

Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)

**Department of
Energy and Climate Change**

**Draft National Policy
Statement for Renewable
Energy Infrastructure (EN-3)**

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of the Planning Act 2008.

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Part 1. The Purpose of Energy National Policy Statements

1.1 Introduction

1.1.1 Electricity generation from renewable sources of energy is an important element in the Government's transition to a low-carbon economy. There are ambitious renewable energy targets in place and a significant increase in generation from large-scale renewable energy infrastructure is necessary.

1.2 Role of this NPS in the Planning System

1.2.1 This National Policy Statement (NPS), taken together with the 'Overarching National Policy Statement for Energy: A Framework Document for Planning Decisions on Nationally Significant Energy Infrastructure' (EN-1), provides the primary basis for decisions by the Infrastructure Planning Commission (IPC) on applications it receives for the renewable energy infrastructure defined at 1.7. Under the Planning Act 2008, the IPC also has to have regard to any local impact report submitted by a relevant local authority, any relevant matters prescribed in regulations, any Marine Policy Statement (MPS) and marine plans and any other matters which the IPC thinks are both important and relevant to the decision.

1.2.2 The Planning Act 2008 also requires that the IPC must decide an application in accordance with relevant NPSs except to the extent it is satisfied that to do so would:

- lead to the UK being in breach of its international obligations;
- be in breach of any statutory duty that applies to the IPC;
- be unlawful;
- result in adverse impacts of the development outweighing the benefits; or
- be contrary to regulations about how its decisions are to be taken.

1.2.3 Applicants should therefore ensure that their applications and any accompanying supporting documents and information are consistent with this NPS, EN-1 and any other NPSs that are relevant to the application in question.

1.2.4 This NPS, and in particular the policy and guidance on generic impacts in Part 2, may be helpful to local planning authorities (LPAs) in preparing their local impact reports. In England and Wales, this NPS may also be a material consideration in decision making on applications that fall under the Town and Country Planning Act 1990 (as amended). Where relevant, those making decisions on such applications in England should apply the policy and guidance in this NPS as far as practicable.

1.2.5 The Marine Management Organisation (MMO), as provided for in the Marine and Coastal Access Bill, will determine applications under s.36 and s.36A of the Electricity Act 1989 relating to any generating station in waters adjacent to England and Wales or in the UK Renewable Energy Zone (except the Scottish part) that does not exceed the capacity threshold set out in the Planning Act 2008. The MMO will determine applications in accordance with the Marine Policy Statement (MPS) and any applicable marine plans, unless relevant considerations indicate otherwise. This NPS may be a relevant consideration for the MMO when it is determining such applications. This NPS may also be a relevant consideration in the preparation of the marine plans.

1.3 Relationship with EN-1

1.3.1 This NPS is part of a suite of energy NPSs and must be read in conjunction with EN-1 which covers:

- the high level objectives, policy and regulatory framework for new energy infrastructure consistent with the objective of contributing to the achievement of sustainable development and the Government's policies on mitigating and adapting to climate change;
- the need and urgency for new energy infrastructure and the social and economic benefits of meeting the need;
- the need for specific technologies, including the infrastructure covered by this NPS;
- key principles to be followed in the consideration and examination of applications;
- the role of the Appraisal of Sustainability and its outcome in relation to the suite of energy NPSs;
- policy on good design, climate change adaptation and other matters relevant to more than one technology-specific NPS; and
- the assessment and handling of generic impacts that are not specific to particular technologies.

1.3.2 This NPS does not repeat the material set out in EN-1.

1.3.3 Further information on the relationship between NPSs and the town and country planning system, as well as background on the role of NPSs and the arrangements in the devolved administrations, will be issued by the Department for Communities and Local Government (CLG).

1.4 Geographical coverage

1.4.1 This NPS, together with EN-1, is the primary decision-making guidance document for the IPC on nationally significant onshore renewable energy infrastructure projects in England and Wales and nationally significant offshore projects in waters in or adjacent to England or Wales up to the seaward limits of the territorial sea or in the UK Renewable Energy Zone (REZ) (defined in Section 84 (4) of the Energy Act 2004), except any part of a Renewable Energy Zone in relation to which Scottish Ministers have functions.

- 1.4.2 It will remain possible for Welsh Ministers to consent offshore wind farms in territorial waters adjacent to Wales under the Transport and Works Act 1992 if applicants apply to them rather than to the IPC.
- 1.4.3 In Scotland the IPC will not examine applications for nationally significant generating stations or electricity network infrastructure. However, energy policy is generally a matter reserved to UK Ministers and this NPS may therefore be a relevant consideration in planning decisions in Scotland.
- 1.4.4 In Northern Ireland, planning consents for all nationally significant energy infrastructure projects are devolved to the Northern Ireland Executive, so the IPC will not examine applications for energy infrastructure in Northern Ireland.

1.5 Period of validity and review

- 1.5.1 The NPS will remain in force in its entirety unless withdrawn or suspended in whole or part by the Secretary of State. It will be subject to review by the Secretary of State in order to ensure that it remains appropriate for IPC decision making. Further information can be found in CLG's NPS guidance.

1.6 Appraisal of Sustainability

- 1.6.1 This NPS has been subject to an Appraisal of Sustainability (AoS) incorporating the requirements for Strategic Environmental Assessment (SEA). The conclusions of the AoS for all the non-nuclear NPSs are summarised in 1.6 of EN-1.
- 1.6.2 The offshore wind energy sections reflect the Offshore Energy SEA undertaken by DECC in 2009¹ and the subsequent post consultation report² and government decision³.

1.7 Infrastructure covered by this NPS

- 1.7.1 This NPS covers the following types of nationally significant renewable energy infrastructure:
- Energy from biomass and/or waste (>50 megawatts (MW))
 - Offshore wind (>100MW)
 - Onshore wind (>50MW)
- 1.7.2 This NPS does not cover other types of renewable energy generation, such as schemes that generate electricity from tidal or wave power.

1 DECC (January 2009) UK Offshore Energy Strategic Environmental Assessment: Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage – Environmental Report.

2 DECC (June 2009) Offshore Energy Strategic Environmental Assessment: Post Public Consultation Report.

3 The Government's decision is explained in *A Prevailing Wind: Advancing UK Offshore Wind Deployment* (June 2009) URN 09D/619.

Part 2. Assessment and Technology-Specific Information

2.1 Introduction

- 2.1.1 Part 4 of EN-1 sets out the general principles that should be applied in the assessment of impacts and advises on the assessment of generic energy impacts which are common across a range of relevant energy technologies. This NPS is concerned with impacts and other matters which are specific to onshore and offshore wind energy, energy from waste and biomass or where, although the impact or issue is generic and covered in EN-1, there are further specific considerations arising from the technologies covered here. The guidance in this NPS is additional to that on generic impacts set out in EN-1 and does not replace it. The IPC should consider this NPS and EN-1 together. In particular, EN-1 sets out the Government's conclusion that there is a significant need for new major energy infrastructure (see summary and conclusion in Part 3 of EN-1). EN-1 Section 3.4 includes assessments of the need for new major renewable energy infrastructure. In the light of this, the IPC should start its assessment of applications for infrastructure covered by this NPS on the basis that need has been demonstrated.
- 2.1.2 Factors influencing site selection by applicants of renewable energy generating stations are set out below. They are included to provide the IPC with guidance on the criteria that applicants consider when choosing a site. But the specific criteria considered by applicants and the weight they give to them, will vary from project to project. This is at the commercial risk of the applicant. Energy market participants decide what applications to bring forward and the Government does not seek to direct applicants to particular sites for renewable energy infrastructure other than in the specific circumstances described in this document in relation to offshore wind. The crucial consideration for the IPC is whether the proposal is in line with the NPS and satisfies the impact considerations set out in EN-1 and this NPS.

2.2 Relationship with English regional and Welsh renewables policies

- 2.2.1 Guidance in regional spatial strategies relating to renewables and renewable energy targets in England (in future the new single regional strategies) and in planning policy and advice issued by the Welsh Assembly Government relevant to renewables, will provide important information to applicants of nationally significant infrastructure projects (NSIPs). The IPC should have regard to this guidance and expect applicants to have taken it into account when working up their proposals. Applicants should explain in their applications to the IPC how their proposals fit with the guidance and support its targets or, alternatively, why they depart from them. Whether or not an application conforms to the guidance or the targets will not, in itself, be a reason for approving or rejecting the application.

2.2.2 Where the IPC considers that any refinement of boundaries of strategic search areas for onshore wind development that has been undertaken by LPAs in Wales is both important and relevant to its decision, the IPC should be satisfied that such an exercise has been undertaken in accordance with the relevant guidance published by the Welsh Assembly Government.

2.3 Climate Change Adaptation

2.3.1 Paragraphs 2.1.7 and 2.1.8 of EN-1 set out Government policy on adaptation, while Section 4.8 of EN-1 sets out the generic considerations that applicants and the IPC should take into account with regard to the potential impact on infrastructure of climate change on renewable energy infrastructure. EN-1 describes how projects should be designed to be resilient to such impacts. As climate change is likely to increase risks to some renewable energy infrastructure, from flooding or rising sea levels for example, applicants should in particular set out how the proposal would be resilient to:

- effects of rising sea levels and increased risk from storm surge;
- increased risk of flooding;
- impact of higher temperatures; and
- increased risk of drought affecting river flows.

2.3.2 The IPC should expect that climate change resilience measures will form part of the relevant environmental impact assessment (EIA) that is set out in the Environmental Statement (ES) accompanying an application. For example, the impact of increased risk of drought as a result of higher temperatures should be covered in the water quality and resources section of the ES.

2.4 Criteria for “good design” for energy infrastructure

2.4.1 Section 4.5 of EN-1 sets out the principles for good design that should be applied to all energy infrastructure.

2.4.2 Regarding proposals for renewable energy infrastructure, in particular the IPC should expect applicants to demonstrate good design in respect of landscape and visual amenity and in the design of the project to mitigate impacts such as noise, and effects on ecology.

2.5 Biomass and Waste Combustion

Introduction

- 2.5.1 The combustion of biomass for electricity generation is likely to play an increasingly important role in meeting the UK's renewable energy targets.
- 2.5.2 The recovery of energy from the combustion of waste, where in accordance with the waste hierarchy, will play an increasingly important role in meeting the UK's energy needs. Where the waste burned is deemed renewable, this can also contribute to meeting the UK's renewable energy targets. Further, the recovery of energy from the combustion of waste, form an important element of waste management strategies in both England and Wales.
- 2.5.3 The combustion plants covered by this NPS are those which generate electricity:
- using waste (possibly including non-renewable sources of waste) and/or biomass as a fuel; and
 - generate more than 50MW of electricity.
- 2.5.4 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for energy from waste plant and biomass plant. The extent to which they are relevant may depend upon the phase of the proposed development being considered: construction, operation or decommissioning.
- 2.5.5 The applicant should identify the impacts of a proposal and these impacts, together with proposals for their avoidance or mitigation wherever possible, should be set out in a statement that should accompany each project application.
- 2.5.6 Guidance on Environmental Impact Assessments can be found in Part 4, Section 4.2 of EN-1. In this NPS, the terms 'effects', 'impacts' or 'benefits' should accordingly be understood to mean likely significant effects, impacts or benefits.

Fuels

- 2.5.7 Biomass is material of recent biological origin derived from plant or animal matter. The biomass used for heat and power usually falls into one or more of three categories:
- biomass sourced from conventional forestry management. This includes thinning, felling and coppicing of sustainably managed forests, parklands and trees from other green spaces. It also includes sawmill residues (often processed to produce wood pellets), other wood processing residues and parts of trees unsuitable for the timber industry;
 - biomass from agricultural crops and residues. This includes crops grown primarily for use in energy generation ('energy crops') 'woody' energy crops such as short rotation coppice (SRC) or miscanthus grass which can be grown on land unsuitable for food crops. Biomass can also be sourced from agricultural residues such as straw, husks and kernels; and

- biomass from biodegradable waste and other similar materials; including sewage sludge, animal manure, waste wood from construction, and food waste that would otherwise be disposed of in landfill.

- 2.5.8 Energy from waste plants take fuel that would otherwise be sent to landfill. Waste can come from municipal or commercial and industrial sources. Some of the waste suitable for such plant may comprise biodegradable waste (some of which may be solid recovered fuel (SRF)) as described in the third bullet point of 2.5.7 above.
- 2.5.9 A proportion of the biodegradable waste may be classed as “renewable” for the purposes of Renewable Obligation Certificates (ROCs)⁴ eligibility. However, this is not an issue of relevance to the IPC.
- 2.5.10 Operators of biomass plants may source biomass from both domestic and imported supplies. Where operators of biomass plants are seeking to gain ROCs for the combustion of biomass as a renewable fuel, they must undertake annual reporting to Ofgem on sustainability issues relating to the sourcing of the biomass sourced including the volume and type of biomass used, country of origin and previous land use. Where operators of biomass plants do not comply with this requirement, Ofgem has the discretion to postpone or even refuse the issuing of ROCs in certain circumstances. Given that operators will need to provide information on the sustainability of the biomass used to Ofgem and will also need to comply with any other requirements or restrictions that may arise, the IPC does not need to consider the source or sustainability of the proposed biomass fuel to be used within the proposed plant.

Combustion Plant Types and Scale

- 2.5.11 Waste and biomass combustion plant covered by this NPS may include a range of different combustion technologies, including grate combustion, fluidised bed combustion, gasification and pyrolysis. The IPC should not be concerned about the type of technology used. All will need to adhere to the policy set out below.
- 2.5.12 The fuel throughput capacity of the combustion plant considered by the IPC may vary widely depending on composition, calorific value and availability of fuel.
- 2.5.13 Throughput volumes are not, in themselves, a factor in IPC decision-making as there are no specific minimum or maximum fuel throughput limits for different technologies or levels of electricity generation. This is a matter for the applicant. However, the increase in traffic volumes, any change in air quality and any other impacts as a result of the increase in throughput should be considered by the IPC in accordance with this NPS as well as the net benefits of the combustion of waste and biomass.

⁴ Definition of biomass in the Renewable Obligation Order 2009.

