

**Report on the Review of the
Revised Nuclear National Policy
Statement of the UK**



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SUP NPS-UK II

**REPORT ON THE REVIEW OF THE REVISED
NUCLEAR NATIONAL POLICY STATEMENT OF
THE UK AND ASSOCIATED DOCUMENTS IN
THE FRAME OF TRANSBOUNDARY
STRATEGIC ENVIRONMENTAL ASSESSMENT
PROCEDURE**

Ordered by the
Federal Ministry for Agriculture, Forestry,
Environment and Water Management,
Project Management Department V/6
“Nuclear Coordination“



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ZUSAMMENFASSUNG

Um die Pläne für den Übergang zu Energiegewinnungsformen mit niedrigeren Kohlenstoffintensitäten und die Errichtung neuer Energieproduktionskapazitäten zu unterstützen, hat die britische Regierung eine grundlegende Reform des Planungssystems für die für England und Wales bedeutende Infrastruktur in die Wege geleitet. Dieses Planungssystem sieht vor, dass die Entwicklung der signifikanten nationalen Infrastruktur von einer neuen unabhängigen Körperschaft, der Infrastructure Planning Commission (IPC), verwaltet wird.

Sechs nationale politische Erklärungen, eine allgemeine und fünf technologie-spezifische, wurden hierfür ausgearbeitet und der Öffentlichkeit im Rahmen eines Nuclear National Policy Statements (Nuclear NPS) vorgelegt. Eine Reihe von unterstützenden Studien und Auswertungen wurden zur Bekräftigung des vorgeschlagenen Entwicklungskurses durchgeführt. Die Anhörung zum Entwurf des Nuclear NPS fand zwischen Dezember 2009 und Februar 2010 statt. Die überarbeiteten Versionen wurden im Oktober 2010 erneut zur Anhörung veröffentlicht. Diese endet mit 24. Januar 2011. Anschließend sollte die formale Genehmigung (Festsetzung) des Nuclear NPS durch die Regierung erfolgen.

Die Bewertung der sozialen und ökonomischen Auswirkungen sowie der Umweltauswirkungen (Appraisal of Sustainability, AoS) des Entwurfs des Nuclear NPS, wurde unter Einbeziehung einer strategischen Umweltbewertung (Strategic Environmental Assessment, SEA) durch die britische Behörde für Energie und Klimawandel (Department of Energy and Climate Change) durchgeführt. Die AoS diskutiert die Auswirkungen der vorgeschlagenen Politik auf nationaler Ebene und die möglichen Anlagenstandorte, die bezüglich ihrer Eignung für die Errichtung von Atomkraftwerken bis 2025 bewertet werden müssen.

Die strategische Standortbewertung in der AoS befindet für den Bau neuer Kernkraftwerke in GB bis 2025 folgende Standorte als potenziell geeignet:



Insgesamt wurden elf potentielle Standorte für den Bau von neuen Kernkraftwerken bis 2025 in Betracht gezogen. Alle Standorte, wurden unter Anwendung derselben Methodik evaluiert, wobei die folgenden Themen hinsichtlich einer nachhaltigen Entwicklung berücksichtigt wurden:

● Luftqualität	● Artenvielfalt und Ökosysteme
● Klimawandel (Querschnittsthema)	● Gemeinden: Bevölkerung, Beschäftigung und Lebensqualität
● Gemeinden: Unterstützende Infrastrukturen	● Gesundheit und Wohlbefinden der Menschen
● Kulturerbe	● Landschaft
● Böden, Geologie und Landnutzung	● Wasserqualität und Ressourcen
● Überflutungsrisiken	● radioaktive und verwandte Risikoabfälle (Querschnittsthema)

Einer der potenzielle Standorte, Dungeness, erfüllte die vorgegeben Kriterien bezüglich Artenvielfalt nicht, weiters gab es Bedenken hinsichtlich Risiken durch Überflutungen und Veränderungen in der Küstenregion. Zwei weitere nominierte Standorte, Braystones und Kirksanton, wurden nach der ersten Phase der Anhörung aus der Liste der potenziell geeigneten Standorte ausgeschlossen. Grund hierfür waren fehlende fixe Netzanschluss-Vereinbarungen der Projektwerber, die die Einsatzfähigkeit der Standorte im Jahr 2025 garantieren würden, sowie vorhersehbare Auswirkungen der Bauvorhaben auf die lokale Landschaft, insbesondere den Lake District Nationalpark.

Die britische Regierung beauftragte zudem eine alternative Standortstudie, um so sicherzustellen, dass potentielle alternative Standorte ebenfalls in Betracht gezogen werden. Durch diesen Prozess wurden drei weitere potentielle Standorte identifiziert: Druridge Bay, Kingsnorth und Owsten Ferry. Nach weiterer Prüfung entschied die britische Regierung jedoch, dass keiner dieser Standorte den Anforderungen des Nuclear NPS entspricht und als Alternative zu den acht bereits vorgeschlagenen Standorten in Betracht gezogen werden soll.

Die potentiellen Auswirkungen von neuen Kraftwerken werden, je nach Lebensphase der Kernkraftwerke – Errichtung, Betrieb und Stilllegung – unterschiedlich dargestellt. Jedoch werden fast alle diese Auswirkungen eher als von lokaler Bedeutung betrachtet.

Die AoS stellt das Potential negativer grenzüberschreitender Folgen von zufälligem und unerwünschtem Ausstoß radioaktiver Materialien aus einem Kernkraftwerk dar. Zudem werden potentielle strategische Auswirkungen auf die Nachhaltigkeit aufgezeigt. Das Risiko, wonach solch ein Fall eintritt, wird jedoch als sehr gering bewertet. Die präventiven Maßnahmen beinhalten existierende Risikobewertungen und Kontrollprozesse. Das 'Health and Safety Executive/Nuclear Installations Inspectorate' hat zu gewährleisten, dass die mit Emissionen von radioaktiven Substanzen verbundenen Risiken für die Öffentlichkeit so gering wie möglich und innerhalb der Risikogrenzen bleiben.

Das überarbeitete Nuclear NPS bietet unmittelbare Leitlinien für die IPC hinsichtlich der Notwendigkeit und Dringlichkeit für die Errichtung neuer Kernkraftwerke. Die Begründung wird in einem überarbeiteten „übergeordneten NPS“ dargelegt. Nach Ansicht Großbritanniens wird die Notwendigkeit der Kernenergie

und der Zeitrahmen für die Entwicklung neuer Kernkraftwerke durch aktuelle Studien und Prognosen unterstützt, die im Rahmen des 'Low Carbon Transition Plan' für den britischen Energiesektor erstellt wurden. In diesem wird die Strategie der Regierung für den Übergang zu einer kohlenstoffarmen Wirtschaft und einer fast vollständig CO₂-freien Stromversorgung bis 2050 festgelegt.

Die Beziehung zwischen den nuklearen rechtlichen Rahmenbedingungen und dem Planungsregime wird, verglichen zum Entwurf, durch eine genauere Trennung der Zuständigkeiten weiter präzisiert.

In der überarbeiteten Version des Nuclear NPS werden die Prüfpunkte für die lokale Prüfung durch das IPC auf folgende Punkte verkürzt:

- Nähe zu (zivilen) Flugbewegungen
- Zugang zu Übertragungsnetzen
- Auswirkungen auf wesentliche Infrastruktur und Ressourcen
- Größe des Standorts, um sowohl Bau als auch Abbruch zu ermöglichen.

Die Prüfung der Aspekte Demographie, Erdbebenrisiko, mögliche geologische Verwerfungen, nicht-seismische Bodenverhältnisse, Notfallplanung, meteorologische Bedingungen, sowie Nähe zu Bergbau-, Bohr- und anderen unterirdischen Operationen wurde der nuklearen Aufsichtsbehörde übertragen.

Verglichen mit dem Entwurf haben sich die Bewertungskriterien des Nuclear NPS nicht geändert. So bleibt die Auswahl von Kriterien, die eine Auswirkung auf den sicheren Betrieb der Anlage hinsichtlich der externen Gefahren und potentiell grenzüberschreitenden Auswirkungen identifizieren, für die neuen Kernkraftwerke unverändert. Dies bezieht sich auch auf jene Kriterien, die hinsichtlich der möglichen Auswirkungen auf Österreich von Relevanz sind.

Grundsätzlich gibt es keine Änderungen in der AoS mit Bezug auf den grenzüberschreitenden Kontext der strategischen Umweltprüfung. Eine Ausnahme ist die Aktualisierung hinsichtlich der Entfernung der potentiellen Standorte Kirksanton und Braystones.

Bezüglich der Aspekte des Klimawandels wird von Seiten Großbritanniens der Betrieb von neuen Kernkraftwerken als positiv betrachtet, da dieser zur Reduktion von Treibhausgasemissionen führt und somit Großbritannien hilft, seine niedrigen Kohlenstoffausstoßzielwerte zu erreichen.

Basierend auf dem wissenschaftlichen Konsens und der internationalen Erfahrungen wird im Rahmen des Nuclear NPS geschlussfolgert, dass trotz einiger Unterschiede in der Charakteristik, die Abfallproblematik keine großen technischen Probleme verursachen würde. Aufgrund der bereits bestehenden Problematik hinsichtlich der Lagerung von nuklearen Abfällen bereits existierender Kernkraftwerke wären demnach keine völlig neuen Lösungen erforderlich.

Im Hinblick auf das derzeitige Niveau der technischen Kenntnisse ist die britische Regierung der Ansicht, dass die wissenschaftlichen Fortschritte im Bezug auf geologische Endlagerung zeigen, dass diese machbar ist und die sicherste Form der langfristigen Entsorgung darstellt. Die britische Regierung anerkennt jedoch, dass eine weitere Erforschung der Entsorgung radioaktiver Abfälle erforderlich ist um die Lagerungs- und Entsorgungskonzepte zu verfeinern.

Hinsichtlich der Vor-Ort-Lagerung von Abfällen höherer Aktivität wird davon ausgegangen, dass verbrauchter Brennstoff vor Ort gelagert werden wird, bis dieser endgültig entsorgt werden kann. Den diesbezüglichen Schlüsselfaktor stellt die Verfügbarkeit eines geologischen Tiefenlagers (Geological Disposal Facility, GDF) dar. Der vorläufige Zeitplan der britischen Nuclear Decommissioning Authority sieht vor, dass ein entsprechendes GDF zur Aufnahme der abgebrannten Brennelemente aus den neuen Atomkraftwerken ungefähr im Jahre 2130 zu Verfügung stehen wird. Die Regierung wird von den Betreibern verlangen, dass ihre Abfälle bis zum Zeitpunkt der Verfügbarkeit eines GDF in einen einlagerungsfähigen Zustand gebracht werden.

Die durchgeführten Bewertungen der Auswirkungen sind als umfassend und systematisch anzusehen. Die Resultate werden im Nuclear NPS korrekt beschrieben. Ein bestimmtes Ausmaß an Unsicherheit auf diesem strategischen Level kann nicht ganz ausgeschlossen werden. Auch wenn angemessene Maßnahmen bezüglich der Auswirkungen und potenzieller Schadensbegrenzungsoptionen getroffen werden, sollten diese auf Projektniveau näher diskutiert werden.

Obwohl Fortschritte in der Forschung und die weltweiten Arbeiten hinsichtlich Planung, Konzeption und Aufbau eines GDF berücksichtigt werden, ist bis heute weltweit kein GDF in Betrieb. Die Machbarkeit bzw. die technologischen Lösungen sind weder im Hinblick auch die Errichtung noch für den dauernden Betrieb gesichert. Ebenso wenig ist die rechtzeitige Verfügbarkeit sichergestellt.

