DEPARTMENT OF ENERGY & CLIMATE CHANGE

Planning For New Energy Infrastructure

Habitats Regulations Assessment of the draft National Policy Statements for :

1. Overarching NPS for Energy (EN-1)
2. Fossil Fuel Electricity Generating Infrastructure (EN-2)
3. Renewable Electricity Infrastructure (EN-3)
4. Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
5. Electricity Networks Infrastructure (EN-5)

October 2010

Contents

Non Technical Summary

S.1 This is a Non-Technical Summary (NTS) of the Habitats Regulations Assessment (HRA) Report that has been prepared to meet the requirement to undertake HRA of plans and projects in accordance with the Conservation of Habitats and Species Regulations 2010 (the 'Habitats and Species Regulations').

S.2 This NTS sets out a summary of the HRA of five revised draft Energy National Policy Statement (NPSs). The objective of the NPSs is to clearly set out a framework for consenting a new generation of large-scale energy infrastructure. The NPSs comprise of an Overarching NPS for Energy and four technology specific NPSs:

- Overarching NPS for Energy (EN-1);
- Fossil Fuel Electricity Generating Infrastructure (EN-2);
- Renewable Electricity Infrastructure (EN-3);
- Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4); and
- Electricity Networks Infrastructure (EN-5).

S.3 The scope of the NPS for Nuclear Power Generation (EN-6) is different from the other draft Energy NPSs. EN-6 lists strategic areas that the Government has judged to be potentially suitable for the deployment of new nuclear power stations. Therefore, the matters covered by EN-6 are the subject of a separate HRA which reflects the spatial nature of EN-6.

S.4 The Habitats and Species Regulations require that a HRA is carried out because the Energy NPSs could affect sites protected by European law – or 'European sites'. However, when considering EN-1 to EN-5, it is not possible to conclude that every European site across England and Wales will be safeguarded, in the absence of specific planning applications.

S.5 The HRA proceeds to consider if there are any alternative solutions which would facilitate the development of large-scale energy infrastructure without damaging European sites. However, there are no clear alternatives which achieve both objectives.

S.6 The Government establishes the case for developing new energy infrastructure which is imperative to deliver our commitment to clean, secure and affordable energy. Finally, the Government sets out criteria for the provision of compensatory habitat should this to be necessary for new large-scale energy infrastructure.

1 Introduction

1.1 The Department of Energy and Climate Change (DECC) has drafted a suite of six National Policy Statements[1] (NPSs). NPSs are considered to be 'plans' for the purposes of the Habitats Directive[2] and have been subject to a Habitats Regulations Assessment (HRA) including Appropriate Assessment (AA). The Conservation of Habitats and Species Regulations 2010 (the 'Habitats and Species Regulations') include a general duty to submit NPSs to the HRA process[3].

1.2 This document reports the findings of the HRA of five revised draft Energy NPSs. These comprise of an Overarching NPS for Energy and four technology specific NPSs:

- Overarching NPS for Energy (EN-1);
- Fossil Fuel Electricity Generating Infrastructure (EN-2);
- Renewable Electricity Infrastructure (EN-3);
- Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4); and
- Electricity Networks Infrastructure (EN-5).

1.3 The scope of the NPS for Nuclear Power Generation (EN-6) is different from the other draft Energy NPSs. EN-6 lists sites that the Government has judged to be potentially suitable for the deployment of new nuclear power stations. Therefore, the matters covered by EN-6 are the subject of a separate HRA which reflects the spatial nature of EN-6.

1.4 EN-1 to EN-5 are broad policy statements which cover England and Wales[4]. Their function in the planning system is explained in the revised draft EN-1 (Part 1). EN-1 to EN-5 are not spatial plans. As a result, it is not possible to conclude, beyond reasonable scientific doubt, that the integrity of specific European sites[5] will be safeguarded, in the absence of project level information.

1.5 In line with the requirements of the Habitats Directive, this strategic level assessment proceeds to consider alternative solutions which would

1 Produced under the Planning Act, 2008.

2 92/43/EEC.

3 Regulation 106 of The Conservation of Habitats and Species Regulations 2010.

4 Includes cross border oil and gas pipelines in Scotland, and generating stations in the territorial sea adjacent to England and Wales and in a renewable energy zone (except any part in relation to which the Scottish Ministers have functions).

5 European site – as defined in Regulation 8 of The Conservation of Habitats and Species Regulations 2010.

achieve the objectives of EN-1 to EN-5 without damaging sites in the Natura 2000 network[6]. In the absence of alternative solutions which achieve the objectives of EN-1 to EN-5, the Government establishes Imperative Reasons of Overriding Public Interest (IROPI) which require that EN-1 to EN-5 are designated.

1.6 EN-1 to EN-5 are not locationally specific plans so the Government cannot rule out potential adverse effects on the integrity of European sites, including those sites which host priority features. The opinion of the European Commission was not sought because the IROPI case relates to:

- the protection of human health;
- public safety; and
- overriding beneficial consequences of primary importance for the environment.

1.7 Finally, the Government sets out criteria for the provision of compensatory habitat should a project level assessment show this to be necessary.

1.8 This HRA is a plan-level assessment which is not transferable to individual projects. Any project that is likely to significantly affect a European site will require a project level Appropriate Assessment in consultation with the relevant Statutory Nature Conservation Bodies, including Scottish bodies where there is potential to affect European sites in Scotland.

1.9 Nationally Significant Energy Infrastructure will only be consented, subject to compliance with the Conservation of Habitats and Species Regulations and in accordance with the NPSs[7].

6 Natura 2000 includes sites protected under the EU Birds and Habitats Directives.

7 The Infrastructure Planning Commission must decide in accordance with the NPSs except to the extent that certain statutory exceptions apply under s.104 of the Planning Act 2008.

2 The Habitats Directive and the Habitats and Species Regulations

2.1 The main objectives of the Habitats Directive are:

"to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies", Article 2(1); and

"to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest", Article 2(2).

2.2 Under Article 6 of the Habitats Directive, an assessment is required where a plan or project is *likely* to have a significant effect upon a European site. This must be interpreted as meaning that any plan or project is to be subject to an Appropriate Assessment if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either alone or in combination with other plans or projects[8]. It is recognised that in the case of EN-1 to EN-5, there are severe limitations and uncertainties in predicting effects on European sites given the plan consists of non-locationally specific policy statements which apply, primarily, across England and Wales. DECC have followed a precautionary approach by assuming that the Appropriate Assessment of the plan (EN-1 to EN-5) could have negative effects on the Natura 2000 network.

2.3 Natura 2000 is a network of sites designated to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the European Union. This includes Special Areas of Conservation (SAC) designated under the Habitats Directive for their habitats and/or species of European importance and Special Protection Areas (SPA) classified under the Conservation of Wild Birds Directive[9] for rare, vulnerable and regularly occurring migratory bird species and internationally important wetlands.

2.4 The requirements of the Habitats Directive are transposed in England and Wales by means of the Conservation of Habitats and Species Regulations 2010. The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 transpose the Habitats Directive in the UK offshore marine area (beyond 12 nautical miles). In addition, it is a matter of UK law that candidate SACs (cSACs) and Sites of Community Importance (SCI) are considered in this process. Government policy is that sites designated

8 Decision of the ECJ in Waddenzee (C-127/02).

9 2009/147/EC.

under the 1971 Ramsar Convention[10] for their internationally important wetlands and potential SPAs (pSPAs) are also considered. Sites protected by European law, UK law and as a matter of Government policy are collectively referred to as "European sites" hereafter.

2.5 EN-1 states that before granting a development consent, the Infrastructure Planning Commission (IPC) (or its successor) must consider the application of the Habitats and Species Regulations to it; that information is provided to developers on where the requirements of the Habitats and Species Regulations can be found; which statutory bodies should be consulted; and what developers must provide to the IPC, including avoidance and/or mitigation measures.

Stages of Habitats Regulations Assessment

2.6 European Commission guidance[11] sets out four distinct stages for assessments under the Habitats Directive:

Stage 1: *Screening* – the process which identifies the likely impacts upon a European site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts are likely to be significant.

Stage 2: *Appropriate Assessment* – the consideration of the impact on the integrity of the European site of the plan or project, either alone or in combination with other plans or projects, with respect to the site's structure and function and its Conservation Objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts. This is to determine whether there will be adverse effects on the integrity of the site.

Stage 3: *Assessment of alternative solutions* – the process which examines alternative ways of achieving the objectives of the plan or project that avoid adverse impacts on the integrity of the European site.

Stage 4: *Assessment where no alternative solutions exist and where adverse impacts remain* – an assessment of whether the development is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the potential compensatory measures needed to maintain the overall coherence of the Natura 2000 network.

10 The Convention on Wetlands of International Importance.

11 EC (2001). Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

3 Purpose of this Report

3.1 This HRA considers the potential effects of designating the draft Energy NPSs, EN-1 to EN-5, on European sites. EN-1 to EN-5 are not *spatial* plans that specify where future energy infrastructure is likely to be built. HRA has been applied to drafts of EN-1 to EN-5 in a manner which is consistent with the non-spatial, strategic nature of these NPSs. As a result, there are severe limitations and uncertainties in predicting the likely effects on European sites. DECC have conducted HRA to the extent possible on the basis of the precision of EN-1 to EN-5 in an effort to direct the continuation of the HRA for 'the plan' (EN-1 to EN-5). DECC have assessed feasible plan alternatives and established IROPI for EN-1 to EN-5[12].

