DEPARTMENT OF ENERGY & CLIMATE CHANGE

Appraisal of Sustainability for the revised draft National Policy Statement for Electricity Networks Infrastructure (EN-5)

Planning For New Energy Infrastructure

October 2010

Preface

This document is the Appraisal of Sustainability report (AoS) for the revised draft energy National Policy Statement for Electricity Networks Infrastructure (EN-5). EN-5 is one of a suite of National Policy Statements (NPSs) which the Government intends should form the basis for decision-making on development consent for a new generation of large-scale energy infrastructure. EN-5 is one of five energy NPSs covering specific technologies, such as nuclear power or fossil fuel generating infrastructure: each of these needs to be read in conjunction with the Overarching Energy National Policy Statement (EN-1), which deals with matters common to all new large-scale energy infrastructure and sets out certain policies which apply to more than one type of such infrastructure.

The main function of this report is to set out the likely significant effects on the environment of developing new electricity networks infrastructure of the types, and on the scale, envisaged by EN-1 and EN-5, as well as indicating how the policies set out in EN-5 are consistent with the principles of sustainable development more generally.

The AoSs are designed to inform consultation on the revised drafts of the NPSs with which they are being published. If you have any comments on them, please respond as part of the consultation on the revised draft NPSs. The documents are available at www.energynpsconsultation.decc.gov.uk. The re-consultation will be open for 14 weeks from the 18th October 2010.

Contents

1. Introduction

1.1. Context

This is the revised Appraisal of Sustainability (AoS) Report for the revised draft National Policy Statement (NPS) on Electricity Networks Infrastructure (EN-5). NPSs are made under the Planning Act 2008. The Act requires AoSs to be prepared for NPSs. The Introduction to the AoS of the Overarching Energy National Policy Statement (EN-1) contains a general explanation of the relationship between the Planning Act 2008 and UK energy policy, and the functions of NPSs and AoSs.

This Report provides information on:

- The revised draft NPS for Electricity Networks Infrastructure (Section 1.2);
- alternatives considered (Section 1.3);
- findings of the Appraisal of Sustainability (AoS) (Section 3); and
- proposed measures for monitoring significant effects (Section 4).

This report should be read in conjunction with the revised AoS Report for EN-1 which provides information on the:

- suite of six Energy NPSs (EN1-6) (Section 1);
- methodology (including when the AoS was undertaken and by whom) (Section 2);
- scope of the appraisal (Section 2);
- method for collecting and presenting baseline information (Section 2);
- approach to completing the appraisal (including the AoS Framework with objectives for sustainability), assumptions and difficulties encountered during the appraisal (Section 2);
- assessment of alternatives (Section 3);
- overall appraisal of the NPS policies (Section 3); and
- monitoring proposals and next steps (Section 5).

Paragraph 2.6.1 of AoS 1 explains how the results of the assessment of likely significant effects is shown. For ease of reference, the table is reproduced here.

Key to Appraising Significance of Predicted Effects

Likely Significant Effects:		
Major positive	++	Policy would resolve an existing sustainability problem; effect considered to be of national/international significance
Minor positive	+	No sustainability constraints ; effect considered to be of regional/ national/international significance
Neutral	0	Neutral effect i.e. no overall effects or not-applicable
Minor Negative	-	Potential sustainability issues, mitigation possible; effect considered to be of regional/ national/international significance
Major Negative	--	Problematical because of known sustainability issues; mitigation difficult and/or expensive; effect considered to be of national/ international significance
Uncertainty	**?**	Where the significance of an effect is particularly uncertain, eg insufficient information is available at the plan stage to fully appraise the effects of the policy or the potential for successful mitigation, the significance category is qualified by the addition of the symbol "?"

1.2. The revised draft NPS for Electricity Networks Infrastructure (EN-5)

The revised draft NPS for EN-5 in conjunction with the Overarching NPS for Energy (EN-1) sets out the relevant planning factors that should be considered by the IPC when determining whether development consent should be granted for a proposed scheme.

EN-5 has been developed via an iterative process, taking account of the ongoing appraisal of the predicted sustainability effects. As the draft NPS was developed, specific topic sections were reviewed by technical specialists and recommendations were made by the AoS team to DECC for their consideration. A record of some of these recommendations and responses to them, highlighting how the NPS was developed was provided in Section 2 of AoS-5 published for consultation in November 2009. Iterative working continued with the revisions to EN-5 and AoS-5 made as a result of the public consultation.

1.2.1. Content of the NPS for Electricity Networks Infrastructure (EN-5)

The definition of what is a nationally significant energy infrastructure project (NSIP). (and therefore requires consent under the Planning Act 2008) varies between technologies. EN-5 covers the following types of nationally significant infrastructure:

- Above ground electricity lines of 132kV and above; and
- Other infrastructure for electricity networks that is associated with a NSIP.

EN-5 does not cover lines below 132kV unless they are associated with a NSIP which will be determined by the IPC.

EN-1 identifies the need for new energy generation capacity and a diverse mix of fuels and technologies, including electricity network infrastructure, in order to meet energy policy objectives. EN-5 covers impacts that are specific to electricity networks and should be read in conjunction with EN-1 which covers the general impacts of energy infrastructure.

The way in which the need for new energy infrastructure is established in EN-1 means that there should be no need to consider at the level of individual projects whether there is a need for new energy infrastructure development of a particular type (see Part 3 of EN-1). However, when an application is made for development consent, the decision-maker will need to consider whether the benefits arising from the proposed development (including the contribution which it would make towards satisfying the need for new energy infrastructure) outweigh any adverse impacts which it would have (see Section 4.1 of EN-1).

Certain impacts may result from the development of new energy infrastructure regardless of the specific technology involved. EN-1 identifies (in Part 5) the potential generic impacts of new energy infrastructure and provides the basis for decision-making with respect to each impact topic (i.e. landscape and visual or socio-economic impacts) but does not cover impacts that would be specific to a particular energy technology.

Generic Impacts detailed within EN-1	
• Air emissions • Biodiversity and geological conservation • Civil and military aviation and defence interests • Coastal change • Dust, odour, artificial light, smoke and insect infestation • Flood Risk • Historic Environment	• Landscape and visual impacts • Land-use including open space, green infrastructure and greenbelt • Noise and vibration • Socio-economic • Traffic and transport Impacts • Waste management and • Water quality and resources

EN-1 also contains (in Part 4) information about other matters which may be of relevance to the consideration of any application for development consent for new large-scale energy infrastructure, such as adaptation to the effects of climate change, and the relationship between the planning regime and other statutory controls such as those on pollution and hazardous substances. The main topics where electricity network

infrastructure detailed in EN-5 may result in technology-specific impacts in addition to those set out in EN-1, are as set out below.

Technology-Specific Impacts detailed within EN-5
• Electric and Magnetic Fields (EMF) • Landscape and visual impacts • Noise

1.3. Alternatives Considered

As explained in Section 1.3 of the AoS for EN-1, the AoS exercise for the energy NPSs also fulfils the requirements of the Strategic Environmental Assessment (SEA) Directive (2001/42/EC) to produce an environmental report on certain types of "plan or programme". The energy NPSs are such a plan or programme because they set the framework for the granting of development consent to large-scale energy infrastructure.

The SEA Directive requires that when an environmental report on a proposed plan or programme is prepared, it must identify, describe and evaluate the likely significant effects of implementing reasonable alternatives to the plan or programme which it assesses, as well as the likely significant effects of the plan or programme itself. The analysis of reasonable alternatives is to take into account "the objectives and the geographical scope of the plan".

Certain strategic alternatives to the draft NPS as a plan were appraised and reported in the AoSs published as part of the November 2009 consultation. As a result of this consultation, the Government decided to look again at the AoSs and the draft NPSs, including the analysis of alternatives. The work presented in this section cannot be compared directly with that reported in the November 2009 draft AoSs and is intended to take the place of the earlier assessment.

The analysis of reasonable alternatives provides a strategic context for the detailed assessment of the likely significant effects of NPS policies, as well as a means of evaluating them by comparing them with other ways of achieving the same wider energy policy objectives through the planning regime – both in terms of their comparative merits as ways of achieving those objectives and in terms of their environmental, social and economic impacts.

Part 3 of AoS-1 contains a strategic-level analysis of alternatives to the policies in EN-1 and describes the process of identifying and evaluating alternatives in more detail. This AoS for EN-5 is concerned with the analysis of alternatives to those policies in the NPS

suite which are of most relevance directly to electricity networks infrastructure. Although, as noted above, EN-5 contains information on the electricity networks-specific aspects of issues and impacts which are considered in EN-1, such as land use and biodiversity, the key points of policy on these are laid down at a generic level in EN-1 and alternatives to them are considered in AoS-1. In its treatment of alternatives, this AoS concentrates on different approaches to reducing or eliminating the impacts of the technology concerned that experience shows are most objectionable – in particular, adverse visual impacts.

The reasonable alternatives for consideration in the AoS for the Electricity Networks Infrastructure NPS are the following:

- EN-5 (a): the Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas

- EN-5 (b): adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as Areas of Outstanding Natural Beauty (AONBs)

1.4. The NPS policies

The aspects of overhead electric lines which have consistently given rise to most concern are their potential to produce adverse landscape and visual impacts and (from a health point of view) the electric and magnetic fields (EMFs) associated with them. The approach of EN-5 to these issues is, broadly speaking, as follows:

- landscape and visual effects should be addressed by designing and siting new electricity lines in such a way as to mitigate adverse effects. While undergrounding of lines is recognised as an option which may be appropriate in individual cases, it is not recommended as general policy, or one to be automatically adopted in any particular category of case, and it should only be adopted where the decision-maker considers that the (usually considerable) additional costs of undergrounding (and associated adverse impacts) are justified; and

- EMF issues can be effectively addressed by ensuring that network companies adhere to International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines and health and safety legislation relating to the location of overhead lines.