Obwohl angenommen wird, dass die Möglichkeiten für grenzüberschreitende Auswirkungen von freigesetzter Strahlung in Österreich gering sind, kann zum gegenwärtigen Zeitpunkt eine Gefährdung nicht völlig ausgeschlossen werden und muss daher während der weiteren Phasen des Bewilligungsprozesses berücksichtigt werden.

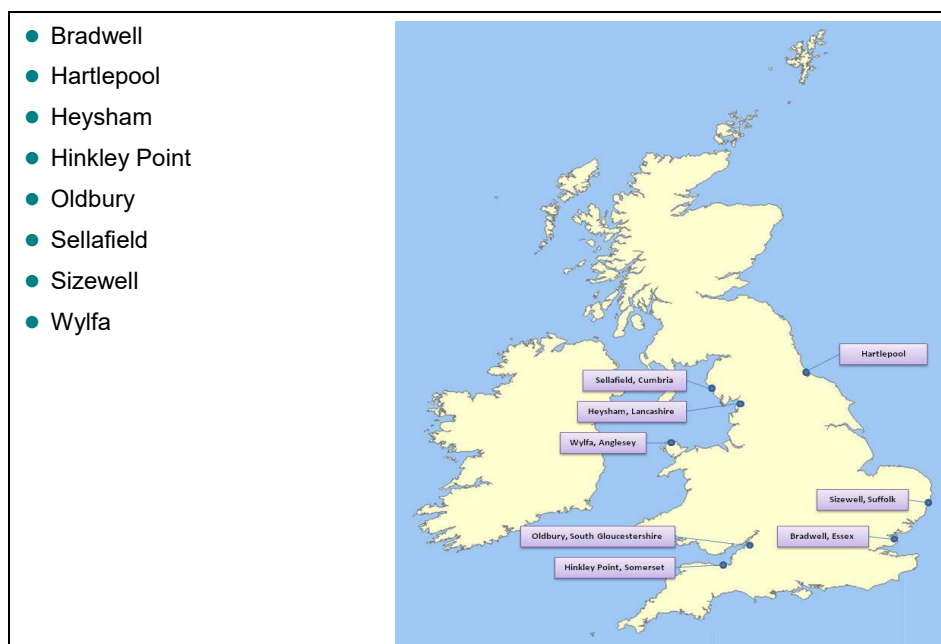
UPDATED EXECUTIVE SUMMARY

To support the Low Carbon Transition Plan and the implementation of new energy generating capacity, the UK Government has embarked on fundamental reform of the planning system for nationally significant infrastructure. Under this system, development consent for nationally significant infrastructure will be administered by a new independent body, the Infrastructure Planning Commission (IPC).

Six National Policy Statements (NPS), one general and five technology specific, have been developed and submitted for public consultation, along with a number of support studies and assessments performed to sustain the proposed course of development. The consultation on the draft NPSs took place in December 2009–February 2010 and revised versions were published again for consultation in October 2010. The consultation will close on 24 January 2011 and should be followed by formal approval (designation) by the Government of the NPSs.

The Appraisal of Sustainability (AoS), incorporating Strategic Environmental Assessment (SEA), of the revised draft Nuclear National Policy Statement (Nuclear NPS) was undertaken by the UK’s Department of Energy and Climate Change at a strategic level. The AoS considers the effects of the proposed policy at a national level and the sites to be assessed for their suitability for the deployment of new nuclear power stations by 2025. The AoS has been performed in a systematic and comprehensive manner, making use of a combination of methods and sources of information, according to the state-of-the-art knowledge on the subject matter and considering all the European Commission and national guidance for the evaluation.

The Appraisal of Sustainability in its strategic site assessment considers the following eight sites (out of eleven sites nominated) as potentially suitable for building the new nuclear power plants in UK by 2025:



All of the eleven sites nominated for the construction of new nuclear power plants by 2025 were evaluated using the same methodology which considered the following sustainable development themes:

● Air Quality	● Biodiversity and Ecosystems
● Climate Change (cross-cutting)	● Communities: Population, Employment and Viability
● Communities: Supporting Infrastructure	● Human Health and Well-Being
● Cultural Heritage	● Landscape
● Soils, Geology and Land Use	● Water Quality and Resources
● Flood Risk	● Radioactive and associated hazardous waste (cross-cutting)

One of the nominated sites, Dungeness, did not pass the discretionary criteria on biodiversity and there were concerns about flood risk and coastal processes. Two other nominated sites, Braystones and Kirksanton, were excluded from the list of potentially suitable sites after the first phase of consultation due to lack of firm grid connection agreements of the proponents of those sites that would warrant their deployability by 2025, and also due to foreseen impact of developments on those sites on local landscape, namely the Lake District National Park.

The UK Government also commissioned an Alternative Sites Study to ensure that potential alternative sites were given due consideration. Three sites were identified through this process; Druridge Bay, Kingsnorth, and Owston Ferry. After further assessment the UK Government decided that none of these three sites should be considered as reasonable alternatives to the sites that have been nominated, and therefore should not be included in the draft Nuclear NPS. This is because the UK Government considers that these sites are not credible for deployment by the end of 2025.

The potential effects of new nuclear power plants (NPP) are different for different NPP life stages: construction, operation and decommissioning, however almost all of them are of local nature.

The AoS has identified that the potential for transboundary effects from any accidental release of radioactive emissions from the NPP site has a potentially strategic effect on sustainability. However, it is noted that there is a very low risk of such an event occurring. Prevention measures include existing risk assessment and regulatory processes. The Health and Safety Executive/Nuclear Installations Inspectorate will need to be satisfied that the radiological and other risks to the public associated with accidental releases of radioactive substances are as low as reasonably practicable and within the relevant radiological risk limits.

The revised Nuclear NPS provides direct guidance for the IPC to consider that the need and urgency for new nuclear power have been demonstrated (the justification being provided in the revised Overarching NPS). The need for nuclear power and the timeframe for developing new NPPs are sustained by various recent studies and predictions for the UK energy sector performed in the frame of the Low Carbon Transition Plan, setting out the Government's strategy for moving towards a low carbon economy (requiring electricity supply to be almost entirely decarbonised by 2050).

On the consideration by the IPC of alternative sites, the UK Government's view is, based on the Strategic Site Assessment (SSA) process, the study commissioned by the Government and the results of the consultation, that there are no alternative sites other than the eight listed meeting the requirements of the Nuclear NPS.

With regard to regulatory justification, it is pointed out that in October 2010 the Secretary of State published his decisions that two nuclear reactor designs, Westinghouse's AP1000 and Areva's EPR, are justified.

The relationship between the nuclear regulatory framework and the planning regime is further clarified as compared to the draft version by a more precise separation of responsibilities.

As compared to the draft Nuclear NPS, in the revised version the flags for local consideration to be considered by the IPC are reduced to:

- proximity to (civil) aircraft movements
- access to transmission networks
- impact on significant infrastructure and resources
- size of site to accommodate construction and decommissioning,

with the demographics, seismic risk, capable faulting, non-seismic ground conditions, emergency planning, meteorological conditions and proximity to mining, drilling and other underground operations deferred to the Nuclear Regulators.

The assessment criteria have not changed as compared to the draft Nuclear NPS, and as such, the selection of criteria which could have an impact on plant safety and security, and thus identify a potential transboundary impact of interest for Austria remains the same, focused on the external hazards for the new NPPs.

There are basically no changes in the AoS for the Nuclear NPS relevant to the transboundary context of SEA, except for the update to take account of the removal of Kirksanton and Braystones from the revised draft Nuclear NPS.

The potential effects of new NPPs are different for different phases of NPP operation construction, operation and decommissioning, however almost all of them are of local nature.

As for the climate change, the impact of new nuclear capacity is assessed as positive by the UK Government because the operation of new NPPs will lead to the reduction of greenhouse gases emission to the atmosphere and will help UK to achieve its low carbon emission targets.

Based on scientific consensus and international experience, it is reasonable to conclude that, despite some differences in characteristics, waste and spent fuel from new nuclear build would not raise such different technical issues compared with nuclear waste from legacy programmes as to require a different technical solution.

With regard to the current level of technical knowledge the UK Government considers that the scientific progress made with respect to geological disposal is such that it is feasible and is the safest form of long-term waste management. The UK Government recognises that further research is required into radioactive waste management systems to refine storage and disposal concepts.

With respect to the on-site storage of higher activity waste, on the assumption that spent fuel will be stored on-site until it can be disposed of, the key factor in determining the duration of on-site storage is the availability of a Geological Disposal Facility (GDF). The Nuclear Decommissioning Authority's current indicative timetable anticipates a GDF being available to take spent fuel from new nuclear power stations from around 2130. The Government will expect operators to ensure their waste is disposable when a GDF is anticipated to be available to take the waste.

Although the progress of research and work on planning, designing and constructing a Geological Disposal Facility worldwide is taken into consideration, there is not, up to date, a GDF in operation anywhere in the world. The feasibility of the technological solution is yet to be ascertained from the practical point of view of realisation and operation, as well as its timely availability to accommodate the waste generated by the new NPPs in UK.

The information provided in the revised Nuclear National Policy Statement for the consideration of the Infrastructure Planning Commission or its successor decision maker after the amendment of the 2008 Planning Act - the Secretary of State at the recommendation of the Major Infrastructure Planning Unit, constitutes adequate guidance for making an informed and correct decision.

The impact assessments performed are comprehensive and systematic, and the results of these assessments are properly reflected in the Nuclear NPS. A certain extent of uncertainty at this strategic level cannot be eliminated, however adequate measures are taken for both the impacts and the potential mitigation options to be more thoroughly studied at the project level.

While it is believed that the possibility for transboundary effects of accidental radiation releases to be felt in Austria is remote, at this point of the process it cannot be completely excluded and should be followed-up at later stages of NPP construction.

1 INTRODUCTION

1.1 Background

To support the Low Carbon Transition Plan and the implementation of new energy generating capacity, the UK Government has embarked on a fundamental reform of the planning system for nationally significant infrastructure. Under this system, development consent for nationally significant infrastructure will be administered by a new independent body, the Infrastructure Planning Commission (IPC).

National Policy Statements (NPSs) lie at the centre of the new regime. They will be the primary consideration for the IPC when it makes decisions on applications for development consent. The UK Government currently envisages that there will be 12 National Policy Statements, covering major infrastructure for energy, transport, waste, water and waste water, out of which 6 related to energy were drafted and submitted to public consultation:

- The draft Overarching National Policy Statement for Energy (EN-1)
- The draft National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2)
- The draft National Policy Statement for Renewable Energy Infrastructure (EN-3)
- The draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
- The draft National Policy Statement for Electricity Networks Infrastructure (EN-5)
- The draft National Policy Statement for Nuclear Power Generation (EN-6 or the Nuclear NPS)

A number of support studies and assessments were performed to sustain this proposed course of development. These documents were published together with the draft energy NPSs as part of the consultation process conducted before Parliamentary scrutiny and formal approval by the Government of the NPSs. A Consultation Document was also published by the UK Government, providing guidance for the process in the form of relevant questions to be answered by the concerned parties in order to collect their views on the subject matter.

An initial review of the draft National Policy Statements and their supporting documents was performed by ENCO at the beginning of 2010, with the objective to provide the expert opinion addressing the potential transboundary risks, from the Austrian point of view, pertaining to the future development and use of nuclear energy in UK. The corresponding “Report on the Review of the draft Nuclear National Policy Statement of the UK and associated documents in the frame of transboundary Strategic Environmental Assessment Procedure”, ENCO-FR-(10)-01, proposed the answers to the consultation questions relevant for the Umweltbundesamt.

