

Overarching National Policy Statement for Energy (EN-1)

Department of Energy and Climate Change

Overarching National Policy Statement for Energy (EN-1)

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of the Planning Act 2008

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Contents

| | | |
|---------------|---|-----------|
| Part 1 | Introduction | 1 |
| | 1.1 Background | 1 |
| | 1.2 Role of this NPS in the planning system | 1 |
| | 1.3 Future planning reform | 2 |
| | 1.4 Scope of the Overarching National Policy Statement for Energy | 2 |
| | 1.5 Geographical coverage | 4 |
| | 1.6 Period of validity and review | 4 |
| | 1.7 The Appraisal of Sustainability and Habitats Regulations Assessment | 4 |
| Part 2 | Government policy on energy and energy infrastructure development | 8 |
| | 2.1 Introduction | 8 |
| | 2.2 The road to 2050 | 8 |
| Part 3 | The need for new nationally significant energy infrastructure projects | 16 |
| | 3.1 IPC decision making | 16 |
| | 3.2 Introduction | 16 |
| | 3.3 The need for new nationally significant electricity infrastructure projects | 17 |
| | 3.4 The role of renewable electricity generation | 26 |
| | 3.5 The role of nuclear electricity generation | 27 |
| | 3.6 The role of fossil fuel electricity generation | 30 |
| | 3.7 The need for new electricity network infrastructure | 32 |
| | 3.8 The need for nationally significant gas infrastructure | 35 |
| | 3.9 The need for new nationally significant oil infrastructure projects | 41 |
| Part 4 | Assessment Principles | 44 |
| | 4.1 General points | 44 |
| | 4.2 Environmental Statement | 45 |
| | 4.3 Habitats and Species Regulations | 46 |

| | | |
|---------------|---|------------|
| 4.4 | Alternatives | 48 |
| 4.5 | Criteria for “good design” for energy infrastructure | 50 |
| 4.6 | Consideration of Combined Heat and Power (CHP) | 51 |
| 4.7 | Carbon Capture and Storage (CCS) and Carbon Capture Readiness (CCR) | 53 |
| 4.8 | Climate change adaptation | 57 |
| 4.9 | Grid connection | 59 |
| 4.10 | Pollution control and other environmental regulatory regimes | 60 |
| 4.11 | Safety | 61 |
| 4.12 | Hazardous Substances | 62 |
| 4.13 | Health | 62 |
| 4.14 | Common law nuisance and statutory nuisance | 63 |
| 4.15 | Security considerations | 64 |
| Part 5 | Generic Impacts | 65 |
| 5.1 | Introduction | 65 |
| 5.2 | Air quality and emissions | 66 |
| 5.3 | Biodiversity and geological conservation | 69 |
| 5.4 | Civil and military aviation and defence interests | 74 |
| 5.5 | Coastal change | 79 |
| 5.6 | Dust, odour, artificial light, smoke, steam and insect infestation | 82 |
| 5.7 | Flood risk | 84 |
| 5.8 | Historic environment | 90 |
| 5.9 | Landscape and visual | 95 |
| 5.10 | Land use including open space, green infrastructure and Green Belt | 99 |
| 5.11 | Noise and vibration | 103 |
| 5.12 | Socio-economic | 106 |
| 5.13 | Traffic and transport | 108 |
| 5.14 | Waste management | 110 |
| 5.15 | Water quality and resources | 112 |
| | Glossary | 114 |

Part 1 Introduction

1.1 Background

- 1.1.1 This National Policy Statement (NPS) sets out national policy for the energy infrastructure defined in Section 1.3 below. It has effect, in combination with the relevant technology-specific NPS (see paragraph 1.4.1), on the decisions by the Infrastructure Planning Commission (IPC) on applications for energy developments that fall within the scope of the NPSs. For such applications this NPS, when combined with the relevant technology-specific energy NPS, provides the primary basis for decisions by the IPC. Under the Planning Act 2008¹ the IPC must also have regard to any local impact report submitted by a relevant local authority, any relevant matters prescribed in regulations, the Marine Policy Statement (MPS) and any applicable Marine Plan, and any other matters which the IPC thinks are both important and relevant to its decision.
- 1.1.2 The Planning Act 2008 also requires that the IPC must decide an application for energy infrastructure in accordance with the relevant NPSs except to the extent it is satisfied that to do so would:
- lead to the UK being in breach of its international obligations;
 - be in breach of any statutory duty that applies to the IPC;
 - be unlawful;
 - result in adverse impacts from the development outweighing the benefits;
or
 - be contrary to regulations about how its decisions are to be taken.
- 1.1.3 Applicants should therefore ensure that their applications, and any accompanying supporting documents, are consistent with the instructions and guidance in this NPS, the relevant technology-specific NPS and any other NPSs that are relevant to the application in question.

1.2 Role of this NPS in the planning system

- 1.2.1 This NPS, and in particular the policy and guidance on generic impacts in Part 5, may be helpful to local planning authorities (LPAs) in preparing their local impact reports. In England and Wales this NPS is likely to be a material consideration in decision making on applications that fall under the Town and Country Planning Act 1990 (as amended). Whether, and to what extent, this NPS is a material consideration will be judged on a case by case basis.
- 1.2.2 Under the Marine and Coastal Access Act 2009, the Marine Management Organisation (MMO), will determine applications under s.36 and s.36A of the

¹ Section 104(2) Planning Act 2008.

Electricity Act 1989 where they relate to a generating station in waters adjacent to England and Wales or in a Renewable Energy Zone (except any part in relation to which Scottish Ministers have functions) provided that the application does not exceed the capacity threshold set out in the Planning Act 2008. The MMO will determine applications in accordance with the Marine Policy Statement (MPS) and any applicable marine plans, unless relevant considerations indicate otherwise. This NPS, in combination with the relevant technology-specific NPSs, may be a relevant consideration for the MMO when it is determining such applications. They may also be a relevant consideration in the preparation of relevant marine plans. The role of the MPS in relation to IPC decisions is set out at paragraph 4.1.6.

- 1.2.3 Further information on the relationship between NPSs and the town and country planning system, as well as information on the role of NPSs is set out in paragraphs 13 to 19 of the Annex to the letter to Chief Planning Officers issued by the Department for Communities and Local Government (CLG) on 9 November 2009².

1.3 Future planning reform

- 1.3.1 Aside from cases where the Secretary of State intervenes, or where the application is not covered by a designated NPS, the Planning Act 2008, as it is in force at the date on which this NPS was designated, provides that all applications for development consent will be both examined and determined by the IPC. However, the enactment and entry into force of the provisions of the Localism Bill (introduced into Parliament in December 2010) relating to the Planning Act would abolish the IPC. The functions of examining applications would be taken on by a new Major Infrastructure Planning Unit (“MIPU”) within the Planning Inspectorate and the function of determining applications on major energy infrastructure projects by the Secretary of State (who would receive a report and recommendation on each such application from MIPU). In the case of energy projects, this function would be carried out by the Secretary of State for Energy and Climate Change.
- 1.3.2 If the Localism Bill is enacted and these changes take effect, references in this NPS to the IPC should be read as follows from the date when the changes take effect. Any statement about the IPC in its capacity as an examining body should be taken to refer to MIPU. Any statement about the IPC in its capacity as a decision-maker determining applications should be taken to refer to the Secretary of State for Energy and Climate Change in his capacity as decision-maker. MIPU would have regard to such statements in framing its reports and recommendations to the Secretary of State.

1.4 Scope of the Overarching National Policy Statement for Energy

- 1.4.1 This Overarching National Policy Statement for Energy (EN-1) is part of a suite of NPSs issued by the Secretary of State for Energy and Climate Change. It sets out the Government’s policy for delivery of major energy infrastructure. A further five technology-specific NPSs for the energy sector

2 <http://www.communities.gov.uk/publications/planningandbuilding/letternpsconsultation>

cover: fossil fuel electricity generation (EN-2); renewable electricity generation (both onshore and offshore) (EN-3); gas supply infrastructure and gas and oil pipelines (EN-4); the electricity transmission and distribution network (EN-5); and nuclear electricity generation (EN-6). These should be read in conjunction with this NPS where they are relevant to an application.

- 1.4.2 The Planning Act 2008³ sets out the thresholds for nationally significant infrastructure projects (NSIPs) in the energy sector. The Act empowers the IPC to examine applications and make decisions on the following nationally significant energy infrastructure projects:
- electricity generating stations generating more than 50 megawatts onshore and 100 megawatts offshore. This includes generation from fossil fuels, wind, biomass, waste and nuclear. For these types of infrastructure, the Overarching NPS (EN-1) in conjunction with the relevant technology-specific NPSs (EN-2 on fossil fuel generating stations, EN-3 on renewable energy infrastructure or EN-6 on nuclear power generation as appropriate) will be the primary basis for IPC decision making;
 - electricity lines at or above 132kV. For this infrastructure, EN-1 in conjunction with the Electricity Networks NPS (EN-5) will be the primary basis for IPC decision making;
 - large gas reception and liquefied natural gas (LNG) facilities and underground gas storage facilities (meeting the thresholds set out in the Planning Act 2008, and explained in detail in Section 1.7 of the gas supply infrastructure and gas and oil pipelines NPS (EN-4)). For this infrastructure EN-1 in conjunction with EN-4 will be the primary basis for IPC decision making; and
 - cross-country gas and oil pipelines and Gas Transporter pipelines (meeting the thresholds and conditions set out in the Planning Act 2008 and Section 1.7 of EN-4). For this infrastructure EN-1 in conjunction with EN-4 will be the primary basis for IPC decision making.
- 1.4.3 The Planning Act 2008 enables the IPC to issue a development consent order including consent for development which is associated with the energy infrastructure listed above (subject to certain geographical and other restrictions set out in Section 115 of the Act). The Secretary of State has issued guidance to which the IPC must have regard in deciding whether development is associated development. EN-1, in conjunction with the relevant technology-specific NPS, will be the primary basis for IPC decision making on associated development. The IPC will not consent associated development in Wales, with the exception of certain development associated with underground gas storage facilities for the storage of gas in natural porous strata by a gas transporter (as set out in more detail in EN-4).
- 1.4.4 The Planning Act 2008 enables the IPC to issue a development consent order that can make provision relating to, or to matters ancillary to, the development of the energy infrastructure listed above. This may include, for example, the granting of wayleaves, the authorisation of tree lopping and the compulsory purchase of land. EN-1 in conjunction with the relevant

³ Part 3 Planning Act 2008.

technology-specific NPSs will be the primary basis for IPC decision making on such matters.

- 1.4.5 The generation of electricity from renewable sources other than wind, biomass or waste is not within the scope of this NPS. Insofar as this NPS relates to the development of new nuclear power stations, it only has effect in relation to applications for the development of new nuclear power stations on the sites listed in EN-6.

1.5 Geographical coverage

- 1.5.1 The IPC will examine all applications (other than as specified in this paragraph) for nationally significant infrastructure projects in England and Wales and the offshore Renewable Energy Zone (REZ) (except any part in relation to which Scottish Ministers have functions). In Wales, the IPC will not examine applications for LNG facilities, gas reception facilities or gas transporter pipelines. The IPC will only examine applications for underground gas storage facilities in Wales where the applicant is a licensed gas transporter and the storage is in natural porous strata; precise details are set out in EN-4 and Section 17 of the Planning Act 2008. It will remain possible for Welsh Ministers to consent offshore wind farms in territorial waters adjacent to Wales under the Transport and Works Act 1992 if applicants apply to them rather than the IPC.
- 1.5.2 In Scotland and in those areas of the REZ where Scottish Ministers have functions, the IPC will not examine applications for nationally significant energy infrastructure projects except as set out in paragraph 1.5.3. However, energy policy is generally a matter reserved to UK Ministers and this NPS may therefore be a relevant consideration in planning decisions in Scotland.
- 1.5.3 The IPC will examine applications for cross country oil and gas pipelines (meeting the conditions set out in Section 21 of the Planning Act 2008) that have one end in England or Wales and the other in Scotland.
- 1.5.4 In Northern Ireland, planning consents for all nationally significant infrastructure projects are devolved to the Northern Ireland Executive, so the IPC will not examine applications for energy infrastructure in Northern Ireland and the NPS will not apply there.

1.6 Period of validity and review

- 1.6.1 This NPS will remain in force in its entirety unless withdrawn or suspended in whole or in part by the Secretary of State. It will be subject to review by the Secretary of State in order to ensure that it remains appropriate. Information on the review process is set out in paragraphs 10 to 12 of the Annex to CLG's letter of 9 November 2009 (see paragraph 1.2.3 above).

1.7 The Appraisal of Sustainability and Habitats Regulations Assessment

- 1.7.1 All the energy NPSs have been subject to an Appraisal of Sustainability (AoS), as required by the Planning Act 2008. The AoSs also incorporate the analysis of likely significant environmental effects required by the Strategic

Environmental Assessment (SEA) Directive (2001/42/EC). The AoSs for EN-1 to EN-5 have been revised substantially to take account of comments made in response to the consultation which took place between November 2009 and February 2010. The purposes and methods of the AoSs are explained in the revised draft of the AoS for EN-1. Their primary function is to inform consultation on the draft NPSs by providing an analysis of the environmental, social and economic impacts of implementing the energy NPSs by granting development consents for large-scale energy infrastructure projects in accordance with them. A non-technical summary of each AoS has also been published for the benefit of non-specialist readers.

1.7.2 Some key points from the AoS for EN-1 are set out below.

- The energy NPSs should speed up the transition to a low carbon economy and thus help to realise UK climate change commitments sooner than continuation under the current planning system. However there is also some uncertainty as it is difficult to predict the mix of technology that will be delivered by the market against the framework set by the Government.
- The energy NPSs are likely to contribute positively towards improving the vitality and competitiveness of the UK energy market by providing greater clarity for developers which should improve the UK's security of supply and, less directly, have positive effects for health and well-being in the medium to longer term through helping to secure affordable supplies of energy and minimising fuel poverty; positive medium and long term effects are also likely for equalities.
- The development of new energy infrastructure, at the scale and speed required to meet the current and future need, is likely to have some negative effects on biodiversity, landscape/visual amenity and cultural heritage. However the significance of these effects and the effectiveness of mitigation possibilities is uncertain at the strategic and non-locationally specific level at which EN-1 to EN-5 are pitched. Short-term construction impacts are also likely through an increased use of raw materials and resources and negative effects on the economy due to impacts on existing land and sea uses. In general, it should be possible to mitigate satisfactorily the most significant potential negative effects of new energy infrastructure consented in accordance with the energy NPSs, and they explain ways in which this can be done; however, the impacts on landscape/visual amenity in particular will sometimes be hard to mitigate.

1.7.3 There may also be cumulative negative effects on water quality, water resources, flood risk, coastal change and health at the regional or sub-regional levels depending upon location and the extent of clustering of new energy and other infrastructure. Proposed energy developments will still be subject to project level assessments, including Environmental Impact Assessment, and this will address locationally specific effects. The energy NPSs set out mitigation for cumulative negative effects by requiring the IPC to consider accumulation of effects as a whole in their decision-making on individual applications for development consent.

- 1.7.4 The conclusions of the AoS for the nuclear power NPS (EN-6), which contains more detailed analysis of impacts because EN-6 designates sites potentially suitable for development, are set out in EN-6.
- 1.7.5 As required by the SEA Directive, Part 3 of the AoS of EN-1 also includes an assessment of reasonable alternatives to the policies set out in EN-1 at a strategic level. In particular, this involved a generic assessment of alternatives which placed more emphasis on three key drivers of policy which are highly relevant to the planning context: securing low cost energy (Alternative A1); reducing greenhouse gas emissions (Alternative A3); and reducing other environmental impacts of energy infrastructure development (Alternative A4). There are many different possible changes which could be made to the individual planning policies set out in EN-1 to EN-5, and very large numbers of possible combinations of those different possible policies. However, any change which was consistent with the overall aims of the energy policies that the consenting of new infrastructure in accordance with the energy NPSs is intended to help achieve, would be motivated by the desire to do more in one or more of the areas represented by Alternatives A1, A3 or A4.
- 1.7.6 Alternative A1 – placing more emphasis on a low cost of energy – would:
- be likely to have an adverse effect on security of supply if it resulted in greater reliance on imports of fossil fuel or reduced the diversity of energy types;
 - indirectly increase carbon emissions if lower energy costs stimulated activity in the wider economy;
 - have beneficial effects on the economy and indirectly on human health and well-being because of the stimulus of lower energy costs;
 - be likely to have adverse effects on features of the built and natural environment that are not protected by statutory designations.
- Although these effects will be local, their cumulative effect over a programme of energy development might be significant.
- 1.7.7 Alternative A1 compares unfavourably with EN-1 in relation to those aspects of sustainable development which are particularly relevant to achievement of underlying energy policy objectives. It has therefore been rejected.
- 1.7.8 Alternative A3, placing more emphasis on a reduction in CO₂ emissions would, by definition be beneficial from a climate change point of view. There is also the possibility that it may compare favourably with EN-1 from a human health and well-being and economic perspective.
- 1.7.9 However it is not clear that it would be possible to give practical effect to such an alternative through the planning system in the next ten years or so without risking negative impacts on security of supply. Equally the planning policies in the energy NPSs as drafted do not put any unjustified barriers in the way of the development of low carbon energy infrastructure (or the networks infrastructure needed to support it). Accordingly, Alternative A3 has not been preferred to EN-1 at this stage, but Government is actively considering other ways in which to encourage industry to accelerate

progress towards a low carbon economy, particularly through the Electricity Market Reform project (see Section 2.2 of this NPS).

- 1.7.10 Alternative A4, placing more emphasis on reducing other environmental impacts, would:
- be beneficial for the natural and built environment;
 - present risks to energy security because more stringent environmental requirements could delay the approval and development of new energy projects.
- 1.7.11 As noted above, the principal area in which consenting new energy infrastructure in accordance with the energy NPSs is likely to lead to adverse effects which cannot always be satisfactorily mitigated is in respect of landscape and visual effects. EN-1 already contains policies which severely limit the prospects for development of large-scale energy infrastructure in the most attractive landscapes and townscapes. Tightening the development consent policies in EN-1 to make it harder for energy infrastructure to be consented which would have adverse landscape or townscape effects would be likely to make it significantly more difficult to gain consent for a range of large-scale energy infrastructure projects. Alternative A4 is not to be preferred to EN-1, at least until such time as it becomes clear that levels of need for new large-scale energy infrastructure are very much lower than Government anticipates that they will be for the foreseeable future.
- 1.7.12 Because all the alternatives are assessed as performing less well than EN-1 against one or more of the criteria for climate change or security of energy supply that are fundamental objectives of the plan, the Government's preferred option is to take forward the energy NPS EN-1 and the technology-specific NPSs EN-2 to EN-6. (Further assessment of technology-specific policy alternatives is set out in the AoSs for EN-2 to EN-6.)
- 1.7.13 Habitats Regulation Assessments (HRA) have been carried out and published for the non-locationally specific NPSs EN-1 to EN-5 and for EN-6 which does specify sites suitable for development. As EN-1 to EN-5 do not specify locations for energy infrastructure, the HRA is a high-level strategic overview. Although the lack of spatial information within the EN-1 to EN-5 made it impossible to reach certainty on the effect of the plan on the integrity of any European Site, the potential for proposed energy infrastructure projects of the kind contemplated by EN-1 to EN-5 to have adverse effects on the integrity of such sites cannot be ruled out. The HRA explains why the Government considers that EN-1 to EN-5 are, nevertheless, justified by imperative reasons of overriding public interest, while noting that its conclusions are only applicable at the NPS level and are without prejudice to any project-level HRA, which may result in the refusal of consent for a particular application. Section 1.7 of EN-6 sets out details of the nuclear HRA.

Part 2 Government policy on energy and energy infrastructure development

2.1 Introduction

- 2.1.1 This Part outlines the policy context for the development of nationally significant energy infrastructure. It reflects the commitment in the Coalition Programme for Government to take forward the energy NPSs and the policies outlined in the first Annual Energy Statement made to Parliament in July 2010⁴. The Annual Energy Statement presented a clear statement of Government objectives, crucial to meeting key goals on carbon emission reductions, energy security and affordability.
- 2.1.2 As explained in Part 3, energy is vital to economic prosperity and social well-being and so it is important to ensure that the UK has secure and affordable energy. Producing the energy the UK requires and getting it to where it is needed necessitates a significant amount of infrastructure, both large and small scale. The energy NPSs consider the large scale infrastructure that play a vital role in ensuring we have the secure energy supplies we need.

2.2 The road to 2050

- 2.2.1 We are committed to meeting our legally binding target to cut greenhouse gas emissions by at least 80% by 2050, compared to 1990 levels⁵. Analysis done on possible 2050 pathways⁶ shows that moving to a secure, low carbon energy system is challenging, but achievable. It requires major investment in new technologies to renovate our buildings, the electrification of much of our heating, industry and transport, prioritisation of sustainable bioenergy and cleaner power generation. And it requires major changes in the way energy is used by individuals, by industry, and by the public sector.
- 2.2.2 Delivering this change is a major challenge not least for energy providers, and the Government is working to ensure their efforts produce the major,

4 <http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/237-annual-energy-statement-2010.pdf>

5 http://www.decc.gov.uk/en/content/cms/legislation/cc_act_08/cc_act_08.aspx

6 2050 Pathways Analysis, HM Government, 2010 <http://www.decc.gov.uk/assets/decc/What%20we%20do/A%20low%20carbon%20UK/2050/216-2050-pathways-analysis-report.pdf>

rapid change the UK needs. Within a market-based system⁷ and with severe constraints on public expenditure in the near-term, the focus of Government activity in this transformation is clear. It should be on developing a clear, long-term policy framework which facilitates investment in the necessary new infrastructure (by the private sector) and in energy efficiency.

2.2.3 The 2010 Annual Energy Statement outlined DECC's programme in four key areas to support the transition to a secure, safe, low carbon, affordable energy system in the UK:

- saving energy (through the Green Deal⁸) and supporting vulnerable consumers;
- delivering secure energy on the way to a low carbon energy future;
- managing our energy legacy responsibly and cost-effectively; and
- driving ambitious action on climate change at home and abroad.

2.2.4 Not all aspects of Government energy and climate change policy will be relevant to IPC decisions or planning decisions by local authorities, and the planning system is only one of a number of vehicles that helps to deliver Government energy and climate change policy. The role of the planning system is to provide a framework which permits the construction of whatever Government – and players in the market responding to rules, incentives or signals from Government – have identified as the types of infrastructure we need in the places where it is acceptable in planning terms. It is important that, in doing this, the planning system ensures that development consent decisions take account of the views of affected communities and respect the principles of sustainable development.

The transition to a low carbon economy

2.2.5 The UK economy is reliant on fossil fuels, and they are likely to play a significant role for some time to come. Most of our power stations are fuelled by coal and gas. The majority of homes have gas central heating, and on our roads, in the air and on the sea, our transport is almost wholly dependent on oil.

2.2.6 However, the UK needs to wean itself off such a high carbon energy mix: to reduce greenhouse gas emissions, and to improve the security, availability and affordability of energy through diversification. Under some of the illustrative 2050 pathways, electricity generation would need to be virtually emission-free, given that we would expect some emissions from industrial and agricultural processes, transport and waste to persist. By 2050, we can

⁷ The essential characteristics of the market-based policy approach which successive administrations have taken to the GB electricity market since 1990 are summarised in paragraphs 2 to 10 of Chapter 2 of Electricity Market Reform: Consultation Document (December 2010, available at:

<http://www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx>).

Paragraph 11 of that Chapter briefly describes some of the ways in which Government has intervened subsequently to influence market structure or the behaviour of participants. See also paragraph 2.2.18 below.

⁸ Set out in the Annual Energy Statement http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/green_deal/green_deal.aspx

expect that fossil fuels will be scarcer, but will still be in demand, and that prices will therefore be far higher. Further, the UK's own oil and gas resources will be depleting and, worldwide, the costs and risks of extracting oil in particular will increase.

- 2.2.7 Continuation of global emissions, including greenhouse gases like carbon dioxide, at current levels could lead average global temperatures to rise by up to 6°C by the end of this century⁹. This would make extreme weather events like floods and droughts more frequent and increase global instability, conflict, public health-related deaths and migration of people to levels beyond any recent experience. Heat waves, droughts, and floods would affect the UK.
- 2.2.8 To avoid the most dangerous impacts of climate change, the increase in average global temperatures must be kept to no more than 2°C, and that means global emissions must start falling as a matter of urgency. To drive the transition needed the Government has put in place the world's first ever legally binding framework to cut emissions by at least 80% by 2050, that will deliver emission reductions through a system of five year carbon budgets that will set a trajectory to 2050.
- 2.2.9 To prepare for the impacts of climate change, the Climate Change Act 2008 also sets out a statutory framework for adapting to climate change, with the Government committed to producing a statutory climate change adaptation programme in 2012 (which will be updated on five-yearly cycles). To lead and co-ordinate work in preparation for this, the Government has established the Adapting to Climate Change Programme¹⁰, which includes:
- undertaking a UK Climate Change Risk Assessment; and
 - using the "Adaptation Reporting Power" to require certain public bodies and statutory undertakers to set out the risks to their work from a changing climate and what they are doing to manage these risks.
- 2.2.10 Alongside this, the Government is committed to ensuring that adaptation needs are built into planning and risk management now to ensure the continued and improved success of businesses and new energy NSIPs. Section 4.8 of this NPS sets out how applicants and the IPC should take the effects of climate change into account when developing and consenting infrastructure.
- 2.2.11 This NPS also sets out how the energy sector can help deliver the Government's climate change objectives by clearly setting out the need for new low carbon energy infrastructure to contribute to climate change mitigation.

9 Climate model projections summarized in the latest Intergovernmental Panel on Climate Change (IPCC) report, the 2007 Fourth Assessment Report, indicate that the global surface temperature is likely to rise a further 1.1 to 6.4 °C (2.0 to 11.5 °F) during the 21st century. IPCC, 2007. Climate Change 2007: Synthesis Report. An Assessment of the Intergovernmental Panel on Climate Change (page 45).

10 http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf
<http://www.defra.gov.uk/environment/climate/adapting/>

The power sector and carbon emissions

- 2.2.12 The EU Emissions Trading System (EU ETS) forms the cornerstone of UK action to reduce greenhouse gas emissions from the power sector. Since 2005, the EU ETS has set a cap on emissions from the large industrial sectors such as electricity generation and heavy industry and from Phase III (2013-2020) this cap will reduce at an annual rate of 1.74%. It is expected to deliver reductions from these sectors of 21% on 2005 levels by 2020, underpinning the transition to low carbon electricity generation.
- 2.2.13 The cap set under the EU ETS translates to a finite number of allowances to emit greenhouse gases. The companies involved can trade these allowances with each other, creating a carbon price and enabling the required reductions to be made where they are cheapest. The carbon price generated by the EU ETS makes producing electricity from carbon intensive power stations less attractive and creates an incentive for power station operators to invest in cleaner electricity generation. Whilst the EU ETS is successfully delivering emissions reductions across the UK and Europe, so far the carbon price has not been sufficient to incentivise the required levels of new low carbon investment¹¹.
- 2.2.14 To help incentivise investment and bolster the EU-wide carbon price, the Government supports a move across the EU from a 20% to a 30% emissions reduction target by 2020. Moreover, to provide even greater certainty and support to the carbon price in the UK, the Government has announced proposals to reform the climate change levy.
- 2.2.15 In the UK, we intend to go beyond the EU ETS and ensure that developers deliver the required levels of investment in low carbon generation to decarbonise the way in which we produce electricity and reinforce our security of supply, whilst retaining efficiency and competitiveness. The Government is developing possible ways of achieving this through the Electricity Market Reform project.

