

Appraisal of Sustainability for the revised draft National Policy Statement for Renewable Energy Infrastructure (EN-3): Non-Technical Summary

Preface

Appraisal of Sustainability for the revised draft National Policy Statement for Renewable Energy Infrastructure

A key objective of Government energy and climate change policy is to ensure the UK has a diverse, safe, secure and affordable energy system that incentivises investment in and deployment of low carbon energy technologies. As regards the nationally significant energy infrastructure with which this document is concerned, that means that the UK needs new power stations, electricity networks and other nationally significant infrastructure if it is to continue to enjoy secure, safe and affordable supplies of energy and drastically reduce the amount of greenhouse gases (particularly carbon dioxide (CO₂)) that it emits.

Building and operating new nationally significant energy infrastructure has a range of environmental, social and economic impacts: some beneficial (such as satisfying demand for electricity and creating jobs), others detrimental (such as construction noise and adverse landscape and visual effects). A new planning regime has been set up to facilitate the rapid development of major energy projects and other important infrastructure which Government believes we need while at the same time ensuring that their benefits outweigh their detriments.

This document presents a summary, for non-specialists, of what constructing a new generation of nationally significant energy infrastructure in accordance with the requirements of the new regime is likely to mean for the environment, society and the economy. It is set out as follows:

- Part 1 (Introduction) sets out relevant legal, factual and policy background;
- Part 2 (Assessment of Alternatives) shows how the proposed policies of the new regime compare against other combinations of policies which could be used to support the delivery of secure, safe and affordable supplies of increasingly low-carbon energy;
- Part 3 (Summary of Appraisal) summarises the likely effect of development taking place in accordance with the policies of the new regime in terms of various environmental, social and economic impacts; and
- Part 4 (Next steps) outlines the process of monitoring the actual effects of the new regime.

This document is about the revised draft Overarching Energy National Policy Statement (NPS) and the Appraisal of Sustainability for it, which are subject to public consultation for 14 weeks from 18th October 2010. For more information on this consultation and how you may give us your views please see:

Consultation Document (www.energynpsconsultation.decc.gov.uk).

Further details are included below in Part 4

Contents

Introduction	1
The Planning Act 2008 and National Policy Statements	1
Need for new energy infrastructure	2
Appraisals of Sustainability	4
Assessment of Alternatives	6
Summary of Appraisal	9
Findings for individual sustainability topics	9
Climate Change	10
Ecology (Flora and Fauna)	11
Resources and Raw Materials	12
Economy and Skills	13
Flood Risk	14
Water Quality	14
Traffic and Transport	15
Noise	16
Landscape, Townscape and Visual	16
Archaeology and Cultural Heritage	17
Air Quality	18
Soil and Geology	18
Health and Well-being	19
Equality	19
Cumulative Effects	20
Overall findings and conclusions	21
Next Steps	24
Consultation	24
The monitoring process	24

Introduction

The Planning Act 2008 and National Policy Statements

- 1.1 The Planning Act 2008 changed the way in which a number of different categories of nationally important planning decisions, including those relating to nationally significant energy infrastructure, are made in England and Wales.
- 1.2 At the heart of the new regime, National Policy Statements (NPSs) produced by Government will provide a blueprint for decision-making on individual applications for development consent by those wishing to build new infrastructure. The Department of Energy and Climate Change (DECC) is responsible for preparing the NPSs relating to energy projects. These are:
 - Overarching NPS for Energy (EN-1, setting out the need for new infrastructure and dealing with a range of issues common to more than one type of nationally significant energy infrastructure);
 - Fossil Fuel Electricity Generating Infrastructure (EN-2, covering power stations with a capacity of more than 50MW, fuelled by coal or gas);
 - Renewable Energy Infrastructure (EN-3, covering onshore wind farms and power stations fuelled by waste or biomass with a capacity of more than 50MW, and offshore wind farms with a capacity of more than 100MW);
 - Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4, covering nationally significant gas storage projects, gas and oil pipelines, and facilities for handling liquefied natural gas);
 - Electricity Network Infrastructure (EN-5, covering overhead electricity transmission and distribution lines with a voltage of 132kV or more); and
 - Nuclear Power Generation (EN-6, covering nuclear power stations).
- 1.3 Before the NPSs can be designated, they must be the subject of public consultation, including the publication of an Appraisal of Sustainability (AoS). The NPSs are plans for granting development consent to proposals to develop new energy infrastructure on a case by case basis, but in accordance with certain general principles which should be applied in all cases. The AoSs are evaluations of the effects of the environmental and other effects of such plans in so far as these can be assessed given that the NPSs indicate how applications will be dealt with, but not what applications will come forward, or (except in the case of EN-6) which sites they will relate to which Government is required to carry out under both UK and EU law (the Planning Act 2008 and the Strategic Environmental Assessment (SEA) Directive (2001/42/EC)).

- 1.4 The energy NPSs were first published for consultation in November 2009. That consultation closed in February 2010. As a result of comments received in response to it, a number of which were critical of the approach taken in the AoSs produced for them, changes have been made to the draft NPSs and the draft AoSs. The changes to the AoSs are quite radical in some respects. Revised versions of both the NPSs and the AoSs are now being consulted on again (for 14 weeks from 18th October 2010), with a view to their being finally "designated" (i.e. coming into effect) following approval by Parliament in 2011.
- 1.5 EN-2 to EN-6 are known as the "technology-specific" NPSs. They set out policies and background which are relevant only to decision-making on the particular types of infrastructure to which they relate. EN-1 sets out matters of relevance to more than one type (if not all types) of nationally significant energy infrastructure. Each application will need to be considered in the light of both EN-1 and any relevant technology-specific NPS, which need to be read together. Similarly, the AoS for EN-1 (AoS-1) considers the impacts of approving the construction of all the required types of new nationally significant energy infrastructure, while the AoSs for EN-2 to EN-6 focus on impacts and policies specific to the specific technologies with which they are concerned.