1.2 Objective and scope of the project

The objective of the project is to provide the expert opinion addressing the potential transboundary risks, from the Austrian point of view, pertaining to the future development and use of nuclear energy in UK proposed in the National Policy Statements and their supporting documents, as revised following the 2009–2010 consultation.

The focus of the review should be on the aspects which address potential transboundary effects in case of nuclear accidents, providing an expert opinion on the adequacy of:

- the UK process, both procedural and content-wise, representing the state-of-knowledge basis for decision making for the IPC,
- addressing and providing sufficient details on the related risks of the potentially suitable sites for new nuclear power plants defined in the NPS on nuclear energy, from the point of view of potential transboundary consequences.

To achieve the above mentioned objective, the project team assessed the need to revise the conclusions made in phase I on the adequacy of the UK process and on the aspects addressing the potential transboundary risks from the Austrian point of view, and to revise the answers to the relevant questions provided in the phase I Consultation Document, reflecting the Austrian position on the UK Strategic Environmental Assessment (SEA) process and documentation.

1.3 Implementation of the project

To achieve the above mentioned objective the Consultant examined the set of NPS's and supporting documents identified in the invitation to tender and in the technical proposal submitted for this tender:

- Consultation on revised draft National Policy Statements for Energy Infrastructure ("Consultation Document")
- Revised draft Overarching National Policy Statement for Energy (EN-1)
- Appraisal of Sustainability of the revised draft Overarching National Policy Statement (Non-Technical Summary, Main Report, Main Report Appendices)
- Revised draft National Policy Statement for Nuclear Power Generation (EN-6)
- Appraisal of Sustainability of the revised draft Nuclear National Policy Statement (Non-Technical Summary, Main Report, Main Report Appendices 1 and 2)
- Appraisals of Sustainability for the 11 sites considered in the Strategic Site Assessment, of which only 8 were listed in the revised EN-6 (Bradwell, Hartlepool, Heysham, Hinkley Point, Oldbury, Sellafield, Sizewell and Wylfa), including Site Reports, their Appendices and corresponding Maps
- Impact Assessment (IA) - Energy National Policy Statements
- Appraisal of Sustainability of the revised draft Nuclear National Policy Statement: Radioactive and Hazardous Waste (Annex I)
- Appraisals of Sustainability of the revised draft energy National Policy Statements: draft Monitoring Strategy

- Government response to consultation on the draft National Policy Statements for Energy Infrastructure
- Advice received on responses to the public consultation on the draft Nuclear National Policy Statement (NPS)

A number of other documents were consulted during the review for corroboration of the statements, justifications and assessments review. These are referenced throughout the text where applicable.

Based on the review findings the answers to consultation questions were re-considered.

1.4 Structure of the report

This report is not to summarize the very large volume of information included in the revised documents reviewed, as this task is very well accomplished by the executive summaries of those documents, as well as by the document entitled “Government Response to Consultation” summarising the changes made in all revised documents, but rather to highlight certain aspects which have been found relevant for the review and for reconsidering the answers to the consultation questions in the last section of this report.

This report builds upon the results of the review of the draft NPSs and support documentation, reiterating to some extent information or conclusions presented in the “Report on the Review of the draft Nuclear National Policy Statement of the UK and associated documents in the frame of transboundary Strategic Environmental Assessment Procedure”, ENCO-FR-(10)-01, to the extent necessary to consolidate the review findings.

Section 2 of the report presents each of the reviewed documents in terms of changes introduced in the revised versions that are relevant to the transboundary context of the SEA process carried out in the UK.

Section 3 presents the conclusion of the review.

2 TECHNICAL EXAMINATION OF DOCUMENTATION

2.1 Structure and scope of documentation

The table below summarises the content and purpose of each document associated with the consultation on the revised draft Nuclear NPS which makes the subject of this review.

Table 1: Purpose and content of revised documents.

Document name	Content and purpose
Revised Draft Overarching Energy NPS (EN-1)	<p>Sets out the Government’s energy policy, explains the need for new energy infrastructure and instructs the IPC on how to assess the impacts of energy infrastructure development in general.</p> <ul style="list-style-type: none"> ● Will be used by the IPC. Includes information on: ● Government policy and energy infrastructure (Part 2) ● Need for new energy infrastructure (Part 3) ● Assessment principles and generic impacts (Part 4)
Revised Appraisal of Sustainability (AoS) for EN-1	<p>Informs the development of the draft Overarching Energy NPS (EN-1). Includes:</p> <ul style="list-style-type: none"> ● A Non-Technical Summary, which is also available separately; ● An explanation of the AoS process and methods; ● A discussion of the alternatives to the draft NPSs; ● An appraisal of the sustainability and environmental impacts of the proposals in the draft NPSs; ● Key recommendations; and ● Information on monitoring of significant effects.
Revised Draft National Policy Statement for Nuclear Power Generation (EN-6 or Nuclear NPS), Volumes I (Main Report) and II (Annexes)	<p>Will be used by the IPC. Includes:</p> <ul style="list-style-type: none"> ● guidance for the IPC evaluation of the need for and urgency of new nuclear power stations, relationship between planning regime and nuclear regulatory framework, assessment of arrangements for the management and disposal of waste from new nuclear power stations (Part 2) ● Impacts of new nuclear power stations and potential ways to mitigate them (Part 3) ● Sites that the Government considers to be potentially suitable for new nuclear power stations (Part 4)
Revised Appraisal of Sustainability (AoS) of the EN-6: Main Report	<p>Informs the revised draft Nuclear NPS, to ensure it meets the requirements of sustainable development. Includes a Non-Technical Summary, which is also available separately, explanation of the AoS process and methods, and key recommendations.</p>
Appraisal of Sustainability (AoS) of the EN-6: Site Reports (x14)	<p>AoS site reports for each of the 11 sites nominated into the Strategic Siting Assessment process, and for the three sites that the Alternative Sites Study considered worthy of further consideration.</p>
Revised Impact Assessment	<p>Analyses the administrative costs and benefits of proposed Government interventions to business, the public sector and the third sector (voluntary organisations).</p>

Document name	Content and purpose
Government response to Consultation on the Energy NPSs	The Government response identifies the key themes that were raised during the (phase I) consultation on all the Energy National Policy Statements, and sets out the Government's views on the points raised. It also provides further discussion of key changes that have been made to the NPS and the reasons why Braystones, Kirksanton and Dungeness have been found to be unsuitable.
Appraisal of Sustainability of the revised draft Nuclear National Policy Statement: Radioactive and Hazardous Waste	This document is Annex I (Radioactive and Hazardous Waste) of the Appraisal of Sustainability of the revised draft Nuclear NPS. It contains the baseline information for Spent Fuel (SF) and Intermediate Level Waste (ILW) and the appraisal matrices for each waste category: SF, ILW, LLW, gaseous and liquid radioactive discharges and non radioactive hazardous waste.
AoS of the revised draft Energy NPSs: draft Monitoring Strategy	Sets out the approach, roles and responsibilities for monitoring the significant strategic effects, of the energy NPSs, which have been identified by the AoSs.
Consultation document	Describes background, context and purpose of the (phase II) consultation on the revised energy NPSs (EN 1-6). Includes consultation questions and explains how to respond. Includes a summary of major changes in the revised documents.

The consultation seeks views on the six revised draft National Policy Statements for energy infrastructure:

- The revised draft Overarching National Policy Statement for Energy (EN-1)
- The revised draft National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2)
- The revised draft National Policy Statement for Renewable Energy Infrastructure (EN-3)
- The revised draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
- The revised draft National Policy Statement for Electricity Networks Infrastructure (EN-5)
- The revised draft National Policy Statement for Nuclear Power Generation (EN-6)

The revised draft Overarching NPS for Energy (EN-1) sets out the Government's energy policy, explains the need for new energy infrastructure and instructs the IPC on how to assess the impacts of energy infrastructure development in general. The other draft energy NPSs contain supplementary information for specific types of infrastructure.

The revised draft Nuclear NPS (EN-6) differs from the other draft technology-specific energy NPSs as it also lists sites that the Government has judged to be potentially suitable for the deployment of new nuclear power stations by the end of 2025. The list of sites in the Nuclear NPS is the output from the Government's Strategic Siting Assessment (SSA) process. The Nuclear NPS also sets out the Government's conclusion that it is satisfied that effective arrangements will exist to manage and dispose of the waste that will be produced by new nuclear power stations in the UK.

Appraisals of Sustainability and Habitats Regulations Assessments have been carried out in relation to the draft energy NPSs and revised after the first phase of consultation. Appraisals of Sustainability (AoS) are required by the Planning Act and are intended to help to ensure that NPSs take account of environmental, social and economic considerations, with the objective of contributing to the achievement of sustainable development. The aim of the Habitats Regulations Assessments (HRA) is to assess the implications of NPSs for protected habitats.

2.2 Overarching National Policy Statement for Energy (EN-1)

2.2.1 Objective

This National Policy Statement sets out UK's national policy for the energy infrastructure. It has effect, in combination with the relevant technology-specific NPS, on the decisions by the Infrastructure Planning Commission (IPC) on applications for energy developments that fall within the scope of the NPSs. For such applications, this NPS, when combined with the relevant technology-specific energy NPS provides the primary basis for decisions by the IPC.

2.2.2 Changes in EN-1 relevant to the transboundary context of the SEA

The Overarching NPS for Energy (EN-1) is an umbrella document, under which all of the remaining draft energy NPSs sit. Its role is:

- to set out how the suite of energy NPSs will work;
- to explain the framework of existing Government policy for energy infrastructure; and
- to establish the need for new nationally significant energy infrastructure.

A number of changes were introduced in the revised EN-1, to improve the clarity of the document, either by restructuring the information or by rewording. However, no changes of the policy itself were introduced.

A major aspect on which many comments were received related to the **need for a specific technology**, with respondents either agreeing or disagreeing that particular technologies should be favoured, or avoided, in the UK. Specifically, the types of infrastructure on which objections were expressed included nuclear power stations, fossil fuel power stations without Carbon Capture and Storage (CCS) and wind farms.

The Government responded that it is not its intention to set targets or limits on all or any new generating infrastructure in the NPSs. The Government believes that renewables, nuclear and fossil fuels with CCS will all have a part to play in delivering the UK's decarbonisation objectives.

With regard to the **timescale of the policy**, the draft EN-1 reflected the "UK Low Carbon Transition Plan – National Strategy for Climate and Energy" which set out a detailed low carbon transition plan to 2020. Since publication of the draft EN-1, the Government has published its *2050 Pathways Analysis* which looks at different pathways to meeting the target of reducing emissions by 80% by 2050. The revised draft EN-1 takes this work into account.

The accountability/legitimacy of decisions made by the IPC was questioned during the consultation. As part of the proposed reform of the planning system for major infrastructure projects that has been announced since the publication of the draft NPSs, the Government intends to abolish the IPC and decisions on major infrastructure projects will be taken by the Secretary of State in accordance with the clear policy framework provided by the NPSs, and on the basis of recommendations by the new examining body - Major Infrastructure Planning Unit (MIPU). These proposed reforms require primary legislation. Until such time as the Planning Act 2008 is amended, the IPC will continue as set out in that Act. As a result, the revised draft NPSs (once designated) will provide the framework for decisions by the IPC on applications for development consent for nationally significant infrastructure projects, and under the new arrangements will provide the policy framework for recommendations by the MIPU to the Secretary of State.