It is not considered that either landscape and visual impacts or EMF issues justify adopting a policy of limiting consents to particular areas and departing from the approach taken in the NPSs generally (with the exception of the nuclear NPS) that the choice of locations is left to the market, with the development consent regime operating

to filter out any proposals which would have unacceptable adverse impacts, and ensuring that appropriate mitigation is in place.

1.5. Discussion of alternatives

A similar policy of not limiting consent to particular areas has been adopted in EN-1, EN-2, EN-3 and EN-4. No detailed alternative has been considered to this approach in relation to the kinds of infrastructure covered by EN-2 and EN-3 because it is considered that there are too many variables in relation to the location and the likely scale of development, so that any policy of designating only certain areas as suitable for such infrastructure is likely to result either in unacceptable cumulative effects as infrastructure is concentrated in too small an area, or in planning blight if too large an area is designated. With electricity networks infrastructure, however, the major sources of demand and some existing infrastructure may provide sufficient fixed points to justify considering in more detail an alternative which would represent a departure from the general case by case, market-led approach taken in the NPSs, rather than leaving it to be dealt with it only as part of generic Alternative A4 in AoS-1 (as has been done with the infrastructure covered by EN-2 and EN-3). Moreover, alternative (a) has sometimes been put forward specifically as a way of addressing concerns about EMFs.

Alternative (b) is considered particularly as a way of addressing concerns about the landscape and visual impacts of overhead lines. It could be implemented either as a blanket policy (no new overhead lines of 132kV and above to be consented anywhere) or in a more focused form (no new overhead lines of 132kV and above in one or more categories of nationally or locally designated landscape areas).

These alternatives focus on different approaches to avoiding or reducing the likely significant impacts of electricity networks infrastructure. They were considered as alternatives to dealing with each application on a case by case basis with no presumption of undergrounding.

2. Assessment of NPS Alternatives

2.1. Introduction

The scope and methods of appraisal are detailed in the Overarching AoS-1. The two strategic alternatives identified for the Electricity Networks Infrastructure NPS-5 were assessed using Sustainable Development themes that better keep the appraisal at the higher and strategic level (see table 2.3 of AoS-1). The preferred policy approach that was likely to better promote the implementation of the aims of the NPS was appraised further in detail using the AoS framework of objectives.

2.2. Alternatives

The findings of the appraisal of the strategic alternatives for EN-5 are set out below, arranged by Sustainable Development theme.

2.2.1. Climate Change

EN-5 (a): The Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

EN-5 notes that the general location of electricity network projects is often determined by the location or the anticipated location of particular generating stations. Taking a strategic view on locations will therefore be informed by the choices made by energy providers. Future power stations are likely to be in coastal, estuarine and riverine locations which may be susceptible to climate change impacts (for example flooding and storm surge). Therefore, whilst the location of infrastructure will be constrained by these requirements, it is possible that taking a strategic view on locations would allow siting decisions to avoid areas most at risk. This option may also allow the avoidance of areas where increased development is assessed as potentially exacerbating flood risk.

Overall it is likely that the effects of this option will be similar to those appraised for EN-5 given the range of parameters that will determine the eventual location of electricity networks infrastructure.

EN-5 (b): Adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs).

The provision of an improved/ upgraded electricity network infrastructure would facilitate the distribution of energy, including from low carbon energy sources. There are potential long term, positive impacts from improving energy distribution, however, the overall impacts on climate change objectives are uncertain, given that the mix of technology

types will depend on how the market develops. These effects are shared by the preferred option, discussed in Section 3.1. As for overhead power transmission there will be some embodied energy in the material used for construction during underground but this is not appraised as significant.

A presumption in favour of undergrounding may provide some resilience to the predicted effects of climate change (overhead power lines are more at risk from extreme weather events, Section 3.1), however, undergrounding may also exacerbate localised vulnerabilities to the effects of climate change, for example by altering soil properties and drainage characteristics in flood prone areas. Mitigation measures would be necessary to ensure that undergrounding power lines does not contribute to greater flood risk in the long term.

Overall this alternative supports the distribution of energy, including from low carbon sources with potentially positive effects for climate change objectives in the long term. There is uncertainty given that the overall mix of energy types is not known.

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
Climate Change		**0**	**+?**

2.2.2. Security of Energy Supply

EN-5 (a): The Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

The designation of strategic locations for consenting electricity network infrastructure is likely to have similar effects to the preferred option and option EN-5 (b), in that, if the "right" areas are designated, this approach will facilitate the transmission of energy, including from low carbon sources, and contribute overall to the delivery of secure, clean, affordable energy, with positive long term effects.

The promotion and maintenance of security of supply is, however, dependent on the deliverability of infrastructure. To ensure positive effects against this AoS objective theme, the strategic choice of locations would be required to take account of the economic and environmental costs of infrastructure implementation as well as the anticipated location of future power stations.

EN-5 (b): Adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs).

In line with the preferred option (Section 3.1) this approach will facilitate the transmission of energy, including from low carbon sources, and contribute overall to the delivery of secure, clean, affordable energy, with positive long term effects. Construction will require the use of raw materials for cabling, tunnelling and supporting infrastructure. Where undergrounding is favoured this will lead to significantly higher material costs given the additional structural requirements when compared with overhead power transmission. Where repairs are required to be undertaken on underground lines, these can be costly and disruptive, and this can affect the security of supply through lines being out of service for longer periods. These higher financial costs are potentially negative effects against security of supply objectives.

A presumption in favour of undergrounding is also likely to result in higher generation of waste products from excavation (soil, rocks etc) which will have accompanying transport and disposal demands. Minor negative effects are possible in the short term dependent on the location and scope of the transmission requirements.

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
Security of Energy Supply		**0?**	**-**

2.2.3. Health and Well-Being

EN-5 (a): The Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

Taking a strategic view on locations for electricity network infrastructure has potentially divergent effects for health and well-being objectives depending on the parameters employed. Limiting consent to areas where power station developments are currently considered likely to occur (coastal or estuarine regions) may result in concentrations of development and may lead to an increase in locally significant issues such as noise, disturbance and air quality changes, that may have cumulative negative impacts over time. If a strategic view on locations directs infrastructure to, and through, new, undeveloped areas then negative impacts on health and well-being are more likely to be dispersed and localised, depending on the nature of the receiving community.

The designation of specific areas for infrastructure may also have effects on equality. Any concentration of development may increase economic opportunities for specific populations, and exclude those outside designated areas. A strategic choice of locations may also offer the opportunity to increase access to employment and economic opportunities for certain sectors of the population.

EN-5 (b): Adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs).

Minor negative effects for noise objectives are likely during the construction phase for electricity line undergrounding. The period of disruption would typically be longer than for equivalent overhead construction given the greater infrastructure demands. However, noise effects during operation and in the long term are appraised as project level/ local issues. Minor negative effects on air quality are also possible during the construction periods, but are appraised as neutral in the medium to long term.

Potential electromagnetic field (EMF) effects arising from overhead lines require appropriate planning and mitigation. For underground lines EMFs are typically more concentrated close to transmission lines, but fall away rapidly at a distance from source[1]. EN-5 requires that the IPC seek evidence of compliance with the International Commission on Non-Ionizing Radiation Protection's guidelines for electric, magnetic and electromagnetic fields. Taking account of the required mitigation, the effects of this option are appraised as neutral in the short, medium and long term.

The option will facilitate the transmission of energy, contributing to the overall security and affordability of supply for all population groups. However, the increased cost of undergrounding is likely to have negative impacts for affordability of electricity supply, especially on the part of the fuel poor. There is potential for the negative impacts of the development/construction phases to be more significant for populations in rural/remote areas, which are forecast to receive additional/new infrastructure to meet the demands of emergent (for example, offshore) technology types. The impacts for equality issues in the context of wider health and safety objectives are therefore appraised as uncertain, particularly in relation to equality due to the negative effects on affordability.

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
Health & Well-Being		**+/-**	**+/-**

2.2.4. Economy

EN-5 (a): The Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

Taking a strategic view on locations for the consenting of electricity network infrastructure is likely to have some similar effects to EN-5 for the economy, including positive effects in the short term, as it is likely to lead to job opportunities and economic

[1] National Grid, 2005. Undergrounding high voltage electricity transmission. The technical issues.

benefits. However, through specifying locations (corridors) where future networks infrastructure will be located, it is likely that this option will lead to these corridors being subject to planning blight, where no further development or investment takes place. This can lead to derelict buildings and uneconomic use of land, and is likely to be a strategic issue in the medium to longer term if the networks infrastructure is not constructed.

As with EN-5, this option will also have potential for negative economic effects locally on existing land uses (for example through temporary disruption during the construction period, disturbance of agricultural land), but this can generally be mitigated through the design and planning process.

In line with the findings for this option in relation to Health and Well-Being objectives, the geographical distribution of the effects detailed will be governed by the specific locational choices taken at a strategic level.

EN-5 (b): Adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs).

The development of electricity network infrastructure may contribute positively to economic objectives during the construction and development phase. These effects are in common with the preferred approach to transmission provision (detailed in Section 3.1) and include the potential for enhanced employment in the short term through the acceleration of energy infrastructure development.