Need for new energy infrastructure

- 1.6 Government believes that the need for new nationally significant energy infrastructure is so acute, for a variety of reasons, that it will not be necessary to consider in detail whether there is a demonstrable need for each individual proposed development. One of the purposes of EN-1 is to establish this "need case", which may be summarised as follows.
- 1.7 To meet its energy and climate change policy goals, the UK needs a new generation of energy infrastructure which will facilitate the supply of secure, safe and affordable energy generated to an increasing extent from low carbon sources (such as wind farms, nuclear power stations, and fossil fuel generating plant fitted with carbon capture and storage equipment this last technology has yet to be demonstrated successfully at commercial scale) rather than on conventional coal- and gas-fired power stations (although the latter will continue to play a part for some time in support of the transition to a low carbon energy system).
- 1.8 Government policy takes as its starting point the principle that a market-based system is the most cost effective and efficient way of providing energy supply and that investment is best made by the private sector. The private sector bases decisions on investment on anticipated profitability. To ensure that investments in new nationally significant infrastructure support the objectives of reducing carbon emissions and so help to combat climate change, the Government seeks to provide incentives to the market to promote the development of more sustainable energy generation methods. While the policies in the NPSs are also designed to support the development of secure, safe, affordable and low carbon energy infrastructure, Government has

- decided not to set quotas or targets for each different technology type in the NPSs as it believes that, provided its other policies have put the right incentives in place, the NPSs will provide an appropriate framework for ensuring that the kinds of developments we need are consented in sufficient quantities to satisfy demand, while ensuring that they do not have unacceptable adverse effects.
- 1.9 As well as addressing more immediate needs, policies put in place now will result in the building of infrastructure which will in many cases still be in operation in 2050 and which in all cases will have some influence on whether we achieve the greenhouse gas reductions we are aiming to achieve by that date. But with such long time horizons come many uncertainties such as the future price of fuel, the price which operators will pay to emit greenhouse gases under the EU Emissions Trading Scheme, and the pace at which new technologies will evolve and be deployed. As a result our analysis shows that there are many different possible ways to achieve our energy and climate change policy objectives in relation to nationally significant energy infrastructure, but that it is impossible at this stage to identify a single "best" way to do so. The NPSs therefore aim to facilitate sensible levels of development of all the technologies which are currently being deployed at the relevant scale and may form part of a successful future energy infrastructure mix, rather than attempting to match a particular view of what the future should look like, based on imperfect information.
- 1.10 1.91.10 The NPSs sit alongside and draw on a very substantial body of existing legislation and policy (detailed in Annex B to AoS-1), much of it deriving from EU or internationally agreed rules and principles, all of which have a bearing on planning consents generally, or specific aspects of infrastructure consenting, such as ensuring that proper protection is given to conservation interests, while still permitting much needed development to go ahead. At least parts of England and Wales have been industrialised to a significant extent for over 200 years and are relatively densely populated. At the same time, considerable legislative, administrative and voluntary effort has gone into attempting to remedy the consequences of high levels of development, often (historically at least) not carried out in a particular sustainable way, with the Government participating in EU programmes such as the designation of protected "Natura 2000" sites, as well as adopting various national measures designed to protect the environment. (For information on the resulting "baseline" condition of the environment to which the NPSs will apply, see Annex F to AoS-1.) A particular challenge facing the development of the large quantities of new large-scale energy infrastructure which the Government has determined need to be constructed is that much of it will, for one reason or another, need to be located in areas which have hitherto seen relatively little large scale development of any kind and/or enjoy some kind of protective designation. In some cases, the need to take account of the increased risk of floods which comes with climate change (and which arises particularly in areas where some types of energy infrastructure may be located) provides an additional challenge.

Appraisals of Sustainability

- 1.11 As part of the planning process, each application for development consent for nationally significant energy infrastructure will be subject to detailed analysis of its environmental impacts. The AoS process does not substitute the need for that analysis. This AoS has two primary functions.
 - EU law requires, in the Strategic Environmental Assessment Directive (2001/42/EC), that before a plan or programme which establishes the framework for development consent is adopted, it should be subject to consultation alongside an environmental report which identifies, describes and evaluates the significant effects which its implementation is likely to have on the environment. Amongst other things, the NPSs are a plan or programme for the purposes of the Directive, and so the AoSs fulfil the function of an environmental report under the Directive.
 - The Planning Act requires that NPSs must be the subject of an appraisal of sustainability before they are designated. The scope of such an appraisal is similar to that of an environmental report under the SEA Directive, but with more emphasis on social and economic impacts, and informed overall with the principles of sustainable development (often summarised as ensuring that development meets the needs of the present without compromising the ability of future generations to meet their own needs).
- 1.12 By requiring the AoS to be produced alongside the NPSs while they are still in draft form, the Directive and Act aim to ensure that consultees are able to review and comment on the NPSs with a sense of what it would mean in environmental and other terms for a new generation of large-scale energy infrastructure to be built in accordance with decisions made on Planning Act applications for development consent which were decided on the basis of the energy NPSs.
- 1.13 This AoS report for EN-3 is organised as follows:

Table 1 – Layout of the Appraisal of Sustainability report on Renewable Energy Infrastructure

Introduction

An Introduction to AoS and a summary of the content and policies of EN-3.