No relevant changes were introduced to the NPS sections on “assessment principles” and “generic impacts”.

2.2.3 Review findings

The Revised draft Overarching NPS for Energy (EN-1) provides the general Government policy for developing the UK’s energy sector and the framework for the more detailed provisions of the technology specific NPSs. This NPS takes adequately into account the results of the appraisal for sustainability performed to inform it, as required by the SEA Directive and the guidance issued by the European Commission for the implementation of this directive^{1,2}. For further details on how this NPS is informed by its AoS see Section 2.3 of this report.

2.3 Revised Appraisal of Sustainability for the Overarching Energy NPS (EN-1)

Although the draft Appraisal of Sustainability for the EN-1 was published by the UK Government as part of the same document as the AoSs for EN-2 to EN-5 for fossil fuels, renewables, gas supply and gas and oil pipelines, and electricity networks, the revised EN-1 AoS is a stand-alone assessment and was published separately from the rest of the mentioned technology specific AoSs. As such, the AoS for EN-1 is relevant when reviewing the Nuclear NPS, as EN-1 is the umbrella policy for the Nuclear NPS. The other four technology specific NPSs and their appraisals for sustainability are distinct policies and assessments elaborated for different energy technologies than nuclear and do not present interest for this review.

¹ Directive 2001/42/EC of the European Parliament and of the Council, of 27 June 2001, on the assessment of the effects of certain plans and programmes on the environment, Annex I

² Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment, Commission’s Guidance on the implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, http://ec.europa.eu/environment/eia/pdf/030923_sea_guidance.pdf

2.3.1 Objective

The objective of this AoS is to identify, describe and evaluate the environmental, social and economic effects of the proposed energy policy, examining alternative options and weighing up their benefits and drawbacks, risks and uncertainties, and possibly modify this policy in accordance with the appraisal findings, before making the decision of adopting it.

The SEA Directive provides a list of “issues” on which the effects have to be considered: biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors; it also defines the type of effects to be considered: secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.

For the AoS a set of 14 objectives has been developed, which cover all the above mentioned issues listed by the SEA.

2.3.2 Contents

The introductory part of the AoS report gives a brief discussion of the UK energy policy, the role of the new planning system, presents the context of the appraisal and an overview of the AoS process.

The effect of the policies has been reappraised in the revised AoS and includes short, medium and long term appraisal, as well as discussion on potential cumulative effects. The “baseline” against which the effects of implementing the NPS policies have been compared has been that of the environment as it stands now, so that the assessment is answering the question, “what difference would it make to build a new generation of energy infrastructure in accordance with the NPSs?”, rather than making a comparison between implementing the same policies with and without an NPS as the previous draft AoSs did.

Certain strategic alternatives to the draft NPS as a plan were appraised and reported in the draft of AoS-1 published as part of the November 2009 consultation. As a result of this consultation, the Government decided to look again at the analysis of alternatives included in the AoSs and the draft NPSs. The revised appraisal of strategic alternatives to EN-1 is set out in this AoS. In line with the principles of good policy making and with the requirements of the SEA legislation, reasonable alternatives for implementing the aims of the NPS were considered. The work presented in this section cannot be compared directly with that reported in the November 2009 AoS-1 and is intended to take the place of the earlier assessment. The assessment of alternatives to EN-1 for the reworked AoS has been a two stage process:

- 1) Development and initial screening to establish a series of reasonable strategic alternatives to the plan.
- 2) Assessment of the selected reasonable alternatives against the AoS objectives.

In order to fulfil the overall objective, that is to enable the development of new energy infrastructure that will maintain safe, secure and affordable supplies of energy to Great Britain consumers (individuals or businesses) in the shorter and

longer term and support the goal of an 80% reduction in UK greenhouse gas emissions by 2050, it was considered that any reasonable alternative to the energy NPSs must strike a balance between four principal criteria:

- i. Cost
- ii. Security of supply.
- iii. Reduction of greenhouse gas (in particular, CO₂) emissions.
- iv. Minimising environmental impacts other than greenhouse gas emissions.

Section 3 of the EN-1 AoS presents eight initial alternatives, one placing more emphasis and one less emphasis on each of the above four criteria, and then reduces them to three reasonable alternatives in terms of meeting the Government's objectives.

Annex G supplements the assessment of alternatives below by showing the kinds of alternatives that could be devised for the key planning policies within EN-1 and explaining why they have not been preferred to the NPS policies. The intention is to confirm (by way of illustration, rather than exhaustively) from a "bottom-up" perspective that the range of alternatives reviewed provides an appropriately strategic-level view of alternatives to the policies in the energy NPSs and provide some further background on the relationship between planning policies and energy and climate change policies.

For the purpose of assessing the alternatives, the 14 SEA objectives have been grouped into 6 sustainable development (SD) themes and then used in the assessment of three options:

Sustainable Development (SD) Themes and AoS Objectives

Headline SD Themes	AoS/SEA Objectives (numbers refer to AoS objectives)
Climate Change	Climate change (1)
Security of Energy Supply	Resources & Raw Materials (3)
Health & Well-Being	Noise (8), Air Quality (11), Health & Well-Being (13), Equality (14)
The Economy	Economy & Skills (4)
The Built Environment	Flood Risk and Coastal Change (5), Traffic & Transport (7), Archaeology & Cultural Heritage (10)
The Natural Environment	Ecology (flora & fauna) (2), Water Quality & Resources (6), Landscape, Townscape & Visual (9), Soils & Geology (12)

Option 1: "Overarching NPS for Energy", the revised NPS EN-1;

Option 2: "No NPS": (the "business as usual" scenario in accordance with normal SEA practice);

Option 3: Alternatives that place greater emphasis on particular aspects of the overall objectives of energy and climate change policy³:

- Alternative A1, that places more emphasis on a low cost of energy
- Alternative A3, that places more emphasis on reduction in greenhouse gas emissions
- Alternative A4, that places more emphasis on reducing environmental impacts other than greenhouse gas emissions.

It was concluded that the No NPS option may have much the same effect as EN-1, but would increase planning uncertainty and may delay development of new energy infrastructure projects. Overall, compared with EN-1, this makes No NPS a less good way of achieving the underlying energy policy objectives, with no countervailing benefits to recommend it. It has therefore been rejected.

Although Alternative A1 compared favourably with EN-1 on the SD themes of Health and Well-being and the Economy, these are themes in respect of which the evaluation of EN-1 indicated few adverse effects. More importantly, Alternative A1 compared unfavourably with it in relation to those SD themes which are relevant to achievement of underlying energy policy objectives. It has therefore been rejected.

Whilst in principle Alternative A3 would be an attractive option, it was considered unlikely that it would be possible to give practical effect to such an alternative in the next ten years or so without running at least some risk either of greater negative impacts than EN-1 on security of supply or the natural environment. Accordingly, Alternative A3 has not been preferred to EN-1 at this stage, although it represents options which should be kept under review for the future (e.g. once the rate of progress towards widespread availability of CCS becomes clear).

With respect to alternative A4, the Government is not prepared to risk adverse effects on security of supply (and consequently potentially on human health and the economy) in order to avoid potential plan-level adverse environmental impacts which are primarily about human appreciation of the environment rather than impacts on non-human species or the ecosystem generally, in particular because any significant adverse impacts on security of supply are likely to be more widely experienced (in the form of power outages or higher prices) than adverse Landscape, Townscape and Visual Effects (which, although they will undoubtedly be keenly felt by some, will generally be confined to the immediate surroundings of consented infrastructure). Accordingly Alternative A4 is not to be preferred to EN-1, at least until such time as it becomes clear that levels of need for new large-scale energy infrastructure are very much lower than Government currently anticipates that they will be for the foreseeable future.

³ Of the initial eight alternatives, A2 (more emphasis on security of supply) has been excluded based on the consideration that there are few, if any specific variations of EN-1 policies which can be said to give more emphasis to security of supply without also potentially contributing to the achievement of lower cost energy or one of the objectives represented by A3 or A4. Alternatives B1 to B4 (less emphasis on each of the four criteria) were discarded from the beginning since by definition, by giving less emphasis to one of the key elements of the energy and climate change policy underlying the energy NPSs, are likely to risk failing to achieve the objectives of that policy.

For all the above stated reasons the alternatives are assessed as performing less well than EN-1 against one or more of the criteria for Climate change or Security of Energy Supply that are fundamental objectives of the plan. The Government's preferred option is to take forward the Energy NPS EN-1 and the technology-specific NPSs EN-2 to EN-6.

As well as the alternatives to EN-1, the AoS has considered the alternatives to each of the EN-2 to EN-5 technology-specific NPSs, concentrated on evaluating the likely development consequences. The key questions were: (i) whether the alternative will in fact reduce the adverse impacts or increase the positive impacts at which it is directed; (ii) what other impacts it will affect, either positively or negatively; and (iii) whether it will still allow the technology type concerned to play its part in achieving the overall energy policy objective.

Section 4 reports the findings of the AoS of EN-1 against the 14 SEA objectives, as well as the EN-2 to EN-6 appraisal findings which relate to likely generic effects and the overall effects for the EN-1.

It concludes that the Energy NPSs are likely to contribute positively towards improving the vitality and competitiveness of the UK energy market by providing greater clarity for developers which should improve the UK's security of supply. Reliable energy supplies nationally will contribute to positive effects generally on the economy and skills with indirect positive effects for health and well-being in the medium to longer term through helping to secure affordable supplies of energy and minimising fuel poverty; positive medium and long term effects are also likely for equalities. The development of new energy infrastructure, at the scale and speed required to meet the current need, is likely to have negative effects on biodiversity, landscape/visual amenity and cultural heritage; however the significance of these effects and the effectiveness of mitigation possibilities is uncertain at the strategic and non-locationally specific level. Short-term construction impacts are also likely through an increased use of raw materials and resources, and negative effects on the economy due to impacts on existing land and sea uses. There may also be cumulative negative effects on water quality, water resources, flood risk, coastal change and health at the regional or sub-regional levels depending upon location and the extent of clustering of new energy and other infrastructure. Proposed energy developments will still be subject to project level assessments, including Environmental Impact Assessments, and these will address locationally specific effects.

Section 5 refers to the draft Monitoring Strategy published alongside the main consultation documents. This draft Monitoring Strategy sets out the approach, roles and responsibilities for monitoring the significant strategic effects, of the energy NPSs, which have been identified by the AoSs. This includes consideration of significant positive and negative effects predicted by the AoSs and the consideration of unforeseen adverse effects that might arise from the implementation of the energy NPSs so as to be able to take appropriate remedial action.

The Annexes include the review of other policies, plans and programs that could influence the Overarching NPS for Energy, the response to the scoping consultation, comparison of the existing consenting requirements for energy with future consenting process (with the NPS), quality assurance checklists and the baseline information.

A straight forward conclusion of the revised AoS on the overall effects of EN-1 (such as that of overall positive effects drawn in the draft version) is lacking, the Overarching NPS is envisaged to have both positive and negative effects, proposed energy developments will still be subject to project level assessments, including Environmental Impact Assessments, and the IPC will be required to consider accumulation of effects as a whole in their decision-making on individual applications for development consent.

Table 2: Results of the AoS for Overarching NPS.