Electricity Market Reform

- 2.2.16 About a quarter of the UK's generating capacity is due to close by 2018 and new low carbon generation is required which is reliable, secure and affordable. For the time being, electricity margins¹² are healthy. However, with the total investment requirement in the electricity sector alone estimated at over £100 billion by the end of this decade, much more has to be done to unlock this investment. The implementation of the Planning Act 2008 (and the projected reforms to it) is part of this process, as the new planning system for major infrastructure is intended to provide a more efficient and transparent decision-making framework which will facilitate the construction of the kinds of new energy infrastructure which we need (as set out in Part 3). However, the Government is also considering what further interventions in energy markets may be necessary in order to ensure that developers

11 CCC, 2009. Meeting Carbon Budgets – the need for a step change. Progress report to Parliament Committee on Climate Change October 2009 (page 112).

<http://downloads.theccc.org.uk/21667%20CCC%20Report%20AW%20WEB.pdf>

12 Part 3 of this NPS provides more information on capacity margins.

come forward with proposals to build enough of these kinds of infrastructure (particularly low carbon infrastructure).

- 2.2.17 The Government is therefore conducting a detailed appraisal of the way the electricity market should be designed. The consultation on Electricity Market Reform published by DECC in December 2010, sought views on a preferred package of reforms: a carbon price support mechanism, a feed-in tariff for low-carbon technologies, an emissions performance standard, and a capacity mechanism. The Government is considering the role these reforms could play in delivering a system that supports investment in a secure, low carbon, affordable electricity mix for decades to come.
- 2.2.18 Providing more support and certainty about the carbon price will improve the prospects for low carbon investment in the period before wider ranging electricity market reforms can be introduced, but by itself it will not drive the decarbonisation of the generating mix. What is required is a clear market design that provides consistent, long term signals for investment in the new generating capacity and transmission and distribution infrastructure that is required.
- 2.2.19 The Planning Act and any market reforms associated with the Electricity Market Reform project will complement each other and are consistent with the Government's established view that the development of new energy infrastructure is market-based. While the Government may choose to influence developers in one way or another to propose to build particular types of infrastructure, it remains a matter for the market to decide where and how to build, as market mechanisms will deliver the required infrastructure most efficiently. Against this background of possibly changing market structures, developers will still need development consent for each proposal. Whatever incentives, rules or other signals developers are responding to, the Government believes that the NPSs set out planning policies which both respect the principles of sustainable development and are capable of facilitating, for the foreseeable future, the consenting of energy infrastructure on the scale and of the kinds necessary to help us maintain safe, secure, affordable and increasingly low carbon supplies of energy.

Security of energy supplies

- 2.2.20 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 manage the risks to achieving security of supply we need:
- sufficient electricity capacity (including a greater proportion of low carbon generation) to meet demand at all times. Electricity cannot be stored¹³ so demand for it must be simultaneously and continuously met by its supply. This requires a safety margin of spare capacity to accommodate unforeseen fluctuations in supply or demand;

¹³ At present we have no ability to store electricity. Currently the only viable utility scale energy storage is hydro pumped storage. Part 3 has more details on pumped storage and the more intelligent use of energy.

- reliable associated supply chains (for example fuel for power stations) to meet demand as it arises;
- a diverse mix of technologies and fuels, so that we do not rely on any one technology or fuel¹⁴. Diversity can be achieved through the use of different technologies and multiple supply routes (for example, primary fuels imported from a wide range of countries); and
- there should be effective price signals, so that market participants have sufficient incentives to react in a timely way to minimise imbalances between supply and demand.

2.2.21 In the medium term, we face the challenges of reducing our energy demand, replacing existing power plants due for closure and maximising the economic production of our declining domestic oil and gas reserves. Developing our infrastructure (for example with Smart Grids for electricity) will help us maintain and improve our security and access to competitive supplies, particularly for electricity generation and gas importation and storage. This investment challenge drives much of the reform outlined in the 2010 Annual Energy Statement.

2.2.22 Looking further ahead, the 2050 pathways show that the need to electrify large parts of the industrial and domestic heat and transport sectors could double demand for electricity over the next forty years. It makes sense to switch to electricity where practical, as electricity can be used for a wide range of activities (often with better efficiency than other fuels) and can, to a large extent, be scaled up to meet demand. To meet emissions targets, the electricity being consumed will need to be almost exclusively from low carbon sources. Contrast this with the first quarter of 2011, when around 75% of our electricity was supplied by burning gas and coal.

2.2.23 The UK must therefore reduce over time its dependence on fossil fuels, particularly unabated combustion. The Government plans to do this by improving energy efficiency and pursuing its objectives for renewables, nuclear power and carbon capture and storage¹⁵. However some fossil fuels will still be needed during the transition to a low carbon economy.

¹⁴ Part 3 of this NPS has more detail on the advantages of a diverse mix of technologies.

¹⁵ CCC, 2008. Building a low carbon economy – the UK's contribution to tackling climate change. The First Report of the Committee on Climate Change December 2008 (pages 415 – 430). <http://www.theccc.org.uk/pdf/TSO-ClimateChange.pdf>

2.2.24 Box 2.1 further explains the Government's approach to security of supply.

Box 2.1 Maintaining security of supply as we move to a low carbon economy

Great Britain has well developed electricity and gas markets, where suppliers compete to deliver energy to consumers. This is within a framework of effective regulation managed by the independent Gas and Electricity Markets Authority (GEMA), whose objectives are set out in statute. Its principal objective is to protect the interests of present and future consumers, taken as a whole and including their interest in reducing emissions and securing energy supplies. GEMA is supported by the executive body Ofgem.

In this context, one of GEMA's key roles is to regulate monopoly gas and electricity networks to protect consumers, including their interest in adequate and timely investment in our electricity and gas networks consistent with maintaining energy security and reducing carbon emissions.

Within the market, companies have strong incentives to ensure that they have enough supply to meet their customers' needs. Suppliers who find themselves with more customer demand than contracted supply must, if the market as a whole is short, pay the balancing penalty (based on the system marginal price) for each unit they are short. These prices are much higher than the average prices in the same period. Prices signal a level of need for capacity and historic evidence shows companies respond to these signals.

In deciding how much infrastructure to build, companies consider the uncertain future, such as risks associated with technology and the ability to secure fuel supplies at competitive rates. The nature of these risks means that companies tend to invest in a variety of types of capacity.

Price signals are complemented by regular forecasts from a number of bodies, including DECC and National Grid. They provide information to the market in a number of sources, including through annual statutory security of supply reporting from DECC and Ofgem, National Grid's "Seven Year Statement" for electricity and the "Ten Year Statement" for gas. DECC also publishes projections of future demand in the Updated Energy and Emissions Projections every year.

2.2.25 The UK faces two main security of supply challenges during our transition to a low carbon economy:

- increasing reliance on imports of oil and gas as North Sea reserves decline in a world where energy demand is rising and oil and gas production and supply is increasingly politicised; and
- the requirement for substantial and timely private sector investment over the next two decades in power stations, electricity networks and gas infrastructure.

- 2.2.26 The intention of this suite of energy NPSs is to provide a robust planning framework to facilitate private sector investment. Part 3 of this NPS sets out the planning policy for the IPC in respect of the Government's need for new energy infrastructure projects.

Delivering Government's wider objectives

- 2.2.27 The Government's wider objectives for energy infrastructure include contributing to sustainable development and ensuring that our energy infrastructure is safe. Sustainable development is relevant not just in terms of addressing climate change, but because the way energy infrastructure is deployed affects the well-being of society and the economy. For example, the availability of appropriate infrastructure supports the efficient working of the market so as to ensure competitive prices for consumers. The regulatory framework also encourages the energy industry to protect the more vulnerable.
- 2.2.28 The planning framework set out in this NPS and the suite of energy NPSs takes full account of the objective of contributing to the achievement of sustainable development and this has been tested through the AoS. The AoS has examined whether the NPS framework for the development of new energy infrastructure projects is consistent with the objectives for sustainable development, including consideration of other Government policies such as those for the environment, economic development, health and transport (See Section 1.7 of this NPS for the AoS).

Part 3 The need for new nationally significant energy infrastructure projects

3.1 IPC decision making

- 3.1.1 The UK needs all the types of energy infrastructure covered by this NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions.
- 3.1.2 It is for industry to propose new energy infrastructure projects within the strategic framework set by Government. The Government does not consider it appropriate for planning policy to set targets for or limits on different technologies.
- 3.1.3 The IPC should therefore assess all applications for development consent for the types of infrastructure covered by the energy NPSs on the basis that the Government has demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described for each of them in this Part.
- 3.1.4 The IPC should give substantial weight to the contribution which projects would make towards satisfying this need when considering applications for development consent under the Planning Act 2008¹⁶.

3.2 Introduction

- 3.2.1 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. 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. The major types of energy that we use are: for generating electricity – fossil fuels, renewable energy and nuclear; for heating and industry – fossil fuels used directly; and for transport – oil-based fuels.
- 3.2.2 As we move towards 2050 the ways in which we use energy will be transformed. We need to become less dependent on some forms of energy, as new and innovative low carbon technologies and energy efficiency measures are taken up. We also shall become more dependent on others –

¹⁶ In determining the planning policy set out in Section 3.1, the Government has considered a range of projections and models that attempt to assess what the UK's future energy needs may be. Figures referenced relate to different timescales and therefore cannot be directly compared. Models are regularly updated and the outputs will inevitably fluctuate as new information becomes available.

for example, demand for electricity will increase if we electrify large parts of transport, heating and industry.

- 3.2.3 This Part of the NPS explains why the Government considers that, without significant amounts of new large-scale energy infrastructure, the objectives of its energy and climate change policy cannot be fulfilled. However, as noted in Section 1.7, it will not be possible to develop the necessary amounts of such infrastructure without some significant residual adverse impacts. This Part also shows why the Government considers that the need for such infrastructure will often be urgent. The IPC should therefore give substantial weight to considerations of need. The weight which is attributed to considerations of need in any given case should be proportionate to the anticipated extent of a project's actual contribution to satisfying the need for a particular type of infrastructure.

3.3 The need for new nationally significant electricity infrastructure projects

- 3.3.1 Electricity meets a significant proportion of our overall energy needs and our reliance on it is likely to increase as we move towards our 2050 goals¹⁷. The key reasons why the Government believes there is an urgent need for new electricity NSIPs are set out below.

Meeting energy security and carbon reduction objectives

- 3.3.2 The Government needs to ensure sufficient electricity generating capacity is available to meet maximum peak demand, with a safety margin or spare capacity to accommodate unexpectedly high demand and to mitigate risks such as unexpected plant closures and extreme weather events. This is why there is currently around 85 GW of total generation capacity in the UK, whilst the average demand across a year is only for around half¹⁸ of this.
- 3.3.3 The larger the difference between available capacity and demand (i.e. the larger the safety margin), the more resilient the system will be in dealing with unexpected events, and consequently the lower the risk of a supply interruption. This helps to protect businesses and consumers, including vulnerable households, from rising and volatile prices and, eventually, from physical interruptions to supplies that might impact on essential services.
- 3.3.4 There are benefits of having a diverse mix of all types of power generation. It means we are not dependent on any one type of generation or one source of fuel or power and so helps to ensure security of supply. In addition, as set out briefly below, the different types of electricity generation have different characteristics which can complement each other:
- fossil fuel generation can be brought on line quickly when there is high demand and shut down when demand is low, thus complementing

17 Part 2 of this NPS provides details of the Government's energy objectives, including the Government's legal obligation to reduce the UK's greenhouse gas emissions by at least 80% (from 1990 levels) by 2050.

18 DECC: Digest of United Kingdom Energy Statistics (DUKES) table 5.2. <http://www.decc.gov.uk/assets/decc/Statistics/publications/dukes/348-dukes-2010-printed.pdf> Total demand for UK: 379 TeraWatt hours (TWh), divided by 8760 hours (no. of hours in a year) gives 43 GW average demand.

generation from nuclear and the intermittent generation from renewables. However, until such time as fossil fuel generation can effectively operate with Carbon Capture and Storage (CCS), such power stations will not be low carbon (see Section 3.6).

- renewables offer a low carbon and proven (for example, onshore and offshore wind) fuel source, but many renewable technologies provide intermittent generation (see Section 3.4); and
- nuclear power is a proven technology that is able to provide continuous low carbon generation, which will help to reduce the UK's dependence on imports of fossil fuels (see Section 3.5). Whilst capable of responding to peaks and troughs in demand or supply, it is not as cost efficient to use nuclear power stations in this way when compared to fossil fuel generation.

3.3.5 The UK is choosing to largely decarbonise its power sector by adopting low carbon sources quickly. There are likely to be advantages to the UK of maintaining a diverse range of energy sources so that we are not overly reliant on any one technology (avoiding dependency on a particular fuel or technology type). This is why Government would like industry to bring forward many new low carbon developments (renewables, nuclear and fossil fuel generation with CCS) within the next 10 to 15 years to meet the twin challenge of energy security and climate change as we move towards 2050.

3.3.6 Within the strategic framework established by the Government it is for industry to propose the specific types of developments that they assess to be viable. This is the nature of a market-based energy system¹⁹. The IPC should therefore act in accordance with the policy set out at in Section 3.1 when assessing proposals for new energy NSIPs.

The need to replace closing electricity generating capacity

3.3.7 In the UK at least 22 GW²⁰ of existing electricity generating capacity will need to be replaced in the coming years, particularly to 2020. This is as a result of tightening environmental regulation and ageing power stations.

3.3.8 Of this 22 GW, the closure of about 12 GW is driven by the Large Combustion Plant Directive (LCPD)²¹, which regulates emissions of sulphur and nitrogen oxides. Generating companies who chose to 'opt out' their coal and oil power stations under the terms of the LCPD are only able to operate

19 The essential characteristics of the market-based policy approach which successive administrations have taken to the GB electricity market since 1990 are summarised in paragraphs 2 to 10 of Chapter 2 of Electricity Market Reform: Consultation Document (December 2010, available at:

<http://www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx>). Paragraph 11 of that Chapter briefly describes some of the ways in which Government has intervened subsequently to influence market structure or the behaviour of participants.

20 22 GW is about a quarter of the UK's current electricity generating capacity of 85 GW. Closure figures from DECC & DEFRA

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/issues/power_stations/power_stations.aspx

<http://www.environment-agency.gov.uk/static/documents/Business/lcpd-nationalplan-update.pdf>

21 Directive 2001/80/EC: <http://ec.europa.eu/environment/air/pollutants/stationary/lcp.htm>

for a maximum of 20,000 hours over the period 2008-2015 and will have to close by the end of 2015. In addition to this, based on their published lifetimes, about 10 GW of nuclear generating capacity is expected to close over the next 20 years²².

- 3.3.9 Further power station closures are expected to occur after the LCPD due to the Industrial Emissions (Integrated Pollution Prevention and Control) Directive²³, which establishes stricter limits on the emissions of sulphur and nitrogen oxide from large combustion plants than those currently set in the LCPD. Any reduction in generation capacity from current levels will need to be replaced in order to ensure security of supply is maintained.

The need for more electricity capacity to support an increased supply from renewables

- 3.3.10 As part of the UK's need to diversify and decarbonise electricity generation, the Government is committed to increasing dramatically the amount of renewable generation capacity (see Section 3.4). In the short to medium term, much of this new capacity is likely to be onshore and offshore wind, but increasingly it may include plant powered by the combustion of biomass and waste and the generation of electricity from wave and tidal power.
- 3.3.11 An increase in renewable electricity is essential to enable the UK to meet its commitments under the EU Renewable Energy Directive²⁴. It will also help improve our energy security by reducing our dependence on imported fossil fuels, decrease greenhouse gas emissions and provide economic opportunities. However, some renewable sources (such as wind, solar and tidal) are intermittent and cannot be adjusted to meet demand. As a result, the more renewable generating capacity we have the more generation capacity we will require overall, to provide back-up at times when the availability of intermittent renewable sources is low. If fossil fuel plant remains the most cost-effective means of providing such back-up, particularly at short notice, it is possible that even when the UK's electricity supply is almost entirely decarbonised we may still need fossil fuel power stations for short periods when renewable output is too low to meet demand, for example when there is little wind.
- 3.3.12 There are a number of other technologies which can be used to compensate for the intermittency of renewable generation, such as electricity storage, interconnection and demand-side response, without building additional generation capacity. Although Government believes these technologies will play important roles in a low carbon electricity system, the development and deployment of these technologies at the necessary scale has yet to be achieved. The Government does not therefore consider it prudent to solely rely on these technologies to meet demand without the additional back-up capacity (see further paragraphs 3.3.30-3.3.34 below). It is therefore likely that increasing reliance on renewables will mean that we need more total

22 Nuclear power stations have published lifetimes which reflect an expected closure date. Operators may apply to the Health and Safety Executive and the Nuclear Decommissioning Authority for life extensions. Although life extensions are possible, they are not guaranteed.

23 <http://ec.europa.eu/environment/air/pollutants/stationary/ippc/proposal.htm>

24 Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

electricity capacity than we have now, with a larger proportion being built only or mainly to perform back-up functions.

Future increases in electricity demand

- 3.3.13 To meet its 2050 emissions reductions goals, the UK needs to move away from fossil fuels not only as a source of electricity generation, but also in other sectors of industry and for heating and surface transport. Increasing the supply of low carbon electricity is an essential pre-requisite for the switch away from fossil fuels in these areas, and this will further substantially increase demand for electricity.
- 3.3.14 Government analysis of the different pathways to 2050²⁵ shows that it will be vital to make energy efficiency improvements per head of population if we are to meet the target of reducing emissions by at least 80% by 2050 (see paragraph 3.3.26 below). However, even with major improvements in overall energy efficiency, we expect that demand for electricity is likely to increase, as significant sectors of energy demand (such as industry, heating and transport) switch from being powered by fossil fuels to using electricity. As a result of this electrification of demand, total electricity consumption (measured in terawatt hours over a year) could double by 2050. Depending on the choice of how electricity is supplied, the total capacity²⁶ of electricity generation (measured in GW) may need to more than double to be robust to all weather conditions. In some outer most circumstances, for example if there was very strong electrification of energy demand and a high level of dependence on intermittent electricity generation, then the capacity of electricity generation could need to triple. The Government therefore anticipates a substantial amount of new generation will be needed.

The urgency of the need for new electricity capacity

- 3.3.15 In order to secure energy supplies that enable us to meet our obligations for 2050, there is an urgent need for new (and particularly low carbon) energy NSIPs to be brought forward as soon as possible, and certainly in the next 10 to 15 years, given the crucial role of electricity as the UK decarbonises its energy sector.
- 3.3.16 Energy NSIPs take a long time to move from design conception to operation and they are generally designed to operate for 30 to 60 years. The Government has therefore considered a planning horizon of 2025 for the energy NPSs in general and for EN-6 in particular, as an interim milestone to secure our longer term objectives. A failure to decarbonise and diversify our energy sources now could result in the UK becoming locked into a system of high carbon generation, which would make it very difficult and expensive to meet our 2050 carbon reduction target. We cannot afford for this to happen.
- 3.3.17 The Government will keep the relevance of this interim milestone of 2025 for the energy NPSs under review to ensure the NPSs remain appropriate for decision taking.

²⁵ 2050 Pathways Analysis, HM Government, 2010

²⁶ The capacity referred to here is nameplate capacity.

3.3.18 It is not possible to make an accurate prediction of the size and shape of demand for electricity in 2025, but in order to get a sense of the possible scale of future demand to 2025, one possible starting point is provided by the most recent Updated Energy and Emissions Projections (UEP)²⁷ which DECC published in June 2010²⁸. It is worth noting that models are regularly updated and the outputs will inevitably fluctuate as new information becomes available. The UEP modelled four different scenarios – see Table 3.1²⁹, which, amongst other outputs, can be used to illustrate the likely impact of different fossil fuel and carbon prices on the need for new electricity generating capacity by 2025³⁰. The projections do not reflect a desired or preferred outcome for the Government in relation to the need for additional electricity generating capacity or the types of electricity generation required.

Table 3.1: Summary of UEP projections of new electricity capacity by 2025

| | Low fossil fuels and carbon prices (GW) | Central fossil fuels and carbon prices (GW) | High fossil fuels and carbon prices (GW) | High high fossil fuels and carbon prices (GW) |
|---|---|---|--|---|
| Projected new electricity capacity required by 2025 | 50 | 54 | 59 | 59 |

3.3.19 For the purposes of the UEP, each scenario has an equal likelihood of projecting the UK’s future energy needs and mix. Given the severe social and economic disruption that would be caused by insufficient electricity supplies and the long lead time to build new infrastructure to meet any deficit, the Government considers it appropriate to consider the ‘high fossil fuel and carbon price scenario’ in further detail below because it is prudent to plan for the greatest potential need for new energy NSIPs³¹. To do otherwise would create an unacceptable risk to the delivery of secure, affordable low carbon energy supplies.

3.3.20 The UEP scenarios all suggest that electricity demand in 2025 will be at approximately the same levels as today. Whilst some industry models

27 <http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx>
 These updated projections do not take into consideration the policies announced in ‘The Coalition: our programme for government’, which include a floor price for carbon. A new UEP is expected to be published later in 2011. Assumptions used on carbon and fossil fuels prices can be seen at chapter 2 of UEP.

28 Interim analysis done on emissions projections for the Fourth Carbon Budget indicates similar or slightly higher levels of new capacity might be needed.

29 These figures have been rounded to the nearest GW for the purposes of this NPS. The figures allow for the intermittency of the renewable capacity built in each scenario.

30 Annex I to the UEP shows new capacity – see the UEP website referred to previously.

31 The ‘high high fossil fuel and carbon price’ scenario also predicts the same amount of new electricity infrastructure, but uses more extreme fuel and carbon prices. Details of the fossil fuel and carbon price assumptions are in chapter 2 of the main UEP report <http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx>

support this assumption³², 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 needed may be even greater than projected in the high price scenario.

- 3.3.21 Whilst no such projections of the UK's future energy mix can be definitive, they illustrate the scale of the challenge the UK is facing and help the Government understand how the market may respond. This enables the Government, taking due account of the relevant uncertainties, to ensure that the appropriate policy, legislation and regulation is in place to provide a framework which it judges will enable the market to deliver new energy NSIPs to meet the UK's future energy needs and climate change policy goals.
- 3.3.22 If we assume, as is prudent, that total electricity demand is unlikely to remain at approximately current levels (and may have increased) in 2025³³ and that a larger amount of generating capacity will be required to serve even the same level of demand³⁴ then, based on the UEP high fossil fuel and carbon price scenario, the UK would need at least 113 GW of total electricity generating capacity³⁵ (compared to around 85 GW now), of which at least 59 GW would be new build. A further breakdown of this figure to illustrate the scale of the challenge facing us in terms of new electricity generating infrastructure provision by technology type would be as follows:
- around 33 GW of the new capacity by 2025 would need to come from renewable sources to meet renewable energy commitments as set out in Section 3.4;
 - it would be for industry to determine the exact mix of the remaining 26 GW of required new electricity capacity, acting within the strategic framework set by the Government;
 - of these figures of 33 GW and 26 GW respectively, around 2 GW of renewables and 8 GW of non-renewable technologies are already under construction³⁶. This leaves a balance of 18 GW to come from new non-renewable capacity; and
 - the Government would like a significant proportion of this balance to be filled by new low carbon generation and believes that, in principle, new nuclear power should be free to contribute as much as possible towards meeting the need for around 18 GW of new non-renewable capacity by 2025.

32 National Grid projections suggest in some scenarios that electricity demand may remain at today's levels by 2025, see: http://www.nationalgrid.com/NR/rdonlyres/BC92D89F-1191-4048-BB41-A4A57F778C7C/46607/TBE_2011_Combined_20110407.pdf .

33 See paragraph 3.3.14 on likely increases in electricity demand.

34 See paragraph 3.3.11 on intermittency of renewable electricity generation.

35 Annex J to the UEP shows total generation capacity.

36 UEP 40 using National Grid figures April 2010. The Government is aware that there are also a number of energy projects (approximately 9 GW in total as of April 2010) that have obtained planning permission, but have not as yet started to be built. As we cannot be certain that these projects will become operational, the Government considers that it would not be prudent to consider these numbers for the purposes of determining the planning policy in this NPS. Such numbers evolve over time and are regularly updated by National Grid in their Seven Year Statement.

- 3.3.23 To minimise risks to energy security and resilience, the Government therefore believes it is prudent to plan for a minimum need of 59 GW of new electricity capacity by 2025.
- 3.3.24 It is not the Government's intention in presenting the above figures to set targets or limits on any new generating infrastructure to be consented in accordance with the energy NPSs. It is not the IPC's role to deliver specific amounts of generating capacity for each technology type. The Government has other mechanisms to influence the current delivery of a secure, low carbon, affordable electricity mix. Indeed, the aim of the Electricity Market Reform project (see Part 2 of this NPS for further details) is to review the role of the variety of Government interventions within the electricity market.

Alternatives to new large scale electricity generation capacity

- 3.3.25 The Government has considered alternatives to the need for new large scale electricity generation infrastructure³⁷. Although we believe that these measures have an important part to play in meeting our energy and climate change objectives, they will not enable us to meet these objectives on their own. The following paragraphs explain how the Government has come to this conclusion.

Reducing demand

- 3.3.26 Reducing demand for electricity is a key element of the Government's strategy for meeting its energy and climate change objectives. The 2050 Pathways Analysis shows that total UK energy demand from all sectors (heating, transport, agriculture, industry and electricity demand) will need to fall significantly per head of population by 2050 and in the most extreme scenarios, total energy demand could be almost 50% lower than 2007 levels by 2050. The analysis highlights the importance of energy efficiency and the potential that this can have to help achieve our carbon emission reduction targets.
- 3.3.27 The Government's current policies for reducing electricity demand include:
- introducing the Green Deal to save energy in the home and non-domestic buildings, whilst supporting vulnerable consumers;
 - introducing minimum energy efficiency standards and energy labelling for new products on sale (for example on white goods and televisions where there is the "A-G" energy label ratings system);
 - a UK voluntary initiative to phase out energy-wasting incandescent light bulbs by 2011;
 - ensuring the roll out of smart meters in every home to enable demand side response and allow people to understand their energy use better and thereby make more energy savings;
 - incentivising large energy users across business and public sectors to reduce their energy use through simplifying the market-based

³⁷ This included considering alternatives in the Appraisal of Sustainability for the NPSs.

mechanisms of the Carbon Reduction Commitment Energy Efficiency Scheme and Climate Change Agreements;

- providing energy efficiency advice and financial support to improve efficiency (through loans and Enhanced Capital Allowances) to businesses and the public sector; and
- leading by example by reducing electricity use across the central Government estate.

3.3.28 Whilst these policies are critically important and will reduce electricity demand in certain areas, the savings will be offset by increases in other areas, and in particular:

- decarbonisation will require an increased use of electricity in domestic and industrial heating and transport, which as previously discussed (see paragraphs 3.3.13 and 3.3.14), will outweigh increases in energy efficiency, potentially leading to a doubling of electricity demand by 2050; and
- growth in the number of households in the UK will be a key driver of electricity demand in the residential sector.

3.3.29 The Government would like to see decentralised and community energy systems such as micro-generation make a much greater contribution to our targets on reducing carbon emissions and increasing energy security from current levels of these systems. These technologies could lead to some reduction in demand on the main generation and transmission system. They can offer significant economic benefits, for example where heat as well as electricity can be put to commercial use, and reduce pressure for expansion of the national transmission system. This is why the Government has put in place financial rewards for small-scale low carbon electricity generation with Feed-in Tariffs³⁸. However, the Government does not believe that decentralised and community energy systems are likely to lead to significant replacement of larger-scale infrastructure. Interconnection of large-scale, centralised electricity generating facilities via a high voltage transmission system enables the pooling of both generation and demand, which in turn offers a number of economic and other benefits, such as more efficient bulk transfer of power and enabling surplus generation capacity in one area to be used to cover shortfalls elsewhere.