Appraisal Findings

Identifies, develops and assesses strategic alternatives to the NPS and comparison of the significant sustainability effects of the strategic alternatives.

The findings of the appraisal of the likely significant effects of the NPS Policies. Potential ways of mitigating adverse effects are presented.

Monitoring and Next Steps

Proposals for monitoring the actual impacts of implementing the NPSs.

1.14 Just as individual applications will have to be assessed in accordance with EN-1 as well as any relevant technology-specific NPS, so the Revised Draft AoS for Renewable

Energy Infrastructure, AoS-3, must be read in conjunction with the Overarching AoS report, AoS-1. The Overarching AoS includes general background material and a discussion of the methodology of the AoSs, as well as considering the impacts of implementing the suite of energy NPSs as a whole, and a number of possible strategic alternatives to the policies set out in EN-1. The relevant technology-specific AoSs (EN-2 to EN-6) focus on alternatives, issues and recommendations which are additional to those already in the Overarching AoS report.

Assessment of Alternatives

- 2.1 The SEA Directive requires the identification, description and evaluation of the likely significant effects of implementing NPSs (which constitute a "plan or programme" for the purposes of the Directive) and any reasonable alternatives to them. In this context, an alternative is reasonable if it may be expected to achieve the ultimate objectives of the plan it is being compared against. Here, that plan is set out in the NPSs and the objectives are those of using the NPS framework to facilitate the development of a new generation of nationally significant energy infrastructure that will produce secure, safe and affordable supplies of increasingly low carbon energy (recognising that the NPSs are not the only policy tool available to Government to achieve this objective).
- 2.2 The AoS published with the draft EN-3 for public consultation in November 2009 contained an assessment of alternatives. However, following comments received during the original consultation that the range of alternatives considered was too narrow and that other alternatives should have been considered more fully, a decision was taken to reassess the alternatives.
- 2.3 The approach taken in assessing the alternatives to EN-3 for the revised AoS has been a two stage process:
 - Development and initial screening to establish a series of reasonable strategic alternatives to the plan.
 - Assessment of the selected reasonable alternatives against the AoS objectives.
- 2.4 A wide range of strategic alternatives have been considered in the initial screening. Those alternatives that appear capable of fulfilling the objectives of the plan and of representing genuinely strategic-level choices have been tested against the AoS objectives. The strategic alternatives proposed and considered by the appraisal team in the initial screening are discussed in the AoS for EN-1 (AoS-1), together with the reasons for those options not taken forward to the second stage of the alternatives assessment. AoS-1 also details the assessment of the selected reasonable alternatives against the AoS objectives, the methodology used for the assessment of alternatives and the methodology for grouping of these objectives into high-level themes.
- 2.5 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. The AoS for EN-3 (AoS-3) is concerned with the analysis of alternatives to those policies in the NPS suite which are of most direct relevance to renewable energy infrastructure. Although EN-3 contains information on the renewable-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, AoS-3 concentrates on

different approaches to reducing or eliminating the impacts of renewable energy infrastructure which experience shows lead to the highest number of objections, namely (in the case of EN-3) the noise and shadow flicker effects of onshore wind farms and the sustainability or otherwise of fuel used in biomass-fuelled power stations.

- 2.6 The reasonable alternatives for consideration in the AoS for the Renewable Energy Infrastructure NPS are the following:
 - (a) adopting a policy that would be less tolerant of the adverse visual, noise and shadow flicker impacts of onshore wind farms;
 - (b) adopting a policy that would mean consents set more stringent criteria for the fuel for biomass / waste combustion facilities based on sustainability considerations.
- 2.7 The findings of the assessment of alternatives, grouped according to six key sustainable development themes, are summarised in the following table 2. Broadly speaking, the conclusion in relation to alternative (a) was that although it would reduce at a local level the adverse impacts it could also easily result in a reduction in the amount of new wind farm development, which in turn would have a negative impact on security of supply or reduce the positive impacts which wind farm development brings from a climate change point of view, and/or an increase in the negative impacts associated with some of the other technologies which may be deployed to plug the gap that would be left if there was less wind farm development (for example, offshore wind farms are significantly more expensive, increased fossil fuel plant development would increase the risks of high carbon lock-in). In relation to alternative (b), the broad conclusion was that introducing such criteria as part of the consenting framework could result in fewer proposals coming forward, at least in the short term, which could be disadvantageous in security of supply and economic terms. The ultimate extent of any impacts would depend partlyon whether the sustainability criteria to be introduced are stricter than those already referred to in the Renewables Obligation (RO) Order 2009. In general terms, if adherence to such criteria is to be mandatory, it was considered that it would be better to make adherence to the criteria a condition of receiving financial support under the RO as has been proposed by an ongoing Government consultation rather than to use the consenting regime to impose sustainability criteria. This gives greater flexibility for subsequent modification of the criteria should this prove appropriate, and would mean that they are applied to all relevant plants, not just new ones.

Table 2 – Summary of Alternatives Assessment Findings

Headline SD themes	EN-3	No NPS	Alternative (a)	Alternative (b)
Climate Change		-?	0	0
Security of Energy Supply		-?	-	-
Health & Well-Being		0	0	+/-
The Economy		0?	-	-
The Built Environment		0?	0	+?
The Natural Environment		0?	+?	+/-

2.8 Therefore the Government's preferred option is to take forward the policies on renewable energy infrastructure set out in EN-1 and EN-3.

Summary of Appraisal

Findings for individual sustainability topics

3.1 The appraisal of the impacts of implementing EN-3 was undertaken in a topic by topic manner, with the revised draft Renewable Energy Infrastructure NPS tested against a series of "AoS objectives", based on the topics listed in Table 3 (section 2 of AoS-1 explains in more detail what each of these topics covers). Many issues and effects for sustainability are cross-cutting and effects are reported where they are most relevant to avoid duplication of appraisal.