AoS objective (topic)	Draft NPS effects on the objective	Revised NPS effects on the objective
1. Climate change: To minimise detrimental effects on the climate from greenhouse gases and ozone depleting substances and maximise resilience to climate change.	Minor positive effects	Uncertain, potentially positive
2. Ecology (Flora and Fauna): To protect and enhance protected habitats, species, valuable ecological networks and ecosystem functionality.	Uncertain effects	Potential for significant, cumulative effects on biodiversity, including adverse effects on European designated sites, most significant in the short term; uncertain effects on flora and fauna
3. Material assets and raw materials: To promote the sustainable use of resources and natural assets and to deliver secure, clean and affordable energy.	Significant positive effects	Minor negative localised impacts; overall neutral with some minor positive long term effects
4. Economy and skills: To promote a strong and stable economy with opportunities for all.	Significant positive effects	Short to medium term positive and negative effects; overall long term positive impacts
5. Flood risk: To avoid an increase in flood risk (including coastal flood risk) and avoid siting flood sensitive infrastructure in areas of high flood risk.	No overall effect	Minor negative short term effects; long term effects uncertain
6. Water quality and resources: To protect and enhance surface (including coastal) and ground water quality (including distribution and flow).	No overall effect	Potential for adverse effects, including cumulative effects; neutral in the medium to long term
7. Traffic and transport: To minimise the detrimental impacts of travel and transport on communities on the environment whilst maximising positive effects.	No overall effect	No overall strategic effect in the short, medium or long term
8. Noise: To protect both human and ecological receptors from disturbing levels of noise.	No overall effect	No overall strategic effect in the short, medium or long term

AoS objective (topic)	Draft NPS effects on the objective	Revised NPS effects on the objective
9. Landscape, townscape and visual: To protect and enhance landscape quality, townscape quality and to enhance visual amenity.	No overall effect	Significant negative effects in the short, medium and long term
10. Archaeology and cultural heritage: To protect and where appropriate enhance historic environment including heritage resources, historic buildings and archaeological features.	No overall effect	Minor negative effects (including cumulative effects) in the short, medium and long term
11. Air quality: To protect and enhance air quality on local, regional, national and international scale.	No overall effect	Minor negative strategic effects on air quality in the medium and long term
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.	No overall effect	Direct negative effects in the short term; uncertain long term effects
13. Health and well-being: To protect and enhance the physical and mental health of the population.	No overall effect	Negative short term effects; Significant indirect positive medium and long term effects
14. Equality: To encourage equality and sustainable communities.	No overall effect	No overall effect in short term, positive effects in the medium to long term

2.3.3 Review findings

The revised AoS is an improvement in terms of comprehensiveness and attempts reaching an increased depth of the assessment. However, the greater the depth of assessment at this stage, more uncertainties have to be taken into account, so a clearer (less uncertain) overall conclusion cannot be drawn by the AoS, but its acknowledgment of potential for both positive and negative effects in short, medium and long term is another step forward in ensuring their follow up and possible mitigation.

The AoS has been performed in a systematic and comprehensive manner, making use of a combination of methods and sources of information, according to the state-of-the-art knowledge on the subject matter and considering all the European Commission and national guidance for the evaluation.

The comprehensiveness of the AoS and openness to all interested parties is visible. Evidence on the appraisal and on the quality assurance process applied to the appraisal is presented, showing that the best quality assurance practice was utilised both during appraisal and for the development of all associated documents.

The findings and conclusions of the appraisal are adequately reflected in the Overarching NPS.

2.4 Revised draft National Policy Statement for Nuclear Power Generation (EN-6)

Unlike the NPSs for fossil fuels, renewables, gas supply and oil pipelines and electricity networks (EN-2 to EN-5), the particularity of the Nuclear NPS is that it includes a list of suitable locations for nuclear energy developments. This approach is being proposed following its evaluation and the evaluation of other three possible approaches.

2.4.1 Objective

The objective of the Nuclear NPS is to provide the primary basis for planning decisions by the IPC on applications for development consent for a new nuclear power station. It sets out the role of nuclear power and the key features of relevant planning policy in which applications for new nuclear power stations should be considered. It describes the nominations and the Strategic Siting Assessment (SSA) process and includes a list of sites that have been assessed to be potentially suitable for new nuclear power stations, reducing the need for the IPC to consider alternative sites and helping to make the decision making more efficient.

2.4.2 Changes in EN-6 relevant to the transboundary context of the SEA

Following on from consideration of the responses to the consultation some key changes have been made to the Nuclear NPS (EN-6), to make the document more concise, more consistent with the other energy NPSs and better integrated with EN-1.

The first part of the revised Nuclear NPS is similar to the draft version, referring to its role in the planning system, and defining the **infrastructure** making the object of this NPS as being nuclear power generation of a capacity of more than 50 MWe.

Because the power to consent to the construction of power stations greater than 50MW capacity has been executivevely devolved to Scottish Ministers and is also devolved in Northern Ireland, the **geographical area** the NPS covers is England and Wales, none of the listed sites being in Scotland or Northern Ireland.

The Nuclear NPS also states the limits of the **IPC attributions** to granting (or denying) consents for development of new NPPs only for applications for the nominated sites. When applications for other sites (even if situated in England and Wales) are received, the IPC retains only an advisory role, the decision being made by the Secretary of State. Should this situation arise, the Secretary of State would consider whether there was a need to review the SSA criteria and/or conduct a further SSA.

The second part of the revised Nuclear NPS provides direct guidance for the IPC to consider that the **need and urgency for new nuclear power** have been demonstrated (the justification being provided in EN-1). The need for nuclear

power and the timeframe for developing new NPPs are sustained by various recent studies and predictions for the UK energy sector performed in the frame of the Low Carbon Transition Plan, setting out the Government's strategy for moving towards a low carbon economy (requiring electricity supply to be almost entirely decarbonised by 2050). These studies showed that 25 GW of new non-renewable capacity will be needed for meeting the target.

The effects of expanding the UK's nuclear programme in terms of carbon emissions were discussed in the White Paper on Nuclear Power⁴. The White Paper reviewed the evidence on the lifecycle CO₂ emissions from nuclear power stations, (including their construction and the mining and transportation of uranium). It concluded that emissions in the range of 7–22 g/kWh are a prudent estimate⁵. This is in line with research published by the Organisation for Economic Co-operation and Development (OECD) and the International Atomic Energy Agency (IAEA) and is similar to the lifecycle CO₂ emissions from wind power and much less than fossil fuelled plant⁶.

With regard to the **rate of development** necessary for meeting the target, the technical feasibility of constructing NPPs at all selected sites by the end of 2025 is no longer mentioned in the revised Nuclear NPS. The feasibility of such a claim was supported, in the draft Nuclear NPS, in the French experience, where multiple units were constructed at multiple sites at even a faster rate. While it is not impossible to repeat the French experience, the UK context may be expected to be different, making such a rate of construction challenging. The French fleet of reactors, especially those constructed in the eighties, had an outstanding degree of standardization, while in UK two and possibly even more different types of reactors may be expected. Increased number of reactor types and sites, even in a case when generic designs are approved, increase the complexities and the need for resources for the regulatory process. An additional bottleneck may occur if the licence applications for several units are submitted within a short period of time. Furthermore, as the Finnish experience has shown, starting nuclear build after a long suspension can be challenging in terms of resources needed from engineering and analysis, over to manufacturing and construction (and eventually commissioning). New technologies and an increased interest in nuclear plants are already causing worldwide shortage of qualified engineers but also nuclear grade equipment manufacturers and contractors.

Part two of the revised Nuclear NPS includes also the issues previously constituting part 3 of the draft, those being:

⁴ This report does not present an opinion on the White Paper on Nuclear Power. The White Paper has been submitted to discussion and public consultation in UK in 2008 and falls outside the scope of this project.

⁵ Meeting the Energy Challenge: A White Paper on Nuclear Power, January 2008, CM 7296, URN 08/525 <http://www.berr.gov.uk/files/file43006.pdf>, p50

⁶ Sustainable Development Commission, The Role of Nuclear Power in a Low Carbon Economy, Paper 2: Reducing CO₂ Emissions – Nuclear and the Alternatives, March 2006

Consideration by the IPC of alternative sites, where the Government's view is, based on the SSA process, the study commissioned by the Government and the results of the consultation, that there are no alternative sites other than the eight⁷ listed, meeting the requirements of the Nuclear NPS. The number of eight sites remaining potentially suitable, reduced from ten in the draft NPS, is considered very limited, requiring all of them to be listed, to allow sufficient flexibility to meet the urgent need for new nuclear power stations (as justified in Part 3 of EN-1) whilst enabling the IPC to refuse consent should it consider it appropriate to do so (Annex A to the Nuclear NPS provides more details on the Imperative Reasons of Overriding Public Interest).

Regulatory justification, where it is pointed out that in October 2010 the Secretary of State published his decisions that two nuclear reactor designs, Westinghouse's AP1000 and Areva's EPR, are justified. The IPC is further instructed not to delay granting consent in the event that a Regulatory Justification decision is subject to legal challenge. If there are concerns about a challenge to, or the validity of, a Regulatory Justification decision, the IPC should consider whether conditions should be attached to the Development Consent Order to the effect that the order is conditional on the existence of a valid Regulatory Justification decision.

The **relationship between the nuclear regulatory framework and the planning regime** is further clarified as compared to the draft version by a more precise separation of responsibilities. Certain matters are for consideration of the Nuclear Regulators only and the IPC should not consider these matters itself. This would include the Generic Design Assessment (GDA) and the site licensing and environmental permitting processes (including in respect of the management/disposal of radioactive waste, the protection of human health, the permitting of cooling water discharges, etc). The Nuclear Regulators are also responsible for demographics, seismic risk (vibratory ground motion), capable faulting, non-seismic ground conditions, emergency planning, meteorological conditions, and proximity to mining, drilling and other underground operations.

The question of whether effective arrangements will exist to **manage and dispose of the radioactive waste** that will be produced from new nuclear power stations is considered to have been addressed by the Government (in Annex B of the EN-6) and the IPC should not consider this further. The IPC should act on the basis that the relevant licensing and permitting regimes for the management (including interim storage, disposal and transport) of all forms of radioactive waste that will be produced by new nuclear power stations will be properly applied and enforced.

Guidance is also provided to the IPC on good design, consideration of combined heat and power and climate change adaptation.

⁷ Three of the sites (Braystones, Kirksanton and Dungeness) which were nominated were not found to be potentially suitable and are thus not considered feasible alternatives. Two of these three sites (Braystones and Kirksanton) were found to be not suitable against criterion D8 (Areas of amenity, cultural heritage and landscape value) and were also not credible for deployment by the end of 2025, although they were found to be no better or worse than the eight potentially suitable sites in terms of potential adverse effects on European sites. The final site (Dungeness) failed on the grounds of the particular adverse effects to European sites that the Habitats Regulations Assessment found would flow from its development. For details see Section 2.4.3 of this report.

Part three of the revised EN-6 presents the policy and guidance for the IPC when considering the **nuclear specific impacts** and **siting issues** of a development consent application, previously treated in part four of the draft EN-6.

The nuclear specific impacts drawn to the attention of the IPC are:

- flood risk, (including tsunami and storm surge)
- water quality and resources
- coastal change
- biodiversity and geological conservation
- landscape and visual
- socio-economic
- human health and well being.

The specific siting considerations are referred to as “**flag for local consideration**” criteria. “Flag for local consideration” are siting criteria that the Government identified through the SSA consultation in 2008 but which were considered (usually due to the need for detailed site-specific investigations and data) more appropriately to be assessed at the local level. They will form an important consideration at the development consent stage. The fact that they are flagged for local consideration rather than applied through the SSA recognises that assessment at a strategic level cannot adequately address these issues.

As compared to the draft EN-6, in the revised version the flags for local consideration to be considered by the IPC are reduced to:

- proximity to (civil) aircraft movements
- access to transmission networks
- impact on significant infrastructure and resources
- size of site to accommodate construction and decommissioning.