Nature of applications

- 2.5.14 A waste/biomass combustion plant proposal is likely to consist of the following:
- a main combustion plant building incorporating emissions abatement, electricity generation units, cooling assembly (variety of types and methods) and chimney stack;
 - buildings necessary for fuel reception, storage, sorting and pre-treatment facilities; and
 - ancillary plant such as an electricity substation, civil engineering workshops and offices.
- 2.5.15 Some development proposals may also incorporate additional features such as waste transfer facilities.
- 2.5.16 Applicants may require ancillary development in order to comply with the requirements of the Animal By-Products Regulations 2005 (S.I. 2005/2347) (ABPR).

Commercial Aspects of Waste Combustion Plant

- 2.5.17 Commercial issues are not likely to be an important matter for the IPC decision-making, but are set out below to provide the IPC with guidance on the considerations faced by applicants.
- 2.5.18 Waste combustion plants are unlike other electricity generating power stations in that they have two roles: treatment of waste and recovery of energy. The commercial rationale for waste combustion plants will be both the gate fee received per tonne of waste handled and income received from energy recovery.
- 2.5.19 Waste combustion plant operators secure fuel through contracts. Local authorities issue municipal waste contracts, which are often long term (up to 25 years). Contracts to manage private sector wastes are generally, but not exclusively, shorter term in nature. The operator may decide to go for either public or private sector contracts, or a combination of the two. The IPC should recognise that contractual arrangements may change throughout the lifetime of the plant.

Co-firing

- 2.5.20 For development proposals involving co-firing of biomass alongside fossil fuel within a conventional fossil fuelled power station, the IPC should cross refer to the Fossil Fuel NPS (EN-2).
- 2.5.21 The IPC should also cross-refer to EN-2 for development proposals involving co-firing of waste alongside fossil fuel. Such proposals will, however, be subject to the Waste Incineration Directive (WID).

Factors influencing site selection by applicants

Grid Connection

- 2.5.22 The technical feasibility of exporting electricity from a biomass or waste combustion plants is dependent on the capacity of the grid network to accept the likely electricity output together with the voltage and distance of the connection. See the generic grid connection text in Section 4.9 of EN-1.
- 2.5.23 It may be the case that the applicant has not received or accepted a formal offer of a grid connection from the relevant network operator at the time of the application, although it is likely to have applied for one and discussed it with them. This is a commercial risk the applicant may wish to take for a variety of reasons and is not likely to be of relevance to the IPC. As set out in EN-1, any application to the IPC must include information on how the combustion plant is to be connected and whether there are any particular environmental issues likely to arise with that connection.

Links to Transport Network

- 2.5.24 Biomass or waste combustion plants are likely to generate considerable transport movements. For example, a biomass or waste combustion plant that uses 500,000 tonnes of fuel per annum (tpa) might generate a minimum of 200 heavy goods vehicles (HGVs) movements per day importing the fuel. There will also be residues which will need to be transported off site regularly. Therefore, any application should incorporate suitable access leading off from the main highway network.
- 2.5.25 Government policy encourages multi-modal transport and the IPC should expect materials (fuel and residues) to be transported via road, rail or water routes. Although there may in some instances be environmental advantages to rail or water transport, whether or not such methods are viable is likely to be determined by the economics of the scheme. Road transport may be required to connect the site to the rail network, waterway or port.

Combined Heat and Power

- 2.5.26 The Government's strategy for Combined Heat and Power (CHP) is described in Section 4.6 of EN-1, including the requirements on applicants to fully explore options for incorporating CHP in applications for thermal generating stations, including biomass and energy from waste plant. The IPC should refer to EN-1 for details of how this should be incorporated into its assessment of any proposed biomass or energy from waste plant.

Carbon Capture Readiness

2.5.27 To ensure that no foreseeable barriers exist to retrofitting Carbon Capture and Storage (CCS) equipment on combustion generating stations in the future, Government has introduced a Carbon Capture Readiness (CCR) requirement for combustion generating stations of a type that are specified in the Large Combustion Plant Directive (LCPD)⁵ with a generating capacity at or over 300MW. CCR is therefore relevant to proposed biomass plant at or over 300MW of generating capacity, and this requirement is detailed in Section 4.7 of EN-1. The IPC should refer to EN-1 for details of how this should be incorporated into its assessment of any relevant proposed biomass plant.

Technical considerations for the IPC when determining biomass/waste combustion plant

Flexibility in the project details

2.5.28 Owing to the complex nature of energy generation development, many of the details of a proposed scheme may be unknown to the applicant at the time of the application to the IPC, such as the precise type of cooling assembly or precise onsite layout for example.

2.5.29 The IPC should accept that biomass/combustion plant operators may not know the precise details of all elements of the proposed development until some time after any consent has been granted. Where some details have not been included in the application to the IPC, the applicant should explain which elements of the scheme have yet to be finalised, and the reasons. Therefore, some flexibility may be required in the consent. Where this is sought and the precise details are not known, then the applicant should assess the maximum potential adverse effects the project could have to ensure that the project as it may be constructed has been properly assessed. In this way the maximum-adverse case scenario will be assessed and the IPC should allow for this uncertainty in its consideration of the application and consent.

IPC Impact Assessment principles

2.5.30 The IPC should adhere to the following principles when examining and determining applications for biomass and relevant energy from waste infrastructure.

National designations

2.5.31 In sites with nationally recognised designations (Sites of Special Scientific Interest, National Nature Reserves, National Parks, Areas of Outstanding Natural Beauty, Heritage Coasts, Scheduled Monuments, Conservation Areas, Listed Buildings, Registered Historic Battlefields and Registered Parks and Gardens) consent for renewable energy projects should only be granted where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits.

⁵ Energy from waste plant is not covered in the LCPD.

Green Belts

2.5.32 Policy on development in the green belt is set out in PPG2⁶. When located in the green belt, elements of many renewable energy projects will comprise of inappropriate development, which may impact on the openness of the green belt. Careful consideration will therefore need to be given to the visual impact of projects, and developers will need to demonstrate very special circumstances that clearly outweigh any harm by reason of inappropriateness and any other harm if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.

Other locational considerations

2.5.33 As most renewable energy resources can only be developed where the resource exists and where economically feasible, the IPC should not use a sequential approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments).

6 Department of the Environment (1995) Planning Policy Guidance Note 2: Green Belts.

Biomass/Waste Impacts – Air Quality and Emissions

Introduction

- 2.5.34 Air quality and emissions are principally dealt with in Section 4.17 of EN-1. This section does not cover carbon dioxide (CO₂) emissions; Government policy on CO₂ is set out in Section 4.7 of EN-1. However, with respect to biomass/waste combustion plant, the following should also be considered.
- 2.5.35 In addition to the air quality legislation set out in EN-1 the Waste Incineration Directive (WID) is also relevant to waste combustion plant which sets out specific emission limit values for waste combustion plants.

Applicant's Assessment

- 2.5.36 The applicant's EIA should include an assessment of the air emissions resulting from the proposed infrastructure and demonstrate compliance with the relevant regulations.

IPC Decision Making

- 2.5.37 Compliance with the WID and the LCPD is enforced through the environmental permitting regime regulated by the Environment Agency (EA). Plants not meeting the requirements of WID and/or LCPD would not be granted a permit to operate. The IPC should refer to the policy in EN-1 at 4.10 relating to other regimes.
- 2.5.38 The pollutants of concern arising from the combustion of waste and biomass include NO_x⁷, SO_x⁸, particulates and CO₂. In addition emissions of heavy metals, dioxins and furans are a consideration for waste combustion plants but limited by WID and regulated by the EA.
- 2.5.39 Where a proposed modern waste combustion plant meets the requirements of WID and will not exceed the local air quality standards, the IPC should not regard the proposed waste plant as being detrimental to health.
- 2.5.40 Similarly, where a proposed modern biomass combustion plant meets the requirements of LCPD and will not exceed the local air quality standards, the IPC should not regard the proposed biomass infrastructure as being detrimental to health.

Mitigation

- 2.5.41 Abatement technologies should be those set out in the relevant sector guidance notes as produced by the EA. The EA will determine if the technology selected for the waste/biomass combustion plant is considered Best Available Technique (BAT) and therefore the IPC does not need to consider equipment selection in its determination process.
- 2.5.42 The EA will require the chimney stack height of the waste/biomass plant to be optimised to ensure appropriate dispersion of emissions to air. Therefore, the IPC need not be concerned with the chimney stack height optimisation process in relation to impact on air quality.

7 Oxides of nitrogen.

8 Sulphur oxides.

Biomass/Waste Impacts – Landscape and Visual

Introduction

- 2.5.43 Generic landscape and visual effects are covered in detail in Section 4.24 of EN-1. In addition, there are specific considerations which apply to biomass/waste combustion plant as set out below.
- 2.5.44 The IPC should be satisfied that the design of the proposed plant is of appropriate quality and minimises adverse effects on the landscape character and quality.

Applicant's Assessment

- 2.5.45 An assessment of the landscape and visual effects of the proposed infrastructure should be undertaken in accordance with the guidance set out in 4.24 of EN-1.

IPC Decision Making

- 2.5.46 The IPC should take into account that any biomass/waste combustion plant will require a building able to host fuel reception and storage, the combustion chamber and abatement units. The overall size of the building will be dependent on design and fuel throughput, although it is unlikely to be less than 25m in height. External to the building there may be cooling towers, the size of which will also be dependent on the throughput of the plant.
- 2.5.47 The IPC should expect any biomass/waste combustion plant to include a chimney stack. The primary driver of the height of the stack is the delivery of optimal dispersion of emissions and is often determined by statutory requirements. The optimal stack height is dependent upon the local terrain and meteorological conditions, in combination with the emission characteristics of the plant. Biomass/waste combustion plant chimney stacks usually range between 60–90m, although some may be taller depending on local circumstances.
- 2.5.48 The IPC should ensure applicants have taken into account the landscape and visual impacts of visible plumes from chimney stacks and/or the cooling assembly.
- 2.5.49 Good design that contributes positively to the character and quality of the area will go some way to mitigate adverse landscape/visual effects. Development proposals should consider the design of the plant, including the materials to be used in the context of the local landscape.
- 2.5.50 The IPC should also be aware of the statutory and technical requirements that form the basis of plant design and may require the incorporation of certain design details e.g. chimney stack height.
- 2.5.51 Mitigation is achieved primarily through aesthetic aspects of site layout and building design including size and external finish and colour of the plant to minimise intrusive appearance in the landscape as far as engineering requirements permit. The precise architectural treatment will need to be site-specific.

2.5.52 The IPC should expect applicants to seek to landscape waste/biomass combustion plant sites to visually enclose them at low level as seen from surrounding external viewpoints. This makes the scale of the plant less apparent, and helps conceal its lower level, smaller scale features. Earth bunds and mounds, tree planting or both may be used for softening the visual intrusion and may also help to attenuate noise from site activities.

Biomass/Waste Impacts – Local and Regional Waste Management

Introduction

- 2.5.53 Waste combustion plants need not disadvantage reuse or recycling initiatives where the proposed development accords with the waste hierarchy⁹.
- 2.5.54 National, regional, local and municipal strategies in England and Wales provide policy expectations for waste management at these different geographical levels. Regional strategies apportion the amount of waste to be managed in each sub region, providing an informative framework for the amount of waste management capacity sought. Information on the type of wastes arising and those that are combustible may also be provided. The relevant regional waste plans in England and Wales will set out the regional strategy for dealing with waste generated in that region and include regional waste targets.

Applicant's Assessment

- 2.5.55 An assessment of the proposed waste combustion plant should be undertaken that examines the conformity of the scheme with the waste hierarchy and the effect of the scheme on the relevant regional waste plan.
- 2.5.56 The application should set out the extent to which the plant and capacity proposed contributes to the recovery targets set out in relevant strategies and plans, taking into account existing capacity.
- 2.5.57 It may be appropriate for assessments to refer to the Annual Monitoring Reports published by relevant waste authorities which provide an updated figure of existing waste management capacity and future waste management capacity requirements.
- 2.5.58 The results of the assessment of the conformity with the waste hierarchy and the effect on relevant regional waste plans should be presented in a separate document to accompany the application to the IPC.

IPC Decision Making

- 2.5.59 The IPC should be satisfied, with reference to the relevant waste strategies and plans that the proposed waste combustion plant is of an appropriate type and scale so as not to prejudice the achievement of local, regional or national waste management targets. Where there are concerns in terms of a possible conflict, evidence should be provided to the IPC by the applicant as to why this is not the case or why a deviation from the relevant waste strategy or plan is nonetheless appropriate and in accordance with the waste hierarchy.

⁹ Waste hierarchy as set out in Article 16 of the Waste Framework Directive 2008.

Biomass/Waste Impacts – Residue Management

Introduction

- 2.5.60 Waste management is principally dealt with in EN-1, Section 4.29. In addition, there are specific considerations which apply to waste and biomass combustion plant as set out below. All waste/biomass combustion plant will produce residues that require further management. Much of the residues can be used for commercial purposes.
- 2.5.61 Waste combustion plant (even if mixed with biomass fuel) produce two types of residues:
- combustion residue is inert material from the combustion chamber. The quantity of residue produced is dependent on technology process and fuel type but might be as much as 30% (in terms of weight) of the fuel throughput of the plant; and
 - fly ash, a residue from flue gas emission abatement technology and usually 3-4% (in terms of weight) of the fuel throughput of the plant.
- 2.5.62 Under the Waste Incineration Directive (WID) the two residues from waste combustion plant cannot be mixed; they must be disposed of separately, under different regimes.
- 2.5.63 Biomass combustion plant will also produce both combustion and flue gas treatment residues. However the residue types can be mixed and managed as one product for disposal. Residues arising from biomass combustion plant are usually <1-12% (in terms of weight) of the fuel capacity of the plant.
- 2.5.64 The regulations on waste disposal for waste combustion and flue gas residues from biomass combustion are intended to reduce the amount of waste that is sent to landfill. Waste combustion fly ash is classified as a hazardous waste material and needs to be managed as such.
- 2.5.65 Waste management is covered in the Environmental Permit for operation of waste or biomass generating stations. Refer to 4.29 of EN-1.

Applicant's Assessment

- 2.5.66 The assessment should include the production and disposal of residues as part of the ES. Any proposals for recovery of ash and mitigation measures should be described.
- 2.5.67 Applicants should set out the consideration they have given to the existence of accessible capacity in waste management sites for dealing with residues for the planned life of the power station.