There is a potential for negative effects on land use and property values and this is likely to be greater where there is a presumption in favour of undergrounding given the higher land take demands and construction footprint (when compared to overhead line alternatives, see Section 3.1). Negative effects will be most significant during the construction period, particularly given the substantially higher financial costs of undergrounding which may affect deliverability. Undergrounding can also lead to sterilisation of agricultural land, therefore medium to long term effects are also greater than for overhead lines.

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
The Economy		**+/-**	**-**

2.2.5. Built Environment

EN-5 (a): The Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

The appraisal of EN-5 notes that the development of electricity networks infrastructure will potentially have negative effects for flood risk and transport issues, particularly at a local level, in the short term during construction periods. These effects are typically more significant where infrastructure is required to be undergrounded, taking into account the excavation requirements. If the Government were to take a strategic view on locations for consenting, then overall the effects for the built environment of this option are likely to be similar to those identified for EN-5.

However, there may be opportunities to reduce or further mitigate the effects identified, by only designating areas where impacts and effects are determined to be less significant, for example, by specifying the avoidance of locations subject to flood risk and coastal change; with limited traffic networks capacity; and known archaeological sensitivities.

EN-5 (b): Adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs).

In the short term undergrounding is likely to have significant negative effects for electricity networks through disruption given the higher footprint requirement than overhead power. This may be more significant in rural areas where networks are less extensive, although these effects are appraised as localised and short term. Mitigation at a local level in line with requirements set out in EN-5 would be necessary.

The effect of the excavation for underground lines on soil and surface characteristics is considered under the Natural Environment. A potential consequence of the excavation is that it could alter surface and ground water flows leading to increased risk of both localised and wider regional flood events. The impacts of excavation on surface and groundwater flows may be mitigated by suitable design and construction. Any residual impacts on flood risk could be mitigated through Flood Risk Assessment (FRA) and would be necessary for developments in sensitive locations. Where mitigation is effectively incorporated, long term effects are likely to be neutral.

The effects of undergrounding on archaeology are potentially significant and will depend on the sensitivities of the receiving location. Excavation requirements, and the associated financial costs, are substantially higher than for overhead lines and any negative effects are likely to be long term given the permanence of the structures. Mitigation measures set out in EN-5, including survey, Environmental Statement and avoidance of designated areas, should address negative impacts. In the long term, however, overall effects are location dependent and therefore uncertain.

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
The Built Environment		**0**	**-?**

2.2.6. The Natural Environment

EN-5 (a): the Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

The development and expansion of the electricity grid is appraised as having the potential for negative effects on water quality, ecology, soils and geology and landscape, particularly at a local level. With the exception of landscape objectives, these effects are appraised as being more significant where infrastructure is undergrounded, due to the much larger footprint and overall disruption and disturbance that results from this approach. Landscape impacts are appraised as significant in the short, medium and long term particularly for overhead lines at the “transmission” (as opposed to distribution) voltages of 275kV and 400kV, which tend to be supported on steel towers rather than wooden poles.

Taking a strategic view on locations for consenting electricity network infrastructure offers the opportunity to avoid and reduce the negative impacts identified, by selecting locations that are less sensitive to development pressures and visual impacts. However, the limitation on strategic location choices given the context of existing infrastructure and anticipated power station locations, means that the overall effects of this option are likely to be similar to those appraised for EN-5.

EN-5 (b): adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs).

A presumption in favour of undergrounding has potentially significant negative impacts and effects for ecology in the short, medium and long term, due to direct habitat loss, disturbance and fragmentation. Undergrounding requires a substantially larger footprint than overhead power lines and its effects, for example on the soil and water environment, may have additional indirect negative effects on habitats and species integrity and survival. The disturbance and removal of soil (including when maintenance work is required) will require specific mitigation to prevent overall loss of quality in the long term. The negative effects for ecology are likely for the terrestrial and possibly fluvial environments. In the long term, the effects on mobile species (for example birds) from undergrounding may be less than occur from overhead lines, which can act as obstructions/barriers to migration routes.

The effect of excavation on soil and surface characteristics may also produce effects on surface and ground water flow leading to negative impacts on water quality and resources. Where mitigation is effectively incorporated, long term effects are likely to be neutral. The potential for changes in surface and ground water flow to affect flood risk is considered under the Built Environment theme.

Significant negative effects on both landscape and townscape are possible in the short term during the construction phases for undergrounding. The larger footprint required by undergrounding may enhance these short term negative effects.

A presumption in favour of undergrounding will have significant positive effects for landscape receptors in the medium to long term by removing long term visual impacts associated with overhead lines. The option of requiring undergrounding for AONBs and other sensitive locations would also be positive for landscape in the medium to long term. However the short-term effects from undergrounding on the landscape may be more significant due to the larger construction footprint and disruption of soil.

The effects on the natural environment of undergrounding, or of undergrounding in particular locations (for example AONBs) are therefore considered to be significant and positive for landscape in the medium to longer term, but more likely to lead to negative impacts on ecology, soil and the water environment.

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
The Natural Environment		**0**	**+/-**

2.2.7. Summary of Alternatives Findings and Preferred Approach for NPS

Headline SD themes	EN-5	Alternative (a)	Alternative (b)
Climate Change		**0**	**+?**
Security of Energy Supply		**0?**	**-**
Health & Well-Being		**+/-**	**+/-**
The Economy		**+/-**	**-**
The Built Environment		**0**	**-?**
The Natural Environment		**0**	**+/-**

EN-5 (a): The Government would take a strategic view on locations where it is best to develop electricity network infrastructure and limit consenting to those areas.

Overall this alternative to EN-5 is likely to have similar effects in relation to the AoS objective themes as the preferred option. This is because the general location of infrastructure networks is determined by existing network/power station locations and the anticipated locations of new stations and, therefore, the strategic choice of locations

will be limited by these factors. (This in turn highlights a practical difficulty, which is that it would be hard to designate corridors for transmission and distribution line development accurately and significantly in advance of applications for consent being made, without firmer information about the location of new generating plant than may be readily available in many cases, given the non-locational approach of EN-2 and EN-3.)

The key difference is that EN-5 is less likely to lead to planning blight, whereas the alternative is likely to lead to adverse economic effects through restricting development and investment in corridors designated for future networks infrastructure. Accordingly, the policies set out in the revised draft EN-5 are preferred.

EN-5 (b): Adopt a presumption that electricity lines should be put underground (generally, or in particular locations, such as AONBs)

The alternative that proposes a presumption in favour of undergrounding, or undergrounding in certain locations, would have similar effects to the preferred option in relation to the AoS objective for climate change. Undergrounding electricity network infrastructure has significantly higher costs than the installation of overhead power lines and this aspect is appraised as having negative effects, which may be cumulative, for security of supply and economic objectives. The increased disruption caused by maintenance and repair can also have effects on security of supply. On affordability and longer term security of supply issues, the preferred option is, therefore, more likely to ensure that the plan is delivered in the timescales necessary to support the transmission of energy supplied.

Undergrounding also demands a substantially higher footprint than overhead lines, and effects on soil, water, and archaeology are all likely to be negative in the short term and will require appropriate mitigation. There is some uncertainty as to the long term effects which will depend on the specific location and the sensitivity of the receiving environment. Significant negative effects in the short term are also appraised for ecology objectives, as direct loss and disturbance from extensive linear excavations are likely, and will require extensive mitigation measures as detailed in EN-1 and EN-5. In common with the appraisal findings for other elements of the natural environment, the exact nature of the effects and their duration will depend on the specific location and the sensitivity of the receiving environment.

Negative effects of undergrounding on landscape are appraised as short term (construction phase). In the long term landscape, townscape and visual impacts will be positive given the removal of electricity lines from local and wider population receptors.

Obviously, all of the potential negative effects of alternative EN-5(b) could be reduced by applying the presumption in favour of undergrounding only to particular types of designated landscape. However, some negative landscape and visual impacts are likely to arise wherever overhead lines are sited (particularly transmission lines supported on steel towers) and the Department has found that local objections to proposed overhead

lines are as likely to arise in non-designated or locally designated areas as in nationally designated landscapes, so that any reduction in the negative effects of alternative EN-5(b), as a result of focusing the presumption in favour of undergrounding more narrowly, would be likely also to reduce the perceived positive impact of the alternative by a similar amount.

Given that underground lines are not without a range of adverse impacts of their own, and that they are significantly more expensive, it is considered better to adopt the policies set out in the revised draft NPSs and not to prefer any presumption in favour of undergrounding. This is because the range of factors to be taken into account means that any decision to underground is best taken within a more flexible policy framework that follows a case by case evaluation of all of the impacts of a particular project and supports the use of both undergrounding and overhead lines as appropriate, in line with the appraisal findings.

3. Appraisal Findings for the revised draft NPS EN-5

Electricity networks infrastructure may have various impacts on communities and the environment depending on the nature of the development and its location. Certain of these impacts are common to other energy infrastructure development and the findings of the appraisal for these generic effects are detailed in the Overarching AoS-1. The likely significant effects of the technology specific policies, requirements and guidance in EN-5 were appraised against the baseline conditions using the AoS framework of 14 topics with objectives for sustainability.