More intelligent use of electricity

3.3.30 In addition to the above measures aimed at reducing overall demand, the potential also exists for more intelligent interaction between supply and demand. For instance, although there is currently around 85 GW of total generation capacity in the UK, average demand across a year is only for around half of it because a high proportion of the total capacity is used only at times of peak demand (see paragraphs 3.3.2-3 on the resilience of the electricity system). Moving some demand from a peak to an off-peak time or moving demand when the system is under stress allows opportunities to help

³⁸ Further information on Feed-in Tariffs can be found on the DECC website: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/feedin_tariff/feedin_tariff.aspx

balance supply and demand. This 'smart demand management' may avoid some power stations being built that only run for a few hours during the year and enable more efficient use of existing stations.

- 3.3.31 Reductions in peak demand may lead to a corresponding increase in demand at a later time when there is sufficient power available to meet it. In addition, while electrical energy storage allows energy production to be decoupled from its supply, and provides a contribution to meeting peak demand, currently the only commercially viable utility-scale energy storage technology is pumped storage³⁹. The UK currently has four pumped storage facilities with a maximum capacity of approximately 3 GW. There is limited further potential in the UK due to a lack of appropriate locations and large capital costs, but high renewable pathways might require more storage beyond 2020, and therefore the commercial climate may change. The Government expects that demand side response, storage and interconnection, will play important roles in a low carbon electricity system, but still envisages back up capacity being necessary to ensure security of supply until other storage technologies reach maturity.

Interconnection of electricity systems

- 3.3.32 The GB electricity system is largely isolated from other systems. At present we only have a 2 GW link with France, a 1.4 GW interconnector with the Netherlands which began commercial operation in March 2011 and a 450 MW link between Great Britain and Northern Ireland (which has a capacity of around 290 MW in the other direction).
- 3.3.33 There are a number of potential projects to build additional interconnection which could increase capacity to over 10 GW by around 2020. For example, there is a 500 MW link with Ireland due to start operation in 2012; links to Norway and Belgium (likely to be around 1 GW each) are at the planning stage and several other interconnections for which feasibility studies are being done. However it cannot be assumed that they will all go ahead, so the UK's level of interconnection is likely to remain relatively low for the foreseeable future. Increased investment in interconnection is therefore unlikely to reduce the need for new infrastructure in the UK to a great extent.

Conclusions on alternatives to new large electricity generation

- 3.3.34 The Government believes that although all of the above measures should and will be actively pursued, their effect on the need for new large scale energy infrastructure will be limited, particularly given the likely increase in need for electricity for domestic and industrial heating and transport as the UK moves to meet its 2050 targets.

³⁹ Pumped storage means using a temporary surplus of electricity to pump water to a high reservoir, and generating hydroelectric power when needed.

3.4 The role of renewable electricity generation

- 3.4.1 The UK has committed to sourcing 15% of its total energy (across the sectors of transport, electricity and heat) from renewable sources by 2020⁴⁰ and new projects need to continue to come forward urgently to ensure that we meet this target. Projections⁴¹ suggest that by 2020 about 30% or more of our electricity generation – both centralised and small-scale – could come from renewable sources, compared to 6.7% in 2009⁴². The Committee on Climate Change in Phase 1 of its advice to Government in September 2010 agreed that the UK 2020 target was appropriate, and should not be increased. Phase 2 was published in May 2011 and provided recommendations on the post 2020 ambition for renewables in the UK, and possible pathways to maximise their contribution to the 2050 carbon reduction targets.
- 3.4.2 Large scale deployment of renewables will help the UK to tackle climate change, reducing the UK's emissions of carbon dioxide by over 750 million tonnes by 2030. It will also deliver up to half a million jobs by 2020 in the renewables sector⁴³. Renewable electricity generation is currently supported in the UK through the Renewables Obligation (RO), which is a market-based support mechanism to encourage investment. Renewables have potential to improve security of supply by reducing reliance on the use of coal, oil and gas supplies to keep the lights on and power our businesses. Meeting the 15% renewables target could reduce fossil fuel demand by around 10% and gas imports by 20-30%. We are committed to meeting 2020 targets and have further ambitions for renewables post-2020. The Committee on Climate Change's May 2011 report⁴⁴ included advice on moving to 30% renewable energy capacity by 2030 and a central scenario of 40% renewable electricity.
- 3.4.3 The UK has substantial renewable energy resources, for example the British Isles have 40% of Europe's wind and some of the highest tidal reaches in the world. Unlike other technologies, the cost of renewables is in the construction and maintenance alone as the resource itself is usually free, so it helps protect consumers against the volatile but generally increasing cost of fossil fuels. Future large-scale renewable energy generation is likely to come from the following sources:
- *Onshore Wind* – onshore wind is the most well-established and currently the most economically viable source of renewable electricity available for future large-scale deployment in the UK;
 - *Offshore Wind* – offshore wind is expected to provide the largest single contribution towards the 2020 renewable energy generation targets;

40 DECC (2009): The UK Renewable Energy Strategy (p.30)
http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/renewable%20energy/renewable%20energy%20strategy/1_20090717120647_e_@@_theukrenewableenergystrategy2009.pdf

41 It is important to recognise that we may reach our renewable energy goals in different ways, depending on how the drivers to investment, supply chain and non-financial barriers evolve. As a result, the lead scenario presented in the Renewable Energy Strategy should not be seen as a sector or technology target.

42 DUKES 2010 (p.184)

43 Innovas, Low Carbon and Environmental Goods and Services: an industry analysis, 2009

44 CCC (May 2011) "The Renewable Energy Review".

- *Biomass* – biomass is a significant source of renewable and low carbon energy. It involves the combustion of fuel, such as wood, which is renewable because, through replanting and regrowth, the biomass can be replaced in a matter of decades and this cycle can be continuously repeated. Whilst energy is required to grow, harvest and transport it, biomass is considered to be low carbon, providing that the biomass has been cultivated, processed and transported with due consideration of sustainability. Its combustion also displaces emissions of carbon dioxide ordinarily released using fossil fuels;
- *Energy from Waste (EfW)* – the principal purpose of the combustion of waste, or similar processes (for example pyrolysis or gasification) is to reduce the amount of waste going to landfill in accordance with the Waste Hierarchy⁴⁵ and to recover energy from that waste as electricity or heat. Only waste that cannot be re-used or recycled with less environmental impact and would otherwise go to landfill should be used for energy recovery. The energy produced from the biomass fraction of waste is renewable and is in some circumstances eligible for Renewables Obligation Certificates, although the arrangements vary from plant to plant; and
- *Wave and Tidal* – the UK has the potential for wave and tidal energy and there are now full scale prototypes working towards array scale and pre-commercial deployment. However many of the technologies for making use of the wave resource and tidal currents are still developing. Proven technology exists for tidal range generation but proposed projects are still some time from commencement. Paragraph 1.4.5 explains how this NPS relates to wave and tidal generation.

3.4.4 Biomass and EfW can be used to generate ‘dispatchable’ power, providing peak load and base load electricity on demand. As more intermittent renewable electricity comes onto the UK grid, the ability of biomass and EfW to deliver predictable, controllable electricity is increasingly important in ensuring the security of UK supplies.

The urgency of need for new renewable electricity generation

3.4.5 Paragraph 3.4.1 above sets out the UK commitments to sourcing 15% of energy from renewable sources by 2020. To hit this target, and to largely decarbonise the power sector by 2030, it is necessary to bring forward new renewable electricity generating projects as soon as possible. The need for new renewable electricity generation projects is therefore urgent.

3.5 The role of nuclear electricity generation

3.5.1 For the UK to meet its energy and climate change objectives, the Government believes that there is an urgent need for new electricity generation plant, including new nuclear power. Nuclear power generation is a low carbon, proven technology, which is anticipated to play an increasingly

⁴⁵ Waste Hierarchy as set out in Article 4 of the revised Waste Framework Directive and the Waste (England and Wales) Regulations 2011.

important role as we move to diversify and decarbonise our sources of electricity.

- 3.5.2 It is Government policy that new nuclear power should be able to contribute as much as possible to the UK's need for new capacity. Although it is not possible to predict whether or not there will be a reactor or more than one reactor at each of the eight sites included in EN-6, a single reactor at each of the eight sites would result in 10-14 GW of nuclear capacity, depending on the reactor technology chosen.

Nuclear power as part of a diverse and secure energy mix

- 3.5.3 New nuclear power stations will help to ensure a diverse mix of technology and fuel sources, which will increase the resilience of the UK's energy system. It will reduce exposure to the risks of supply interruptions and of sudden and large spikes in electricity prices that can arise when a single technology or fuel dominates electricity generation.
- 3.5.4 The characteristics of nuclear power are quite different to those of conventional fossil fuel or renewable forms and provide specific advantages with regards to energy security.
- Nuclear fuel fabrication is a stable and mature industry with a range of uranium sources. Uranium deposits are predicted to last much longer than oil and gas reserves⁴⁶. Following the review of publications from the Organisation for Economic Co-operation and Development (OECD)/ International Atomic Energy Agency (IAEA)⁴⁷ and the Euratom Supply Agency (ESA)⁴⁸ the Government believes that adequate uranium resources exist to fuel a global expansion of nuclear power, including any new nuclear power stations constructed in the UK.
 - The supply chains of nuclear fuel, gas and coal are not interdependent. An interruption in the supply of gas or coal is unlikely to affect the supply of uranium. Consequently, including new nuclear power stations in the generating mix increases the diversity of fuels that we rely on and reduces the risks of interruptions to fuel supply.
 - Unlike some other generation technologies (for example gas fired generation), fluctuations in fuel prices do not significantly affect the cost of electricity from nuclear power stations⁴⁹.
 - In situations where gas prices are high, the relatively low generation costs of nuclear power means that it can place downward pressure on long-run

46 Europe's Energy Portal. Estimated dates of exhaustion: natural gas 2068; oil 2047; uranium 2144. <http://www.energy.eu/>

47 OECD, IAEA. Uranium 2009: Resources, Production and Demand. July 2010. <http://www.nea.fr/press/2010/2010-03.html>

48 Euratom Supply Agency. Annual Report 2009. July 2010. <http://ec.europa.eu/euratom/ar/ar2009.pdf>

49 Tarjanne & Rissanen. Least-Cost Option for Baseload Electricity in Finland. The Uranium Institute 25th Annual Symposium, 30 August-1 September 2000: London. Tarjanne and Rissanen's paper found that an increase in the uranium price causes only a slight increase in nuclear electricity costs, whereas for the natural gas alternative a rising trend of gas prices causes a major cost increase. <http://www.world-nuclear.org/sym/2000/pdfs/tarjanne.pdf>

wholesale prices. This might help reduce the UK's exposure to higher fossil fuel prices.

- Nuclear power stations can continue to operate for long periods of time without refuelling.

Nuclear power as part of a low carbon electricity mix

- 3.5.5 Having examined a range of independent life cycle analyses⁵⁰, the Government believes that carbon emissions from a new nuclear power station are likely to be within the range of 7-22g/kWh. This is in line with research published by the Sustainable Development Commission⁵¹ and the IAEA⁵². It is similar to the lifecycle CO₂ emissions from wind power and much less than fossil fuelled plant.
- 3.5.6 New nuclear power therefore forms one of the three key elements of the Government's strategy for moving towards a decarbonised, diverse electricity sector by 2050: (i) renewables; (ii) fossil fuels with CCS; and (iii) new nuclear.
- 3.5.7 To ensure our future energy is secure, clean and affordable, the UK needs a mix consisting of each of these forms of electricity generation. The Government believes that new nuclear generation would complement renewables and fossil fuels with CCS in ensuring that we meet our legal obligations as it can provide dependable supplies of low carbon electricity. Nuclear is also the only non-renewable low carbon technology that is currently proven and can be deployed on a large scale⁵³.
- 3.5.8 The Government believes that nuclear power is economically competitive with other forms of generating technology (including the lowest cost renewable technologies) and new nuclear is likely to become the least expensive form of low carbon electricity generation⁵⁴. It is therefore anticipated that industry will want to bring forward applications for new nuclear power stations and to date energy companies have announced that

50 Life cycle analyses examine the emissions for the complete nuclear fuel cycle (including CO₂ emitted during construction, operation and decommissioning of the power station, mining, transport of fuel and disposal of waste). For a review of life cycle analyses see Chapter 4 of the decisions by the Secretary of State for Energy and Climate Change on the Regulatory Justification of the AP1000 and EPR nuclear power station designs, at http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/new/reg_just/reg_just.aspx

51 Sustainable Development Commission (2006). The role of nuclear power in a low carbon economy. Paper 2: Reducing CO₂ emissions – nuclear and the alternatives. p. 21. <http://www.sd-commission.org.uk/publications/downloads/Nuclear-paper2-reducingCO2emissions.pdf>

52 Spadaro, Joseph V. et al. (2000). Greenhouse gas emissions of electricity generation chains: assessing the difference. IAEA Bulletin, 42/2/2000. pp. 19 – 24. <http://www.iaea.org/Publications/Magazines/Bulletin/Bull422/article4.pdf>

53 16% of the UK's electricity supply came from nuclear power stations in 2010.

54 Electricity Generation Cost Model 2011 Update – Parsons Brinckerhoff, 2011 available at www.decc.gov.uk.

they intend to put forward proposals to develop 16 GW of new nuclear power generation capacity by the end of 2025⁵⁵.

The urgency of the need for new nuclear power

- 3.5.9 Given the urgent need for low carbon forms of electricity to contribute to the UK's energy mix and enhance the UK's energy security and diversity of supply, it is important that new nuclear power stations are constructed and start generating as soon as possible and significantly earlier than 2025 (see Section 2.2 of EN-6, which sets out policy in respect of the IPC's consideration of early deployment of new nuclear power stations). Based on the availability of – amongst other things – construction materials, skills, investment, the timescale for licensing, and related investment in transmission and distribution infrastructure, the Government believes that it is realistic for new nuclear power stations to be operational in the UK from 2018, with deployment increasing as we move towards 2025.
- 3.5.10 For these reasons, the Government's assessment of sites potentially suitable for new nuclear development (see Part 4 of EN-6) only included sites that were shown to be capable of deployment by the end of 2025; 2025 also represents a realistic timeframe for the construction of new nuclear power stations and avoids an unnecessarily long list of potential sites which may not come on stream for some years. Nuclear power stations have an estimated design lifetime of 60 years so any new nuclear power stations operational by the end of 2025 will play a vitally important role in the decarbonisation of the electricity system and will therefore directly contribute towards our 2050 targets and objectives.
- 3.5.11 France has already demonstrated that it is technically feasible to build nuclear power stations at the rate that would be needed in the UK if new nuclear power stations were to be constructed on all of the sites listed in this NPS before the end of 2025⁵⁶.

3.6 The role of fossil fuel electricity generation

- 3.6.1 Fossil fuel power stations play a vital role in providing reliable electricity supplies: they can be operated flexibly in response to changes in supply and demand, and provide diversity in our energy mix. They will continue to play an important role in our energy mix as the UK makes the transition to a low carbon economy, and Government policy is that they must be constructed, and operate, in line with increasingly demanding climate change goals.
- 3.6.2 Fossil fuel generating stations contribute to security of energy supply by using fuel from a variety of suppliers and operating flexibly. Gas will continue to play an important role in the electricity sector – providing vital flexibility to support an increasing amount of low-carbon generation and to maintain

55 <http://www.centrica.co.uk/index.asp?pageid=217&newsid=1783>
http://www.edfenergy.com/media-centre/press-news/EDF_Energy_welcomes_Government_announcement_on_nuclear_sites.shtml
<http://www.rwe.com/web/cms/en/216362/rwe-ncpower/more-our-business/nuclear-power/>,
<http://pressreleases.eon-uk.com/blogs/eonukpressreleases/archive/2009/04/29/1382.aspx>
http://www.scottishpower.com/PressReleases_1948.htm

56 Nuclear Energy Association, Nuclear Energy outlook 2008, NEA No. 6348, p.318.

security of supply. The UK gas market has diversified its sources of supply of gas in recent years, so that as the UK becomes more import dependent, companies supplying the market are not reliant on one source of supply. This protects the UK market from disruptions to supply. UK natural gas supplies come from the producing fields on the UK Continental Shelf, by pipeline direct from Norway, and from continental Europe through links to Belgium and the Netherlands. Liquefied natural gas (LNG) is imported by tanker, supported by ongoing investment in LNG facilities such as those on the Isle of Grain and at Milford Haven. Similarly, although a proportion of coal used in British generating stations is imported, the UK still has its own reserves. Further, coal is available globally and most generating station operators will already have alternative suppliers depending on prevailing market conditions. This ability to source fuel from alternative suppliers helps to give stability to the UK's generating capacity. In addition, unlike some renewable energy sources such as wind power, fossil fuels may be stockpiled in anticipation of future energy demands.

- 3.6.3 Some of the new conventional generating capacity needed is likely to come from new fossil fuel generating capacity in order to maintain security of supply, and to provide flexible back-up for intermittent renewable energy from wind. The use of fossil fuels to generate electricity produces atmospheric emissions of carbon dioxide. The amount of carbon dioxide produced depends, amongst other things, on the type of fuel and the design and age of the power station. At present coal typically produces about twice as much carbon dioxide as gas, per unit of electricity generated. However, as explained further below, new technology offers the prospect of reducing the carbon dioxide emissions of both fuels to a level where, whilst retaining many of their existing advantages, they also can be regarded as low carbon energy sources.

Carbon Capture and Storage

- 3.6.4 As explained in paragraph 2.2.23 above, to meet emissions targets, dependency on unabated fossil fuel generating stations must be reduced. To help achieve this reduction but maintain security of supply, it is necessary to reduce carbon emissions particularly from coal-fired generating stations. Carbon Capture and Storage (CCS) has the potential to reduce carbon emissions by up to 90%, although the process of capturing, transporting and storing carbon dioxide also means that more fuel is used in producing a given amount of electricity than would be the case without CCS. The complete chain of CCS has yet to be demonstrated at commercial scale on a power station. Whilst there is a high level of confidence that the technology involved in CCS will be effective, less is known about the impact of CCS on the economics of power station operation. There is therefore uncertainty about the future deployment of CCS in the economy, which in the Government's view cannot be resolved without first demonstrating CCS at commercial scale.
- 3.6.5 The Government is leading international efforts to develop CCS. This includes supporting the cost of four commercial scale demonstration projects at UK power stations. The intention is that each of the projects will demonstrate the full chain of CCS involving the capture, transport and

storage of carbon dioxide in the UK. These demonstration projects are therefore a priority for UK energy policy. The demonstration programme will also require the construction of essential infrastructure (such as pipelines and storage sites) that are sized and located both for the purpose of the demonstration programme and to take account of future demand beyond the demonstration phase. The IPC should take account of the importance the Government places on demonstrating CCS, and the potential deployment of this technology beyond the demonstration stage, in considering applications for consent of CCS projects and associated infrastructure.

3.6.6 The Government has placed two conditions on the consenting of fossil fuelled power stations (including gas and coal-fired) to require the development and facilitate the adoption of CCS once it is available. These conditions are:

- all commercial scale (at or over 300 MW) combustion power stations (including gas, coal, oil or biomass) have to be constructed Carbon Capture Ready (CCR); and
- new coal-fired power stations are required to demonstrate CCS on at least 300 MW of the proposed generating capacity⁵⁷.

3.6.7 More information on Government policy on CCR and the CCS requirement is set out in Section 4.7.

The need for fossil fuel generation

3.6.8 As set out in paragraph 3.3.8 above, a number of fossil fuel generating stations will have to close by the end of 2015. Although this capacity may be replaced by new nuclear and renewable generating capacity in due course, it is clear that there must be some fossil fuel generating capacity to provide back-up for when generation from intermittent renewable generating capacity is low and to help with the transition to low carbon electricity generation. It is important that such fossil fuel generating capacity should become low carbon, through development of CCS, in line with carbon reduction targets. Therefore there is a need for CCR fossil fuel generating stations and the need for the CCS demonstration projects is urgent.

3.7 The need for new electricity network infrastructure

3.7.1 Much of the new electricity infrastructure that is needed will be located in places where there is no existing network infrastructure. This is likely to be the case for many wind farms⁵⁸, or where there may be technical reasons

57 CCS has yet to be demonstrated on commercial-scale on a power station. The minimum level for CCS therefore needs to be set at a realistic level that will allow CCS projects to come forward whilst still being affordable and delivering value for money. 300MW is based on technical considerations of the different capture technologies that are likely to be used and the relationship with the size of generating units likely to be deployed in coal-fired power stations.

58 The UK has historically had a centralised electricity generation network relying on large scale generation from conventional power stations, some clustered in specific parts of the country and close to centres of demand. However, new renewable generation, e.g. wind is likely to be developed in locations much further from demand, such as in rural Scotland and offshore, while other low carbon generation is also likely to be sited in more peripheral areas.

why existing network infrastructure is not suitable for connecting the new generation infrastructure.

- 3.7.2 The need to connect to new sources of electricity generation is not the only driver of need for new electricity network infrastructure. As noted in Parts 2 and 3 of this NPS, it is likely that demand for electricity will increase significantly over the coming decades. Factors contributing to such growth include the development of new housing and business premises (the number of households in England is projected to grow to 27.8 million by 2031⁵⁹) and the increased use of electricity in domestic and industrial heat and transport. Lack of sufficiently robust electricity networks can cause, or contribute to, large scale interruptions. Existing transmission and distribution networks will have to evolve and adapt in various ways to handle increases in demand, but construction of new lines of 132 kV and above⁶⁰ will also be needed to meet the significant national need for expansion and reinforcement of the UK's transmission and distribution networks.
- 3.7.3 It is important to note that new electricity network infrastructure projects, which will add to the reliability of the national energy supply, provide crucial national benefits, which are shared by all users of the system.
- 3.7.4 An idea of the scale and urgency of need for new electricity network infrastructure is conveyed by the work of the Electricity Networks Strategy Group (ENSG), an industry group jointly chaired by Government and Ofgem, which was set the task of:
- developing electricity generation and demand scenarios consistent with the EU target for 15% of the UK's energy to be produced from renewable sources by 2020; and
 - identifying and evaluating a range of possible electricity transmission networks solutions that would be required to accommodate these scenarios.
- 3.7.5 The group's full report⁶¹ illustrates the scale of potential need for new transmission infrastructure and the kind of locations where it needs to be constructed if low carbon sources are to play their part in the generating mix, as we want them to, over the coming years. The report is based on a range of scenarios that take into account the significant changes anticipated in the generation mix to 2020. In particular, the scenarios 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. An addendum published in July 2009⁶² examined whether likely reinforcements required to 2030 under a range of scenarios impacted on the potential reinforcements identified to meet the 2020 vision. The work of the

59 <http://www.communities.gov.uk/publications/corporate/statistics/2031households0309>

60 Large-scale conventional power stations generally require a 275 kV or 400 kV connection, but the lower output of many wind farms (both onshore and offshore) and other smaller-scale renewable projects, such as energy from waste plants in the range of 50-100 MW, means that a 132 kV connection will often be sufficient for them.

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

62 http://www.ensg.gov.uk/assets/ensg_2030_transmission_addendum_final_issue_1.pdf

ENSG is ongoing and it may update its reports in the light of developments in generation, demand, policy and technology.

3.7.6 Under the scenarios considered by the ENSG significant potential increases in generation and changes in direction of net electricity flows to 2020 were considered likely to be:

- from north to south, with between 6.6 GW and 11.4 GW of renewables in Scotland;
- from Eastern England to centres of demand in the Midlands and South East England, accommodating around 8 GW of offshore wind, along with 3.3 GW of nuclear;
- from South West England and South Wales eastwards to centres of demand in the Midlands and South East England, with up to 2-3 GW of wind along with 3.3 GW of new nuclear; and
- from the North West and North Wales, to accommodate some 5-7 GW of wind, along with 3.3 GW of nuclear.

3.7.7 As the full report makes clear, these kinds of flows of power cannot be accommodated by the existing network. Accordingly, new lines will have to be built, and the location of renewable energy sources and designated sites for new nuclear power stations makes it inevitable that a significant proportion of those new lines will have to cross areas where there is little or no transmission infrastructure at present, or which it may be claimed should be protected from such intrusions. The urgency of need for new generating capacity means that the need for new transmission infrastructure that is required to connect that capacity will be similar.

3.7.8 The Government believes that the ENSG work represents the best available overview of where the electricity networks will need to be reinforced and augmented in order to achieve the UK's renewable energy and security of supply targets, and will therefore be relevant to the IPC's consideration of electricity network proposals. However, ENSG reports are not exhaustive and only include scenarios for network investment needed in advance of the generation plant so other applications will come forward. Inevitably, reports are largely based around new generating stations, which developers have expressed an intention of constructing, but which in many cases have not yet been consented, or even been made the subject of a consent application. Also, while the reports do include small scale maps and other generic indications of where new lines might be located, they do so only by way of illustration. The fact that an application for development consent relates to a project which corresponds to a scheme in an ENSG report should not prejudice the outcome of applications, nor should ENSG reports be seen as limiting the scope of schemes that may be proposed, considered or granted development consent under the Planning Act 2008.

3.7.9 Other information which shows the scale and possible nature of need for new electricity transmission and distribution infrastructure includes the

following, published by National Grid in its role as National Electricity System Operator (NETSO):

- an annual Seven Year Statement, which presents a wide range of information relating to the transmission system in GB, including forward investment plans under a range of scenarios showing both the amount of infrastructure that is likely to be needed and its location; and
- an annual Offshore Development Information Statement, which presents potential scenarios and NETSO's best view of the development of the transmission network offshore to help ensure a coordinated and informed approach to the offshore transmission network.

3.7.10 In the light of the above, there is an urgent need for new electricity transmission and distribution infrastructure (and in particular for new lines of 132 kV and above) to be provided. The IPC should consider that the need for any given proposed new connection or reinforcement has been demonstrated if it represents an efficient and economical means of connecting a new generating station to the transmission or distribution network, or reinforcing the network to ensure that it is sufficiently resilient and has sufficient capacity (in the light of any performance standards set by Ofgem) to supply current or anticipated future levels of demand. However, in most cases, there will be more than one technological approach by which it is possible to make such a connection or reinforce the network (for example, by overhead line or underground cable) and the costs and benefits of these alternatives should be properly considered as set out in EN-5 (in particular section 2.8) before any overhead line proposal is consented.

3.8 The need for nationally significant gas infrastructure

Introduction

- 3.8.1 The UK is highly dependent on natural gas, which is used in roughly equal quantities in domestic households (largely for space heating purposes), for electricity generation (generating just over two fifths of electricity in 2010) and across a range of businesses (both as a fuel and as a feedstock). Although our reliance on fossil fuels will fall, the transition will take some time, and gas will continue to play an important part in the UK's fuel mix for many years to come. The share of natural gas in UK primary energy demand (including electricity generation) is expected to fall from 41% in 2010 to around 33% by 2020, and then could rise again to around 36% by 2025 as the use of coal for electricity generation declines⁶³.
- 3.8.2 The UK is one of the largest gas consumers in Europe, with demand representing close to a fifth of the EU total and 3% of the global total. In addition to meeting domestic gas demand and associated infrastructure, supplies to Great Britain are also needed to meet demand from Northern Ireland and the Republic of Ireland and for (gross) exports to the Continent through the Bacton-Zeebrugge Interconnector. Irish gas import demand is currently partially met through pipelines from Scotland; in future some Irish

63 DECC (2010) Demand Projections, see: <http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx>

import demand might be met by direct importation of Liquefied Natural Gas (LNG).

- 3.8.3 Domestic (household) demand for gas for heating purposes underpins strong seasonal variation in demand for gas – winter average daily demand is around 350-400 million cubic metres of gas per day (mcm/d), compared with annual average demand of 250-300 mcm/d. Peak demand in winter can be much higher; for example National Grid estimate that “1 in 20” diversified winter demand, used for operational planning purposes, equates to a demand of 506 mcm/d for winter 2011/12⁶⁴.