IPC Decision Making

- 2.5.68 The IPC should consult EA on the suitability of the proposals.
- 2.5.69 When the IPC considers noise and vibration, release of dust and transport impacts, as set out in this NPS and EN-1, it should recognise that these impacts may arise as a result of the need for residue disposal as well as other factors.
- 2.5.70 The IPC should be satisfied that management plans for residue disposal satisfactorily minimise the amount that cannot be used for commercial purposes. The IPC should give substantial positive weight to development proposals that have a realistic prospect of recovering these materials.
- 2.5.71 The IPC may need to consider whether appropriate conditions are required. If the EA has indicated that there are no known barriers to it issuing an environmental permit for operation of the proposed biomass/waste fuelled generating station and agrees that management plans suitably minimise the wider impacts from ash disposal, any residual ash disposal impacts should have limited weight.

Mitigation

- 2.5.72 Combustion residues: the environmental burdens associated with the management of combustion residues can be mitigated through recovery of secondary products, for example aggregate or fertiliser, rather than disposal to landfill. The primary management route for fly ash is hazardous waste landfill. However, there may be opportunities to reuse this material e.g. in the stabilisation of industrial waste. The management of hazardous waste will be considered by the EA through the Environmental Permitting regime.
- 2.5.73 The environmental burdens associated with the management of residues arising from a biomass combustion plant can be mitigated through recovery of secondary products, for example aggregate or fertiliser, rather than disposal to landfill. The IPC should give substantial positive weight to development proposals that have a realistic prospect of recovering these materials.

2.6. Offshore Wind

Introduction

- 2.6.1 Offshore wind farms are expected to make up a significant proportion of the UK's renewable energy generating capacity up to 2020 and towards 2050.
- 2.6.2 There are two main UK sea areas in which structures such as offshore wind farms can be built: in UK territorial waters, which extend up to 12 nautical miles (nm) from the coast and beyond the 12nm limit, under international law the UK is able to construct wind farm installations or other structures to produce renewable energy in the Renewable Energy Zone (REZ) as declared in the Energy Act 2004¹⁰.
- 2.6.3 For clarification, any reference within this NPS to offshore wind farm infrastructure includes all the elements which may be part of an application, including wind turbines, all types of foundations, onshore and offshore substations, anemometry masts, accommodation platforms and cabling.
- 2.6.4 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for offshore wind farms. The extent to which they are relevant may depend upon the phase of the proposed development being considered. For example, land-based traffic and transport, and noise issues may be relevant during the construction and decommissioning periods only, depending upon the precise proposal.
- 2.6.5 The applicant should identify the impacts of a proposal and these impacts, together with proposals for their avoidance or mitigation wherever possible, should be set out in an Environmental Statement (EN-1) that should accompany each project application. Guidance on Environmental Impact Assessments can be found in Part 4, Section 4.2 of EN-1. In this NPS, the terms 'effects', 'impacts' or 'benefits' should accordingly be understood to mean likely significant effects, impacts or benefits.

IPC offshore consenting process

CPA consent

- 2.6.6 Any consent granted by the IPC may include provision deeming consent under s.34 of the Coast Protection Act 1949 (a CPA consent) for operations carried out wholly in England, Wales, waters adjacent to England and Wales up to the seaward limits of the territorial sea or in any area designated under s.1(7) of the Continental Shelf Act 1964.

FEPA licence

- 2.6.7 Any consent granted by the IPC may include provision deeming a licence to have been issued under Part 2 of the Food and Environment Protection Act 1985 (a FEPA licence) for operations carried out wholly in England, waters adjacent to England up to the seaward limits of the territorial sea, the UK Renewable Energy Zone (REZ) (except any part of a renewable energy zone in relation to which the Scottish Ministers have functions) or in any area designated under s.1(7) of the Continental Shelf Act 1964.

¹⁰ The REZ was declared under section 84 of the Energy Act 2004. It extends from the seaward limit of the territorial sea up to a maximum of 200 nautical miles from the baseline.

- 2.6.8 Welsh Ministers are responsible for issuing FEPA licences for operations carried out in Wales and in waters adjacent to Wales up to the seaward limits of the territorial sea.

Marine licence

- 2.6.9 As provided for in the Marine and Coastal Access Bill, marine licences will replace the requirement for CPA consents and FEPA licences. Any consent granted by the IPC will be able to include provision deeming the grant of a marine licence for operations carried out wholly in England, waters adjacent to England up to the seaward limits of the territorial sea or the UK Renewable Energy Zone (REZ) (except any part of a renewable energy zone in relation to which the Scottish Ministers have functions).
- 2.6.10 Welsh Ministers will be responsible for issuing marine licences for operations carried out in Wales and in waters adjacent to Wales up to the seaward limits of the territorial sea.

Implications for IPC

- 2.6.11 FEPA licences and CPA consents, and their successor, the Marine Licence, are primarily concerned with the need to protect the environment and human health, and to prevent interference with legitimate uses of the sea.
- 2.6.12 FEPA licences (in due course marine licences) are likely to be required for all the offshore elements of the proposed wind farm, including associated development such as the offshore cabling and any offshore substations that are required.
- 2.6.13 The Marine and Fisheries Agency (MFA) (in due course to become the Marine Management Organisation) is responsible for enforcement and ongoing management of licence conditions, for operations carried out in England, waters adjacent to England up to the seaward limits of the territorial sea or a renewable energy zone (except any part of a renewable energy zone in relation to which the Scottish Ministers have functions).
- 2.6.14 The IPC should liaise closely with the Marine and Fisheries Agency (in due course the MMO) on the proposed terms of any deemed CPA consent, FEPA licence or marine licence.

Factors influencing site selection and design by applicant

Strategic Environmental Assessment

- 2.6.15 Through the Offshore Energy Strategic Environmental Assessment 2009 (SEA) process, the Government has assessed the environmental implications and spatial interactions of a plan/programme for some 25GW of new offshore wind capacity¹¹, on top of existing plans for 8GW of offshore wind. The Government concluded that there are no overriding environmental considerations to prevent the achievement of the plan/programme for offshore wind, if mitigation measures are implemented to prevent, reduce and offset significant adverse effects¹². In the light of the SEA process, consultation responses and other available information, the Government decided¹³ to adopt the plan/programme for some 25GW of new offshore wind capacity in the UK Renewable Energy Zone and the territorial waters of England and Wales, up to 60m depth and subject to some spatial restrictions.
- 2.6.16 In addition to new offshore projects, the Government has decided that, in line with Recommendation 6 of the Post Consultation Report (PCR), there is potential for capacity extensions to existing wind farm leases within UK waters¹⁴. However, this will require careful, site-specific evaluation through the planning process, since significant new information on sensitivities and uses of these areas has become available.
- 2.6.17 Applicants should set out how they have drawn on the Government's Offshore Energy SEA in making their site selection.
- 2.6.18 Government is undertaking a rolling SEA programme for offshore energy, including a research programme and data collection to facilitate future assessments. These future offshore SEAs and data will be relevant to the applicants and the IPC as and when they become available.

The Crown Estate

- 2.6.19 The Crown Estate own virtually the entire seabed out to the 12 nm territorial limit, including the rights to explore and utilise the natural resources of the UK Continental Shelf (excluding oil, gas and coal). Therefore it is necessary to obtain permission from the Crown Estate prior to placing any offshore structures on, or pass cables over, the seabed and its foreshore. As well as owning the rights to explore and utilise waters up to 12nm, the Energy Act 2004 gives The Crown Estate rights to issue licences for development beyond the territorial limit and within the REZ.
- 2.6.20 The Crown Estate Act 1961 states that, with regard to property and land, The Crown Estate must "maintain and enhance its value and the return obtained from it, but with due regard to the requirements of good management".

11 DECC (January 2009) UK Offshore Energy Strategic Environmental Assessment: Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage – Environmental Report.

12 DECC (June 2009) Offshore Energy Strategic Environmental Assessment: Post Public Consultation Report.

13 The Government's decision is explained in *A Prevailing Wind: Advancing UK Offshore Wind Deployment* (June 2009) URN 09D/619.

14 Territorial waters and the UK Renewable Energy Zone.

- 2.6.21 The Crown Estate identifies potential development areas in accordance with the requirements of The Crown Estate Act, Government policy, plans and associated SEA work. The Crown Estate issues leases for offshore wind farms in tendering Rounds. Rounds 1 and 2 are closed and sites leased in those rounds are operational, in construction, consented but yet to be constructed or, in some cases, still awaiting determination. The Crown Estate may grant capacity extensions to existing wind farm leases in Round 1 and 2 areas, again in accordance with the above, subject to applicants obtaining necessary consents.
- 2.6.22 For Round 3, The Crown Estate has adopted an approach based on development zones. Having completed its tendering exercise, The Crown Estate will enter exclusive agreements with development partners to identify and seek consent for sites within each of the zones. There are a number of zones, each with a separate agreement. The size of the zones and the number of sites that may be applied for within them vary.
- 2.6.23 The award of Zone Development Agreements (ZDAs) amounts to a plan within the meaning of the Offshore Marine Regulations 2007. The Crown Estate will undertake a Habitat Regulations Assessment before awarding the ZDAs.
- 2.6.24 Applicants for wind farms will select sites having considered a range of technical, environmental and operational constraints as set out below.
- 2.6.25 The zonal approach to development adopted by The Crown Estate is intended to provide applicants with a flexible approach to site identification and the means to minimise the risk of a significant environmental impact (alone or where there are multiple sites within a zone, cumulatively or in-combination).
- 2.6.26 In the process of identifying sites within zones, particularly the larger zones, applicants may have conducted a process of Zonal Assessment and Planning (ZAP). This could involve various studies to characterise the zone and an assessment of the constraints and opportunity for wind farm development.
- 2.6.27 ZAP is also an opportunity for early consultation with stakeholders, including statutory consultees about development alternatives, the scope of EIA and any Appropriate Assessment required, particularly with respect to cumulative and in-combination effects arising from those sites identified within the zone.
- 2.6.28 There may be some instances where the outputs of the ZAP exercise are considered relevant to feed into those aspects of EIA and any Appropriate Assessment (where this is required) relating to cumulative or in-combination effects for each of the individual site applications brought forward within each zone.
- 2.6.29 Future offshore development may occur in rounds or as piecemeal development using zones, ZAP or any other development mechanism as required.

Wind resource

- 2.6.30 The wind resource is critical to the economics of a proposed offshore wind farm. Applicants may have collected wind speed data using an anemometry mast or similar to inform their economic modelling. However, collection of this data is not obligatory as the suitability of the wind speed across the site and economics of the scheme are a matter for the commercial judgement of the wind farm applicant.

Water depth and foundation conditions

- 2.6.31 Water depth, bathymetry and geological conditions are all important considerations for the selection of sites and will affect the design of the foundations of the turbines, the layout of turbines within the site and the siting of the cables that will export the electricity.
- 2.6.32 The onus is on the applicant to ensure that the foundation design is technically suitable for the seabed conditions and that the application caters for any uncertainty regarding the geological conditions. Whilst the technical suitability of the foundation design is not in itself a matter for the IPC, it will need to be satisfied that the foundations will not have an unacceptable adverse effect on marine biodiversity, physical environment and marine cultural heritage in accordance with the guidance below. The applicant should have provided the necessary details to allow the IPC to assess such impacts.

Grid connection

- 2.6.33 The connection of a proposed offshore wind farm into the relevant electricity network will be an important consideration for applicants of onshore wind farms. The grid connection text at Section 4.9 in EN-1 sets out the important issues here.
- 2.6.34 Applicants of offshore wind farms will have to work within the regulatory regime for offshore transmission networks established by Ofgem. Under the regime, offshore transmission will be a licensed activity, regulated by Ofgem.

Other offshore infrastructure

- 2.6.35 There may be constraints imposed on the siting or design of offshore wind farms because of restrictions resulting from the presence of other offshore infrastructure or activities.

Technical considerations for the IPC when determining offshore wind farms

Grid connection infrastructure

- 2.6.36 When considering grid connection issues, the IPC should be mindful of the constraints of the regulatory regime for offshore transmission networks. At the time of the application, the applicant may or may not have secured a connection with the network operator into the onshore transmission network, and is unlikely to know who will own and manage the offshore transmission assets required for the wind farm.

- 2.6.37 Where the applicant has identified a precise route of the cable from the wind farm to a precise location for the onshore substation and connection to the transmission network, the EIA should assess the effects of the cable.
- 2.6.38 Where the applicant does not know the precise location of any cabling or any necessary onshore and/or offshore substations, a corridor should be identified within which the cable and any offshore substation is likely to be located. The EIA for the proposed project should assess the effects of including this infrastructure within that corridor.
- 2.6.39 Where the point of onshore connection is unknown at the time of the application, the applicant should assess a corridor from the wind farm to the shore that is considered to be a reasonably likely area for the cable and any offshore substation should be assessed as part of the EIA.
- 2.6.40 A proposed offshore electricity cable connecting the wind farm with the onshore electricity infrastructure and any offshore electricity substations that may be required, may constitute associated development, depending on their scale and nature in relation to the offshore wind farm¹⁵. Where the IPC is satisfied that such offshore infrastructure does constitute associated development and can form part of the application, it should be considered by the IPC in accordance with this NPS.
- 2.6.41 The onshore element of the grid connection (electric lines and substations) should be determined in accordance with the Electricity Networks NPS. Depending upon the scale and type of this onshore development, elements of it could constitute either associated development or a nationally significant infrastructure project (NSIP) in its own right.

Flexibility in the project details

- 2.6.42 Owing to the complex nature of offshore wind farm development, many of the details of a proposed scheme may be unknown to the applicant at the time of the application to the IPC, possibly including:
- precise location and configuration of turbines and associated development;
 - foundation type;
 - exact turbine tip height;
 - cable type and cable route; and
 - exact locations of offshore and/or onshore substations.

¹⁵ Refer to relevant associated development guidance.

2.6.43 The IPC should accept that wind farm operators are unlikely to know precisely which turbines will be procured for the site until some time after any consent has been granted. Where some details have not been included in the application to the IPC, the applicant should explain which elements of the scheme have yet to be finalised, and the reasons. Therefore, some flexibility may be required in the consent. Where this is sought and the precise details are not known, then the applicant should assess the maximum potential adverse effects the project could have to ensure that the project as it may be constructed has been properly assessed (the “Rochdale Envelope”). In this way the maximum-adverse case scenario will be assessed and the IPC should allow for this uncertainty in its consideration of the application and consent.