3.2 This HRA will be subjected to public consultation alongside the revised drafts of EN-1 to EN-5.

3.3 The HRA has focused on the key issues raised by EN-1 to EN-5, namely:

- The need for new Nationally Significant Energy Infrastructure (as defined in Section 3 of EN-1) and the potential for likely significant effects on European sites;
- An Appropriate Assessment which follows a precautionary approach in the absence of locations and project level information (such as scale, design, avoidance or mitigation) at the non-spatial, strategic level of EN-1 to EN-5;
- The feasible 'plan alternatives' for EN-1 to EN-5, as defined in the Appraisal of Sustainability (AoS) Reports and their potential effects on European sites; and
- IROPI for draft Energy NPSs, EN-1 to EN-5, and further guidance on potential compensatory measures.

12 Follows the opinion of the Advocate General in Commission v UK (C-6/04) at paragraph 49.

4 Screening (Stage 1)

4.1 Guidance from the European Commission[13] recommends that screening should fulfil the following steps:

Step 1: Determine whether the plan is directly connected with or necessary to the management of the [European] site;

Step 2: Describe the plan and describe and characterise any other plans or projects which, in combination, have the potential for having significant effects on the European site;

Step 3: Identify the potential effects on the European site both alone and in combination with other plans and projects; and

Step 4: Assess the significance of any effects on European sites.

Step 1: Determine whether the plan is directly connected with or necessary to the management of the [European] site

4.2 The first part of the screening process considers whether the plan is directly connected with or necessary to the management of a European site. 'Directly' in this context means solely conceived for the conservation management of a site. 'Management' in this context refers to the management measures required in order to maintain, in favourable condition, the features for which the European site has been designated.

4.3 EN-1 to EN-5 are not directly connected with, or necessary to, the management of a European site.

Step 2: Describe the plan and describe and characterise any other plans or projects which, in combination, have the potential for having significant effects on the European site

4.4 The principal aim of the Energy NPSs is to provide the IPC with a framework for decision-making on applications for development consent for appropriate new Nationally Significant Energy Infrastructure with the objective of contributing to the achievement of sustainable development.

4.5 EN-1 covers the policy and regulatory framework for new Nationally Significant Energy Infrastructure; the need for new Nationally Significant Energy Infrastructure; the assessment principles to be followed in the consideration and examination of applications; and the handling of generic impacts and mitigation measures. EN-2 to EN-5 should be read in conjunction with EN-1 as they set out additional information specific to the

13 EC (2001). Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

relevant energy technology. The structure of the revised Energy NPSs is outlined in Figure 4.1.

4.6 The development of new Nationally Significant Energy Infrastructure may interact with a range of national, regional and local plans and other Nationally Significant Infrastructure Projects[14]. Other plans and projects which, in combination, have the potential for having significant effects on European sites are outlined in Table 4.1.

Figure 4.1 Structure of the draft Energy NPSs

<table>
<tr><td colspan="4">Overarching Energy NPS (EN-1)
– Government energy and climate policy
– the need for new energy infrastructure
– Key assessment principles
– Impacts that cut across different NPSs/technologies</td></tr>
<tr><td>Fossil Fuel Electricity Generating Infrastructure NPS (EN-2)
Introduction
Considerations and assessment of impacts[15]</td><td>Renewable Electricity Infrastructure NPS (EN-3)
Introduction
Considerations and assessment of impacts
a) Energy from Waste and Biomass
b) Offshore Wind[16]
c) Onshore Wind</td><td>Nuclear Power Generation NPS (EN-6)[17]
Introduction
Outputs of the Strategic Siting Assessment</td><td rowspan="2">Gas Supply Infrastructure and Gas and Oil Pipelines NPS (EN-4)
Introduction
Considerations and assessment of impacts
a) Gas storage
b) LNG facilities
c) Gas reception facilities
d) Gas and oil pipelines</td></tr>
<tr><td colspan="3">Electricity Networks NPS (EN-5)
Introduction
Considerations and assessment of impacts</td></tr>
</table>

14 Nationally Significant Infrastructure Projects – as defined in Part 3 of the Planning Act 2008.

15 Assessment of impacts will include consideration of avoidance and mitigation, where required.

16 Offshore energy is subject of a separate SEA and HRA. Available at http://www.offshore-sea.org.uk/site/index.php (Accessed 13/09/10).

17 The NPS for Nuclear Power Generation is subject of a separate AoS and HRA as part of an Strategic Siting Assessment which aims to identify potentially suitable locations for new nuclear power stations.

Table 4.1 Characterisation of other plans and projects that may have in combination effects

Typical Plans and Projects	Potential in-combination effects
• Other NPSs[18]; • Marine Policy Statement; • Marine Plans; • Welsh Transport Strategy; • Wales Spatial Plan; • National Planning Framework (Scotland); • Joint Infrastructure Plans; • River Basin Management Plans; • Water Resource Management Plans; • Catchment Abstraction Management Strategies; • Shoreline Management Plans; • Unitary Development Plans; • Local Development Frameworks; • Local Development Plans; • Local Development Plans (Wales); • Local Transport Plans; • Nationally Significant Infrastructure Projects and associated development(s) which are either operating, consented or in planning; and • Other infrastructure projects which are either operating, consented or in planning.	• Habitat loss/fragmentation; • Loss of breeding areas; • Barrier effects; • Energetic effects; • Reduction in air quality; • Exceeding critical loads • Reduction in water quality/resources; • Changes in hydrology; • Changes to habitat structure; • Contamination; • Disturbance to species; • Noise and vibration disturbance; • Visual and lighting disturbance; • Wildlife collisions; and • Climate change effects on habitats and species.

18 Energy, transport, water, waste water and waste.

Step 3: Identify the potential effects on the European site

4.7 The third stage of the screening process involves:

I. *Characterising the European sites that may be affected; and*

II. *The likely significant effect of the Energy NPSs on sites within the Natura 2000 network, alone and in combination with plans and projects.*

Characterising the European sites that may be affected

4.8 There are currently over 630 Special Areas of Conservation (SACs), over 260 Special Protection Areas (SPAs) and 157 Ramsar sites across the UK[19] [20]. EN-1 to EN-5 are non-locationally specific plans covering England and Wales. EN-1 to EN-5 do not identify specific locations to construct new Nationally Significant Energy Infrastructure, and while they emphasise the importance of biodiversity and related conservation interests, they also do not rule out as a matter of policy the possibility of granting development consent for projects that may adversely affect the integrity of a European site. As a result, while it has not been possible to identify any specific European sites which could potentially be affected by EN-1 to EN-5, the possibility cannot be ruled out, at this strategic level, that European sites could potentially be adversely affected by a project brought forward under EN-1 to EN-5 – particularly given the need for new energy infrastructure set out in EN-1, the broad range of energy infrastructure within EN-2 to EN-5 and the mobility of certain species connected to European sites.

The likely effect of the Energy NPSs, EN-1 to EN-5, on European sites, alone and in combination with other plans and projects

4.9 EN-1 sets out the need for new Nationally Significant Energy Infrastructure. Section 3 of EN-1 indicates that by 2025 the UK might need around 113 GW of total electricity capacity (compared to around 80 GW now); of which 59 GW would be new build. EN-1 also sets out that by 2050, we might need to have tripled our generation capacity in comparison with today.

4.10 As explained in EN-1, increased demand for electricity and the need to replace old generation capacity will necessitate new, Nationally Significant Energy Infrastructure. The construction, operation (and eventual decommissioning) of new Nationally Significant Energy Infrastructure at any location in England and Wales could affect European sites. Potential effects may also be associated with ancillary and induced development. Table 4.2 outlines likely significant effects which could apply either alone or in combination with other plans or projects.

4.11 EN-1 to EN-5 do not mandate the rejection of projects which could potentially affect a European site, either alone or in combination with other

19 Joint Nature Conservation Committee, 2010.

20 Defra, 2006. Ramsar sites across the UK – a policy statement .

plans or projects. This approach follows Article 6(4) of the Habitats Directive.

Table 4.2 Likely significant effects of EN-1 to EN-5 on European sites.