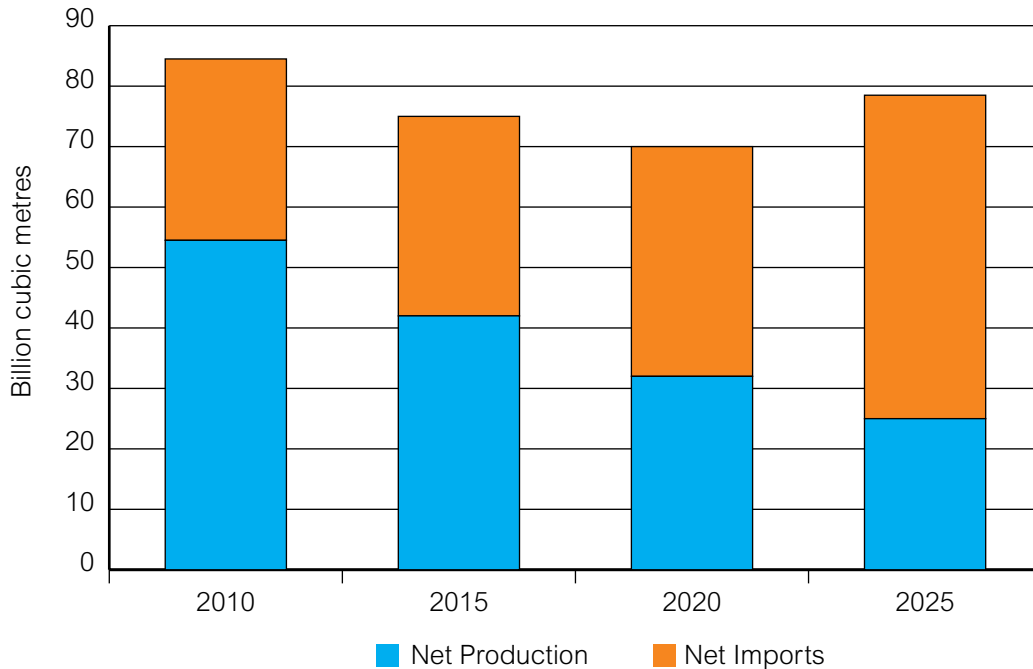
The UK Gas Market

- 3.8.4 Secure gas supplies have been assured over the last thirty or so years largely from indigenous supplies from the UK Continental Shelf (UKCS). Production of gas from the UKCS is now in decline. In 2004, the UK again became a net importer of gas and in 2011 around 40% of the UK’s net demand for gas was expected to be met by net imports. Whilst there are large uncertainties when looking so far into the future, DECC’s latest central projections indicate that the UK’s demand for gas will fall by around 17% between 2010 and 2020 but then rise by 12% by 2025⁶⁵. DECC’s central projections, which assume the full and timely success of the Government’s demand reduction policies, included in the UK Low Carbon Transition Plan, indicate UK gas demand of 70 billion cubic metres (bcm) in 2020, within a range of 65-75 bcm depending on energy prices. On central assumptions, net import demand for gas is now estimated to rise from around 30 bcm in 2010 to 38 bcm in 2020 and 53 bcm in 2025. The latest DECC demand projections (comprising net production plus net imports) are shown in figure 3.1 below.

64 National Grid Ten Year Statement TABLE A2.1.5 – Slow Progression 1 in 20 Peak Day Diversified Demand (GWh/day), Total Throughput
<http://www.nationalgrid.com/uk/Gas/TYS/current/TYS2009.htm>

65 DECC (2010) Demand Projections (<http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx>) and September 2010 UKCS production projections (https://www.og.decc.gov.uk/information/bb_updates/chapters/Section4_17.htm).

Figure 3.1: Projected net annual UK Gas Production and Imports, 2010 to 2025



3.8.5 Great Britain’s⁶⁶ gas supply infrastructure must, amongst other things, be sufficient to:

- meet ‘peak’ demand. This is a much more demanding requirement than meeting annual demand. Gas market participants may aim to have some “redundancy” in their supply arrangements, above the minimum amount to meet peaks, to manage the risk that other capacity may not be available (for example, if undergoing maintenance);
- allow for a sustained delivery of large volumes of gas, for example, due to the need to be prepared to meet demand over a particularly cold winter;
- provide access to the most competitive gas supplies. Because price relativities will vary through time, this also implies some redundancy in gas supply infrastructure. Market participants may therefore see distinct value in having access to gas from different sources – imports by pipeline, imports as LNG, and gas from storage (especially close-to-market storage that can be accessed rapienable market participants to manage the large uncertainties around the evolution of Great Britain’s demand for gas, in annual and in peak terms, as well as the other supply and demand risks that they identify.

3.8.6 The importance of having sufficiently large and diverse infrastructure was demonstrated in the winter of 2009/2010. Whilst usual demand for gas on a day might be around 250 mcm, the highest demand for gas ever recorded on a day, 465 mcm, occurred in January 2010 due to low temperatures at a time of supply problems from an external provider of gas. The UK gas market

⁶⁶ This section now focuses on Great Britain, as opposed to the UK, because there are separate regulatory arrangements for the gas market in Northern Ireland.

remained well supplied despite the winter being one of the coldest for around 30 years.

- 3.8.7 In the past, and in the winter of 2009/2010 as described above, so-called 'swing supply' to meet seasonal changes in demand has been provided by highly responsive gas fields in the North Sea and Eastern Irish Sea. However, as these fields age and become depleted, and even though they may still contain considerable gas reserves, they react more sluggishly, and cannot release gas at the rate they previously did. Great Britain needs a diverse mix of gas storage and supply infrastructure (including gas import pipelines and terminals) to respond effectively in future to the large daily and seasonal changes in demand, and to provide endurance capacity during a cold winter.

Need for more gas infrastructure

- 3.8.8 DECC has commissioned and published analysis, from Pöyry Energy Consulting, on the future risks to Great Britain's security of gas supplies over the medium term, until around 2025⁶⁷. This assessment considered the impacts if various adverse events should 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 risk of 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. 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 consumers⁶⁸.

- 3.8.9 As UKCS production declines, a range of infrastructure is likely to be required:

- new import infrastructure, both in terms of conventional import pipelines, gas reception facilities and LNG import facilities. These will be necessary in order to provide import capacity for the increasingly import-dependent UK gas market; and
- increased gas storage capacity, whether for gaseous gas in underground storage facilities, or as LNG in tanks above ground, is required to provide close-to-market 'swing supply' to help meet peak demand. Demand varies considerably throughout the day and it is necessary for some sources to be close to the market so that gas is quickly available. Gas supply infrastructure will also need to keep pace with any changes in the regional demand for gas across the UK – which may change due to changes in location of population and/or commercial or industrial demand.

67 http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/markets/gas_markets/gas_markets.aspx

68 The Government is responding by bringing forward legislation to confer powers for Ofgem to strengthen the market incentive mechanism for ensuring that sufficient gas (and therefore sufficient gas supply infrastructure) is available (see the Energy Bill, clause 77). The policy is summarised at: <http://www.decc.gov.uk/assets/decc/legislation/energybill/542-energy-security-bill-brief-gas-measures.pdf>.

- 3.8.10 These different kinds of gas supply infrastructure are not fully interchangeable.
- 3.8.11 Gas import capacity gives access to annual flows of gas (substituting for the declining annual production of indigenous gas), while over-sized gas import capacity can also help to provide supply-side flexibility (substituting for the reducing “swing-capability” of indigenous production).
- 3.8.12 Close-to-market gas storage capacity has advantages complementary to import capacity. “Long range” (or seasonal) storage, typically partially depleted hydrocarbon fields holding large quantities of gas, provides “endurance” to help gas supply companies meet high winter demand by purchasing and storing gas in the summer (when prices are typically lower) which can then be withdrawn in winter. Long-range storage also provides some robustness against gas supply shocks. “Medium range storage”, typically gas stored in caverns in salt strata deep underground, has faster withdrawal and refill rates helping gas supply companies to respond to changing market conditions from day to day (“diurnal”) and week to week. “Short-range storage”, gas stored in small quantities as LNG very close to some main centres of demand, helps to respond to sudden peaks in demand. Gas travels slowly through pipelines, at around 40 kph, and LNG at the speed of the tanker. Close-to-market gas storage also provides a prompt supply capability, which is particularly valuable when there is a delay before gas imports can respond to a market signal for increased supplies.
- 3.8.13 There is no “right” way to balance the GB gas market – there are indigenous supplies, imports by pipe-line, imports by LNG, or storage (whether long, medium or short range). The appropriate portfolio of supply sources, and the implications for gas supply infrastructure, are quintessentially commercial decisions for the various gas market participants (and potentially a source of commercial advantage for them). A great strength of the British gas market is the way that separate commercial decisions, by a number of separate companies, contribute to the overall diversity of our gas supply, promoting secure supplies at competitive prices.

Alternatives to additional gas supply capacity

- 3.8.14 The GB market arrangements already encourage “demand-side response” from the industrial and powers sectors:
- industrial customers and power stations can reduce their demand voluntarily in response to price (perhaps switching to back-up energy supplies); and
 - these consumers can also agree informal arrangements to sell back gas to suppliers at times of high prices.
- 3.8.15 These arrangements provide domestic consumers and small businesses with a high degree of security of supply, because industry and power stations are able to reduce their demand in response to market conditions. This helps to shield domestic consumers from short term wholesale price impacts.
- 3.8.16 Gas is a primary fuel – an internationally traded commodity, with an unavoidable need to be transported from the geological strata where it is found, to the markets where it is consumed. “Biomethane” – i.e. biogas

(sourced from organic material) that has been upgraded for supply through the gas pipeline system – may change this, but there are large uncertainties about the size of the potential contribution from this source.

- 3.8.17 There has been progress towards open, liquid and competitive gas markets. Increased international trade in LNG is helping to create a global market in gas, through the ability of LNG supplies to arbitrage⁶⁹ within the Atlantic Basin and between the Atlantic and Pacific Basins. However, because of the cost and time required to transport physical gas, arbitrage will remain imperfect. Furthermore, increasing globalisation of the gas market exposes EU consumers, including British consumers, to gas market shocks arising in other continents; for example to the impact of hurricanes in the USA.
- 3.8.18 A competitive gas market across the European Union, which may include potential gas sources such as shale gas or gas from coal gasification, will have an increasingly important part to play in meeting the needs of UK and other European gas consumers. Such a market needs to be supported by adequate investment in essential infrastructure including gas storage, transportation and import facilities. There has been good progress towards a single European energy market. This progress is being reinforced through the transposition into national legislations, in 2011, of the EU Third Internal Energy Package as well as implementation of the Regulation on Gas Security of Supply. Increasing inter-operability within the EU will help to spread the risk of supply shocks, to the benefit of UK and other EU consumers⁷⁰. However it could also increase our exposure to supply shocks affecting eastern and southern Europe.

Need for a diverse range of gas supply capacity

- 3.8.19 Gas is the cleanest and most reliable fossil fuel. It is likely to continue to be a central part of GB's energy mix during the transition to a low carbon economy:
- in the domestic (household) sector, where it remains the fuel of choice for cooking and heating;
 - in the industrial sector, as a source of energy and as a feedstock;
 - in the power generation sector, as a reliable source of flexible power generating capacity, to back-up intermittent renewables, so underpinning security of supply and price stability in the electricity market;
 - gas demand for power generation could increase substantially due to the greater use of electricity for heat and transport;

69 Arbitrage is the activity of trading between markets, to take advantage of price differences between those markets. The rapid growth in international trade in LNG during the past 10 years has enabled arbitrage between what previously were distinct gas markets in Europe, North America and East Asia.

70 The directives and regulations comprising the 3rd Package are at: <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:211:SOM:EN:HTML>. The Gas Security of Supply Regulation is at: <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2010:295:SOM:EN:HTML>

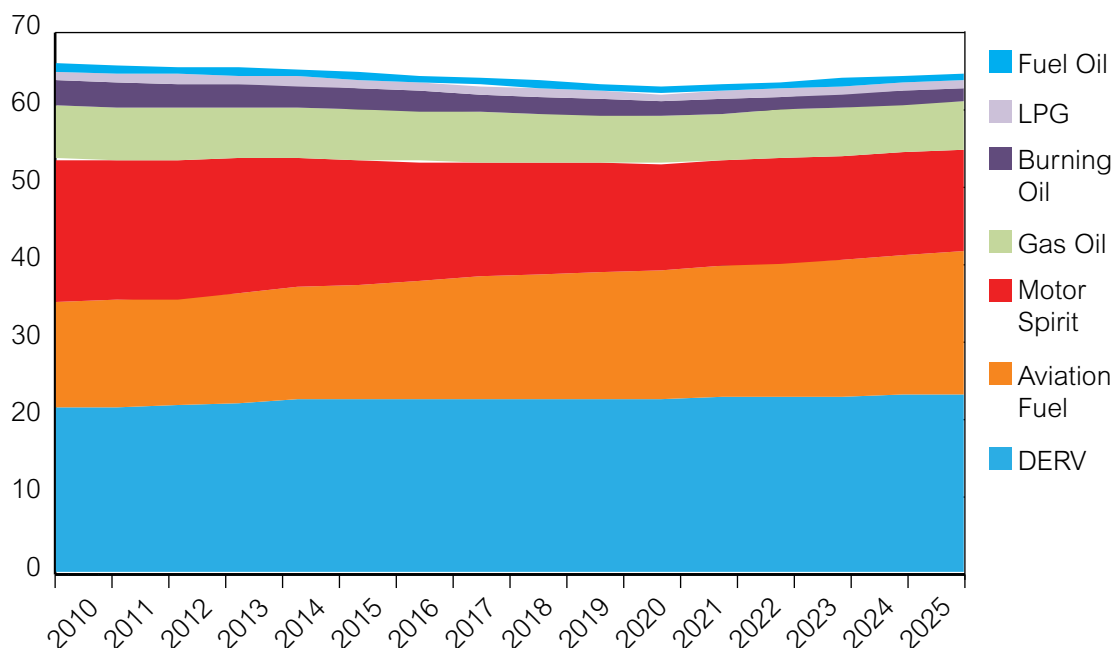
- if carbon capture and storage (CCS) technologies, in development for both the power and industrial sectors, prove technically and commercially viable, that could underpin gas demand from these sectors; and
- the requirement for gas supply infrastructure is determined by the level of peak demand. Even if annual gas demand reduces, peak gas demand, driven by demand for power generation, could drive a requirement for additional gas supply infrastructure.

3.8.20 Decisions on gas supply infrastructure are initially a commercial matter for gas market participants (and subject to regulatory requirements). They will take into account the continuing central role for gas, during the transition to a low carbon economy and against that background their requirement for additional gas supply capacity. The nature of that capacity (as between indigenous production, imports and storage) and the technical specification of gas storage capacity that might be proposed (for example the “range” of a proposed storage facility), are all commercial matters. Market participants will also take into account the various risks summarised above. There is no one “right” answer. However, the strong expectation is that they will wish to bring forward proposals for additional gas supply infrastructure, i.e. import and storage capacity. Some market participants may judge that their requirement for additional gas supply capacity is urgent. The UK markets and consumers (in Northern Ireland as well as Great Britain) benefit from the diversity of sourcing strategies developed by gas supply companies, and the way that this translates into a diversity of instruments for balancing the market.

3.9 The need for new nationally significant oil infrastructure projects

- 3.9.1 Oil products play an important role in the UK economy, providing around 33% of the primary energy used. We currently rely on oil for almost all of our motorised transport needs. Transport accounted for around 75% of final consumption of oil products in the UK in 2009, amounting to 49.6 million tonnes of oil. In the longer term we need to reduce our dependence on oil by improving vehicle efficiency and using new alternative fuelled vehicles. However, demand is projected to increase in the short to medium term, because although consumption of petrol in the UK is forecast to fall, demand for diesel and aviation fuel is expected to continue to rise.
- 3.9.2 Over time technology changes, including electric vehicles and the generation of more heat from renewables, together with energy efficiency policies such as seeking to encourage greater use of public transport will reduce demand for oil. But as Figure 3.2 illustrates, significant reductions are not expected over the next 10-15 years. This is primarily because the transport sector is the main consumer of oil and will continue to be heavily dependent on it over this period.

Figure 3.2: Forecast UK oil demand by petroleum product type



Source: DECC Updated Energy Projections, June 2010

3.9.3 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. These requirements can be met by sufficient, diverse and reliable supplies of fuel, with adequate capacity to import, produce, store and distribute these supplies to customers. This in turn highlights the need for reliable infrastructure including refineries, pipelines and import terminals and the need for flexibility in the supply chain to accommodate the inevitable risk of physical outages.

Petroleum product distribution

3.9.4 Finished petroleum products are distributed from the refineries to around 50 major distribution terminals in the UK by pipeline (51%) and by sea via coastal tankers (34%) or rail (15%). Some of the coastal terminals also import finished products from abroad. Onward distribution to customers is mostly by road tanker, but some of the larger customers have pipeline connections.

3.9.5 There is an extensive network of private and Government owned pipelines in the UK, with around 4,800km of pipeline currently in use. The 2,400km of privately owned UK pipeline network carries a variety of oil products from road transport fuels to heating oil and aviation fuel. The network provides an efficient and robust distribution system across the UK and directly provides jet fuel for some of the UK’s main airports. The Government also operates a separate oil pipeline system – the Government Pipeline and Storage System (GPSS), supplying a number of MoD airfields and with connections to some non-MoD sites (for example, Stansted Airport).

- 3.9.6 The drivers for new downstream oil infrastructure such as pipelines include:
- meeting increasing demand by end users, particularly for diesel and aviation fuel;
 - compliance with EU and International Energy Agency obligations for compulsory oil stocking, which are set to increase as North Sea resources decline;
 - meeting requirements for sulphur-free diesel and petrol blended with biofuels (including ethanol distribution), which are set to increase;
 - increasing imports of refined products (due to changing demand patterns);
 - emerging planning, safety and environmental protection requirements; and
 - market requirements to improve supply resilience in order to meet demand in full in a timely fashion under credible emergency scenarios.
- 3.9.7 New pipeline infrastructure could require associated works including oil processing plant to pump or filter blend products, storage tanks for bulk storage and product settling, road handling facilities for discharge into road tankers and jetties for loading and offloading sea tankers.
- 3.9.8 In the light of the above, the IPC should expect to receive a small number of significant applications for oil pipelines and start its assessment from the basis that there is a significant need for this infrastructure to be provided⁷¹.

⁷¹ Wood Mackenzie note the need for “investment in new pipeline capacity to both Heathrow and Stansted and regional airports to transfer fuel inland from import points” in a report for DECC that can be found at: http://decc.gov.uk/en/content/cms/what_we_do/uk_supply/resilience/downstream_oil/improving/improving.aspx.

Part 4 Assessment Principles

4.1 General points

- 4.1.1 The statutory framework for deciding applications for development consent under the Planning Act is summarised in Section 1.1 of this NPS. This Part of the NPS sets out certain general policies in accordance with which applications relating to energy infrastructure are to be decided that do not relate only to the need for new energy infrastructure (covered in Part 3) or to particular physical impacts of its construction or operation (covered in Part 5 and the technology-specific NPSs).
- 4.1.2 Given the level and urgency of need for infrastructure of the types covered by the energy NPSs set out in Part 3 of this NPS, the IPC should start with a presumption in favour of granting consent to applications for energy NSIPs. That presumption applies unless any more specific and relevant policies set out in the relevant NPSs clearly indicate that consent should be refused. The presumption is also subject to the provisions of the Planning Act 2008 referred to at paragraph 1.1.2 of this NPS.
- 4.1.3 In considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the IPC should take into account:
- its potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and
 - its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.
- 4.1.4 In this context, the IPC should take into account environmental, social and economic benefits and adverse impacts, at national, regional and local levels. These may be identified in this NPS, the relevant technology-specific NPS, in the application or elsewhere (including in local impact reports).
- 4.1.5 The policy set out in this NPS and the technology-specific energy NPSs is, for the most part, intended to make existing policy and practice of the Secretary of State in consenting nationally significant energy infrastructure clearer and more transparent, rather than to change the underlying policies against which applications are assessed (or therefore the “benchmark” for what is, or is not, an acceptable nationally significant energy development). Other matters that the IPC may consider both important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for purposes of IPC decision making given the national significance of the infrastructure. The energy NPSs have taken account of relevant Planning Policy Statements (PPSs) and older-style Planning Policy Guidance Notes

(PPGs) in England and Technical Advice Notes (TANs) in Wales where appropriate.

- 4.1.6 The Marine and Coastal Access Act 2009 provides for the preparation of a Marine Policy Statement (MPS) and a number of marine plans. The IPC must have regard to the MPS and applicable marine plans in taking any decision which relates to the exercise of any function capable of affecting the whole or any part of the UK marine area. In the event of a conflict between any of these marine planning documents and an NPS, the NPS prevails for purposes of IPC decision making given the national significance of the infrastructure.
- 4.1.7 The IPC should only impose requirements⁷² in relation to a development consent that are necessary, relevant to planning, relevant to the development to be consented, enforceable, precise, and reasonable in all other respects. The IPC should take into account the guidance in Circular 11/95, as revised, on “The Use of Conditions in Planning Permissions” or any successor to it.
- 4.1.8 The IPC may take into account any development consent obligations⁷³ that an applicant agrees with local authorities. These must be relevant to planning, necessary to make the proposed development acceptable in planning terms, directly related to the proposed development, fairly and reasonably related in scale and kind to the proposed development, and reasonable in all other respects.
- 4.1.9 In deciding to bring forward a proposal for infrastructure development, the applicant will have made a judgement on the financial and technical viability of the proposed development, within the market framework and taking account of Government interventions. Where the IPC considers, on information provided in an application, that the financial viability and technical feasibility of the proposal has been properly assessed by the applicant it is unlikely to be of relevance in IPC decision making (any exceptions to this principle are dealt with where they arise in this or other energy NPSs and the reasons why financial viability or technical feasibility is likely to be of relevance explained).

⁷² As defined in section 120 of the Planning Act 2008.

⁷³ Where the words “planning obligations” are used in this NPS they refer to “development consent obligations” under section 106 of the Town & Country Planning Act 1990 as amended by section 174 of the Planning Act 2008.

4.2 Environmental Statement

- 4.2.1 All proposals for projects that are subject to the European Environmental Impact Assessment Directive⁷⁴ must be accompanied by an Environmental Statement (ES) describing the aspects of the environment likely to be significantly affected by the project⁷⁵. The Directive specifically refers to effects on human beings⁷⁶, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them. The Directive requires an assessment of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects at all stages of the project, and also of the measures envisaged for avoiding or mitigating significant adverse effects.
- 4.2.2 To consider the potential effects, including benefits, of a proposal for a project, the IPC will find it helpful if the applicant sets out information on the likely significant social and economic effects of the development, and shows how any likely significant negative effects would be avoided or mitigated. This information could include matters such as employment, equality, community cohesion and well-being.
- 4.2.3 For the purposes of this NPS and the technology-specific NPSs the ES should cover the environmental, social and economic effects arising from pre-construction, construction, operation and decommissioning of the project. In some circumstances (for example, gas pipe-lines) it may be appropriate to assess effects arising from commissioning infrastructure once it is completed but before it comes into operation. Details of this and any other additional assessments are set out where necessary in sections on individual impacts in this NPS and in the technology-specific NPSs. In the absence of any additional information on additional assessments, the principles set out in this Section will apply to all assessments.
- 4.2.4 When considering a proposal the IPC should satisfy itself that likely significant effects, including any significant residual effects taking account of any proposed mitigation measures or any adverse effects of those measures, have been adequately assessed. In doing so the IPC should also examine whether the assessment distinguishes between the project stages and identifies any mitigation measures at those stages. The IPC should request further information where necessary to ensure compliance with the EIA Directive.

74 Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, amended by Directives 97/11/EC and 2003/35/EC. In respect of energy NSIPs, Annex 1 of the directive applies to thermal power stations, nuclear power stations, waste-disposal installations for the incineration, chemical treatment or land fill of toxic and dangerous wastes. Under Annex 2 it applies to industrial installations for the production of electricity, steam and hot water (i.e. CHP), industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables, surface storage of natural gas, underground storage of combustible gases and installations for hydroelectric energy production.

75 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (SI 2009/2263).

76 The effects on human beings includes effects on health.

- 4.2.5 When considering cumulative effects, the ES should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence)⁷⁷. The IPC may also have other evidence before it, for example from appraisals of sustainability of relevant NPSs or development plans, on such effects and potential interactions. Any such information may assist the IPC in reaching decisions on proposals and on mitigation measures that may be required.
- 4.2.6 The IPC should consider how the accumulation of, and interrelationship between, effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.
- 4.2.7 In some instances it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.
- 4.2.8 Where some details are still to be finalised the ES should set out, to the best of the applicant's knowledge, what the maximum extent of the proposed development may be in terms of site and plant specifications, and assess, on that basis, the effects which the project could have to ensure that the impacts of the project as it may be constructed have been properly assessed⁷⁸.
- 4.2.9 Should the IPC determine to grant development consent for an application where details are still to be finalised, it will need to reflect this in appropriate development consent requirements. Clearly, if development consent is granted for a proposal and at a later stage the developer wishes for technical or commercial reasons to construct it in such a way that its extent will be greater than has been provided for in the terms of the consent, it may be necessary to apply for a change to be made to the development consent, and the application to change the consent may need to be accompanied by further environmental information to supplement the original ES.
- 4.2.10 To help the IPC consider thoroughly the potential effects of a proposed project in cases where the EIA Directive does not apply and an ES is not therefore required, the applicant should instead provide information proportionate to the scale of the project on the likely significant environmental, social and economic effects. References to an Environmental Statement in this NPS should be taken as including a statement which provides this information, even if the EIA Directive does not apply.

⁷⁷ For guidance on the assessment of cumulative effects, see, for example, Circular 02/99, Environmental impact assessment, or *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions* (<http://ec.europa.eu/environment/eia/eia-studies-and-reports/guidel.pdf>).

⁷⁸ Case law (for example Rochdale MBC Ex. Parte C Tew 1999) provides a legal principle that indicative sketches and layouts cannot provide the basis for determining applications for EIA development. The "Rochdale Envelope" is a series of maximum extents of a project for which the significant effects are established. The detailed design of the project can then vary within this 'envelope' without rendering the ES inadequate.

- 4.2.11 In this NPS and the technology-specific NPSs, the terms ‘effects’, ‘impacts’ or ‘benefits’ should be understood to mean likely significant effects, impacts or benefits.

4.3 Habitats and Species Regulations

- 4.3.1 Prior to granting a development consent order, the IPC must, under the Habitats and Species Regulations⁷⁹, (which implement the relevant parts of the Habitats Directive and the Birds Directive⁸⁰ in England and Wales) consider whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects. Further information on the requirements of the Habitats and Species Regulations can be found in a Government Circular⁸¹. Applicants should also refer to Section 5.3 of this NPS on biodiversity and geological conservation. The applicant should seek the advice of Natural England and/or the Countryside Council for Wales, and provide the IPC with such information as it may reasonably require to determine whether an Appropriate Assessment is required. In the event that an Appropriate Assessment is required, the applicant must provide the IPC with such information as may reasonably be required to enable it to conduct the Appropriate Assessment. This should include information on any mitigation measures that are proposed to minimise or avoid likely effects.

4.4 Alternatives

- 4.4.1 As in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to the proposed development is in the first instance a matter of law, detailed guidance on which falls outside the scope of this NPS. From a policy perspective this NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option.
- 4.4.2 However:
- applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility;
 - in some circumstances there are specific legislative requirements, notably under the Habitats Directive, for the IPC to consider alternatives. These should also be identified in the ES by the applicant; and

79 The Conservation of Habitats and Species Regulations 2010 (SI2010/490).

80 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora; Council Directive 2009/147/EC on the conservation of wild birds.

81 Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their impact within the Planning System (ODPM 06/2005, Defra 01/2005) available via TSO website www.tso.co.uk/bookshop. It should be noted that this document does not cover more recent legislative requirements. Where this circular has been superseded, reference should be made to the latest successor document.

- in some circumstances, the relevant energy NPSs may impose a policy requirement to consider alternatives (as this NPS does in Sections 5.3, 5.7 and 5.9).