Micrositing

2.6.44 Any consent that is granted by the IPC should be flexible to allow for necessary micrositing of elements of the proposed wind farm during its construction where requested at the application stage. This allows for unforeseen events such as the discovery of previously unknown marine archaeology that it would be preferable to leave *in situ*.

2.6.45 Where micrositing tolerance is requested by the applicant in any consent, given that the EIA should assess a maximum adverse case scenario, the assessment should reflect the implications of any micrositing as far as reasonably possible.

Extensions

2.6.46 The Crown Estate may offer new leases in areas adjacent to existing consented wind farms. This could be to either the owner/operator of the existing site or to a different company from that operating the existing wind farm. These leases will form extensions to existing wind farms.

2.6.47 Leases may be awarded subject to the company obtaining the necessary consents and may be subject to various constraining conditions, including the presence of an existing operational wind farm.

2.6.48 The IPC should be aware of the potential for applications for extensions to existing wind farms and that there may be constraints on such leases over which the applicant will have little or no control.

Repowering

2.6.49 Where an operational offshore wind farm reaches the end of its life, subject to obtaining the necessary lease from The Crown Estate or providing an existing lease is still valid, the owner of the wind farm may wish to “repower” the site with new turbines. Given the likely change in technology over the intervening time period, any repowering of sites is likely to involve wind turbines of a different scale and nature. This could result in significantly different impacts as well as a different electricity generating capacity and a new consent application would be required.

- 2.6.50 In determining an application for the repowering of a site, the new proposed replacement scheme should be determined by the IPC on its individual merits.

Future monitoring

- 2.6.51 Owing to the relatively new and complex nature of offshore wind development, the IPC should consider requiring the applicant to undertake monitoring prior to and during construction and during its operation in order to measure and document the effects of the development. This enables an assessment of the accuracy of the original predictions and may inform the scope of future EIAs.
- 2.6.52 The IPC may consider that monitoring of any impact is appropriate. Monitoring should be presented in formal reports which should be made publicly available.

Decommissioning

- 2.6.53 Section 105 of the Energy Act 2004 enables the Secretary of State to require the submission of a decommissioning programme for a proposed offshore wind farm, provided at least one of the statutory consents required has been given or has been applied for and is likely to be given.
- 2.6.54 Where the IPC decides to grant consent for a proposed offshore wind farm, the IPC should include a condition requiring the applicant to submit a decommissioning programme to the Secretary of State before any offshore construction works begin. The decommissioning programme must satisfy the requirements of s.105(8) of the Energy Act 2004.

IPC Impact Assessment principles

- 2.6.55 The IPC should adhere to the following principles when examining and determining applications for offshore wind farms and associated infrastructure.

National designations

- 2.6.56 In sites with nationally recognised designations (Sites of Special Scientific Interest, National Nature Reserves, National Parks, Areas of Outstanding Natural Beauty, Heritage Coasts, Scheduled Monuments, Conservation Areas, Listed Buildings, Registered Historic Battlefields and Registered Parks and Gardens) consent for renewable energy projects should only be granted where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits.

Green Belts

2.6.57 Policy on development in the green belt is set out in PPG2¹⁶. When located in the green belt, elements of many renewable energy projects will comprise inappropriate development, which may impact on the openness of the green belt. Careful consideration will therefore need to be given to the visual impact of projects, and developers will need to demonstrate very special circumstances that clearly outweigh any harm by reason of inappropriateness and any other harm if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.

Other locational considerations

2.6.58 As most renewable energy resources can only be developed where the resource exists and where economically feasible, the IPC should not use a sequential approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments).

¹⁶ Department of the Environment (1995) Planning Policy Guidance Note 2: Green Belts.

Offshore Wind Farm Impacts – Biodiversity

Introduction

- 2.6.59 Generic ecology and biodiversity effects are covered in detail in EN-1, Section 4.18. The coastal geomorphology guidance in EN-1, Section 4.20 may also be relevant. In addition, there are specific considerations which apply to offshore wind energy infrastructure proposals as discussed below.
- 2.6.60 Biodiversity considerations concerning offshore infrastructure include:
- seabed habitats – intertidal and subtidal;
 - marine mammals;
 - ornithology; and
 - fish.
- 2.6.61 Effects on commercial fish stocks are covered in paragraphs 2.6.120 to 2.6.136.
- 2.6.62 Evidence from existing offshore wind farms demonstrates that it has been possible to locate wind farms in ecologically sensitive areas in some circumstances where careful siting of turbines has been undertaken following appropriate ecological surveys and assessments.
- 2.6.63 Effects of offshore wind farms can include temporary disturbance during the construction phase (including underwater noise) and ongoing disturbance during the operational phase and direct loss of habitat. Adverse effects can be on spawning, overwintering, nursery and feeding grounds and migratory pathways in the marine area. However, the presence of wind turbines can also have positive benefits to ecology and biodiversity.

Applicant's Assessment

- 2.6.64 Assessment of offshore ecology and biodiversity should be undertaken by the applicant for all stages of the lifespan of the proposed offshore wind farm and in accordance with the appropriate guidance for offshore wind farm EIAs.
- 2.6.65 Consultation should be undertaken at early stages with the statutory consultees as appropriate on the assessment methodologies.
- 2.6.66 Any relevant data that has been collected as part of post-construction ecological monitoring from existing, operational offshore wind farms should be referred to where appropriate.
- 2.6.67 The assessment should include the potential of the scheme to have both positive and negative effects on marine ecology and biodiversity.

IPC Decision Making

- 2.6.68 A risk-based approach should be taken by the IPC when considering the effects of a proposal on marine ecology and biodiversity taking into account all relevant information made available to it.
- 2.6.69 The designation of an area as Natura 2000¹⁷ site does not necessarily restrict the construction or operation of offshore wind farms in or near that area.

Mitigation

- 2.6.70 Mitigation may be possible in the form of careful design of the development itself and the construction techniques employed.
- 2.6.71 Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that where appropriate adverse effects can then be mitigated and to enable further useful information to be published relevant to future projects.

¹⁷ Ecological network of protected areas in the territory of the European Union.

Offshore Wind Farm Impacts – Fish

Introduction

- 2.6.72 The biodiversity section, 4.18 of EN-1 sets out policy for the IPC in relation to generic biodiversity impacts and paragraphs 2.6.59 to 2.6.71 above set out offshore wind-specific biodiversity policy. The coastal geomorphology section at Section 4.20 of EN-1 may also be relevant. In addition, there are specific considerations which apply to the effect of offshore wind energy infrastructure proposals on fish as set out below.
- 2.6.73 There is the potential for the construction and decommissioning phases, including activities occurring both above and below the seabed, to interact with seabed sediments and therefore have the potential to impact fish communities, migration routes, spawning activities and nursery areas of particular species. In addition, there are potential noise impacts, which could affect fish during construction and decommissioning and to a lesser extent during operation.

Applicant's Assessment

- 2.6.74 The applicant should identify fish species that are the most likely receptors of impacts with respect to:
- feeding areas;
 - spawning grounds;
 - nursery grounds; and
 - migration routes.

IPC Decision Making

- 2.6.75 Where it is proposed that the offshore export cables are armoured and buried at a sufficient depth to reduce electromagnetic fields (EMF) (greater than 1.5m below the sea bed)¹⁸, the effects of electromagnetic fields (EMF) on sensitive species from cable infrastructure during operation are unlikely to be a reason for the IPC to have to refuse to grant consent for a development. Once installed, operational EMF impacts are unlikely to be of sufficient range or strength to create a barrier to fish movement¹⁹.

Mitigation

- 2.6.76 The inter-array and export cables should be armoured and buried at a sufficient depth to reduce electromagnetic fields (EMF) (greater than 1.5m below the sea bed).
- 2.6.77 During construction, 24 hour working practices may be employed so that the overall construction programme and the potential for impacts to fish communities is reduced in overall time.

18 CMACS, 2004. Kentish Flats Offshore Wind Farm. EMF Modelling and Interpretation for Electrosensitive Fish Species. CMACS Report J3025/v1.2/10-04.

19 Bio/Consult, 2005. Infauna monitoring. Horns Rev Offshore Wind Farm. Annual Status Report, 2004. npower Renewables Limited, 2003. Baseline Monitoring Report. North Hoyle Offshore Wind Farm.

Offshore Wind Farm Impacts – Intertidal

Introduction

- 2.6.78 The biodiversity section of EN-1 sets out policy for the IPC in relation to generic biodiversity impacts and paragraphs 2.6.59 to 2.6.71 above set out offshore wind-specific biodiversity policy. The coastal geomorphology section at 4.20 of EN-1 may also be relevant. In addition, there are specific considerations which apply to offshore wind energy infrastructure proposals and the intertidal zone as set out below.
- 2.6.79 The intertidal zone is the area between high tide and low tide marks. Intertidal habitat and ecology are often recognised through statutory nature conservation designations.
- 2.6.80 Export cable routes will cross the intertidal zone resulting in habitat loss, and temporary disturbance of intertidal ecology.

Applicant's Assessment

- 2.6.81 Where necessary, assessment of the effects of installing cable across the intertidal zone should include:
- any alternative landfall sites that have been considered by the applicant during the design phase and the reasons for the final choice should be explained;
 - any alternative cable installation methods that have been considered by the applicant during the design phase and the reasons for the final choice should be explained;
 - potential loss of habitat;
 - disturbance during cable installation and removal (decommissioning);
 - increased suspended sediment loads in the intertidal zone during installation; and
 - predicted rates at which the intertidal zone might recover from temporary effects.
- 2.6.82 Where it is proposed to install offshore cables to a depth of at least 1.5m below the sea bed, the applicant should not have to assess the effect of the cables on intertidal habitat during the operational phase of the offshore wind farm²⁰.
- 2.6.83 Applicants are expected to have regard to guidance issued in respect of FEPA (in due course Marine Licence) requirements.

IPC Decision Making

- 2.6.84 The conservation status of intertidal habitat is of relevance to the IPC.
- 2.6.85 The IPC should be satisfied that cable installation and decommissioning has been designed sensitively taking into account intertidal habitat.
- 2.6.86 Where adverse effects are predicted during the installation or decommissioning of cables, in coming to a judgement, the IPC should consider the extent to which the effects are temporary or reversible.

20 http://www.eia.doe.gov/cneaf/pubs_html/feat_trans_capacity/water_sale.html

- 2.6.87 Where it is proposed that the offshore export cables are armoured and buried at a sufficient depth to minimise heat effects (greater than 1.5m below the sea bed), the effects of heat on sensitive species from cable infrastructure during operation are unlikely to be a reason for the IPC to have to refuse to grant consent for a development.

Mitigation

- 2.6.88 Effects on intertidal habitat cannot be avoided entirely. Landfall and cable installation and decommissioning methods should be designed appropriately to minimise effects on intertidal habitats, taking into account other constraints.
- 2.6.89 Where cumulative effects on intertidal habitats are predicted as a result of the cumulative effects of multiple cable routes, it may be appropriate for applicants of various schemes to work together to ensure that the number of cables crossing the intertidal zone are minimised and installation and decommissioning phases are coordinated to ensure that disturbance is also reasonably minimised.

Offshore Wind Farm Impacts – Marine Mammals

Introduction

- 2.6.90 The biodiversity section, 4.18, of EN-1 sets out policy for the IPC in relation to generic biodiversity impacts and paragraphs 2.6.59 to 2.6.71 above sets out offshore wind-specific biodiversity policy. In addition, there are specific considerations from piling noise which apply to offshore wind energy infrastructure proposals with regard to marine mammals including cetaceans and seals which are statutorily protected.
- 2.6.91 Offshore piling may reach noise levels which are high enough to cause injury, or even death, to marine mammals. If piling associated with an offshore wind farm is likely to lead to an offence (which would include deliberately disturbing, killing or capturing a European Protected Species) being committed, an application will have to be made for a wildlife licence. It will be advisable for an applicant to discuss any proposed piling activities with the relevant body in advance of applying for a license.

Applicant's Assessment

- 2.6.92 Where necessary, assessment of the effects on marine mammals should include:
- likely feeding areas;
 - known birthing areas/haul out sites;
 - nursery grounds;
 - known migration or commuting routes;
 - duration of the potentially disturbing activity including cumulative/in-combination effects with other plans or projects;
 - baseline noise levels;
 - predicted noise levels in relation to mortality, permanent threshold shift (PTS) and temporary threshold shift (TTS);
 - soft-start noise levels according to proposed hammer and pile design; and
 - operational noise.

IPC Decision Making

- 2.6.93 The IPC should be satisfied that the preferred methods of construction, in particular the construction method needed for the proposed foundations and the preferred foundation type, where known at the time of application, are designed so as to reasonably minimise significant disturbance effects on marine mammals. The IPC will need to consider refusing the application unless suitable noise mitigation measures can be imposed by conditions to any development consent.
- 2.6.94 The conservation status of marine European Protected Species and seals are of relevance to the IPC. The IPC should take into account the views of the relevant statutory advisors.

- 2.6.95 Fixed submerged structures such as foundations are likely to pose little collision risk for marine mammals and the IPC is not likely to have to refuse to grant consent for a development on the grounds that offshore wind farm foundations pose a collision risk to marine mammals.

Mitigation

- 2.6.96 Monitoring of the surrounding area before and during the piling procedure can be undertaken.
- 2.6.97 During construction, 24 hour working practices may be employed so that the overall construction programme and the potential for impacts to marine mammal communities is reduced in time.
- 2.6.98 Soft start procedures during pile driving may be implemented. This enables marine mammals in the area disturbed by the sound levels to move away from the piling before significant adverse impacts are caused.

Offshore Wind Farm Impacts – Ornithology

Introduction

- 2.6.99 The biodiversity section, 4.18 of EN-1, sets out policy for the IPC in relation to generic biodiversity impacts and paragraphs 2.6.59 to 2.6.71 above set out offshore wind-specific biodiversity policy. In addition, there are specific considerations which apply to the effect of offshore wind energy infrastructure proposals on ornithology as set out below.
- 2.6.100 Offshore wind farms have the potential for the following effects on ornithology:
- collisions with rotating blades;
 - direct habitat loss;
 - disturbance from construction activities such as the movement of construction/ decommissioning vessels and piling;
 - displacement during the operational phase, resulting in loss of foraging/roosting area; and
 - impacts on bird flight lines (i.e. barrier effect) and associated energetic expenditure for commuting flights between roosting and foraging areas.