The appraisal focused on the technology specific impacts with consideration of mitigation measures, such as the development control policies included in the AoS-1 in order to avoid duplication of assessment. It then considered the strategic effect of the implementation of EN-5 on the AoS objectives, giving consideration to the role of the revised draft of EN-5 in providing greater certainty to energy developers and facilitating energy networks infrastructure more rapidly than would otherwise occur. A summary of the generic effects from AoS-1 is included for context at the beginning of each topic appraisal. The likely significant effects arising specifically from electricity networks infrastructure are then discussed, including suggestions for mitigating significant negative effects, and a summary of the appraisal of EN-1 is provided for each topic.

3.1. Climate Change

AoS Objective	Assessment (by timescale)		
	S	M	L
1. Climate Change: To minimise detrimental effects on the climate from greenhouse gases and ozone depleting substances and maximise resilience to climate change.	0	+?	+?

AoS-1 describes the effects of energy infrastructure on climate change as including:

- minor positive effects for climate change through the accelerated consenting/construction of low carbon electricity projects with the potential for cumulative positive effects in the medium to long term; and
- minor positive effects in the medium and long term for climate change adaptation objectives through the requirements in EN1 for adaptation and resilience measures in all new energy sector developments.

Through facilitating the development of new electricity networks infrastructure that is vital to the renewables industry in particular, EN-5 is likely to provide an indirect positive contribution to the achievement of the Climate Change AoS objective. Whilst it will help to facilitate the delivery of low carbon energy, the construction and operation of transmission and distribution infrastructure will also lead to a minor increase in emissions through embodied energy in materials and transport. However this is not considered significant in comparison with the reductions in emissions to which it would contribute by connecting with renewable sources of electricity.

Climate change resilience is an important consideration when planning infrastructure projects, and networks infrastructure projects are no exception. Important considerations include the potential contributions to localised flood risk and coastal erosion (discussed under AoS Objective 5), arising from new coastal infrastructure, for example, through the introduction of hard surfaces (substations) or changes to soil structure/ permeability that can occur both during and after construction phases (for example where there is cable undergrounding). Climate change-related events can also cause possible effects on electricity networks infrastructure from physical changes (for example coastal erosion) arising as a result of climate change. Of particular concern to EN-5 is the prediction of changing weather patterns under climate change scenarios, including an intensification of storms and high winds that can adversely affect overhead lines. Another predicted effect of climate change is higher average temperatures and this can lead to increased transmission losses for overhead lines.

EN-5 directs applicants for development consent in respect of new electricity networks infrastructure to include climate change resilience measures as part of the relevant impact assessment in the Environmental Statement accompanying an application and to set out how the proposal would be resilient to flooding, wind, transmission losses, and earth movement and subsidence caused by flooding and droughts. EN-1 also notes that applicants will be expected to take appropriate mitigation measures to address adverse effects on coastal geomorphology, in consultation with the Marine Management Organisation, the Environment Agency, Local Planning Authorities, other statutory consultees, Coastal Partnerships and other coastal groups as appropriate.

3.1.1. Summary

While the draft of EN-5 will help to facilitate the delivery of renewable energy, its effect on the Climate Change AoS objective is considered unlikely to be significant in the short-term. In the medium to long term, low carbon energy sources are more likely to be operational and connected to the network and therefore EN-5 may have a positive effect, although this is dependent on the implementation of other energy NPSs and the construction of projects on the ground. The effect is therefore considered to be minor positive and uncertain.

Resilience to climate change is also an important consideration, and the development of electricity network infrastructure can be affected through transmission losses in hot weather, damage from high winds and flooding. EN-5 and EN-1 require consideration of these issues, and include mitigation measures that should ensure any negative effects are minimised.

3.2. Ecology (Flora and Fauna)

AoS Objective	Assessment (by timescale)		
	S	M	L
2. Ecology (Flora and Fauna): To protect and enhance protected habitats, species, valuable ecological networks and ecosystem functionality.	-?	0	0

AoS-1 describes the generic impacts of energy infrastructure and their potential effects on ecology as including:

- loss of habitat (and species) - direct loss from land take or the abstraction of water resources, and indirect or temporary, for example during construction phases;
- disturbance of habitats and species - through noise, light and visual and dust pollution arising from construction, operation and decommissioning activities;
- pollution impacts - from emissions to water, ground and air with impacts on water, soil and air quality;
- habitat fragmentation/severance/isolation - through development (in particular linear features);
- obstructions - from tall structures presenting obstacles to migration and flight paths;
- changes to microclimates - alterations to wind patterns/speeds, shading/shadow effects; and
- habitat integrity and connectivity improvements from management, restoration and enhancement activities.

Overhead lines are linear in nature and can cover significant distances. As a result electricity networks infrastructure has the potential to affect designated and non-designated ecology over a large area through, for example, disturbance and habitat loss and fragmentation. When lines are placed underground, to match overhead line

performance for a 400kV double circuit as many as twelve separate cables in four separate trenches may be needed, resulting in a cable swathe of up to 40 metres. The volume of spoil excavated for an underground cable where two cables per phase are installed can be some 14 times more than for an equivalent overhead line route[2]. Vegetation also needs to be cleared along and to the side of trenches to allow for construction and associated access for vehicles. Where electricity lines cross rivers, cables may be placed in ducts on river beds, and any necessary river diversions may result in significant local impacts for aquatic life (fish, otters etc). As a result, the effects of laying underground cables on ecology are likely to be more significant than overhead lines, through increased disturbance and habitat loss and fragmentation.

Negative effects on ecology can be reduced through careful planning and design, such as the selection of an appropriate route for transmission lines. The revised draft of EN-1 outlines a number of mitigation measures that will help to reduce the risk of the identified generic negative effects to ecology. This includes the requirement for applicants to show how the project has taken advantage of opportunities to conserve and enhance biodiversity. Applicants will also be expected to have included appropriate mitigation measures as an integral part of the proposed development. Any large proposed electricity networks infrastructure development will be subject to project level Habitats Regulations Assessment (HRA) and Environmental Impact Assessment (EIA).

The revised draft of EN-5 identifies the potential for electricity networks infrastructure to have negative effects on ecology through bird collisions with overhead transmission lines. This can be a particular issue for large bird species such as swans and geese which sometimes collide with overhead line conductors in poor visibility, resulting in their injury or death. This risk is greater when overhead power lines intersect migration routes and/or the breeding and feeding grounds of bird species. Large raptors sometimes use power lines and pylons as vantage points for hunting, which can also result in electrocution if they touch more than one line at once.

The risk of bird collision and electrocution can be reduced through careful planning and design. Determining the flight pattern of local bird species will allow the design of the route to take account of migration routes as well as breeding and feeding grounds. Marking devices can also be fitted to power lines to increase their visibility to birds[3]. Large raptors will often use the highest vantage point from which to hunt. Providing a perch that sits higher than the power lines and pylons can therefore help to reduce the risk of large raptors being accidently electrocuted. The undergrounding of power lines can completely remove the risk of collisions; however, this is a more expensive option and can also have negative effects on ecology through increased habitat disturbance and fragmentation.

[2] National Grid (2009) Undergrounding high voltage electricity transmission: The technical issues.
[3] National Grid Website (Accessed 09/07/10) Birds and Overhead Power Lines: http://www.nationalgrid.com/uk/LandandDevelopment/community/birds/

The revised draft of EN-5 also identifies that high voltage lines can generate noise under certain conditions, which could have negative effects on ecology; this is described in more detail under AoS objective 8: Noise.

The AoS recommended that the revised NPS include reference to bird collisions with overhead lines as a technology-specific impact, and this has since been incorporated into EN-5.

3.2.1. Summary

The effects of underground lines on ecology are considered to be more significant than those for overhead lines as the associated excavation can lead to significant disturbance and/or loss to terrestrial and aquatic habitats and species. The mitigation measures outlined in the revised draft of EN-1 along with careful planning and design will help to minimise negative effects on ecology.

The revised draft of EN-5 identifies that birds sometimes collide with overhead line conductors in poor visibility, resulting in their injury or death. Large raptors can also be accidently electrocuted when using power lines and pylons as vantage points to hunt. Mitigation measures for these technology-specific effects include the careful planning and design of over head power lines so that they avoid migration routes and feeding/ breeding areas as well as providing alternative areas for large raptors to perch.

The significance of the effects identified and the effectiveness of mitigation depends upon the specific sensitivities of the sites together with details of design and site layout. This will be addressed alongside wider effects on ecology during the project level HRA and EIA assessments. There are opportunities to mitigate certain potential negative effects on ecology, for example, project design to avoid sensitive areas, and habitat retention and species protection measures on site. As the nature and significance of effects is dependent on the location of electricity network infrastructure, it is appraised that the effect of enabling the development of new electricity networks infrastructure on ecology in the short term is minor negative and uncertain. It is appraised that the effects of enabling the development of electricity networks infrastructure as envisaged in the revised draft of EN-5 on ecology will be neutral in the medium and long term given the mitigation measures available.

3.3. Resources and Raw Materials

AoS Objective	Assessment (by timescale)		
	S	M	L
3. Resources and Raw Materials: To promote the sustainable use of resources and natural assets and to deliver secure, clean and affordable energy.	0	0	?

AoS-1 describes the effects of the energy NPSs on resources and raw materials as including:

- positive effects on resources in the long term through the delivery of secure, clean and affordable energy;
- short-term minor negative effects on resources and raw materials through the use of resources for construction materials and production of construction waste from infrastructure projects;
- medium to long-term negative effects through production of radioactive waste and decommissioning redundant infrastructure; and
- negative effects on resources and raw materials in the short to medium term through continued reliance on fossil fuels.