- 4.4.3 Where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements. Given the level and urgency of need for new energy infrastructure, the IPC should, subject to any relevant legal requirements (e.g. under the Habitats Directive) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives:
- the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner;
 - the IPC should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development;
 - where (as in the case of renewables) legislation imposes a specific quantitative target for particular technologies or (as in the case of nuclear) there is reason to suppose that the number of sites suitable for deployment of a technology on the scale and within the period of time envisaged by the relevant NPSs is constrained, the IPC should not reject an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals;
 - alternatives not among the main alternatives studied by the applicant (as reflected in the ES) should only be considered to the extent that the IPC thinks they are both important and relevant to its decision;
 - as the IPC must decide an application in accordance with the relevant NPS (subject to the exceptions set out in the Planning Act 2008), if the IPC concludes that a decision to grant consent to a hypothetical alternative proposal would not be in accordance with the policies set out in the relevant NPS, the existence of that alternative is unlikely to be important and relevant to the IPC's decision;
 - alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the IPC's decision;
 - alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the IPC's decision; and
 - it is intended that potential alternatives to a proposed development should, wherever possible, be identified before an application is made to the IPC in respect of it (so as to allow appropriate consultation and the development of a suitable evidence base in relation to any alternatives

which are particularly relevant). Therefore where an alternative is first put forward by a third party after an application has been made, the IPC may place the onus on the person proposing the alternative to provide the evidence for its suitability as such and the IPC should not necessarily expect the applicant to have assessed it.

4.5 Criteria for “good design” for energy infrastructure

- 4.5.1 The visual appearance of a building is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object — be it a building or other type of infrastructure — including fitness for purpose and sustainability, is equally important. Applying “good design” to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.
- 4.5.2 Good design is also a means by which many policy objectives in the NPS can be met, for example the impact sections show how good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts such as noise.
- 4.5.3 In the light of the above, and given the importance which the Planning Act 2008 places on good design and sustainability, the IPC needs to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable (including taking account of natural hazards such as flooding) as they can be. In so doing, the IPC should satisfy itself that the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible. Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation. Furthermore, the design and sensitive use of materials in any associated development such as electricity substations will assist in ensuring that such development contributes to the quality of the area.
- 4.5.4 For the IPC to consider the proposal for a project, applicants should be able to demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected. In considering applications the IPC should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy.
- 4.5.5 Applicants and the IPC should consider taking independent professional advice on the design aspects of a proposal. In particular, Design Council

CABE can be asked to provide design review for nationally significant infrastructure projects and applicants are encouraged to use this service⁸².

- 4.5.6 Further advice on what the IPC should expect applicants to demonstrate by way of good design is provided in the technology-specific NPSs where relevant.

4.6 Consideration of Combined Heat and Power (CHP)

- 4.6.1 Combined Heat and Power (CHP) is the generation of usable heat and electricity in a single process. A CHP station may either supply steam direct to customers or capture waste heat for low-pressure steam, hot water or space heating purposes after it has been used to drive electricity generating turbines. The heat can also be used to drive absorption chillers, thereby providing cooling.
- 4.6.2 In conventional thermal generating stations, the heat that is raised to drive electricity generation is subsequently emitted to the environment as waste. Supplying steam direct to industrial customers or using lower grade heat, such as in district heating networks, can reduce the amount of fuel otherwise needed to generate the same amount of heat and power separately. CHP is technically feasible for all types of thermal generating stations, including nuclear, energy from waste and biomass, although the majority of CHP plants in the UK are fuelled by gas.
- 4.6.3 Using less fuel to generate the same amount of heat and power reduces emissions, particularly CO₂. The Government has therefore committed to promoting Good Quality CHP, which denotes CHP that has been certified as highly efficient under the CHP Quality Assurance programme. In accordance with the EU Cogeneration Directive, schemes need to achieve at least 10% primary energy savings compared to the separate generation of heat and power in order to qualify for Government support associated with the programme.
- 4.6.4 In 2009, there was 5.6 GW of Good Quality CHP in the UK, providing over 7% of electricity and saving an estimated 9.5 MtCO₂ per annum. There is a recognised cost-effective potential for a further 10 GW of Good Quality CHP, estimated to offer a further saving of 175 MtCO₂ by 2015⁸³.
- 4.6.5 To be economically viable as a CHP plant, a generating station needs to be located close to industrial or domestic customers with heat demands. The distance will vary according to the size of the generating station and the nature of the heat demand. For industrial purposes, customers are likely to be intensive heat users such as chemical plants, refineries or paper mills. CHP can also be used to provide lower grade heat for light industrial users such as commercial greenhouses, or more commonly for hot water and space heating, including supply through district heating networks. A 2009 report for DECC⁸⁴ on district heating networks suggested that, for example, a district heating network using waste heat from a generating station would

82 <http://www.communities.gov.uk/publications/planningandbuilding/letterdesignplanning>

83 <http://www.defra.gov.uk/environment/climatechange/uk/energy/chp/pdf/potential-report.pdf>

84 "The Potential and Costs of District Heating Networks", Pöyry and Faber Maunsell, April 2009.

be cost-effective where there was a demand for 200 MWth of heat within 15 km. Additionally, the provision of CHP is most likely to be cost-effective and practical where it is included as part of the initial design and is part of a mixed-use development. For example, retrofitting a district heating network to an existing housing estate may not be efficient.

- 4.6.6 Under guidelines issued by DECC (then DTI) in 2006⁸⁵, any application to develop a thermal generating station under Section 36 of the Electricity Act 1989 must either include CHP or contain evidence that the possibilities for CHP have been fully explored to inform the IPC's consideration of the application. This should be through an audit trail of dialogue between the applicant and prospective customers. The same principle applies to any thermal power station which is the subject of an application for development consent under the Planning Act 2008. The IPC should have regard to DECC's guidance, or any successor to it, when considering the CHP aspects of applications for thermal generating stations.
- 4.6.7 In developing proposals for new thermal generating stations, developers should consider the opportunities for CHP from the very earliest point and it should be adopted as a criterion when considering locations for a project. Given how important liaison with potential customers for heat is, applicants should not only consult those potential customers they have identified themselves but also bodies such as the Homes and Communities Agency (HCA), Local Enterprise Partnerships (LEPs) and Local Authorities and obtain their advice on opportunities for CHP. Further advice is contained in the 2006 DECC guidelines and applicants should also consider relevant information in regional and local energy and heat demand mapping.
- 4.6.8 Utilisation of useful heat that displaces conventional heat generation from fossil fuel sources is to be encouraged where, as will often be the case, it is more efficient than the alternative electricity/heat generation mix. To encourage proper consideration of CHP, substantial additional positive weight should therefore be given by the IPC to applications incorporating CHP. If the proposal is for thermal generation without CHP, the applicant should:
- explain why CHP is not economically or practically feasible for example if there is a more energy efficient means of satisfying a nearby domestic heat demand;
 - provide details of any potential future heat requirements in the area that the station could meet; and
 - detail the provisions in the proposed scheme for ensuring any potential heat demand in the future can be exploited.
- 4.6.9 CHP may require additional space than for a non-CHP generating station. It is possible that this might conflict with space required for a generating station to be Carbon Capture Ready, as set out in Section 4.7. The material provided by applicants should therefore explain how the development can both be ready to provide CHP in the future and also be Carbon Capture

⁸⁵ Guidance on background information to accompany notifications under Section 14(1) of the Energy Act 1976 and applications under Section 36 of the Electricity Act 1989.

Ready or set out any constraints (for example space restrictions) which would prevent this.

- 4.6.10 If the IPC is not satisfied with the evidence that has been provided, it may wish to investigate this with one or more of the bodies such as the HCA, LEPs and Local Authorities.
- 4.6.11 Furthermore, if the IPC, when considering an application for a thermal generating station, identifies a potential heat customer that is not explored in the application (for instance, on the advice of the HCA or Local Authorities), it should request that the applicant pursues this. Should the applicant not be able to reach an agreement with a potential customer, it should provide evidence demonstrating why it was not possible.
- 4.6.12 The IPC may be aware of potential developments (for example from the applicant or a third party) which could utilise heat from the plant in the future, for example planned housing, and which is due to be built within a timeframe that would make the supply of heat cost-effective. If so, the IPC may wish to impose requirements to ensure that the generating station is CHP-ready unless the IPC is satisfied that the applicant has demonstrated that the need to comply with the requirement to be Carbon Capture Ready will preclude any provision for CHP.

4.7 Carbon Capture and Storage (CCS) and Carbon Capture Readiness (CCR)

CCS

- 4.7.1 Carbon Capture and Storage (CCS) is an emerging technology that enables carbon dioxide that would otherwise be released to the atmosphere to be captured and permanently stored. It can be applied to any large point source of carbon dioxide, such as fossil fuel power stations or other industrial processes that are high emitters. Carbon capture technologies are able to remove up to 90% of the carbon dioxide that would otherwise be released to the atmosphere and offers the opportunity for fossil fuels to continue to be an important element of a secure and diverse low carbon energy mix.
- 4.7.2 The chain of CCS has three links: capture of carbon, transport, and storage. There are three types of capture technology:
- *Pre-combustion capture*: this method involves reacting fuel with oxygen or air, and in some cases steam, to produce a gas consisting mainly of carbon monoxide and hydrogen. The carbon monoxide is reacted with more steam in a catalytic shift converter to produce more hydrogen and CO₂. The CO₂ is then separated and the hydrogen is used as fuel in a combined cycle gas turbine generating station. For coal, this method is based on integrated coal gasification combined cycle (IGCC) technology.
 - *Post-combustion capture*: this uses solvents to scrub CO₂ out of flue gases. The CO₂ is then released as a concentrated gas stream by a regeneration process. Post-combustion capture is applicable to pulverised coal generating stations.

- *Oxy-fuel combustion*: in this process, fuel is burnt in an oxygen/CO₂ mixture rather than air to produce a flue gas that is predominantly CO₂. With coal the technology would be deployed with a suitably modified pulverised coal combustion system, whilst with gas it could be used with a combined cycle system.
- 4.7.3 Once carbon dioxide has been captured, it is then compressed and transported, before being permanently stored in deep geological formations, such as depleted oil and gas fields and saline aquifers. In the UK, the majority of locations thought to be best suited to storage of CO₂ are located offshore.
- 4.7.4 The Government has taken a number of steps to facilitate and encourage the demonstration of CCS technology. The demonstration programme described in 3.6.5 focused initially on coal-fired power stations. This is because the emissions from coal generation are substantially higher than from other fuels, including gas; the projected increase in coal use globally creates a greater urgency to tackling emissions from coal; tackling emissions from coal first makes most economic sense because of the greater emissions intensity; and new coal generating stations would contribute to the diversity and security of UK energy supplies as we make the transition to a low carbon mix. However, CCS will also be required for other combustion generating stations in future and the Government has therefore extended the demonstration programme to include gas-fired generating stations.
- 4.7.5 All commercial scale fossil fuelled generating stations have to be carbon capture ready (see CCR Section below). In addition to satisfying the CCR criteria, to reduce CO₂ emissions new coal-fired generating stations, or significant extensions to existing stations, in England or Wales must have CCS on at least 300 MW net of the proposed generating capacity and secure arrangements for the transport and permanent storage of carbon dioxide. Coal-fired generating stations of less than 300 MW net capacity should show that the proposed generating station will be able to capture CO₂ from their full capacity. Operators of fossil fuel generating stations will also be required to comply with any Emission Performance Standards (EPS) that might be applicable, but this is not part of the consents process.
- 4.7.6 Given this requirement to fit a technology which is at a relatively early stage of development, and therefore very costly, it is unlikely that any coal-fired plants will be built in the foreseeable future without financial support for CCS demonstration. However it is possible that developers may wish to submit applications in advance of securing funding. Any decision on a planning application for a new coal-fired generating station should be made independently of any decision on allocation of funding for CCS demonstration. This may mean, therefore, that planning consent could be given to more applications than will be able to secure financial support for CCS demonstration.
- 4.7.7 The most likely method for transporting the captured carbon dioxide is through pipelines. These will be located both onshore and offshore. There are currently no carbon dioxide pipelines in the UK and considerable future investment in pipelines will be required for the purpose of the demonstration programme. If CCS is deployed more widely, it is likely that these initial

investments could form the basis of a wider carbon dioxide pipeline network, which is likely to require greater capacity pipelines. In considering applications the IPC should therefore take into account that the Government wants developers to bear in mind foreseeable future demand when considering the size and route of their investments and may therefore propose pipelines with a greater capacity than necessary for the project alone. Existing legislation already provides powers to require modification of pipelines where this would reduce the need for additional pipelines to be constructed in the future.

- 4.7.8 To construct a coal power station with the full CCS chain, applicants will need a range of consents from different bodies. These include a CO₂ storage licence and (if appropriate) consent for both on and offshore pipeline construction. An environmental permit will be required from the Environment Agency (EA) which incorporates conditions for operation of the CCS chain.
- 4.7.9 Further information on the CCS obligations to be imposed on new coal-fired power stations will be available in guidance issued by DECC⁸⁶. The IPC must follow this CCS guidance, or any successor to it, when considering applications for combustion generating stations.

CCR

- 4.7.10 To ensure that no foreseeable barriers exist to retrofitting carbon capture and storage (CCS) equipment on combustion generating stations, all applications for new combustion plant which are of generating capacity at or over 300 MW⁸⁷ and of a type covered by the EU's Large Combustion Plant Directive (LCPD)⁸⁸ should demonstrate that the plant is "Carbon Capture Ready" (CCR) before consent may be given. The IPC must not grant consent unless this is the case. In order to assure the IPC that a proposed development is CCR, applicants will need to demonstrate that their proposal complies with guidance issued by the Secretary of State in November 2009⁸⁹ or any successor to it. The guidance requires:
- that sufficient space is available on or near the site to accommodate carbon capture equipment in the future;
 - the technical feasibility of retrofitting their chosen carbon capture technology;
 - that a suitable area of deep geological storage offshore exists for the storage of captured CO₂ from the proposed combustion station;

86 Draft Guidance was issued for consultation in November 2009.

87 The threshold set for this CCR requirement is capacity measured in MW electricity (MWe) for combustion plants which are covered by the LCPD, consistent with the requirements of Article 9a of the LCPD, as inserted by Article 33 of the EU Directive on the Geological Storage of Carbon Dioxide (2009/31/EC). This article requires applicants to carry out CCR assessments, and it requires Member State authorities (in this case, the IPC) to ensure that suitable space for the capture equipment is set aside. The policy set out here represents the implementation of Article 9a as regards Great Britain, but it also goes beyond what the Directive requires, as explained in DECC guidance.

88 2001/80/EC. Energy from waste plants are not covered by the LCPD.

89 Carbon Capture Readiness A guidance note for Section 36 Applications URN09D/810 http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/consents_planning/guidance.aspx

- the technical feasibility of transporting the captured CO₂ to the proposed storage area; and
 - the economic feasibility within the combustion station's lifetime of the full CCS chain, covering retrofitting, transport and storage.
- 4.7.11 Government envisages that the technical feasibility study for retrofitting CCS equipment will take the form of a written report and accompanying plant designs which:
- make clear which capture technology is currently considered most appropriate for retrofit in the future to the power station; and
 - provide sufficient detail to enable the EA to advise the Secretary of State on whether the applicant has sufficiently demonstrated there are no currently known technical barriers to subsequent retrofit of the declared capture technology.
- 4.7.12 The assessment of technological feasibility could be against either:
- an appropriate reference document; or
 - by the provision of sufficient technical detail by the applicant in their submitted plans and discussions with the advisory body.
- 4.7.13 Applicants should conduct a single economic assessment which encompasses retrofitting of capture equipment, CO₂ transport and the storage of CO₂. Applicants should provide evidence of reasonable scenarios, taking into account the cost of the capture technology and transport option chosen for the technical CCR assessments and the estimated costs of CO₂ storage, which make operational CCS economically feasible for the proposed development.
- 4.7.14 The preparation of an economic assessment will involve a wide range of assumptions on each of a number of factors, and Government recognises the inherent uncertainties about each of these factors. There can be no guarantee that an assessment which is carried out now will predict with complete accuracy either in what circumstances it will be feasible to fit CCS to a proposed power station or when those circumstances will arise, but it can indicate the circumstances which would need to be the case to allow operational CCS to be economically feasible during the lifetime of the proposed new station.
- 4.7.15 A model assessment structure is suggested in DECC's CCR guidance, although this is not the only way which the assessment could be addressed. It is the responsibility of applicants to justify the capture, transport and storage options chosen for their proposed development.
- 4.7.16 The IPC should consult EA on the technical and economic feasibility assessments. The IPC should also have regard to advice from EA as to the suitability of the space set aside on or near the site for CCS equipment. If the IPC, having considered these assessments and other available information including comments by EA, concludes that it will not be technically and economically feasible to retrofit CCS to a proposed plant during its expected lifetime, then the proposed development cannot be judged to be CCR and therefore cannot receive consent.

- 4.7.17 If granted consent, operators of the power station will be required to:
- retain control over sufficient additional space on or near the site on which to install the carbon capture equipment and the ability to use it for that purpose;
 - submit update reports on the technical aspects of its CCR status to the Secretary of State for DECC. These reports will be required within 3 months of the commercial operation date of the power station (so avoiding any burden on the operator with an unimplemented consent) and every two years thereafter. Should CCS equipment be retrofitted to the full capacity of the plant, the obligation to provide such reports will lapse.

4.8 Climate change adaptation

- 4.8.1 Part 2 of this NPS covers the Government's energy and climate change strategy, including policies for mitigating climate change. This part of the NPS sets out how applicants and the IPC should take the effects of climate change into account when developing and consenting infrastructure. While climate change mitigation is essential to minimise the most dangerous impacts of climate change, previous global greenhouse gas emissions have already committed us to some degree of continued climate change for at least the next 30 years. If new energy infrastructure is not sufficiently resilient against the possible impacts of climate change, it will not be able to satisfy the energy needs as outlined in Part 3 of this NPS.
- 4.8.2 Climate change is likely to mean that the UK will experience hotter, drier summers and warmer, wetter winters. There is a likelihood of increased flooding, drought, heatwaves and intense rainfall events, as well as rising sea levels. Adaptation is therefore necessary to deal with the potential impacts of these changes that are already happening.
- 4.8.3 To support planning decisions, the Government produces a set of UK Climate Projections and is developing a statutory National Adaptation Programme⁹⁰. In addition, the Government's Adaptation Reporting Power⁹¹ will ensure that reporting authorities (a defined list of public bodies and statutory undertakers, including energy utilities) assess the risks to their organisation presented by climate change. The IPC may take into account energy utilities' reports to the Secretary of State when considering adaptation measures proposed by an applicant for new energy infrastructure.
- 4.8.4 In certain circumstances, measures implemented to ensure a scheme can adapt to climate change may give rise to additional impacts, for example as a result of protecting against flood risk, there may be consequential impacts on coastal change (see Section 5.5).
- 4.8.5 New energy infrastructure will typically be a long-term investment and will need to remain operational over many decades, in the face of a changing climate. Consequently, applicants must consider the impacts of climate change when planning the location, design, build, operation and, where appropriate, decommissioning of new energy infrastructure. The ES should

⁹⁰ s.58 of the Climate Change Act 2008.

⁹¹ s.62 of the Climate Change Act 2008.

set out how the proposal will take account of the projected impacts of climate change. While not required by the EIA Directive, this information will be needed by the IPC.

- 4.8.6 The IPC should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate Projections available at the time the ES was prepared to ensure they have identified appropriate mitigation or adaptation measures. This should cover the estimated lifetime of the new infrastructure. Should a new set of UK Climate Projections become available after the preparation of the ES, the IPC should consider whether they need to request further information from the applicant.
- 4.8.7 Applicants should apply as a minimum, the emissions scenario that the Independent Committee on Climate Change suggests the world is currently most closely following – and the 10%, 50% and 90% estimate ranges. These results should be considered alongside relevant research which is based on the climate change projections.
- 4.8.8 The IPC should be satisfied that there are not features of the design of new energy infrastructure critical to its operation which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections, taking account of the latest credible scientific evidence on, for example, sea level rise (for example by referring to additional maximum credible scenarios – i.e. from the Intergovernmental Panel on Climate Change or EA) and that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime.
- 4.8.9 Where energy infrastructure has safety critical elements (for example parts of new fossil fuel power stations or some electricity sub-stations), the applicant should apply the high emissions scenario (high impact, low likelihood) to those elements. Although the likelihood of this scenario is thought to be low, it is appropriate to take a more risk-averse approach with elements of infrastructure which are critical to the safety of its operation.
- 4.8.10 If any adaptation measures give rise to consequential impacts (for example on flooding, water resources or coastal change) the IPC should consider the impact of the latter in relation to the application as a whole and the impacts guidance set out in Part 5 of this NPS.
- 4.8.11 Any adaptation measures should be based on the latest set of UK Climate Projections, the Government's latest UK Climate Change Risk Assessment, when available⁹² and in consultation with the EA.
- 4.8.12 Adaptation measures can be required to be implemented at the time of construction where necessary and appropriate to do so. However, where they are necessary to deal with the impact of climate change, and that measure would have an adverse effect on other aspects of the project and/or surrounding environment (for example coastal processes), the IPC may consider requiring the applicant to ensure that the adaptation measure could be implemented should the need arise, rather than at the outset of the

92 s.56 of the Climate Change Act 2008.

development (for example increasing height of existing, or requiring new, sea walls).

- 4.8.13 The generic impacts advice in this NPS and the technology specific advice on impacts in the other NPSs provide additional information on climate change adaptation.

4.9 Grid connection

- 4.9.1 The connection of a proposed electricity generation plant to the electricity network is an important consideration for applicants wanting to construct or extend generation plant. In the market system, it is for the applicant to ensure that there will be necessary infrastructure and capacity within an existing or planned transmission or distribution network to accommodate the electricity generated. The applicant will liaise with National Grid who own and manage the transmission network in England and Wales or the relevant regional Distribution Network Operator (DNO) to secure a grid connection. It may be the case that the applicant has not received or accepted a formal offer of a grid connection from the relevant network operator at the time of the application, although it is likely to have applied for one and discussed it with them. This is a commercial risk the applicant may wish to take for a variety of reasons, although the IPC will want to be satisfied that there is no obvious reason why a grid connection would not be possible.
- 4.9.2 The Planning Act 2008 aims to create a holistic planning regime so that the cumulative effect of different elements of the same project can be considered together. The Government therefore envisages that wherever possible, applications for new generating stations and related infrastructure should be contained in a single application to the IPC or in separate applications submitted in tandem which have been prepared in an integrated way. However this may not always be possible, nor the best course in terms of delivery of the project in a timely way, as different aspects may have different lead-in times and be undertaken by different legal entities subject to different commercial and regulatory frameworks (for example grid companies operate within OFGEM controls). So the level of information available on the different elements may vary. In some cases applicant(s) may therefore decide to put in an application that seeks consent only for one element but contains some information on the second. Where this is the case, the applicant should explain the reasons for the separate application.
- 4.9.3 If this option is pursued, the applicant(s) accept the implicit risks involved in doing so, and must ensure they provide sufficient information to comply with the EIA Directive including the indirect, secondary and cumulative effects, which will encompass information on grid connections. The IPC must be satisfied that there are no obvious reasons why the necessary approvals for the other element are likely to be refused. The fact that the IPC has decided to consent one project should not in any way fetter its subsequent decisions on any related projects.
- 4.9.4 Further guidance on the considerations for the IPC is contained in EN-5.

4.10 Pollution control and other environmental regulatory regimes

- 4.10.1 Issues relating to discharges or emissions from a proposed project which affect air quality, water quality, land quality and the marine environment, or which include noise and vibration may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes.
- 4.10.2 The planning and pollution control systems are separate but complementary. The planning system controls the development and use of land in the public interest. It plays a key role in protecting and improving the natural environment, public health and safety, and amenity, for example by attaching conditions to allow developments which would otherwise not be environmentally acceptable to proceed, and preventing harmful development which cannot be made acceptable even through conditions. Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health.
- 4.10.3 In considering an application for development consent, the IPC should focus on whether the development itself is an acceptable use of the land, and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. The IPC should work on the assumption that the relevant pollution control regime and other environmental regulatory regimes, including those on land drainage, water abstraction and biodiversity, will be properly applied and enforced by the relevant regulator. It should act to complement but not seek to duplicate them.
- 4.10.4 Applicants should consult the Marine Management Organisation (MMO) on nationally significant projects which would affect, or would be likely to affect, any relevant marine areas as defined in the Planning Act 2008 (as amended by s.23 of the Marine and Coastal Access Act 2009). The IPC consent may include a deemed marine licence and the MMO will advise on what conditions should apply to the deemed marine licence. The IPC and MMO should cooperate closely to ensure that energy NSIPs are licensed in accordance with environmental legislation, including European directives.
- 4.10.5 Many projects covered by this NPS will be subject to the Environmental Permitting (EP) regime, which also incorporates operational waste management requirements for certain activities. When a developer applies for an Environmental Permit, the relevant regulator (usually EA but sometimes the local authority) requires that the application demonstrates that processes are in place to meet all relevant EP requirements. In considering the impacts of the project, the IPC may wish to consult the regulator on any management plans that would be included in an Environmental Permit application.
- 4.10.6 Applicants are advised to make early contact with relevant regulators, including EA and the MMO, to discuss their requirements for environmental permits and other consents. This will help ensure that applications take

account of all relevant environmental considerations and that the relevant regulators are able to provide timely advice and assurance to the IPC. Wherever possible, applicants are encouraged to submit applications for Environmental Permits and other necessary consents at the same time as applying to the IPC for development consent.

- 4.10.7 The IPC should be satisfied that development consent can be granted taking full account of environmental impacts. Working in close cooperation with EA and/or the pollution control authority, and other relevant bodies, such as the MMO, Natural England, the Countryside Council for Wales, Drainage Boards, and water and sewerage undertakers, the IPC should be satisfied, before consenting any potentially polluting developments, that:
- the relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and
 - the effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits.
- 4.10.8 The IPC should not refuse consent on the basis of pollution impacts unless it has good reason to believe that any relevant necessary operational pollution control permits or licences or other consents will not subsequently be granted.

4.11 Safety

- 4.11.1 HSE is responsible for enforcing a range of occupational health and safety legislation some of which is relevant to the construction, operation and decommissioning of energy infrastructure. Applicants should consult with the Health and Safety Executive (HSE) on matters relating to safety.
- 4.11.2 Some technologies, for example the use of salt caverns for underground gas storage, will be regulated by specific health and safety legislation. The application of these regulations is set out in the technology-specific NPSs where relevant.
- 4.11.3 Some energy infrastructure will be subject to the Control of Major Accident Hazards (COMAH) Regulations 1999. These Regulations aim to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any that do occur. COMAH regulations apply throughout the life cycle of the facility, i.e. from the design and build stage through to decommissioning. They are enforced by the Competent Authority comprising HSE and the EA acting jointly in England and Wales (and by the HSE and Scottish Environment Protection Agency acting jointly in Scotland). The same principles apply here as for those set out in the previous section on pollution control and other environmental permitting regimes.
- 4.11.4 Applicants seeking to develop infrastructure subject to the COMAH regulations should make early contact with the Competent Authority. If a safety report is required it is important to discuss with the Competent Authority the type of information that should be provided at the design and development stage, and what form this should take. This will enable the

Competent Authority to review as much information as possible before construction begins, in order to assess whether the inherent features of the design are sufficient to prevent, control and mitigate major accidents. The IPC should be satisfied that an assessment has been done where required and that the Competent Authority has assessed that it meets the safety objectives described above.