Generating type	Assumptions	Possible Activities	Possible Impacts	Likely Significant Effects
Fossil fuels	>300MW – requires CCR Access to cooling water	Earthworks and excavations; Traffic and transport; Water quality and resources; Site drainage; Emissions to air; Materials management; Vehicle and personnel movements; Coastal change; Physical presence of site; Decommissioning activities; Restoration design; Noise; Water abstraction; Cooling water discharge; Emissions to air; and Emissions to land and water.	Air pollution; Noise pollution; Light pollution; Water pollution; Land take; Change in water quality; Impingement & entrainment of fish; and Modified drainage.	Habitat/species loss and/or fragmentation; Reduction in air quality; Reduction in water quality or resource; Changes in hydrology; Changes to habitat structure; Contamination; Disturbance to key species; and Climate change effects on habitats and species.
Onshore wind	Requires adequate wind resource (Potentially either upland or fenland areas). Expansive sites	Earthworks and excavations; Traffic and transport; Water quality and resources; Site drainage; Vehicle and personnel movements; Physical presence of site;	Water pollution; Land take; Change in water quality; Noise pollution; Modified drainage; and Bird and/or bat strike.	Habitat/species loss and/or fragmentation; Barrier/energetic effects – physical restrictions to species movement; Reduction in water quality or resource;

Generating type	Assumptions	Possible Activities	Possible Impacts	Likely Significant Effects
	likely to include over 17 turbines (i.e. >50MW)	Restoration design; Noise; Construction activities; Bird/bat strike; and Noise.		Changes in hydrology; Changes to habitat structure; and Wildlife collisions.
Offshore wind	Requires Crown Estate lease within Zones	Piling; vessel movements; Physical presence of site; Cable installation through seabed and intertidal; Bird strike; Suspended solids; and Decommissioning activities.	Coastal change; Disturbance of marine mammals; and Bird strike.	Habitat/species loss and/or fragmentation; Barrier/energetic effects – physical restrictions to species movement; Reduction in water quality or resource; Disturbance to key species (from noise, vibration); and Wildlife collisions.
Biomass	Requires imported biomass	Earthworks and excavations; Traffic and transport; Water quality and resources; Site drainage; Emissions to air; Materials management; Vehicle and personnel movements; Physical presence of site; Decommissioning activities; Restoration design;	Air pollution; Noise pollution; Light pollution; Water pollution; Land take; Change in water quality; and Modified drainage.	Habitat/species loss and/or fragmentation; Reduction in air quality; Reduction in water quality or resource; Changes in hydrology; Changes to habitat structure; and Disturbance to key species (from noise, vibration and lighting).

Generating type	Assumptions	Possible Activities	Possible Impacts	Likely Significant Effects
		Noise; and Emissions to air.		
Energy from Waste	Requires proximity to sources of waste	Earthworks and excavations; Traffic and transport; Water quality and resources; Site drainage; Emissions to air; Materials management; Vehicle and personnel movements; Physical presence of site; Decommissioning activities; Restoration design; Noise; and Emissions to air.	Air pollution; Noise pollution; Light pollution; Water pollution; Land take; Change in water quality; and Modified drainage.	Habitat/species loss and/or fragmentation; Reduction in air quality; Reduction in water quality or resource; Changes in hydrology; Changes to habitat structure; and Disturbance to key species (from noise, vibration and lighting).
Gas Supply Infrastructure and Gas and Oil Pipelines		Earthworks and excavations; Traffic and transport; Water quality and resources; Site drainage; Vehicle and personnel movements; Coastal change; Physical presence of site; Restoration design; and Noise.	Air pollution; Noise pollution; Light pollution; Water pollution; Land take; Change in water quality; and Modified drainage.	Habitat/species loss and/or fragmentation; Reduction in water quality or resource; Changes in hydrology; Changes to habitat structure; Contamination; and Disturbance to key species.

Generating type	Assumptions	Possible Activities	Possible Impacts	Likely Significant Effects
Networks	Connecting existing and new power stations to areas of negative charge	Traffic and transport; Materials management; Vehicle and personnel movements; Physical presence of site; Restoration design; and Noise.	Bird strike; Change in water quality; and Modified drainage.	Habitat/species loss and/or fragmentation; Barrier/energetic effects – physical restrictions to species movement; and Wildlife collisions.

Step 4: Assess the likely significance of any effects on the Natura 2000 sites

4.12 Experience suggests that, under the pre-Planning Act regimes, approximately a quarter of onshore projects and the majority of offshore projects undergo Appropriate Assessment[21] – indicating that they have been thought to have "likely significant environmental effects" on European site(s).

4.13 Projects subjected to Appropriate Assessment may be consented, but to date no energy project in England and Wales has relied on Article 6(4) of the Habitats Directive: in other words, where likely significant effects have been identified and consent has been granted, the Secretary of State has concluded that the construction and operation of the projects, as consented (including appropriate conditions to ensure avoidance or mitigation of potential adverse environmental impacts) will not, in fact, adversely affect the integrity of the European site(s) concerned, either alone or in combination with other plans or projects.

4.14 However, Government cannot rule out the possibility that at some point, proposals for non-nuclear energy infrastructure will come forward under the Planning Act regime which may rely on Article 6(4) and be consented notwithstanding an adverse effect on the integrity of one or more European sites, since there is nothing in either the energy NPSs or the Habitats regime to prevent this[22]. At any rate, Government cannot say for certain that the consenting of infrastructure under EN-1 to EN-5 will not have significant effects on one or more European sites. This is because:

(i) as Parts 2 and 3 of EN-1 show, we need a great deal of new large-scale energy infrastructure to start being built very soon (and carry on being built for some time); and

(ii) although the plan does not tell people where to build this infrastructure, and although developers will not generally choose to develop in protected areas unless there are compelling reasons to do so, it is inherent in the size and nature of some of the infrastructure[23], the scale on which it will have to be developed[24] and the NPS policies[25] that at

21 DECC Energy Infrastructure Portal https://www.og.decc.gov.uk/EIP/pages/recent.htm (Accessed 27/09/10).

22 The Habitats Directive controls (Article 6(3) but does not absolutely prohibit development on European sites (Article 6(4)).

23 Large areas involved: wind farms (especially offshore), biomass combustion plant (bigger footprint compared with fossil fuel). Fossil fuel plant and biomass / energy from waste (and nuclear) all need to be close to river estuaries or coast (where greater proportion of available land is European site / discharges likely to affect European sites). Onshore wind works best in rural areas where more likely to run across European sites?

24 Scale of need for new energy infrastructure makes it more likely that there will be cumulative impacts in areas most suitable from an infrastructure point of view.

least some of it is likely to be proposed to be developed in places where it could have significant environmental effects European sites and may even adversely affect the integrity of these sites.[26]

4.15 Any such development would have to be the subject of Appropriate Assessment at the site-specific, project level, and may proceed either as a result of a positive assessment or, in the absence of alternatives, the development could proceed by demonstrating IROPI.

4.16 The Government cannot rule out that consents made under EN-1 to EN-5 might require the use of the derogations in Article 6(4) (and hence necessitate a significant effect on a European Site). This could potentially occur due to three reasons:

(i) because the Energy NPSs do not prohibit development which could have an adverse effect on European sites;

(ii) because of the scale and nature of the energy infrastructure of which it aims to facilitate consent – which is likely to require many developments of different types and in a variety of locations and may also therefore mean that there is a lack of alternatives;

(iii) because the "need case" highlights the fundamental public interest requirements that underpin this need and as section 7 details these are capable of constituting IROPI.

4.17 So, while EN-1 to EN-5 do not actively identify locations as potentially suitable for the construction of large-scale energy infrastructure even where such development in those locations could adversely affect the integrity of European sites, as the nuclear NPS does, it could fairly be said, for the reasons given above, that the EN-1 to EN-5 could lead to development consents being granted for projects which have a significant effect on a European site.

25 As already noted, NPSs do not prohibit development which will adversely affect European sites.

26 Consequently the whole HRA is being conducted on a precautionary basis.

5 Appropriate Assessment (Stage 2)

5.1 The European sites potentially affected by the development of new Nationally Significant Energy Infrastructure could include sites which are:

- Special Areas of Conservation (including sites offshore);
- candidate Special Areas of Conservation (including sites offshore);
- Sites of Community Importance;
- Special Protection Areas;
- potential Special Protection Areas; and
- Ramsar Sites.

5.2 In an effort to establish potential effects at a strategic level, it is possible to characterise the impact types associated with different types of Nationally Significant Energy Infrastructure. Potential effects on biodiversity, flora and fauna caused by the construction, operation or decommissioning of Nationally Significant Energy Infrastructure are summarised, but not restricted to those outlined in Annex 1.

5.3 Potential effects on biodiversity which could amount to adverse effects on the integrity of European sites may potentially include:

- Habitat/species loss and/or fragmentation;
- Barrier/energetic effects – physical restrictions to species movement;
- Reduction in air quality;
- Reduction in water quality or resource;
- Changes in hydrology;
- Changes to habitat structure;
- Contamination;
- Disturbance to key species (from noise, vibration and lighting);

- Wildlife collisions; and
- Climate change effects on habitats and species.

5.4 EN-1 to EN-5 do not identify locations to construct new Nationally Significant Infrastructure Projects and it is not possible to predict which locations developers will choose with any great precision or confidence. As a consequence, it has not been possible to consider the effects that EN-1 to EN-5 might have on the integrity of one or more European site(s) of the NPSs, with respect to a specific European sites' conservation objectives and its overall structure and function.

5.5 Avoidance/mitigation measures which could remove the adverse impact on the integrity of European Sites may be available at project level. Generic avoidance/ mitigation measures used, to date, in consenting Nationally Significant Energy Infrastructure Projects have, broadly, included:

- Alternative spatial locations, routes or scales to avoid/mitigate adverse effects;
- Alternative construction or operation methods for certain activities to avoid/mitigate the risk of adverse effects on the integrity of a European site;
- Scheduling (construction, operation and decommissioning) so that potentially damaging activities avoid important stages of the life-cycle of key species (e.g. migration, breeding and overwintering periods); and
- Developing adaptive management plans and procedures to reduce the risk of adverse effects on the integrity of a European site.

5.6 EU guidance[27] on the Habitats Directive Adequate state that the competent authority should agree avoidance/mitigation measures before development consent is given and the competent authority must be confident that these measures will be effective.

5.7 EN-1 to EN-5 do not mandate the rejection of all projects which could adversely affect the integrity of a European site because the Habitats Directive allows for projects to proceed under the strict tests under Article 6(4).