Table 3 – Appraisal of Sustainability topics

Climate Change
Ecology (Flora and Fauna)
Resources and Raw Materials
Economy and Skills
Flood Risk
Water Quality
Traffic and Transport
Noise
Landscape, Townscape and Visual
Archaeology and Cultural Heritage
Air Quality
Soil and Geology
Health and Well Being
Equality

3.2 The likely short, medium and long-term effects of EN-3 on each of these AoS objectives was evaluated and recorded using the following key.

Table 4 – Key to Appraisal Significance of Predicted Effects

Likely Signif	icant I	Effects:
Major Positive	++	Policy would resolve an existing sustainability problem; major effect considered to be of national/international significance
Minor Positive	+	No major sustainability constraints or effects; minor effect considered to be of regional/ national/ international significance
Neutral	0	Neutral effect ie no overall effects or not-applicable
Minor Negative	-	Potential sustainability issues, mitigation possible; effect considered to be of regional/ national/ international significance
Major Negative		Policy would exacerbate known sustainability issues; mitigation difficult and/or expensive; major effect considered to be of national/ international significance
Uncertainty	?	Where the significance of an effect is particularly uncertain, e.g. 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 "?"

- 3.3 Inter-relationships between topics and interactions between different impacts, as well as the overlapping impacts of different projects (so-called "cumulative effects") are also reported where appropriate in each topic. Where significant adverse effects are predicted, possibilities for mitigation are suggested.
- 3.4 For the purposes of the AoS the short term has been defined as the effects arising generally during the infrastructure construction period of between 2-7 years; the medium term as between 5 and 25 years (varying with the characteristics of different technologies); and the long term as beyond 25 years (and including decommissioning where relevant).

Climate Change

Objective: To minimise detrimental effects on the climate from greenhouse gases and ozone depleting substances and maximise resilience to climate change.

AoS Objective 1.		Assessment (by timescale)			
Climate Change	Technology	S	М	L	
	Onshore wind	0	++	++	
	Offshore wind	++	++	++	
	Biomass/ Energy	0			
	from waste	U	+	+	

- 3.5 Through facilitating new development of onshore wind infrastructure, EN-3 is likely to make a positive contribution to meeting low carbon energy targets, with a positive effect on climate change over the medium to long term. The AoS identified that wind farms may be at risk of damage due to increased storm intensities. This led to the inclusion of a requirement in EN-3 that proposals need to set out resilience of wind turbines to storms.
- 3.6 As for onshore wind, the implementation of EN-3 in relation to offshore wind is likely to make a positive contribution to meeting the low carbon energy targets, through facilitating new development of offshore wind infrastructure. This is considered to have a positive effect on climate change over the medium to long term.
- 3.7 Through facilitating new development of biomass/energy from waste infrastructure, EN-3 is likely to make a positive contribution to meeting low carbon energy targets, with a positive effect on climate change over the medium to long term. If biomass is imported, the positive effects on climate change of (temporary) carbon sequestration while biomass grows will not contribute to the UK's targets. As a result of the AoS process, EN-3 was amended to take account of the water demand of waste/biomass combustion facilities in relation to climate change adaption

Ecology (Flora and Fauna)

Objective: To protect and enhance protected habitats, species, valuable ecological networks and ecosystem functionality.

AoS Objective 2. Ecology		Assessment (by timescale)				
(Flora and Fauna)	Technology	S	М	L		
	Onshore wind	?	?	?		
	Offshore wind	?	?	?		
	Biomass/ Energy from waste	?	?	?		

- 3.8 Although disturbance to peat soils is limited to the construction period, the effect is considered to be permanent. Changes to the carbon storage of the soil and its hydrogeological properties are not reversible, and, therefore, the effect on fauna and flora would also be permanent.
- 3.9 Bird and bat mortality are of concern over the operational life of wind farms (25 years). Monitoring is, therefore, required to validate collision risk modelling results and bat mortality estimates and inform other wind farm applications. The significance of the effect on ecology over the short, medium and long-term depends on the location of the development and the sensitivity of the receiving environment and is, therefore, uncertain at this strategic level. Any proposed developments will be subject to environmental impact assessments (EIA) and habitats regulations assessments (HRA).
- 3.10 Through facilitating new offshore wind development, EN-3 could have positive and negative effects on ecology. Negative effects could result from disturbance to birds,

fish and marine mammals, as well as effects on intertidal and sub-tidal habitats. However, changes to fishing practices in the vicinity of wind farms may have positive effects on certain shellfish and fish species. The significance of the effect on ecology over the short, medium and long-term depends on the location of the development and the sensitivity of the receiving environment and is, therefore, uncertain at this strategic stage. Any proposed developments will be subject to EIA and HRA.

3.11 Adoption of EN-3 to facilitate biomass/waste combustion at the large scale could lead to some negative effects on ecology, particularly habitat loss and fragmentation, disturbance to fauna and the ecological effects of emissions to air. The significance of the effect on ecology over the short, medium and long-term depends on the location of the development and the sensitivity of the receiving environment and is, therefore, uncertain at this strategic stage. Any proposed developments will be subject to EIA and HRA.

Resources and Raw Materials

Objective: To promote the sustainable use of resources and natural assets and to deliver secure, clean and affordable energy.