Through facilitating and enabling the electricity networks infrastructure required to support the transition to a low carbon economy and ensure security of supply more rapidly, the revised draft of EN-5 will contribute to the delivery of secure, clean and affordable energy.

The construction of electricity networks infrastructure involves the use of raw materials and resources, including for substations (for example concrete and steel), pylons (steel or wood), and lines (metals, for example aluminium) and this has the potential for negative effects. Facilities are designed to ensure minimal wastage of resources (for cost and environmental reasons) therefore the production of waste is not considered to be a significant issue during construction or operation. Any decommissioning of facilities may produce waste, although it is noted that often facilities are upgraded and repaired, rather than being completely decommissioned, so this is not considered to be significant.

As with other large infrastructure developments, a project Environmental Management System would be developed and agreed with stakeholders for each project, which would seek to minimise waste, and recycle materials where possible. A waste management plan would also be required for the decommissioning of any infrastructure relating to transmission and distribution.

3.3.1. Summary

Through facilitating and enabling the electricity networks infrastructure necessary to support the transition to a low carbon economy, the revised draft of EN-5 may have a small positive short-term effect on sustainable resource use and will help to deliver

secure, clean and affordable energy. However, its overall impact on raw materials and resources is not considered to be significant. The production of waste is a potential short-term (construction) and long-term (decommissioning) effect, however this can be mitigated through employing Environmental Management Plans, and it is noted that electricity networks infrastructure is more likely to be upgraded and repaired rather than completely decommissioned.

3.4. Economy and Skills

AoS Objective	Assessment (by timescale)		
	S	M	L
4. Economy and Skills: To promote a strong and stable economy with opportunities for all.	+	0	0

The significant positive strategic effects identified in AoS-1 for the energy NPSs include:

- improved vitality and competitiveness of the UK energy industry through providing greater clarity, with benefits for investment certainty and inward investment;
- enhanced economy, employment and jobs across England and Wales through provision of a secure and affordable supply of energy; and
- benefits for employment in the short, medium and long-term through the planning, construction, operation and decommissioning of large scale energy infrastructure; including for skilled workers and particularly in the low carbon energy industries (including in research and development).

Negative effects identified at the project level include:

- potential negative economic effects on existing and future land uses, especially during construction; including disruption, land sterilisation, decreases in property values and planning blight.

Through providing more certainty and helping to facilitate the construction of electricity networks infrastructure, EN-5 may lead to job opportunities and economic benefits, particularly during the construction stage. It is also likely to contribute cumulatively to the overall positive effect of the suite of energy NPS documents for the UK economy through ensuring a secure supply of energy required by industry and business and supporting the transition to a low carbon economy. Due to the linearity of electricity networks infrastructure, for larger projects the economic benefits may be spread across a wider geographic area than for other energy infrastructure, with jobs and raw materials/resources sourced from further afield.

The linearity of electricity networks networks may further exacerbate negative effects on current and future land uses, including property values and the introduction of planning blight. This includes short-term, reversible effects from construction (which can affect many communities/properties along the route), and longer-term effects due to the requirement for wayleaves/easements, resulting in the restriction of some future land uses, especially where underground cables are involved. These effects can be significant at a local scale, particularly for agricultural land uses. Such matters should be considered in the project planning and EIA process, and as part of any Sustainability Assessment prepared. Each case will be considered on its merits.

3.4.1. Summary

EN-5 is considered to have positive effects in the short term, as it is likely to lead to job opportunities and economic benefits occurring earlier than would have occurred otherwise. Through facilitating and enabling the electricity networks infrastructure necessary to support the transition to a low carbon economy and ensure security of supply, the NPS may also contribute indirectly to the positive cumulative effects of the energy NPSs on economy and skills. Whilst there is some potential for negative economic effects locally on existing and future land uses, as noted in EN-5 this can generally be mitigated through the design and planning process, and for the AoS is not considered of strategic significance.

3.5. Flood Risk and Coastal Change

AoS Objective	Assessment (by timescale)		
	S	M	L
5. Flood Risk and Coastal Change: To avoid, reduce and manage flood risk (including coastal flood risk) from all sources and coastal erosion risks by locating infrastructure in lower risk areas and ensuring it is resilient over its lifetime without increasing risks elsewhere.	0	0	0

AoS-1 describes the effects of energy infrastructure on flood risk as including:

- changes to hydrological flows (surface and ground water) from alterations to land use, including increases in impermeable surfaces (built structures, hard standing etc) may result in negative and more uncertain effects in the short, medium and long term; and
- construction activities, the introduction of water management measures including sustainable drainage systems (positive effects for water management) and the

development coastal/ river defences which may have negative effects in the short term with uncertain effects in the longer term.

As noted in the assessment summary for soil and geology, the laying of underground cables can result in the disturbance and/or loss of significant amounts of soil where large construction footprints are necessary, leading to changes in permeability, ground and surface water flow and potentially increasing localised flood risk. The construction of overhead lines will not generally contribute to flood risk as the construction footprint is minimal. Any related infrastructure, for example substations, may make a minor contribution through increasing hard-standing surfaces, but this can easily be mitigated. Where there is a likelihood of flooding effects, soil management plans and appropriate surface water drainage can mitigate any negative effects on people and property.

As discussed in AoS-1, electricity infrastructure can be susceptible to flood risk, and this applies to electricity lines where there is potential for damage from earth movement and subsidence, particularly where they have been undergrounded. Substations are particularly vulnerable to flooding effects, as discussed in EN-5.

EN-1 identifies generic guidance on flood risk and directs the IPC to assess whether an application is permissible in accordance with the policy set out in Planning Policy Statement 25: Development and Flood Risk. EN-1 requires that energy infrastructure projects of 1 hectare or greater in Flood Zone 1 in England or Zone A in Wales and all proposals for energy projects in Flood Zones 2 and 3, are accompanied by a flood risk assessment. Such an assessment will also be required if a project covering less than 1 hectare is subject to sources of flooding other than rivers and the sea. Applicants for projects which may be affected by, or add to, flood risk are directed by EN-1 to arrange pre-application discussions with the Infrastructure Planning Commission and the Environment Agency as well as a range of other relevant stakeholders.

3.5.1. Summary

Enabling the development of electricity networks infrastructure has the potential to increase flood risk through changes to hydrological flow, and these effects are typically localised. More so than for overhead lines, the construction of underground lines can result in the disturbance and/or loss of soil leading to changes in permeability and ground and surface water flow. However, this effect can be mitigated through appropriate surface water drainage and soil management plans.

Electricity networks infrastructure, and particularly substations, are vulnerable to flooding, however the requirements and mitigation outlined in EN-1 will help to minimise flood risk and coastal change and to manage the impacts on people and property. Taking mitigation measures into account, it is assessed that enabling the development

of new electricity networks infrastructure will have no overall effect on flood risk in the short, medium or long term.

3.6. Water Quality

AoS Objective	Assessment (by timescale)		
	S	M	L
6. Water Quality: To protect and enhance surface (including coastal) and groundwater quality (including distribution and flow).	0	0	0

AoS-1 describes the effects of energy infrastructure on the water environment as including:

- increased water discharges and atmospheric pollution (eutrophication) can lead to reduced water quality;
- construction, operation and decommissioning activities can increase risk of pollution spills and leaks, which can result in reduced water quality;
- increased abstractions can reduce water levels and therefore modify surface and groundwater flow; and
- construction activities and associated land take can result in modified surface and groundwater flow.

Enabling the development of new electricity network infrastructure is not likely to have any effects beyond those identified generically in AoS-1. As noted in the assessment summary for soil and geology, the laying of underground cables can result in the disturbance and/or loss of significant amounts of soil, which can lead to changes in permeability, ground and surface water flow. As a result, the effect of laying underground cables on the water environment is likely to be more significant than that for overhead lines or sub-stations.

Negative effects on the water environment can be reduced through careful planning and design. Adherence to good pollution control practice and the efficient use of water can minimise negative effects on water quality and resources. EN-1 identifies that applicants will be required to undertake an assessment of impacts of the proposed project on water quality, water resources and physical characteristics of the water environment as part of the Environmental Statement. The IPC is required to consider whether appropriate conditions should be attached to any new development consent or planning obligations entered into to mitigate negative effects on the water environment. EN-1 states that the IPC will generally need to give impacts on the water environment more

weight where a project would have an impact on the achievement of the environmental objectives established under the WFD. The level of mitigation required will be dependent on the sensitivity of the receiving water environment.

3.6.1. Summary

There are a number of generic effects on the water environment that are applicable to all energy infrastructure development, including electricity networks infrastructure. The significance of the effects and effectiveness of mitigation depends on the location of development and will need to be evaluated during studies for project level EIAs. The mitigation measures outlined in EN-1 with regard to water quality and resources, including the requirement for an assessment of the impacts of new development on the water environment, should help to minimise negative effects on the water environment. Taking mitigation measures into account it is considered that enabling the development of new electricity networks infrastructure will have no overall effect on the water environment in the short, medium and long term.

3.7. Traffic and Transport

AoS Objective	Assessment (by timescale)		
	S	M	L
7. Traffic and Transport: To minimise the detrimental impacts of travel and transport on communities and the environment, whilst maximising positive effects.	0	0	0

As detailed in AoS-1, through the transport of materials, goods and personnel, energy infrastructure projects can have significant effects on traffic and transport networks, with the effects more pronounced during the construction stage. Identified effects include:

- disruption to road and public transport services; cycleways and footpaths, especially during construction;
- increased traffic leading to congestion and increased journey times;
- increased noise and atmospheric emissions from road transport;
- impacts on aviation through interfering with the operation of radars and radio signals; and
- potential positive effects through new road facilities and transport links, upgrading of existing roads, enhanced public transport.