27 Section 4.5 Managing Natura 2000 Sites (EU 2000) and Section 3.2.5 Step four - mitigation measures Assessment of plans and projects significantly affecting Natura 2000 sites.

Article 6(4) of the Habitats Directive:

"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."

5.8 To date, detailed avoidance or mitigation measures have been applied at project level to avoid or reduce damage to European sites from Nationally Significant Energy Infrastructure. However, in the absence of further, detailed information which would enable an assessment of the likely success in particular cases of avoidance or mitigation strategies, this HRA cannot exclude the possibility that the integrity of one or more European sites, including sites which host priority habitats or species, could be adversely affected by new Nationally Significant Energy Infrastructure, either alone or in combination with other plans and projects[28].

5.9 It is recognised that there are limitations or uncertainties in predicting impacts on European sites at the plan level. The requirement, where uncertainty exists, is to ensure a precautionary approach is applied, and if necessary, that the plan accounts for and directs the continuation of the HRA process for subsequent plan development[29].

5.10 The Habitats Directive allows a plan or project to be carried out in spite of a negative assessment of its implications for the integrity of European sites, including possible impacts on priority habitats and

28 The case of Waddenzee establishes that a competent authority can conclude that there will be no adverse impact on integrity when no reasonable scientific doubt remains as to the absence of such an effect.

29 Tyldesley, D. (2009) The Habitats Regulations Assessment of Local Development Documents. Revised Draft Guidance for Natural England.

species, subject to the absence of feasible alternative solutions[30], by the demonstration of IROPI[31] and compensatory measures[32].

30 Advocate general in its Opinion for Case C-239/04, " among the alternatives short-listed ' the choice does not inevitable have to be determined by which alternative least adversely affects the site concerned. Instead, the choice requires a balance to be struck between the adverse effect on the integrity of the site and the relevant reasons of overriding public interest".

31 IROPI – as outlined in Regulation 62 of the Habitats and Species Regulations 2010.

32 Compensatory measures are intended to offset negative effects so that the overall coherence of the Natura 2000 network is protected.

6 Assessment of NPS Level Alternative Solutions (Stage 3)

6.1 The Habitats Directive requires that where the Appropriate Assessment undertaken in accordance with Article 6(3) produces findings that are negative or uncertain, then the plan maker must consider whether there are alternative solutions for delivering the aims of the plan that better respect the integrity of European Site(s).

6.2 The objective of the NPSs is to clearly set out a framework for consenting a new generation of large-scale energy infrastructure of the kinds covered by EN-2 to EN-5, consisting of the policies set out in EN-1 to EN-5. As set out in Parts 2 and 3 of EN-1, the plan is a response to unprecedented challenges arising from our need simultaneously to decarbonise our energy supply and double or triple our capacity to generate electricity and transmit it. In addition, we must build new gas infrastructure to import more gas from overseas.

6.3 We need new energy infrastructure; we need a system of development consents and a set of criteria against which consent will be granted – not least because the gas and electricity single market legislation requires it. As a result, this assessment has focused on those alternatives which relate to land-use or set the framework for development consent. This assessment has also considered the 'No NPS' or 'Zero' option. These alternatives have been subject to an Appraisal of Sustainability (AoS) which includes Strategic Environmental Assessment (SEA). Guidance[33] suggests that it is good practice for the HRA to consider options for the plan delivery that are also being considered by the wider SEA process[34].

6.4 The alternatives presented in the AoS represent the main ways in which the objectives of EN-1 to EN-5 might be delivered. These alternatives, which have been subject to an AoS, are summarised in Table 6.1 to indicate the potential outcomes in relation to European sites and in relation to the objective of the Energy NPSs.

6.5 The assessment concludes that there are no alternatives which would both meet the objectives of EN-1 to EN-5, and would better manage the potential for adverse impacts on the integrity of

33 Department of Communities and Local Government (DCLG) (2006), Planning for the Protection of European Sites.

34 Section 2 of the Appraisal of Sustainability Report for EN-1 deals with the plan alternatives for EN-1 to EN-5.

European Sites than EN-1 to EN-5. This finding concurs with the findings of the AoS for EN-1 and the approach that the Government has chosen to adopt.

Table 6.1 Consideration of alternative solutions for delivering EN-1 to EN-5

NPS	Alternative solution	Potential outcomes in relation to European sites
EN-1	No NPS or 'Zero Option'	The IPC is without guidance on: energy policy; the need for infrastructure; assessment principles and generic impacts/ mitigation measures. Decision making is delayed. There is no reason to suppose that proposed developments will not be put forward for consent which adversely affects European sites, or that, if put forward, they are less likely to be consented than would be the case under EN-1 to EN-5. However, delays in the planning process may add to the uncertainty in energy investment in the UK, including nuclear, renewables and fossil fuels with Carbon Capture and Storage (CCS). This could make it more difficult for the UK Government to meet its energy policy objective of urgently tackling climate change by decarbonising electricity generation. The integrity of European sites may be affected, in the long-term, by climate change if the UK cannot decarbonise the electricity generation sector. Significant proportions of land based species and birds could be at greater risk from extinction from climate change if the UK and other nations do not take the lead in decarbonising electricity generation[35] [36].
	Place more emphasis on low cost energy	If lower energy costs are achieved through a relaxation of environmental protection requirements, this would be likely to have an adverse effect on the natural environment. Provided that all statutory protections of the natural environment are complied with, the risk of adverse effects will fall predominantly on those features that do not have this level of protection. For example, sites of local nature conservation interest that do not receive the same level of protection as European sites, could be more at risk of adverse effects from the development of large-scale energy infrastructure. It is not possible to consider how this alternative might affect the integrity of a European site. However, European sites are part of the natural environment; they do not function in isolation from it. The broad requirement to maintain or restore European sites or species in a favourable condition may not be met, if components of the wider environment are adversely affected by the relaxation of environmental

35 Thomas, C. D., Cameron, A., Green, R. E., Bakkenes, M., Beaumont, L. J., Collingham, Y. C., Erasmus, B. F. N., de Siqueira, M. F., Grainger, A., Hannah, L., Hughes, L., Huntley, B., van Jaarsveld, A. S., Midgley, G. F., Miles, L., Ortega Huerta, M. A., Townsend Peterson, A., Phillips, O. L. & Williams, S. E. 2004. Extinction risk from climate change. Nature 427: 145-148.

36 Huntley, B., Green, R., Collingham, Y. & Willis, S. G. 2007. A Climatic Atlas of European Breeding Birds. Lynx Edicions, Barcelona. 521pp.

NPS	Alternative solution	Potential outcomes in relation to European sites
		protection requirements in the NPSs. There is also the possibility that this option might lead to more unabated fossil fuel plant and so increase the risks to European sites associated with climate change.
	Place more emphasis on reduction in CO2 emissions	Energy saving measures are a very important factor in achieving CO2 reductions although it is clear from the analysis in Part 3 of EN-1 that energy saving measures cannot in themselves eliminate the need for new large-scale energy infrastructure required in order to achieve the greenhouse gas emissions reductions targets set for 2050 in the Climate Change Act 2008. Selective relaxation of development controls might be used in conjunction with targets or quotas for particular types of energy infrastructure, to encourage development of low carbon generating capacity. Low carbon technologies, for example wind power and nuclear power are proven. It is very doubtful whether, in practical terms, there is any prospect, over the next ten years or so (i.e. over the likely lifetime of the current batch of energy NPSs, and quite possibly, of their immediate successors), of nuclear or wind being developed significantly more quickly, or on a significantly larger scale, than is already envisaged by the NPSs. The Committee on Climate Change in initial advice to Government in September 2010 on the UK's renewables ambition, agreed that the envisaged contribution from renewable electricity (approximately 30% of total generation) by 2020 is appropriate in the context of the need to substantially decarbonise the power sector by 2030 (on the path to meeting the economy-wide target to reduce emissions by 80% relative to 1990 levels). The AoS for EN-1 notes that while more rapid progress towards decarbonisation of electricity supply (and energy supply more generally) is desirable, it does not follow that changes to the NPSs are necessary to achieve this: if other forms of Government intervention are required, it is intended that they should be identified through the Electricity Market Reform project.
	Place more emphasis on reducing environmental impacts other than	Scenarios can be developed that could, potentially, restrict environmental impacts to lower levels than is achieved by EN-1. The AoS concludes that these could not be implemented without risk to security of supply, which is a fundamental goal of energy policy. EN-1 to EN-5 make clear that in order to fulfil our energy policy objectives, unprecedented quantities of new infrastructure will need to be developed, often in areas with no history of industrial development,