AoS Objective 3. Resources		Assessment (by timescale)					ale)	
and Raw Materials	Technology	S			M		L	
	Onshore wind	0		0		0 0		0
	Offshore wind	0		0 0		0	0	
	Biomass/ Energy		-?		-?	+	-?	
	from waste		- 1		- 1		- :	

- 3.12 Overall, implementing EN-3 is considered to have no effect on resources and raw materials with regard to onshore and offshore wind power. This is because, in the short and medium term, the turbines are manufactured outside the UK and imported. Although the effect of long-term development of a UK manufacturing industry is possible, the effect on raw materials is not considered to be significant.
- 3.13 The implementation of EN-3 could lead to both positive and negative effects on resources and raw materials in the short, medium and long term with regard to biomass/energy from waste plants. However, it is unlikely to have any effects on local and regional waste management plans and strategies if the measures set out in EN-3 are followed. The potential effects on biomass resources arising as a result of adoption of EN-3 are uncertain, as these are likely to be in the long-term and depend on other factors such as the international biomass market and supply-chain. Water demands for biomass/waste combustion facilities may have adverse effects on water resources, especially during drought periods. The significance and magnitude of the impacts that may occur as a result of implementing EN-3 are uncertain (although adverse), since water abstraction is subject to various regulations that would potentially limit the adverse impacts.

3.14 The effects of residue management through the implementation of EN-3 are likely to result in neutral or positive consequences. Combustion reduces the amount of waste to landfill and the recovery of ash products could result in positive consequences. As a result of recommendations from AoS process, EN-3 was amended to take account of the water demand of waste/biomass combustion facilities in relation to climate change adaption. DECC has indicated that EN-3 is also to be further amended to include a section on Water Resources and Water Quality using the equivalent section in EN-2 as a model.

Economy and Skills

Objective: To promote a strong and stable economy with opportunities for all.

AoS Objective 4. Economy		Assessment (by timescale))
and Skills	Technology	S M			L		
	Onshore wind	+? +?			+?		
	Offshore wind	+ - + -		+	-		
	Biomass/ Energy						
	from waste	+ +		_	+		

- 3.15 With regard to onshore wind, positive effects on economy and skills from implementing EN-3 are likely to be greatest in the short-term (construction). Given that more wind farms will be consented over the period of the EN-3 than without an NPS, the effect would also be positive in the medium and long term.
- 3.16 With regard to offshore wind, there are potential effects relating to economy and skills identified in EN-3, which are linked to the commercial fishing industry, which could be positive or negative depending on fishing method. These effects need to be considered at the site-level. Implementation of EN-3 ensures that the importance of shipping routes for international navigation is given consideration and priority. The effects on shipping are therefore considered local. These effects will be over the lifetime of the wind farm (25 years).
- 3.17 The implementation of Biomass and energy from waste, although not specifically identified in EN-3, is likely to have positive effects on the economy and skills, as it enables the development of nationally significant biomass/waste combustion facilities. This is considered to represent a positive effect in the short, medium and long terms.

Flood Risk

Objective: 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.

AoS Objective 5. Flood		Assessment (by timescale)			
Risk	Technology	S	М	L	
	Onshore wind	0	0	0	
	Offshore wind	0	0	0	
	Biomass/ Energy from waste	-?	-	-	

- 3.18 Development of additional onshore wind farms through the implementation of EN-3 is considered to have a neutral effect over the short, medium and long term on flood risk.
- 3.19 Implementation of EN-3, with regards to offshore wind farms is not considered have any strategically significant effect on flood risk, as the effects are likely to be sitespecific.
- 3.20 Flood risk is not specifically considered in EN-3 in relation to biomass/waste combustion facilities. Implementing EN-3 would result in potentially increased flood risk, due to the likely location of these facilities at or near rivers, coasts and estuaries. These effects are considered to be greatest in the medium and long term.

Water Quality

Objective: To protect and enhance surface (including coastal) and groundwater quality (including distribution and flow).

AoS Objective 6. Water		Assessment (by timescale)			
Quality	Technology	S	М	L	
	Onshore wind	0	0	0	
	Offshore wind	-	-	-?	
	Biomass/ Energy		_		
	from waste	-	-	-	

- 3.21 The negative effects of onshore wind farms on water quality are minor and limited to some sediment mobilisation or breakthrough into an aquifer or confining layer during construction and earthworks. The overall effect is therefore considered neutral in the short, medium and long term.
- 3.22 Sediment disturbance is identified as the key effect on water quality that would result through construction of offshore wind farms if EN-3 were implemented. This is considered to be a short to medium term effect, as they relate primarily to construction. In mitigation, EN-3 requires applicants to undertake geotechnical investigations and choose construction methods based on these results. The effects on water quality are likely to be negative, but regional in extent and dependent on where facilities are constructed.

3.23 The effect of adopting EN-3 with regard to biomass and energy from waste plants may result in negative effects on water quality, since EN-3 does not suggest mitigation measures for the impacts of biomass/waste combustion on water quality. The effects could in some measure be limited by good design principles, but the high water demands could still result in negative water quality effects. As a result of recommendations from AoS process, EN-3 was amended to take account of the water demand of waste/biomass combustion facilities in relation to climate change adaption. DECC has indicated that EN-3 is also to be further amended to include a section on Water Resources and Water Quality using the equivalent section in EN-2 as a model.

Traffic and Transport

Objective: To minimise the detrimental impacts of travel and transport on communities and the environment, whilst maximising positive effects.