Applicant's Assessment

- 2.6.101 The scope, effort and methods required for ornithological surveys should have been discussed with the relevant statutory advisor.
- 2.6.102 Relevant data from operational offshore wind farms should be referred to in the applicant's assessment.
- 2.6.103 It may be appropriate for assessment to include collision risk modelling for certain species of birds. Where necessary, the assessments carried out by applicants should assess collision risk using survey data collected from the site at the pre-application EIA stage. The IPC will want to be satisfied that the collision risk assessment has been conducted to a satisfactory standard having had regard to the advice from the relevant statutory advisor.
- 2.6.104 Applicants are expected to adhere to requirements in respect of FEPA (in due course Marine) licence requirements.

IPC Decision Making

- 2.6.105 Decision making should be in accordance with EN-1 and the offshore wind-specific biodiversity advice set out above.

Mitigation

- 2.6.106 Aviation and navigation lighting should be minimised to avoid attracting birds taking into account impacts on safety.
- 2.6.107 Subject to other constraints, wind turbines should be laid out within a site, to minimise collision risk, where the collision risk assessment shows there is a significant risk of collision.
- 2.6.108 Construction vessels associated with offshore wind farms should, where practicable and compatible with operational requirements and navigational safety, avoid rafting seabirds during sensitive periods.
- 2.6.109 The exact timing of peak migration events is inherently uncertain. Therefore, shutting down turbines within migration routes during estimated peak migration periods is unlikely to offer suitable mitigation.

Offshore Wind Farm Impacts – Subtidal

Introduction

- 2.6.110 The biodiversity section, 4.18 of EN-1, sets out policy for the IPC in relation to generic biodiversity impacts and paragraphs 2.6.59 to 2.6.71 above set out offshore wind-specific biodiversity policy. The coastal geomorphology section, 4.20, in EN-1 may also be relevant. In addition, there are specific considerations which apply to the effect of offshore wind energy infrastructure proposals on the subtidal zone as set out below.
- 2.6.111 The subtidal zone is the area below the low tide mark which remains submerged at low tide. Loss of subtidal habitat and benthic ecology is an additional issue for consideration.

Applicant's Assessment

- 2.6.112 Where necessary, assessment of the effects on the subtidal environment should include:
- loss of habitat due to foundation type including associated seabed preparation, predicted scour, scour protection and altered sedimentary processes;
 - environmental appraisal of inter-array and cable routes and installation methods;
 - habitat disturbance from construction vessels' extendible legs and anchors;
 - increased suspended sediment loads during construction; and
 - predicted rates at which the subtidal zone might recover from temporary effects.
- 2.6.113 Where it is proposed to install offshore cables to a depth of at least 1.5m below the sea bed, the applicant should not have to assess the effect of the cables on intertidal habitat during the operational phase of the offshore wind farm.²¹

IPC Decision Making

- 2.6.114 The conservation status of subtidal habitat is of relevance to the IPC.
- 2.6.115 The IPC should be satisfied that activities have been designed taking into account sensitive subtidal environmental aspects.
- 2.6.116 Where adverse effects are predicted, in coming to a judgement, the IPC should consider the extent to which the effects are temporary or reversible.
- 2.6.117 Where it is proposed that the offshore export cables are armoured and buried at a sufficient depth to minimise heat effects (greater than 1.5m below the sea bed) the effects of heat on sensitive species from cable infrastructure during operation are unlikely to be a reason for the IPC to refuse to grant consent for a development.

21 http://www.eia.doe.gov/cneaf/pubs_html/feat_trans_capacity/water_sale.html

Mitigation

- 2.6.118 Construction and decommissioning methods should be designed appropriately to minimise effects on subtidal habitats, taking into account other constraints. Mitigation measures which the IPC should expect the applicants to have considered may include:
- surveying and micrositing of the export cable route to avoid adverse effects on sensitive habitat and biogenic reefs;
 - burying cables at a sufficient depth, taking into account other constraints, to allow the seabed to recover to its natural state; and
 - the use of anti-fouling paint might be minimised on sub-tidal surfaces, to encourage species colonisation on the structures.
- 2.6.119 Where cumulative effects on subtidal habitats are predicted as a result of the cumulative effects of multiple cable routes, it may be appropriate for applicants for various schemes to work together to ensure that the number of cables crossing the subtidal zone are minimised and installation/decommissioning phases are coordinated to ensure that disturbance is reasonably minimised.

Offshore Wind Farm Impacts – Commercial Fisheries and Fishing

Introduction

- 2.6.120 There are a number of different fishing activities within UK waters including:
- bottom trawling – fishing with one or more towed nets being dragged along the sea bed;
 - mid-water trawling – fishing for pelagic species such as herring and mackerel by towing one or more nets through the water column;
 - long-lining – using static or trailed hooks and lines usually set on the sea bed and left for a number of hours;
 - dredging – towing several dredges either side of a vessel and through the sea bed, typically for scallops but also other shellfish;
 - fixed netting – using ‘fleets’ of nets anchored in some way to the sea beds and lifted, cleared and re-set from time to time;
 - drift netting – allowing nets (attached to a vessel) to drift with the vessel down wind/tide; and
 - potting – typically for crab, lobster and whelks using numbers of pots (a string of pots) anchored to the sea bed.
- 2.6.121 The construction and operation of offshore wind farms can have both positive and negative effects on fish and shellfish stocks.
- 2.6.122 Whilst the footprint of the offshore wind farm and any associated infrastructure may be a hindrance to certain types of commercial fishing activity such as trawling and long-lining, other fishing activities may be able to take place within operational wind farms without unduly disrupting or compromising navigational safety. Consequently, the establishment of a wind farm can increase the potential for some fishing activities, such as potting where this would not compromise any safety zone in place. This is a matter that will need to be considered on a case by case basis.
- 2.6.123 In some circumstances, transboundary issues may be a consideration as fishermen from other countries may fish in waters within which offshore wind farms are sited.
- 2.6.124 Where an offshore wind farm could affect a species of fish that is of commercial interest, but is also of ecological value, the IPC should refer to paragraphs 2.6.59 to 2.6.77 of this NPS above with regard to the latter.
- 2.6.125 In some circumstances, applicants may seek declaration of safety zones around wind turbines and other infrastructure, although these might not be applied for until after consent to the wind farm has been granted. The declaration of a safety zone excludes or restricts activities within the defined sea areas including commercial fishing.

Applicant's Assessment

- 2.6.126 Early consultation should be undertaken with statutory advisors and with representatives of the fishing industry which could include discussion of impact assessment methodologies. Where any part of a proposal involves a grid connection to shore, appropriate inshore fisheries groups should also be consulted.
- 2.6.127 Where a number of offshore wind farms have been proposed within an identified zone, it may be beneficial to undertake such consultation at a zonal, rather than a site-specific, level.
- 2.6.128 The assessment by the applicant should include detailed surveys of the effects on fish stocks of commercial interest and any potential reduction as well as any likely constraints on fishing activity within the project's boundaries.
- 2.6.129 Robust baseline data should have been collected and studies conducted as part of the assessment.
- 2.6.130 Where there is a possibility that safety zones will be sought around offshore infrastructure, potential effects should be included in the assessment on commercial fishing.
- 2.6.131 Where the precise extents of potential safety zones are unknown, a realistic worst case scenario should be assessed. Applicants should consult the Maritime and Coastguard Agency. Exclusion of certain types of fishing may make an area more productive for other types of fishing. The assessment by the applicant should include detailed surveys of the effects on fish stocks of commercial interest and the potential reduction or increase in such stocks that will result from the presence of the wind farm development and of any safety zones.

IPC Decision Making

- 2.6.132 The IPC should be satisfied that the site selection process has been undertaken to reasonably minimise adverse effects on fish stocks, including during peak spawning periods and the activity of fishing itself. This will include siting in relation to the location of prime fishing grounds. The IPC should consider the extent to which the proposed development occupies any recognised important fishing grounds and whether the project would prevent or significantly impede protection of sustainable commercial fisheries or fishing activities. Where the IPC considers the wind farm would significantly impede protection of sustainable fisheries or fishing activity at recognised important fishing grounds, this should be attributed appropriate weight.
- 2.6.133 The IPC should be satisfied that the applicant has sought to design the proposal having consulted representatives of the fishing industry with the intention of minimising the loss of fishing opportunity taking into account effects on other marine interests. Guidance has been jointly agreed by the renewables and fishing industries on how they should liaise with the intention of allowing the two industries to successfully co-exist.

Mitigation

- 2.6.134 Any mitigation proposals should result from the applicant having detailed consultation with relevant representatives of the fishing industry.
- 2.6.135 Mitigation should be designed to enhance where reasonably possible any potential medium and long-term positive benefits to the fishing industry and commercial fish stocks.
- 2.6.136 The IPC will need to consider the extent to which disruption to the fishing industry, whether short term during construction or long term over the operational period, including that caused by the future implementation of any safety zones, has been mitigated where reasonably possible.

Offshore Wind Farm Impacts – Historic Environment

Introduction

- 2.6.137 Generic onshore historic environment effects are covered in EN-1, Section 4.23. However, with reference to offshore energy infrastructure, there are different types of cultural heritage features that should be considered.
- 2.6.138 Marine archaeology exists offshore and within the intertidal areas (area between high tide and low tide marks). It can include remains from pre-historic settlements which existed prior to sea water rises as well as wreck sites and other features of historic maritime significance.
- 2.6.139 Marine archaeology can be affected by offshore wind farm development in two principal ways:
- from the direct effect of the physical siting of the development itself such as the installation of the wind turbine foundations and electricity cables or the siting of plant required during the construction period; and
 - from indirect changes to the physical marine environment (such as scour, coastal erosion or sediment deposition) caused by the proposed infrastructure itself or its construction (see the guidance on physical environment above).

Applicant's Assessment

- 2.6.140 Consultation with the relevant statutory consultees should be undertaken by the applicants at an early stage of the development.
- 2.6.141 Assessment should be undertaken in accordance with best practice, and is likely to include desk-based studies and also take into account any geotechnical or geophysical surveys that have been undertaken to aid the wind farm design.
- 2.6.142 Assessment should also include the identification of any beneficial effects on the historic marine environment, for example through improved access or the contribution to new knowledge that arises from investigation.
- 2.6.143 Where elements of an application (whether offshore or onshore) interact with features of historic maritime significance that are located onshore, the effects should be assessed in accordance with the guidance at Section 4.23 in EN-1.

IPC Decision Making

- 2.6.144 The IPC should be satisfied that offshore wind farms and associated infrastructure have been designed sensitively taking into account known archaeological features and their status, for example features designated as Protected Wrecks.
- 2.6.145 Where a proposed offshore wind farm has a negative effect on a marine archaeological feature, through its alteration or destruction, the IPC should weigh the public benefits of the proposed development against the adverse impacts, recognising that the greater the harm to the significance of a marine archaeological feature, the greater the justification that will be needed for consent to be given.

2.6.146 The proposed mitigation measures set out in the ES for the protection of both known and any as yet unknown marine archaeology will be of relevance to the IPC.

Mitigation

2.6.147 Applicants should aim to design the proposal to avoid unnecessary damage but also ensure that any unavoidable losses are recorded.

2.6.148 Mitigation measures applicable to archaeological sites generally take three forms:

- prevention or avoidance;
- reduction;
- remedying or offsetting.

2.6.149 International best practice favours the preservation *in situ* of nationally important archaeological remains.

2.6.150 The avoidance of important sites is the most effective form of protection and can be achieved through the implementation of archaeological exclusion zones around archaeological sites and features which preclude development activities within their boundaries. The boundaries can be drawn around either discrete archaeological sites or more extensive areas identified in the EIA.

2.6.151 It is likely to be necessary for the IPC to impose conditions requiring that one or both of the following are undertaken:

- a Written Scheme of Investigation (WSI). This sets out when, how and why archaeological mitigation measures recommended in the ES are to be implemented. It should include necessary monitoring of the effects of the development during the construction, operational and decommissioning phases of the scheme.
- a Protocol for Unexpected Discoveries. This is a formal mechanism for intercepting and reporting accidental discoveries of unexpected marine archaeological material.

2.6.152 As set out in paragraphs 2.6.44 and 2.6.45 above, where requested by applicants, the IPC should consider granting consents that allow for micro-siting to be undertaken within a specified tolerance. This allows changes to be made to the precise location of infrastructure during the construction phase so that account can be taken of unforeseen circumstances such as the discovery of marine archaeological remains.

Offshore Wind Farm Impacts – Navigation and Shipping

Introduction

- 2.6.153 Offshore wind farms will occupy an area of the sea and therefore it is inevitable that there will be some impact on navigation in and around the area of the site. This is relevant to both commercial and recreational users of the sea who may be affected by disruption or economic loss as a result of the proposed offshore wind farm. It is Government policy that wind farms should not be consented where they would pose unacceptable risks to navigational safety after mitigation measures have been adopted.
- 2.6.154 Impacts on navigation can arise from the wind farm or other infrastructure and equipment creating a physical barrier during construction and operation. The presence of the wind turbines can also have impacts on communication and shipborne and shore-based radar systems.
- 2.6.155 Further impacts may arise from the granting of safety zones. Applicants may seek declaration of safety zones around wind turbines and other infrastructure, although these might not be applied for until after consent for the wind farm has been granted. The declaration of a safety zone excludes or restricts activities within the defined sea areas.
- 2.6.156 There is a public right of navigation over navigable tidal waters. In public international law, foreign vessels have the right of innocent passage through the UK's territorial waters. Beyond the seaward limit of the territorial sea, shipping has the freedom of navigation although offshore infrastructure and the imposition of safety zones can hinder this.
- 2.6.157 The use of the sea by recreational craft is also an important consideration for applicants and the IPC. Recreational craft, such as yachts, may try to avoid areas of sea used by commercial vessels such as recognised sea lanes essential to international navigation.
- 2.6.158 In some circumstances vessels from other countries may sail in waters within which offshore wind farms are sited.