NPS	Alternative solution	Potential outcomes in relation to European sites
	CO2 emissions	and/or which are inherently likely to include or affect European sites. For example, it would perhaps be surprising if the UK succeeded in meeting its 2020 renewables targets without there being adverse effects on the integrity of one or more European sites, given the amount of new electricity generating capacity required for this purpose; the very large part which offshore wind farms are expected to play in meeting the target; and the prevalence of European sites in and around the areas where the major offshore wind farm developments are likely to be proposed. While the range of options for such developments is not as restricted as it is for new nuclear power sites as identified in EN-6, the position of the two technologies bears comparison from the point of view of their likely impact on European sites: in some respects the only differences are that the nature of the adverse effects is somewhat different for each technology and that we are likely to need a lot more wind farms (each taking up a considerable amount of space) than we will need nuclear power stations in order to meet our energy and climate change policy goals. The fact that so much development consent covered by EN-1 to EN-5 is likely to take place in coastal or estuarine areas reinforces the conclusion that it is probably only a matter of time, given the level of need for new infrastructure, before a large-scale energy infrastructure project is consented which has adverse effects on the integrity of a European site. It follows from these considerations and the scale of our need for new energy infrastructure that to exclude the possibility of consenting projects which adversely affect the integrity of a European site is a step which could not prudently be taken by a UK Government which is truly committed to maintaining safe, secure and affordable supplies of energy while staying on course to meet the targets for greenhouse gas emissions reductions in the Climate Change Act 2050 (as well as its obligations under the EU Renewables Directive). In this context, it bears repeating that prohibiting development in European sites would go beyond the requirements of the Habitats Directive (Article 6(4)) and that sometimes it may be necessary to rely on Article 6(4) in order to consent infrastructure which, by contributing to the mitigation of climate change, may ultimately help to do considerably more good than harm to the conservation of species and habitats.
EN-2	Stricter approach to CCS (e.g. no new coal without full CCS, or no new fossil fuel plants	Technologies, such as CCS, are innovative and untried on a large scale. CCS infrastructure could affect terrestrial European sites (during the construction and operation of the plant) and disturb sites along the pipeline corridor which may extend offshore. Current CCR policy recognises that some part of the proposed pipeline corridor; especially nearer to the site where the options may be more limited, may

NPS	Alternative solution	Potential outcomes in relation to European sites
	without a substantial amount of CCS from the outset)	unavoidably impinge on a European site. Increasing the requirement of CCS on fossil fuel generating capacity may result in fewer proposals coming forward, especially for gas fired stations, given that developers will need to be confident of economic and technical viability. This is likely to have a negative effect on security of supply. Increasing the requirement of CCS on fossil fuel generating capacity has the potential to further reduce CO2 emissions from this electricity generating infrastructure compared with EN-2. However, there is a balance to be struck. The technical and economic viability of CCS has yet to be demonstrated at a commercial scale. A stricter approach to CCS may dissuade investment and thus increase the challenges in demonstrating the viability of CCS.
	Stricter approach to Carbon Capture Readiness (CCR) (i.e. more demanding criteria set for demonstrating that retrofit of CCS will be economically feasible)	Current CCR policy requires applicants to set aside land adjacent to the plant to build a CCS and identify a feasible corridor to transport CO2 to the coast or another suitable storage area. Current policy states that land set aside for the purposes of CCR should not be considered as environmental space to compensate for loss of habitat due to the power station. A CCR site is not allowed to become a wildlife reserve through neglect or mismanagement such that it would be unavailable for CCS plant in the future. Current CCR policy recognises that some part of the proposed pipeline corridor; especially nearer to the site where the options may be more limited, may unavoidably impinge on a European site. Feasibility studies should recognise that means exist to avoid or mitigate the effects of current infrastructure, including gas pipelines, on these types of site, e.g. through sophisticated boring techniques- applicants should suggest how such impacts could be minimised. Tightening the criteria for the demonstration of CCR viability may reduce the number of proposals submitted to the IPC, especially gas fired generating stations. This is likely to result in approval of a smaller total fossil fuel generating capacity than would be the case with EN-2. This may therefore increase the risk of insufficient generating capacity being available to provide electricity supply through the transition to a low carbon economy. Maintaining the security of supply is a key objective of Government energy policy.
EN-3	Adopting a policy that would be less	Visual effects, operational noise and shadow flicker have not, to date, constituted a likely significant effect for European sites or species. This alternative is not considered to be directly relevant to the integrity of

NPS	Alternative solution	Potential outcomes in relation to European sites
	tolerant of the adverse visual, noise and shadow flicker impacts of onshore wind farm	European sites. However, it is assumed that if more stringent criteria on adverse visual noise and flicker impacts of onshore wind were set, the number of sites suitable for onshore windfarms would be reduced. The impacts on ecology, water quality and soils are related to the number of wind farms developed and specific details of the location. Consequently, if fewer wind farms are proposed under this alternative when compared to the number under EN-3, the effect on the environment, possibly including European sites is reduced, in the short to medium term. If we are to meet legally binding carbon budgets, then restricting the development of onshore wind may increase the development of other renewables sources (such as offshore wind, biomass and energy from waste stations). As a result, restricting onshore wind may serve only displace development and, in doing so, increase the likelihood of significant affects from other renewable generation types, either alone or in combination, elsewhere within the Natura 2000 network.
	Adopting a policy that would mean consents set more stringent criteria for biomass / energy from waste (based on what such plants were allowed to burn)	If the sustainability criteria proposed for this alternative were more stringent than those proposed for the Renewables Obligation Order (2009) (RO), then biomass and waste may become more expensive as a fuel resulting in fewer biomass or energy from waste plants being developed. In addition, existing plants may reduce or stop generation. Operational emissions of oxides of Nitrogen (NOx), from all combustion plants and heavy metals depending on the fuel type, may alter plant physiology or contaminate waterways and thus have the potential to affect the integrity of European sites. Reductions in the number of biomass/energy from waste plants and/or output would reduce deposition and changes in air quality, at a local level. However, deposition and air quality are currently controlled through dispersion modelling and applying thresholds for combustion. Reducing the emissions from biomass and energy from waste plants may increase the 'capacity' available to other forms of generation. Gas or coal plants may increase output within the available combustion threshold. As a result, the levels of NOx deposition and air quality at European sites could remain unchanged. The integrity of European sites could be affected, in the long-term, by climate change because the UK has not decarbonised energy generation which, in part, may be addressed by biomass and energy from waste.

NPS	Alternative solution	Potential outcomes in relation to European sites
EN-4	Government takes a strategic view on locations where it is best to develop new oil and gas infrastructure (based on geology, cost etc) and limit consenting to those areas	The designation of strategic areas and corridors within which consent would be given is likely to result in energy technologies clustering in certain locations as a result of their specific development requirements. For example, the development of underground storage of gas within salt caverns will be focused within Wessex, West Lancashire, Cheshire and the Yorkshire North Sea Coast[37] as these areas are where suitable rock strata are located. Similarly, gas storage within oil and gas fields could be located within the north east of England, the East Midlands, the Wessex-Channel Basin and West Lancashire. LNG facilities require coastal or estuarine locations with deepwater channels capable of taking large LNG tankers. Gas receptor facilities also required coastal locations, restricted to the east and south coasts of England due to the importation of gas via pipelines from Scandinavia and the Continent. The establishment of strategic corridors for gas and oil pipelines may prove difficult as the pipelines may be required to connect to a variety of energy technology installations such as gas or oil fired power stations. These energy technology installations often have commercial requirements for development locations and may result in very wide, or a complex web of, strategic corridors to ensure connection. One potential effect may arise from the restriction of development into smaller areas than would otherwise occur. This could raise the likelihood of in combination effects within these areas from construction through to decommissioning, and potentially elevating the prospect of a negative Appropriate Assessment and creating the need to consent via Article 6(4). In the absence of any strategic view it is not possible to conclude that this option is beneficial for European sites.
EN-5	Government takes a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas	The development and expansion of the electricity grid is appraised as having the potential for negative effects on water quality, ecology, soils and geology. These effects are considered to be significant where infrastructure is undergrounded, due to disturbance during construction. Effects of overhead lines across migratory flyways may be significant depending on the flying characteristics of migratory birds or the energy expenditure commuting birds. Taking a strategic view on locations for consenting transmission infrastructure could offer the opportunity to avoid and reduce the likelihood of significant effects, by selecting locations that are less sensitive to development pressures or avoid major bird flyways. However, the location of infrastructure networks is

37 Storage of Gas In Your Area – Your Questions Answered (BERR)

NPS	Alternative solution	Potential outcomes in relation to European sites
		determined by existing network/ power station locations and the anticipated locations of new stations and, therefore, the strategic choice of locations for new electricity network infrastructure would remain limited by these factors.
	Adopt a presumption that transmission lines should be put underground (generally, or in particular locations)	The policy set out in EN-5 expresses no preference for undergrounding of transmission or distribution lines. A presumption in favour of undergrounding has potentially significant negative impacts and effects for European sites in the short, medium and long term, due to direct habitat loss, disturbance and fragmentation. Undergrounding requires a substantially higher footprint than overhead power lines and its effects, for example on the soil and water environment may have additional indirect negative effects on the integrity of European sites or species. The disturbance and removal of soil (including when maintenance work is required) will require specific mitigation to prevent overall loss of quality in the long term. The negative effects for ecology are likely for both the terrestrial and possible fluvial environments. In the long term, the effects on birds (habitat loss, disturbance) from undergrounding may be less than those effects attributed to overhead lines which can present a collision risk, particularly when located in migration flyways. It is not possible to conclude that the net benefits to birds of undergrounding lines are greater that the effects of undergrounding lines through European sites. The preferred option supports the use of both undergrounding and overhead lines as appropriate, on a case-by-case basis.

7 Imperative Reasons of Overriding Public Interest for EN-1 to EN-5 (Stage 4)

7.1 The AA concluded that the potential for adverse effects on the integrity of European sites, either from EN-1 to EN-5 alone, or in combination with other plans, could not be ruled out. The assessment noted avoidance and mitigation measures but, in the absence of project level detail, it has not been able to conclude beyond reasonable scientific doubt that the identified potential adverse effects on the integrity of the European sites will be effectively avoided or mitigated.