4.12 Hazardous Substances

- 4.12.1 All establishments wishing to hold stocks of certain hazardous substances above a threshold need Hazardous Substances consent. Applicants should consult the HSE at pre-application stage⁹³ if the project is likely to need hazardous substances consent. Where hazardous substances consent is applied for, the IPC will consider whether to make an order directing that hazardous substances consent shall be deemed to be granted alongside making an order granting development consent⁹⁴. The IPC should consult HSE about this.
- 4.12.2 HSE will assess the risks based on the development consent application. Where HSE does not advise against the IPC granting the consent, it will also recommend whether the consent should be granted subject to any requirements.
- 4.12.3 HSE sets a consultation distance around every site with hazardous substances consent and notifies the relevant local planning authorities. The applicant should therefore consult the local planning authority at pre-application stage to identify whether its proposed site is within the consultation distance of any site with hazardous substances consent and, if so, should consult the HSE for its advice on locating the particular development on that site.

4.13 Health

- 4.13.1 Energy production has the potential to impact on the health and well-being (“health”) of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the production, distribution and use of energy may have negative impacts on some people’s health.
- 4.13.2 As described in the relevant sections of this NPS and in the technology-specific NPSs, where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate. The impacts of more than one development may affect people simultaneously, so the applicant and the IPC should consider the cumulative impact on health.

93 Further information is available at the HSE’s website:

<http://www.hse.gov.uk/landuseplanning/nsip-applications.htm>

94 Hazardous substances consent can also be applied for subsequent to a DCO application. However, the guidance in 4.12.1 still applies i.e. the application should consult with HSE at the pre-application stage and include details in their DCO

- 4.13.3 The direct impacts on health may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests.
- 4.13.4 New energy infrastructure may also affect the composition, size and proximity of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity.
- 4.13.5 Generally, those aspects of energy infrastructure which are most likely to have a significantly detrimental impact on health are subject to separate regulation (for example for air pollution) which will constitute effective mitigation of them, so that it is unlikely that health concerns will either constitute a reason to refused consents or require specific mitigation under the Planning Act 2008. However, the IPC will want to take account of health concerns when setting requirements relating to a range of impacts such as noise.

4.14 Common law nuisance and statutory nuisance

- 4.14.1 Section 158 of the Planning Act 2008 confers statutory authority for carrying out development consented to by, or doing anything else authorised by, a development consent order. Such authority is conferred only for the purpose of providing a defence in any civil or criminal proceedings for nuisance. This would include a defence for proceedings for nuisance under Part III of the Environmental Protection Act 1990 (statutory nuisance) but only to the extent that the nuisance is the inevitable consequence of what has been authorised. The defence does not extinguish the local authority's duties under Part III of the EPA 1990 to inspect its area and take reasonable steps to investigate complaints of statutory nuisance and to serve an abatement notice where satisfied of its existence, likely occurrence or recurrence. The defence is not intended to extend to proceedings where the matter is "prejudicial to health" and not a nuisance.
- 4.14.2 It is very important that, at the application stage of an energy NSIP, possible sources of nuisance under section 79(1) of the 1990 Act and how they may be mitigated or limited are considered by the IPC so that appropriate requirements can be included in any subsequent order granting development consent. (See Section 5.6 on Dust, odour, artificial light etc. and Section 5.11 on Noise and vibration.)
- 4.14.3 The IPC should note that the defence of statutory authority is subject to any contrary provision made by the IPC in any particular case in a development consent order (section 158(3)). Therefore, subject to Section 5.6, the IPC can disapply the defence of statutory authority, in whole or in part, in any particular case but in so doing should have regard to whether any particular nuisance is an inevitable consequence of the development.

4.15 Security considerations

- 4.15.1 National security considerations apply across all national infrastructure sectors. Overall responsibility for security of the energy sector lies with DECC. It works closely with Government security agencies including the Centre for the Protection of National Infrastructure (CPNI) to reduce the vulnerability of the most 'critical' infrastructure assets in the sector to terrorism and other national security threats. The Office for Civil Nuclear Security (OCNS) is the security regulator for the UK's civil nuclear industry.
- 4.15.2 Government policy is to ensure that, where possible, proportionate protective security measures are designed into new infrastructure projects at an early stage in the project development. Where applications for development consent for infrastructure covered by this NPS relate to potentially 'critical' infrastructure, there may be national security considerations.
- 4.15.3 DECC will be notified at pre-application stage about every likely future application for energy NSIPs, so that any national security implications can be identified. Where national security implications have been identified, the applicant should consult with relevant security experts from CPNI, OCNS and DECC to ensure that physical, procedural and personnel security measures have been adequately considered in the design process and that adequate consideration has been given to the management of security risks. If CPNI, OCNS and/or DECC are satisfied that security issues have been adequately addressed in the project when the application is submitted to the IPC, it will provide confirmation of this to the IPC. The IPC should not need to give any further consideration to the details of the security measures in its examination.
- 4.15.4 The applicant should only include sufficient information in the application as is necessary to enable the IPC to examine the development consent issues and make a properly informed decision on the application.
- 4.15.5 In exceptional cases, where examination of an application would involve public disclosure of information about defence or national security which would not be in the national interest, the Secretary of State can intervene and examine a part or the whole of the application. In that case, the Secretary of State may appoint an examiner to consider evidence in closed session, and the Secretary of State would be the decision maker for the application.

Part 5 Generic Impacts

5.1 Introduction

- 5.1.1 Some impacts (such as landscape and visual impacts) arise from the development of any of the types of energy infrastructure covered by the energy NPSs. Others (such as air quality impacts) are relevant to all types of energy infrastructure but nevertheless arise in similar ways from the development of types of energy infrastructure covered in at least two of the energy NPSs. Both these classes of impacts are considered in this Part and are referred to as “generic impacts”. However, in some cases the technology-specific NPSs provide detail on the way these impacts arise or are to be considered in the context of applications which is specific to the technology in question. Impacts which are more or less limited to one particular technology are only covered in the relevant technology-specific NPS.
- 5.1.2 The list of impacts (generic and technology-specific) and the policy in respect of the consideration of impacts in this Part and in the impact section of the technology-specific NPSs is not exhaustive. The NPSs address those impacts and means of mitigation that are anticipated to arise most frequently; they are not intended to provide a list of all possible effects or ways to mitigate such effects. The IPC should therefore consider other impacts and means of mitigation where it determines that the impact is relevant and important to its decision. The technology-specific NPSs may state that certain impacts should be given a particular weight. Where they do not do so, the IPC should follow any policy set out on the level of weight to be given to such impact set out in this NPS. Applicants should identify the impacts of their proposals in the ES in terms of those covered in this NPS and any others that may be relevant to their application.
- 5.1.3 Some of the impact sections in this NPS and the technology-specific NPSs refer to development consent requirements or obligations being a means of securing appropriate mitigation. The fact that the possible use of requirements or obligations are not mentioned in relation to other impacts does not mean that they may not be relevant.
- 5.1.4 Some of the impact sections in this NPS and the technology-specific NPSs also refer to bodies whom the applicant or IPC should consult. The references to specific bodies are not intended to be exhaustive. The fact that in other impact sections no mention is made of such consultation does not mean that the applicant or IPC should not, where appropriate, engage in it. Applicants must also ensure they consult the relevant bodies about their proposed applications in accordance with section 42 to 44 of the Planning Act 2008 and the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.

5.2 Air quality and emissions

Introduction

- 5.2.1 Infrastructure development can have adverse effects on air quality. The construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats, or on the wider countryside. Impacts on protected species and habitats are covered in Section 5.3. Air emissions include particulate matter (for example dust) up to a diameter of ten microns (PM¹⁰) as well as gases such as sulphur dioxide, carbon monoxide and nitrogen oxides (NO_x). Levels for pollutants in ambient air are set out in the Air Quality Strategy which in turn embodies EU legal requirements. The Secretary of State for the Environment Food and Rural Affairs is required to make available up to date information on air quality to any relevant interested party⁹⁵.
- 5.2.2 CO₂ emissions are a significant adverse impact from some types of energy infrastructure which cannot be totally avoided (even with full deployment of CCS technology). However, given the characteristics of these and other technologies, as noted in Part 3 of this NPS, and the range of non-planning policies aimed at decarbonising electricity generation such as EU ETS (see Section 2.2 above), Government has determined that CO₂ emissions are not reasons to prohibit the consenting of projects which use these technologies or to impose more restrictions on them in the planning policy framework than are set out in the energy NPSs (e.g. the CCR and, for coal, CCS requirements). Any ES on air emissions will include an assessment of CO₂ emissions, but the policies set out in Section 2, including the EU ETS, apply to these emissions. The IPC does not, therefore need to assess individual applications in terms of carbon emissions against carbon budgets and this section does not address CO₂ emissions or any Emissions Performance Standard that may apply to plant.
- 5.2.3 A particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment. Eutrophication from air pollution results mainly from emissions of NO_x and ammonia. The main emissions from energy infrastructure are from generating stations. Eutrophication can affect plant growth and functioning, altering the competitive balance of species and thereby damaging biodiversity. In aquatic ecosystems it can cause changes to algal composition and lead to algal blooms, which remove oxygen from the water, adversely affecting plants and fish. The effects on ecosystems can be short-term or irreversible, and can have a large impact on ecosystem services such as pollination, aesthetic services and water supply.

⁹⁵ Air Quality Standards Regulations 2010, No.2010/1001.

- 5.2.4 Emissions from combustion plants are generally released through exhaust stacks. Design of exhaust stacks, particularly height, is the primary driver for the delivery of optimal dispersion of emissions and is often determined by statutory requirements. The optimal stack height is dependent upon the local terrain and meteorological conditions, in combination with the emission characteristics of the plant. The EA will require the exhaust stack height of a thermal combustion generating plant, including fossil fuel generating stations and waste or biomass plant, to be optimised in relation to impact on air quality. The IPC need not, therefore, be concerned with the exhaust stack height optimisation process in relation to air emissions, though the impact of stack heights on landscape and visual amenity will be a consideration (see Section 5.9).
- 5.2.5 Impacts of thermal combustion generating stations with respect to air emissions are set out in the technology-specific NPSs.

Applicant's assessment

- 5.2.6 Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement (ES).
- 5.2.7 The ES should describe:
- any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;
 - the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;
 - existing air quality levels and the relative change in air quality from existing levels; and
 - any potential eutrophication impacts.

IPC decision making

- 5.2.8 Many activities involving air emissions are subject to pollution control. The considerations set out in Section 4.10 on the interface between planning and pollution control therefore apply.
- 5.2.9 The IPC should generally give air quality considerations substantial weight where a project would lead to a deterioration in air quality in an area, or leads to a new area where air quality breaches any national air quality limits. However air quality considerations will also be important where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits.
- 5.2.10 In all cases the IPC must take account of any relevant statutory air quality limits. Where a project is likely to lead to a breach of such limits the developers should work with the relevant authorities to secure appropriate mitigation measures to allow the proposal to proceed. In the event that a project will lead to non-compliance with a statutory limit the IPC should refuse consent.

Mitigation

- 5.2.11 The IPC should consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the project application. A construction management plan may help codify mitigation at this stage.
- 5.2.12 In doing so the IPC may refer to the conditions and advice in the Air Quality Strategy⁹⁶ or any successor to it.
- 5.2.13 The mitigations identified in Section 5.13 on traffic and transport impacts will help mitigate the effects of air emissions from transport.

96 <http://www.defra.gov.uk/environment/quality/air/airquality/strategy/index.htm>

5.3 Biodiversity and geological conservation

Introduction

- 5.3.1 Biodiversity is the variety of life in all its forms and encompasses all species of plants and animals and the complex ecosystems of which they are a part. Geological conservation relates to the sites that are designated for their geology and/or their geomorphological importance.
- 5.3.2 The wide range of legislative provisions at the international and national level that can impact on planning decisions affecting biodiversity and geological conservation issues are set out in a Government Circular⁹⁷. A separate guide sets out good practice in England in relation to planning for biodiversity and geological conservation⁹⁸.

Applicant's assessment

- 5.3.3 Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the IPC consider thoroughly the potential effects of a proposed project.
- 5.3.4 The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.

IPC decision making

- 5.3.5 The Government's biodiversity strategy is set out in 'Working with the grain of nature'⁹⁹. Its aim is to ensure:
- a halting, and if possible a reversal, of declines in priority habitats and species, with wild species and habitats as part of healthy, functioning ecosystems; and
 - the general acceptance of biodiversity's essential role in enhancing the quality of life, with its conservation becoming a natural consideration in all relevant public, private and non-governmental decisions and policies.
- 5.3.6 In having regard to the aim of the Government's biodiversity strategy the IPC should take account of the context of the challenge of climate change: failure to address this challenge will result in significant adverse impacts to biodiversity. The policy set out in the following sections recognises the need

97 Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System (ODPM 06/2005, Defra 01/2005) available via TSO website www.tso.co.uk/bookshop. It should be noted that this document does not cover more recent legislative requirements, such as the Marine Strategy Framework Directive.

98 Planning for Biodiversity and Geological Conservation: A Guide to Good Practice (March 2006).

99 'Working with the grain of nature' applies in England only.

to protect the most important biodiversity and geological conservation interests. The benefits of nationally significant low carbon energy infrastructure development may include benefits for biodiversity and geological conservation interests and these benefits may outweigh harm to these interests. The IPC may take account of any such net benefit in cases where it can be demonstrated.

- 5.3.7 As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives (as set out in Section 4.4 above); where significant harm cannot be avoided, then appropriate compensation measures should be sought.
- 5.3.8 In taking decisions, the IPC should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; habitats and other species of principal importance for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment.

International Sites

- 5.3.9 The most important sites for biodiversity are those identified through international conventions and European Directives. The Habitats Regulations provide statutory protection for these sites but do not provide statutory protection for potential Special Protection Areas (pSPAs) before they have been classified as a Special Protection Area. For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes pSPAs to be considered in the same way as if they had already been classified. Listed Ramsar sites should, also as a matter of policy, receive the same protection¹⁰⁰.

Sites of Special Scientific Interest (SSSIs)

- 5.3.10 Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection. All National Nature Reserves are notified as SSSIs.
- 5.3.11 Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site¹⁰¹, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs. The IPC should use requirements and/or planning

¹⁰⁰ See <http://www.jncc.gov.uk/page-161>

¹⁰¹ 'At this site' applies the language in PPS9: *Biodiversity and Geological Conservation*. The benefits of the development 'at this site' should be interpreted as including any benefits which are not dependent on a particular location.

obligations to mitigate the harmful¹⁰² aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest.

Marine Conservation Zones

5.3.12 Marine Conservation Zones (MCZs) (Marine Protected Areas in Scotland), introduced under the Marine and Coastal Access Act 2009, are areas that have been designated for the purpose of conserving marine flora or fauna, marine habitats or types of marine habitat or features of geological or geomorphological interest. The protected feature or features and the conservation objectives for the MCZ are stated in the designation order for the MCZ, which provides statutory protection for these areas implemented by the MMO (see paragraph 1.2.2). As a public authority, the IPC is bound by the duties in relation to MCZs imposed by sections 125 and 126 of the Marine and Coastal Access Act 2009.

Regional and Local Sites

5.3.13 Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a fundamental role to play in meeting overall national biodiversity targets; contributing to the quality of life and the well-being of the community; and in supporting research and education. The IPC should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent.

Ancient Woodland and Veteran Trees

5.3.14 Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The IPC should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location¹⁰³ outweigh the loss of the woodland habitat. Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided¹⁰⁴. Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why.

102 In line with the principle in paragraph 4.2.11, the term 'harm' should be understood to mean 'significant harm'.

103 "in that location" applies the language in PPS9: *Biodiversity and Geological Conservation*. The benefits of the development in that location should be interpreted as including any benefits which are not dependent on a particular location.

104 This does not prevent the loss of such trees where the IPC is satisfied that their loss is unavoidable.

Biodiversity within Developments

- 5.3.15 Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, the IPC should maximise such opportunities in and around developments, using requirements or planning obligations where appropriate.

Protection of Habitats and Other Species

- 5.3.16 Many individual wildlife species receive statutory protection under a range of legislative provisions¹⁰⁵.
- 5.3.17 Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and thereby requiring conservation action¹⁰⁶. The IPC should ensure that these species and habitats are protected from the adverse effects of development by using requirements or planning obligations. The IPC should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context the IPC should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development.

Mitigation

- 5.3.18 The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that:
- during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;
 - during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements;
 - habitats will, where practicable, be restored after construction works have finished; and
 - opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.

¹⁰⁵ Certain plant and animal species, including all wild birds, are protected under the Wildlife and Countryside Act 1981. European plant and animal species are protected under the Conservation of Habitats and Species Regulations 2010. Some other animals are protected under their own legislation, for example Protection of Badgers Act 1992.

¹⁰⁶ Lists of habitats and species of principal importance for the conservation of biological diversity in England published in response to Section 41 of the Natural Environment and Rural Communities Act 2006 are available from the Biodiversity Action Reporting System website at <http://www.ukbap-reporting.org.uk/news/details.asp?X=45>

- 5.3.19 Where the applicant cannot demonstrate that appropriate mitigation measures will be put in place the IPC should consider what appropriate requirements should be attached to any consent and/or planning obligations entered into.
- 5.3.20 The IPC will need to take account of what mitigation measures may have been agreed between the applicant and Natural England (or the Countryside Council for Wales) or the Marine Management Organisation (MMO), and whether Natural England (or the Countryside Council for Wales) or the MMO has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.

5.4 Civil and military aviation and defence interests

Introduction

- 5.4.1 Civil and military aerodromes, aviation technical sites, and other types of defence interests (both onshore and offshore) can be affected by new energy development.

Aviation

- 5.4.2 UK airspace is important for both civilian and military aviation interests. It is essential that the safety of UK aerodromes, aircraft and airspace is not adversely affected by new energy infrastructure. Similarly, aerodromes can have important economic and social benefits, particularly at the regional and local level. Commercial civil aviation is largely confined to designated corridors of controlled airspace and set approaches to airports. However, civilian leisure and military aircraft may often fly outside of ‘controlled air space’. The approaches and flight patterns to aerodromes are not necessarily routine and can be irregular owing to a variety of factors including the performance characteristics of the aircraft concerned and the prevailing meteorological conditions.
- 5.4.3 Certain civil aerodromes, and aviation technical sites, selected on the basis of their importance to the national air transport system, are officially safeguarded in order to ensure that their safety and operation are not compromised by new development. A similar official safeguarding system applies to certain military aerodromes and defence assets, selected on the basis of their strategic importance. Areas of airspace around aerodromes used by aircraft taking off or on approach and landing are described as “obstacle limitation surfaces” (OLS). OLS for civil aerodromes are defined according to criteria set out in relevant Civil Aviation Authority (CAA) guidance¹⁰⁷ and for military aerodromes according to MoD criteria. Aerodromes that are officially safeguarded will have officially produced plans that show the OLS.
- 5.4.4 The certified Safeguarding maps depicting the OLS and other criteria (for example to minimise “birdstrike” hazards) are deposited with the relevant local planning authorities. DfT/ODPM Circular 01/2003¹⁰⁸ provides advice to planning authorities on the official safeguarding of aerodromes and includes a list of the aerodromes which are officially safeguarded. The Circular and CAA guidance also recommend that the operators of aerodromes which are not officially safeguarded should take steps to protect their aerodrome from the effects of possible adverse development by establishing an agreed consultation procedure between themselves and the local planning authority or authorities.
- 5.4.5 There are also “Public Safety Zones” (PSZs) at the end of runways of the busiest airports in the UK, within which development is restricted to minimise risks to people on the ground in the event of an aircraft accident on take-off

¹⁰⁷ CAA (Dec 2008) CAP 168: Licensing of Aerodromes.

¹⁰⁸ DfT/ODPM Circular 01/2003: Safeguarding, Aerodromes, Technical Sites and Military Explosives Storage Areas.

or landing. Maps showing the PSZs are deposited with the relevant local planning authorities. DfT/ODPM Circular 01/2010 provides advice to local planning authorities on Public Safety Zones¹⁰⁹.

- 5.4.6 The military Low Flying system covers the whole of the UK and enables low flying activities as low as 75m (mean separation distance). A considerable amount of military flying for training purposes is conducted at as low as 30m in designated Tactical Training Areas (TTAs) in mid Wales, Cumbria, the Scottish Border region and in the Electronic Warfare Range in the Scottish Border area. In addition, military helicopters may operate down to ground level. New energy infrastructure may cause obstructions in Ministry of Defence (MoD) low flying areas.
- 5.4.7 Safe and efficient operations within UK airspace is dependent upon communications, navigation and surveillance (CNS) infrastructure, including radar (often referred to as ‘technical sites’). Energy infrastructure development may interfere with the operation of CNS systems such as radar. It can also act as a reflector or diffractor of radio signals upon which Air Traffic Control Services rely (an effect which is particularly likely to arise when large structures, such as wind turbines, are located in close proximity to Communications and Navigation Aids and technical sites). Wind turbines may also cause false returns when built in line of sight to Primary or Secondary Surveillance radar installations.

Other defence interests

- 5.4.8 The MoD operates military training areas, military danger zones (offshore Danger and Exercise areas), military explosives storage areas and TTAs. There are extensive Danger and Exercise Areas across the UK Continental Shelf Area (UKCS) for military firing and highly surveyed routes to support Government shipping that are essential for national defence.
- 5.4.9 Other operational defence assets may be affected by new development, for example the Seismological Monitoring Station at Eskdalemuir and maritime acoustic facilities used to test and calibrate noise emissions from naval vessels, such as at Portland Harbour. The MoD also operates Air Defence radars and Meteorological radars which have wide coverage over the UK (onshore and offshore). It is important that new energy infrastructure does not significantly impede or compromise the safe and effective use of any defence assets.

Applicant’s assessment

- 5.4.10 Where the proposed development may have an effect on civil or military aviation and/or other defence assets an assessment of potential effects should be set out in the ES (see Section 4.2).
- 5.4.11 The applicant should consult the MoD, CAA, NATS and any aerodrome – licensed or otherwise – likely to be affected by the proposed development in preparing an assessment of the proposal on aviation or other defence interests.

¹⁰⁹ DfT/ODPM Circular 01/2002: Control of Development in Airport Safety Zones.

- 5.4.12 Any assessment of aviation or other defence interests should include potential impacts of the project upon the operation of CNS infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures. It should also assess the cumulative effects of the project with other relevant projects in relation to aviation and defence.
- 5.4.13 If any relevant changes are made to proposals during the pre-application and determination period, it is the responsibility of the applicant to ensure that the relevant aviation and defence consultees are informed as soon as reasonably possible.

IPC decision making

- 5.4.14 The IPC should be satisfied that the effects on civil and military aerodromes, aviation technical sites and other defence assets have been addressed by the applicant and that any necessary assessment of the proposal on aviation or defence interests has been carried out. In particular, it should be satisfied that the proposal has been designed to minimise adverse impacts on the operation and safety of aerodromes and that reasonable mitigation is carried out. It may also be appropriate to expect operators of the aerodrome to consider making reasonable changes to operational procedures. When assessing the necessity, acceptability and reasonableness of operational changes to aerodromes, the IPC should satisfy itself that it has the necessary information regarding the operational procedures along with any demonstrable risks or harm of such changes, taking into account the cases put forward by all parties. When making such a judgement in the case of military aerodromes, the IPC should have regard to interests of defence and national security.
- 5.4.15 If there are conflicts between the Government's energy and transport policies and military interests in relation to the application, the IPC should expect the relevant parties to have made appropriate efforts to work together to identify realistic and pragmatic solutions to the conflicts. In so doing, the parties should seek to protect the aims and interests of the other parties as far as possible.
- 5.4.16 There are statutory requirements concerning lighting to tall structures¹¹⁰. Where lighting is requested on structures that goes beyond statutory requirements by any of the relevant aviation and defence consultees, the IPC should satisfy itself of the necessity of such lighting taking into account the case put forward by the consultees. The effect of such lighting on the landscape and ecology may be a relevant consideration.
- 5.4.17 Where, after reasonable mitigation, operational changes, obligations and requirements have been proposed, the IPC considers that:
- a development would prevent a licensed aerodrome from maintaining its licence;
 - the benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs,

110 Articles 219 and 220. Air Navigation Order 2009.

taking into account the relevant importance and need for such aviation infrastructure; or

- the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training;
- the development would have an impact on the safe and efficient provision of en route air traffic control services for civil aviation, in particular through an adverse effect on the infrastructure required to support communications, navigation or surveillance systems;

consent should not be granted.

Mitigation

5.4.18 Where a proposed energy infrastructure development would significantly impede or compromise the safe and effective use of civil or military aviation or defence assets and or significantly limit military training, the IPC may consider the use of ‘Grampian’¹¹¹, or other forms of condition which relate to the use of future technological solutions, to mitigate impacts. Where technological solutions have not yet been developed or proven, the IPC will need to consider the likelihood of a solution becoming available within the time limit for implementation of the development consent. In this context, where new technologies to mitigate the adverse effects of wind farms on radar are concerned, the IPC should have regard to any Government guidance which emerges from the joint Government/Industry Aviation Plan.

5.4.19 Mitigation for infringement of OLS may include¹¹²:

- amendments to layout or scale of infrastructure to reduce the height, provided that it does not result in an unreasonable reduction of capacity or unreasonable constraints on the operation of the proposed energy infrastructure;
- changes to operational procedures of the aerodromes in accordance with relevant guidance, provided that safety assurances can be provided by the operator that are acceptable to the CAA where the changes are proposed to a civilian aerodrome (and provided that it does not result in an unreasonable reduction of capacity or unreasonable constraints on the operation of the aerodrome); and
- installation of obstacle lighting and/or by notification in Aeronautical Information Service publications.

5.4.20 For CNS infrastructure, the UK military Low Flying system (including TTAs) and designated air traffic routes, mitigation may also include:

- lighting;
- operational airspace changes; and

¹¹¹ A negative condition that prevents the start of a development until specific actions, mitigation or other development have been completed.

¹¹² Where mitigation is required using a condition or planning obligation, the tests set out at paragraphs 4.1.7 – 4.1.8 in EN-1 should be applied.

- upgrading of existing CNS infrastructure, the cost of which the applicant may reasonably be required to contribute in part or in full.

5.4.21 Mitigation for effects on radar, communications and navigational systems may include reducing the scale of a project, although in some cases it is likely to be unreasonable for the IPC to require mitigation by way of a reduction in the scale of development, for example, where reducing the tip height of wind turbines in a wind farm would result in a material reduction in electricity generating capacity or operation would be severely constrained. However, there may be exceptional circumstances where a small reduction in such function will result in proportionately greater mitigation. In these cases, the IPC may consider that the benefits of the mitigation outweighs the marginal loss of function.

5.5 Coastal change

Introduction

5.5.1 The Government's aim is to ensure that our coastal communities continue to prosper and adapt to coastal change. This means planning should:

- ensure that policies and decisions in coastal areas are based on an understanding of coastal change over time;
- prevent new development from being put at risk from coastal change by
 - (i) avoiding inappropriate development in areas that are vulnerable to coastal change or any development that adds to the impacts of physical changes to the coast, and
 - (ii) directing development away from areas vulnerable to coastal change;
- ensure that the risk to development which is, exceptionally, necessary in coastal change areas because it requires a coastal location and provides substantial economic and social benefits to communities, is managed over its planned lifetime; and
- ensure that plans are in place to secure the long term sustainability of coastal areas.

5.5.2 For the purpose of this section, coastal change means physical change to the shoreline, i.e. erosion, coastal landslip, permanent inundation and coastal accretion. Where onshore infrastructure projects are proposed on the coast, coastal change is a key consideration. Some kinds of coastal change happen very gradually, others over shorter timescales. Some are the result of purely natural processes; others, including potentially significant modifications of the coastline or coastal environment resulting from climate change, are wholly or partly man-made. This section is concerned both with the impacts which energy infrastructure can have as a driver of coastal change and with how to ensure that developments are resilient to ongoing and potential future coastal change.

5.5.3 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 and coastal protection measures which could result in direct effects on the coastline, seabed and marine ecology and biodiversity.

5.5.4 Additionally, indirect changes to the coastline and seabed might arise as a result of a hydrodynamic response to some of these direct changes. This could lead to localised or more widespread coastal erosion or accretion and changes to offshore features such as submerged banks and ridges and marine biodiversity.