Other Flags for Local Consideration (as set out below) will be considered at the time of the development consent application by the NII:

- demographics;
- seismic risk (vibratory ground motion);
- capable faulting;
- non-seismic ground conditions;
- emergency planning (the NII will work together with the local authority or other Emergency Planning Authority);
- meteorological conditions; and
- proximity to mining, drilling and other underground operations.

As these Flags for Local Consideration are for the NII rather than the IPC to consider, detailed policy is not set out as planning policy in this NPS.

Part four of the EN-6 lists the sites that the Government has determined are potentially suitable for the deployment of new nuclear power stations in England and Wales before the end of 2025:

- Bradwell;
- Hartlepool;
- Heysham;
- Hinkley Point;

- Oldbury;
- Sizewell;
- Sellafield; and
- Wylfa.

The site assessments for each of the listed sites have been moved to Annex C to this NPS and relevant changes as compared to the draft version of the EN-6 are discussed in the following.

2.4.3 Assessment of sites nominated in the SSA process

The assessment criteria have not changed as compared to the draft EN-6, and as such, the selection of criteria which could have an impact on plant safety and security, and thus identify a potential transboundary impact of interest for Austria remains the same, respectively:

- C2 and D5 Proximity to military activities
- D1 Flooding, storm surge and tsunami
- D2 Coastal processes
- D3 Proximity to hazardous facilities and operations
- D4 Proximity to civil aircraft movements
- D9 Size of site to accommodate operation
- D10 Access to suitable sources of cooling.

In the assessment of sites presented in the draft EN-6, various types of impacts which could not be fully assessed at this stage have been identified. In consequence, the ENCO assessment corresponding to the phase I has highlighted certain aspects for each nominated site on which more detailed consideration would be required at a later stage. Those aspects related mainly to the proximity of some of the nominated sites to military activities (criteria C2 and D5) and/or hazardous facilities and operations (criterion D4).

With further clarifications provided in the revised EN-6 after consulting the authorities (such as the Ministry of Defence or the NII) on the extent of the respective hazards (e.g. that there are no munitions left over from military training at Silecroft Range close to the Kirksanton and Sizewell sites) there are at this stage no aspects to be highlighted. However, as also stated in EN-6, detailed assessments will be necessary at the project development phase to demonstrate that the sites can be protected against the risks of potential external hazards identified (but not limited to those) at the SEA level.

It is rather considered necessary that all siting aspects (criteria C2 and D5, D1 to D4, D9 and D10) which could have an impact on plant safety and security and thus identify a potential transboundary impact of interest for Austria be followed up during the Environmental Impact Assessment (EIA) and site licensing phases for the developments on each of the sites.

In addition to the Dungeness site, which did not pass the discretionary criteria on biodiversity and for which there were concerns about flood risk and coastal processes, two other sites, Braystones and Kirksanton have been removed from the list of potentially suitable sites due to lack of firm grid connection agreements of the proponents of those sites that would warrant their deployability by 2025, and also due to foreseen impact of developments on those sites on local landscape, namely the Lake District National Park.

2.4.4 Review findings

The technical examination of the UK's Nuclear National Policy Statement (EN-6) revealed no aspects of concern with regard to the strategic planning or its future implementation. At the current stage of planning for new nuclear energy capacities in UK, details of the future projects and their potential transboundary impacts are not known. However, all reasonable measures are taken at this stage to ensure proper consideration of all aspects which could pose risks on nuclear safety and human health in the following stages of the process. The SEA process conducted is consistent, systematic and comprehensive.

The following aspects of interest for the next stages of deploying new nuclear power stations in UK were noted as result of the technical examination of the Nuclear National Policy Statement (EN-6):

- The SEA procedure does not replace the EIA or any of the regulatory licensing steps required by legislation. The EIA and the normal licensing process will still be followed, ensuring that the new NPPs will meet all relevant national and international safety requirements for new builds.
- The interaction between the regulatory and planning regimes is very well defined in the NPS, providing for clear separation of responsibilities and avoidance of overlaps in the next stage of evaluating applications for development consent. The IPC receives clear guidance on the aspects which it should refer to the relevant regulatory authority (e.g. NII and/or OCNS) for assessing the “nuclear specific impacts”.
One example are the specific effects and consequences of external hazards arisen from climate change: rising sea levels (flood) and temperature (increased temperature of cooling water). These potential impacts of the site/environment on the safety of the NPP cannot be, at this “strategic planning” level of detail, properly assessed, but the IPC should satisfy itself when reviewing the application for development consent that the applicant will consider them and provide for mitigation measures when performing the Environmental Impact Assessment for the project. The specific expertise of the nuclear regulator is to be employed at that stage for informing the IPC's decision at that point.
- The policy on managing high activity level radioactive waste in the long term taking into account the presumption of a once through fuel cycle – interim storage until a geological disposal is available – is at this point consistent with the international approach and state of knowledge. Although the maximum interim storage period considered (100 to 160 years) is longer than predictions of other countries facing the similar challenge, this solution is considered only to assess it's practical viability as a contingency in the event of failure or delay in securing a repository, with regard to safety and security (See also Section 2.7). Research for and development of a geological disposal facility (GDF) are planned for and actively pursued, in accordance with the international practice.
- The application of the SSA criteria is consistent and the identification and evaluation of the possible effects are well described and justified.

2.5 Revised Appraisal of Sustainability for the Nuclear National Policy Statement (EN-6)

Having to fulfil the requirements of the Planning Act of 2008 but also the requirements of the EU Directive 2001/42/EC, the UK Government performed an assessment considering socio-economic effects in the same way as environmental effects as required by the SEA Directive and documented this entire comprehensive assessment into a single report – the Appraisal of Sustainability.

2.5.1 Objective

Similarly with the AoSs for Overarching Energy NPS and for the other four technology specific NPSs, this AoS's objective is to identify, describe and evaluate the environmental, social and economic effects of the proposed energy policy, examining alternative options and weighing up their benefits and drawbacks, risks and uncertainties, and possibly modify this policy in accordance with the appraisal findings, before making the decision of adopting it.

It considers the effects of the proposed policy on nuclear energy development at a national level and the sites to be assessed for their suitability for the deployment of new nuclear power stations by 2025.

2.5.2 Changes in the AoS for EN-6 relevant to the transboundary context of SEA

There are basically no changes in the AoS for EN-6, except for update to take account of the removal of Kirksanton and Braystones from the revised draft Nuclear NPS. This includes an update of the assessment of cumulative effects of sites.

Although it is stated in the Government's Response to Consultation document that for clarity, existing material on the conclusion that there are no transboundary effects from the NPS has been consolidated in one section, this section is in reality a single phrase under the air quality sustainable development topic, stating that the risk of deterioration in air quality due to radioactive releases to air or accidental releases of radioactive emissions is judged to be very small because of the strict regulatory regime in place in the UK, and therefore significant transboundary effects are not considered likely.

2.5.3 Review findings

The AoS has been performed in a very transparent, systematic and comprehensive manner, making use of a combination of methods and sources of information, according to the state-of-the-art knowledge on the subject matter and considering all the EC and national guidance for the evaluation. The comprehensiveness of the appraisal and openness to all interested parties are visible, as well as the fact that the best quality assurance practice was utilised both during appraisal and for the development of all associated documents.

The findings and conclusions of the appraisal are fully reflected in the Nuclear NPS.

2.6 Revised Appraisal of Sustainability for the Nuclear NPS – Site Reports

The Government has considered where new nuclear power stations should be located through the Strategic Siting Assessment process. Sites were nominated by third parties and the Government has assessed them against SSA criteria and taken account of the Appraisal of Sustainability and Habitats Regulations Assessment in reaching a decision about their potential suitability.

Eleven nominated sites passed the exclusionary criteria and were subject to the discretionary criteria: Bradwell, Braystones, Dungeness, Hartlepool, Heysham, Hinkley Point, Kirksanton, Oldbury, Sellafield, Sizewell, and Wylfa. These eleven sites also underwent appraisal through the AoS process.

The Government also commissioned an Alternative Sites Study to ensure that potential alternative sites were given due consideration. The study drew on a number of information sources to identify sites that might be “worthy of further consideration” by the Government to determine whether these sites were suitable for the deployment of new nuclear power stations by 2025. Three sites were identified through this process: Druridge Bay, Kingsnorth, and Owston Ferry. A site AoS and HRA was undertaken for each of these sites.

2.6.1 Objective

A site level AoS has been undertaken for each of the nominated sites. These appraisals’ objective was to identify potential impacts and likely effects of a generic design of a new nuclear power station. The appraisals have been undertaken at a strategic level and were intended only as a high level assessment of the suitability of the sites from an environmental and sustainability perspective.

2.6.2 Changes in the AoS for EN-6 – Site Reports relevant to the transboundary context of the SEA

Each of the fourteen site reports present a site characterisation in terms of the 11 sustainable development themes (the 12th, radioactive waste, is considered in the “Appraisal of Sustainability: Radioactive and Hazardous Waste”), followed by the appraisal against each of these themes:

● Air Quality	● Biodiversity and Ecosystems
● Climate Change	● Communities: Population, Employment and Viability
● Communities: Supporting Infrastructure	● Human Health and Well-Being
● Cultural Heritage	● Landscape
● Soils, Geology and Land Use	● Water Quality and Resources
● Flood Risk	●

The main outcomes of the revised evaluations for the different NPP life stages: construction, operation, decommissioning, have not changed compared to the draft version of the AoS. These are presented in tables 3–5.

Potential transboundary impacts have been identified when assessing the sites against two of the SD themes: air quality and human health and well-being. These are similar for all the sites, both the ones still on and the ones eliminated from the list of EN-6 and can be resumed as:

Air Quality	There is potential for release of radioactive emissions, planned and accidental, during the operation and decommissioning of a new nuclear power station and interim radioactive waste storage on the site. The potential effects of release of radiation are discussed in the main AoS report, however detailed modelling will be required and considered as part of the HSE and Environmental Regulators risk assessment as carried out for the consenting process.
Human Health and Well-Being	There is a potential for any radioactive material discharged from the proposed site to travel both nationally and internationally (for example to countries on the European continent). However, current radiological monitoring of the nuclear power station that has been on the site since 1962, suggests that the risk to the public is extremely low with total dosage from all sources (including direct radiation) currently (2007–2008) estimated as approximately 0,5 to 38 % (varying with the site) of the limit specified in the Ionising Radiations Regulations 1999. With regard to transboundary effects, there is a requirement under Article 37 of the Euratom Treaty for the United Kingdom, before plant authorisation can be granted, to submit its assessment of the likely effects to a panel of European experts who decide whether contamination of the water, soil or airspace of another Member State is likely to take place.

2.6.3 Review findings

In undertaking the AoS of each nominated site, a wide range of information was considered including the scoping report, the Environmental Study, the Update Report, information from other Government departments, the statutory consultees and regulators, information from the nominators and other published reports. If additional local information was available, for example, an EIA scoping report or a locally relevant Strategic Flood Risk Assessment, it has been used to inform the appraisal where appropriate.

The site AoS reports identified likely strategically significant effects at the national or international levels and likely locally significant effects at the local or regional level.

The potential effects of new NPPs are different for different phases of NPP operation construction, operation and decommissioning, however almost all of them are of local nature.

The AoS has identified that the potential for transboundary effects from any accidental release of radioactive emissions from the NPP site has a potentially strategic effect on sustainability. However, it is noted that there is a very low risk of such an event occurring. Prevention measures include existing risk assessment and regulatory processes. The HSE/NII will need to be satisfied that the

radiological and other risks to the public associated with accidental releases of radioactive substances are as low as reasonably practicable and within the relevant radiological risk limit.