These effects are likely to also apply to EN-5, particularly during the construction of overhead and underground lines, which may cause temporary disruption of major roads or railways during construction. The construction phases for underground cables can be up to five times longer than for overhead lines, increasing this temporary disruption period.[4] Both underground and overhead lines require the construction of access tracks and haul roads during construction and there will be an ongoing requirement for operational access that may have some minor, localised impacts on transport in the medium to long term. The transport of large infrastructure components (for example pylons) may also have negative short term effects on the existing transport infrastructure. These effects may be enhanced for rural areas, where road closures and diversions can involve significant increases to journey times and HGVs can cause congestion and road safety issues.

These construction effects can usually be mitigated through employing appropriate traffic management measures, including avoiding the transport of materials and machinery during peak times. Underground lines may also have the effect of restricting the development of new transport infrastructure; therefore, consultation with transport bodies is important during the planning stage. EN-5 also noted that power frequency Electric Magnetic Fields (EMFs) arise from the transmission of electricity and the potential impacts on military and civilian aircraft should be taken into account in siting decisions.

As for all energy infrastructure projects, any proposals for development of electricity lines should include consideration of the effects on traffic and transport during the production of an Environmental Statement.

3.7.1. Summary

The negative effects of electricity networks infrastructure on transport and traffic are generally limited to the construction period, and can be mitigated through appropriate design, planning (for example traffic management plans) and consultation with affected stakeholders. A similar effect on traffic and transport would occur if a network were decommissioned.

Through facilitating electricity networks, EN-5 may therefore have negative effects in the short term, however such effects are considered to be local and not strategically significant to the AoS.

[4] May 2008 Ecofys Germany GmbH, University of Duisburg-Essen, Golder Associates Ireland. Study on the Comparative merits of Overhead Electricity Transmission Lines Versus Underground Cables.

3.8. Noise

AoS Objective	Assessment (by timescale)		
	S	M	L
8. Noise: To protect both human and ecological receptors from disturbing levels of noise.	0	0	0

AoS-1 identifies the potential for the following generic impacts on noise from energy infrastructure projects:

- noise generated as a result of construction activities (for example, from large construction equipment/ machinery);
- operational noise (for example, from the operation of turbines);
- noise generated as a result of decommissioning (for example, from demolition of structures); and
- noise generated as a result of supporting or ancillary services (for example, from increased traffic movements).

High voltage transmission lines have the potential to generate noise under certain conditions. The highest noise levels generated by a line generally occur during rain - water droplets collect on the surface of the conductor and initiate corona discharges with noise levels being dependent on the level of rainfall. Audible noise effects can also arise from substation equipment such as transformers, quadrature boosters and mechanically switched capacitors. Transmission line audible noise is generally categorised as ‘crackle’ or ‘hum’, according to its tonal content. This has the potential for minor negative effects on health and well-being and ecology, depending on the proximity of residential areas and sensitive ecological receptors.

EN-1 sets out generic effects, guidance and requirements in relation to noise. The decision-maker must be satisfied that a proposal will avoid significant negative effects on health and quality of life from noise and will mitigate and minimise other negative impacts on health and quality of life from noise. The applicant is also required to, where possible, contribute to improvements to health and quality of life by effective management and control of noise. EN-5 outlines mitigation measures that seek to minimise the potential for increased noise. These include the sensitive positioning of lines; ensuring conductor arrangements are appropriately sized; ensuring conductors are kept clean and free of surface contaminants and avoiding damage to overhead line conductors during manufacture and transportation.

3.8.1. Summary

Enabling the development of new electricity infrastructure has the potential for minor negative effects on the noise AoS objective due to noise generated by high voltage transmission lines and substation equipment. The general mitigation measures outlined in EN-1 and the technology-specific mitigation identified in EN-5, such as the sensitive positioning of lines, should help to minimise negative effects on noise. Taking mitigation measures into account it is considered that enabling the development of new electricity networks infrastructure will have no overall effect on noise levels in the short, medium and long term.

3.9. Landscape, Townscape and Visual

AoS Objective	Assessment (by timescale)		
	S	M	L
9. Landscape, Townscape and Visual: To protect and enhance landscape quality, townscape quality and to enhance visual amenity.	--?	--?	--?

AoS-1 notes that the landscape and visual effects of energy projects vary in accordance with the type of development, its location and the landscape setting of the proposed development:

- negative effects can occur through construction and operation and can be temporary (for example from construction of temporary access tracks) or permanent. Effects can occur in designated landscape areas (of local or national importance) and in non-designated areas, including towns and can include negative effects on views, visual amenity and on local amenity (for example from light pollution).

Effects arising from electricity networks infrastructure include negative landscape and visual impacts from above ground electricity lines, towers and poles; negative effects from new substations, and other above ground installations. These effects occur during construction for overhead lines (short-term) and with ongoing effects during operation (medium-term). These effects may be reversed in the long term if the infrastructure is decommissioned. For underground lines, negative effects are likely during construction and are therefore short-term.

It is likely that the need to connect sources of supply in remote or otherwise rural areas (notably wind farms) will result in a need for many new transmission and distribution lines to cross open country. The magnitude of the effects noted above in this and other

contexts is dependent on the sensitivity of the receiving environment, for example, the effects caused by development in AONBs or National Parks are likely to be considered more strategically significant than effects on a non-designated agricultural area. The development of overhead transmission systems in particular (which unlike overhead lines of 132kV and below generally require to be supported on steel towers) adds an industrial element to the landscape. Natural, unspoilt environments and landscape have been identified as primary drivers of tourism.[5] In areas where employment and the economy relies on tourism from the natural environment and its scenery, there is a concern that negative impacts may occur that are considered to be of local and wider, regional significance. Overhead towers may also impact on scenic waterways and cumulative landscape and townscape effects can occur where new overhead lines are required alongside energy infrastructure and related developments, such as substations. This is recognised in EN-5.

The existing planning regime for electricity networks infrastructure includes requirements under EIA regulations for assessment of visual impacts and use of the Guidelines for the Routeing of new overhead lines (The Holford Rules), which tend towards mitigation of adverse visual impacts. EN-5 also proposes that applicants will be expected to consider network reinforcement options, the suitability of design and support infrastructure and appropriate corridor/detailed route alignment. The IPC can also impose conditions that will further mitigate negative effects of smaller infrastructure, including landscaping and screening.

One way of mitigating adverse visual effects of electricity networks is through undergrounding new infrastructure; EN 5 allows the IPC to consider this on a case-by-case basis, but states that the IPC needs to be satisfied that the extra economic, social and environmental costs of undergrounding are justified. Further discussion on the effect of undergrounding on ecology is provided in the appraisal of AoS Objective 2: Ecology (flora and fauna).

3.9.1. Summary

Through facilitating the expansion of the electricity grid, EN1 has the potential for increased strategic negative visual effects on landscape and townscape across England and Wales. The NPS (particularly EN-1 and EN-5) includes robust mitigations which will help to minimise negative effects. However, even if some undergrounding takes place on a case by case basis, and/or overhead line routes otherwise avoid nationally designated landscapes, the development of transmission networks is likely to have negative effects for landscape, potentially including significant direct impacts on the tourist economy at local and regional scales and therefore the overall effect is likely to be major negative in the short, medium and longer term.

[5] [5] May 2008 Ecofys Germany GmbH, University of Duisburg-Essen, Golder Associates Ireland. Study on the Comparative merits of Overhead Electricity Transmission Lines Versus Underground Cables.

3.10. Archaeology and Cultural Heritage

AoS Objective	Assessment (by timescale)		
	S	M	L
10. Archaeology and Cultural Heritage: Protect and where appropriate enhance the historic environment including heritage resources, historic buildings and archaeological features.	0?	0?	0?

AoS-1 describes the effects of the NPSs for energy infrastructure on Archaeology and Cultural Heritage as including:

- disturbance or loss of heritage assets[6] as a result of ground works or excavation; and
- impacts on the setting of nearby heritage assets.

The potential effect of energy infrastructure on archaeology and cultural heritage is dependent on the location of the development and the importance of the area affected. Overhead and underground lines are linear in nature and can cover significant distances; therefore they have the potential to cause negative effects on archaeology and cultural heritage over a large area. These effects can be direct, for example if the route of a proposed development passes through a designated area, or indirect, via effects to the setting of heritage assets or conservation areas.

As noted in the assessment summary for soil and geology, the laying of underground cables can result in significant disturbance to soil, during and after the construction phase. As a result, the effect of laying underground cables on archaeology is likely to be more significant than that for overhead lines.

The significance of these effects will depend on the importance of the archaeological and cultural heritage features, their location and setting relative to electricity networks infrastructure.

EN-1 ensures that sufficient weighting is given to designated sites and to elements of setting that enhance the significance of designated heritage assets and non-designated archaeological assets. EN-1 also gives due regard to the highest level of protection (World Heritage Sites) and advises that the IPC should not accept material harm to or removal of significance in relation to a heritage asset, unless it can be demonstrated that the harm is outweighed by the wider social, economic and environmental benefits of the proposed development. Furthermore, the IPC may request applicants to

[6] Those elements of the historic environment – buildings, monuments, sites or landscapes – that have significance due to their historic, archaeological, architectural or artistic interests are called 'heritage assets'.

undertake desk and field based assessment prior to application as part of an Environmental Impact Assessment and, where consent is given, to maximise opportunities to advance the understanding of the historic assets. During the planning stage an assessment of impacts would identify sites of significant importance and provide the opportunity to avoid or divert potential sites or routes.