5.5.5 This section only applies to onshore energy infrastructure projects situated on the coast. The impacts of offshore renewable energy projects on marine life and coastal geomorphology are considered in the Renewable Energy NPS. Section 5.3 on biodiversity and geological conservation, Section 5.7 on flood risk and Section 4.8 of Part 4 on adaptation to climate change, including the increased risk of coastal erosion, are also relevant, as is advice on access to coastal recreation sites and features in Section 5.10 on land use. Advice on the historic environment in Section 5.8 may also be relevant.

Applicant's assessment

5.5.6 Where relevant, applicants should undertake coastal geomorphological and sediment transfer modelling to predict and understand impacts and help identify relevant mitigating or compensatory measures.

5.5.7 The ES (see Section 4.2) should include an assessment of the effects on the coast. In particular, applicants should assess:

- the impact of the proposed project on coastal processes and geomorphology, including by taking account of potential impacts from climate change. If the development will have an impact on coastal processes the applicant must demonstrate how the impacts will be managed to minimise adverse impacts on other parts of the coast;
- the implications of the proposed project on strategies for managing the coast as set out in Shoreline Management Plans (SMPs) (which provide a large-scale assessment of the physical risks associated with coastal processes and present a long term policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner), any relevant Marine Plans, River Basin Management Plans and capital programmes for maintaining flood and coastal defences;
- the effects of the proposed project on marine ecology, biodiversity and protected sites;
- the effects of the proposed project on maintaining coastal recreation sites and features; and
- the vulnerability of the proposed development to coastal change, taking account of climate change, during the project's operational life and any decommissioning period.

5.5.8 For any projects involving dredging or disposal into the sea, the applicant should consult the Marine Management Organisation (MMO) at an early stage. Where the project has the potential to have a major impact in this respect, this is covered in the technology-specific NPSs. For example, EN-4 looks further at the environmental impacts of dredging in connection with Liquefied Natural Gas (LNG) tanker deliveries to LNG import facilities.

5.5.9 The applicant should be particularly careful to identify any effects of physical changes on the integrity and special features of Marine Conservation Zones, candidate marine Special Areas of Conservation (SACs), coastal SACs and candidate coastal SACs, coastal Special Protection Areas (SPAs) and

potential coastal SPAs, Ramsar sites, Sites of Community Importance (SCIs) and potential SCIs and Sites of Special Scientific Interest.

IPC decision making

- 5.5.10 The IPC should be satisfied that the proposed development will be resilient to coastal erosion and deposition, taking account of climate change, during the project's operational life and any decommissioning period.
- 5.5.11 The IPC should not normally consent new development in areas of dynamic shorelines where the proposal could inhibit sediment flow or have an adverse impact on coastal processes at other locations. Impacts on coastal processes must be managed to minimise adverse impacts on other parts of the coast. Where such proposals are brought forward consent should only be granted where the IPC is satisfied that the benefits (including need) of the development outweigh the adverse impacts.
- 5.5.12 The IPC should ensure that applicants have restoration plans for areas of foreshore disturbed by direct works and will undertake pre- and post-construction coastal monitoring arrangements with defined triggers for intervention and restoration.
- 5.5.13 The IPC should examine the broader context of coastal protection around the proposed site, and the influence in both directions, i.e. coast on site, and site on coast.
- 5.5.14 The IPC should consult the MMO on projects which could impact on coastal change, since the MMO may also be involved in considering other projects which may have related coastal impacts.
- 5.5.15 In addition to this NPS the IPC must have regard to the appropriate marine policy documents, as provided for in the Marine and Coastal Access Act 2009. The IPC may also have regard to any relevant SMPs.
- 5.5.16 Substantial weight should be attached to the risks of flooding and coastal erosion. The applicant must demonstrate that full account has been taken of the policy on assessment and mitigation in Section 4.22 of this NPS, taking account of the potential effects of climate change on these risks as discussed above.

Mitigation

- 5.5.17 Applicants should propose appropriate mitigation measures to address adverse physical changes to the coast, in consultation with the MMO, the EA, LPAs, other statutory consultees, Coastal Partnerships and other coastal groups, as it considers appropriate. Where this is not the case the IPC should consider what appropriate mitigation requirements might be attached to any grant of development consent.

5.6 Dust, odour, artificial light, smoke, steam and insect infestation

Introduction

- 5.6.1 During the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects. All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990. Note that pollution impacts from some of these emissions (for example dust, smoke) are covered in the Section 5.2 on air emissions.
- 5.6.2 Because of the potential effects of these emissions and infestation, and in view of the availability of the defence of statutory authority against nuisance claims described in Section 4.14, it is important that the potential for these impacts is considered by the IPC.
- 5.6.3 For energy NSIPs of the type covered by this NPS, some impact on amenity for local communities is likely to be unavoidable. The aim should be to keep impacts to a minimum, and at a level that is acceptable.

Applicant's assessment

- 5.6.4 The applicant should assess the potential for insect infestation and emissions of odour, dust, steam, smoke and artificial light to have a detrimental impact on amenity, as part of the Environmental Statement.
- 5.6.5 In particular, the assessment provided by the applicant should describe:
- the type, quantity and timing of emissions;
 - aspects of the development which may give rise to emissions;
 - premises or locations that may be affected by the emissions;
 - effects of the emission on identified premises or locations; and
 - measures to be employed in preventing or mitigating the emissions.
- 5.6.6 The applicant is advised to consult the relevant local planning authority and, where appropriate, the EA about the scope and methodology of the assessment.

IPC decision making

- 5.6.7 The IPC should satisfy itself that:
- an assessment of the potential for artificial light, dust, odour, smoke, steam and insect infestation to have a detrimental impact on amenity has been carried out; and
 - that all reasonable steps have been taken, and will be taken, to minimise any such detrimental impacts.

- 5.6.8 If the IPC does grant development consent for a project, it should consider whether there is a justification for all of the authorised project (including any associated development) being covered by a defence of statutory authority against nuisance claims. If it cannot conclude that this is justified, it should disapply in whole or in part the defence through a provision in the development consent order.
- 5.6.9 Where it believes it appropriate, the IPC may consider attaching requirements to the development consent, in order to secure certain mitigation measures.
- 5.6.10 In particular, the IPC should consider whether to require the applicant to abide by a scheme of management and mitigation concerning insect infestation and emissions of odour, dust, steam, smoke and artificial light from the development. The IPC should consider the need for such a scheme to reduce any loss to amenity which might arise during the construction, operation and decommissioning of the development. A construction management plan may help codify mitigation at that stage.

Mitigation

- 5.6.11 Mitigation measures may include one or more of the following:
- **engineering:** prevention of a specific emission at the point of generation; control, containment and abatement of emissions if generated;
 - **lay-out:** adequate distance between source and sensitive receptors; reduced transport or handling of material; and
 - **administrative:** limiting operating times; restricting activities allowed on the site; implementing management plans.

5.7 Flood risk

Introduction

- 5.7.1 Flooding is a natural process that plays an important role in shaping the natural environment. However, flooding threatens life and causes substantial damage to property. The effects of weather events on the natural environment, life and property can be increased in severity both as a consequence of decisions about the location, design and nature of settlement and land use, and as a potential consequence of future climate change. Although flooding cannot be wholly prevented, its adverse impacts can be avoided or reduced through good planning and management.
- 5.7.2 Climate change over the next few decades is likely to mean milder, wetter winters and hotter, drier summers in the UK, while sea levels will continue to rise. Within the lifetime of energy projects, these factors will lead to increased flood risks in areas susceptible to flooding, and to an increased risk of the occurrence of floods in some areas which are not currently thought of as being at risk. The applicant and the IPC should take account of the policy on climate change adaptation in Section 4.8.
- 5.7.3 The aims of planning policy on development and flood risk are to ensure that flood risk from all sources of flooding is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new energy infrastructure is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, by reducing flood risk overall.

Applicant's assessment

- 5.7.4 Applications for energy projects of 1 hectare or greater in Flood Zone 1 in England or Zone A in Wales¹¹³ and all proposals for energy projects located in Flood Zones 2 and 3 in England or Zones B and C in Wales should be accompanied by a flood risk assessment (FRA). An FRA will also be required where an energy project less than 1 hectare may be subject to sources of flooding other than rivers and the sea (for example surface water), or where the EA, Internal Drainage Board or other body have indicated that there may be drainage problems. This should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account.
- 5.7.5 The minimum requirements for FRAs are that they should:
- be proportionate to the risk and appropriate to the scale, nature and location of the project;
 - consider the risk of flooding arising from the project in addition to the risk of flooding to the project;

¹¹³ The Flood Zones refer to the probability of flooding from rivers, the sea and tidal sources and ignore the presence of existing defences, because these can be breached, overtopped and may not be in existence for the lifetime of the project. The definition of Flood Zones can be found in PPS25 (in England), TAN 15 (in Wales), or their relevant successor documents.

- take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made;
- be undertaken by competent people, as early as possible in the process of preparing the proposal;
- consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure;
- consider the vulnerability of those using the site, including arrangements for safe access;
- consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as ‘residual’) risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project;
- consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems;
- consider if there is a need to be safe and remain operational during a worst case flood event over the development’s lifetime; and
- be supported by appropriate data and information, including historical information on previous events.

5.7.6 Further guidance can be found in the Practice Guide which accompanies Planning Policy Statement 25 (PPS25), TAN15 for Wales or successor documents.

5.7.7 Applicants for projects which may be affected by, or may add to, flood risk should arrange pre-application discussions with the EA, and, where relevant, other bodies such as Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators. Such discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the FRA, and identify the information that will be required by the IPC to reach a decision on the application when it is submitted. The IPC should advise applicants to undertake these steps where they appear necessary, but have not yet been addressed.

5.7.8 If the EA has concerns about the proposal on flood risk grounds, the applicant should discuss these concerns with the EA and take all reasonable steps to agree ways in which the proposal might be amended, or additional information provided, which would satisfy the Environment Agency’s concerns.

IPC decision making

- 5.7.9 In determining an application for development consent, the IPC should be satisfied that where relevant:
- the application is supported by an appropriate FRA;
 - the Sequential Test has been applied as part of site selection;
 - a sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk;
 - the proposal is in line with any relevant national and local flood risk management strategy¹¹⁴;
 - priority has been given to the use of sustainable drainage systems (SuDs) (as required in the next paragraph on National Standards); and
 - in flood risk areas the project is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed over the lifetime of the development.
- 5.7.10 For construction work which has drainage implications, approval for the project's drainage system will form part of the development consent issued by the IPC. The IPC will therefore need to be satisfied that the proposed drainage system complies with any National Standards published by Ministers under Paragraph 5(1) of Schedule 3 to the Flood and Water Management Act 2010. In addition, the development consent order, or any associated planning obligations, will need to make provision for the adoption and maintenance of any SuDS, including any necessary access rights to property. The IPC should be satisfied that the most appropriate body is being given the responsibility for maintaining any SuDS, taking into account the nature and security of the infrastructure on the proposed site. The responsible body could include, for example, the applicant, the landowner, the relevant local authority, or another body, such as an Internal Drainage Board.
- 5.7.11 If the EA continues to have concerns and objects to the grant of development consent on the grounds of flood risk, the IPC can grant consent, but would need to be satisfied before deciding whether or not to do so that all reasonable steps have been taken by the applicant and the EA to try to resolve the concerns.
- 5.7.12 The IPC should not consent development in Flood Zone 2 in England or Zone B in Wales unless it is satisfied that the sequential test requirements have been met. It should not consent development in Flood Zone 3 or Zone C unless it is satisfied that the Sequential and Exception Test requirements have been met. The technology-specific NPSs set out some exceptions to the application of the sequential test. However, when seeking development consent on a site allocated in a development plan through the application of the Sequential Test, informed by a strategic flood risk assessment, applicants need not apply the Sequential Test, but should apply the sequential approach to locating development within the site.

¹¹⁴ As provided for in section 9(1) of the Flood and Water Management Act 2010.

The Sequential Test

5.7.13 Preference should be given to locating projects in Flood Zone 1 in England or Zone A in Wales. If there is no reasonably available site in Flood Zone 1 or Zone A, then projects can be located in Flood Zone 2 or Zone B. If there is no reasonably available site¹¹⁵ in Flood Zones 1 or 2 or Zones A & B, then nationally significant energy infrastructure projects can be located in Flood Zone 3 or Zone C subject to the Exception Test. Consideration of alternative sites should take account of the policy on alternatives set out in Section 4.4 above.

The Exception Test

5.7.14 If, following application of the sequential test, it is not possible, consistent with wider sustainability objectives, for the project to be located in zones of lower probability of flooding than Flood Zone 3 or Zone C, the Exception Test can be applied. The test provides a method of managing flood risk while still allowing necessary development to occur.

5.7.15 The Exception Test is only appropriate for use where the sequential test alone cannot deliver an acceptable site, taking into account the need for energy infrastructure to remain operational during floods. It may also be appropriate to use it where as a result of the alternative site(s) at lower risk of flooding being subject to national designations such as landscape, heritage and nature conservation designations, for example Areas of Outstanding Natural Beauty (AONBs), Sites of Special Scientific Interest (SSSIs) and World Heritage Sites (WHS) it would not be appropriate to require the development to be located on the alternative site(s).

5.7.16 All three elements of the test will have to be passed for development to be consented. For the Exception Test to be passed:

- it must be demonstrated that the project provides wider sustainability benefits to the community¹¹⁶ that outweigh flood risk;
- the project should be on developable, previously developed land¹¹⁷ or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously developed land subject to any exceptions set out in the technology-specific NPSs; and

¹¹⁵ When making the application, the applicant should justify with evidence what area of search has been used in examining whether there are reasonably available sites. This will allow the IPC to consider whether the Sequential Test has been met as part of site selection.

¹¹⁶ These would include the benefits (including need), for the infrastructure set out in Part 3.

¹¹⁷ Previously developed land is that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure. This definition includes defence buildings, but excludes (a) land that is or has been occupied by agricultural or forestry buildings (b) land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures (c) land in built up areas such as parks, recreation grounds and allotments, which, although it may feature paths, pavilions and other buildings, has not been previously developed (d) land that was previously developed but where the remains of the permanent surface structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings).

- a FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall.

5.7.17 Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the IPC may grant consent if it is satisfied that the increase in present and future flood risk can be mitigated to an acceptable level and taking account of the benefits of, including the need for, nationally significant energy infrastructure as set out in Part 3 above. In any such case the IPC should make clear how, in reaching its decision, it has weighed up the increased flood risk against the benefits of the project, taking account of the nature and degree of the risk, the future impacts on climate change, and advice provided by the EA and other relevant bodies.

Mitigation

5.7.18 To satisfactorily manage flood risk, arrangements are required to manage surface water and the impact of the natural water cycle on people and property.

5.7.19 In this NPS, the term Sustainable Drainage Systems (SuDS) refers to the whole range of sustainable approaches to surface water drainage management including, where appropriate:

- source control measures including rainwater recycling and drainage;
- infiltration devices to allow water to soak into the ground, that can include individual soakaways and communal facilities;
- filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed;
- basins ponds and tanks to hold excess water after rain and allow controlled discharge that avoids flooding; and
- flood routes to carry and direct excess water through developments to minimise the impact of severe rainfall flooding.

5.7.20 Site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts.

5.7.21 The surface water drainage arrangements for any project should be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the proposed project, unless specific off-site arrangements are made and result in the same net effect.

5.7.22 It may be necessary to provide surface water storage and infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the site. There may be circumstances where it is appropriate for infiltration facilities or attenuation storage to be provided outside the project site, if necessary through the use of a planning obligation.

- 5.7.23 The sequential approach should be applied to the layout and design of the project. More vulnerable uses should be located on parts of the site at lower probability and residual risk of flooding. Applicants should seek opportunities to use open space for multiple purposes such as amenity, wildlife habitat and flood storage uses. Opportunities should be taken to lower flood risk by reducing the built footprint of previously developed sites and using SuDS.
- 5.7.24 Essential energy infrastructure which has to be located in flood risk areas should be designed to remain operational when floods occur. In addition, any energy projects proposed in Flood Zone 3b the Functional Floodplain (where water has to flow or be stored in times of flood), or Zone C2 in Wales, should only be permitted if the development will not result in a net loss of floodplain storage, and will not impede water flows.
- 5.7.25 The receipt of and response to warnings of floods is an essential element in the management of the residual risk of flooding. Flood Warning and evacuation plans should be in place for those areas at an identified risk of flooding. The applicant should take advice from the emergency services when producing an evacuation plan for a manned energy project as part of the FRA. Any emergency planning documents, flood warning and evacuation procedures that are required should be identified in the FRA.

5.8 Historic environment

Introduction

- 5.8.1 The construction, operation and decommissioning of energy infrastructure has the potential to result in adverse impacts on the historic environment.
- 5.8.2 The historic environment includes all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, landscaped and planted or managed flora. Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest are called "heritage assets". A heritage asset may be any building, monument, site, place, area or landscape, or any combination of these. The sum of the heritage interests that a heritage asset holds is referred to as its significance¹¹⁸.
- 5.8.3 Some heritage assets have a level of significance that justifies official designation. Categories of designated heritage assets are: a World Heritage Site; Scheduled Monument; Protected Wreck Site; Protected Military Remains, Listed Building; Registered Park and Garden; Registered Battlefield; Conservation Area; and Registered Historic Landscape (Wales only)¹¹⁹.
- 5.8.4 There are heritage assets with archaeological interest that are not currently designated as scheduled monuments, but which are demonstrably of equivalent significance. These include:
- those that have yet to be formally assessed for designation;
 - those that have been assessed as being designatable but which the Secretary of State has decided not to designate; and
 - those that are incapable of being designated by virtue of being outside the scope of the Ancient Monuments and Archaeological Areas Act 1979.
- 5.8.5 The absence of designation for such heritage assets does not indicate lower significance. If the evidence before the IPC indicates to it that a non-designated heritage asset of the type described in 5.8.4 may be affected by the proposed development then the heritage asset should be considered subject to the same policy considerations as those that apply to designated heritage assets.

118 Save for the term "Designated Heritage Asset (covered in 5.8.3 above), these and other terms used in this section are defined in Annex 2 to PPS5, or any successor to it. The PPS5 Practice Guide contains guidance on their interpretation. Additionally, part of the purpose of designating National Parks is in order to protect their cultural heritage and the conservation of cultural heritage is an important consideration in all Areas of Outstanding Natural Beauty.

119 The issuing of licenses to undertake works on Protected Wreck Sites in English waters is the responsibility of the Secretary of State for Culture, Media and Sport and does not form part of development consents issued by the IPC. In Wales it is the responsibility of Welsh Ministers. The issuing of licences for Protected Military Remains is the responsibility of the Secretary of State for Defence .

- 5.8.6 The IPC should also consider the impacts on other non-designated heritage assets, as identified either through the development plan making process (local listing) or through the IPC's decision making process on the basis of clear evidence that the assets have a heritage significance that merits consideration in its decisions, even though those assets are of lesser value than designated heritage assets.
- 5.8.7 Impacts on heritage assets specific to types of infrastructure are included in the technology-specific NPSs.

Applicant's assessment

- 5.8.8 As part of the ES (see Section 4.2) the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. As a minimum the applicant should have consulted the relevant Historic Environment Record¹²⁰ (or, where the development is in English or Welsh waters, English Heritage or Cadw) and assessed the heritage assets themselves using expertise where necessary according to the proposed development's impact.
- 5.8.9 Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact.
- 5.8.10 The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents.

IPC decision making

- 5.8.11 In considering applications, the IPC should seek to identify and assess the particular significance of any heritage asset that may be affected by the proposed development, including by development affecting the setting of a heritage asset, taking account of:
- evidence provided with the application;
 - any designation records;

¹²⁰ Historic Environment Records (HERs) are information services maintained by local authorities and National Park Authorities with a view to providing access to resources relating to the historic environment of an area for public benefit and use. The County HERs for England are available from the Heritage Gateway website at <http://www.heritagegateway.org.uk/Gateway/CHR/>. For Wales, HERs can be obtained through the Historic Wales Portal at <http://jura.rcahms.gov.uk/nms/start.jsp>. English Heritage and Cadw hold additional information about heritage assets in English or Welsh waters. This should also be consulted, where relevant.

- the Historic Environment Record, and similar sources of information¹²¹;
 - the heritage assets themselves;
 - the outcome of consultations with interested parties; and
 - where appropriate and when the need to understand the significance of the heritage asset demands it, expert advice.
- 5.8.12 In considering the impact of a proposed development on any heritage assets, the IPC should take into account the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between conservation of that significance and proposals for development.
- 5.8.13 The IPC should take into account the desirability of sustaining and, where appropriate, enhancing the significance of heritage assets, the contribution of their settings and the positive contribution they can make to sustainable communities and economic vitality¹²². The IPC should take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height, massing, alignment, materials and use. The IPC should have regard to any relevant local authority development plans or local impact report on the proposed development in respect of the factors set out in footnote 122.
- 5.8.14 There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II listed building park or garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including Scheduled Monuments; registered battlefields; grade I and II* listed buildings; grade I and II* registered parks and gardens; and World Heritage Sites, should be wholly exceptional.
- 5.8.15 Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the

121 Guidance on the available sources of information can be found in PPS5 Planning for the Historic Environment: Historic Environment Planning Practice Guide, March 2010, or any successor document.

122 This can be by virtue of:

- heritage assets having an influence on the character of the environment and an area's sense of place;
- heritage assets having a potential to be a catalyst for regeneration in an area, particularly through leisure, tourism and economic development;
- heritage assets being a stimulus to inspire new development of imaginative and high quality design;
- the re-use of existing fabric, minimising waste; and
- the mixed and flexible patterns of land use in historic areas that are likely to be, and remain, sustainable.

greater the harm to the significance of the heritage asset the greater the justification will be needed for any loss. Where the application will lead to substantial harm to or total loss of significance of a designated heritage asset the IPC should refuse consent unless it can be demonstrated that the substantial harm to or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm.

- 5.8.16 Not all elements of a World Heritage Site or Conservation Area will necessarily contribute to its significance. The policies set out in paragraphs 5.8.11 to 5.8.15 above apply to those elements that do contribute to the significance. When considering proposals the IPC should take into account the relative significance of the element affected and its contribution to the significance of the World Heritage Site or Conservation Area as a whole.
- 5.8.17 Where loss of significance of any heritage asset is justified on the merits of the new development, the IPC should consider imposing a condition on the consent or requiring the applicant to enter into an obligation that will prevent the loss occurring until it is reasonably certain that the relevant part of the development is to proceed.
- 5.8.18 When considering applications for development affecting the setting of a designated heritage asset, the IPC should treat favourably applications that preserve those elements of the setting that make a positive contribution to, or better reveal the significance of, the asset. When considering applications that do not do this, the IPC should weigh any negative effects against the wider benefits of the application. The greater the negative impact on the significance of the designated heritage asset, the greater the benefits that will be needed to justify approval.

Recording

- 5.8.19 A documentary record of our past is not as valuable as retaining the heritage asset and therefore the ability to record evidence of the asset should not be a factor in deciding whether consent should be given.
- 5.8.20 Where the loss of the whole or a material part of a heritage asset's significance is justified, the IPC should require the developer to record and advance understanding of the significance of the heritage asset before it is lost. The extent of the requirement should be proportionate to the nature and level of the asset's significance. Developers should be required to publish this evidence and deposit copies of the reports with the relevant Historic Environment Record. They should also be required to deposit the archive generated in a local museum or other public depository willing to receive it.
- 5.8.21 Where appropriate, the IPC should impose requirements on a consent that such work is carried out in a timely manner in accordance with a written scheme of investigation that meets the requirements of this Section and has been agreed in writing with the relevant Local Authority (where the development is in English waters, the Marine Management Organisation and English Heritage, or where it is in Welsh waters, the MMO and Cadw)) and that the completion of the exercise is properly secured¹²³.

¹²³ Guidance on the contents of a written scheme of investigation is set out in the Practice Guide to PPS5.

- 5.8.22 Where the IPC considers there to be a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the IPC should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction.

5.9 Landscape and visual

Introduction

- 5.9.1 The landscape and visual effects of energy projects will vary on a case by case basis according to the type of development, its location and the landscape setting of the proposed development. In this context, references to landscape should be taken as covering seascape and townscape where appropriate.
- 5.9.2 Among the features of energy infrastructure which are common to a number of different technologies, cooling towers and exhaust stacks and their plumes have the most obvious impact on landscape and visual amenity for thermal combustion generating stations¹²⁴. Some natural draught cooling towers may be up 200 metres, although this would be exceptional. Visual impacts may be not just the physical structures but also visible steam plumes from cooling towers.
- 5.9.3 Other types of cooling system, for example direct throughput where water is abstracted, used for cooling then returned to source, or air-cooled condensers, will have less visible impacts as the structures are considerably lower than natural draught cooling towers and exhibit no visible steam plumes. Further, modern hybrid cooling systems – for example mechanical draught – do not generally exhibit visible steam plumes except in exceptional adverse weather conditions. These systems are normally considered as the “Best Available Techniques” (BAT). However there may be losses of electricity output owing to the need for energy to operate hybrid cooling or air-cooled condenser systems.
- 5.9.4 When considering visual impacts of thermal combustion generating stations, the IPC should presume that the adverse impacts would be less if a hybrid or direct cooling system is used and that developers will use BAT. The IPC should therefore expect the applicant to justify BAT for the use of a cooling system that involves visible steam plumes or has a high visible structure, such as a natural draught cooling tower. It should be satisfied that the application of modern hybrid cooling technology or other technologies is not reasonably practicable before giving consent to a development with natural draught cooling towers.

Applicant's assessment

- 5.9.5 The applicant should carry out a landscape and visual assessment and report it in the ES. (See Section 4.2) A number of guides have been produced to assist in addressing landscape issues¹²⁵. The landscape and

¹²⁴ Cooling towers and exhaust stacks can form part of projects covered by EN-2, EN-3 and EN-6. Other features of energy infrastructure which can be similarly prominent are associated with particular technologies and so are considered in the technology-specific NPSs (see e.g. Section 2.8 of EN-5).

¹²⁵ Landscape Institute and Institute of Environmental Management and Assessment (2002, 2nd edition): *Guidelines for Landscape and Visual Impact Assessment*; and Land Use Consultants (2002): *Landscape Character Assessment – Guidance for England and Scotland*; Countryside Council for Wales/Cadw (2007) *Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process*.

visual assessment should include reference to any landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the proposed project. The applicant's assessment should also take account of any relevant policies based on these assessments in local development documents in England and local development plans in Wales.

- 5.9.6 The applicant's assessment should include the effects during construction of the project and the effects of the completed development and its operation on landscape components and landscape character.
- 5.9.7 The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include light pollution effects, including on local amenity, and nature conservation.

IPC decision making

Landscape impact

- 5.9.8 Landscape effects depend on the existing character of the local landscape, its current quality, how highly it is valued and its capacity to accommodate change. All of these factors need to be considered in judging the impact of a project on landscape. Virtually all nationally significant energy infrastructure projects will have effects on the landscape. Projects need to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints the aim should be to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.

Development proposed within nationally designated landscapes

- 5.9.9 National Parks, the Broads and AONBs have been confirmed by the Government as having the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help ensure their continued protection and which the IPC should have regard to in its decisions¹²⁶. The conservation of the natural beauty of the landscape and countryside should be given substantial weight by the IPC in deciding on applications for development consent in these areas.
- 5.9.10 Nevertheless, the IPC may grant development consent in these areas in exceptional circumstances. The development should be demonstrated to be

¹²⁶ For an explanation of the duties which will apply to the IPC, see 'Duties on relevant authorities to have regard to the purposes of National Parks, AONBs and the Norfolk and Suffolk Broads' at <http://www.defra.gov.uk/rural/documents/protected/npaonb-duties-guide.pdf>

in the public interest¹²⁷ and consideration of such applications should include an assessment of:

- the need for the development, including in terms of national considerations¹²⁸, and the impact of consenting or not consenting it upon the local economy;
- the cost of, and scope for, developing elsewhere outside the designated area or meeting the need for it in some other way, taking account of the policy on alternatives set out in Section 4.4; and
- any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.