7.2 In line with the requirements of the Habitats Directive, the assessment proceeds to consider whether there were alternative solutions to delivering the requirements of the plan that would better respect the integrity of the European sites considered in the HRA process. The Government here outlines the imperative reasons of overriding public interest (IROPI) that require that the NPSs are designated.

7.3 Although the HRA could not rule out potential adverse effects on the integrity of European sites which host priority features, the opinion of the European Commission on IROPI was not sought, as the IROPI which justifies the plan relates to:

- the protection of human health;
- public safety; and
- overriding beneficial consequences of primary importance for the environment.

7.4 In section 6, the Government considered alternative ways of meeting the objectives of EN-1 to EN-5. Before IROPI can be demonstrated, for the NPS, it is necessary to analyse and show the need for EN-1 to EN-5 and the alternative of not having EN-1 to EN-5 (i.e. the “zero option”). The Government considered:

a. why new generating capacity is needed;

b. why we need a mix of new energy infrastructure; and

c. why the revised draft Energy NPSs, EN-1 to EN-5, are needed.

7.5 This IROPI case is a plan level assessment which applies to EN-1 to EN-5 only. The extent to which any project meets the IROPI case will be determined on a case-by-case basis and is dependent on scale, nature and location of the project and the interest features of the European site(s) affected.

a) Why new generating capacity is needed

7.6 Energy underpins almost every aspect of our way of life. It enables us to heat and light our homes; to produce and transport food; to travel to work, around the country and the world. Our businesses and jobs rely on the use of energy. And energy is essential for the critical services we rely on – from hospitals to traffic lights and cash machines. It is difficult to overestimate the extent to which our quality of life is dependent on adequate energy supplies.

7.7 Part 2 of EN-1 explains the two key policy goals that drive the need for new electricity generation. The first is the need to decarbonise the economy. The second is that it is critical that the UK continues to have secure and reliable supplies of electricity as we make the transition to a low carbon economy. To do this, we need sufficient capacity to meet demand at all times (including a sufficient capacity margin). We also need a diverse mix of technologies and fuels, so that we do not rely on any one technology or fuel.

7.8 To meet the Government's objective to maintain or enhance levels of energy security and because, as explained above, electricity is an essential component of any modern society, there is a need to replace capacity as well as to meet expected increases in demand for electricity generation. The option of not doing so is not tenable because of the harmful impacts on human health and public safety as a result of interruptions to electricity supply. As set out in EN-1, a significant amount of existing generating capacity (about 22GW) is due to close by 2025 either because it does not meet European emission standards or because power stations are coming to the end of their natural operating lives.

7.9 The UK is committed to reducing greenhouse gas emissions by at least 80% by 2050, relative to 1990 levels[38]. The Committee on Climate Change has stated that in order to achieve this there is a need for the supply of electricity to be almost entirely decarbonised by 2050[39]. This is a very significant undertaking and it is therefore essential that no form of low carbon generation (for example, renewables, fossil fuels with carbon capture and storage (CCS) and nuclear power) is ruled out. EN-1 also sets out that by 2050, we

38 The 2050 target is enshrined in the Climate Change Act 2008.

39 The Climate on Change Committee has said that the UK will need to decarbonise the electricity system by 75% by 2030 to meet the 2050 target see report at http://www.theccc.org.uk/pdf/7980-TSO%20Book%20Chap%205.pdf

might need to have tripled our generation capacity in comparison with today in order to meet our legal obligations.

7.10 EN-1 considers in detail the possible alternatives to adding new generation capacity: demand reduction; more intelligent use of electricity; and the increased interconnection of electricity systems. The Government believes that although increased energy efficiency, smart demand management and opportunities for increased storage and interconnection are being actively pursued and are important, their effect on the need for new large-scale energy infrastructure will be limited due to increased need for electricity for domestic and industrial heating and transport[40]. Strategies to reduce demand and improve energy efficiency are therefore complementary, rather than an alternative to new generating capacity.

7.11 The Government has considered the likely scale of the need for new capacity that could be required by 2025. The Updated Energy and Emissions Projections (UEP)[41] show, assuming that demand for electricity in 2025 is at similar levels to today, in one scenario around 59GW of new capacity will be required by the end of 2025[42].

7.12 The UEP scenarios all assume that electricity demand in 2025 will be at approximately the same levels as today. Whilst increased energy efficiency measures and the impact of the recent recession mean that some industry models support this assumption[43], it is quite possible that any of these scenarios may underestimate the increased use of electricity by 2025 as the UK moves to decarbonise. This means that the amount of new capacity shown in the scenarios (including the high scenario considered below) may be too low.

7.13 The Government has to look beyond immediate energy demand, in the context of how the UK will move to a secure, low carbon economy by 2050. This is because new energy infrastructure which is consented in the next 10 to 15 years will still be generating electricity for 30 to 60 years and therefore has long term implications for energy security and carbon reduction.

7.14 Beyond 2025 the increased use of electricity as a way of decarbonising the economy is likely to increase the demand for

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40 Part 3 of EN-1 [3.7.18].

41 Updated Energy and Emissions Projections, DECC, 2010 (scenario used is the high fossil fuel and carbon prices scenario. It should be noted that there is a significant amount of uncertainty in forecasting future demand and capacity.) EN-1 sets out that Government considers it appropriate to consider the high scenario because it is prudent to plan for the greatest potential need for new electricity generating infrastructure . To do otherwise would create an unacceptable risk to the delivery of secure, affordable low carbon energy supplies.

42 EN-1 sets out the amounts of this that are under construction and in the planning system.

43 National Grid projections (published in April 2010) suggest in some scenarios that electricity demand may remain at today's levels by 2025.

electricity. The Government's 2050 Pathways Analysis considers different scenarios by which the UK can move to a secure low carbon economy by 2050[44]. Whilst there are different pathways by which the UK can reach its 2050 objectives, common themes from the different pathways have emerged which show that:

- ambitious per capita demand reduction is needed and the greater the constraints on low carbon energy supply the greater the reduction in demand will need to be;
- a substantial level of electrification of heating, transport and industry will be required;
- electricity demand could double by 2050 from present levels; and
- the electricity supply will need to be decarbonised.

7.15 The 2050 Pathways Analysis shows that reductions in electricity consumption resulting in improvements from energy efficiency will be far outweighed by increases in electricity demand potentially leading to a doubling of electricity demand between now and 2050. If electricity demand were to double, generation capacity would also need to double if it was supplied by fossil fuels with CCS and nuclear. If one third of the electricity were to be supplied by renewables, generation capacity would need to triple because more capacity would be needed to account for the intermittency of renewables.

7.16 The Government considers it prudent to plan on the basis that:

- as much as 59GW of new generating capacity could be required by 2025;
- electricity demand could in fact double by 2050 meaning that capacity could also double;
- the electricity supply needs to be decarbonised and in doing so we need to retain security of our supplies; and
- that investment decisions made in the short term on electricity generating infrastructure will have long term consequences.

7.17 The Government has considered its objectives of ensuring security of supply whilst combating climate change, in the face of increased demand and capacity needing to be replaced. It has considered the alternatives of relying on energy efficiency measures, the likely demand for new capacity by 2025 and the themes from the 2050

44 The 2050 Pathways Analysis was published as part of a call for evidence in July 2010 http://econsultation.decc.gov.uk/decc-executive/2050_pathways/consult_view

Pathways Analysis which show that, in the longer term, demand for electricity could double by 2050 and that electricity supply needs to be decarbonised.

7.18 Having considered the alternatives, there is IROPI in permitting new generation capacity and network infrastructure because security of the electricity supply is essential for the maintenance of human health and public safety and because combating climate change (which is one of the factors creating the demand for new generating capacity) will have beneficial consequences of primary importance for the environment.

b) Why we need a mix of new energy infrastructure and why we need each of the technologies covered by EN-2 to EN-5 in that mix

7.19 We need a diversity of energy sources so that we are not overly reliant on any one source of technology (avoiding potential technology lock-in), fuel or supplier.

7.20 Without new **renewable generation** the UK would not be able to comply with the Renewables Directive. The large-scale deployment of renewables also has the potential to improve security of supply by reducing reliance on fossil fuels to keep the lights on and power our businesses. Meeting the 15% renewables target could reduce fossil fuels demand by 10% and gas imports by 20-30%. The large-scale deployment of renewables is essential to achieve the greenhouse gas emissions reductions targets set for 2050 in the Climate Change Act 2008. The Committee on Climate Change in initial advice to Government in September 2010 on the UK's renewables ambition, agreed that the envisaged contribution from renewable electricity (approximately 30% of total generation) by 2020 is appropriate in the context of the need to substantially decarbonise the power sector by 2030 (on the path to meeting the economy-wide target to reduce emissions by 80% relative to 1990 levels).

7.21 **Fossil fuel power stations** play a vital role in providing secure electricity supplies. They can be operated flexibly in response to changes in supply and demand. Fossil fuel stations provide flexible back-up for intermittent renewable energy from wind and tidal sources. The use of fossil fuels produces carbon dioxide. However, Government policy is that fossil fuel station must be constructed and operate in line with increasingly demanding climate change goals. The Government has placed conditions on the consenting of fossil fuelled power stations to facilitate the adoption of CCS once it is available. Given the likely rate of old fossil fuel plant closures and development of new low carbon capacity, it would not be prudent to prohibit the consenting of new fossil fuel plant, particularly, since there is reason to expect that CCS will begin to be successfully demonstrated at commercial scale within the next 10 years or so. This would put all fossil fuel plant developed in accordance with

CCR criteria (i.e. all new fossil fuel plant consented in accordance with the energy NPSs) within reach of being low-carbon. If CCS were not to prove successful or readily deployable on wider scale soon enough, any need to curb emissions from such plant in future (or to discourage further projects) which is not met by the EU-ETS regime could be adequately addressed by other measures, such as a future emissions performance standard.