Applicant's Assessment

- 2.6.159 Applicants should establish stakeholder engagement with interested parties in the navigation sector early in the development phase of the proposed offshore wind farm and this should continue throughout the life of the development including during construction, operational and decommissioning phases. Such engagement should be taken to ensure that solutions are sought that allow offshore wind farms and navigation uses of the sea to successfully co-exist.
- 2.6.160 Assessment should be underpinned by consultation with the MFA (in due course the MMO), Maritime and Coastguard Agency (MCA), the relevant General Lighthouse Authority, the relevant industry bodies (both national and local) and any representatives of recreational users of the sea, such as the Royal Yachting Association (RYA), who may be affected.

- 2.6.161 Information on internationally recognised sea lanes is publicly available and this should be considered by applicants prior to undertaking assessments.
- 2.6.162 The assessment should include reference to any relevant, publicly available data available on the Maritime Database.
- 2.6.163 Applicants should undertake a Navigational Risk Assessment (NRA) in accordance with relevant Government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above.
- 2.6.164 The navigation risk assessment will for example necessitate:
- a survey of vessels in the vicinity of the proposed wind farm;
 - a full NRA of the likely impact of the wind farm on navigation in the immediate area of the wind farm in accordance with the relevant marine guidance; and
 - cumulative and in-combination risks associated with the development and other developments (including other wind farms) in the same area of sea.
- 2.6.165 Where there is a possibility that safety zones will be sought around offshore infrastructure, potential effects should be included in the assessment on navigation and shipping.
- 2.6.166 Where the precise extents of potential safety zones are unknown, a realistic worst case scenario should be assessed. Applicants should consult the MCA and refer to the Government guidance on safety zones.
- 2.6.167 The potential effect on recreational craft, such as yachts, should be considered in any assessment.

IPC Decision Making

- 2.6.168 As under s.36b of the Electricity Act 1989, the IPC must not grant development consent in relation to the construction or extension of an offshore wind farm if it considers that interference with the use of recognised sea lanes essential to international navigation is likely to be caused by the development. The use of recognised sea lanes essential to international navigation means:
- (a) anything that constitutes the use of such a sea lane for the purposes of article 60(7) of the United Nations Convention on the Law of the Sea 1982, or
 - (b) any use of waters in the territorial sea adjacent to Great Britain that would fall within paragraph (a) if the waters were in a Renewable Energy Zone.

- 2.6.169 The IPC should be satisfied that the site selection has been made with a view to avoiding or minimising disruption or economic loss to the shipping and navigation industries with particular regard to approaches to ports and to strategic routes essential to regional, national and international trade, lifeline ferries²² and recreational users of the sea. Where a proposed development is likely to affect major commercial navigation routes, for instance by causing appreciably longer transit times, the IPC should give these adverse effects substantial weight in its decision making. There may however be some situations where reorganisation of traffic activity might be both possible and desirable when considered against the benefits of the wind farm application. Such circumstances should be discussed with the MCA and the commercial shipping sector and it should be recognised that alterations might require national endorsement and international agreement and that the negotiations involved may take considerable time and do not have a guaranteed outcome.
- 2.6.170 Where a proposed offshore wind farm is likely to affect less strategically important shipping routes, a pragmatic approach should be employed by the IPC. For example, vessels usually tend to transit point to point routes between ports (regional, national and international). Many of these routes are important to the shipping and ports industry as is their contribution to the UK economy. In such circumstances the IPC should expect the applicant to minimise negative impacts to as low as reasonably practicable (ALARP). Again, there may be some situations where reorganisation of traffic activity might be both possible and desirable when considered against the benefits of the wind farm application and such circumstances should be discussed with the MCA and the commercial shipping sector.
- 2.6.171 The NRA will assist the MCA in advising the IPC on the mitigation measures proposed.
- 2.6.172 A detailed Search and Rescue Response Assessment should be undertaken prior to commencement of construction should consent for the offshore wind farm be granted. Such a requirement could be secured by condition to any consent. However, where there are significant concerns over the frequency or the consequences of such incidents, a full assessment may be required before the application can be determined.
- 2.6.173 The IPC should not consent applications which pose unacceptable risks to navigational safety after all possible mitigation measures have been considered.
- 2.6.174 The IPC should be satisfied that the scheme has been designed to minimise the effects on recreational craft and that appropriate mitigation measures, such as buffer areas, are built into applications to allow for recreational use outside of commercial shipping routes. In view of the level of need for energy infrastructure, where an adverse effect on the recreational community has been identified, and where no reasonable mitigation is feasible, the IPC should weigh the harm caused with the benefits of the scheme.

²² "Lifeline ferries" provide an essential service between islands or an island and the mainline on which the occupiers of the island rely for transportation of passengers and goods.

- 2.6.175 Providing proposed schemes have been carefully designed by the applicants, and that the necessary consultation with the MCA and the other navigation stakeholders listed above has been undertaken at an early stage, mitigation measures may be found that can negate or enable sufficient reduction of effects on navigation to a level sufficient to enable the IPC to grant consent.
- 2.6.176 The IPC should, in determining whether to grant consent for the construction or extension of an offshore wind farm, and what conditions to include in such a consent, have regard to the extent and nature of any obstruction of or danger to navigation which (without amounting to interference with the use of such sea lanes) is likely to be caused by the development.
- 2.6.177 In considering what interference, obstruction or danger is likely and its extent and nature, the IPC should have regard to the likely overall effect (both whilst being carried on and subsequently) of the development in question and to any cumulative effects of other relevant proposed, consented and operational offshore wind farms.

Extinguishing Public Rights of Navigation

- 2.6.178 The IPC may include provisions within the terms of a development consent as respects rights of navigation so far as they pass through waters in or adjacent to Great Britain which are between the mean low water mark and the seaward limits of the territorial sea. The provisions may specify or describe rights of navigation which:
- are extinguished;
 - are suspended for the period that is specified in the development consent order;
 - are suspended until such time as may be determined in accordance with provision contained in the development consent order; or
 - are exercisable subject to such restrictions or conditions, or both, as are set out in the development consent order.
- 2.6.179 The IPC should specify the date on which any such provisions are to come into force, or the means by which that date is to be determined.
- 2.6.180 The IPC should require the applicant to publish any such provisions, as are included within the terms of the development consent order, in such manner as appears to the IPC to be appropriate for bringing them, as soon as is reasonably practicable, to the attention of persons likely to be affected by them.
- 2.6.181 As under s.36a of the Electricity Act 1989, the IPC should include provisions as respects rights of navigation within the terms of a development consent order only if the applicant has requested such provision be made as part of their application for development consent.

Mitigation

- 2.6.182 Mitigation measures will include site configuration, lighting and marking of projects to take account of any requirements of the General Lighthouse Authority and also the provision of an acceptable Active Safety Management System.

- 2.6.183 In some circumstances, the IPC may wish to consider the potential to use conditions involving arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed.

Offshore Wind Farm Impacts – Oil, Gas and Other Offshore Infrastructure and Activities

Introduction

- 2.6.184 The scale and location of future offshore wind development around England and Wales raises the likelihood of development being proposed in or close to areas where other offshore infrastructure, such as telecommunication cables or oil and gas pipelines are located, or other activities, including oil and gas exploration/drilling or marine aggregate dredging, take place.
- 2.6.185 Further, it is likely that other technologies will come along that may interact with offshore wind farms in the future, including other marine renewable electricity generation, such as wave and tidal devices, and the infrastructure required for the transportation and storage of carbon as a result of its capture in some combustion power stations.
- 2.6.186 The use of the offshore area for other offshore activities and siting of new infrastructure is regulated. For example, the Government grants licences to companies to explore for and develop oil and gas reserves in waters around the UK. Such activity could result in the construction of offshore infrastructure necessary for extraction of any reserves discovered, including offshore platforms and pipelines, much of which require access for helicopters. In some situations, new developments may be able to access existing petroleum pipelines, but in some circumstances new pipelines will need to be constructed.

Applicant's Assessment

- 2.6.187 Where a potential offshore wind farm is proposed close to existing operational offshore infrastructure, or has the potential to affect activities for which a licence has been issued by Government the applicant should undertake an assessment of the potential effect of the proposed development on such existing or permitted infrastructure or activities.
- 2.6.188 Applicants should establish stakeholder engagement with interested parties in the potentially affected offshore sectors as necessary early in the development phase of the proposed offshore wind farm with an aim to resolve as many issues as possible prior to the submission of an application to the IPC.
- 2.6.189 Such stakeholder engagement should continue throughout the life of the development including construction, operation and decommissioning phases where necessary. As many of these offshore industries are regulated by Government, the relevant Secretary of State should also be a consultee where necessary. Such engagement should be taken to ensure that solutions are sought that allow offshore wind farms and other uses of the sea to successfully co-exist.

IPC Decision Making

- 2.6.190 There are statutory requirements concerning automatic establishment of navigational safety zones relating to offshore petroleum developments.²³
- 2.6.191 Where a proposed offshore wind farm potentially affects other offshore infrastructure or activity, a pragmatic approach should be employed by the IPC. Much of this infrastructure is important to other offshore industries as is its contribution to the UK economy. In such circumstances the IPC should expect the applicant to minimise negative impacts and reduce risks to as low as reasonably practicable (ALARP).
- 2.6.192 As such, the IPC should be satisfied that the site selection and site design of the proposed offshore wind farm has been made with a view to avoiding or minimising disruption or economic loss or any adverse effect on safety to other offshore industries. The IPC should not consent applications which pose unacceptable risks to safety after mitigation measures have been considered.
- 2.6.193 Where a proposed development is likely to affect the future viability or safety of an existing or approved/licensed offshore infrastructure or activity, the IPC should give these adverse effects substantial weight in its decision making.
- 2.6.194 Providing proposed schemes have been carefully designed by the applicants, and that the necessary consultation with relevant bodies has been undertaken at an early stage, mitigation measures may be found that can negate or enable sufficient reduction of effects on other offshore infrastructure or operations to a level sufficient to enable the IPC to grant consent.

Mitigation

- 2.6.195 Detailed discussions between the applicant for the offshore wind farm and the relevant consultees should have progressed as far as reasonably possible prior to the submission of an application to the IPC. As such, appropriate mitigation should be included in any application to the IPC, and ideally agreed between relevant parties.
- 2.6.196 In some circumstances, the IPC may wish to consider the potential to use conditions involving arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed.

²³ Section 21, Part 3 Petroleum Act 1987.

Offshore Wind Farm Impacts – Physical Environment

Introduction

2.6.197 The construction, operation and decommissioning of offshore energy infrastructure can affect the following elements of the physical offshore environment:

Water quality	disturbance of the seabed sediments or release of contaminants can result in indirect effects on habitats and biodiversity and fish stocks thus affecting the fishing industry.
Waves and tides	the presence of the turbines can cause indirect effects on flood defences, marine ecology and biodiversity, marine archaeology and potentially, coastal recreation activities.
Scour effect	the presence of wind turbines and other infrastructure can result in a change in the water movements within the immediate vicinity of the infrastructure, resulting in scour (localised seabed erosion) around the structures. This can indirectly affect navigation channels for marine vessels and marine archaeology.
Sediment transport	the resultant movement of sediments, such as sand across the seabed or in the water column, can indirectly affect navigation channels for marine vessels.
Suspended solids	the release of sediment during construction and decommissioning can cause indirect effects on marine ecology and biodiversity.

Applicant's Assessment

2.6.198 Assessment should be undertaken for all stages of the lifespan of the proposed wind farm in accordance with the appropriate guidance for offshore wind farm EIAs.

2.6.199 The Environment Agency (EA) regulates emissions to land, air and water out to 3 nm. Where any element of the wind farm or any associated development included in the application to the IPC is located within 3 nm of the coast, the EA should be consulted at the pre-application stage on the assessment methodology for impacts on the physical environment.

2.6.200 Beyond 3 nm, the Marine and Fisheries Agency (MFA, in due course the MMO) is the regulator. The applicant should consult the MFA/MMO and Centre for Environment, Fisheries & Aquaculture Science (CEFAS) on the assessment methodology for impacts on the physical environment at the pre-application stage.

- 2.6.201 Geotechnical investigations should form part of the assessment as this will enable design of appropriate construction techniques to minimise any adverse effects.
- 2.6.202 The assessment should include predictions of the physical effect that will result from the construction and operation of the required infrastructure and include effects such as the scouring that may result from the proposed development.

IPC Decision Making

- 2.6.203 As set out above, the direct effects on the physical environment can have indirect effects on a number of other receptors. Where indirect effects are predicted, the IPC should refer to relevant sections of this NPS and EN-1.
- 2.6.204 The IPC should be satisfied that the methods of construction, including use of materials are such as to reasonably minimise the potential for impact on the physical environment. This could involve, for instance, the exclusion of certain foundations on the basis of their impacts or minimising quantities of rock that are used to protect cables whilst taking into account other relevant considerations such as safety.

Mitigation

- 2.6.205 Mitigation measures which the IPC should expect the applicants to have considered include the burying of cables to a necessary depth and using scour protection techniques around offshore structures to prevent scour effects around them. Applicants should consult the statutory consultees on appropriate mitigation.

Offshore Wind Farm Impacts –Seascape and Visual Effects

Introduction

- 2.6.206 Generic landscape and visual impacts are covered in EN-1 Section 4.24. In addition, there are specific considerations which apply to offshore wind energy infrastructure proposals as set out below.
- 2.6.207 Seascape is an additional issue for consideration, and in some circumstances, it may be necessary to carry out a seascape and visual impact assessment (SVIA) in accordance with the relevant offshore wind farm EIA guidance.
- 2.6.208 Seascape is a discrete area within which there is shared inter-visibility between land and sea.²⁴
- 2.6.209 The seascape is an important resource and an economic asset. Coastal landscapes are often recognised through statutory landscape designations.

Applicant's Assessment

- 2.6.210 Some applications for offshore wind farms that are submitted to the IPC will be proposed at distances that mean it is not visible from the shore. In these instances, the IPC is likely to be able to conclude that an SVIA will not be required.
- 2.6.211 Where a proposed offshore wind farm will be visible from the shore, an SVIA should be undertaken which is proportionate to the scale of the potential impacts. Impact on seascape should be addressed in addition to the landscape and visual effects discussed in EN-1.
- 2.6.212 Where necessary, assessment of the seascape should include an assessment of three principal considerations on the likely effect of offshore wind farms on the coast:
- limit of visual perception from the coast;
 - individual characteristics of the coast which affect its capacity to absorb a development; and
 - how people perceive and interact with the seascape.
- 2.6.213 As part of the SVIA, photomontages are likely to be required. Viewpoints to be used for the SVIA should be selected in consultation with the statutory consultees at the EIA Scoping stage.