As for the climate change, the impact of new nuclear capacity is believed positive by the UK Government because the operation of new NPPs will lead to the reduction of greenhouse gases emission to the atmosphere and will help UK to achieve its low carbon emission targets.

Potential environmental and sustainability effects considered to be of a wider strategic significance were also identified, including preliminary consideration of how the potential adverse effects may be mitigated and possible suggestions for mitigation to be considered at the project level.

At this strategic level of appraisal, there are some uncertainties on the significance of some impacts and the effectiveness of suggested mitigation measures. It is recommended for the developers and the regulators to conduct further detailed studies at the project level stage.

The AoS has been performed in a very transparent, systematic and comprehensive manner, making use of a combination of methods and sources of information, according to the state-of-the-art knowledge on the subject matter and considering all the EC and national guidance for the evaluation. The comprehensiveness of the appraisal and openness to all interested parties are visible, as well as the fact that the best quality assurance practice was utilised both during appraisal and for the development of all associated documents.

The findings and conclusions of the appraisals are fully reflected in the Nuclear NPS.

Table 3: Summary of the Significance of Potential Strategic Sustainability Effects for construction.

Sustainable Development Theme	Bradwell	Braystones	Dungeness	Hartlepool	Heysham	Hinkley Point	Kirksanton	Oldbury	Sellafield	Sizewell	Wylfa	Druridge Bay	Kingsnorth	Owston Ferry
Air Quality	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biodiversity and Ecosystems	--?	--?	--?	--?	--?	-?	--?	--?	--?	--?	--?	--?	--?	--?
Climate Change	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Communities: population, employment and viability	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?
Communities: Supporting Infrastructure	-	-?	-?	-?	-	-?	-?	-?	-?	-	-?	-	-	-
Human Health and Well-Being	+	+	+	+	+	+	+	+	+	+	+	+	+	+?
Cultural Heritage	--?	-	-	-?	-	-	-	-	-	-	-	-	-	-
Landscape	-	--	-	-	-	-	--	-	--	--	-	--	-	-
Soils, Geology, Land Use	-?	-	-?	-?	-?	-?	-?	-	-	-	-?	-	-?	+?
Water Quality and Resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flood Risk	-	-	-	-	-	-	-	-	-	-	-	-	-	--

Table 4: Summary of the Significance of Potential Strategic Sustainability Effects for operation.

Sustainable Development Theme	Bradwell	Braystones	Dungeness	Hartlepool	Heysham	Hinkley Point	Kirksanton	Oldbury	Sellafield	Sizewell	Wylfa	Druridge Bay	Kingsnorth	Owston Ferry
Air Quality	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?
Biodiversity and Ecosystems	--?	--?	--?	--?	--?	-?	--?	--?	--?	--?	--?	--?	--	--?
Climate Change	++	++	++	++	++	++	+?	++	++	++	++	++	++	++
Communities: population, employment and viability	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?	+?
Communities: Supporting Infrastructure	-	-?	-?	-?	-	-?	-?	-?	-?	-	-?	-	-	-
Human Health and Well-Being	+	+	+	+	+	+	+	+	+	+	+	+	+	+?
Cultural Heritage	--?	-	-	-?	-	-	-	-	-	-	-	-	-	-
Landscape	-	--	-	-	-	-	--	-	--	--	-	--	-	-
Soils, Geology, Land Use	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	0?	-?
Water Quality and Resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flood Risk	-	-	-	-	-	-	-	-	-	-	-	-	-	--

Table 5: Summary of the Significance of Potential Strategic Sustainability Effects for decommissioning.

Sustainable Development Theme	Bradwell	Braystones	Dungeness	Hartlepool	Heysham	Hinkley Point	Kirksanton	Oldbury	Sellafield	Sizewell	Wylfa	Druridge Bay	Kingsnorth	Owston Ferry
Air Quality	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?
Biodiversity and Ecosystems	--?	--?	--?	--?	--?	-?	--?	--?	--?	--?	--?	--?	--	0
Climate Change	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?
Communities: population, employment and viability	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communities: Supporting Infrastructure	-	-?	-?	-?	-	-?	-?	-?	-?	-	-?	-	-	-
Human Health and Well-Being	+	+	+	+	+	+	+	+	+	+	+	+	+	+?
Cultural Heritage	+?	-	-	-?	-	-	-	-	-	-	-	-	-	-
Landscape	0?	0?	0?	0?	0?	0?	0?	0?	0?	0?	-	0?	0?	0?
Soils, Geology, Land Use	-?	-	-?	-?	-?	-?	-?	-?	-	-?	-?	-	-?	-?
Water Quality and Resources	-?	-	-?	-?	-	-	-	-	-	-	-	-?	-?	-?
Flood Risk	-	-	-	-	-	-	-	-	-	-	-	-	-	--

Key: Significance and Categories of Potential Strategic Effects	
++	Development actively encouraged as it would resolve an existing sustainability problem; effect considered to be of regional/national/international significance
+	No sustainability constraints and development acceptable; effect considered to be of regional/ national/international significance
0	Neutral effect
-	Potential sustainability issues, mitigation and/or negotiation possible; effect considered to be of regional/national/international significance
--	Problematical because of known sustainability issues; mitigation or negotiation difficult and/or expensive; effect considered to be of regional/national/ international significance
Uncertainty	
?	Where the significance of an effect is particularly uncertain, for example because insufficient information is available at the plan stage to fully appraise the effects of the development or the potential for successful mitigation, the significance category is qualified by the addition of '?'

2.7 Management and Disposal of Waste from New Nuclear Power Stations

2.7.1 Objective

The basis on which the UK's Government conclusion (Section 2.11 of the revised Nuclear NPS) on the arrangements for the management and disposal of the waste from new nuclear power stations has been reached is set out in Annex B of the Revised draft EN-6. That Annex considers the management and disposal of "higher activity" wastes in particular, in terms of technical achievability of a geological disposal, for which is presenting the current progress of research and technology in UK but also worldwide.

Before reaching its conclusion, the Government has reviewed, besides the information in the above mentioned Annex B, a range of evidence on the arrangements for the management and disposal of the waste from new nuclear power stations. This evidence is summarized in the paper "The arrangements for the management and disposal of waste from new nuclear power stations: a summary of evidence", which has been published as additional background information in the first phase of the consultation.

2.7.2 Changes in the policy for radioactive waste management relevant to the transboundary context of the SEA

The draft Nuclear NPS set out the preliminary view that the UK Government is satisfied that effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations.

Having considered the responses to question 19 of the consultation, "Do you agree with the Government's preliminary conclusion that effective arrangements will exist to manage and dispose of the waste that will be produced by new nuclear power stations in the UK?", the Government has concluded that it is satisfied with the preliminary conclusion set out in the draft NPS. Therefore the revised draft Nuclear NPS confirms that the Government is satisfied that effective arrangements will exist to manage and dispose of the waste that will be produced by new nuclear power stations in the UK.

In light of the responses to this consultation there were three points on which the wording in the draft Nuclear NPS was revised. These changes were intended to:

- demonstrate the Government's confidence that geological disposal will be implemented;
- clarify the Government's expectations in relation to the likely duration of the on-site storage of higher activity waste; and
- clarify the role of the IPC in relation to arrangements for the management and disposal of wastes from new nuclear power stations.

With regard to the current level of technical knowledge the Government considers that the **scientific progress made with respect to geological disposal** is such that it is feasible and is the safest form of long-term waste management. The Government recognises that further research is required into radioactive waste management systems to refine storage and disposal concepts. The

statement of OECD/NEA of June 2008⁸ and Disposability Reports prepared by the UK's Nuclear Decommissioning Authority (NDA) for Areva⁹ and Westinghouse¹⁰ are called in as fresh evidence to support this conclusion.

However, the Government recognises that the regulators will need to be satisfied on this issue and notes that they have yet to provide a written report on the Disposability Assessments. The Government will take the regulators' comments into account when they publish these assessments.

The Government has further looked at the Canadian and Swiss proposals as additional examples of how geological disposal for higher activity wastes is being taken forward.

The Canadian Nuclear Waste Management Organisation (NWMO) spent around three years, from 2003 to 2005, looking at ways to take forward the management of Canada's spent nuclear fuel. In 2005 the NWMO recommended to the Government of Canada an Adaptive Phased Management approach for managing spent nuclear fuel. The recommendation is for centralized containment and isolation of the used fuel in a deep geological repository in a suitable rock formation, such as the crystalline rock of the Canadian Shield or Ordovician sedimentary rock. In June 2007, the Government of Canada selected the NWMO's recommendation for Adaptive Phased Management (APM).

In Switzerland, following around 30 years of work by Nagra (The Swiss National Cooperative for the Disposal of Radioactive Waste) to produce scientific evidence that safe repositories could be developed to dispose of higher activity radioactive wastes, the Swiss Federal Government accepted, in June 2006, that Nagra had successfully shown through "Project Entsorgungsnachweis" that disposal of HLW in Switzerland is technically feasible. Opalinus Clay has been confirmed as the preferred host rock option with the crystalline basement of northern Switzerland and the Lower Freshwater Molasse being reserve options.

The Government is aware of one operating facility for higher activity radioactive wastes which is the Waste Isolation Pilot Plant (WIPP) located at Carlsbad, New Mexico, USA. WIPP has operated since 1998; the facility is for trans-uranic wastes, some of which are broadly equivalent to long-lived ILW. The WIPP disposal facility is located in a deep salt bed 2150 ft beneath the Chihuahuan Desert.

⁸ OECD Nuclear Energy Agency's Moving Forward with Geological Disposal of Radioactive Waste: An NEA RWMC Collective Statement, June 2008, <http://www.nea.fr/rwm/docs/2008/rwm2008-5-rev2.pdf>

⁹ NDA. *Generic Design Assessment: Summary of Disposability Assessment for Wastes and Spent Fuel arising from Operation of the UK EPR*. October 2009, <http://www.nda.gov.uk/documents/upload/TN-17548-Generic-Design-Assessment-Summary-of-Disposability-Assessment-for-Wastes-and-Spent-Fuel-arising-from-Operation-of-the-EPWR.pdf>

¹⁰ NDA. *Generic Design Assessment: Summary of Disposability Assessment for Wastes and Spent Fuel arising from Operation of the Westinghouse AP1000*. October 2009. <http://www.nda.gov.uk/documents/upload/TN-17548-Generic-Design-Assessment-Summary-of-DA-for-Wastes-and-SF-arising-from-Operation-of-APPWR-October-2009.pdf>

With respect to the **on-site storage of higher activity waste**, on the assumption that spent fuel will be stored on-site until it can be disposed of, the key factor in determining the duration of on-site storage is the availability of a GDF. The NDA's current indicative timetable anticipates a GDF being available to take spent fuel from new nuclear power stations from around 2130. The Government will expect operators to ensure their waste is disposable when a GDF is anticipated to be available to take the waste.

The Government recognises that interim storage on-site might be required beyond 2130, particularly in the event that a GDF is not available to take the waste. However there are some factors which might cause this interim storage period to be significantly shorter, for example it is not necessarily the case that the whole interim storage period for the spent fuel produced by a new nuclear power station will be on-site. The Government does not wish to preclude alternative arrangements, for example a central storage facility, if a site can be identified and the necessary regulatory and planning permissions obtained.