7.22 Much of the new electricity infrastructure that is needed will be located in places where there is no existing network infrastructure. It would not be possible to construct the volume and type of new generation infrastructure that we need without new network infrastructure, especially in the long term given that as explained above overall demand is expected to increase to 2050 and potentially to 2025. An idea of the scale and urgency of need for **new electricity network infrastructure** is conveyed by the recent work of the Electricity Networks Strategy Group (ENSG), an industry group jointly chaired by Government and Ofgem. The group's full report[45] is based on a range of scenarios that examined the potential new transmission infrastructure needed to connect the large volumes of onshore and offshore wind generation required to meet the 2020 renewables target and other essential new generation, such as new nuclear.

7.23 It is important to note the need for expansion and reinforcement of the UK's transmission and distribution networks, which will add to the reliability of the national energy supply and provide crucial national benefits, which are shared by all users of the system.

7.24 As regards **gas supply infrastructure and gas and oil pipelines**, it should be noted that DECC commissioned and published analysis on the future risks to our security of gas supplies over the medium term, until around 2025. This assessment considered the impacts on Great Britain's gas market should various adverse events occur - such as a particularly cold winter, an interruption to a major source of supply, a failure of a major piece of infrastructure, or a combination of these events. Using cautious assumptions about the build-up of gas supply infrastructure, the assessment showed that, whilst the gas market is largely robust to a range of adverse events, the risks to shortfalls in supply cannot be ruled out, nor the risk that there may need to be significant rises in wholesale gas prices in order to balance the market. The work showed that further infrastructure – beyond that which exists or is under construction at present – will be needed in future in order to reduce supply or price risks to consumers. The UK needs a diverse mix of gas storage and supply infrastructure (including gas import pipelines) to respond effectively in future to the large daily and seasonal changes in demand, and to provide endurance capacity during a cold winter.

45 http://www.ensg.gov.uk/assets/ensg_transmission_pwg_full_report_final_issue_1.pdf

7.25 Oil products play an important role in the UK economy, providing around 33% of the primary energy used The UK needs to ensure it has safe and secure supplies of the oil products it requires. Sufficient fuel and infrastructure capacity are necessary to avoid socially unacceptable levels of interruption to physical supply and excessive costs to the economy from unexpectedly high or volatile prices.

7.26 The drivers for new downstream oil infrastructure such as pipelines include: meeting increasing demand by end users, particularly for diesel and aviation fuel and compliance with EU and International Energy Agency obligations for compulsory oil stocking, which are set to increase as North Sea resources decline. Ultimately we need to improve supply resilience in order to meet demand in full in a timely fashion, under credible emergency scenarios.

c) Why the revised Energy NPSs, EN-1 to EN-5, are needed

7.27 The Energy NPSs enable the delivery of one of the key principles of the new planning system for Nationally Significant Infrastructure Projects pursuant to the Planning Act 2008; namely that the IPC (or its successor) should consider urgently needed infrastructure in a timely fashion and decisions should be taken without delay. The national need for the infrastructure has been established by the Government (as set out in EN-1). When the IPC considers an individual application it should therefore act on the basis that the need for such a development has been demonstrated and should be given substantial weight.

7.28 The Energy NPSs set out the policy that the IPC should act in accordance with when considering applications for energy infrastructure. Without having to consider the detail of the need for each case, the IPC will be able to focus on the local impacts of the development, taking into account the views of local people and local authorities and relevant environmental and regulatory assessments.

7.29 Setting out planning policy, (including a strong expression of the need for new energy infrastructure) in the Energy NPS will result in a more streamlined planning system with enhanced certainty for developers. Continuing delays in the planning process would add to uncertainty for energy companies and could result in them choosing to invest in other generation technologies or in other countries. This would make it more difficult for the UK Government to meet its energy policy objectives of urgently tackling climate change, ensuring security of supply, supporting vulnerable consumers and decarbonising the economy.

7.30 The Government has considered alternatives approaches to the development of EN-1 to EN-5 and concluded that the potential for likely significant effects on European sites would be best managed within EN-1 to EN-5. Nationally Significant Energy Infrastructure

Projects will only be consented subject to compliance with the Habitats and Species Regulations, and in accordance with the NPSs[46].

7.31 In the light of the Government's objective of having NPSs setting out: Government energy policy; the need for new energy infrastructure and assessment principles and generic impacts, and having considered that the alternative of not having EN-1 to EN-5 would be likely to cause delay and uncertainty in the planning system, there is IROPI for EN-1 to EN-5. The alternatives of not having an EN-1 to EN-5, or having them constructed in a different way, would delay development consent decisions which is not compatible with the Government objectives, which require rapid de-carbonisation of the generation mix, security of supply and affordable energy

7.32 We need new infrastructure; we need a system of development consents and a set of criteria against which they will be determined – not least because the gas and electricity single market legislation requires it.

7.33 The Government is therefore satisfied that there are IROPI in adopting EN-1 to EN-5.

46 The IPC must decide in accordance with the NPSs except to the extent that certain statutory exceptions apply under s.104 of the Planning Act 2008.

8 Potential Compensatory Measures and Monitoring

8.1 Article 6(4) of the Habitats Directive requires that where, in spite of a negative assessment on European site(s) integrity, the competent authority proceeds with the plan on the basis of IROPI, all necessary compensatory measures[47] are taken to ensure that the overall coherence of the Natura 2000 network is protected.

8.2 Given the strategic nature of the HRA process for EN-1 to EN-5, the inherent uncertainties and limitations of the HRA conclusions, and the potential changes that may occur as the NPSs are implemented, it is not possible to ascertain a negative effect on a European site and therefore specify the precise nature or location of any compensation measures that might be required.

8.3 The role of the energy NPSs is to provide a robust framework through the direction they provides to the IPC that sets out the broad parameters for compensatory measures, should they be required following detailed project level assessment.

8.4 All project level HRAs must take account of the potential adverse effects and relevant avoidance and mitigation measures outlined in EN-1 to EN-5. Where a project level HRA establishes that impacts cannot be adequately mitigated, there are no alternative solutions and there is IROPI; then compensation is required. Where project level assessments identify that compensation is required, it must meet the following criteria and be[48]:

a. appropriate for the area and the loss caused by the project;

b. capable of protecting the overall coherence of the Natura 2000 network;

c. capable of implementation;

d. in operation at the time the damage occurs;

e. directed in measurable proportions to the habitats and species negatively affected;

f. related to the same biogeographical region (within the UK);

47 Compensatory measures are distinct from mitigation. Compensatory measures are only considered after it has been established that impacts cannot be adequately mitigated, there are no alternative solutions and there are IROPI for a particular proposal.

48 Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – European Commission

g. serving functions that are comparable to those that motivated the original area's submission for designation; and

h. clearly defined, with implementation goals and managed so that the compensatory measures can achieve the goal of maintaining or improving the overall coherence of Natura 2000.

Monitoring

8.5 Where necessary, projects may require monitoring. The aim of project level monitoring should be to ensure that measures are actually being carried out and that they are successfully preventing impacts on the integrity of European sites. Specific monitoring of trends in a site's qualifying features, in addition to that already undertaken by statutory bodies, should be identified at project level by the IPC, statutory bodies and developers. It should be implemented, enforced and reported (at agreed suitable intervals) to provide useful feedback for future project implementation.

9 Conclusion

9.1 The alternatives and IROPI case outlined within this HRA are only applicable at the NPS level (i.e. to the Energy NPSs) they are not applicable for individual projects and do not create a presumption that any tests of the Habitats Directive shall be automatically met at the project level.

9.2 Projects, likely to have a significant effect on a European site, would still be subject to assessment under Regulation 61 of the Conservation of Habitats and Species Regulations (2010) prior to a decision and following consultation with the relevant Statutory Nature Conservation Body or Bodies.

9.3 The lack of spatial information within the EN-1 to EN-5 has made it impossible to reach certainty on the effect of the plan on the integrity of European sites. As a result, this HRA has proceeded to discuss plan alternatives and plan IROPI to the extent possible given that EN-1 to EN-5 are not spatial plans.

Annex 1

Activities potentially affecting biodiversity, flora and fauna in the absence of details on location, scale, design, avoidance or mitigation.