AoS Objective 7. Traffic		Assessment (by timescale)		
and Transport	Technology	S	М	L
	Onshore wind	-	0	0
	Offshore wind	-	-	0
	Biomass/ Energy			
	from waste	-	-	-

- 3.24 The overall effect of onshore wind turbines in relation to traffic is considered negative in the short term. During construction the disruption may be high due to large vehicles on minor roads and there are potential negative environmental effects, including on climate change and air quality, of increased transportation. In the event that a number of wind farms are located close together, the effect on traffic and other road users will be compounded and therefore would be a severe negative effect in the short term. In the medium and long term, effects are considered neutral as the number of vehicle movements associated with the operation of the wind farms is minor.
- 3.25 The potential consequences of development of offshore wind farms that affect recognised international navigation routes would be a significant negative effect at an international level. However, the safeguard and mitigations set out in EN-3 would enable the development of wind farms with potentially low negative effects. The effects could be regional in the short and medium term. In the long term, it is assumed that new local navigation routes would become accepted.
- 3.26 The overall effect of implementation on traffic and transport of biomass/waste combustion through the implementation of EN-3 is considered negative in the short, medium and long term. These effects are primarily from the movement of fuel and residue during the operational phase of the facility, although some significant, short term, local negative effects may result from the movement of component parts to the facility during construction.

Noise

Objective: To protect both human and ecological receptors from disturbing levels of noise.

AoS Objective 8. Noise		Assessment (by timescale		
	Technology	S	М	L
	Onshore wind	-?	-?	0
	Offshore wind	-?	-?	0
	Biomass/ Energy from waste	-?	-?	-?

- 3.27 EN-3 states that the design of onshore wind farms and their siting relative to residential areas should be such that noise levels are within 'acceptable limits'. However, humans vary in sensitivity to noise, so disturbance cannot be ruled out entirely. EN-3 does not propose mitigation measures for the impacts of noise on ecological receptors, so disturbance effects could be significant for sensitive fauna. Noise effects are likely to be experienced in close proximity to the wind farm, but could be significant at the regional level if energy generation is located in clusters or if species of conservation importance are disturbed. Any effects experienced would be short to medium-term, throughout the lifetime of the development (typically 25 years).
- 3.28 The implementation of EN-3 is not considered to have any additional effects on human receptors with regard to noise from offshore wind. However, it is considered that there are potentially strategically significant negative effects, depending on the site location, on ecological receptors in the short to medium term.
- 3.29 The impact of noise from biomass and energy from waste facilities constructed as a result of EN-3 is considered to have potential negative effects on human and ecological receptors, although this is dependent on site location. Although industrial noise regulations would apply, the continuous operation would result in continual noise at the permitted levels. Depending on the choice of transport for fuel and residues, there may also be noise levels associated with fuel and residue transport and movement. Facilities are designed to operate 25-35 years and, therefore, these effects are considered long term.

Landscape, Townscape and Visual

Objective: To protect and enhance landscape quality, townscape quality and to enhance visual amenity.

AoS Objective 9. Landscape,		Assessment (by timescale)		escale)
Townscape and Visual	Technology	S	М	L
	Onshore wind	-?	-?	0
	Offshore wind	-?	-?	0
	Biomass/ Energy from waste	0	-?	-?

- 3.30 The visual effects of onshore wind turbines resulting from the implementation of EN-3 are considered to be reversible and in the order of 25 years. The resulting negative effect is therefore considered uncertain in the medium and long term, as the effect may be significant, depending on the location, but would be reversed when the facility is decommissioned. In the short term, the effects are considered neutral.
- 3.31 The result of developing offshore wind farms in line with measures set out in EN-3 is uncertain. Since EN-3 states that visual effects should not be the primary reason for refusing to grant consent, there may be circumstances where the effect has the potential to be significant on a regional or even international scale. The effects would be for the duration of construction through to decommissioning and would be reversible. Implementation of EN-3 is, therefore, considered to have an uncertain visual and seascape effect, with any effects likely to be in the short and medium term.
- 3.32 Visual and landscape effects resulting from the implementation of EN-3 in relation to biomass/waste combustion facilities are considered negative in the medium to long term. Although some attempt can be made to make the facility visually less intrusive through the proposed mitigation measures, these facilities will remain large features on the landscape, with a high chimney. However, the significance of the effect is dependent on the location.

Archaeology and Cultural Heritage

Objective: Protect and where appropriate enhance the historic environment including heritage resources, historic buildings and archaeological features.

AoS Objective 10. Archaeology and Cultural Heritage		Assessment (by timescale)		/
	Technology	S	M	L
	Onshore wind	0?	0?	0?
	Offshore wind	0?	0?	0?
	Biomass/ Energy from waste	0?	0?	0?

3.33 Effects on archaeology and cultural heritage relating to onshore and offshore wind, and biomass/waste combustion facilities, resulting from adopting EN-3 are considered neutral but uncertain. Impacts are dependent on the location and design of new facilities assisted by the implementation of EN-3. Further studies would be necessary at the site-specific level.

Air Quality

Objective: To protect and enhance air quality on local, regional, national and international scale.

AoS Objective 11. Air Quality		Assessment (by timescale		nescale)
	Technology	S	М	L
	Onshore wind	0?	0?	0?
	Offshore wind	0	0	0
	Biomass/ Energy from waste	0?	-?	0?

- 3.34 The overall negative effect on air quality of onshore wind turbines is considered to be small and localised. Dust emissions are limited to the construction period, and possibly the decommissioning period if there is excavation of foundations. Some carbon dioxide release can be expected if turbines are sited on peat, since disturbance of the soil will allow release of the stored carbon. There are no specific mitigation measures proposed or required. The effect of implementation of EN-3 in relation to onshore wind farms is considered to be uncertain, in the short, medium and long term.
- 3.35 Implementation of EN-3 is considered to have negative neutral effect on air quality in relation to offshore wind farms.
- 3.36 The implementation of EN-3 for large scale biomass/waste combustion facilities is considered to have effects that are potentially significant in nature and strategic in magnitude during the operational phase of the combustion facilities. For construction and decommissioning, negative effects are likely to be local in extent through these periods, and following decommissioning air quality impacts from the development will be neutral.