²⁴ Definition taken from Appendix 3 of DTI (2005) Guidance in the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report.

- 2.6.214 Magnitude of change to both the identified seascape receptors (such as seascape units and designated landscapes) and visual receptors (such as viewpoints) should be assessed in accordance with the standard methodology for SVIA.
- 2.6.215 Where appropriate, cumulative SVIA should be undertaken in accordance with the guidance on cumulative assessment outlined in EN-1.

IPC Decision Making

- 2.6.216 The IPC should assess the proposal in accordance with the policy set out in the Landscape and Visual section, 4.24 of EN-1.
- 2.6.217 Where a proposed offshore wind farm is within sight of the coast, there may be adverse effects. The IPC should not refuse to grant consent for a development solely on the ground of an adverse effect on the seascape or visual amenity unless:
- it considers that an alternative layout within the identified site could be reasonably proposed which would significantly minimise any harm taking into account other constraints that the applicant has faced such as ecological effects, maintaining safety or economic viability of the application; or
 - given the sensitivity of the receptor(s), the harmful effects are considered to outweigh the benefits of the proposed scheme.
- 2.6.218 Where adverse effects are anticipated either during the construction or operational phases, in coming to a judgement, the IPC should take into account the extent to which the effects are temporary or reversible.

Mitigation

- 2.6.219 Neither the design nor scale of individual wind turbines can be changed without significantly affecting the electricity generating output of the wind turbines. Therefore, the IPC should expect it to be unlikely that mitigation in the form of reduction in scale will be feasible. However, the layout of the turbines should be designed appropriately to minimise harm, taking into account other constraints such as ecological effects, safety reasons or engineering and design parameters.

2.7 Onshore Wind

Introduction

- 2.7.1 Onshore wind farms are the most established, large-scale source of renewable energy in the UK. Onshore wind farms will continue to play an important role in meeting renewable energy targets.
- 2.7.2 Modern wind farms comprise a number of wind turbines. They can be sited at many types of locations throughout England and Wales.
- 2.7.3 Onshore wind farm proposals are currently likely to involve turbines from around 2 megawatts (MW) of generating capacity and currently range up to 3.5MW, but as technology develops, this could increase.
- 2.7.4 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for onshore wind farms. The extent to which they are relevant may depend upon the phase of the proposed development being considered.
- 2.7.5 The applicant should identify the impacts of a proposal, together with proposals for their avoidance or mitigation wherever possible. These should be set out in a statement that should accompany each project application. Guidance on Environmental Impact Assessments (EIA) can be found in Part 4, Section 4.2.1 of EN-1. In this NPS, the terms 'effects', 'impacts' or 'benefits' should accordingly be understood to mean likely significant effects, impacts or benefits.

Factors influencing site selection by applicant

- 2.7.6 The key considerations involved in the siting of an onshore wind farm are likely to be influenced by the following factors.

Predicted wind speed

- 2.7.7 The predicted wind resource will be a key consideration for the applicant in identifying a potential site as the electricity generated on site is directly affected by the wind speed. Wind speed increases with height above ground level and the amount of electricity generated increases disproportionately with increases in the wind speed. This in turn affects the carbon emission savings and the commercial viability of the site.
- 2.7.8 Applicants will often have installed temporary anemometry masts or similar on the site for 12 months or more to ascertain precise onsite wind speeds prior to submitting the wind farm application. It is the decision of individual applicants as to whether this is necessary.

Proximity of site to dwellings

- 2.7.9 Commercial scale wind turbines are large structures and can range from tip heights of 100m up to 130m although advances in technology may result in larger machines coming on the market. All wind turbines generate sound during their operation. As such, appropriate distances should be maintained between wind turbines and residential properties to protect residential amenity. The two main impact issues that determine the acceptable separation distances are visual amenity and noise. These are considered in the Landscape and Visual and Noise impact sections below.

Capacity of a site

- 2.7.10 In order for wind turbines to generate electricity efficiently, the turbines must be placed at a sufficient distance from one another within the site. The spacing will depend on the prevailing wind direction and the physical characteristics of the site. A spacing of 6 rotor diameters is normally required in the direction of the prevailing wind direction, and 4 rotor diameters perpendicular to this. This is a matter for the applicant.

Electricity grid connection

- 2.7.11 The connection of the proposed onshore wind farm into the relevant electricity network will be an important consideration for applicants of onshore wind farms. The grid connection text at Section 4.9 in EN-1 sets out the important issues.
- 2.7.12 Most onshore wind farms are connected into the local distribution network at an intermediate voltage of 33, 66 or 132 kilovolts (kV). The capacity of the local grid network to accept the likely output from a proposed wind farm is critical to the technical feasibility of a development. The connection voltage and the distance from the wind farm to the existing network can have a significant effect on the commercial feasibility of a development proposal.

Access

- 2.7.13 Applicants will need to consider the suitability of the access routes to the proposed site for both the construction and operation of the wind farm with the former likely to raise more significant issues. EN-1 advises on generic traffic and transport impacts while those which are specific to onshore wind farms are considered in sections 2.7.82 to 95 below. Given that potential onshore wind farm sites are largely in rural areas, access for the delivery of turbine components during construction can be a significant consideration for wind farm siting.

Technical considerations for the IPC when determining onshore wind farms

2.7.14 Applications for onshore wind farms are likely to comprise a number of elements including wind turbines, access tracks, crane pads, substation, underground connecting cables and anemometer.

Access tracks

2.7.15 Developers will usually need to construct access tracks to connect onshore wind farms to the public road network. Applications should include the full extent of the access tracks necessary and an assessment of their effects.

Project lifetimes

2.7.16 Onshore wind turbines typically have a design life of 25 years although this can vary. As such, they are not permanent and can be decommissioned relatively easily and cheaply. The nature and extent of decommissioning of a site can vary. Generally the wind turbines themselves will always be decommissioned with the concrete foundations in the ground dug out to a certain depth to ensure that the use of the site, typically for agriculture, can continue.

2.7.17 Applications for onshore wind farms should set out details of what will be decommissioned and removed from the site at the end of the operational life of the plant. There may be some instances where it would be more harmful to the ecology of the site to remove elements of the development, such as the access tracks or underground cabling, than to retain them. Further, there may be other socio-economic benefits of retaining parts of the development. For example, the tracks may increase access to land that was previously relatively inaccessible for farming or other purposes.

2.7.18 The consent for onshore wind farms should be time-limited by a condition from the date the wind farms start to generate electricity. Such a condition should also secure the decommissioning of the plant after the expiration of its permitted operation to ensure that inoperative plant is removed after its operational life. A limit of 25 years is typical, although applicants may seek consent for differing time-periods for operation.

2.7.19 The time-limited, non-permanent nature of wind farms is likely to be an important consideration for the IPC when assessing impacts such as landscape and visual effects and potential effects on the settings of historic assets. Such judgements should include consideration of the period of time sought by the applicants for the plant to operate and the extent to which the site will return to its original state may also be a relevant consideration.

Flexibility in the project details

2.7.20 Many different makes and models of onshore wind turbines are available. Each of these will have differing hub heights, tip heights, design and generating capacity. Further, the need for external cabins adjacent to the wind turbines to house transformers can also vary depending upon make and model of wind turbines.

- 2.7.21 At the time of application, wind farm operators may not know precisely which turbine will be procured for the site until some time after any consent has been granted. If turbine details, or any other relevant information, are not available, such as the precise location of the source of concrete and crushed stone to be used for the construction, then the applicant should assess the maximum adverse effects that the project could have to ensure that the project as it may be constructed has been properly assessed. In this way, some flexibility should be provided in the consent.
- 2.7.22 In the case of onshore wind farms, it is likely that this flexibility will be needed in relation to the dimensions of the turbines, including tip height, hub height and rotor diameter. This may extend to other details of the turbine design, including the necessary size of any external cabins that may be required. However, in some specific circumstances, applicants may not know the precise layout of wind turbines, such as where the site is covered by forestry at the time of the application.
- 2.7.23 Where specific details of the design of the site are uncertain at the time of application, this should be made clear by the applicant with the reasons for the uncertainty given.
- 2.7.24 Where elements of the design of the scheme are unknown, the maximum-case scenario should be assessed and the IPC should consider the maximum adverse effects in its consideration of the application and consent.

Micrositing

- 2.7.25 Applicants are likely to need flexibility in a project consent to allow for any necessary micrositing of elements of the proposed wind farm after its consent and during its construction. This allows for unforeseen events which may arise.
- 2.7.26 Whilst it is for the applicant to specify the level of tolerance they are seeking, a tolerance of between 30m and 50m of elements of the required infrastructure is typical. However, there may be some circumstances where the IPC considers that the micrositing tolerance requested by the applicant is too great, and that on the evidence of the EIA and its own assessment of the proposal, that it is necessary to restrict either the overall tolerance for the scheme or the tolerance of specific elements of the proposal. When making this judgement, the IPC should take into account the purposes for the applicant having requested the micrositing.

Repowering

- 2.7.27 Given the age of some of the UK's older wind farms, the owner of the wind farm may seek to "repower" the site with new turbines. The IPC is therefore likely to have to consider applications for the repowering of existing sites.
- 2.7.28 Where an operational onshore wind farm nears the end of its operational life or reaches the permitted time-limit for operation, the older turbines are very likely to have to be decommissioned. Where repowering of a site is planned, it will involve renegotiation between the owner/operator of the wind farm and the owner of the land or potentially a new developer. This is a commercial matter for the applicant.

- 2.7.29 Given the likely change in technology over the intervening time period, any repowering of sites may involve a different number of wind turbines (usually fewer) of a different scale and nature (usually larger). This would result in a significantly altered site layout and electricity generating capacity and a new consent application would be required.
- 2.7.30 In determining an application for the repowering of a site, the new proposed replacement scheme should be determined by the IPC on its individual merits.

IPC Impact Assessment principles

- 2.7.31 The IPC should adhere to the following principles when examining and determining applications for onshore wind farms and associated infrastructure.

National designations

- 2.7.32 In sites with nationally recognised designations (Sites of Special Scientific Interest, National Nature Reserves, National Parks, Areas of Outstanding Natural Beauty, Heritage Coasts, Scheduled Monuments, Conservation Areas, Listed Buildings, Registered Historic Battlefields and Registered Parks and Gardens) consent for renewable energy projects should only be granted where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits.

Green Belts

- 2.7.33 Policy on development in the green belt is set out in PPG2²⁵. When located in the green belt, elements of many renewable energy projects will comprise inappropriate development, which may impact on the openness of the green belt. Careful consideration will therefore need to be given to the visual impact of projects, and developers will need to demonstrate very special circumstances that clearly outweigh any harm by reason of inappropriateness and any other harm if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.

Other locational considerations

- 2.7.34 As most renewable energy resources can only be developed where the resource exists and where economically feasible, the IPC should not use a sequential approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments).

²⁵ Department of the Environment (1995) Planning Policy Guidance Note 2: Green Belts.

Onshore Wind Farm Impacts – Biodiversity and Geological Conservation

Introduction

- 2.7.35 Generic biodiversity and geological impacts are covered in EN-1 Section 4.18. In addition, there are specific considerations which apply to onshore wind turbines as set out below.
- 2.7.36 In addition to the impacts set out in EN-1, there is the potential for the rotating blades of a wind turbine to strike bats and birds resulting in injury or death.
- 2.7.37 Many proposed onshore wind farm sites within England and Wales are proposed on peat. Peat is a sensitive habitat that is important for many species of flora and fauna. In some instances, soil disturbance may lead to the change in the local hydrological regime which can affect biodiversity. Further, peat is rich in carbon so disturbance of peat can result in a release of carbon stored in soils.

Applicant's Assessment

- 2.7.38 Where necessary, the assessments carried out by applicants should assess collision risks using the data collected from the site at the pre-application EIA stage. The IPC should satisfy itself that the assessment has been conducted to a satisfactory standard having had regard to advice from the relevant statutory advisor.
- 2.7.39 Relevant data from operational wind farms should be referred to in the applicant's assessment.
- 2.7.40 It may be appropriate for the assessment to include collision risk modelling for certain types of species of birds. The parameters to be used in such modelling should have been discussed with the relevant statutory consultees.
- 2.7.41 The assessment should include any effects on biodiversity resulting from the disturbance of important habitats such as peat. Where relevant, the IPC may instruct applicants to provide geotechnical and hydrological information in support of applications, identifying the presence of peat at each site, including the risk of landslide connected to any development work.

IPC Decision Making

- 2.7.42 Decision making should be in accordance with guidance in EN-1.
- 2.7.43 In addition, where developments are proposed on peat, the IPC should be satisfied that the wind farm layout and construction methods have been designed to minimise soil disturbance when building and maintaining roads and tracks, turbine bases and other infrastructure. This is to ensure the development will result in minimal disruption to the ecology and that the carbon balance savings of the scheme are maximised.

Mitigation

- 2.7.44 Taking into account other constraints, wind turbines should be laid out in such a way as to minimise risk of collision with bats or birds where the collision risk assessment shows there is a significant risk of collision.
- 2.7.45 There may be other forms of mitigation such as making the land surrounding the turbines less attractive to the species of concern. However, in many cases the applicant will not own the wind farm site or surrounding land. Often applicants only lease the land required for the wind turbines and access tracks.

Future Surveys and Monitoring

- 2.7.46 Whilst there is a considerable amount of knowledge about the effects of onshore wind farms on specific species of birds, and currently a more limited knowledge about the effects on bats, the IPC should seek to validate the results of the EIA and any collision risk modelling by requiring, where reasonable, relevant monitoring during the construction and operational phases of onshore wind farms. Such monitoring results should be made publicly available.

Onshore Wind Farm Impacts – Historic Environment

Introduction

2.7.47 Historic environment impacts are covered in EN-1, Section 4.23. However, with respect to onshore wind farms, the following considerations also apply.

Applicant's Assessment

2.7.48 Visualisations may be required to demonstrate the effects of a proposed onshore wind farm on the setting of historic features.