NPS	Potential effects on biodiversity, flora and fauna in the absence of details on location, design or mitigation
Overarching	**Earthworks and excavations** Earthworks and excavations may result in direct habitat loss, fragmentation, severance or disturbance. • Habitat loss and fragmentation could result in the displacement of European interest features from suitable breeding, roosting and foraging grounds to alternate areas. This may have synergistic effects by increasing competition for food resources elsewhere within the Natura 2000 network. Where geomorphological processes (e.g. transfer and movement of sediment) that uphold levels of nutrient and sediment input and output are modified, qualifying habitat features such as estuaries, sandbanks or mudflats could be affected; • Disturbance may occur to individual species (including rare and sensitive species and those which are specifically protected from disturbance under European Law); and • Fragmentation may occur where projects either temporarily or permanently break European sites or interlinkages between them. **Traffic and transport** The transport of materials, goods and personnel to and from a development during both the construction and operational phases can have a variety of impacts on the surrounding transport infrastructure and potentially on connecting transport networks, e.g. disturbance from noise and air emissions from road transport which could potentially reduce air quality at a European site. **Water quality and resources** Infrastructure development can have adverse effects on the water environment[49], including groundwater, inland surface water, transitional waters[50] and coastal waters. During the construction, operation and decommissioning phases, it can lead to increased demand for water, involve discharges to water and cause adverse

49 The water environment is quality of water in rivers, lakes and estuaries, coastal and marine waters.

50 Transitional waters are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows.

NPS	Potential effects on biodiversity, flora and fauna in the absence of details on location, design or mitigation
	ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects may impact upon the water quality and resources available at European sites. **Site drainage** The drainage of the site may result in altered run-off rates to watercourses which could in turn affect stream hydrology (especially flow rates) and morphology. This has the potential to impact upon water quality and resources. The use of machinery, vehicles and new drainage systems may mobilise soil particles in surface run-off which can result in adverse impacts on aquatic flora and fauna due to increased sediment loading of streams causing a reduction in water quality. **Emissions to air** Infrastructure development can have adverse effects on air quality. The construction, operation and decommissioning phases can involve emissions to air which could, if they exceed critical loads, lead to adverse impacts on protected species and habitats. **Odour, dust, steam, smoke, artificial light and infestation of insects.** The potential exists for disturbance from odour, dust, steam, smoke, artificial light and infestation of insects to have an adverse impact on European sites and species. **Materials management** The management of materials may result in accidental contamination of watercourses and soils from oil, fuel, cement or other substances. This may result in harm to flora and fauna although good site environmental management practices should minimise these risks. **Vehicle and personnel movements** The use of vehicles, machinery and movement of personnel on site gives rise to the risk of noise and visual disturbance from the site to have an adverse impact on species, in particular sensitive bird species associated with neighbouring SPAs. **Coastal change** The construction of an onshore energy project on the coast may involve, for example, dredging, dredge spoil deposition, cooling water, culvert construction, marine landing facility construction and flood protection measures which could result in direct effects on the coastline, seabed and marine ecology and biodiversity. Coastal squeeze impacts are closely related to habitat (and species) loss and fragmentation, and relate to situations where the coastal margin is squeezed by a fixed landward boundary – mainly through flood and sea defences, and reinforcement of coastal margins through hard engineering. Coastal squeeze could prevent and/or alter the natural transport and

NPS	Potential effects on biodiversity, flora and fauna in the absence of details on location, design or mitigation
	movement of coastal material, and impact on species, communities and habitats. **Physical presence of site** The physical presence of the site buildings may cause direct alteration, disturbance or direct physical loss of terrestrial habitats and species. This may include the severance of migration corridors and commuting routes for protected species. Direct land take (development of the site itself, construction laydown areas, cooling water infrastructure etc.), induced and ancillary developments (e.g. transport infrastructure) and the construction and maintenance of flood defences could result in the direct loss and degradation of qualifying habitat. **Decommissioning activities** During decommissioning there may be risks of continued soil, water and air contamination if radioactive and other hazardous materials are released during decommissioning activities. The risk of this is considered very low given the strict regulatory requirements that would need to be adhered to during decommissioning. A stringent decommissioning strategy would be required together with full EIA prior to decommissioning. **Restoration design** Following decommissioning, the site may be restored, presenting an opportunity for habitat creation and thus the enhancement of nature conservation value. **Noise** The most disturbing activities are irregular, unpredictable and loud noise events, and vibrations of long duration. There are other activities and outputs, such as tonal noise. Noise can affect the behavior, reproductive success and distribution of European interest features.
Fossil Fuels	**Water abstraction** Water is needed for cooling purposes and may be abstracted from groundwater, the sea, rivers or lakes. Water intake from surface water bodies can lead to: • the incidental mortality of fish and other aquatic species, particularly on the intake screens. Fish may be impinged on the intake screens; • zooplankton and phytoplankton can be entrained in the condenser unit and subject to heat and biocide dosing before being returned to the sea; • Biocides in the effluent discharge may affect aquatic biodiversity by increasing the buildup of heavy metals, salts and the uptake of toxic compounds may increase species

NPS	Potential effects on biodiversity, flora and fauna in the absence of details on location, design or mitigation
	vulnerability to disease and genetic mutation, potentially altering reproduction and dispersal rates; • Cooling water discharges could further reduce the amount of dissolved oxygen in the water column, and create thermal and chemical barriers to fish migration; • Groundwater abstractions may, where European Sites are hydrologically connected, affect groundwater supply to other areas of valuable habitat including rivers and streams, resulting in habitat degradation potentially affecting migratory fish species (e.g. Lamprey, Shad); • Abstraction and/or addition of water to or in the vicinity of European Sites (particularly the volume, timing and duration of freshwater flows in rivers and estuaries) could affect fish migration and spawning. It could also alter the structure of physical habitats and compromise aquatic plant and invertebrate communities; and • Changes to groundwater levels as a result of abstraction and/or discharge of water could result in altered base flows in rivers, or impact water levels in important habitats (e.g. marshes). **Cooling water discharge** Power stations using direct cooling require water to be abstracted and then discharged into a suitable water body. Discharge may be to the sea, rivers or lakes. The temperature of the discharge will often be above that of the receiving water body and may result in changes to the aquatic ecology by creating habitat that favours non-native species and/or create thermal and chemical barriers to fish migration. **Emissions to air** Operational emission of oxides of Nitrogen (NOx) and Sulphur (SOx) and heavy metals may alter plant physiology or contaminate waterways and thus affect designated habitats locally and contribute to habitat damage at a national scale. **Emissions to land and water** By products of combustion such as de-sulpho gypsum and fuel ash may, without management, enter water courses and habitats causing a reduction in water quality and contaminate land.
Renewables	**Ornithology (including bats)** Mortality rates from collisions may be significant for some species in certain locations and create a direct population decline. Impacts on flight lines (i.e. barrier effect) and associated energetic expenditure for commuting flights between roosting and foraging areas may result in a loss of fitness and eventual population decline. **Intertidal**

NPS	Potential effects on biodiversity, flora and fauna in the absence of details on location, design or mitigation
	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. Export cable routes will cross the intertidal zone resulting in temporary habitat loss and disturbance of intertidal ecology which may support ornithological interests. **Subtidal** The subtidal zone is the area between below the low tide mark which remains submerged at low tide. The loss of subtidal habitat and benthic ecology either through the footprint of an offshore windfarm or cable route is an additional issue for consideration as subtidal ecology may include Annex I features such as Sabellaria spinulosa reefs. **Marine Mammals** 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 (disturbing, killing or capturing a European Protected Species) being committed, an application will have to be made for a wildlife license. It will be advisable for an applicant to discuss proposed piling activities with the relevant body in advance of applying for a license. **Fish** Potential for the construction, operation 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. **Water quality** Disturbance of the seabed sediments or release of contaminants can result in indirect effects on habitats and biodiversity **Waves and tides** The presence of the turbines can cause indirect effects on marine ecology and biodiversity. **Sediment transport** The resultant movement of sediments, such as sand across the seabed or in the water column, can affect habitat features such as sandbanks **Suspended solids** The release of sediment during construction and decommissioning can cause indirect effects on marine ecology and biodiversity. **Emissions to air** Operational emission of oxides of Nitrogen (NOx), from biomass

NPS	Potential effects on biodiversity, flora and fauna in the absence of details on location, design or mitigation
	combustion plant and heavy metals depending on the source of the biomass, may alter plant physiology or contaminate waterways and thus affect designated habitats in the immediate vicinity and contribute to habitat damage at a regional or national scale.
Electricity Networks	**New electricity transmission infrastructure** Construction of new over or underground transmission lines could cause direct disturbance and physical loss of terrestrial habitats. Mortality rates from collisions may be significant for some species of birds and bats in certain locations (overhead lines only).
Oil & Gas	**Oil and gas pipelines** Clearance of vegetation, earthworks associated with site preparation works, drilling activities and loss of landscape features, such as hedgerows. However, most pipeline effects will be temporary and with adequate mitigation only minor residual long-term landscape impacts should remain. Pipelines may cross estuaries and the marine environment. Impacts of pipelines laid in the offshore environment can include disturbance of marine species or smothering of marine habitats or geological features, from the pipeline or associated dredged materials or rock dump. There may also be impacts on natural coastal and maritime processes such as sediment drift, shoreline erosion and accretion **Salt caverns** A newly developed salt gas storage facility will require leaching new salt cavities, whether built on the site of an existing salt mine or not. This involves injecting water into the underground strata to dissolve the salt until cavities of sufficient dimension have been formed and then the brine is withdrawn through the same well bore. The issue is the disposal of the brine and the protection of water quality and resources. **LNG and gas reception terminals - construction** Habitat loss, disturbance and displacement related to large construction sites – as noted for in EN-1. **LNG and gas reception terminals - dredging** LNG facilities may require additional dredging to accommodate LNG vessels. The potential environmental effects of maintenance dredging are generally two-fold, firstly as a result of the dredging process itself and secondly as a result of the disposal of the dredged material. Dredging will be regulated by the Marine Management Organisation.

URN 10D/844

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