3.10.1. Summary

No technologically specific effects on archaeology have been identified in relation to electricity networks infrastructure although it is recognised that overhead and underground lines have the potential to affect archaeological and cultural designations over a large spatial area, given their linear nature and potential for significant route distance.

The mitigation measures outlined in EN-1 with regard to the historic environment, for example the requirement for proposed developments to take account of the setting of heritage assets and how it contributes to its significance, should help to minimise adverse effects on archaeology and cultural heritage. Taking the mitigation measures into account it is considered that enabling the development of new electricity networks infrastructure will have no overall effect on archaeology and cultural heritage in the short, medium or long term.

3.11. Air Quality

AoS Objective	Assessment (by timescale)		
	S	M	L
11. Air Quality: To protect and enhance air quality on local, regional, national and international scale.	0	0	0

As detailed in AoS-1, energy infrastructure projects can have significant negative effects on air quality during construction, operation and decommissioning. These include:

- emissions generated as a result of construction activities (transport emissions from the transport of materials, resources and personnel; dust and fumes from machinery operation, excavation and drilling);
- emissions from project operation (operation of plant, transport of materials, resources and personnel);
- emission from plant, machinery and vehicles during the decommissioning of projects (including transport to and from site).

Enabling the development of new electricity network infrastructure is not likely to have any further effects, although it is noted that negative effects are generally minor and restricted to construction, with no significant operational effects. The significance of construction effects will depend upon local site specific factors, including transport routes and proximity to residential areas and these can be addressed in the project level EIA.

EN-1 identifies that applicants will be required to undertake an assessment of impacts of the proposed project on air quality as part of the Environmental Statement. The IPC will consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the project application. The measures outlined for transport and traffic impacts in EN-1 will also help to mitigate the effects of air emissions from transport.

3.11.1. Summary

Localised negative effects on air quality as a result of electricity networks infrastructure are likely in the short term as a result of air emissions generated during construction. Taking mitigation measures into account it is considered that enabling the development of new electricity networks infrastructure will have no overall effect on air quality in the short, medium or long term.

3.12. Soil and Geology

AoS Objective	Assessment (by timescale)		
	S	M	L
12. Soil and Geology: To promote the use of brownfield land and where this is not possible to prioritise the protection of geologically important sites and agriculturally important land.	0?	0?	0?

AoS-1 identifies the potential for a number of generic effects on soil and geology which are applicable across the different types of energy infrastructure development. They include:

- disturbance or loss of soils and geologically important sites; and
- increased risk of pollution and potential contamination of soils.

Overhead and underground electricity lines have the potential to affect soil and geology over a large area, due to their linear nature and the significant distances covered. Due to the larger excavation footprint required, the undergrounding of lines has a greater potential for negative effects on soils and geology, both during construction and in the

longer term when maintenance and repair may be necessary. For example, to match overhead line performance for a 400kV double circuit as many as twelve separate cables in four separate trenches may be required, resulting in a cable swathe of up to 40 metres. As a consequence, the volume of spoil excavated for an underground cable where two cables per phase are installed can be some 14 times more than for an equivalent overhead line route[7]. The level of soil removal can also negatively impact drainage patterns, as discussed in relation to the AoS Flood Risk objective.

Medium and longer term impacts on soil from overhead transmission lines are less significant, and maintenance and repair activities, whilst more frequent, are typically less disruptive both of supply and of other activities going on in their surroundings than those necessary for underground cables.

EN-1 directs the IPC to expect the applicant to have included appropriate mitigation measures as an integral part of the proposed development. The IPC is also directed to take account of the effects that proposed energy infrastructure may have on existing, adjacent and proposed land uses, including effects on the agricultural quality of soils and on the planning significance of any affected development. EN-1 also states that the environmental statement for the infrastructure project should set out the effects on international, national and locally designated sites of geological conservation and show how the project has taken advantage of opportunities to conserve and enhance geological conservation interests.

As with any major construction project, there is an increased risk of pollution and potential contamination of soils but this will be dealt with by the appropriate environmental management controls through the EIA process.

3.12.1. Summary

No technologically specific effects have been identified in relation to electricity networks infrastructure although it is recognised that overhead power lines have the potential to affect soil and geology over a large spatial area, given their linear nature and the long distances covered. The undergrounding of transmission lines has the potential for a more significant negative effect on soil and geology than for overhead lines, due to the requirement to excavate large trenches and the maintenance and repair activities that may be necessary during the infrastructure lifecycle. Mitigation measures outlined in EN-1 with regard to geological conservation will help to minimise any negative effects. Taking mitigation measures into account it is assessed that the effect of enabling the development of new electricity networks infrastructure on soil and geology will be neutral and uncertain in the short, medium and long term.

[7] National Grid (2009) Undergrounding high voltage electricity transmission: The technical issues.

3.13. Health and Well-Being

AoS Objective	Assessment (by timescale)		
	S	M	L
13. Health and Well-Being: To protect and enhance the physical and mental health of the population.	0	0	0

AoS-1 identifies the potential for the following positive effects on health and wellbeing from energy infrastructure projects:

- significant positive effects from an increase in employment opportunities and enhanced economy; and
- significant positive effects from enhanced energy security and affordability, particularly a reduction in fuel poverty.

However, potential significant negative effects on human health and wellbeing were also identified, with these effects more significant during the construction period:

- disruption and annoyance effects due to noise and vibration;
- effects on health from odour, dust and air pollution;
- effects on health and wellbeing from artificial light; smoke; steam; or insect infestation; and
- effects from loss of amenity, open space, access and recreational areas.

EN-5 will contribute towards the positive indirect health effects resulting from an enhanced economy, employment and a secure and affordable energy supply that are predicted in AOS-1.

Specific negative effects on human health and wellbeing relating to electricity lines are to do with noise and community concern about electric and magnetic fields (EMFs). Noise related effects are discussed under AoS Objective 8: Noise.

EMFs are produced by overhead power lines and these can have direct and indirect effects on health, including impacts on the central nervous system and production of microshocks. There is also a history of concern around the negative health effects of human exposure to EMFs, which can potentially lead to anxiety for some members of the population. However, as discussed in EN-5, the balance of scientific evidence over several decades of research has not proven a causal link between EMFs and cancer or any other disease.

EN-5 notes the existing regulatory environment for guidelines for the exposure of humans to EMFs. The International Commission on non-ionizing radiation (ICNIRP) guidelines are voluntarily complied with by electricity companies and EN-5 states that the IPC should expect to see evidence of this compliance in applications. It also states that the IPC should refuse consent if an applicant cannot demonstrate that the line will be compliant with the Electricity Safety, Quality and Continuity Regulations 2002 and that the ICNIRP basic restriction for public exposure will not be reached for residential accommodation.

3.13.1. Summary

The positive effects on health of EN-5 are similar to the other NPSs, and this effect is dealt with in detail in the appraisal of EN-1. Potential negative effects of electricity networks infrastructure include effects on human health from Electro Magnetic Fields; however mitigations are provided in EN-5, including requiring the application of voluntary international guidelines on non-ionizing radiation (ICNIRP). Other potential effects on health relating to dust, noise and congestion are dealt with in the air pollution, noise and traffic sections of the AoS respectively. The overall effect of EN-5 on health and wellbeing is considered to be neutral at this strategic level of appraisal, but may be a consideration for project-level assessment, especially for proposals in urban areas.

3.14. Equality

AoS Objective	Assessment (by timescale)		
	S	M	L
14. Equality: To encourage equality and sustainable communities.	0	0	0

AoS -1 notes that the Energy NPSs will have the following effects on Equality:

- positive effects through ensuring energy security and affordability, with benefits for all socio-economic groups, but particularly for those on low incomes and hence susceptible to fuel poverty; and
- indirect positive effects due to the enhanced economic benefits and increased employment and skills opportunities likely to be created as a result of the energy NPSs.

EN-5, through providing more certainty and helping to facilitate the transmission and distribution networks required to meet UK energy needs, will further contribute to energy

security and affordability, with positive effects for all socio-economic groups, including those suffering from fuel poverty.

Opportunities for good design and enhanced open space should be considered by the IPC and applicants as means of enhancing community benefits from networks infrastructure.

3.14.1. Summary

Through providing more certainty and helping to facilitate the electricity network infrastructure required to meet UK energy needs, EN-5 will further contribute to energy security and affordability, with positive effects for all socio-economic groups, especially low-income groups susceptible to fuel poverty. In itself this is not considered to be a significant effect, however when considered together with the other Energy NPSs and the enhanced employment opportunities likely to occur from the suite of NPSs this will have positive cumulative effects for equality.

3.15. Cumulative Effects

Cumulative effects have been considered during the AoS-5 appraisal, and noted where relevant under each topic. The following summarises the cumulative effects identified for EN-5:

- **Climate change effects:** Through helping to facilitate the delivery of low carbon energy, EN-5 will contribute to the UK meeting its renewables targets and minimising greenhouse gas emissions.

- **Economic effects**: EN-5 is likely to contribute cumulatively to the overall positive effect of the Energy NPS documents for the UK Economy through ensuring a secure supply of energy required by industry and business and in supporting the transition to a low carbon economy.