IPC Decision Making

2.7.49 As explained in paragraphs 2.7.16 to 2.7.19 above, onshore wind turbines are not permanent features in the landscape. Applicants will specify the length of time they wish the consent to be granted for. Consent is generally sought for around 25 years although this can vary. After the expiration of the consent, turbines should be decommissioned and removed from the landscape and therefore, any indirect effect to historic environment features such as effects on setting, will not be permanent.

2.7.50 The time-limited and non-permanent nature of wind farms should be a relevant consideration for the IPC when assessing the indirect effects on the historic environment such as the effects on the setting of other heritage features such as listed buildings or Conservation Areas taking into account the length of time consent is sought for.

Mitigation

2.7.51 Trial trenching and/or a watching brief prior to and during construction are a standard mitigation against unnecessary damage to below ground archaeology.

2.7.52 The ability of the applicants to microsite specific elements of the proposed development during the construction phase, as set out in paragraphs 2.7.25 to 2.7.26 above, should be an important consideration by the IPC when assessing the risk of damage to archaeology.

2.7.53 Therefore, where requested by the applicant, the IPC should consider granting consents which allow for the micrositing within a specified tolerance of elements of the permitted infrastructure so that precise locations can be amended during the construction phase in the event that unforeseen circumstances, such as the discovery of previously unknown archaeology, arise.

Onshore Wind Farm Impacts – Landscape and Visual

Introduction

2.7.54 Generic landscape and visual impacts are covered in EN-1, Section 4.24. In addition, there are specific considerations which apply to onshore wind turbines as set out below.

Applicant's Assessment

2.7.55 Detailed pre-application consultation should be carried out in accordance with the assessment guidance set out in Landscape and Visual section of EN-1.

IPC Decision Making

2.7.56 Modern onshore wind turbines that are used in commercial wind farms are large structures and there will always be significant landscape and visual effects from their construction and operation for a number of kilometres around a site.

2.7.57 The arrangement of wind turbines should be carefully designed within a site to minimise effects on the landscape while meeting technical and operational siting requirements and other constraints.

2.7.58 There are existing operating wind farms where commercial scale wind turbines are sited close to residential dwellings. The IPC should consider any evidence put before it on the experience of similar-scale turbines at similar distances to residential properties.

Mitigation

2.7.59 It is unlikely that either the number or scale of wind turbines can be changed without significantly affecting the electricity generating output of the wind farm. Therefore, mitigation in the form of reduction in scale may not be feasible.

Onshore Wind Farm Impacts – Noise

Introduction

- 2.7.60 Generic noise impacts, including noise associated with the construction, operation and decommissioning of most energy infrastructure, are covered in detail in EN-1, Section 4.26. In addition, there are specific considerations which apply to the operation of onshore wind turbines as discussed below.
- 2.7.61 Operational wind turbines may generate increases in noise levels (whether from machinery, e.g. aerodynamic noise from turbines, or from associated sources, such as traffic) although this diminishes with distance. The noise associated with the construction and decommissioning of the proposed infrastructure, including construction traffic, is covered in EN-1.

Applicant's Assessment

- 2.7.62 BS 4142, as set out in EN-1, is the “Method for rating industrial noise affecting mixed residential and industrial areas”²⁶. However, the noise created by wind turbines is very different to conventional industrial noise and as such, has specific guidance and assessment methodology.
- 2.7.63 The method of assessing the impact of noise from a wind farm on nearby residents is described in the report, ‘The Assessment and Rating of Noise from Wind Farms’ (ETSU-R-97). This was produced by the Working Group on Noise from Wind Turbines (Final Report, September 1996) and the report sets noise limits to safeguard the amenity of all dwellings. The acceptable noise levels recommended by ETSU-R-97 are determined by a combination of absolute noise limits and noise limits relative to the existing background noise levels around the site at different wind speeds. Therefore, noise limits will often influence the separation of wind turbines from residential properties.
- 2.7.64 The applicant's assessment of noise from the operation of the wind turbines should use ETSU-R-97²⁷ in accordance with latest industry good practice which should reflect any updated guidance issued in relation to ETSU-R-97 and accepted by Government.

IPC Decision Making

- 2.7.65 The IPC should use ETSU-R-97 to satisfy itself that the noise from the operation of the wind turbines is within acceptable levels.
- 2.7.66 Where the correct methodology has been followed and a wind farm is shown to comply with ETSU-R-97 it should be reasonable for the IPC to conclude that it may give little or no weight to adverse noise impacts from the operation of the wind turbines.

²⁶ BS 4142:1997 (15/09/97).

²⁷ All references to ETSU-R-97 in this section should be taken to include any successor to it endorsed by the Government.

- 2.7.67 Where a wind farm cannot demonstrate compliance with the recommended noise limits set out in ETSU-R-97, the IPC will need to consider refusing the application unless suitable noise mitigation measures can be imposed by conditions to the development consent.
- 2.7.68 There is no evidence that ground transmitted low frequency noise from wind turbines is at a sufficient level to be harmful to human health²⁸. Therefore, the IPC is unlikely to have to give any weight to claims of harm to human health as a result of low frequency noise.

Mitigation

- 2.7.69 Mitigation should be inherent in good design of a wind farm so that increases in ambient noise levels around developments are kept to acceptable levels in relation to existing background noise.
- 2.7.70 Where the wind turbines are located at sufficient distance from residential properties to prevent ambient background noise levels being affected by operational turbines under normal circumstances, the IPC may wish to consider a condition relating to operational noise of the turbines to ensure that the wind turbines are maintained appropriately with any operational deficiencies quickly remedied so as not to cause any unnecessary disruption to residential amenity.
- 2.7.71 Where the assessment shows that an effect from the operation of the wind turbines on ambient noise levels and residential amenity cannot be ruled out, the IPC should impose a condition to ensure that the appropriate noise levels are maintained within those limits permitted by ETSU-R-97 throughout the operational lifetime of the wind farm.

28 ODPM (2004) Planning for Renewable Energy. A Companion Guide to PPS22. Paragraph 44. Technical Annex 8.

Onshore Wind Farm Impacts – Shadow Flicker

Introduction

- 2.7.72 Shadow flicker is the effect caused when an operating turbine is located between the sun and a receptor, such as a dwelling or place of work. The effect occurs when the shadow of the rotating blades falls over the dwelling causing the light intensity within specific affected rooms of the occupied building to fluctuate.
- 2.7.73 The potential significance of the effect is dependent on a number of factors: the location of the relevant building relative to the path of the sun and the turbines; the distance of turbines from such buildings; the size of the window apertures and their location in the building relative to the turbines; the turbine height and rotor diameter; the presence of intervening topography, buildings or vegetation; the frequency of bright sun and cloudless skies; the time of the year; and, the prevailing wind direction and hence usual rotor orientation. Flicker effects have been proven to occur only within ten rotor diameters of a turbine²⁹. Therefore if the turbine has 80m diameter blades, the potential shadow flicker effect could be felt up to 800m from a turbine.
- 2.7.74 The occurrence/extent of shadow flicker at a particular occupied building is dependent upon:
- Wind speed – wind speed will determine its frequency;
 - Wind direction – must allow the rotor to be perpendicular to the dwelling for a shadow flicker effect to take place; and
 - Cloud cover – must be sufficiently thin to allow the sun to shine brightly enough for shadow flicker to occur.

Applicant's Assessment

- 2.7.75 Where wind turbines have been proposed within 10 rotor diameters of an existing occupied building, a shadow flicker assessment should be carried out by the applicant. The IPC should anticipate that the intensity of the shadow of the rotating blades from turbines at distances from such buildings of 10 rotor diameters and beyond is sufficiently diminished so as to have no significant impact on occupied buildings.
- 2.7.76 The maximum potential number of hours that shadow flicker could occur at each affected occupied building within 10 rotor diameters should be calculated. It is possible to calculate precisely the maximum number of hours each year that shadow flicker could occur at individual properties, including specific days of the year, times of the day and length of duration of each potential episode.

²⁹ Office of the Deputy Prime Minister (2004) Planning for Renewable Energy. A Companion Guide to PPS22. Paragraph 76, Technical Annex 8.

IPC Decision Making

- 2.7.77 Modern wind turbines can be controlled such that the operation of individual wind turbines at the periods when shadow flicker has the potential to occur at a specific property or group of properties can be inhibited on sunny days, for those properties, for the specific times of the day, and on specific days of the year.
- 2.7.78 In circumstances where a wind turbine is fitted with a mechanism to inhibit shadow flicker where it has the potential to affect a property, the IPC should be able to judge the shadow flicker impacts on that property to be of negligible significance.
- 2.7.79 The maximum frequency of the shadowing effect from commercial scale wind turbines is less than 1 hertz, which is well below that known to affect sufferers of epilepsy (which lie above 2.5 hertz³⁰). Recent research on the subject concludes that the shadows cast by one turbine on another should not be viewable by the public if the cumulative flash rate exceeds three per second and that turbine blades should not be reflective³¹. Therefore, shadow flicker frequencies are not in the region known to induce seizures in sufferers of epilepsy, and as such, where the frequency of potential flashes will not exceed 2.5 hertz, the IPC should give very limited weight to any claims of effects on epileptics from onshore wind turbines.

Mitigation

- 2.7.80 Where the possibility of shadow flicker exists, mitigation can be enforced through use of conditions.
- 2.7.81 Rotating blades should not be reflective (other than in terms of countering effects on radar).

30 Office of the Deputy Prime Minister (2004) Planning for Renewable Energy. A Companion Guide to PPS22. Paragraph 77, Technical Annex 8.

31 Harding, G. Harding P, and Wilkins, A. (2008) Wind turbines, flicker, and photosensitive epilepsy: Characterizing the flashing that may precipitate seizures and optimizing guidelines to prevent them.

Onshore Wind Farm Impacts – Traffic and Transport

Introduction

- 2.7.82 Generic traffic and transport impacts are covered in EN-1, Section 4.28. In addition, there are specific considerations which apply to onshore wind turbines as set out below.
- 2.7.83 The degree of disturbance caused by the traffic and abnormal loads generated during the construction phase of a wind farm will depend on the scale and type of the proposal as this will determine the length of the construction period and nature of the loads. Public perception of the construction phase will derive mainly from the effects of traffic movements.
- 2.7.84 Many onshore wind farms will be sited in areas served by a minor road network. Modern wind turbines are large structures and some components, notably the rotor blades, can currently only be transported to sites as complete structures. Blades currently range from between 30m and 45m in length, although this could change as technology develops. The construction of a wind farm will therefore require sufficient access for long and wide load items. Further, some individual components of the wind turbines can weigh in excess of 100 tonnes and it is important that all sections of roads and bridges on the proposed delivery route can accommodate the weight of the loads.

Applicant's Assessment

- 2.7.85 The applicant should have assessed the various potential routes to the site for delivery of materials and components where the source of the materials is known at the time of the application, and selected the route that is considered to be the most appropriate route. It is possible that the exact location of the source of construction materials, such as crushed stone or concrete will not be known at the time of the application to the IPC. In these circumstances, the impact of additional vehicles on the likely potential routes should have been assessed.
- 2.7.86 The applicant should assess whether the access roads are suitable for the transportation of components which will include whether they are sufficiently wide for the rotor blades, or bridges sufficiently strong for the heavier components to be transported to the site. Any sections of the route which will require modification to allow for the transportation of components to site should be identified and potential effects assessed.
- 2.7.87 The applicant should provide a comparison of the future baseline traffic numbers with and without the construction traffic that would be generated by the project.

- 2.7.88 There may be a number of wind farms proposed that use a common port and/or access route and pass through the same towns. Where a cumulative impact is likely then a cumulative transport assessment should form part of the EIA to consider the impacts of abnormal traffic movements relating to the project in question in combination with those from any other relevant development. Consultation with the relevant local highways authorities is likely to be necessary.
- 2.7.89 Depending on the scale of the proposal, the EIA may also need to include an assessment of the traffic that is likely to be generated during the operational phase of the wind farm.

IPC Decision Making

- 2.7.90 Consistent with the generic policy set out in EN-1, the IPC should be satisfied, taking into account the views of the relevant local highway authorities, that abnormal loads can be safely transported in such a way that minimises inconvenience to other road users and that the environmental effects of this and other construction traffic, after mitigation, are acceptable. The temporary nature of the transport impacts during construction should be a relevant consideration for the IPC. In view of the level of need for renewable energy infrastructure, only in exceptional circumstances should the traffic or transport impacts from the construction phase of a project prevent it from being approved by the IPC.
- 2.7.91 Once wind farms are in operation, traffic movements to and from the site are generally very light, in some instances as little as a few visits each month by a light commercial vehicle or car. The need to replace machine components will generate heavier commercial vehicle movements, but these are likely to be infrequent. Therefore, it is very unlikely that traffic or transport impacts from the operational phase of a project would prevent it from being approved by the IPC.

Mitigation

- 2.7.92 In some instances, it may be necessary for the applicant to undertake modifications to the highway to facilitate delivery or components and/or minimise disruption to other highway users. Further, it may be appropriate to request that the applicant undertake a “dry-run” of the delivery of the largest components to ensure delivery is possible in a way that minimises disruption. Requirements for strengthening bridges may also be requested by the relevant highways authority.
- 2.7.93 In some cases, the local highways authority may request that the IPC impose controls on the number of vehicle movements to and from the wind farm site in a specified period during its construction and possibly, on the routing of such movements, particularly by heavy vehicles. Where the IPC agrees that this is necessary taking into account all representations, this could be achieved by imposing suitable conditions on development consent or through planning obligations with the applicant as appropriate.

- 2.7.94 Where cumulative effects on the local road network or residential amenity are predicted as a result of multiple wind farm developments, it may be appropriate for applicants of various projects to work together to ensure that the number of abnormal loads and deliveries are minimised and the timings of deliveries are managed and coordinated to ensure that disruption to local residents and other highway users is reasonably minimised. It may also be appropriate for the highway authority to set limits for and coordinate these deliveries through active management of the delivery schedules through the abnormal load approval process. Once consent for a scheme has been granted, applicants should liaise with the relevant local highway authority (or other coordinating body) regarding the start of construction and the broad timing of deliveries. The IPC may consider that a planning obligation is necessary to secure appropriate measures.
- 2.7.95 It may be appropriate for any non-permanent highway improvements carried out for the development (such as temporary road widening) to be made available for use by other subsequent wind farm developments. The IPC may consider that a planning obligation is necessary to secure appropriate measures.

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