind farm. The Smøla wind farm has

been developed in two stages, stage 1 including the first 20 windmills, running from September 2002, and stage 2 with an additional 48 windmills planned to be producing power from the autumn 2005.

The Norwegian Institute for Nature Research (NINA) is responsible for the impact studies of Smøla wind farm on the breeding Sea-eagle population, and the Sea-eagle Project is doing the field studies. The studies include monitoring of the annual breeding status, including the reproductive output, ringing the eaglets according to the international colour ringing scheme, and finally a number of nestling have been tagged with transmittors for satellite GIS to track the movements of the juveniles after fledging.

This paper gives the results of the studies on Smøla so far, including the experience of the effects of human disturbance and activity on the nesting Sea-eagles during the pre windpower period, and the nesting and reproduction data from the period of construction and running Smøla Wind farm stage 1, and the Smøla Wind farm stage 2 for the years 2003 and 2004.

6

HYDRO TECHNOLOGY IN THE UK

Andrew Brown and Alastair Gill*

Npower renewables, RWE Npower, Dolgarrog Power Station, Dolgarrog, Nr. Conwy LL32 8QE, UK
*Email: alastair.gill@rwenpower.com

This paper briefly describes the hydro schemes currently operating in the UK and distinguishes between schemes with reservoirs and those without. This is then expanded to describe current and expected developments over the coming years. The contribution of UK hydro to reducing carbon emissions is briefly outlined. Case studies of recent installations are then used to describe the consenting process with particular reference to environmental issues and those affecting birds. Finally, the most challenging aspects of balancing environmental impacts and benefits are drawn out, and suggestions made for improving this balance.