Based on domestic and international experience, the Government is satisfied that interim storage facilities are and will be safe and effective, and will remain so for as long as is necessary, for example through the building of new stores and periodic refurbishment of stores if needed, until a geological disposal facility is available. In the event that geological disposal facilities are not available to accept radioactive waste in accordance with the indicative timetable set out above, the Government is satisfied that interim storage will provide an extendable, safe and secure means of containing waste for as long as it takes to site and construct a geological disposal facility.

The **role of the IPC** is further clarified in the revised Nuclear NPS, which states that the IPC should consider that effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations, and should act on the basis that the relevant licensing and permitting regimes in place for the management (including interim storage, disposal and transport) of all forms of radioactive waste that will be produced by new nuclear power stations will be properly applied and enforced. If an application for development consent includes proposals for waste management facilities that either form part of the development of the nationally significant energy infrastructure projects or constitute "associated development" for the purposes of the Planning Act 2008, the IPC should consider the application in accordance with the policy set out in EN-1, this NPS and the provisions of the Planning Act 2008.

2.7.3 Review findings

The Revised draft Nuclear National Policy Statement sets out the preliminary view that the UK Government is satisfied that effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations.

Appraisal on arrangements for the management and disposal of waste from new nuclear power stations was done for the Nuclear NPS and for all nominated sites and covers solid radioactive waste, non-radioactive hazardous waste, and liquid and gaseous radioactive discharges.

Based on scientific consensus and international experience, it is reasonable to conclude that, despite some differences in characteristics, waste and spent fuel from new nuclear build would not raise such different technical issues compared with nuclear waste from legacy programmes as to require a different technical solution.

Although the progress of research and work on constructing a GDF worldwide is taken into consideration¹¹, there is not, up to date, a Geological Disposal Facility in operation anywhere in the world. The feasibility of this technology is yet to be ascertained from the practical point of view of realisation and operation, as well as its timely availability to accommodate the waste generated by the new NPPs in UK.

¹¹ Moving Forward with Geological Disposal of Radioactive Waste, A Collective Statement by the NEA Radioactive Waste Management Committee (RWMC), OECD 2008, NEA No. 6433

3 CONCLUSION OF THE REVIEW

In the light of the review of revised NPSs and their support documentation, it is concluded that there are no changes of the aspects addressing the potential transboundary risks from the Austrian point of view. As such, no changes of the answers to consultation questions provided in the previous expert opinion are mandated.

As the results of the review mandate no changes of the expert opinion provided in phase I of the consultation or in the responses to the phase I consultation questions, the executive summary of this review report represents an update of the initial one, reflecting the current stage of the consultation process and taking into account the change in the list of sites considered potentially suitable for development of new nuclear power plants.

The proposed answers to the phase I consultation questions remain the same:

Q 16 Do you think that the Government should formally approve ('designate') the draft Nuclear National Policy Statement?

A 16 We believe that, as the UK Government is supportive of nuclear power, the development while having an approved NPS, is superior to not having a NPS.

In the light of the analysis and appraisals undertaken, it is reasonable to conclude that the having a thoroughly discussed and finally approved Nuclear NPS will allow for a much clearer and transparent framework for the development of nuclear energy than it would be the case without the NPS¹².

Q 17 Does the draft Nuclear National Policy Statement provide the Infrastructure Planning Commission with the information it needs to reach a decision on whether or not to grant development consent?

A 17 Yes, the information provided in the draft Nuclear National Policy Statement for the consideration of the Infrastructure Planning Commission constitutes adequate guidance for making an informed and correct decision.

After reviewing the Nuclear NPS and the associated studies and evaluations, it is reasonable to conclude that the findings of these evaluations have been adequately reflected in the guidance to the IPC, allowing for all the relevant considerations to be taken into account in decision making.

¹² It should be noted that the Austrian government, as established in the "Programme of the Austrian Federal Government for the XXIV Legislative Period", "remains convinced that nuclear energy represents neither a sustainable form of energy supply nor a viable way of combating climate change"

Q 18 Does the draft Nuclear National Policy Statement provide suitable direction to the Infrastructure Planning Commission on the need and urgency for new nuclear power stations?

A 18 Yes, the draft Nuclear National Policy Statement provides the Infrastructure Planning Commission with suitable direction to consider both the aspects of need and urgency for new nuclear power stations.

Although the Nuclear NPS guides the IPC not to seek further assurance for the need of new nuclear energy developments, as this need is already established by the draft Nuclear NPS, and guides the IPC towards avoiding unnecessary delays in granting development consents due to the urgency for new nuclear energy developments, there is satisfactory evidence that the safety and security of the new developments will not be overridden, and due consideration will be given to possible significant transboundary effects prior to granting development consents.

Q 19 Do you agree with the Government's preliminary conclusion that effective arrangements will exist to manage and dispose of the waste that will be produced by new nuclear power stations in the UK?

A 19 In our opinion the question of management and disposal of the waste that will be produced by the new nuclear power stations in UK cannot be considered closed.

After examining the evidence presented on the current state and pursued course of action it is reasonable to conclude that the proposed arrangements for management and disposal of radioactive waste (HLW and ILW in particular) that will be produced by new nuclear power stations in UK are not too different to the solutions applied to the current UK NPP fleet.

Although the progress of research and work on constructing a GDF worldwide is taken into consideration, there is not, up to date, a GDF in operation anywhere in the world. The feasibility of the technological solution is yet to be ascertained from the practical point of view of realisation and operation, as well as its timely availability to accommodate the waste generated by the new NPPs in UK.

Q 20 Does the draft Nuclear National Policy Statement appropriately cover the impacts of new nuclear power stations and potential options to mitigate those impacts?

A 20 Yes, the draft Nuclear National Policy Statement appropriately covers the impacts of new nuclear power stations and potential options to mitigate those impacts, at the strategic level of assessment.

In the light of the reviewed evidence it can be concluded that the impact assessments performed are comprehensive and systematic, and the results of these assessments are properly reflected in the draft Nuclear NPS. A certain extent of uncertainty at this strategic level cannot be eliminated. A range of measures are taken at this stage to ensure that both the impacts and the potential mitigation options will be more thoroughly studied at the project level.

Q 21 Do you agree with the Government’s preliminary conclusion on the potential suitability of sites nominated into the Strategic Siting Assessment, as set out below? You can respond in general terms on the assessment as a whole, or against one or more specific sites.

a) General comments

The Government considers the following sites to be potentially suitable for the deployment of new nuclear power stations by the end of 2025:

- b) Bradwell**
- c) Braystones**
- d) Hartlepool**
- e) Heysham**
- f) Hinkley Point**
- g) Kirksanton**
- h) Oldbury**
- i) Sellafield**
- j) Sizewell**
- k) Wylfa**

The Government does not consider the following site to be potentially suitable for the deployment of new nuclear power stations by the end of 2025:

l) Dungeness

A 21 *The UK Government’s preliminary conclusion on the potential suitability of ten of the nominated sites and the decision to exclude the Dungeness site are, to a certain extent, satisfactorily justified.*

The appraisals reviewed have shown that there are no significant differences between the eleven nominated sites with regard to transboundary concerns. The basis for excluding the Dungeness site are not related to transboundary concerns. The transboundary effects, assessed as unlikely at this stage, will still have to be more thoroughly considered in the EIA of each of the sites. There is reasonable assurance that the effects of the sites on the safety and security of the new NPPs will be given due consideration in the following stages: application for development consent, site licensing and construction licensing, under the relevant regulatory regimes. Public consultations will be held at these stages also.

While it is believed that the possibility for transboundary effects of accidental radiation releases to be felt in Austria is remote, at this point of the process it cannot be completely excluded.

Q 22 Do you agree with the Government’s preliminary conclusion that the three sites identified in the Alternative Sites Study, as listed below, are not potentially suitable for the deployment of new nuclear power stations by the end of 2025? You can respond in general terms on the sites identified in the Study as a whole, or against one or more specific sites.

- a) General comments
 b) Druridge Bay
 c) Kingsnorth
 d) Owston Ferry
-

A 22 The exclusion from further consideration of the three sites identified in the Alternative Sites Study on the basis of their unsuitability for deployment by the end of 2025 does not eliminate the concerns for potential transboundary effects.

Even if not included in the Nuclear NPS, applications for development consent for these sites will still be possible, with the decision making entrusted to the Secretary of State at the IPC advice.

The appraisals reviewed have shown that the transboundary concerns were not among the reasons for excluding these three alternative sites from further consideration for development. The transboundary effects, assessed as unlikely at this stage, will still have to be more thoroughly considered in the EIA of each of the sites, if applications for development on these sites are received. There is reasonable assurance that the effects of the sites on the safety and security of the new NPPs will be given due consideration in the following stages: application for development consent, site licensing and construction licensing, under the relevant regulatory regimes. Public consultations will be held at these stages also.

While it is believed that the possibility for transboundary effects of accidental radiation releases to be felt in Austria is remote, at this point of the process it cannot be completely excluded.

Q 23 Do you agree with the findings from the Appraisal of Sustainability reports for the draft Nuclear National Policy Statement?

A 23 Yes, the findings from the Appraisal of Sustainability reports for the draft Nuclear National Policy Statement are well substantiated.

After reviewing the Appraisal of Sustainability reports (in terms of methodology, comprehensiveness, correctness and quality assurance) it is reasonable to conclude that their findings are well substantiated. Further consideration to those findings is to be given at the project level.

Q 24 Do you think that any findings from the Appraisal of Sustainability reports for the draft Nuclear National Policy Statement have not been taken account of properly in the draft Nuclear National Policy Statement?

A 24 No. We believe that all the findings from the Appraisals of Sustainability reports for the draft Nuclear National Policy Statement have been properly taken into account in the draft Nuclear NPS.

After reviewing the way in which the findings from the AoS have been taken into account in the draft Nuclear NPS, including the justification provided in each case, it can be concluded that all the findings were properly considered. In addition, a number of them for which the applicability at a later stage could not be now determined, were recommended for further investigation at project level.

Q 26 Do you have any comments on any aspect of the draft Nuclear National Policy Statement or its associated documents not covered by the previous questions?

A 26 No, the previous questions adequately covered the aspects of our interest for this consultation.

4 ABBREVIATIONS

AoS	Appraisal of Sustainability
ASC.....	Advanced Supercritical Coal plant
BAT	Best Available Technology
BERR.....	Department for Business, Enterprise and Regulatory Reform
CCGT.....	Combined Cycle Gas Turbine
CCS	Carbon Capture and Storage
CoRWM	Committee on Radioactive Waste Management
DECC.....	Department for Energy and Climate Change
EC	European Commission
EIA	Environmental Impact Assessment
FDP.....	Funded Decommissioning Programme
GDA	Generic Design Assessment
GDF	Geological Disposal Facility
HRA	Habitats Regulations Assessment
HSE.....	Health and Safety Executive
IAEA.....	International Atomic Energy Agency
ILW	Intermediate Level Waste
IPC.....	Infrastructure Planning Commission
LLW	Low Level Waste
LLWR.....	Low Level Waste Repository
LWR.....	Light Water Reactor
MoD	Ministry of Defence
NDA	Nuclear Decommissioning Authority
NII	Nuclear Installations Inspectorate
NPP.....	Nuclear Power Plant
NPS.....	National Policy Statement
OCNS.....	Office for Civil Nuclear Security
OECD.....	Organisation for Economic Co-operation and Development
OSPAR	Oslo-Paris Convention for the Protection of the Marine Environment of the North East Atlantic
RWMD	Radioactive Waste Management Department
SD	Sustainable Development
SEA.....	Strategic Environmental Assessment
SSA.....	Strategic Site Assessment
VLLW	Very Low Level Waste

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