5.9.11 The IPC should ensure that any projects consented in these designated areas should be carried out to high environmental standards, including through the application of appropriate requirements where necessary.

Developments outside nationally designated areas which might affect them

5.9.12 The duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. The aim should be to avoid compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints. This should include projects in England which may have impacts on National Scenic Areas in Scotland.

5.9.13 The fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent.

Developments in other areas

5.9.14 Outside nationally designated areas, there are local landscapes that may be highly valued locally and protected by local designation. Where a local development document in England or a local development plan in Wales has policies based on landscape character assessment, these should be paid particular attention. However, local landscape designations should not be used in themselves to refuse consent, as this may unduly restrict acceptable development.

5.9.15 The scale of such projects means that they will often be visible within many miles of the site of the proposed infrastructure. The IPC should judge whether any adverse impact on the landscape would be so damaging that it is not offset by the benefits (including need) of the project.

5.9.16 In reaching a judgment, the IPC should consider whether any adverse impact is temporary, such as during construction, and/or whether any adverse impact on the landscape will be capable of being reversed in a timescale that the IPC considers reasonable.

¹²⁷ PPS7 applies a public interest test for major development in these designated areas.

¹²⁸ National considerations should be understood to include the national need for the infrastructure as set out in Part 3 of this NPS and the contribution of the infrastructure to the national economy.

- 5.9.17 The IPC should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to minimise harm to the landscape, including by reasonable mitigation.

Visual impact

- 5.9.18 All proposed energy infrastructure is likely to have visual effects for many receptors around proposed sites. The IPC will have to judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the project. Coastal areas are particularly vulnerable to visual intrusion because of the potential high visibility of development on the foreshore, on the skyline and affecting views along stretches of undeveloped coast.
- 5.9.19 It may be helpful for applicants to draw attention, in the supporting evidence to their applications, to any examples of existing permitted infrastructure they are aware of with a similar magnitude of impact on sensitive receptors. This may assist the IPC in judging the weight it should give to the assessed visual impacts of the proposed development.
- 5.9.20 The IPC should ensure applicants have taken into account the landscape and visual impacts of visible plumes from chimney stacks and/or the cooling assembly. It may need to attach requirements to the consent requiring the incorporation of particular design details that are in keeping with the statutory and technical requirements.

Mitigation

- 5.9.21 Reducing the scale of a project can help to mitigate the visual and landscape effects of a proposed project. However, reducing the scale or otherwise amending the design of a proposed energy infrastructure project may result in a significant operational constraint and reduction in function – for example, the electricity generation output. There may, however, be exceptional circumstances, where mitigation could have a very significant benefit and warrant a small reduction in function. In these circumstances, the IPC may decide that the benefits of the mitigation to reduce the landscape and/or visual effects outweigh the marginal loss of function.
- 5.9.22 Within a defined site, adverse landscape and visual effects may be minimised through appropriate siting of infrastructure within that site, design including colours and materials, and landscaping schemes, depending on the size and type of the proposed project. Materials and designs of buildings should always be given careful consideration.
- 5.9.23 Depending on the topography of the surrounding terrain and areas of population it may be appropriate to undertake landscaping off site. For example, filling in gaps in existing tree and hedge lines would mitigate the impact when viewed from a more distant vista.

5.10 Land use including open space, green infrastructure & Green Belt

Introduction

- 5.10.1 An energy infrastructure project will have direct effects on the existing use of the proposed site and may have indirect effects on the use, or planned use, of land in the vicinity for other types of development. Given the likely locations of energy infrastructure projects there may be particular effects on open space¹²⁹ including green infrastructure¹³⁰.
- 5.10.2 The Government's policy is to ensure there is adequate provision of high quality open space (including green infrastructure) and sports and recreation facilities to meet the needs of local communities. Open spaces, sports and recreational facilities all help to underpin people's quality of life and have a vital role to play in promoting healthy living. Green infrastructure in particular will also play an increasingly important role in mitigating or adapting to the impacts of climate change.
- 5.10.3 Although the re-use of previously developed land for new development can make a major contribution to sustainable development by reducing the amount of countryside and undeveloped greenfield land that needs to be used, it may not be possible for many forms of energy infrastructure.
- 5.10.4 Green Belts, defined in a local authority's development plan¹³¹, are situated around certain cities and large built-up areas. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the most important attribute of Green Belts is their openness. Green Belt land can play a positive role in providing access to sport and recreation facilities or access to the open countryside. For further information on the purposes of Green Belt policy see PPG2 or any successor to it.

Applicant's assessment

- 5.10.5 The ES (see Section 4.2) should identify existing and proposed¹³² land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan.
- 5.10.6 Applicants will need to consult the local community on their proposals to build on open space, sports or recreational buildings and land. Taking account of the consultations, applicants should consider providing new or additional open space including green infrastructure, sport or recreation

¹²⁹ Open space is defined in the Town and Country Planning Act 1990 as land laid out as a public garden, or used for the purposes of public recreation, or land which is a disused burial ground. However, in applying the policies in this section, open space should be taken to mean all open space of public value, including not just land, but also areas of water such as rivers, canals, lakes and reservoirs which offer important opportunities for sport and recreation and can also act as a visual amenity.

¹³⁰ Green infrastructure is a network of multi-functional green spaces, both new and existing, both rural and urban, which supports the natural and ecological processes and is integral to the health and quality of life of sustainable communities.

¹³¹ Or else so designated under The Green Belt (London and Home Counties) Act 1938.

¹³² For example, where a planning application has been submitted.

facilities, to substitute for any losses as a result of their proposal. Applicants should use any up-to-date local authority assessment or, if there is none, provide an independent assessment to show whether the existing open space, sports and recreational buildings and land is surplus to requirements.

- 5.10.7 During any pre-application discussions with the applicant the LPA should identify any concerns it has about the impacts of the application on land use, having regard to the development plan and relevant applications and including, where relevant, whether it agrees with any independent assessment that the land is surplus to requirements.
- 5.10.8 Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.
- 5.10.9 Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.
- 5.10.10 The general policies controlling development in the countryside apply with equal force in Green Belts but there is, in addition, a general presumption against inappropriate development within them. Such development should not be approved except in very special circumstances. Applicants should therefore determine whether their proposal, or any part of it, is within an established Green Belt and if it is, whether their proposal may be inappropriate development within the meaning of Green Belt policy (see paragraph 5.10.17 below).
- 5.10.11 However, infilling or redevelopment of major developed sites in the Green Belt, if identified as such by the local planning authority, may be suitable for energy infrastructure. It may help to secure jobs and prosperity without further prejudicing the Green Belt or offer the opportunity for environmental improvement. Applicants should refer to relevant criteria¹³³ on such developments in Green Belts.
- 5.10.12 An applicant may be able to demonstrate that a particular type of energy infrastructure, such as an underground pipeline, which, in Green Belt policy terms, may be considered as an “engineering operation” rather than a building is not in the circumstances of the application inappropriate development. It may also be possible for an applicant to show that the physical characteristics of a proposed overhead line development or wind farm are such that it has no adverse effects which conflict with the fundamental purposes of Green Belt designation.

133 See Annex C to Planning Policy Guidance 2: Green belts, or any successor to it.

IPC decision making

- 5.10.13 Where the project conflicts with a proposal in a development plan, the IPC should take account of the stage which the development plan document in England or local development plan in Wales has reached in deciding what weight to give to the plan for the purposes of determining the planning significance of what is replaced, prevented or precluded. The closer the development plan document in England or local development plan in Wales is to being adopted by the LPA, the greater weight which can be attached to it.
- 5.10.14 The IPC should not grant consent for development on existing open space, sports and recreational buildings and land unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements or the IPC determines that the benefits of the project (including need), outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities. The loss of playing fields should only be allowed where applicants can demonstrate that they will be replaced with facilities of equivalent or better quantity or quality in a suitable location.
- 5.10.15 The IPC should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. It should give little weight to the loss of poorer quality agricultural land (in grades 3b, 4 and 5), except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy.
- 5.10.16 In considering the impact on maintaining coastal recreation sites and features, the IPC should expect applicants to have taken advantage of opportunities to maintain and enhance access to the coast. In doing so the IPC should consider the implications for development of the creation of a continuous signed and managed route around the coast, as provided for in the Marine and Coastal Access Act 2009.
- 5.10.17 When located in the Green Belt, energy infrastructure projects are likely to comprise ‘inappropriate development’¹³⁴. Inappropriate development is by definition harmful to the Green Belt and the general planning policy presumption against it applies with equal force in relation to major energy infrastructure projects. The IPC will need to assess whether there are very special circumstances to justify inappropriate development. Very special circumstances will not exist unless the harm by reason of inappropriateness, and any other harm, is outweighed by other considerations. In view of the presumption against inappropriate development, the IPC will attach substantial weight to the harm to the Green Belt when considering any application for such development while taking account, in relation to renewable and linear infrastructure, of the extent to which its physical characteristics are such that it has limited or no impact on the fundamental purposes of Green Belt designation.

¹³⁴ Referred to in section 3 of PPG2: Green Belts.

- 5.10.18 In Wales, 'green wedges' may be designated locally¹³⁵. These enjoy the same protection as Green Belt in Wales and the IPC should adopt a similar approach. Green wedges give the same protection as Green Belt in Wales. Green wedges do not convey the same level of permanence of a Green Belt and should be reviewed by the local authority as part of the development plan review process. As with Green Belt, there is a presumption against inappropriate development and the IPC should assess whether there are very special circumstances to justify any proposed inappropriate development.

Mitigation

- 5.10.19 Although in the case of much energy infrastructure there may be little that can be done to mitigate the direct effects of an energy project on the existing use of the proposed site (assuming that some at least of that use can still be retained post project construction) applicants should nevertheless seek to minimise these effects and the effects on existing or planned uses near the site by the application of good design principles, including the layout of the project.
- 5.10.20 Where green infrastructure is affected, the IPC should consider imposing requirements to ensure the connectivity of the green infrastructure network is maintained in the vicinity of the development and that any necessary works are undertaken, where possible, to mitigate any adverse impact and, where appropriate, to improve that network and other areas of open space including appropriate access to new coastal access routes.
- 5.10.21 The IPC should also consider whether mitigation of any adverse effects on green infrastructure and other forms of open space is adequately provided for by means of any planning obligations, for example exchange land and provide for appropriate management and maintenance agreements. Any exchange land should be at least as good in terms of size, usefulness, attractiveness and quality and, where possible, at least as accessible. Alternatively, where Sections 131 and 132 of the Planning Act 2008 apply, replacement land provided under those sections will need to conform to the requirements of those sections.
- 5.10.22 Where a proposed development has an impact upon a Mineral Safeguarding Area (MSA), the IPC should ensure that appropriate mitigation measures have been put in place to safeguard mineral resources.
- 5.10.23 Where a project has a sterilising effect on land use (for example in some cases under transmission lines) there may be scope for this to be mitigated through, for example, using or incorporating the land for nature conservation or wildlife corridors or for parking and storage in employment areas.
- 5.10.24 Rights of way, National Trails and other rights of access to land are important recreational facilities for example for walkers, cyclists and horse riders. The IPC should expect applicants to take appropriate mitigation measures to address adverse effects on coastal access, National Trails and other rights of way. Where this is not the case the IPC should consider what appropriate mitigation requirements might be attached to any grant of development consent.

¹³⁵ See section 2.6 of Planning Policy Wales.

5.11 Noise and vibration

Introduction

- 5.11.1 Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality. The Government's policy on noise is set out in the Noise Policy Statement for England¹³⁶. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references to "noise" below apply equally to assessment of impacts of vibration.
- 5.11.2 Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the IPC in accordance with the Biodiversity and Geological Conservation section of this NPS.
- 5.11.3 Factors that will determine the likely noise impact include:
- the inherent operational noise from the proposed development, and its characteristics;
 - the proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces);
 - the proximity of the proposed development to quiet places and other areas that are particularly valued for their acoustic environment or landscape quality; and
 - the proximity of the proposed development to designated sites where noise may have an adverse impact on protected species or other wildlife.

Applicant's assessment

- 5.11.4 Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:
- a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;
 - identification of noise sensitive premises and noise sensitive areas that may be affected;
 - the characteristics of the existing noise environment;
 - a prediction of how the noise environment will change with the proposed development;
 - in the shorter term such as during the construction period;
 - in the longer term during the operating life of the infrastructure;

¹³⁶ <http://www.defra.gov.uk/environment/quality/noise/npse/>

- at particular times of the day, evening and night as appropriate.
- an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and
- measures to be employed in mitigating noise.

The nature and extent of the noise assessment should be proportionate to the likely noise impact.

- 5.11.5 The noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation, should also be considered.
- 5.11.6 Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards¹³⁷ and other guidance. Further information on assessment of particular noise sources may be contained in the technology-specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards¹³⁸ and other guidance which also give examples of mitigation strategies.
- 5.11.7 The applicant should consult EA and Natural England (NE), or the Countryside Council for Wales (CCW), as necessary and in particular with regard to assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.

IPC decision making

- 5.11.8 The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission.
- 5.11.9 The IPC should not grant development consent unless it is satisfied that the proposals will meet the following aims:
- avoid significant adverse impacts on health and quality of life from noise;
 - mitigate and minimise other adverse impacts on health and quality of life from noise; and
 - where possible, contribute to improvements to health and quality of life through the effective management and control of noise.

¹³⁷ For example BS 4142: BS 6472 and BS 8233.

¹³⁸ For example BS 5228.

- 5.11.10 When preparing the development consent order, the IPC should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent.

Mitigation

- 5.11.11 The IPC should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. In doing so the IPC may wish to impose requirements. Any such requirements should take account of the guidance set out in Circular 11/95 (see Section 4.1) or any successor to it.
- 5.11.12 Mitigation measures may include one or more of the following:
- **engineering:** reduction of noise at point of generation and containment of noise generated;
 - **lay-out:** adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural barriers, or other buildings; and
 - **administrative:** restricting activities allowed on the site; specifying acceptable noise limits; and taking into account seasonality of wildlife in nearby designated sites.
- 5.11.13 In certain situations, and only when all other forms of noise mitigation have been exhausted, it may be appropriate for the IPC to consider requiring noise mitigation through improved sound insulation to dwellings.

5.12 Socio-economic

Introduction

5.12.1 The construction, operation and decommissioning of energy infrastructure may have socio-economic impacts at local and regional levels. Parts 2 and 3 of this NPS set out some of the national level socio-economic impacts.

Applicant's assessment

- 5.12.2 Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES (see Section 4.2).
- 5.12.3 This assessment should consider all relevant socio-economic impacts, which may include:
- the creation of jobs and training opportunities;
 - the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;
 - effects on tourism;
 - the impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure. This could change the local population dynamics and could alter the demand for services and facilities in the settlements nearest to the construction work (including community facilities and physical infrastructure such as energy, water, transport and waste). There could also be effects on social cohesion depending on how populations and service provision change as a result of the development; and
 - cumulative effects – if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe, there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region.
- 5.12.4 Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies.
- 5.12.5 Socio-economic impacts may be linked to other impacts, for example the visual impact of a development is considered in Section 5.9 but may also have an impact on tourism and local businesses.

IPC decision making

5.12.6 The IPC should have regard to the potential socio-economic impacts of new energy infrastructure identified by the applicant and from any other sources that the IPC considers to be both relevant and important to its decision.

- 5.12.7 The IPC may conclude that limited weight is to be given to assertions of socio-economic impacts that are not supported by evidence (particularly in view of the need for energy infrastructure as set out in this NPS).
- 5.12.8 The IPC should consider any relevant positive provisions the developer has made or is proposing to make to mitigate impacts (for example through planning obligations) and any legacy benefits that may arise as well as any options for phasing development in relation to the socio-economic impacts.

Mitigation

- 5.12.9 The IPC should consider whether mitigation measures are necessary to mitigate any adverse socio-economic impacts of the development. For example, high quality design can improve the visual and environmental experience for visitors and the local community alike.

5.13 Traffic and transport

Introduction

- 5.13.1 The transport of materials, goods and personnel to and from a development during all project phases can have a variety of impacts on the surrounding transport infrastructure and potentially on connecting transport networks, for example through increased congestion. Impacts may include economic, social and environmental effects. Environmental impacts may result particularly from increases in noise and emissions from road transport. Disturbance caused by traffic and abnormal loads generated during the construction phase will depend on the scale and type of the proposal.
- 5.13.2 The consideration and mitigation of transport impacts is an essential part of Government's wider policy objectives for sustainable development as set out in Section 2.2 of this NPS.

Applicant's assessment

- 5.13.3 If a project is likely to have significant transport implications, the applicant's ES (see Section 4.2) should include a transport assessment, using the NATA/WebTAG¹³⁹ methodology stipulated in Department for Transport guidance¹⁴⁰, or any successor to such methodology. Applicants should consult the Highways Agency and Highways Authorities as appropriate on the assessment and mitigation.
- 5.13.4 Where appropriate, the applicant should prepare a travel plan including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts.
- 5.13.5 If additional transport infrastructure is proposed, applicants should discuss with network providers the possibility of co-funding by Government for any third-party benefits. Guidance has been issued¹⁴¹ in England¹⁴² which explains the circumstances where this may be possible, although the Government cannot guarantee in advance that funding will be available for any given uncommitted scheme at any specified time.

IPC decision making

- 5.13.6 A new energy NSIP may give rise to substantial impacts on the surrounding transport infrastructure and the IPC should therefore ensure that the applicant has sought to mitigate these impacts, including during the construction phase of the development. Where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the IPC should consider requirements to mitigate

139 WelTag in Wales.

140 Guidance on transport assessments is at <http://www.dft.gov.uk/pgr/regional/transportassessments/guidanceonta> and (for Wales) at: <http://wales.gov.uk/topics/transport/publications/weltag/?lang=en>

141 <http://www.dft.gov.uk/pgr/regional/fundingtransportinfrastructure/>

142 Please note that no separate guidance has been issued for Wales. The Welsh Assembly Government discusses funding arrangements with developers on a project-specific basis.

adverse impacts on transport networks arising from the development, as set out below. Applicants may also be willing to enter into planning obligations for funding infrastructure and otherwise mitigating adverse impacts.

- 5.13.7 Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG transport assessment, with attribution of costs calculated in accordance with the Department for Transport's guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure.

Mitigation

- 5.13.8 Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts.
- 5.13.9 The IPC should have regard to the cost-effectiveness of demand management measures compared to new transport infrastructure, as well as the aim to secure more sustainable patterns of transport development when considering mitigation measures.
- 5.13.10 Water-borne or rail transport is preferred over road transport at all stages of the project, where cost-effective.
- 5.13.11 The IPC may attach requirements to a consent where there is likely to be substantial HGV traffic that:
- control numbers of HGV movements to and from the site in a specified period during its construction and possibly on the routing of such movements;
 - make sufficient provision for HGV parking, either on the site or at dedicated facilities elsewhere, to avoid 'overspill' parking on public roads, prolonged queuing on approach roads and uncontrolled on-street HGV parking in normal operating conditions; and
 - ensure satisfactory arrangements for reasonably foreseeable abnormal disruption, in consultation with network providers and the responsible police force.
- 5.13.12 If an applicant suggests that the costs of meeting any obligations or requirements would make the proposal economically unviable this should not in itself justify the relaxation by the IPC of any obligations or requirements needed to secure the mitigation.

5.14 Waste management

Introduction

- 5.14.1 Government policy on hazardous and non-hazardous waste is intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Where this is not possible, waste management regulation ensures that waste is disposed of in a way that is least damaging to the environment and to human health.
- 5.14.2 Sustainable waste management is implemented through the “waste hierarchy”, which sets out the priorities that must be applied when managing waste¹⁴³:
- a) prevention;
 - b) preparing for reuse;
 - c) recycling;
 - d) other recovery, including energy recovery; and
 - e) disposal.
- 5.14.3 Disposal of waste should only be considered where other waste management options are not available or where it is the best overall environmental outcome.
- 5.14.4 All large infrastructure projects are likely to generate hazardous and non-hazardous waste. The EA’s Environmental Permitting (EP) regime incorporates operational waste management requirements for certain activities. When an applicant applies to the EA for an Environmental Permit, the EA will require the application to demonstrate that processes are in place to meet all relevant EP requirements.
- 5.14.5 Specific considerations with regard to radioactive waste are set out in section 2.11 and Annex B of EN-6. This section will apply to non-radioactive waste for nuclear infrastructure as for other energy infrastructure.

Applicant’s assessment

- 5.14.6 The applicant should set out the arrangements that are proposed for managing any waste produced and prepare a Site Waste Management Plan. The arrangements described and Management Plan should include information on the proposed waste recovery and disposal system for all waste generated by the development, and an assessment of the impact of the waste arising from development on the capacity of waste management facilities to deal with other waste arising in the area for at least five years of operation. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that this is the best overall environmental outcome.

¹⁴³ The Waste Hierarchy is set out in Article 16 of the Waste Framework Directive 2008 and The Waste (England and Wales) Regulations 2011.

IPC decision making

- 5.14.7 The IPC should consider the extent to which the applicant has proposed an effective system for managing hazardous and non-hazardous waste arising from the construction, operation and decommissioning of the proposed development. It should be satisfied that:
- any such waste will be properly managed, both on-site and off-site;
 - the waste from the proposed facility can be dealt with appropriately by the waste infrastructure which is, or is likely to be, available. Such waste arisings should not have an adverse effect on the capacity of existing waste management facilities to deal with other waste arisings in the area; and
 - adequate steps have been taken to minimise the volume of waste arisings, and of the volume of waste arisings sent to disposal, except where that is the best overall environmental outcome.
- 5.14.8 Where necessary, the IPC should use requirements or obligations to ensure that appropriate measures for waste management are applied. The IPC may wish to include a condition on revision of waste management plans at reasonable intervals when giving consent.
- 5.14.9 Where the project will be subject to the EP regime, waste management arrangements during operations will be covered by the permit and the considerations set out in Section 4.10 will apply.

5.15 Water quality and resources

Introduction

5.15.1 Infrastructure development can have adverse effects on the water environment, including groundwater, inland surface water, transitional waters¹⁴⁴ 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 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 could lead to adverse impacts on health or on protected species and habitats (see Section 4.3 and Section 4.18) and could, in particular, result in surface waters, groundwaters or protected areas¹⁴⁵ failing to meet environmental objectives established under the Water Framework Directive¹⁴⁶.

Applicant's assessment

5.15.2 Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent. (See Section 4.2.)

5.15.3 The ES should in particular describe:

- the existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;
- existing water resources¹⁴⁷ affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies);
- existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and

144 As defined in the Water Framework Directive (2000/60/EC), 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.

145 Protected areas are areas which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water.

146 2000/60/EC.

147 See EA document *Water resources strategy for England and Wales: water for people and the environment* (2009).

- any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.

IPC decision making

- 5.15.4 Activities that discharge to the water environment are subject to pollution control. The considerations set out in Section 4.10 on the interface between planning and pollution control therefore apply. These considerations will also apply in an analogous way to the abstraction licensing regime regulating activities that take water from the water environment, and to the control regimes relating to works to, and structures in, on, or under a controlled water¹⁴⁸.
- 5.15.5 The IPC will generally need to give impacts on the water environment more weight where a project would have an adverse effect on the achievement of the environmental objectives established under the Water Framework Directive.
- 5.15.6 The IPC should satisfy itself that a proposal has regard to the River Basin Management Plans and meets the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater. The specific objectives for particular river basins are set out in River Basin Management Plans. The IPC should also consider the interactions of the proposed project with other plans such as Water Resources Management Plans and Shoreline/Estuary Management Plans.
- 5.15.7 The IPC should consider whether appropriate requirements should be attached to any development consent and/or planning obligations entered into to mitigate adverse effects on the water environment.

Mitigation

- 5.15.8 The IPC should consider whether mitigation measures are needed over and above any which may form part of the project application. (See Sections 4.2 and 5.1.) A construction management plan may help codify mitigation at that stage.
- 5.15.9 The risk of impacts on the water environment can be reduced through careful design to facilitate adherence to good pollution control practice. For example, designated areas for storage and unloading, with appropriate drainage facilities, should be clearly marked.
- 5.15.10 The impact on local water resources can be minimised through planning and design for the efficient use of water, including water recycling.

¹⁴⁸ Controlled waters include all watercourses, lakes, lochs, coastal waters, and water contained in underground strata.

Glossary

| | |
|------------------------|--|
| AoS | Appraisal of Sustainability |
| Associated development | Development associated with the NSIP as defined in Section 115 of the Planning Act 2008 |
| BAT | Best Available Technique; should normally be used and, if not, reasons for not using BAT given. |
| Biomass | Material of recent biological origin derived from plant or animal matter |
| Birds Directive | Council Directive 2009/147/EC on the conservation of wild birds |
| CCGT | Combined Cycle Gas Turbine |
| CHP | Combined Heat and Power |
| CCS | Carbon Capture and Storage |
| CCR | Carbon Capture Readiness |
| CLG | Department for Communities and Local Government |
| Co-firing | Use of two fuel types (e.g. coal and biomass) in a thermal generating station (<i>qv</i>) |
| COMAH | Control of Major Accident Hazards |
| DECC | Department of Energy and Climate Change |
| Defra | Department of Environment, Food and Rural Affairs |
| DfT | Department for Transport |
| “Dispatchable” power | Sources of electricity that can be supplied (turned on or off) by operators at the request of power grid operators, in contrast to intermittent power sources that cannot be similarly controlled. |
| DNO | Distribution Network Operator. |
| EfW | Energy from Waste – combustion of waste material to provide electricity and/or heat. |
| EIA | Environmental Impact Assessment. |
| ES | Environmental Statement. |
| FEPA | Food and Environmental Protection Act 1985: licences for operations in England or waters adjacent to England are issued under this Act, although they will be replaced by marine licences under the Marine and Coastal Access Act 2008 |

| | |
|----------------------------------|---|
| Generic Impacts | Potential impacts of any energy infrastructure projects, the general policy for consideration of which is set out in Part 5 of EN-1 |
| Habitats Directive | The European Directive (92/43/EEC) on the Conservation of Natural Habitats and Wild Flora and Fauna |
| Habitats And Species Regulations | The Conservation of Habitats and Species Regulations 2010(SI2010/490), which implement the Habitats Directive and relevant parts of the Birds Directive |
| HRA | Habitats Regulations Assessment |
| LCPD | Large Combustion Plant Directive: sets emission limits of certain pollutants from industrial combustion plants with a thermal input equal to or greater than 50 MW |
| Nameplate capacity | The rated output of the unit/station at the generator, and therefore includes station own use (parasitic power), and any other consumption/loss prior to despatch to the grid, local network, industrial site or similar transmission system |
| MMO | Marine Maritime Organisation: set up under the Marine and Coastal Access Act 2008 |
| MW | Megawatt = one million watts |
| NETSO | National Electricity System Operator |
| NSIP | Nationally significant infrastructure project |
| OHL | Overhead electricity line carried on poles or pylons |
| pfa | Pulverised fuel ash; fine ash from the use of finely crushed coal in fossil fuel generating stations |
| PPG/PPs | Planning Policy Guidance/Planning Policy Statement: issued by CLG to inform Local Authorities on planning policy, primarily for application to local development plans. Local Authorities should also have regard to PPSs when considering individual planning applications |
| Substation | An assembly of equipment in an electric power system through which electric energy is passed for transmission, transformation, distribution, or switching |
| Technical feasibility | Whether it is possible to build and operate a proposed development according to its design parameters |
| Thermal Generating Station | Electricity generating station that uses a heat source (combustion of fuel or nuclear) to create steam that drives a generating turbine or which uses gas directly to drive a generating turbine |
| WID | Waste Incineration Directive: sets specific emission limits for waste combustion plant |

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