Soil and Geology

Objective: 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.

AoS Objective 12. Soil and		Assessment (by timescale)		escale)
Geology	Technology	S	М	L
	Onshore wind	0?	0?	0?
	Offshore wind	0?	0?	0?
	Biomass/ Energy from waste	0?	0?	0?

3.37 The effects on soil and geology resulting from onshore wind development in terms of the implementation of EN-3 are considered uncertain in the short, medium and long term. Effects are site-specific and are dependant, in part, on the geology, the magnitude of the disturbance created and the local hydrology.

- 3.38 The effect of implementing EN-3 with regard to offshore wind farms is likely to result in neutral, but uncertain, effects in the short, medium and long term. Depending on geology, there may be negative effects from seabed disturbance, but the spatial extent of these effects would be local to the development and not strategically significant.
- 3.39 EN-1 considers the potential generic effects on soils and geology and associated mitigation measures. EN-3 does not identify additional specific technology-related effects or mitigation measures in relation to soil and geology. Implementation of EN-3 is therefore considered to have a neutral, but uncertain, effect on soil and geology in the short, medium and long term.

Health and Well-being

Objective: To protect and enhance the physical and mental health of the population.

AoS Objective 13. Health		Assessment (by timescale)		nescale)
and Well-Being	Technology	S	М	L
	Onshore wind	0	0	0
	Offshore wind	0?	0?	0?
	Biomass/ Energy	0	0	0
	from waste	U	U	U

- 3.40 It is considered that the impact of the implementation of EN-3 with regard to onshore wind on human health and well-being is neutral over the short to long term, as impacts from shadow flicker would be limited to a small geographical area in and around the site.
- 3.41 It is considered that the effects on human health and well-being through offshore wind turbines developed as a result of the implementation of EN-3 would be neutral in the short, medium and long-term.
- 3.42 It is considered that the development of biomass/waste combustion facilities developed as a result of the implementation of EN-3 will not have significant effects on health and well-being in the short, medium and long term.

Equality

Objective: To encourage equality and sustainable communities.

AoS Objective 14.	Assessment (by timesca		nescale)	
Equality		S	М	L
	Technology			
	Onshore wind	0?	0?	0?
	Offshore wind	0?	0?	0?
	Biomass/ Energy from waste	0?	0?	0?

- 3.43 It is considered that the development of new onshore wind facilities as facilitated by EN-3 has potentially positive effects on equality and sustainable communities, particularly through access to affordable, low carbon energy. However, disturbance effects on local communities could potentially be regionally significant if generation was to become concentrated in certain areas or if particular groups, such as rural communities, were more affected than others and inequalities increased. Overall effects were considered neutral, but uncertain. Any effects experienced would be short to medium-term, throughout the lifetime of the development (typically 25 years).
- 3.44 It is considered that the development of new offshore wind facilities as facilitated by EN-3 has potentially positive effects on equality and sustainable communities, particularly through access to affordable, low carbon energy. However, disturbance effects on local communities could potentially be regionally significant if generation was to become concentrated in certain areas or if particular groups, such as coastal or fishing communities, were more affected than others and inequalities increased. Overall effects of implementing EN-3 are, therefore, considered neutral, but uncertain. Any effects experienced would be short to medium-term, throughout the lifetime of the development (typically 25 years).
- 3.45 It is considered that the development of new biomass/waste combustion facilities as facilitated by EN-3 has potentially positive effects on equality and sustainable communities, particularly through access to affordable, low carbon energy and employment opportunities. EN-3 does not identify any effects on equality resulting from development of biomass/combustion facilities. However, there are potential negative effects associated with the likely locations of these facilities and these burdens are mostly on low income areas. The effects of implementing EN-3 are considered neutral, but uncertain in the short, medium and long term.

Cumulative Effects

3.46 EN-1 notes that the renewable energy targets will primarily be met by onshore and offshore wind. It is therefore likely that a number of wind farms could be proposed in areas with good wind resources. This clustering of facilities has the potential to lead to cumulative effects during construction and operation. Potential cumulative short term effects (during construction) in relation to the development of onshore wind turbines, as facilitated by EN-3, are likely to relate to landscape and visual effects, noise, traffic and transport, ecology, economy and skills, soils and geology and health and well being. In the medium term, there is the potential for cumulative operational impacts related to landscape and visual effects, noise, ecology and health and well-being. A positive cumulative impact may result if a manufacturing industry develops as a result of numerous onshore wind developments through the implementation of EN-3. This in turn may have positive impacts on skills and the economy and health and well-being. Adverse cumulative impacts may be difficult to mitigate since the facilities need to be located where there is sufficient wind resource.