- **Landscape, townscape and visual effects:** Negative cumulative landscape and townscape effects, including for tourist-dependent economies, can occur where new overhead lines are required alongside energy infrastructure, such as generating stations and related developments, such as substations. This is considered in AoS-1.

- **Equality effects:** EN-5 will contribute cumulatively to energy security and affordability, with positive effects for all socio-economic groups, especially low-income groups susceptible to fuel poverty.

3.16. Summary of Key Findings of Appraisal

Generally, electricity networks infrastructure development has similar effects to other types of energy infrastructure, although due to the linear nature of electricity lines, effects are often more dispersed and spread across a wider area; therefore, for the majority of the AoS objectives, the strategic effects of EN-5 are considered to be neutral.

However, through facilitating and enabling the electricity networks infrastructure necessary to support the transition to a low carbon economy and ensure security of supply, EN-5 is considered likely to have significant positive effects on the economy and skills AoS objective in the short-term.

Effects on ecology are uncertain at this level of appraisal, as they are dependent on the sensitivity of the environment and the location and design of infrastructure, however it is noted that EN-1 and EN-5 include extensive mitigations to ensure these effects are considered by applicants and the IPC when preparing and determining applications.

Significant negative effects were identified for the short, medium and long-term for the landscape, townscape and visual AoS objective due to the prominent visual nature of the electricity networks infrastructure that EN-5 will facilitate. In areas where employment and the economy relies on tourism from the natural environment and its scenery, negative impacts may be considered to be of local and wider, regional significance. The NPS (particularly EN-1 and EN-5) includes robust mitigations and considerations for the IPC which will help to minimise negative effects on landscape, however the residual effect remains significant.

A summary of the likely significant effects arising specifically from networks development is set out in the following table 2.1:

Table 2.1: Summary of Key AoS Findings Specific to Electricity Networks

AoS Objective	Assessment of effects (by timescale)		
	S	M	L
1. Climate Change	0	+?	+?
2. Ecology (Flora and Fauna)	-?	0	0
3. Resources and Raw Materials	0	0	?
4. Economy and Skills	+	0	0
5. Flood Risk and Coastal Change	0	0	0
6. Water Quality	0	0	0
7. Traffic and Transport:	0	0	0
8. Noise	0	0	0

9. Landscape, Townscape and Visual	--?	--?	--?
10. Archaeology and Cultural Heritage	0?	0?	0?
11. Air Quality	0	0	0
12. Soil and Geology	0?	0?	0?
13. Health and Well-Being	0	0	0
14. Equality	0	0	0

4. Monitoring and Next Steps

4.1. Monitoring

Monitoring should be focussed upon likely significant effects that may give rise to irreversible damage, with a view to identifying trends before such damage is caused and likely significant effects where there was uncertainty in the AoS such that monitoring would enable preventative or mitigation measures to be undertaken.

A draft Monitoring Strategy for the Energy NPSs and AoSs will be published alongside the main consultation documents. The Government will further develop the monitoring strategy during the re-consultation period to take into account responses received on the revised draft NPSs and AoSs. The Strategy sets out the proposed indicators for monitoring together with agreed responsibilities and frequencies of monitoring during the implementation of the NPSs. This will be summarised in the Post- Adoption Statement that will be published with the designated NPSs.

4.2. Quality Assurance Checklist

The Government's guidance on SEA contains a quality assurance checklist to help ensure that the requirements of the SEA Directive are met. This has been completed and is presented in Annex A.

4.3. Next Steps

The revised draft energy NPSs and AoS Reports will be available for re-consultation for a period of 14 weeks from 18 October 2010. The documents are available at www.energynpsconsultation.decc.gov.uk and details of how to comment are set out in the Consultation Document.

5. Annex A: Quality Assurance Checklist

The Government's Guidance on SEA[8] contains a quality assurance checklist to help ensure that the requirements of the SEA Directive are met. Those relevant to this stage have been highlighted below.

Quality Assurance Checklist	
Objectives and Context	
The plan's purpose and objectives are made clear.	**Section 1** of this AoS Report and **Section 2** of the AoS Report for EN-1.
Sustainability issues, including international and EC objectives, are considered in developing objectives and targets.	International and European objectives and targets are identified in **Annex B** and **Annex F**.
SEA objectives are clearly set out and linked to indicators and targets where appropriate.	**Section 2.4** of the AoS Report for EN-1 presents the AoS objectives and Guide Questions.
Links to other related plans, programmes and policies are identified and explained.	**Annex F** identifies a number of relevant plans and programmes.
Scoping	
The environmental consultation bodies are consulted in appropriate ways and at appropriate times on the content and scope of the Scoping Report.	The consultation on the Scoping Report ran for 5 weeks from the 13th February 2009 to 23rd March 2009. Two scoping workshops were also held during the scoping stage in March 2009 (one in Cardiff and one in London), to which all the consultation bodies were invited.
The SEA focuses on significant issues.	Significant issues were identified in the Scoping Report and were reiterated in **Annex F.**
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	These were stated throughout the **Scoping Report** where appropriate, and are presented in **Section 2.5** and **Section 2.6** of the AoS Report for EN-1.

[8] ODPM, Scottish Executive, Welsh Assembly Government, DoENI (2005) A Practical Guide to the Strategic Environmental Assessment Directive, ODPM, London.

Reasons are given for eliminating issues from further consideration.	These are stated in the **Scoping Report** as appropriate.
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented.	Alternatives were identified in **Section 3** of the AoS Report for EN-1. Technology-specific alternatives are presented in **Section 1.3** and are assessed in **Section 2.2** of this AoS Report.
Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant.	These were considered in **Section 3** of the AoS Report for EN-1.
The environmental effects (both adverse and beneficial) of each alternative are identified and compared.	Refer to **Section 3** in EN-1 for generic alternatives and to **Section 2.2** of this report for technology-specific alternatives.
Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained.	Refer to **Section 2.2** of this report, **Section 3** of the AoS for EN-1 and the review of policies, plans and programmes in **Annex F**.
Reasons are given for selection or elimination of alternatives.	These are presented in **Section 3** of the AoS for EN-1.
Baseline Information	
Relevant aspects of the current state of the environment and their likely evolution without the plan are described.	This is set out in **Annex F**.
Characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan where practical.	Refer to **Annex F**.
Difficulties such as deficiencies in information or methods are explained.	These are stated throughout the report where appropriate.
Prediction and Evaluation of Significant Environmental Effects	
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets,	These are set out in **Annex F** and **Section 3** of this AoS Report.

cultural heritage and landscape) as relevant; other likely environmental effects are also covered as appropriate.	
Both positive and negative effects are considered, and the duration of effects (short, medium, or long tem) is addressed.	This is covered in the appraisal in **Section 3** of this AoS Report and in **Annex F.**
Likely secondary, cumulative and synergistic effects are identified where practicable.	Refer to **Section 3.15** of this AoS Report and **Section 4.16** of the AoS report for EN-1.
Inter-relationships between effects are considered where practicable.	Refer to **Section 3** of this AoS Report.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations and thresholds.	These are considered in the appraisal in **Annex F.**
Methods used to evaluate the effects are described.	These are described in **Section 4** of the AoS Report of EN-1.
Mitigation Measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated.	This is presented in **Section 3** of this report and **Section 4** of the AoS of EN-1.
Issues to be taken into account in project consents are identified.	These are considered in **Section 3**.
Environmental Report	
Is clear and concise in its layout and presentation.	The layout of the AoS Report is set out in **Section 1**.
Uses simple, clear language and avoids or explains technical terms.	Abbreviations are presented in **Annex A** and technical terms are explained throughout where necessary.
Uses maps and other illustrations where appropriate.	Figures and tables have been used throughout to where appropriate.
Explains the methodology used. Explains who was consulted and what methods of consultation were used.	This is presented in **Section 4** of the AoS Report of EN-1. This is covered in **Section 1.4** of the AoS Report of EN-1.

Identifies sources of information, including expert judgement and matters of opinion.	This is covered in **Section 4**, and **Annex F** of the AoS Report of EN-1.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main options considered, and any changes to the plan resulting from the SEA.	An NTS is provided at the front of the AoS Report.
Consultation	
The SEA is consulted on as an integral part of the plan-making process.	Consultation has already taken place on the Scoping Report in February and March 2009. The AoS Report will be published alongside the draft NPS for consultation.
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate timeframes to express their opinions on the draft plan and Environmental Report.	Stakeholders have been kept engaged throughout the report's preparation and comments have been sought during designated consultation periods and workshops.
Decision-making and Information on the Decision	
The AoS Report (Environmental Report) and the opinions of those consulted are taken into account in finalising and adopting the plan or programme.	This will be included in the Post Adoption Statement (to be issued following consultation).
An explanation is given of how they have been taken into account.	This will be included in the Post Adoption Statement (to be issued following consultation).
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered.	This will be included in the Post Adoption Statement (to be issued following consultation).
Monitoring Measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA.	These are presented in **Section 5** of the AoS Report of EN-1 and in **Section 4.1**.

Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA.	These are presented in **Section 5** of the AoS Report of EN-1 and in **Section 4.1**.
Monitoring enables unforeseen adverse effects to be identified at an early stage (these effects may include predictions which prove to be incorrect).	These are presented in **Section 5** of the AoS Report of EN-1 and in **Section 4.1**.
Proposals are made for action in response to significant adverse effects.	This will be set out in the Post Adoption Statement (to be published following consultation).

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