- 3.47 Multiple offshore wind facilities, which have the potential to be clustered, could also, potentially, result in cumulative effects. EN-3 identifies that there are potential cumulative effects on the subtidal and intertidal habitats and species if a number of offshore facilities are located along the same stretch of coastline. EN-3 also proposes that effects of multiple cable routes could be mitigated by cooperation between developers of these facilities. Cumulative impacts on flood defences may result in increased risk of flooding along the coast. Further cumulative impacts are likely to relate to visual and seascape effects, skills and economy (through fishing impacts), shipping and navigation, and health and well-being effects resulting from visual impacts and impacts on employment (potentially positive or negative). As for onshore wind, a positive cumulative impact may result in the medium to long term if a manufacturing industry for wind turbines develops as a result of the adoption of EN-3. The overall cumulative impacts are potentially positive and negative impacts, but are uncertain. The uncertainty arises because the number and location of potential proposals can not be ascertained at this strategic stage.
- 3.48 It is possible that biomass facilities may be located in clusters near ports, since it likely that in the short to medium term biomass fuel will need to be imported, in the absence of an established supply chain. It is unlikely that there will be cumulative air quality emissions that would impact on human health in the medium to long term (during the operational phase) due to regulated standards that have to be met. However, dust from construction activities may impact on local communities. Cumulative air emissions may also adversely impact ecology.
- 3.49 It is not considered likely that there will be clustering of waste combustion facilities. Since the facilities will be located where sufficient fuel is available or can be readily transported to the facility, these are not likely to be located in close proximity. However, in the event that facilities are clustered, the effects are considered to be similar to those outlined for biomass combustion above.

Overall findings and conclusions

- 3.50 Generally, renewable energy infrastructure development would have similar effects to other types of energy infrastructure. Onshore wind facilities have a smaller footprint in land use terms than biomass or energy from waste facilities. Offshore wind will, conversely, have impacts on marine and coastal environments. For the majority of AoS objectives, the strategic effects of EN-3 were considered to be neutral for onshore and offshore wind, whilst biomass and energy from waste were associated with a greater number of negative effects.
- 3.51 However, through facilitating and enabling the new renewable energy infrastructure necessary to support the transition to a low carbon economy and ensure security of supply, the three technologies covered by EN-3 are considered likely to have significant positive effects on the AoS climate change objective in the medium and long term and both positive and negative effects on equality through provision of affordable

- energy. There are positive effects on economy and skills from EN-3's facilitation of development of onshore wind and biomass/energy from waste, and both positive and negative effects from offshore wind. Biomass/energy from waste is associated with positive and negative effects on raw materials and resources.
- 3.52 Significant negative effects were identified for onshore wind for traffic and transport; noise; landscape, townscape and visual and soil and geology. For offshore wind, negative effects are identified for landscape, townscape and visual; water quality; traffic and transport and noise. Biomass/energy from waste is associated with negative effects under the AoS objectives of landscape, townscape and visual; flood risk; water quality; traffic and transport and noise.
- 3.53 EN-3 contains a range of mitigation measures for significant effects identified.
- 3.54 A summary of the likely significant effects arising specifically from renewable energy infrastructure development is set out in the following tables.

Table 5: Summary of Key AoS Findings Specific to Renewable Energy Infrastructure - Onshore Wind

AoS Objective	Assessment of non-generic effects (by timescale)		
	S	M	L
Climate Change	0	++	++
2. Ecology (Flora and Fauna)	-?	?	?
3. Resources and Raw Materials	0	0	0
4. Economy and Skills	+	+?	+?
5. Flood Risk	0	0	0
6. Water Quality	0	0	0
7. Traffic and Transport	-	0	0
8. Noise	·-	-?	0
9. Landscape, Townscape and Visual	-?	-?	0
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?

Table 6: Summary of Key AoS Findings Specific to Renewable Energy Infrastructure - Offshore Wind

	Assessment of non-generic effects (by timescale)			
AoS Objective	S	М	L	
1. Climate Change	0	++	++	
2. Ecology (Flora and Fauna)	-?	?	?	
3. Resources and Raw Materials	0	0	0	
4. Economy and Skills	+ -	+ -	+ -	
5. Flood Risk	0	0	0	
6. Water Quality	1	-	-?	
7. Traffic and Transport	•	-	0	
8. Noise	-?	-?	0	
9. Landscape, Townscape and Visual	·-	-?-	0	
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	

Table 7: Summary of Key AoS Findings Specific to Renewable Energy Infrastructure - Biomass and Energy from Waste

AoS Objective	Assessment of non-generic effects (by timescale)		
	S	М	L
1. Climate Change	0	+	+
2. Ecology (Flora and Fauna)	-?	?	?
3. Resources and Raw Materials	+ -?	+ -?	+ -?
4. Economy and Skills	+	+	+
5. Flood Risk	-?	-	-
6. Water Quality	-	-	-
7. Traffic and Transport	-	-	-
8. Noise	·-	-?:	-?
9. Landscape, Townscape and Visual	0	-?:	-?
10. Archaeology and Cultural Heritage	0?	0?	0?
11. Air Quality	0?	-?	0?
12. Soil and Geology	0?	0?	0?
13. Health and Well-Being	0	0	0
14. Equality	0?	0?	0?

Next Steps

Consultation

- 4.1 The Appraisal of Sustainability and the Revised Draft of the Revised Draft the Appraisal of Sustainability report (AoS-3) for Renewable Energy Infrastructure National Policy Statement (NPS) are subject to public consultation.
- 4.2 The public consultation commences on the 18th October 2010 and continues until the 21st January 2011.
- 4.3 For more information on this consultation and how you may give us your views please see the Consultation Document (www.energynpsconsultation.decc.gov.uk).
- 4.4 Alternatively you may contact nps.consultation@decc.gsi.gov.uk for further details.
- 4.5 The Government will consider any further comments received during the public reconsultation in the decision making on the finalising the energy NPSs. On designation of the NPS, an AoS Post Adoption Statement will be published and this will summarise how the AoS and the consultation responses have been taken into account, including how sustainability and environmental considerations have been integrated into EN-1.

The monitoring process

- 4.6 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.
 - 4.7 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.

URN 10D/848

Department of Energy and Climate Change 3 Whitehall Place London SW1A 2AW www.decc.gov.uk